Industry Intellectual Capital Disclosure on the Ghana Stock Exchange

Nicholas Asare*, Joseph M Onumah** and James K Otieku***

This paper undertakes a comparative analysis of sector disclosure of Intellectual Capital (IC) in corporate annual reports of listed companies in Ghana. The study examines the Intellectual Capital Disclosure (ICD) of 25 listed companies on the Ghana Stock Exchange (GSE) across industry sectors over a five-year period (2006-2010) through content analysis of their corporate annual reports. The study reveals that there are marginal increases in the overall average ICD levels over the five-year period for most of the industries/sectors. The banking, finance and insurance sector tend to disclose more IC in annual reports than any other industry, as there are significant differences in ICD levels of the industries on the GSE. This largely indicates that industry affiliation does affect the ICD of listed firms but not necessarily in terms of the knowledge-intensive nature of the industry.

Introduction

It is apparent that the challenge with the traditional financial accounting framework is the failure to publicize the most important assets and resources of today's business (Vergauwen *et al.,* 2007). What has become abundantly clear in the Intellectual Capital (IC) reporting arguments so far is that intangible assets are driving value creation in today's global economy (Dumay and Garanina, 2013). There is a growing discussion on IC and the knowledge economy more generally within the accounting literature (McPhail, 2009). This has set the tone for the discussion of IC to be situated in the general discussion of transparency in various firms and industries.

In the last decade, transparency has become a necessary mantra for both publicly listed companies and government institutions and that IC reporting is often related to this goal of enhancing the transparency of business and public institutions (Nielsen and Madsen, 2009). Bhasin (2011) asserted that market participants, practitioners and regulators alike argue that there is an important need for greater investigation and understanding of Intellectual Capital Disclosure (ICD) or Intellectual Capital Reporting (ICR) as the usefulness of financial information in explaining firm profitability continues to deteriorate. The disclosure of information by companies has in recent years experienced increased attention due to factors such as globalization and integration of capital markets, increased mobility of monetary and actual goods, growing

*   Lecturer, Accounting Department, Methodist University College, Dansoman, Accra, Ghana; and is the corresponding author. E-mail: nasare@mucg.edu.gh

**   Senior Lecturer, Accounting Department, University of Ghana, Legon, Accra, Ghana. E-mail: jmonumah@ug.ed.gh

*** Senior Lecturer, Accounting Department, University of Ghana, Legon, Accra, Ghana. E-mail: jkotieku@ug.ed.gh

competition and new dominant industries as well as the development within IT and the Internet (Bukh and Johanson, 2003).

IC is generally described as intangible assets which include technology, customer information, brand name, reputation and corporate culture that are invaluable to a firm's competitive power (Low and Kalafut, 2002). A look at definitions of IC in the literature tends to establish the fact that IC's value to value creation in contemporary times is unprecedented and places a company in a certain limelight. It is implied from prior research that companies may be motivated to make additional voluntary reporting on these IC assets either within the annual reports, or through a separate disclosure medium because such disclosure would have a positive impact on their reputation and would attract more investors to buy their stocks (Saleh *et al.,* 2010).

In the mid-1990s, a number of OECD (Organization for Economic Cooperation and Development) conferences were held to encourage attention to accounting for intangibles (Liyanage *et al.*, 2002). Since then, a number of studies have been undertaken to investigate the disclosure of IC in corporate annual reports. However, barriers to disclosure exist such as the cost of obtaining information on intangibles, or the perceived loss of competitive advantage with disclosure (Vergauwen *et al.*, 2007). So, despite growing interest and demand for IC information, prior research till date suggests a persistent and significant variation, both in the quantity and quality of information reported by firms on this pivotal resource (Bhasin, 2011). These arguments normally leave one to marvel the extent to which barriers to disclosures affect ICD in the annual reports whether in different jurisdictions.

ICD in general tends to be voluntary and most of the times non-quantitative (Guthrie *et al.*, 2006; and Singh and Kansal, 2011). This makes such disclosures likely to be unveiled in other sections of the corporate annual reports, other than the conventional financial statements. But then, is the disclosure of IC in annual reports relatively different in particular industries? The study tends to find out the industry with larger disclosure of IC in corporate annual reports vis-a-vis the components that they tend to disclose more. This study gives an in-depth analysis with specific references to the industries and IC categories of ICD in annual reports. This lays bare what actually pertains to each industry on the GSE as studies from Sub-Saharan Africa as a geographic region in this area remain relatively scarce.

Literature Review

Academic work on IC frequently incorporates a critique of the traditional model of accounting, which is castigated for its failure to encompass more than a small proportion of a very broad range of intangible assets (Gowthorpe, 2009). The accounting literature thus to some extent has narrowly focused on the inability of traditional accounting concepts and methods to deal with the intangible nature of contemporary capitalism and on suggestions that these deficiencies are often reflected in huge discrepancies between book and market values (Seetharaman *et al.*, 2002). Given that financial reports fail to reflect a wide range of value-creating intangible assets, occasioning a rise to increasing information asymmetry between firms and users, and thus creating inefficiencies in the resource allocation process within capital markets

(Bhasin, 2011), research works have tried to fill the gap by perusing the corporate annual reports of various firms across various industries in many countries. This has partly been done with particular emphasis on IC as a pivot for value creation in contemporary businesses. Accordingly, academic interest in IC has grown rapidly, and there is a very significant growth in the number of academic journal articles published on various aspects of the topic (Gowthorpe, 2009). The work on IC reporting escalated in many countries in the 1990s, with the pioneering work by Sveiby in Sweden, Lev in the USA, Mouritsen in Denmark, Roos in the UK, Bontis in Canada, Andriessen in The Netherlands and many more (Edvinsson, 2013).

Knowledge being the new engine of corporate development has become one of the great clichés of recent years (Muhammad and Ismail, 2009). The various forms of ICD provide valuable information for investors as they help to reduce the uncertainty about future prospects and facilitate a more precise valuation of the corporation (Bhasin, 2011). Prior research also finds that additional disclosure would reduce analyst forecast errors and the cost of equity, as well as increase the capital market liquidity (Saleh *et al.,* 2010). ICD has been seen as a relative chunk of such additional disclosures in annual reports. Perhaps on the basis of improving or providing additional disclosures, many models have been developed. The Skandia Navigator model was the basis for the first official publication of a corporate IC annual report in the world in 1994 (Edvinsson, 2013). Skandia is considered to be the first large company that started modelling and measuring its knowledge assets. It is the first company to issue an IC supplement in addition to its traditional financial report to shareholders in 1994 (Vafaei *et al.*, 2011). This, in fact, gave impetus for more models to be developed subsequently. Among the most outstanding models are invisible balance sheet, the intangible asset monitor, the balanced scorecard, the value explorer, intellectual capital index and intellectual capital audit (Hervas-Oliver *et al.*, 2011). The technology broker is also a model in this area (Abhayawansa and Abeysekera, 2008).

It is noteworthy that there is no unique model of IC (Hervas-Oliver *et al.*, 2011). This perhaps shows how disparaging the practice of measuring and reporting IC is across the world. Companies and individuals are using their own ways and means to identify, measure and report IC. Dumay (2009), in his study, "IC Measurement: A Critical Approach", offered an insight that the traditional frameworks in use need to be transformed. He further stated in defence of his position that this is because there is the inability of these contemporary measures to reduce the ambiguity between the interaction of intangible resources and value creation at specific points in time. This perhaps could be addressed by managing the organization's IC.

Invariably, the current practice has been at the mercy of corporate management over the amount and type of IC information to be reported; capital market participants rely on management to develop suitable mechanisms to measure IC, as existing management accounting techniques are highly outdated for the new economic era (Zhan *et al.*, 2007). In that regard, the variety of approaches and models as enumerated in this review has been advanced to measure and report IC (Vafaei *et al.*, 2011). Hervas-Oliver *et al.* (2011) explain that a majority of the models of measurement of IC have served as a support for companies in the complex task of measuring their intangible assets with the purpose, primarily, of informing third parties about the value of these assets.

It is therefore not out of place that an aspect of the debate in the literature concerns the appropriate model to adopt in standards/regulations and the subsequent subjectivity and relativity with which accounting practitioners will practise ICD. There is friction between ICD and accounting regulation as applied these days, thereby signalling a need for a "revolution in accounting regulations" in order to ensure the fair presentation of the economic state of the firm (Vergauwen and Alem, 2005).

So, one of the key questions IC researchers have continued to grapple with is: Why is a company's market value greater than its book value? IC is the answer (Haji and Mubaraq, 2012). Edvinsson and Malone (1997) earlier argued that the worth of a company lies not in bricks and mortar, but in intangible kind of asset, that is IC, which is hidden behind the company's book values. This hidden IC has attracted the attention and efforts of many researchers and has elicited numerous intriguing results. Edvinsson's (2013) reflections of the past and vision for the future of IC research reported that IC is still for many an invisible fuzzy dimension, or mainly a measuring and accounting issue; and that for others, it is thought of as a more and more strategic ecosystem for sustainable value creation.

Guthrie *et al.* (2006) investigated the voluntary reporting of IC by listed companies in Hong Kong and Australia and concluded that the levels of voluntary ICD are found to be low and in qualitative rather than quantitative form. Singh and Kansal (2011) also examined inter-firm ICD and its variations in India and came to the conclusion that although the study involved companies of knowledge-led industry, ICD was low, narrative and varying significantly among companies. A study by Bezhani (2010) to examine the amount and nature of the voluntary ICD in UK found that the amount of IC disclosed in annual reports was low.

These few studies out of the lot with similar results suggest that ICD has been low in many countries and different sectors of economies in spite of the incessant calls in the literature that the conventional financial reporting does not adequately depict the value of the firm. It can probably be speculated that practitioners are yet to come to terms that by disclosing IC information, their individual companies can publicly provide evidence about their true values and their wealth creation capabilities, which in turn may enhance the company's reputation (Brüggen *et al.*, 2009). Jihene's (2013) finding confirms the pivotal role of IC in the valuation of firms listed on the Tunisian Stock Exchange. There are characteristics relative to market competition, the type of private information, and the threat of entry of new firms into the market providing incentives for companies belonging to the same industry to disclose more information than firms in another industry (Oliveira *et al.*, 2006).

Hence, this study pioneers and provides some foundation for future research on the ICD practices of the companies and more specifically industries on the GSE in Ghana. There is advocacy for the need to continue to dissect into issues of IC reporting, especially to adduce evidence of the practices from Sub-Saharan African countries to probably affect future research and directions. It is worth, therefore, spending a little time on exploring the current state of the accounting model and the potential for absorbing IC within it (Gowthorpe, 2009) via the corporate annual reports.

Hypothesis Development

Studies by Bukh *et al.* (2005), Bozzolan *et al.* (2006), Oliveira *et al.* (2006) and Brüggen *et al.* (2009) indicate that the industrial sector a firm belongs to is found to be a predictor of levels of ICD. On the other hand, Bozzolan *et al.* (2003), Branco *et al.* (2011), An *et al.* (2011), indicated that industrial affiliation is barely a factor explaining the level of ICD. Quite apart from these mixed empirical findings, there is conviction within the accounting profession that there are sometimes industry-specific guidelines and conventions which customarily influence disclosures in corporate annual reports; and that ICD may not be left out of the effects of these industry-specific regulations and conventions.

Following from this study, the companies are classified into various industries in line with the industry classification standard of the GSE. By and large, companies/industries can be classified into knowledge-intensive sector and traditional sector (e.g., Bozzolan *et al.*, 2003; Branco *et al.*, 2011; and Oliveira *et al.*, 2006). The following sectors are generally considered as knowledge-intensive industrial sectors: media, banking, finance and insurance, technology and pharmaceuticals, with other sectors like basic resources, construction and materials, manufacturing and industrial goods considered as being traditional sectors (Branco *et al.*, 2011).

Singh and Kansal (2011), examined inter-firm ICD and its variations in India and came to the conclusion that although the study involved companies of knowledge-led industry, ICD was low. Haji and Mubaraq (2012) looked at ICD from a longitudinal perspective in Nigeria, and the results show that the overall ICD of Nigerian banks increased moderately over the period. Muhammad and Ismail (2009) also found that the banking sector relied more on IC, followed by insurance companies and brokerage firms. Obviously, knowledge-intensive industries are expected to garner and disclose more IC in their annual reports than non-knowledge intensive industries. Apart from that, ICD have been noted to help firms gain competitive advantage. So, to overcome competition, a company may focus not only on physical capital, but also on IC (Iswatia and Anshoria, 2007). This means that the competitive nature of an industry is more likely to have a relationship with the disclosure level of IC and as such ICD in industries may differ relative to the competitive nature of the industry. A critical perusal of the ICD level for each of the industries under consideration in this study could help unravel whether the particular industry matters when it comes to ICD. This study hypothesizes that:

H_1: ICD scores for an industry differ significantly from that of other industries.

IC is divided into three primary interrelated forms: Human Capital (HC), Structural Capital (SC) and Relational Capital (RC) (e.g., Edvinsson and Sullivan, 1996; Edvinsson and Malone, 1997; Stewart, 1997; and Bontis, 1998). Singh and Kansal (2011) relate SC to the knowledge that has been captured and institutionalized within the structure, process and culture of an organization. SC also includes the complementary business assets that are often necessary to convert an innovative idea into a saleable product or service (Sullivan, 1999). Sonnier (2008) defined HC generally as the knowledge, skill, expertise/know-how, problem solving capacity, education, training, judgement, experience, abilities and loyalty of the employees of the firm. Human beings and to a greater extent HC are the single most important asset of firms. RC

emphasizes the relationship or processes that the firm maintains with the external agents that surround it (Reed *et al.*, 2006). RC is important to an organization because it acts as a multiplying element creating value for the organization by connecting HC and SC with stakeholders (Ordớñez de Pablos, 2004).

Wagiciengo and Belal (2012) reported that HC is the most disclosed in South Africa. Khan and Ali's (2010) study of Bangladeshi commercial banks indicated that the key focus for ICD by financial institutions is on HC. Haji and Mubaraq (2012) showed that HC and SC disclosures dominated banks' ICD in Nigeria. The findings of Bozzolan *et al.* (2003), Oliveras *et al.* (2008), and Singh and Kansal (2011) also indicate that RC disclosures are relatively higher than HC and SC disclosures in Italy, Spain and India, respectively**.**

These three IC categories can be perceived not to be disclosed proportionately in the corporate annual reports as there are no generally accepted stringent criteria for such disclosures, especially in the context of Ghana. The study hypothesizes that in terms of the IC categories:

H_2: *ICD level for the industries together differs significantly for the IC Categories and even within specific industries.*

Data and Methodology

Data for this research were collected from corporate annual reports of 25 out of 36 listed firms on the GSE in 2010. The companies were those listed before the year 2006, as those listed after year 2006 did not possess the required data for the study. At the end of the year 2005, there were 27 listed companies. Two of them were dropped because their annual reports for some of the years were not available when the analysis was done. The companies, according to the GSE industry classifications, fall into the following industries: banking, finance and insurance, mining, manufacturing, food and beverage, distribution and trading, printing and publishing, pharmaceutical and ICT. The sample included companies from almost all of the industry sectors represented on the GSE (Table 1).

Table 1: Distribution of Companies by Sector			
	Number of Firms Listed	Number Included in Sample	Percentage (%) Included
Banking, Finance and Insurance	12	6	50
Pharmaceuticals	2	1	50
Printing and Publishing	2	2	100
Distribution and Trading	5	4	80
ICT	2	1	50
Mining	2	0	0
Food and Beverage	3	3	100
Manufacturing	8	8	100
Total	**36**	**25**	
Source: GSE and Authors' Estimation (2012)			

The annual reports basically comprise financial statements, Chairman's reports, Directors' reports, Managing Director's reports, Auditor's reports, etc. These sections of the 2006-2010 corporate annual reports of companies were important sources for the data gleaned. Eleven companies with missing data are excluded from the study.

ICD Scores and Indexes

ICD indexes were determined to connote the level of ICD by firms and in particular industries. ANOVA was employed to assess whether there are differences in ICD levels within industries and IC categories. One of the generally accepted means of determining disclosure levels in reports, content analysis was used to determine ICD level. The sentence counts were preferred by the researchers for the content analysis (e.g., Bozzolan *et al.*, 2003; and Vandemaele *et al.*, 2005). Bozzolan *et al.* (2003) also chose sentences as the recording unit to overcome problems related to the use of words or portions of pages, which seem to add unnecessary unreliability. Also, in analyzing the ICD scores in the annual reports, repeated information was considered or recorded once.

Guthrie *et al.* (2006 and 2009), Oliveira *et al.* (2006), and Wagiciengo and Belal (2012) developed frameworks for their studies; the researchers relied on and took cues from their frameworks and developed the current framework (i.e., Table 2) used in this study. In all, the ICD framework consisted of 30 indicators/attributes; the indicators were assumed to be relevant to all the firms. In line with previous studies, a numerical coding format was employed in the content analysis (e.g., Bozzolan *et al.*, 2003; Guthrie *et al.*, 2006; and Oliveira *et al.*, 2006). An IC indicator/attribute that was disclosed in quantitative terms was recorded. A score of 1 was assigned to an IC indicator/attribute disclosed in qualitative/narrative/descriptive terms, whilst a score of 0 for an indicator that was not disclosed.

Following the formula of Oliveira *et al.* (2006 and 2010) in Equation (1) below, this study computed the ICD indexes of each firm, industry and IC component. Bukh *et al.* (2005) lend credence to this method used in determining disclosure scores/indexes.

$$ICD \ Index = \frac{\Sigma_{i=1}^{m} d_i}{m} \qquad \qquad ...(1)$$

where d_i = 0 or 1 or 2 (0, 1, and 2 if the disclosure item is not disclosed, disclosures inqualitative and disclosures in quantitative terms respectively);

m = The weighted maximum number of (relevant) attributes a company may disclose.

In spite of a few criticisms of content analysis as a technique for evaluating the ICD of firms (e.g., Oliveira *et al.*, 2006), it still remains the most insightful technique being used in the extant literature to determine ICD. The weighing given to the quantitative disclosures is to some extent based on the assertion by Botosan (1997) that precise information is more useful and will enhance management's reputation and credibility, and as such quantitative disclosures tend to be relatively exact than qualitative disclosures.

Results and Discussion

In order to have an in-depth analysis of what pertains to the industries discussed in this study, the disclosure of IC in corporate annual reports was broken down into industries.

This analysis was done over a period of five years, 2006-2010 for each of the sampled companies. An index of ICD was determined for each company as well as each IC category and industry. The aggregate disclosure scores of IC attributes/indicators were aggregated in determining the ICD index for a company and for each category of IC over the period using an ICD index formula. The actual scores of each company and IC category were assessed using the ICD framework (i.e., disclosure attributes/indicators) in Table 2.

Table 2: The ICD Framework	
Indicators/Attributes	**Details**
Human Capital	
1. Career Planning/Development	Any management initiatives that encourage career progress or development amongst employees.
2. Education	Educational qualifications of directors and/or employees.
3. Employee Number/Demographics	Specifics of total number of employees and their demographic characteristics.
4. Incentives and Remuneration	Additional non-financial benefits such as health insurance and details of salaries of employees.
5. Industrial Relations	Labor union relations and activities.
6. Innovation, Initiative, Motivation and Dedication	New methods, ideas and important acts; issues on employee commitments and zealousness.
7. Know-How and Experience	Number of years worked, previous experience-particularly with directors and key employees.
8. Occupational Health and Safety	Health and safety issues and standards.
9. Teamwork capacity and Spirit	References to the ability of directors/ employees to work well together in relation to the loyalty amongst them.
10. Training and Work-Related Competencies	Any mention of training programs and effectiveness and efficiencies of directors and employees.
Structural Capital	
1. Corporate Culture	General reference to working culture.
2. Information Systems/Technology	Information on systems or networking.
3. Intellectual Property (Patents, Copyrights and Trademarks)	Any mention of IP particulars.
4. Management Philosophy	General mention of particular set of management ideas and thoughts implemented.

Table 2 (Cont.)

Indicators/Attributes	Details
5. Management Processes	Management or technical processes (series of actions) implemented to achieve specific results.
6. Organizational Learning Capacity	Reference to organizational learning.
7. Organizational Structure	The General mention or description of the kind of Organizational structure in use.
8. Policies and Procedures	References to plans and accepted ways of actions to engineer decisions.
9. Quality Services/Products	Includes ISO accreditations, reference to quality initiatives.
10. Research and Development	Mention of research initiatives and development-oriented projects.
Relational Capital	
1. Alliances and Partnerships	Reference to business collaboration. Any named companies involved in agreements.
2. Community Involvement	Company and employee involvement in community-based activities.
3. Competitors	Reference to overall competitive nature of an industry or markets.
4. Customer and Supplier	Reference to overall satisfaction of customers and relations with suppliers.
5. Distribution Channels	Reference to supply chain management and distribution.
6. Favorable Contracts	Favorable contracts signed.
7. Financial Relations	References to established relations with financial institutions.
8. Investors	References made to shareholders and potential investors.
9. Licensing/Franchizing	Any franchise agreements signed.
10. Organization Name/Brands	Description of brands owned/bought by the firm and Reference to business collaboration.

Source: Adopted and Modified from Studies of Guthrie et al. *(2006 and 2009), Oliveria* et al. *(2006) and Wagiciengo and Belal (2012)*

For a company, the scores were out of a possible total disclosure score of 60, and thus the weight. This was made up of 10 attributes/indicators each of the three IC categories (HC, SC and RC) multiplied by the highest possible score of two for a disclosure attribute/indicator. The three IC categories have an equal proportion to the aggregate disclosure index (i.e., in qualitative and quantitative terms).

Table 3 shows a dispersion of average ICD levels of the companies. Twelve companies representing 48% of the sample had a mean ICD index less than their specific industry average. Two companies representing 8% also had an index equal to the industry average. Cumulatively, 56% of the sampled companies fall into the low and moderate level category of ICD[1]. This, coupled with the overall ICD index of the companies of 29.94%, clearly depicts that ICD level of listed companies in Ghana is quite low. This is fairly consistent with the findings of other similar studies: Guthrie *et al.* (2006), Oliveras *et al.* (2008), and Singh and Kansal (2011), that ICD is low in annual reports. This indicates that the ICD level of listed companies on the GSE is generally low. This somehow points to the fact that ICD in various firms and industries are relatively low.

Table 3: Distribution of Average ICD Levels by Companies (2006-2010)		
Average Disclosure Index Range	**Number of Companies**	**Percentage(%) in the Sample**
Below Industry Average (Low Level)	12	48.00
Equal to Industry Average (Moderate Level)	2	8.00
Above Industry Average (High Level)	11	44.00
Total	**25**	**100.00**
Source: GSE and Authors' Estimation (2012)		

In order to have an in-depth analysis of what pertains to the industries discussed in this study, the disclosure of IC in corporate annual reports was broken down into industries, the motive being to investigate whether perceptions or assertions that industry-specific guidelines and conventions apart from accounting standards customarily influence their disclosures in corporate annual reports.

Generally, from Table 3, it is indicated that the banking and finance and insurance sectors had the highest mean ICD index of 43.22%. Apart from the latter, other sectors touted in the literature as basically endemic with IC were the pharmaceutical and ICT sectors. But from the results shown, one could certainly conclude that the mean ICD index of the two sectors was 30.67% and 28%, respectively, which is cursorily not much different from that of the so-called traditional sectors like manufacturing (29.29%) and food and beverage (30.89%). The mean ICD index of the printing and publishing sector, 22.83%, was the lowest among the sectors. This signifies that the printing and publishing firms disclose less IC information compared to the other sectors studied.

As shown in Table 4 and Figure 1, the trend of ICD indexes over the period showed that there were marginal increases in the average ICD levels over the five-year period for most of the industries/sectors. To be more specific, some industry sectors had continuous increases (manufacturing and food and beverage); others like banking and finance and insurance, printing

---

[1] In this study, percentage index less than the industry average of the specific company is considered low level, exactly as the industry average is moderate/fair level. Accordingly, above the industry average is viewed as high level ICD.

Table 4: Sector Average Ranking ICD Index						
Sector	**2006**	**2007**	**2008**	**2009**	**2010**	**Average (%)**
Banking, Finance and Insurance	0.4222	0.4056	0.4167	0.4500	0.4667	43.22
Food and Beverage	0.2611	0.2944	0.3056	0.3389	0.3444	30.89
Pharmaceutical	0.3500	0.3000	0.3000	0.3000	0.2833	30.67
Manufacturing	0.2750	0.2771	0.2938	0.3083	0.3188	29.46
Distribution and Trading	0.2625	0.2667	0.3000	0.2917	0.3208	28.83
ICT	0.2333	0.2167	0.2167	0.2500	0.2667	23.67
Printing and Publishing	0.2167	0.2333	0.2167	0.2333	0.2417	22.83
Overall Average (%)	**28.87**	**28.48**	**29.28**	**31.03**	**32.03**	**29.94**
Source: GSE and Authors' Computations (2012)						

Figure 1: Trends of Overall ICD Level of all Sectors or Companies

Source: GSE and Authors' Computations (2012)
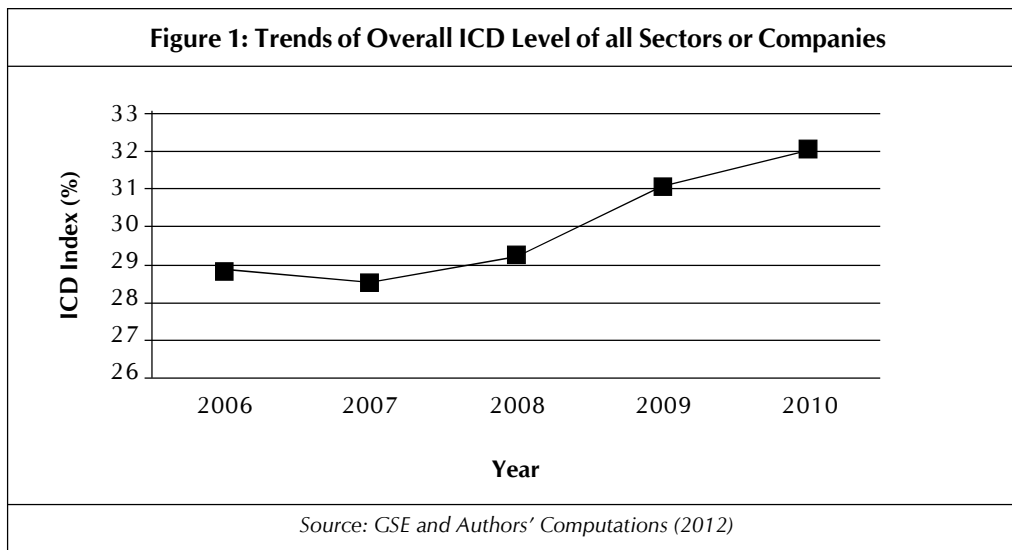
and publishing, distribution and trading and ICT had intermittent increases over the period. The pharmaceutical sector also experienced stability and subsequently declined in its ICD indexes over the period.

One-way analysis of variance (ANOVA) was employed in the study to test if there exist significant differences in ICD indexes in terms of the various industries. As Table 5 reveals, ICD scores were significantly different across the industries. This indicates that the industry affiliation affects the ICD of firms listed on the GSE. The analysis done on Table 4 thus validates H_1.

Table 5: ANOVA Sector Average ICD Index					
Source of Variation	SS	df	MS	*F*	*P*-Value
Between Groups	0.1346	6	0.0224	39.3371	0.0000***
Within Groups	0.0160	28	0.0006		
Total	**0.1506**	**34**			
Note: *** denotes significance level of 1%.					

There were also marginal increases in the overall average ICD levels over the five- year period after a dip in 2007 (Figure 1). The increases in the ICD levels over the period clearly indicate that the ICD level is improving in Ghana but at marginal rates. Therefore, one can categorically state that, there is improvement in the volume of IC information disclosed by the firms in the industries over the period, which is consistent with the findings of Vandemaele *et al.* (2005), Oliveras *et al.* (2008), and Yusoff and Lim (2011) that ICD level of companies is improving over time. So, indications are that with the passage of time disclosures of IC in corporate annual reports will increase; the practice will thus improve and help solve aspects of the general problem of information asymmetry of listed firms. In any case, there should be calculated attempts by stakeholders in this direction to improve ICD practice.

Banking, Finance and Insurance

Table A1 in the appendix illustrates that the companies sampled from this sector disclose HC more than RC and SC. In this instance, HC had a mean ICD index of 50.67% as against 48% and 31.33% for RC and SC, respectively, over the period. The maximum ICD index (52.50%) for all the categories was recorded in both 2006 and 2010 by the most disclosed category in this sector, i.e., HC. The minimum index (25.83%) was recorded in 2007 by the least reported category (SC) by the sector. This finding might not be exclusive as human resources are key assets in the banking, finance and insurance sectors. The sensitivity of their operations in relation to the keen competition in the industry and strict adherence to varied standards/regulations perhaps account for the comparatively low disclosures on SC and high disclosure on HC, and invariably more disclosures on IC than the other industries. Figure 2 shows that

Figure 2: Trend of ICD for Banking, Finance and Insurance Sector

Source: GSE and Authors' Computations (2012)
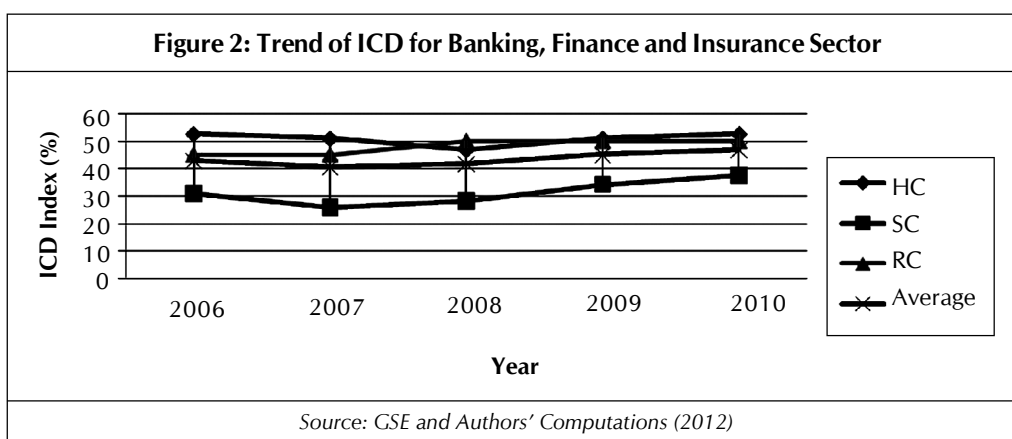
the most disclosed category of IC by this sector (HC) did not rise throughout the period but fell and rose. The RC was constant through 2006 to 2007, rose in 2008, and was constant to 2010. The SC and the average curves followed the same trend. This corroborates the results of Khan and Ali's (2010) study of Bangladeshi commercial banks that the key focus for ICD by financial institutions is on HC.
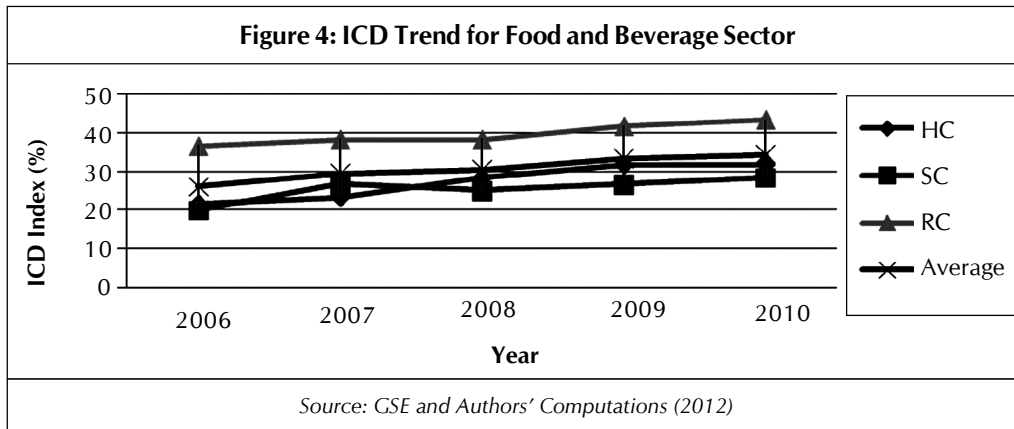
Manufacturing

Table A1 gives an idea about the most disclosed IC category by the manufacturing sector of the sampled companies. This sector saw the highest mean ICD index of 31.13% for RC. The latter was underpinned by gradual increases over the period. Disclosures on HC ranked second with a mean ICD index of 29.13%. Figure 3, hence, shows that average ICD index increased consistently all through the period. Except for the HC index which fell in 2007, rose in 2008 and remained constant in 2009 and 2010, both RC and SC rose throughout the period. This really gives all four curves a similar trend. The RC indicators dominate ICD in the corporate annual reports of listed manufacturing firms. It could be that the firms ordinarily do not need to exhibit HC in their reportage in order to create value as traditionally value is created with just their ability to produce. Innovativeness of Ghanaian manufacturers is generally low as most of the commodities produced here are imitations from the western countries; in that regard, HC issues would be somehow normal, though important.

Figure 3: ICD Trend by Manufacturing Sector

Source: GSE and Authors' Computations (2012)
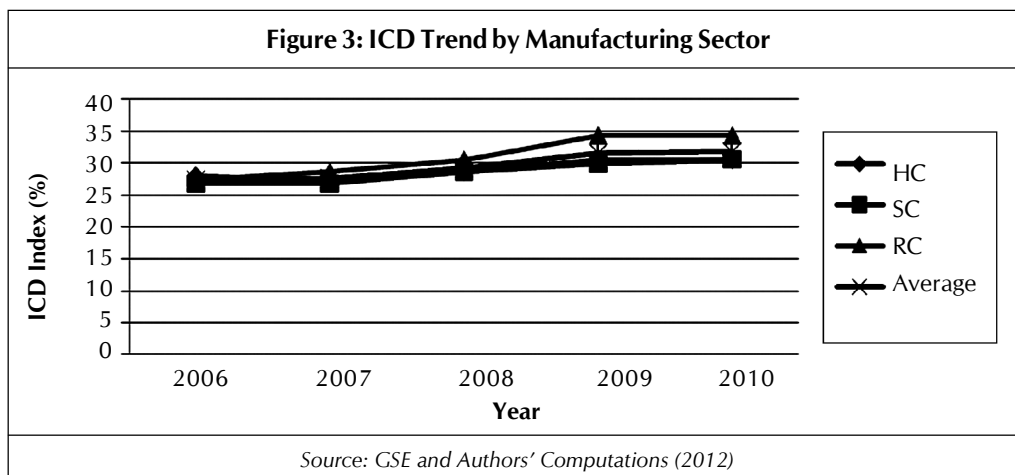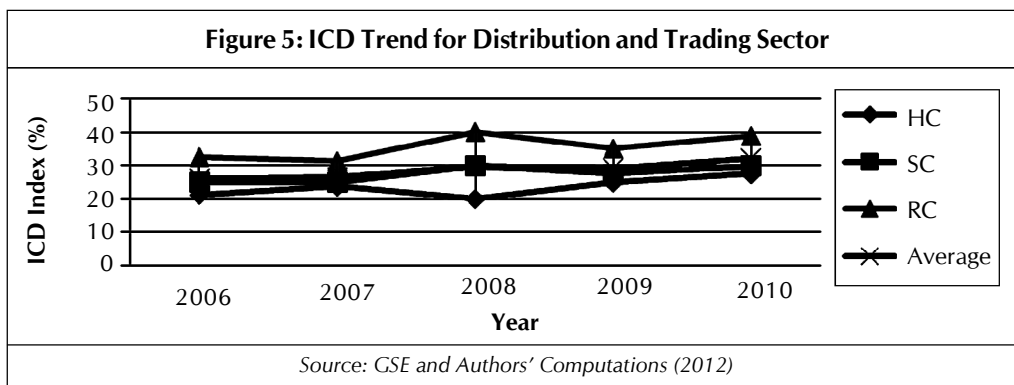
Food and Beverage

Generally, from the results depicted in Table 1, the maximum ICD index for any of the three categories was 43.33% for RC in 2010 with the minimum index of 20% for SC in 2006. The greatest average ICD index over the period was RC of 39.67%. This indicates that the food and beverage sector on average disclosed more RC indicators than both SC and HC. Figure 4 indicates that the average ICD index curve for this sector rose steadily from 2006 to 2010. The RC indexes were higher than HC and SC for all the years under consideration having its curve lying above that of HC and SC. This gives a good visual impression of the trend of HC, RC and SC increasing over the period relative to slight inconsistencies in the increases over the period.

Figure 4: ICD Trend for Food and Beverage Sector

Source: GSE and Authors' Computations (2012)

The underlying reasons for the trend of ICD industry could be similar to that of manufacturing as they are all traditional sector companies and as such issues of IC pertaining to this industry are not peculiar and may not necessarily help them create enormous value for stakeholders.

Distribution and Trading Sector

The mean ICD index for HC which was 23.50% was the lowest in this sector as shown in Table A1. The highest mean ICD index was 35.50% for this sector and was in respect of RC. This was explained ironically by the sporadic increases in the RC over the period. The minimum and maximum average ICD index was 26.25% and 32.08% correspondingly in 2006 and 2010. The operations and activities in this sector are intertwined with frequent interactions with stakeholders, especially customers and suppliers, and perhaps is the reason why RC disclosures are relatively high in this sector so as to win their trust and create more wealth. Figure 5 indicates that the average ICD index for the period rose from 2006 to 2008, fell in 2009 and rose again in 2010. This is as observed from the average ICD index curve. The RC curve lays above all the other curves as year-on-year indexes were relatively greater than that of HC and SC.

Figure 5: ICD Trend for Distribution and Trading Sector

*Source: GSE and Authors' Computations (2012)*

Printing and Publishing

Table A1 illustrates that this sector was characterized by relatively low ICD levels for all the IC categories compared to most of the other sectors under deliberation. This was also the only

Figure 6: ICD Trend of Printing and Publishing Sector

Source: GSE and Authors' Computations (2012)
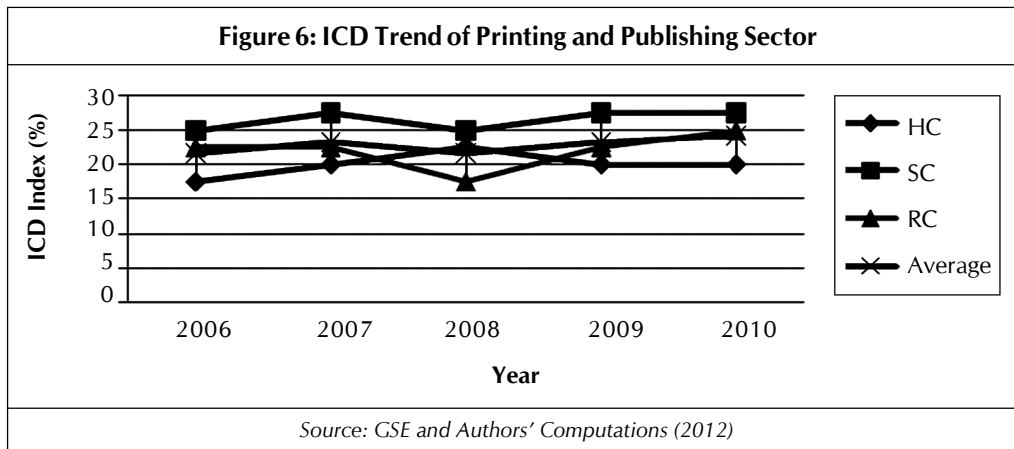
industry where SC disclosures were comparatively higher than that of RC and HC. The mean ICD index for the SC was 26.50% over the period. This means that on average 26.50% of all SC indicators were disclosed in corporate annual reports by the companies in this sector over the period. Figure 6 shows that the RC, SC and average curves fell in 2008 and rose again from 2008 to 2010, with the exception of HC which rose up to 2008 and fell continually to 2010. This industry is one of the growing industries in Ghana and might be undergoing technological changes in the context of the incessant introduction of new technologies, e.g., new machines with multi-printing purposes. So, it is quite not surprising that SC disclosures dominate ICD in this industry.

Pharmaceutical Sector

It can be observed from Table 1 that HC indicators were averagely disclosed more than any other category in the pharmaceutical sector for the period. A look at Figure 7 illustrates the drastic fall in HC disclosures by this sector over the period. The average ICD index remained consistent after a fall in 2006 to 2007. Further research would be needed to probably understand the trend of HC disclosures in this industry as the industry is noted in the literature to thrive on the HC creating value.

Figure 7: ICD Trend for Pharmaceutical Sector

Source: GSE and Authors' Computations (2012)
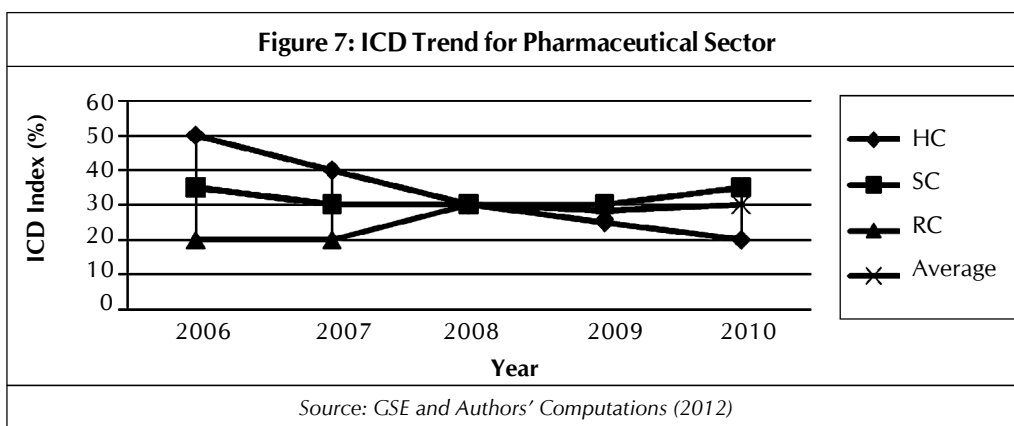
ICT Sector

In Table 1, it could be realized that the mean ICD index for HC was the pronounced ICD category. As per this result, the ICT sector generally disclosed an average of 26% of the HC indicators in the corporate annual reports over the period. The maximum ICD index, which in this instance was 30%, was recorded in 2010 by HC category. Figure 8 reveals that the ICD indexes for the three categories and the average index hovered between 20% and 25% from 2006 to 2009. In 2009, almost all the curves were at the same point. By 2010, ICD index for HC lay above all the others. This is quite intuitive as the ICT sector is seen generally as HC based, i.e., the sector thrives basically on innovation and human beings at large. So disclosure of more HC by a company in this industry could help it gain competitive advantage.

Figure 8: ICD Trend for ICT Sector

Source: GSE and Authors' Computations (2012)
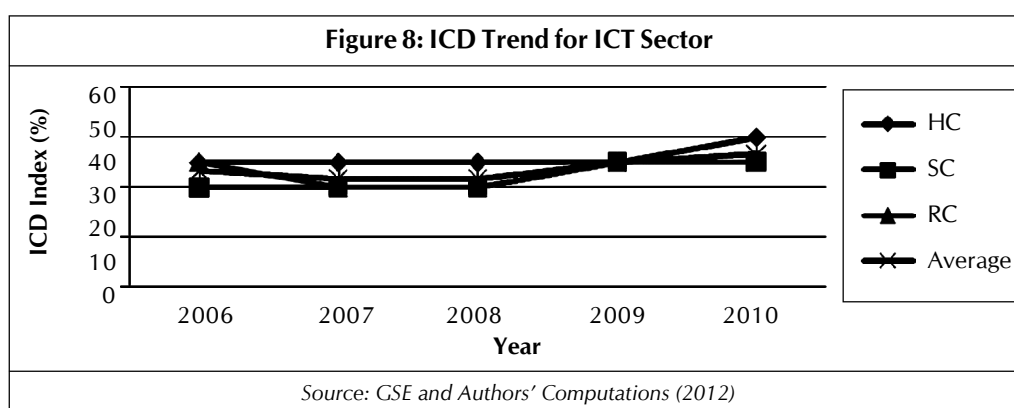
Categories of IC

For an index of an IC category, the scores used were out of a possible total disclosure score of 500. Thus, for instance, an IC category was made up of 10 attributes/indicators multiplied by the highest possible score of two for a disclosure attribute/indicator and the number of companies (25). The three IC categories have an equal proportion to the aggregate disclosure index.

Table 6 depicts the level of ICD by categories for the period under consideration using the ICD index. SC (26.60% in 2006 to 31.60% in 2010) and HC (32.00% in 2006 to 34.20% in 2010) increased sporadically over the period. On the other hand, RC increased continuously from 32.80% in 2006 to 38.80% in 2010 over the period, which reveals that RC disclosures in corporate annual reports are relatively higher than HC and SC disclosures among listed

IC Category	2006	2007	2008	2009	2010	Average
HC	32.00	31.80	31.00	33.40	34.20	32.48
SC	26.60	26.20	27.80	29.80	31.60	28.40
RC	32.80	33.00	36.20	37.60	38.80	35.68

Table 6: The ICD Index[a] in Percentage (%) by Categories

Note: [a] Percentage ICD index out of total possible score of 500 for each IC category.

Source: GSE and Authors' Computations (2012)

firms in Ghana. In fact, RC disclosures were relatively higher than HC and SC disclosures in all the years. In order to have a good visual impression of the trend of disclosures for the IC categories, Figure A1 (Appendix) was generated. The disclosure of RC as revealed by the ICD index and depicted by the RC curve is relatively higher than HC and SC. SC is relatively the lowest disclosed as the curve lies below that of RC and HC. These reflect a more consistent approach of the firms in the various industries to disclose IC to develop existing relationships with various stakeholders, and they are dominated by RC indicators per the results. In other words, this means that the companies' ICD are more tailored to address the direct concerns of stakeholders and win their trust and support. For instance, they are dominated by issues like community involvement, distribution channels, investors, organization name/brands, etc.

ANOVA was again used to test if there exist significant differences in ICD levels in terms of the three categories by the listed firms. Table 7 reveals that ICD indexes were significantly different across the three categories. It means there exists difference in ICD levels among the three categories, and it is concluded that there are significant differences in ICD levels in relation to the components. This could be explained by the fact that firms may be having difficulties in balancing the disclosure of IC in terms of its categories to achieve some specific objectives. With this observation the researchers, as indicated earlier, specify that RC disclosures dominate ICD in annual reports in Ghana. This finding is similar to those by Bozzolan *et al.* (2003), Oliveras *et al.* (2008) and Singh and Kansal (2011), who concluded that there is a greater volume of communication by companies in the area of RC than in either HC or SC. This study provides additional evidence that RC disclosures are dominant in ICDs in corporate annual reports.

Table 7: ANOVA: The ICD Index in Percentage (%) by Categories					
Source of Variation	SS	df	MS	F	P-Value
Between Groups	133.1413	2	66.5707	14.1399	0.0007***
Within Groups	56.4960	12	4.7080		
Total	**189.6373**	**14**			
Note: *** denotes significance levels of 1%.					
Source: GSE and Authors' Computations (2012)					

Conclusion

This study basically sought to undertake a comparative analysis of sector disclosure of IC in corporate annual reports of listed companies on the GSE. The study examined the ICD of 25 companies across industry sectors over a five-year period (2006-2010) via content analysis of the annual reports. The study concludes that there were marginal rises in the overall average ICD levels over the five-year period for most of the industries/sectors. RC disclosures were relatively higher than HC and SC disclosures among listed firms. The banking, finance and insurance sector as a knowledge-intensive sector tend to disclose more IC in annual reports than any other industry, though other knowledge-intensive industries' ICD were normal as that of the traditional sectors. However, analysis indicated that difference exists in ICD level of the

industries on the GSE, but indicating largely that industry affiliation does affect the ICD of listed firms but not necessarily in terms of the knowledge-intensive nature of the industry. The study accentuates the industries that are actually playing up IC as key to gaining competitive advantage as depicted by their disclosure level. Not only that, difference exists in ICD level of the three IC components and as such the researchers concluded that there are significant differences in ICD levels in relation to the IC components. But then, statistical inferences and/or generalizations made outside of this population may have limitations, as the study was limited to 25 of the 36 companies listed on the GSE as of 2010.

The study implores industries that are lagging behind in terms of the disclosure of IC in corporate annual reports to find appropriate framework to guide their ICD so as to create economic value for their stakeholders. Listed companies should continue to improve their disclosures by disclosing relevant and reliable information on IC to help reflect the true value of the firms and also as a means of improving transparency. Various institutions could still initiate seminars and symposiums on IC reporting and how it could help companies to gain competitive advantage and catch the attention of investors and potential investors.

Future research work could be undertaken to improve the ICD in Ghana by focusing on the quantity and quality of IC information reported by institutions other than listed companies. Studies can also focus on the barriers to disclosures affecting ICD in the annual reports in our jurisdiction and compare it with others. The study focused on a content analysis of the five years' corporate annual reports of listed firms in Ghana. Forthcoming research could use other methodologies like questionnaire surveys, interviews and many more.■

References

1. Abhayawansa S and Abeysekera I (2008), "An Explanation of Human Capital Disclosure from the Resource-Based Perspective", *Journal of Human Resource Costing & Accounting*, Vol. 12, No. 1, pp. 51-64.

2. An Y, Davey H and Eggleton I R C (2011), "The Effects of Industry Type, Company Size and Performance on Chinese Companies' IC Disclosure: A Research Note", *AAFBJ*, Vol. 5, No. 3, pp. 107-116.

3. Bezhani I (2010), "Intellectual Capital Reporting at UK Universities", *Journal of Intellectual Capital*, Vol. 11, No. 2, pp. 179-207.

4. Bhasin M L (2011), "Intellectual Capital Disclosure Scenario in India: An Empirical Study of IT Corporations", *Review of Economics & Finance,* Article ID: 1923-7529-2011-02-58-11.

5. Blaise M. Sonnier, (2008) "Intellectual capital disclosure: high-tech versus traditional sector companies", Journal of Intellectual Capital, Vol. 9 Iss: 4, pp.705 - 722 6. Bontis N 6. Bontis N (1998), "Intellectual Capital: An Exploratory Study that Develops Measures and Models", *Management Decision*, Vol. 36, No. 2, pp. 63-76.

6. Botosan C (1997), "Disclosure Level and the Cost of Equity Capital", *Accounting Review*, Vol. 72, No. 3, pp. 323-349.

7. Bozzolan, S., Favotto, F. and Ricceri, F. (2003), "Italian Annual Intellectual Capital Disclosure - An Empirical Analysis", Journal of Intellectual Capital, Vol.4, No. 4, pp. 543-558.

8. Bozzolan S, O'Regan P and Ricceri F (2006), "Intellectual Capital Disclosure: A Comparison of Italy and the UK", *Journal of Human Resource Costing & Accounting*, Vol. 10, No. 2, pp. 92-113.

9. Branco M C, Delgado C, Sousa C and Sa M (2011), "Intellectual Capital Disclosure Media in Portugal", *Corporate Communications: An International Journal,* Vol. 16, No. 1, pp. 38-52.

10. Bru¨ggen A, Vergauwen P and Dao M (2009), "Determinants of Intellectual Capital Disclosure: Evidence from Australia", *Management Decision*, Vol. 47, No. 2, pp. 233-245.

11. Bukh N P and Johanson U (2003), "Research and Knowledge Interaction; Guidelines for Intellectual Capital Reporting", *Journal of Intellectual Capital*, Vol. 4, No. 4, pp. 576-587.

12. Bukh P N, Nielsen C, Gormsen P and Mouritsen J (2005), "Disclosure of information on intellectual capital in Danish IPO prospectuses. Accounting", *Auditing and Accountability Journal*. Vol. 18, No. 6, p. 713.

13. Dumay J C (2009), "Intellectual Capital Measurement: A Critical Approach", *Journal of Intellectual Capital*, Vol. 10, No. 2, pp. 190-210.

14. Dumay J and Garanina T (2013), "Intellectual Capital Research: A Critical Examination of the Third Stage", *Journal of Intellectual Capital,* Vol. 14, No. 1, pp. 10-25.

15. Edvinsson L and Sullivan P (1996), "Developing a Model for Managing Intellectual Capital", *European Management Journal,* Vol. 14, No. 4, pp. 356-364.

16. Edvinsson L and Malone M S (1997), "Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower", *Harper Business*, New York.

17. Edvinsson L (2013), "IC 21: Reflections from 21 years of IC Practice and Theory", *Journal of Intellectual Capital*, Vol. 14, No. 1, pp. 163-172.

18. Gowthorpe C (2009), "Wider Still and Wider? A Critical Discussion of Intellectual Capital Recognition, Measurement and Control in a Boundary Theoretical Context", *Critical Perspectives on Accounting*, Vol. 20, pp. 823-834.

19. Guthrie J, Petty R and Ricceri F (2006), "The Voluntary Reporting of Intellectual Capital Comparing Evidence from Hong Kong and Australia", *Journal of Intellectual Capital*, Vol. 7, No. 2, pp. 254-271.

20. Guthrie J, Steane P and Farneti F (2009), "IC Reporting in the Australian Red Cross Blood Service", *Journal of Intellectual Capital*, Vol. 10, No. 4, pp. 504-519.

21. Haji A A and Mubaraq S (2012), "The Trends of Intellectual Capital Disclosures: Evidence from the Nigerian Banking Sector", *Journal of Human Resource Costing & Accounting*, Vol. 16, No. 3, pp. 184-209.

22. Hervas-Oliver J, Rojas R, Martins B and Cervelló-Royo R (2011), "The Overlapping of National IC and Innovation Systems", *Journal of Intellectual Capital*, Vol. 12, No. 1, pp. 111-131.

23. Iswatia S and Anshoria M (2007), "The Influence of Intellectual Capital to Financial Performance at Insurance Companies in Jakarta Stock Exchange (JSE)", Proceedings of the 13th Asia Pacific Management Conference, Melbourne, Australia, pp. 1393-1399.

24. Jihene F (2013), "The Effect of Intellectual Capital Disclosure on the Value Creation: An Empirical Study Using Tunisian Annual Reports", *International Journal of Accounting and Financial Reporting*, Vol. 3, No. 1.

25. Khan H and Ali M M (2010), "An Empirical Investigation and Users' Perceptions on Intellectual Capital Reporting in Banks; Evidence from Bangladesh", *Journal of Human Resource Costing & Accounting*, Vol. 14, No. 1, pp. 48-69.

26. Liyanage S, Johanson U and Hansson B (2002), "Management of Knowledge and Intellectual Capital", *Singapore Management Review*, Vol. 24, No. 3, pp. 1-6.

27. Low J and Kalafut P C (2002), *Invisible Advantage – How Intangibles are Driving Business Performance*, Perseus Publishing, Cambridge.

28. McPhail K (2009), "Where is the Ethical Knowledge in the Knowledge Economy? Power and Potential in the Emergence of Ethical Knowledge as a Component of Intellectual Capital", *Critical Perspectives on Accounting,* Vol. 20, pp. 804-822.

29. Muhammad N M N and Ismail M K A (2009), "Intellectual Capital Efficiency and Firm's Performance: Study on Malaysian Financial Sectors", *International Journal of Economics and Finance*, Vol. 1, No. 2.

30. Nielsen C and Madsen M T (2009), "Discourses of Transparency in the Intellectual Capital Reporting Debate: Moving from Generic Reporting Models to Management Defined Information", *Critical Perspectives on Accounting,* Vol. 20, pp. 847-854.

31. Oliveira L, Rodrigues L L and Craig R (2006), "Firm-Specific Determinants of Intangibles Reporting: Evidence from the Portuguese Stock Market", *Journal of Human Resource Costing & Accounting*, Vol. 10, No. 1, pp. 11-33.

32. Oliveras E, Gowthorpe C, Kasperskaya Y and Perramon J (2008), "Reporting Intellectual Capital in Spain", *Corporate Communications: An International Journal*, Vol. 13, No. 2, pp. 168-181.

33. Ordóñez de Pablos P (2004), "The Importance of Relational Capital in Service Industry: the Case of the Spanish Banking Sector", *International Journal of Learning and Intellectual Capital*, Vol. 1, No. 4, pp. 431-140.

34. Reed K, Lubatkin M and Srinivasan N (2006), "Proposing and Testing an Intellectual Capital-Based View of the Firm", *Journal of Management Studies*, Vol. 43, No. 4, pp. 867-893.

35. Saleh N M, Hassan M S, Jaffar R and Shukor Z A (2010), "Intellectual Capital Disclosure Quality: Lessons from Selected Scandinavian Countries", *The IUP Journal of Knowledge Management*, Vol. 8, No. 4, pp. 40-60.

36. Seetharaman A, Bin Zaini Sooria H H and Saravanan A S (2002), "Intellectual Capital Accounting and Reporting in the Knowledge Economy", *Journal of Intellectual Capital*, Vol. 3, No. 2, pp. 128-48.

37. Singh S and Kansal M (2011), "Voluntary Disclosures of Intellectual Capital: An Empirical Analysis", *Journal of Intellectual Capital*, Vol. 12, No. 2, pp. 301-318.

38. Sonnier B M (2008), "Intellectual Capital Disclosure: High-Tech Versus Traditional Sector Companies", *Journal of Intellectual Capital*, Vol. 9, No. 4, pp. 705-722.

39. Stewart T A (1997), *Intellectual Capital: The New Wealth of Organizations,* Double day Dell Publishing Group, Inc., New York.

40. Sullivan P H (1999), "Profiting from Intellectual Capital", *Journal of Knowledge Management*, Vol. 3, No. 2, pp. 132-142.

41. Vafaei A, Taylor D and Ahmed K (2011), "The Value Relevance of Intellectual Capital Disclosures", *Journal of Intellectual Capital*, Vol. 12, No. 3, pp. 407-429.

42. Vandemaele S N, Vergauwen P G M C and Smits A J (2005), "Intellectual Capital Disclosure in the Netherlands, Sweden and the UK: A Longitudinal and Comparative Study", *Journal of Intellectual Capital,* Vol. 6, No. 3, pp. 417-426.

43. Vergauwen P G M C and Alem F J C (2005), "Annual Report IC Disclosures in the Netherlands, France and Germany", *Journal of Intellectual Capital*, Vol. 6, No. 1, pp. 89-104.

44. Vergauwen P, Bollen L and Oirbans E (2007), "Intellectual Capital Disclosure and Intangible Value Drivers: An Empirical Study", *Management Decision,* Vol. 45, No. 7, pp. 1163-1180.

45. Wagiciengo M M and Belal A R (2012), "Intellectual Capital Disclosures by South African Companies: A Longitudinal Investigation", *Advances in Accounting, Incorporating Advances in International Accounting*, Vol. 28, pp. 111-119.

46. Yusoff W F W and Lim W (2011), "IC Reporting in Traditional Sectors of Malaysian Public Listed Firms", *Journal of Modern Accounting and Auditing*, Vol. 7, No. 9, pp. 966-973.

47. Zahn J-L W M, Singh I, and Heniro J (2007), "IC Disclosure is there an Association Between Intellectual Capital Disclosure, Under-Pricing and Long-Run Performance?", *Journal of Human Resource Costing & Accounting*, Vol. 11, No. 3, pp. 178-213.

Appendix

Table A1: Overall IC Category Disclosure Index of Sector from 2006-2010

Sector	2006		2007		2008		2009		2010		Average	
	Score	Index	Score	Index	Score	Index	Score	Index	Score	Index	Score	Index (%)
Banking, Finance and Insurance												
HC	63	0.53	61	0.51	56	0.47	61	0.51	63	0.53	60.8	51
SC	37	0.31	31	0.26	34	0.28	41	0.34	45	0.38	37.6	31
RC	54	0.45	54	0.45	60	0.50	60	0.50	60	0.50	57.6	48
Manufacturing												
HC	45	0.28	44	0.28	46	0.29	49	0.31	49	0.31	46.6	29
SC	43	0.27	43	0.27	46	0.29	48	0.30	49	0.31	45.8	29
RC	44	0.28	46	0.29	49	0.31	55	0.34	55	0.34	49.8	31
Food and Beverage												
HC	13	0.22	14	0.23	17	0.28	19	0.32	19	0.32	16.4	27
SC	12	0.20	16	0.27	15	0.25	16	0.27	17	0.28	15.2	25
RC	22	0.37	23	0.38	23	0.38	25	0.42	26	0.43	23.8	40
Distribution and Trading												
HC	17	0.21	19	0.24	16	0.20	20	0.25	22	0.28	18.8	24
SC	20	0.25	20	0.25	24	0.30	22	0.28	24	0.30	22.0	28
RC	26	0.33	25	0.31	32	0.40	28	0.35	31	0.39	28.4	36

Appendix (Cont.)

Table A1 (Cont.)

Sector	2006		2007		2008		2009		2010		Average	
	Score	Index	Score	Index	Score	Index	Score	Index	Score	Index	Score	Index (%)
Banking, Finance and Insurance												
Printing and Publishing												
HC	7	0.18	8	0.20	9	0.23	8	0.20	8	0.20	**8.0**	**20**
SC	10	0.25	11	0.28	10	0.25	11	0.28	11	0.28	**10.6**	**27**
RC	9	0.23	9	0.23	7	0.18	9	0.23	10	0.25	**8.8**	**22**
Pharmaceutical												
HC	10	0.50	8	0.40	6	0.30	5	0.25	4	0.20	**6.6**	**33**
SC	7	0.35	6	0.30	6	0.30	6	0.30	7	0.35	**6.4**	**32**
RC	4	0.20	4	0.20	6	0.30	6	0.30	7	0.35	**5.4**	**27**
ICT												
HC	5	0.25	5	0.25	5	0.25	5	0.25	6	0.30	**5.2**	**26**
SC	4	0.20	4	0.20	4	0.20	5	0.25	5	0.25	**4.4**	**22**
RC	5	0.25	4	0.20	4	0.20	5	0.25	5	0.25	**4.6**	**23**

Source: GSE and Author's Computation (2012)

Appendix (Cont.)

Figure A1: Trends of ICD Index for IC Categories

Source: GSE and Authors' Computations (2012)