DETERMINANTS OF INTELLECTUAL CAPITAL DISCLOSURE: AN INVESTIGATION ON DS30 FIRMS IN BANGLADESH

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ABSTRACT

Research aim: The study aims to investigate intellectual capital disclosure (ICD) practices and its determinants in Bangladesh.

Design/Methodology/Approach: The top 30 firms known as DS30 companies that reflect around 51 percent of the total equity market capitalisation have been considered as a sample. Content analysis is used to extract the data from the annual report of the respective firm for the years 2013 to 2017. Multiple regression analysis is performed to identify the determinants of ICD.

Research findings: This paper finds that board independence and globally affiliated auditors have a substantial positive impact on ICD. In contrast, board gender diversity documents marginally significant negative association with ICD. However, our examination does not show any significant impact of board size, leverage, profitability and firm size on ICD quality.

Theoretical contribution/ Originality: This study differs in its approach of narrowing down the items of ICD index to maintain the perspective of a developing country like Bangladesh. It is a longitudinal study and does not consider any particular industry of Bangladesh to identify the drivers of ICD.

Practitioner/ Policy implication: Policymakers and regulators could consider the factors identified in this paper for setting corporate reporting regulations, particularly corporate governance mechanisms.

Research limitation: This study considered only the top 30 firms and 30 disclosure items. Our investigation is limited to only the annual reports of the respective companies.

Keywords: Bangladesh, DS30 Companies, Determinants, Human Capital, Intellectual Capital

Type of Manuscript: Research paper

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1. Introduction

In conventional accounting literature, intellectual capital (IC) refers to unaccounted capital (Abeysekera & Guthrie, 2005). Existing financial reporting mechanisms have certain limitations as they fail to report the IC. In the contemporary reporting world, this has been noticed with great significance. As a result, several studies have been conducted to identify ways to include IC reporting, and the findings are inconclusive. IC comprises skills, knowledge, copyright, patents, reputation, and so on. It provides additional insight into a firm's capability that can be used for long-term sustainable value generation. Researchers from various countries documented and tested several models to unify the IC items and prospects. In several studies, IC has been broadly categorised under three heads: internal capital, external capital and human capital (Ahmed Haji & Mohd Ghazali, 2012; Alfraih, 2017).

In contemporary research settings, IC reporting provides information that is specifically bound to provide a competitive advantage for any organisation. The idea of IC refers to many different things from the perspective of various authors. Nonetheless, all have agreed that IC is the source of satisfying information needs and competitive advantage. Abeysekera and Guthrie (2005) document that companies in developing countries seek to reduce transaction cost and open access to capital. Singh and Van der Zahn (2007) state that IC in the reporting field is still in its infancy and provides an important area to explore to contribute to the authentication of IC as a discipline. Traditional accounting is lagging due to a disproportionate focus on physical capital, which constrains IC practice.

In a knowledge-driven corporate world, it is critical to identify and understand the significance of IC. In contemporary business settings, companies are relying more and more on IC value creation instead of traditional factors of production (Vandemaele, Vergauwen, & Smits, 2005). Several studies have been carried out, but the concept of IC disclosure is still not defined uniformly (Edvinsson & Sullivan, 1996). John Kenneth Galbraith first coined IC in 1969 as a dynamic capital rather than static. It is a kind of knowledge that can be transformed into value. Managers have two components of IC, namely human resources and structural capital. Successful business organisations know where to focus and bring out a competitive edge. Traditional accounting has several limitations for which there is an increasing interest in disclosing IC in respect to non-financial information, specifically 'soft assets', which is supposed to generate long-term value for a company (Robb, Single, & Zarzeski, 2001). Also, the capital market efficiency can be increased by

disclosing more information, but it varies according to firm differences (Aljifri, 2008).

IC is hard to measure. The value of intellectual or human capital cannot be measured in conventional accounting system because of specific measurement principles of accounting standards (Dey & Sarkar, 2015). Traditional accounting focuses on an economy of industry where physical assets are valued while ignoring the IC assets (Zéghal & Maaloul, 2010).

Studies of intellectual capital disclosure (ICD) in developing countries like Bangladesh are inadequate, particularly concerning corporate governance attributes (Muttakin, Khan, & Belal, 2015). In Bangladesh, most prior researches sampled only either financial companies (Dey & Sarkar, 2015) or non-financial companies (Muttakin et al., 2015; Nurunnabi, Hossain, & Hossain, 2011; Rashid, 2013). Also, Abhayawansa and Azim (2014) and Rahman, Sobhan and Islam (2019) investigate only the pharmaceutical industry. Therefore, this study considers the top 30 firms covering both financial and non-financial companies from different industries. Moreover, some studies focus on IC reporting practice and the extent of the disclosure (Abhayawansa & Azim, 2014; Rashid, 2013). Rashid (2013) finds that IC disclosure practice is limited but has a growing trend. Abhayawansa and Azim (2014) document significant variation in IC and its subcategories disclosure among Bangladeshi pharmaceutical firms and suggest a consistent framework. Similarly, Nurunnabi et al. (2011) find that the level of disclosures is very low thereby underscoring the need to develop a compliance guideline that will increase the disclosure practice of IC. The weighted disclosure index was used by Nurunnabi et al. (2011) where values ranged from 1 to 3. This presents a constraint of measurement for some information.

Other problems were related to items in the index and their categorisation. Hence, due to the subjectivity of measurement, we use an unweighted measure to construct the ICD score or index. Some studies (Nurunnabi et al., 2011; Rahman et al., 2019) consider one or two periods. Hence, our study embraces a longitudinal perspective with relatively larger firm-year observations of top listed firms across 13 industries. Dhaka stock exchange (DSE) lists 30 companies according to various criteria for being a potential source of sample firm known as DS30 which covers 51 percent of the share market capitalisation. As the disclosure of IC is mostly voluntary, the top 30 firms might be a feasible sample to avoid the risk of heterogeneity effect in our analysis. The observation-year is expanded to five years ranging from 2013 to 2017 to provide a broader and up-to-date data source.

Muttakin et al. (2015) state that there is a dearth of empirical evidence that documents corporate governance characteristics and ICD quality. Board of directors' attributes are critical factors for good corporate governance. Corporate governance attributes, particularly board traits, are used in several corporate disclosure related research. Hence, this study also includes key corporate governance attributes, namely the number of board members, the proportion of independent, female directors and auditor type as potential determinants. Besides, company attributes e.g. firm size, leverage and financial performance i.e. profitability (e.g. Rahman et al., 2019) are also commonly used as explanatory variables to identify the possible determinants of the level and extent of voluntary disclosure. Therefore, we use these board and firm characteristics as independent variables.

The primary objective of the study is to identify the level and determinants in particular, of ICD in the top 30 firms (known as DS30 companies) listed on the Dhaka Stock Exchange (DSE) by asking the questions, what are the level and extent of ICD? what are the factors that drive ICD in the annual report?

The results reveal that a higher proportion of independent or outside directors and statutory auditor firm's global affiliation have a significant positive impact on the level of ICD. Female representation in the board reduces the level of ICD, but this result is marginally significant at 10 percent level. Moreover, our examination does not suggest bigger board size, greater firms, highly leveraged firms and high profitable companies are not likely to disclose a higher level of disclosure on IC.

The remainder of the paper is constructed as follows. The second section presents the literature review, theory and hypotheses development. The next section explains the data and research methodology. In section four, the results and findings of the paper are discussed. The final section illustrates the conclusion, limitation and prospects of future research.

2. Theoretical Framework, Literature Review and Hypothesis Development

2.1. Theoretical Framework

Contracting efficiency determines the accounting policy of a firm. Organisations with an agency problem will deploy more resources than others for monitoring and bonding. Healthy organisations will attract more capital by expanding resources for providing such information. Moreover, firms that contribute to and operate within social norms and

values will be regarded as legitimate. A mixture of these theories will be used to explain the extents of ICD and certain characteristics of firms.

Due to the agency relationship, managers disclose information to their shareholders (Aljifri, 2008; Cooke, 1992; Firth, 1979). Disclosures about market share, supplier knowledge, beating the competition, management philosophy, and management process will assure the principals about protecting their interests. IC and other discretionary disclosures may increase the confidence of the principals about the agent's best effort in managing provided resources. Agency theory suggests that more information will be disclosed by a highly levered firm for the purpose of compensating debenture holders and through which the cost of capital and uncertainty of the investors will be lowered (Nurunnabi et al., 2011). Thus, higher level of disclosure of IC reduces agency cost by minimising information asymmetry between management and capital providers (Widiatmoko & Indarti, 2017).

Organisations run their business within the bounds and norms that are recognised by society for securing legitimacy (Guthrie, Petty, Yongvanich, & Ricceri, 2004). It is desirable that an organisation will voluntarily disclose information about its activities while the management assumes that society expects from it within which it operates. IC reporting is closely related to this theory, where disclosure is used as an instrument to gain and maintain legitimacy. If a firm fails to operate within the bounds and norms of the society, it could be penalised in various ways. The general perception of society is that larger organisations and specific industries will thrive to work for the betterment of a society through its activities. This expectation of society can be satisfied with more disclosure about how it treats human resources, values cultural diversity and customers. Thus, the organisations may report IC as a means of gaining and maintaining social legitimacy.

2.2. Literature Review

IC was measured by many, coined by some, agreed by few and valued formally and practically by no one (Sveiby, 1997). It is coined as intangible assets, including customer list or information, technology, reputation, brand recognition and corporate culture (Taliyang, Sultan, Abidin, Latif, & Mustafa, 2011). Intellect management is sought to depend on value creation in the contemporary era of business knowledge (Bontis, 1998). Human factors display a core role in an organisation. The concept of IC is gaining rapid recognition where efforts are driven toward creating a knowledge-based model (Sumedrea, 2013). Firms continuously change their environment to look for different answers to the complications they

face and to utilise all available resources more efficiently. IC is a vital factor for building and maintaining corporate value and nourishing a competitive advantage. Contemporary accounting standards do not require IC recognition in a firm's financial statements, and few of them disclose such items of IC in annual reports. The presence of asymmetry is increasing among users and companies due to the absence of IC disclosures in the financial statements (Bruggen, Vergauwen, & Dao, 2009). Companies need to "Know what they know" and in which way they can utilise their knowledge so as to achieve a sustainable advantage in competition (Carlucci, Marr, & Schiuma, 2004).

Several studies sought to know the potential items of ICD and which items drive the performance of the organisation. Youndt and Snell (2004) identified three distinct forms of IC, i.e. human, social and organisational capital related to human resource activities organisational performance. Crook, Todd, Combs, Woehr, and Ketchen (2011) studied the relationship between firm performance and human capital by presenting a meta-analysis of the literature. The study surprisingly found that human capital was strongly related to firm performance. They also provided interesting insights into the strength of the firm when human capital is not available for trading freely. Researchers use such performance measures which are not easily subject to misappropriation. Diaz-Fernandez, Gonzalez-Rodriguez, and Simonetti (2015) found a positive relationship among the diversity of top management and firms which have complex financing dynamics. Chan (2009) found that Hong Kong listed companies and investors prefer tangibles which is a factor to consider for future research. He also identified that corporate markets reside more on physical than intangible assets.

Nurunnabi et al. (2011) conducted a study in Bangladesh and found that the growth of the stock market in the period of recession excluded disclosures of IC. They also found that size and industry were key attributes for ICD explanation in Bangladesh. Rashid (2013), and Abhayawansa and Azim (2014) examined the level and extent of IC reporting practice, whereas Abhayawansa and Azim (2014) studied only on the pharmaceutical industry and found significant variation among different subcategories of ICD. Rashid (2013) documented limited disclosure practice but found an upward trend. Hsu and Sabherwal (2011) define that intellectual capital offers a representation of organisational knowledge, which significantly influences innovation. They observed that capacity utilisation and enhancement of knowledge leads to the development of innovation. Previous studies on ICD have used content analysis to coding the information found in the annual reports.

The origins of the IC framework can be traced to various professional assertions on IC. The rationale that IC disclosure leads to improved efficiency has led to different research undertakings (Guthrie & Petty, 2000). Researchers have categorised ICD into three different categories. This study has also classified ICD into three categories viz., internal capital, external capital and human capital according to the framework developed by Sveiby (1997). Reporting IC under several categories has been energised with a view to extracting a clear index for ICD.

Prior literature suggests several determinants of ICD. Martins, Morais, Isidro and Laureano (2016) considered several firm attributes e.g. firm size, auditor type, industry, the proportion of non-executive directors, CEO duality to find the drivers of ICD in Portuguese companies. Similarly, Rahman et al. (2019) used board size, independent directors, gender diversity in the board, firm size, leverage or debt ratio, profitability etc. Moreover, in the Bangladesh context, Muttakin et al. (2015) examined the association between corporate governance attributes and ICD quality. Widiatmoko and Indarti (2017) investigated Indonesian listed firms and hypothesised both corporate governance and firm factors, i.e. company size, age, profitability and firm leverage. Tejedo-Romero, Rodrigues and Craig (2017) explored the impact of female representation in the board of Spanish companies on the disclosure of IC information. Some researchers (Martins et al., 2018; Muttakin et al., 2015) used the presence of audit committee as an explanatory variable, but in Bangladesh, the formation of the audit committee is mandatory since the issuance of the Corporate Governance Code 2012. Therefore, this study does not find it relevant to include the audit committee variable but considers other pertinent factors based on these prior researches.

2.3. Hypotheses Development

After reviewing the literature, this study assesses the following corporate governance mechanisms and firm characteristics that may affect the ICD. Managers and executives follow the policies and strategies defined by the board of directors (Akhtaruddin et al., 2009). The positive effect of a larger number of board members on firm performance has been documented due to the accumulation of diversity and experience (Akhtaruddin et al., 2009; Al-Najjar & Abed, 2014). On the other hand, Wang and Hussainey (2013) find smaller boards are generally more effective than larger boards to communicate and coordinate problems. In several studies on corporate disclosure and reporting, board size has also been used but failed to find any significant association between board size and corporate disclosures

(Kılıç & Kuzey, 2018; Nurunnabi et al., 2011; Rahman et al., 2019; Taliyang et al., 2011). Thus, the following hypothesis will be tested.

H_1: A larger board positively affects the extent of ICD.

Non-executive or independent directors are included in the board to reduce the risk of capital misappropriation and to bring an independent view in the board's decision. This also reduces the cost of agency and creates pressure for minimising information asymmetry through disclosure (Forker, 1992). Board independence increases the controlling role that leads to better disclosures. Various studies on disclosures have used this attribute and find mixed results (Agyei-Mensah, 2017; Abed, Al-Najjar & Roberts, 2016; Kılıç & Kuzey, 2018; Wang & Hussainey, 2013). Muttakin et al. (2015) found significant positive impacts on ICD whereas Martins et al. (2018) and Rahman et al. (2019) found an insignificant association between the percentage of non-executive directors and ICD. Independent directors protect the interest of investors ensuring better corporate disclosure.

H_2: A higher proportion of independent directors has a significant positive effect on ICD.

In the contemporary corporate world, board diversity is important to bring about extra skills. Diversity in the board composition means differences in board members in relation to several features like education, personalities, gender, race, age, skills and expertise (Coffey & Wang, 1998). Including female board members inclusion is a new phenomenon in the corporate world as it brings talents, diversity and new skills. Gender diversity has substantial positive impacts on ICD (Kılıç & Kuzey, 2018; Tejedo-Romero et al., 2017). Although Rahman et al. (2019) do not suggest any significant impact of female directors, we hypothesise:

H_3: There is a positive association between board gender diversity and ICD.

Morris (1987) explains agency theory as the reason for which highly leveraged firms tend to disclose more so as to reduce the cost of the agency. Empirical studies demonstrate a mixed relationship. Leverage has been used as an explanatory variable to disclosure in several studies (Brüggen et al., 2009; Kılıç & Kuzey, 2018; Nurunnabi et al., 2011; Taliyang et al., 2011). High leverage firms need to attract creditors, and ICD may be used for this purpose. High disclosure tends to reduce information asymmetry and leads to a lower cost of borrowing. Widiatmoko and

Indarti (2017) documented a significant positive impact of leverage on ICD. In contrast, Rahman et al. (2019) suggested a negative association. However, we estimate a positive relationship based on the theoretical suggestion.

H_4: Leverage has a significant positive impact on the level and extent of ICD.

Auditor plays a significant role in minimising the opportunistic motives of the management. Audit firms seek to protect their reputation by means of an appropriate audit opinion. Audit firms with global affiliation have to comply with some requirements of a global firm and maintain global standards of auditing. Thus, internationally affiliated audit firms may have positive attributes on non-financial disclosure. An insignificant association between auditor type and corporate disclosure (Aljifri & Hussainey, 2007; Martins et al., 2018) is documented while Uyar and Kılıç (2012) find a significant relationship. Therefore, we hypothesise:

H_5: There is a significant positive association between auditor type and ICD.

The profitability of a firm can be defined through several proxy variables. Return on assets describes company profitability according to the size of the total assets of a firm. Previous studies show no significant relationship between firm performance and voluntary corporate disclosures (McNally et al., 1982; Meek et al., 1995; Kılıç & Kuzey, 2018; Uyar & Kılıç, 2012; Widiatmoko & Indarti, 2017). On the other hand, a positive correlation is also found (Aljifri & Hussainey, 2007; Qu et al., 2015). However, profitable companies are expected to disclose more because they can use more resources and cost for discretionary disclosure.

H_6: More profitable firms disclose more information on IC.

Empirical studies exhibit a positive relationship between firm size and corporate disclosure. Larger companies may have a more significant influence on the extent of IC disclosure. In previous studies, the firm size was found to have a significant relationship with the amount of voluntary disclosure (Martins et al., 2018; Singh & Van der Zahn, 2007; White et al., 2007). Also, size has been used as an explanatory variable in disclosure related studies (Agyei-Mensah, 2017; Abed et al., 2016; Al-Najjar & Abed, 2014; Aljifri & Hussainey, 2007; Kılıç & Kuzey, 2018; Qu et al., 2015). Given the above, this study tests the following hypothesis:

H_7: Larger firms substantially disclose IC-related information.

3. Methodology

3.1. Sample

DSE 30 Index (DS30 companies) is one of the two indices computed by the Dhaka Stock Exchange (DSE). The sample of the study includes only DS30 companies (see Appendix 1). These companies are the leading 30 firms that are classified and updated by DSE following the methodology of S&P Dow Jones Indices. We consider this sample size because of several reasons. Firstly, it reflects 51 percent of the total market capitalisation of equity so this can be a good viable representative sample. Secondly, these top 30 firms are an investable index of the exchange in terms of market capitalisation, liquidity, financial viability and base value. Thirdly, it excludes mutual funds, bonds and debentures. Finally, ICD is a voluntary disclosure in Bangladesh. The disclosure of IC and its extent may be affected by different corporate factors and attributes. The selection of leading 30 companies can be said to similar in terms of some of these corporate attributes, and hence, it may reduce the risk of heteroskedasticity. Moreover, in Bangladesh, the academic papers that identify the possible determinants of ICD are scarce, which motivates us to explore the Bangladesh context.

Data sources of the study are based on secondary data. Secondary data includes only the annual reports of DS30 companies for the year 2013-2017. Stakeholders mostly prefer annual reports as their source of information (Shehata, 2014). Moreover, annual reports are believed to be a significant, prime and frequent source for information. Other than this, annual reports are audited, timely, accurate and consistent (Bozzolan et al., 2003; Firer et al., 2000; Nurunnabi et al., 2011; Petty & Guthrie, 2000; Singh & Mitchell Van der Zahn, 2008). In this study, annual reports are downloaded from the respective company's website and LankaBangla Financial Portal website if the report is unavailable on the respective firm's website. In some extreme cases, when the annual reports are not available from either source, we tried to collect a soft copy of the annual report from the DSE library. The sample observations are reduced to 139 firm-years (out of possible 150 firm-year observations) because of data unavailability. The 30 sampled firms cover 13 industries as per the DSE category.

3.2. Dependent Variable

There is no uniformly accepted disclosure items upon which an ICD index (ICDI) can be formulated for content analysis (Nurunnabi et al., 2011).

Singh & Mitchell Van der Zahn (2008) formulated an ICD index with 81 items with six key categories namely resources, customers, information technology, processes, research & development and strategic statements based on prior research. Similarly, Nurunnabi et al. (2011) developed a disclosure index consisting of 63 items. However, in this study, the items are pretested and analysed to include only those that reflect the relevant economic dimension of the intended users. To reduce the issue of subjectivity, the unweighted dichotomous scale (1 if disclosed, otherwise 0) will be used (Singh & Mitchell Van der Zahn, 2008). However, using weighted or unweighted yields similar results (Cooke, 1989).

The ICD index or score for each of the sample firm is evaluated using the extent an item is disclosed by the firm using a self-constructed measure. The maximum value that any firm can achieve will be 1 when it discloses an item and a minimum of 0 when it fails to disclose. Items of ICD for the self-constructed index are presented in Appendix 2. Items of the ICD index have been categorised after studying and analysing the previous literature. Furthermore, items have been included after testing sample firm reports to provide a picture of Bangladesh reporting perspectives. Prior studies used similar items in different categories. For defining ICD index, the most significant items of ICD has been selected. Our ICD index consists of three categories, i.e. internal, external and human capital under which there are many different items that can be used to demonstrate the practice of ICD in the annual report. These soft assets will be searched in the annual report, and in some instances, relevant search terms will also be used where there are differences in the wording of the items.

3.3. Explanatory Variables

Table 1. List of variables with operational definitions

Variables name	Operational definition
Intellectual capital disclosure index (ICDI)	Total number of intellectual capital items disclosed by firm *j* to the total number of disclosure items applicable to the firm *j*
Board size (lnBSIZE)	Natural logarithm of total board members
Board independence (BINDP)	The proportion of non-executive directors on the board
Board gender diversity (BGDIV)	The proportion of female directors on the board
Leverage (LEV)	The ratio of total liabilities to total assets
Auditor type (AT)	If the company's audit firm has an international affiliation is 1 otherwise 0
Profitability (ROA)	The ratio of net income to total assets
Firm size (lnFSIZE)	Natural logarithm of total assets

Board size, board independence, board gender diversity, leverage, auditor type, profitability and firm size have been considered as independent variables. Independent variables have been analysed based on previous studies. Key corporate governance factors: board size, independence and gender diversity play a significant role in driving the corporate disclosures. For this reason, the explanatory variables used in this study may include variables used by other studies for corporate reporting practices. All the data regarding independent variables were collected from the company's annual reports.

3.4. Research Model

For constructing the ICD index (ICDI), content analysis is adopted. Content analysis is a common scientific and quantitative methodology in social science research, which depends on the comprehension of human communication; for instance, through writing. It refers to the ability to comprehend written texts, phrases, or terms (Campbell & Abdul Rahman, 2010; Kılıç & Kuzey, 2018). Stakeholder theory and legitimacy theory support the use of content analysis for ICD (Guthrie et al., 2004).

Statistical analysis is used to gauge the relationship between explanatory variables and ICD. Such analysis will include multiple regression analysis, Spearman correlation.

$$ICDI_{it} = \beta_0 + \beta_1 lnBSIZE_{it} + \beta_2 BINDP_{it} + \beta_3 BGDIV_{it} + \beta_4 LEV_{it} + \beta_5 AT_{it} + \beta_6 ROA_{it} + \beta_7 lnFSIZE_{it} + \sum year\_dummies_{it} + \sum industry\_dummies_{it} + e_{it}$$

4. Results and Discussion

4.1. Descriptive Statistics

Table 2. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ICDI	139	18.137	7.956	1	29
BSIZE	139	9.331	2.852	5	21
BINDP	139	.228	.087	0	.571
BGDIV	139	.144	.130	0	.429
LEV	139	.629	.415	.001	4.172
AT	139	.719	.451	0	1
ROA	139	.078	.122	-.128	1.244
lnFSIZE	139	24.502	1.267	21.202	27.525

Table 2 exhibits the descriptive statistics in reference to dependent and explanatory variables. The table presents the observation, mean, standard deviation, minimum and maximum value regarding the variables in the observed data set. The results indicate that the level and extent of ICD practice is low. Significant variations of ICD are also observed for the 139 firm-year sample. The mean of voluntary ICDI, as presented in Table 2, is 18.14 items and ranges from 1 to 29 with a standard deviation of 8. None of the organisations in the DS30 has disclosed all the items of the ICD index. Apart from this, the level and extent of disclosure practice are on an upward trend. Within the observation, a significant variation is also evident in reference to the independent variables, as exhibited by their maximum and minimum values. The number of members in the board of directors is on average about 1. On average, the representation of independent directors is 23 percent only, which is a little bit higher than the minimum threshold limit of 20 percent of total board members. It means, firms try to ensure they comply with the requirement to include independent members. In addition, the inclusion of female board members is on average, about 15 percent. Remarkably, the maximum proportion of female members is about 43 percent, which is praiseworthy in terms of gender equality in top management. The mean leverage is about 63 percent with a higher standard deviation of 41.5 percent. The auditor type is a dummy or binary variable and the result illustrates about 72 percent firms' external or statutory auditor(s) have an international affiliation. The possible explanation behind this scenario may be DS30 firms have large market value of equity capital. Thus, they select top audit firms, and these audit firms generally maintain international affiliation for increasing their brand value. The mean profitability of the sample firms is about 8 percent with standard deviation of 12.2 percent. This high deviation is due to the negative profitability of very few firms. The average value of firm size, natural log of total assets, is 24.50 with a standard deviation of 1.27 percent.

4.2. Correlation Matrix

For identifying the presence of an econometric problem, the data set used in the model is examined using the Spearman correlation matrix, as presented in Table 3 before running the regression analysis. The independence of variables is tested to ensure the nonexistence of exact multicollinearity problems, which may bias the results of multiple regression. The results exhibit a positive significant correlation of board independence and auditor type with ICDI at 5 the percent level. Moreover,

other explanatory variables fail to display any significant correlation with ICD index at the 5 percent level of significance.

Table 3. Correlation matrix analysis results

	ICDI	lnBSIZE	BINDP	BGDIV	LEV	AT	ROA	lnFSIZE
ICDI	1							
lnBSIZE	.131	1						
BINDP	.236*	-.196*	1					
BGDIV	-.111	-.152	.218*	1				
LEV	.040	.200*	-.026	.107	1			
AT	.247*	-.209*	.013	-.005	-.013	1		
ROA	.024	-.146	.129	.183*	.382*	.081	1	
lnFSIZE	.069	.358*	.031	-.056	.161*	-.039	-.350*	1

Notes: * Spearman correlation is significant at 5percent significance level

Variable inflation is used to test the presence of higher correlations between the explanatory variables. In Table 4, the result of the test for collinearity is exhibited. VIF for these variables ranged from 1.06 to 1.55, which is lower than the threshold of 1. The result indicates that there is no problem of collinearity between the explanatory variables.

Table 4. Variable inflation factor (Test of collinearity)

Variable	VIF	1/VIF
ROA	1.55	.6441
lnFSIZE	1.43	.6991
LEV	1.39	.7189
lnBSIZE	1.32	.7597
BIND	1.12	.8922
BGDIV	1.10	.9110
AT	1.06	.9466
Mean VIF	1.28	

4.3. Regression Result

The multiple linear regression analysis results are provided in the following table. Table 5 summaries the regression estimates of ICD on different independent variables. Columns (1) and (3) estimate the regression of ICD on only fundamental corporate governance characteristics, i.e. board size, independence and gender diversity without and with industry control respectively. In columns (2) and (4), we expand the model including more explanatory covariates (i.e. leverage, auditor firm with international affiliation, profitability and firm size) that may affect ICD quality without and with fixed effects of industry type respectively.

Column 4 demonstrates the result of our empirical model. The coefficient estimate 4.836 with 3.144 standard error (SE) suggests no significant impact of board size on ICD. Thus, we can reject the hypothesis, H1. Like some previous studies (Kılıç & Kuzey, 2018; Nurunnabi et al., 2011; Taliyang et al., 2011; Tejedo-Romero et al., 2017) we also fail to document any significant association between board size and IC disclosure.

Table 5. Regression models of ICD

Variable	(1)	(2)	(3)	(4)
Board size (lnBSIZE)	4.342*	6.294**	3.412	4.836
	(2.277)	(2.477)	(3.140)	(3.144)
Board independence (BIND)	26.658***	27.703***	16.733***	17.664**
	(6.920)	(6.502)	(7.584)	(7.274)
Board gender diversity (BGDIV)	-9.623**	-9.119**	-8.927*	-8.836*
	(4.229)	(4.368)	(4.927)	(5.151)
Leverage (LEV)		.291		-1.415
		(1.769)		(2.238)
Auditor type (AT)		5.072***		4.816***
		(1.524)		(1.440)
Profitability (ROA)		-.813		3.722
		(6.168)		(7.204)
Firm size (lnFSIZE)		-.246		-.431
		(.530)		(.683)
Constant	3.151***	.856	8.591	14.692
	(5.622)	(12.229)	(8.118)	(2.641)
Year control?	Yes	Yes	Yes	Yes
Industry control?	No	No	Yes	Yes
Sample size (firm-years)	139	139	139	139
R-squared	.127	.206	.409	.474
Adjusted R-squared	.081	.137	.326	.380

Notes: This table reports estimates of the determinants of ICD. Columns (1) and (3) reports coefficients from a regression using only corporate governance-related variables. The results in models (2) and (4) include all possible determinants. Robust and cluster standard errors are reported in parentheses. Robust standard errors are in column (1) and (2); and cluster standard errors are in column (3) and (4). 10%, 5% and 1% statistical significance from t-statistic is indicated with *, ** and *** respectively.

The estimate of board independence of 17.664 (SE=7.274) reported in column 4 explains the significant positive association with ICD. This result is statistically significant at the 5 percent level. Therefore, we cannot reject our null hypothesis, H2, and conclude that a higher proportion of independent board member increases the level and extent of ICD. This result coincides with the result of Wang and Hussainey (2013) but contradicts Rahman et al. (2019).

In contrast, the negative estimate (-8.836) of gender diversity implies a negative association with ICD. This means that the inclusion of female

directors reduces the ICD level, but the standard error (5.151) implies it is only statistically significant at the 10 percent level. Hence, we may reject hypothesis H3, as 5 percent significance level is usually considered the threshold. This negative result contradicts the result of Kılıç and Kuzey (2018) and Tejedo-Romero et al. (2017). Moreover, Rahman et al. (2019) do not document any significant impact of female directors.

For leverage, the estimate -1.415 (SE=2.238) explains no significant impact of leverage on ICD. Thus, we reject hypothesis H4. Nurunnabi et al. (2011) and Uyar and Kılıç (2012) also document an insignificant association between leverage and ICD which is consistent with our result. This finding, however, does not support the theoretical prediction of agency theory.

The estimate of auditor type variable reported in column (4) is 4.816 (SE=1.44). The result is statistically significant even at the 1 percent level. Thus, we cannot reject hypothesis H5 and conclude that a firm's auditor with international affiliation has a significant positive effect on the level of ICD in the annual report.

Generally, it is predicted that a profitable firm discloses more corporate information to gain the attention of stakeholders. Thus, we hypothesised a positive relationship between profitability and ICD. The estimate (3.722) of profitability does not suggest any statistically significant relationship. This result supports the finding of Nurunnabi et al. (2011), Taliyang et al. (2011) and Widiatmoko and Indarti (2017). Hence, we can reject hypothesis H6.

Similarly, larger firms are expected to disclose more to meet the higher expectation of capital providers. The coefficient estimate (-.431) and standard error (.683) of the firm size reported in column (4) indicate no significant relationship with ICD. Therefore, we also reject hypothesis H7. Although, prior studies (Brüggen et al., 2009; Martins et al., 2018; Nurunnabi et al., 2011; Rahman et al., 2019; Taliyang et al., 2011) identify firm size as one of the important explanatory variables that determines the corporate disclosure, like Widiatmoko and Indarti (2017), we do not find any significant association between firm size and ICD. This finding does not support the theoretical perspective of voluntary disclosure.

5. Conclusion

This study investigates the level and determinants of ICD in the annual reports of listed companies in Bangladesh. A self-constructed index score is developed using content analysis of annual reports. Based on the literature, we identified seven company attributes to examine the determinants of ICD. This study, surprisingly, does not find any financial

variables (e.g. profitability or leverage) that substantially impact on ICD. We find that independent or non-executive directors play a significant role in better corporate disclosure. More specifically, a higher proportion of independent directors on the board increases the ICD quality. This examination also explores the auditor's international affiliation, which considerably affects the level and extent of ICD. Firms with internationally affiliated external auditors disclose more IC-related information in the annual report than firms with a non-affiliated auditor. Thus, this paper documents a statistically significant positive relationship between audit firm's international affiliation and ICD. Contrary to our expectation, the inclusion of female board members decreases the level of ICD. Although this negative association is statistically significant only at 10 percent level. However, our investigation does not document any significant association between ICD and board size, leverage, profitability or firm size. The disclosure of IC and integration with financial and other non-financial information is growing. In the meantime, the annual reports of the firms are insufficient in many cases, which creates challenges. Internal capital disclosure varies from industry to industry. External capital includes certain items of IC that are considered value generators for an organisation. This study is initiated to identify the infancy of IC disclosure in Bangladesh.

The findings of this paper should be interpreted in light of the following limitations. Although the size of firm-year observations is greater than previous literature in Bangladesh, a sample size of 30 firms is still small. Secondly, the selection of DS30 firms ignores variations of company nature and differences in terms of size and performance. Finally, only 30 disclosure items may not be intuitive, where authors consider a large number of items. Therefore, in future research, more disclosure items can be included, and primary data like interviews of professionals and other secondary sources like the firm's website can also be considered. Moreover, comparative studies covering other developing countries can be considered to portray IC reporting practices. The value relevance of corporate non-financial disclosure, e.g. ICD in the capital market can be investigated. Due to endogeneity concerns, researchers may need to identify instrumental variables. The findings of this paper may help researcher identify the potential instrumental variable(s) for further studies like the examination of the impact of IC on firm performance and other financial attributes. Regulators and policymakers may consider the findings of this paper before setting corporate governance regulations, particularly for listed companies. A positive association of board independence urges the inclusion of more independent directors on the

board. External auditors may also play a vital role in the overall enhancement of corporate disclosure.

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Appendix

DS30 companies list (as at May 7, 2018)

SL	Company name	SL	Company name
1	ACI Limited	16	LankaBangla Finance Ltd
2	British American Tobacco Bd. Com. Ltd	17	LafargeHolcim Bangladesh Ltd
3	Bangladesh Export Import Com. Ltd	18	MJL Bangladesh Limited
4	BRAC Bank Ltd	19	Meghna Petroleum Limited
5	Bangladesh Steel Re-Rolling Mills Ltd	20	National Bank Ltd
6	BSRM Steels Ltd	21	Olympic Industries Ltd
7	Beximco Pharmaceuticals Ltd	22	Orion Pharma Ltd
8	The City Bank Ltd	23	Padma Oil Co. Ltd
9	Delta Life Insurance Com. Ltd	24	RAK Ceramics (Bangladesh) Ltd
10	Eastern Bank Ltd	25	Renata Ltd
11	Grameenphone Ltd	26	Singer Bangladesh Ltd
12	Heidelberg Cement Bd. Ltd	27	Square Pharmaceuticals Ltd
13	IDLC Finance Ltd	28	Summit Power Limited
14	IFAD Autos Limited	29	Titas Gas Transm. & Dist. Co.
15	Islami Bank Bangladesh Ltd	30	Unique Hotel & Resorts Ltd

ICD index items

Category	Items
Internal capital	Copyrights
	Corporate culture
	Leadership
	Information systems
	Cultural diversity
	Management philosophy
	Management process
	Patents
	Research and development
	Trademarks
External capital	Beating the competition
	Brands
	Supplier knowledge
	Company Reputation
	Customer loyalty
	Customers
	Distribution channels
	Licensing agreements
	Market share
	Quality standards
Human capital	Number of employees
	Academic qualifications
	Career and development
	Employee demographics breakdown
	Employees thanked
	Health and safety
	Know-how/Skills
	Professional qualifications
	Human Capital/Resources
	Training

Notes: Adopted from: (Alfraih, 2017; Bharathi Kamath, 2008; Brennan, 2001; Guthrie & Petty, 2000; Nurunnabi et al., 2011; Singh & Van der Zahn, 2008)