

Impact of Corporate Governance on Intellectual Capital Efficiency: Evidence from Sri Lanka

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Purpose of this study is to investigate the impact of corporate governance (CG) attributes on intellectual capital (IC) efficiency of listed Sri Lankan manufacturing sector companies from 2017-2019. This study uses data extracted from audited financial statements of 31 companies for three years (i.e. 2017-2019). The study develops hypotheses on CG attributes; board size, board composition, CEO duality, audit committee size, audit committee independence, audit committee meetings and IC efficiency. Findings of the study reveal that board size, board composition, audit committee size, and audit committee independence are significantly associated with IC efficiency and explained the relationship in the expected direction. In contrast, CEO duality found to have a significant positive association with IC efficiency. The findings of the study provide contextual specific insights on how CG attributes influence IC efficiency and practical insights on what CG attributes should consider in developing IC in manufacturing organizations. This study would stand as the first study in the Sri Lankan context to investigate the impact of CG attributes on IC efficiency.

JEL Codes: M41, G32, G34 and C33

1. Introduction

Development of a knowledge-based economy has eroded the traditional approaches to obtain competitive advantages. IC has materialized as a strategic asset that generates sustainable competitive advantage for modern organizations (Appuhami & Bhuyan, 2015; Brooking, 1997). Thus, organizations tend to invest in employee training and development, research and development, information technology, advanced technologies, customer relations, connectivity and networking (Organization for Economic Corporation and Development [OECD], 2019). IC creates wealth for the organization by developing and sustaining creativeness, innovativeness, information technology, interpersonal activities, and competitive advantage and is positioned in people, structures, and relationships (Guthrie, 2001; Appuhami & Bhuyan, 2015). Edvinsson (1997) defines IC as “the possession of the knowledge, applied experience, organizational technology, customer relationship and professional skills that provide a competitive edge in the market” p.368. IC has gained much attention among academic researchers and practitioners since IC has been considered the main driver in creating and maintaining superior performance (Tan, Plowman & Hancock, 2007). Thus, several studies have emphasized the strategic importance of efficiently managing and controlling IC to obtain competitiveness in the market place (Kehelwalatenna & Premaratne, 2013; Riahi-Belkaoui, 2003; Tan et al., 2007). Review of IC literature reveals that there were ample research studies available on the relationship between IC efficiency and firm

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performance (Clarke, Seng & Whiting, 2011; Kamath, 2007; Kehelwalatenne & Premaratne, 2013; Riahi-Belkaoui, 2003; Tan et al., 2007; Zeghal & Maaloul, 2010). The above studies show mixed results when it comes to the impact of IC efficiency on firm performance. Further, empirical studies noted that organizations are not sufficiently utilizing their IC for wealth creation (Buallay, 2018; Firer & Williams, 2013). In this regard, it is advisable to investigate factors that influence IC efficiency in organizations. CG is a framework directed towards controlling managerial decision making. Several studies have highlighted the importance of CG in efficiently managing IC in organizations (Appuhami & Bhuyan, 2015; Aslam & Haron, 2020; Buallay, 2018; Buallay & Hamdan, 2019; Dashtbayaz, Salehi, Mirzaei & Nazaridavaji, 2020). Since the IC is a significant participant in the value creation process (Holland, 2003), it is necessary to identify the effective CG mechanisms to improve the IC efficiency (Buallay, 2018).

There are several prior studies in the literature that analyze the impact of CG attributes on IC efficiency (Appuhami & Bhuyan, 2015; Aslam & Haron, 2020; Buallay, 2018; Buallay & Hamdan, 2019; Dashtbayaz et al., 2020; Nadeem, Farooq & Ahmed, 2019; Tran, Van & Vo, 2020). However, the focus of those studies has rested in different contexts and different sectors around the world. For example, the Australian service sector (Appuhami & Bhuyan, 2015), Middle Eastern, South Asian and Southeast Asian Islamic banking sector (Aslam & Haron, 2020), Banks in Gulf Corporation Countries (Buallay, 2018), Saudi listed companies (Buallay & Hamdan, 2019), Iranian listed companies (Dashtbayaz et al., 2020), listed companies in United Kingdom (Nadeem et al., 2019) and Vietnamese listed companies (Tran et al., 2020). Although the above studies reveal the impact of CG on efficient management and development of IC, findings show mixed results. Further, CG structure is country-specific, and its impact on IC development will differ from country to country (Appuhami & Bhuyan, 2015; Aslam & Haron, 2020). Hence, Aslam and Haron (2020) call for further research on how diverse CG mechanisms influence decisions leading to IC efficiency. Despite these, review of IC literature reveals studies that review the role of CG in developing IC in the Sri Lankan context is minimal (Puwanenthiren, 2018). The above research also has investigated the association of CG on IC disclosures. Thus, this study focuses on explaining how CG attributes impact on the efficiency of IC.

Sri Lanka, since the economic liberalization in 1978, the country has moved from an agrarian economy to a service-based economy, surpassing a manufacturing-based economy (Central Bank of Sri Lanka [CBSL], 2017). According to Central Bank statistics, the contribution of the manufacturing sector to the gross domestic production (GDP) from 1978 to 2016 remains stagnated at 19 to 15 percent, while the contribution from the agricultural sector was declining and the service sector and non-manufacturing sector considerably increasing. The economists have highlighted the importance of restoring the growth of the manufacturing sector in order to abstain from this premature deindustrialization development pattern to achieve sustainable economic growth (CBSL, 2017). Further, the manufacturing sector plays a vital role in gaining sustainable economic development (Li, Xue & Huang, 2018). OECD (2019), highlighted the importance of skill development of employees, technological developments, and process and product innovations to escalate the growth of the manufacturing sector. At this juncture, it is necessary to explore the development of

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IC in the manufacturing sector as a strategic source for creating value and increase organizational performance.

Hence, considering the above facts, the present study attempts to address how CG attributes influence IC efficiency of manufacturing sector organizations in Sri Lanka. Hypotheses were developed in light of agency theory and past studies about the relationship between different CG attributes (board size and composition, Chief Executive Officer [CEO] duality, and Audit Committee [AC] size, independence and meeting frequency) and IC efficiency. The dependent variable IC efficiency is measured using Value Added Intellectual Coefficient (VAIC™).

The remainder of the paper is organized as follows. Section 2 of the paper reviews the related literature and development of hypotheses of the study; Section 3 describes the research design of the study; Section 4 presents the empirical results based on the analyses carried out, and section 5 presents the discussion and conclusion.

2. Review of Literature and Hypotheses Development

2.1 Classification of IC and IC Efficiency

The consultation of IC literature shows that there are several frameworks for classifying and measuring IC. Edvinson (1997) has classified IC as the sum of human capital and structural capital. In another classification, human capital, structural capital and relational capital are identified as the components of IC (Bontis, 1998; Harris, 2000; Mouritsen, 1998; Pablos, 2002). Instead of structural capital and relational capital, internal capital and external capital have identified along with human capital in the classification (Abeysekara, 2008; Guthrie & Petty, 2000). However, Lim and Dallimore (2004) categorized IC into eight sub-components: human capital, corporate capital, business capital, functional capital, customer capital, alliance capital, supplier capital, and investor capital. Analysis of the classification of IC indicates that the majority of prior studies have adopted the three categorizations, which include the IC sub-components such as human capital, structural capital and relational capital (Bontis, 1998; Harris, 2000; Mouritsen, 1998; Pablos, 2002).

Even though there were different terms used by different scholars, the understanding tends to be similar between the above-mentioned IC categories. Human capital (HC) represents the knowledge, experience and skills of the employees of the firm and the commitment and motivation of the employees attributable to their continuance in the firm (Pablos, 2005). HC includes education, skills, training, values, experience, commitment, motivation and creativity of organizational employees (Guthrie & Petty, 2000; Pablos, 2005, Joshi et al., 2011). Structural capital (SC) refers to the infrastructure of the organization that facilitate knowledge creation and development as well as organizational structures rooted within the organization (Pablos, 2005). This includes organizational routines, procedures, systems, cultures, organizational flexibility, information technologies, organizational learning capacity, and legally protected intellectual property rights (Guthrie & Petty, 2000; Riahi-Belkaoui, 2003). Relational capital (RC) of an organization refers to the relationship with its stakeholders (Choong, 2008). Elements of RC includes the relationship with

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customers, suppliers, market channels, government, related associations and society (Bontis, 1998; Pablos, 2005).

There has been epidemic research in the literature in relation to measuring IC efficiency. The difficulty in measuring IC efficiency is commonly acknowledged in the literature. Whilst there are several models that researchers have developed, three specific models are widely being used; the Economic Value Added (Bontis et al., 1999), Tobin's q (Bontis, 1998) and VAICTM (Pulic, 1998). Among the above, the VAICTM model has gained significant attention due to its ability to capture contribution from every resource of the organization, that is, human, structural, physical and financial resources (Zeghal & Maaloul, 2010).

2.2 CG Attributes

According to Parkinson (1994), CG is the process of supervision and control aimed at ensuring the activities of an organization's management in line with the best interest of shareholders. In that respect, the influence of CG attributes on developing IC, and its performance can be considered vital.

2.2.1 Board of Directors (BOD)

According to the Institute of Chartered Accountants of Sri Lanka [ICASL] (2017), BOD has an enormous responsibility towards the activities of a company to develop a sustainable business strategy. BOD collectively responsible for the organizational actions for the shareholders at the end of the day. From an agency theory perspective, BOD act as agents, appointed by shareholders (the principal) on their behalf, which possess the authority to make decisions for the best interest of shareholders (Jensen & Meckling, 1976). Thus, it can be considered that the development of IC will depend on BOD activities whereby they can determine how much to invest in IC, which will influence the value creation at the end of the day. Consequently, it can be said that board characteristics such as; board size, independence, separation of the role of CEO and Chairman may enhance the effectiveness of decision making. Several prior studies have examined board characteristics and their influence on IC efficiency (Appuhami & Bhuyan, 2015; Aslam & Haron, 2020; Dashtbayaz et al., 2020; Dalwai & Mohammadi, 2020; Tran et al., 2020).

2.2.1.1 Board Size

Board size denotes the total number of board members on the board. Jensen (1993) has claimed that the larger the board size, it is harder to communicate, coordinate and control the management behaviour. However, larger boards will have the privilege to deploy directors with diverse experience. Several previous studies have investigated the impact of board size on IC efficiency (Appuhami & Bhuyan, 2015; Aslam & Haron, 2020; Dashtbayaz et al., 2020; Dalwai & Mohammadi, 2020; Tran et al., 2020). Empirical findings of Tran et al. (2020) a study conducted using 45 listed firms in Vietnam, shows a significant negative impact between board size and IC efficiency. Appuhami & Bhuyan (2015), Aslam & Haron (2020), Dashtbayaz et al. (2020), and Dalwai & Mohammadi (2020) found to have a positive association between board size and IC efficiency. Taking into consideration agency theory and

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Tran et al. (2020), this study formulates the hypothesis to determine the association of board size and IC efficiency as:

H₁: There is a negative relationship between the board size and IC efficiency.

2.2.1.2 Board Composition

Board composition refers to the number of independent non-executives in proportion to the total number of directors on board. According to agency theory, independent non-executive directors play an independent monitoring role to enhance the corporate performance whilst minimizing the agency problem. The balanced view of independent non-executive directors will reduce the opportunistic behaviour of management. The findings of the previous studies provide mixed results on board composition and IC efficiency. A study by Appuhami and Bhuyan (2015) that investigate board composition and IC efficiency of Australian service organizations have found a significant positive association. Another study by Aslam and Haron (2020), conducted in the Islamic banking sector in the Middle East, South Asian and Southeast Asian countries, have exposed a significant positive relationship. Further, a study carried out by Dashtbayaz et al. (2020), using the listed firm in Tehran Stock Exchange, found to have a significant positive relationship between board composition and IC efficiency. In contrast to agency theory, some studies have exposed a negative association between board composition and IC efficiency (Dalwai & Mohammadi, 2020; Tran et al., 2020). However, consistent with agency theory and the findings discussed above, this study constructs the hypothesis to investigate the relationship of board composition as follows;

H₂: There is a positive relationship between the proportion of independent non-executive directors and IC efficiency.

2.2.1.3 CEO Duality

CEO duality is another variable to measure the independence of the board of directors. This is evaluated based on whether one person holding both the CEO and the head position of the board of directors. The existence of duality provides broader power over the decision-making board and operational activities whilst weakening the board independence (Appuhami & Bhuyan, 2015). Agency theory suggests that separating the roles of CEO and Chairman will reduce agency problem as it avoids one person holding unfettered power over decision making. Several empirical studies have considered the impact of CEO duality on IC efficiency (Appuhami & Bhuyan, 2015; Aslam and Haron, 2020; Buallay & Hamdan, 2018; Dashtbayaz et al., 2020; Tran et al., 2020). A study by Aslam and Haron (2020) show a significant negative relationship between CEO duality and IC efficiency. Appuhami and Bhuyan (2015) have found a significant positive association between CEO duality and IC efficiency contradictory to agency theory. Further, studies have found insignificant mixed results in relation to CEO duality and IC efficiency (Buallay & Hamdan, 2018; Dashtbayaz et al., 2020). Considering the above factors and following the agency theory, the current study formulates the association of CEO duality and IC efficiency as;

H₃: There is a negative relationship between the CEO duality and IC efficiency.

2.2.2 AC Attributes

Apart from board characteristics, independent subcommittees to the board perform an important role in monitoring and controlling the decision-making process of an organization (Cotter & Silvester, 2003; Li et al., 2008). According to Smith Report (2003), the purpose of AC is to ensure an organization's financial reporting and internal controls are properly managed in order to protect the interest of shareholders. Availability of AC is seen as a device for reducing information asymmetry between management and shareholders and also protects investors (McMullan, 1996). In general, the AC is considered a critical and influential mechanism in CG. Recent studies have shown that an audit committee is an effective governance mechanism, including its role in monitoring internal controls, strengthening the role of independent directors and coordinating internal and external auditor's roles (Haji, 2015). There were limited prior studies available that considered AC attributes in assessing the relationship between CG attributed and IC efficiency (Appuhami & Bhuyan, 2015; Aslam and Haron, 2020; Buallay, 2018)

2.2.2.1 AC size

The AC size refers to the number of members who are forming the committee. In order to perform the role effectively, AC should have adequate resources and authority (Li, Mangena & Pike, 2012). That means, for the purpose of controlling and monitoring top management activities, the AC must have enough members to carry out their responsibilities (Vinten & Lee, 1993). Therefore, AC size is an integral factor for firms to ensure effective monitoring of management behaviour. According to ICASL (2017), AC should exclusively be formed of a minimum of three non-executive directors whilst two should be independent non-executive directors. A review of the literature reveals a limited number of studies that have examined the relationship between AC size and IC efficiency. Among those, Buallay (2018) and Appuhami and Bhuyan (2015) provide mixed associations with AC size and IC efficiency. According to Aslam and Haron (2020), Human Capital Efficiency (HCE) have a significant positive association with AC size and Structural Capital Efficiency (SCE), and Relational Capital Efficiency (RSE) have a significant negative association with AC size. However, for the purpose of the current study, the hypothesis is formulated as;

H₄: There is a positive relationship between the AC size and IC efficiency.

2.2.2.2 AC Independence

AC independence is another variable to measure AC performance. This refers to the number of independent non-executive directors in proportion to the total number of members of the AC. According to ICASL (2017), AC should comprise exclusively non-executive directors, from which the majority should be independent non-executive directors. The independence of AC will influence the quality of decision making as it creates no conflicting interest due to liberated actions of independent non-executive directors. From an agency theory perspective, AC independence will ensure proper decision making is done relating to IC investment and performance. Prior studies which investigated AC independence and IC efficiency have provided mixed results. In the Australian service sector, AC independence found to have no impact on IC efficiency (Appuhami & Bhuyan, 2015). Another study by Buallay

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(2018) has claimed a significant positive influence of AC independence on IC efficiency. Following agency theory and results of prior studies hypothesis for the current study was is formulated as;

H₅: There is a positive relationship between AC independence and IC efficiency

2.2.2.3 AC Meetings

AC meetings refer to the frequency of AC meetings during the year. The number of AC meetings is the only publicly available quantitative signal about the diligence of the AC (Raghunandan & Rama, 2007). Further, the greater meeting frequency will demonstrate the due diligence of AC in carrying out their responsibilities (Dezoort et al., 2002). According to Financial Reporting Council (2016), it is recommended to have not less than three AC meetings per year. Prior literature has studied the relationship between AC meetings and firm performance (Raghunandan & Rama, 2007, Aldamen et al., 2012), level of IC disclosures (Li et al., 2012; Haji, 2015) and IC efficiency (Buallay, 2018; Dalwai & Mohammadi, 2020). According to Raghunandan & Rama (2007), AC meetings have a positive relationship with growth and profitability. Buallay (2018) has found significant positive results between AC meetings and IC efficiency. Another study by Dalwai and Mohammadi (2020) claimed that there is a significant positive relationship between AC meetings and IC efficiency. Thus, with the more frequency of AC meetings, it is expected to improve the quality and quantity of IC performance, and the hypothesis of the current study develops as follows;

H₆: There is a positive relationship between the AC meetings and IC efficiency.

3. Methodology

3.1 Sample and Data

The current study focuses explicitly on manufacturing sector companies in Sri Lanka. The selection of the manufacturing sector to study the impact of CG on IC efficiency is based on several reasons. Firstly, it is noted that the contribution of the manufacturing sector to the GDP of Sri Lanka is stagnated since 1978 (CBSL, 2017), and due to low economic growth, economists have refocused their attention to escalate the growth of the manufacturing sector to achieve sustainable economic growth. In the above course, it is vital to examine the IC development of the manufacturing sector in order to facilitate growth. Secondly, it has been noted that there were limited attempts made to examine the impact of CG on IC efficiency in the manufacturing sector of Sri Lanka. Therefore, the present study carried out using data of manufacturing firms listed in Colombo Stock Exchange (CSE), Sri Lanka, for the period of 2017/2018 to 2019/2020. Initially, the population of the study made up of 38 companies, out of which annual reports for 31 companies were retrievable for the research purpose. Owing to unavailability of data for the selected period and duplication of information, the study eliminated 3 companies. Further, 4 companies were removed due to the difference in the financial period. Finally, 93 firm-year observations were made to carry out the study.

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3.2 Measurement of CG Attributes and Control Variables

The present study examines the impact of CG attributes on IC efficiency. Data related to CG attributes were collected from the annual reports of selected companies and measured through board size (BSIZE), board composition (BCOM), CEO duality (DUAL), AC size (ACS), AC independence (ACIND), and AC meetings (ACM). Table 1 presents a detailed explanation of all variables.

Table 1: Summary of variables

Variable	Definition	Measurement
<i>Dependent variable</i>		
IC	IC efficiency	VAIC™
<i>Independent variables</i>		
BSIZE	Board size	Total number of members of the board of directors
BCOM	Board composition	The number of independent non-executives divided by the total number of directors on board
DUAL	CEO duality	Equals to 1 if the CEO holds the head position of the board simultaneously, otherwise 0.
ACS	AC size	Total number of members in the AC
ACIND	AC independence	The number of independent non-executive directors divided by the total number of members in the committee
ACM	AC meetings	Frequency of AC meetings held annually
<i>Control variables</i>		
LFSIZE	Firm size	Equals to the logarithm of the total sales
LEVERAGE	Financial Leverage	Equals to total debt on total assets

Grounded on the prior literature, control variables were selected for the present study. Review of literature reveals that previous studies have identified various control variables which might have an impact on IC efficiency other than CG attributes. According to Appuhami and Bhayun (2015), firm size, firm performance, capital structure, AC size and remuneration committee size have been identified as control variables. Aslam and Haron (2020) have identified firm size, leverage, and foreign ownership under bank characteristics, gender and number of board meetings under board characteristics, and GDP under macro-economic factors. Another study by Dashtbayaz et al. (2020) has considered firm size, financial leverage and return on investment as control variables. Similarly, Dalwai & Mohammadi (2020) have identified firm size, financial leverage, return on equity as control variables in their study. In this regard, the existing study has considered the size of the firm and leverage of the firm as control variables. In measuring the firm size, the natural logarithm of total sales of the company was considered. Financial leverage was measured using the ratio of total debt to total assets.

3.3 Measurement of IC Efficiency

In many countries, including Sri Lanka, VAIC™ was the commonly used tool to measure IC efficiency (Appuhami & Bhuyun, 2015; Buallay, 2018; Clarke et al.,

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2011; Makki & Lodhi, 2014; Tan et al., 2007). Further, the data required to calculate VAICTM are standard financial numbers that are freely available in audited financial statements. Therefore, in the current study, VAICTM model has been used to form the underlying basis of measurement for IC efficiency. This model calculates the IC efficiency using the sum of three efficiency measures, namely, Capital Employed Efficiency (CEE), HCE and SCE. Equation 1 presents the VAICTM relationship;

$$VAIC^{TM}_{it} = CEE_{it} + HCE_{it} + SCE_{it} \quad (1)$$

Where VAICTM_{it} = IC coefficient for firm *i* at year *t*; CEE_{it} = VA_{it}/CE_{it}; CEE for firm *i* at year *t*; HCE_{it} = VA_{it}/HC_{it}; HCE for firm *i* at year *t*; SCE_{it} = SC_{it} /VA_{it}; SCE for firm *i* at year *t*; CE_{it} = book value of the net assets for firm *i* at year *t*; HC_{it} = total investment salary and wages for firm *i* at year *t*; SC_{it} = VA_{it} – HC_{it}; structural capital for firm *i* at year *t*, and VA_{it} = the value added by the resources of firm *i* at year *t*. Equation (2) shows how to calculate VA_{it};

$$VA_{it} = DP_{it} + I_{it} + D_{it} + T_{it} + R_{it} \quad (2)$$

Where DP_{it} = depreciation expenses of firm *i* at year *t*; I_{it} = interest expenses of firm *i* at year *t*; dividends of firm *i* at year *t*; T_{it} = corporate taxes of firm *i* at year *t*; R_{it} = retained profits of firm *i* at year *t*.

After considering the above independent, dependent and control variables, the following regression model developed to test the hypotheses.

$$IC_{it} = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 BCOM_{it} + \beta_3 DUAL_{it} + \beta_4 ACS_{it} + \beta_5 ACIND_{it} + \beta_6 ACM_{it} + \beta_7 LFSIZE_{it} + \beta_8 LEVERAGE_{it} + \epsilon_{it} \quad (3)$$

4. Analysis and Findings

Table 2 presents a summary of descriptive statistics for the dependent and independent variables used in the study. The mean of the IC efficiency is 2.44 for the selected companies over the period of 2017-2019. The results show a higher standard deviation of 2.16, which demonstrates the difference of IC efficiency of the selected manufacturing firms of the study and values are positioned in a wider range. The minimum IC efficiency is -1.75, and the maximum value is 9.96. Further, the positive skewness shows that many of the selected companies of the sample report an IC efficiency less than the mean value; meanwhile, certain companies report extremely high IC efficiency values.

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Table 2: Summary of Descriptive Statistics

	IC	BSIZE	BCOM	DUAL	ACS	ACIND	ACM
Mean	2.44	7.87	0.74	0.10	3.00	0.89	4.13
Median	2.00	8.00	0.75	0.00	3.00	1.00	4.00
Std. Deviation	2.16	1.91	0.16	0.30	0.70	0.15	1.34
Skewness	0.83	0.72	-0.13	2.72	1.90	-0.62	-0.37
Kurtosis	4.25	3.80	1.85	8.44	12.98	1.45	5.57
Minimum	-1.75	5.00	0.42	0.00	2.00	0.67	0.00
Maximum	9.96	14.00	1.00	1.00	7.00	1.00	8.00

Note: Number of observations is 93

It can be observed that the average number of board members is 8 of the sample companies with a range of 5 to 14 members. On average, 74 percent of the board represents non-executive directors above the code of best practice of 2017 requirement. Further, the maximum value of 100 percent and minimum value of 42 percent shows that every company in the sample has complied with the code of best practice of 2017 in terms of board composition. Companies with CEO duality counts to 10 percent indicates that in most of the sample companies CEO does not serve as the chairman of the board.

Further, the average number of members of the AC in the selected companies are 3, and this indicates that companies are complying with the code of best practice of 2017, which states to maintain 3 to 5 members. However, the minimum value reported is 2, which indicates that there are companies that do not comply with the best practice while the maximum value reported is 7 members. On average, 89 percent of the AC members are independent non-executive directors in the selected sample companies. Concerning the AC meetings, the average number of 4 meetings conducted per year. This complies with the code of best practice which has recommended conducting 4 meetings per year. In contrast, it is observed certain companies have not conducted AC meetings while the maximum number of meetings conducted was 8.

Before performing the regression analysis, the correlation coefficients between independent variables were analyzed to check the multicollinearity problem. In this respect, correlation coefficients of all possible associations between board size, board composition, CEO duality, AC size, AC independence, and AC meetings were observed. Among all possible correlations between independent variables considered in the study a minimum correlation of -0.264 between board composition and AC independence was reported, whereas, the highest correlation of 0.327 between board size and AC size was existed. These results indicate a weak relationship between independent variables, thus concludes the absence of multicollinearity problem.

Table 3: Regression Estimates

Model: $IC_{it} = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 BCOM_{it} + \beta_3 DUAL_{it} + \beta_4 ACS_{it} + \beta_5 ACIND_{it} + \beta_6 ACM_{it} + \beta_7 LFSIZE_{it} + \beta_8 LEVERAGE_{it} + \varepsilon_{it}$			
Variable	Coefficient	t-statistic	p-value
β_0	-2.27	-0.51	0.61
β_1 BSIZE	-0.12	-1.64	0.10 ^γ
β_2 BCOM	3.12	2.12	0.03 ^β
β_3 DUAL	1.69	1.91	0.05 ^β
β_4 ACS	0.49	4.81	0.00 ^α
β_5 ACIND	3.06	4.94	0.00 ^α
β_6 ACM	-0.17	-0.60	0.54
β_7 LFSIZE	0.01	0.04	0.96
β_8 LEVERAGE	-1.02	-1.23	0.22
Adjusted R² = 0.04; F-statistic = 1.49 (0.17)			
Note: Number of observations is 93; Estimates are based on random effects model selected through the Hausman Specification Test; Levels of significance are α=0.01, β=0.05, and γ=0.10.			

Table 3 presents the results of selected firms for three years using random effects model, and for the selecting purpose, the Hausman Specification Test was carried out. The F-statistic of the model is 1.691, and the adjusted R² is 0.03. According to the regression estimates, board size depicted a significant negative relationship with IC efficiency. Board composition and CEO duality characterized a positive association with IC efficiency at a 95 percent level of significance. However, in contrast to the literature, CEO duality found to have a positive coefficient on IC efficiency. Further, AC size and AC independence demonstrated a significant positive association with IC efficiency. Hence, predicted negative relationship between board size and IC efficiency (H₁), positive relationship between board composition and IC efficiency (H₂), positive relationship between AC size and IC efficiency (H₄), and positive relationship with AC independence and IC efficiency (H₅) of the study can be supported whereas, predicted negative relationship with CEO duality and IC efficiency (H₃) and positive relationship with AC meetings (H₆) are not supported by the statistical evidence of data analysis. However, the study has found that the frequency of AC meetings has no influence on IC efficiency in the selected sample. Regarding the control variables, firm size depicted a positive and leverage depicted a negative but insignificant influence on IC efficiency, which is not consistent with the previous findings.

5. Discussion and Conclusion

According to prior literature, it has mixed results on the relationship between CG attributes and IC efficiency. The present study found to have a significant negative association between board size and IC efficiency in line with previous studies conducted in Vietnam (Trans et al., 2020) and Western Europe and North America (De Andres et al., 2005). This finding is coherent with the agency theory as it suggests large boards will hinder firm performance due to the inability to control and coordination problems. Thus, the findings of the study imply that a large board size

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will negatively impact the IC efficiency. Board composition positively associates with the IC efficiency in the study.

Similarly, Aslam and Haron (2020), Appuhami and Bhuyun (2015), and Ho and Williams (2003) demonstrated significant positive results with board composition and IC efficiency. According to agency theory, independent non-executive directors will reduce the agency problem while improving organizational performance. Hence, these results suggest that independent non-executive directors act in favour of shareholders and ensure wealth maximization and development of IC efficiency to add value to the organization. When considering the CEO duality, the findings of the study show a significant positive relationship with IC efficiency, unlike in agency theory and the findings of Alsam and Haron (2020). However, this finding is consistent with Appuhami and Bhuyun (2015). The results suggest that CEO duality will improve IC efficiency.

Consistent with prior studies (Li et al., 2008; Buallay, 2018), AC size found to have a significant positive relationship with IC efficiency. According to the agency theory, the findings justify the fact that organizations ability to develop IC with the involvement of AC. However, studies have found negative (Dashtbayaz et al., 2020) and mixed (Aslam & Haron, 2020) relationship with AC size and IC efficiency. Further, the results of the study show a significant positive association between AC independence and IC efficiency coherent with Buallay (2018). In contrast, Dashtbayaz et al. (2020) have found no significant relationship between AC independence and IC efficiency. However, from an agency theory perspective, findings of the study stress the key role of independent non-executive directors monitoring and controlling investments of the organization. In relation to AC meetings, contrary to the hypotheses developed, the study found a negative non-significant relationship with IC efficiency. In contrast, Dalwai and Mohammadi (2020) and Li et al. (2008) have found a significant positive relationship between AC meetings and IC.

The objective of this study is to examine the influence of CG attributes, mainly board attributes (board size, composition and CEO duality) and AC attributes (AC size, independence and meeting frequency), on IC efficiency in the manufacturing sector of Sri Lanka using 93 firm-year observations. Hypotheses were developed based on agency theory relation to board size, board composition, CEO duality, AC size, AC independence and AC meetings with IC efficiency. According to the analysis of the study, board size, board composition, AC size and AC independence depicted the relationship in the anticipated direction. In contrast, CEO duality demonstrated a positive association, and AC meetings demonstrated a negative association with IC efficiency.

The current study contributing to the literature in several means. Most of the existing studies in this area has been empirically tested in developed countries (UK), Gulf countries and OIC countries, whilst the current investigation extended towards a South Asian country, Sri Lanka. In this respect, existing study provide contextual specific insights to the literature about how CG attributes influence IC efficiency. Further, prevailing studies have focused on the banking or service sector while the current study focused on the manufacturing sector. Correspondingly, the study

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contributes to the practitioners by laying a foundation and knowledge on what CG attributes to consider developing IC efficiency in the manufacturing sector.

The identification of certain limitations is possible, referring to the content of this study. However, some of these limitations contribute to suggestions for future research and success of the future research. This study cannot be generalized to other industries or sectors since there are some identical differences in the manufacturing sector and other sectors in terms of the resource base, use of knowledge, etc. Further, the efficiency of the model developed in the study is at a lower rate, and future researches need to be cautious in carrying out IC studies in the manufacturing sector. Moreover, the current study used the VAIC™ model in valuing IC efficiency, and it is advisable to consider a more accurate method to calculate IC efficiency in the manufacturing sector.

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