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Contents

Reducing Agency Costs through Balanced Decision-Making Power in Sri Lanka

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Abstract

The aim of this study is to examine how corporate decision-making dominance leads to agency conflict between managers and shareholders of Sri Lankan firms where board members and managers are presumed to be dominant in decision-making upon legitimate power and some socio-cultural individualities. Panel data window covers 200 firms listed in the Colombo Stock Exchange for a period of thirteen years starting from 2011. Different proxies were separately used to measure board decision-making dominance, managerial decision-making dominance, and agency cost. The findings reveal that board decision-making dominance does not increase agency costs, suggesting that existing good practices of corporate governance may have encouraged dual leadership structure and board balance. In contrast, managerial decision-making dominance leads to severe agency conflicts, suggesting when managers hold excessive decision-making power, agency conflicts are intensified. In terms of large shareholders, their presence does not play any moderating role on the relation between corporate decision-making dominance and agency dynamics. It seems that their influence might not be strong enough to make such interaction effect given that the lack of shareholders' activism in Sri Lanka. Conclusively, the study suggests the implementation of checks and balances to prevent excessive concentration of decision-making power within the board room and management team. Thus, regular reviews and assessments on the distribution of power among upper echelons are required to maintain a balanced and effective governance structure.

Keywords: corporate governance, board dominance, managerial dominance, agency costs, large shareholders

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1. Introduction

Managerial power and decision-making behavior are crucial to understanding how organizations function. Managers control resources, set strategies, and influence people, which gives them a powerful role in shaping outcomes. Different theories explain how this power operates. Yukl (2013) explained that managers with knowledge can influence key strategic choices. French and Raven (1959) outlined coercive power can lead to compliance, but excessive use can reduce trust and long-term commitment, affecting the quality of decisions. Pfeffer (1992) also argued that organizations are political systems where managers use power and influence to achieve their goals. This can ultimately lead to the maximization of shareholders' wealth.

However, when the firm becomes larger, the problem of the separation of ownership and control, seminally identified by Berle and Means (1932) for the large corporation, can arise where managers do not act in the best interest of shareholders. This can eventually lead to an agency cost where the theory was first outlined by Smith (1776) as conflicts of interest that exist between so-called agent and agent-principal. This was later formalized by Jensen and Meckling in 1976 highlighting the increased agency cost owing to the self-interested behavior of managers.

When managers use their decision-making power to pursue such self-interested behavior, it can lead to agency costs. Such power can be generated through legitimacy and some socio-cultural characteristics of managers (see Finkelstein, 1992). Though agency cost is supposed to be mitigated on the presence of shareholders-managers, their large equity stakes may create decision-making power among others, which may in turn create agency conflicts. This supports the entrenchment effect of managerial ownership (Onali et al., 2016) where managers would use their power to extract higher emoluments and other personal benefits (Dutta et al., 2011). Managers with longer tenure are supposed to be much thoughtful over the firm and they may exert the authority upon subordinates to get them involved in operations effectively. Hermalin and Weisbach (1998) underline that firms need much monitoring over new CEOs than longer-tenured CEOs given that the abilities of new CEOs are uncertain. However, such an experienced CEO may spread authority across the firm and consequently, her dominating decisions may inspire self-interest. Chaganti et al. (2001) show that firms with longer-term CEOs underperform.

When managers gradually obtain experience and expertise knowledge across varieties of functions, they would be offered board seats of other firms. Such cross-directorships particularly held by CEOs would inevitably be industry leaders and in turn they may showcase their power in decision-making within the firm resulting in expropriation of corporate resources. This is theoretically argued as prestige power which arises mainly from individuals' prestige and popularity (Kim & Lu, 2011).

Expertise knowledge with managers could also be another weapon for being dominance in decision-making. According to Jensen and Zajac (2004), this educational background-based decision power is regarded as one aspect of prestige power of managers. Such knowledge is basically presumed to be prevalent with managers who have completed higher education and/ or obtained memberships of professional bodies. When they raise voice with expertise knowledge in organizational decision-making, other people would have less confidence in decision contributions resulting in a disparity in decision dominance.

Historically, males dominate in almost all societies from households to public administration. Such male dominance could also be prevalent in the corporate sector particularly holding key managerial positions. When male managers head some committee meetings, others would make less counterarguments than occasions where such committee are headed by female managers. Thus, on the presence of a male CEO, he would spread-out decision-making power not only over committees but also across the whole firm. Wang et al. (2019) highlight the prevalence of gender imbalance problem at CEO and managerial levels in Asian countries.

Management behavior is particularly important in Sri Lanka, as cultural and organizational structures influence the way that decisions are made. Its corporate sector is also characterized by concentrated ownership structure and family control. Sumanasiri (2020) shows that for Sri Lankan managers, sustainable leadership is most strongly driven by stakeholder relationships, with ethical behavior, and change leadership is playing a key mediating role. This shows that how managers behave can affect the alignment between their decisions and shareholder interests, which is directly related to agency costs.

The appointment of members of the board of directors and external auditors came to the forefront to monitor the management. Directors may particularly have incentives to maintain their independence in monitoring management. However, directors may build up their power in decision-making upon some firm-specific and socio-cultural characteristics: CEO duality, executive directorship, family directorship, founding chairmanship, and board ethic homogeneity (Nazliben et al., 2023). In these occasions, board members would showcase decision-making dominance resulting in decision bias. Thus, it is suspicious whether the expected monitoring role of directors towards managers is sustained. Whereas, as we discussed earlier, the CEO himself develops power in decision-making upon his large equity stake, longer tenure, cross-directorships, expertise knowledge, and masculinity. Thus, we argue that corporate decision-making dominance held by the board as well as managers could lead to agency conflicts between managers and shareholders.

There could be plenty of significant consequences of this study. It may at first contribute to the larger literature on corporate governance in Sri Lanka by bringing a fresh viewpoint to the preexisting theoretical framework. Managers in Sri Lankan companies can benefit from understanding how specific traits within boards and management can influence decision-making and perhaps cause agency conflicts. They can reduce conflicts and enhance corporate governance processes using this knowledge. By exposing the findings, Sri Lanka can improve shareholder protection places where governance practices might benefit from improvement or reform. The study's findings can be used by regulators and policymakers to develop corporate governance laws in Sri Lanka. The creation of governance policies that better balance the interests of management and shareholders can be informed by this. Increased investor trust in Sri Lankan businesses can bring in more domestic and foreign investments and promote economic progress. This is made possible by having a better grasp of the variables causing agency disputes. This research may be used as a foundation for comparison assessments with other nations, providing insights into how corporate governance dynamics vary between countries and regions, which can be helpful for conversations about international trade and policy. By offering empirical data and insights particular to the Sri Lankan context, the study adds to the academic literature.

2. Literature Review

2.1. Theoretical Literature

Corporate Governance and Agency Cost

Corporate governance was initially defined by Andrei Shleifer and Robert Vishny (1989) referring to the mechanisms that ensure a favorable return for the company's financial stakeholders. The primary objective of corporate governance is to enhance returns to shareholders and creditors. As companies grow larger, separation of ownership and control becomes a concern, a concept first highlighted by Adolph Berle and Gardiner Means (1932) for large corporations. In such cases, managers may not consistently act in the best interests of shareholders, leading to agency costs. This idea was initially discussed by Adam Smith (1776) addressing conflicts of interest between agents and principals. Jensen and Meckling (1976) formalized this concept, defining the agency relationship as a contract where one party (the principal) engages another party (the agent) to perform services on their behalf. Consequently, organizations have sought ways to enforce discipline on managers, leading to the prominence of appointing board members and the external auditor.

Shareholder Theory

Shareholder theory suggests that the firm is looking to maximize the wealth of its shareholders (Ferrero et al., 2014). Managers should invest in positive NPV projects which seek to create the maximum value for the firm investors. Jensen and Meckling (1976) highlighted that the agency cost arises when managers often fail to maximize profits, thereby shareholders invest time and money to create appropriate incentives and monitor the resulting behaviors. In contrast shareholder theory is restricted to generating benefits for stakeholders by neglecting the important role of those players in or around a firm, including employees, suppliers, customers, the government and society. When it comes to stakeholder theory, such as Parmar et al. (2010b) stressed out that corporations should be managed in a way that serves the interests of all contributors, not solely the shareholders. But Sundaram and Inkpen (2004) stated that by aiming the shareholder value maximization can be advantageous to all stakeholders since the cash flows from share ownership are residual claims which are due only after all committed corporate obligations.

Resource Dependency Theory

According to Braam and Peeters (2017) organizations depend on external resources for survival A resource dependency theory emphasizes how the environment plays a key role in the fate of an organization and how adverse conditions make it difficult for the business to survive (Wu et al., 2023).The negative impact of the environment on the company can break its autonomy and cast doubt on its future. For example, a company's daily operations, resource management, and strategic decisions can influence the environment. One of the most important tools for reducing the company's dependence on the environment is the board of directors (Wijethilake & Ekanayake, 2019).

2.2. Empirical Literature

***Managerial Equity* Ownership**

It is one of the mechanisms used by corporate governance to bridge the gap between the interest of shareholders and the self-interested behavior of managers (Jensen & Meckling, 1976) thereby examine the relation between managerial equity ownership and firm performance as a proxy for agency costs (Morck & Yeung, 2003; Hermalin & Weisbach, 1998a). Managers who

own significant shares of their own company could exercise significant voting influence. This influence can lead to their entrenchment, thereby making it difficult to monitor the firm's operation effectively. Other researchers Holderness et al. (1999) in agreement with traditional theory, it predicts that agency costs will decline steadily as managerial equity ownership increases. However, some researchers have found that, at some levels, equity ownership aligns the interest of management with that of shareholders, reducing agency costs. Also, there are some studies emphasizing that share ownership of top management is positively related to firm performance (Chaganti & Damanpour, 1991). In the Sri Lankan context, we observe that CEO and family owners hold substantially shares of their own firm.

CEO Tenure

Another point is CEO tenure and its relationship with strategic decisions and firm performance has brought great interest to new researchers in various fields (Dechow & Sloan, 1991). Jensen (1993) and Hermalin and Weisbach (1998) provide significant insight and emphasize a direct correlation between CEO tenure and agency costs. Previous research on the relationship between CEO tenure and agency costs suggests that as a CEO's tenure increases, they tend to accumulate more power and become stronger in their position. As a result, they may prioritize their own interests over those of shareholders and reduce the board's monitoring effectiveness due to their enhanced control. This dynamic may ultimately have a positive relationship with agency costs. In contrast, research by Fang et al. (2020) suggests that CEOs with extensive experience tend to enhance corporate performance through their expert knowledge and influence. In Sri Lanka, it is common for CEOs to have lengthy tenures averagely they tend to hold the position for seven years (Nazliben et al., 2023).

Interlocking Director (CEO Cross-directorships)

Consistent with Rahman's (2010) definition, a corporate governance concern arises when two directors simultaneously serve on the boards of two different companies. This situation often occurs when the CEO of Company A serves on the board of Company B, and the CEO of Company B serves on the board of Company A." This situation can increase the company's performance as it deals with additional information about rival companies ultimately enables them to make an indirect comparison (Haniffa & Cooke, 2002). In terms of decision-making structure, outside executives on corporate boards have been associated with strengthening management, as evidenced by (Davis et al., 1997). This suggests that the presence of these external executives may lead to an imbalance of decision-making power within firms and may exert their excessive influence on decision-making processes. Nevertheless, it gives competitive disadvantages to the company in case of executive directors that sit on more than one board will make them less independent (Davis et al., 1997). However, this negative aspect of CEO power is related to nepotism and may be particularly relevant in the Sri Lankan context (Nazliben et al., 2023).

CEO Expertise Knowledge

In the field of prestige power measurement, it is recommended that knowledge and expertise play a vital role as outlined by (Jensen & Zajac, 2004b). As shown in the study by Lei et al. (2023b), it has been observed that when the CEO is older, has a higher educational background and has more international experience trend to reduce the agency costs associated with management since. As suggested by Johnson et al., (2013) and Jiang et al., (2016), individuals with higher education are better at bridging the gaps and analyzing business problems and thus provide more comprehensive solutions which can be considered as his expectation. We find that there is a positive relationship between firm performance and expertise knowledge (Fang et al., 2020). Moreover, lack of supervision knowledge in a related industry is due to the

inaccessibility of expert staff, and this could enhance the agency costs. By looking at the Sri Lankan content it is obviously observed that For the Position of CEO each firm is requesting advance knowledge as well as considering their education level as well.

CEO Masculinity

The gender gap in senior management positions, particularly regarding CEOs, has been extensively discussed in the field of corporate governance (Flabbi et al., 2019). According to several research, businesses with more executive female representation have lower organizational expenses. However, when diversity is considered, the negative association between the two is not as significant. For instance, Welbourne (1999) discovered that having women on a company's senior management team improves the short-term success of the company (as shown by Tobin's Q) also on long-term performance (expressed as the price of a stock over a three-year period) growth and EPS growth). According to earlier research, businesses with more women on their boards typically pay less in agency fees (Antoni et al., 2011). It is important to note that female members may be more able to participate in board meetings, which might improve their efficacy (Kiliç et al., 2015). Jurkus et al. (2011) conducted an analysis of the connection between agency expenses and the presence of women in senior management. Their findings suggest that a rise in the proportion of women in top management positions might reduce agency expenses.

CEO Duality

Those who advocate either combining or splitting the roles of CEO and chairperson have their own theoretical justifications. Some refer to this as CEO duality and non-duality Finkelstein and D'aveni (1994), Agency theorists argue that the roles of CEO and chairman within a firm are best filled by separate individuals. When these roles are combined into a single position known as CEO duality, it often indicates a powerful and dominant CEO who can exercise significant control over the board. As highlighted in research by Daly and Dalton (1993) and Jensen (1993), this integration may lead to a situation in which the board becomes less effective in its oversight role, particularly in detecting and preventing managerial selfishness and opportunistic behavior. CEO duality enhances CEO entrenchment and reduces board independence (Finkelstein & D'aveni, 1994b), so that less independent directors will be appointed to the board. Agency theory believes that CEO duality weakens board control and promotes CEO entrenchment. Therefore, CEO duality has negative implications for firm performance (Jensen & Meckling, 1976). However, it is worth noting that there are some 11 negative arguments for agency theory as well. A dual CEO leadership structure removes ambiguity in the decision-making process and can improve firm performance (Finkelstein & D'aveni, 1994b).

Executive Directorship

The executive director, usually a company's CEO, is the senior executive in the organization responsible for the day-to-day management of the company. Executive directorship, which leads to agency costs through decision-making dominance, refers to situations in which executives in key leadership positions in a company, such as CEO or chairman of the board, use their influence and control to make primarily self-serving decisions. Bhagat and Black (2002) examines the relationship between CEO ownership and board independence. It finds that CEOs with high ownership stakes can have more influence on board decisions, which can lead to agency costs.

Family Directorship

Company ownership is concentrated in the hands of a few wealthy families (Lemmon & Lins, 2003). Claessens et al. (2002), for example, argue that using the family as the unit of analysis is useful as this approach better represents the actual control of the firm. Morck and Yeung (2003b) argue that the management of family-controlled firms, acting only for the controlling family, may worsen the agency problem. The principal agency problem relates to the conflict between the controlling family and minority shareholders (Shleifer and Vishny 1997). It has been argued that the prevalence of family control provides a rationale for using the family rather than individuals as the unit of analysis, as family members of controlling owners share the same interests and adopt similar behaviors in contracting production. In Sri Lanka, family directorships are visible in many firms showing concentrated ownership structure.

Founding Chairman

As discussed by Demsetz and Lehn (1985), previous research suggests that founders of firms contribute value through a combination of factors such as specialized knowledge, significant and long-term ownership stakes, and nonfinancial ties such as reputation and emotional connections to the business (James, 1999). Founder-directors, because of their extensive firm-specific experience, are better positioned to minimize information gaps between the board and the management team that, as noted by Jensen in 1993, can impede effective monitoring. Consequently, firms with founder-directors are expected to face fewer agency problems and exhibit superior corporate governance relative to firms without founders. This may be why previous studies have shown that family-owned firms have higher valuations when founders are actively involved in managing the firm, as shown in research by (Anderson & Reeb, 2003b).

Board Ethnic Homogeneity

According to Alesina and La Ferrara (2005) ethnicity is the distinctive cultural traits of certain groups made up of various abilities, experiences, and subcultures. Companies benefit from a competitive edge when their employee groups include people from a variety of cultural backgrounds, according to (Cox & Blake, 1991b). Cook and Glass (2015) look into the relationship between racial diversity on CEO boards. They find that corporations with a white CEO and a diverse board of directors have superior corporate governance procedures and more active product innovation. Marimuthu (2008) illustrates how racial diversity improves a company's bottom line. He also clarifies an increase of one lead to a six-unit increase in the company. one unit in the board's ethnic diversity. Johnson and Mitton (2003) reveal boards with higher ethnic diversity have less agency and are more autonomous. Marimuthu (2008) explains how racial diversity enhances the financial performance of businesses. And he clarifies A six-unit rise in the firm results from an increase of one unit in the ethnic diversity of the board. This battle Recent research by Nazliben et al. (2021) focuses on board diversity in Sri Lankan enterprises based on ethnicity, language, religion, and gender. They discover no evidence that board diversity is positively correlated with business success, and they find no indication that board heterogeneity causes interpersonal conflict or communication issues.

Large Shareholder

Here we are going to analyze the presence of large shareholders in term of both board dominance and managerial dominance finally the impact on agency cost. The presence of large shareholders depends on the comparative size of large shareholder (Maury, 2005). The presence of large shareholders may influence the board composition by having influence powers (Hermalin, 1995). When the interest of minority shareholders may not align with the interest of controlling shareholders, it may lead to agency cost (Jiang & Peng, 2010). The power

of the largest shareholder, represented by ownership rate, negatively moderates the relationship between board characteristics (Guizani, 2013). Large shareholders also have strong incentives to put pressure on managers. For example, Shleifer and Vishny (1997) point out that large shareholders may address the agency problem while keeping the interest on profit maximization and enough control over the assets.

3. Methodology

Within the quantitative research approach, this study provides a structural framework for investigating relationships using numbers and statistical techniques. Thus, this section explains the data collection process, sample size, the variables used to test hypotheses, and the statistical methods used to generate findings

3.1. Population and Sample

The population comprises 284 firms listed in the Colombo Stock Exchange (Nazliben et al., 2023). When selecting the sample, banks, finance and insurance firm were disregarded owing to different accounting treatments and disclosure requirements. We also ignored recently listed firms, delisted firms, and firms with missing observations. Thus, the final sample comprises 200 firms selected randomly representing 20 industrial sectors reported under GICS industry classification.

3.2. Variable Definitions and Measurements

In this research, we study how corporate decision-making dominance created by board and managerial Characteristics leads to agency conflict between managers and shareholders in Sri Lankan firms. According to the prior research, we measure decision making dominance in boards by CEO duality, executive directorship, family directorship, founding chairman, board ethnic homogeneity, and decision-making dominance in management team by managerial share ownership, CEO tenure, CEO cross directorship, CEO expertise knowledge, male CEO. Agency cost is measured by higher capital expenditures, lower dividend payout, lower leverage, lower ownership concentration, higher free cash flow, inefficient assets utilization, higher operating expenses (Nazliben et al., 2023). We measure control variable by firm size, age and the presence of a large shareholder as mediating variable.

Agency cost is the dependent variable which is measured by a composite index which combines several agency costs proxies because in the absence of direct measurement we use proxies as indirect measure (Nazliben et al., 2023). So here we use; higher capital expenditure (*Cap. Exp.*), lower dividend payout ratio (*Div. Pay.*), lower leverage (Leverage), lower ownership concentration (*Own. Concen.*), higher free cash flow (*Free Cash Flow*), inefficient asset utilization (*Asset. Utili.*), and higher operating expenses (*Operate. Exp.*). All proxies are taken as binary variables.

Independent variables include board dominance and managerial dominance in decision-making. Managerial dominance is measured as a composite index that is to say a combination of multiple indicators into a single value which accounts for several board characteristics such as CEO duality (CEO Dual.), executive directorship (Exec. Direct.), family directorship (Fam. Direct.), founding chairman (Found. Chair.), and ethnic homogeneity (Nazliben et al., 2023). The decision-making dominance in management team is also represented by a composite index. It considers several characteristics of the CEO which enable him/ her to be dominant in the top management team. CEO share ownership (CEO Own.), CEO tenure (CEO Tenu.), CEO cross

directorship (CEO Cros.), CEO expertise knowledge (CEO. Exper.), and CEO Masculinity (CEO Mascu.) (Nazliben et al., 2023). Appendix 1 presents the measurements of all these variables.

3.3. Data Collection

We prepared a panel data window covering 200 firms for 13 years from 2011 to 2023.We focus on non – financial firm excluding banks, insurance and other financial institution due to their distinct accounting practices. The study gathered numerical and qualitative information from various sources, such as annual reports, and other companies' records. We majorly accessed directors and managers' profiles, directors' report, corporate governance compliance report, and shareholders' information accompanied by annual reports.

3.4. Methods

A descriptive analysis is undertaken to examine the nature and distribution of variables where tools of descriptive statistics are applied. To examine the association between variables, a correlation analysis is implemented. To establish the causal effect of managerial dominance and board dominance on agency costs, different model specifications are proposed where the following model is taken as its general form.

$$\text{Agent. Cost}_{it} = \beta_0 + \beta_1 \text{ Board Domi.}_{it} + \beta_2 \text{ Manag. Domi.}_{it} + \beta_3 \text{ Board Domi.}_{it} * \beta_4 \text{ Larg. Shareh.}_{it} + \beta_5 \text{ Manag. Domi.}_{it} * \beta_6 \text{ Larg. Shareh.}_{it} + \beta_7 \text{ Size}_{it} + \beta_8 \text{ Age}_{it} + \text{Years} + \text{Industries} + U_{it}$$

4. Analysis and Discussion

This section presents an in-depth analysis of data collected and to test all hypotheses about the decision-making dominance of corporate boards and management teams and their impact on agency costs. The central objective is to assess whether decision-making dominance within the board and management contributes to higher agency costs, reflecting the ineffectiveness of the firm's governance. Additionally, the study analyzes whether large shareholders can effectively moderate this relationship, thereby mitigating the potential adverse effects of dominance.

Descriptive Statistics

Descriptive statistics (Table 2) present a snapshot of key variables in the data set comprising 2574 observations. Descriptive statistics are important for understanding the distribution, nature and behavior of data set, which form the basis for further analysis. Measures of central tendency comprise the mean and median, whereas measures of variability comprise the standard deviation or variance, the minimum and maximum variables and the kurtosis and skewness.

Table 2: Descriptive Statistics

Variable	Mean	S.D.	Minimum	Maximum
Agency cost index (Y)	3.443	1.457	0	7
Board dominance index (X_1)	1.405	0.936	0	4.667
Managerial dominance index (X_2)	2.915	0.989	0	6
Large shareholder (M)	0.906	0.292	0	1
Log of total assets (C_1)	21.852	1.527	12.684	25.856
Log of Age (C_2)	1.643	0.727	0	2.485

The mean value for agency cost is 3.44, indicating that, on average, the sample firms experience relatively moderate levels of agency costs. Both board and management dominance show average values respectively 1.405 and 2.915 indicating that board control is relatively low while there is strong control by management. The presence of large shareholders is reported at 90.6 percent of cases.

Correlation Analysis

The results of table 3 show that board dominance is weakly positively correlated 0.0434 with agency costs, while managerial dominance shows a slight positive correlation but weak. The presence of a large shareholder is moderately correlated with lower agency costs, suggesting a potential moderating effect. Firm age represents a negative correlation with agency cost. Agency cost is more strongly correlated with. A weak positive correlation (0.111) between firm size (log total assets) and agency costs indicates that larger firms have slightly higher agency costs

Table 3: Correlation Metrix

	1	2	3	4	5	6
Agency cost index	1.000					
Board dominance index	0.043	1.000				
Managerial dominance index	0.087	0.041	1.000			
Large shareholder	0.047	-0.034	-0.043	1.000		
Log (Total assets)	0.111	0.061	-0.008	0.013	1.000	
Log (Age)	-0.175	-0.012	0.064	0.054	0.136	1.000

Panel Regressions

A regression model was used to estimate the effect of board and management team decision-making dominance on agency costs, controlling for large shareholder presence, total assets, age, and industry. In table 04, it is presented a set of models [(01)-(08)] to explain the effect of corporate decision-making dominance on agency costs. In overall, board decision-making dominance negatively and significantly affects agency cost (see models (1), (2) and (8)) at 10 percent level. It seems that board decision-making dominance discourages agency conflicts between managers and shareholders. However, models (1) and (7) illustrate that managerial decision-making dominance leads to higher agency cost. The presence of large shareholders does not play any moderate role on the relation between corporate decision-making dominance and agency costs.

Based on the regression results, the hypothesis testing is executed. The first hypothesis; H1: Decision-making dominance in the board increases agency costs, is not supported as the relationship between board dominance and agency costs is negative and statistically significant at 10% confident level (see models (1), (2) and (8)). Literature suggests that the board of directors acts as "professional referees" providing effective oversight hence mitigates the agency problem (Jensen & Meckling, 1976). The second hypothesis; H2: Decision-making dominance in the management team increases agency costs, is supported as the relationship between management dominance and agency costs is positive and statistically significant at

1% confident level in models (1) and (7). Some studies suggest that self – serving managerial behaviors may lead to increased agency costs (Jensen & Meckling ,1976). The CEO enrichment may reduce board oversight due to managerial dominance prioritizing their interest over shareholders (Hermalin & Weisbach, 1988). While some empirical evidence suggests that managerial dominance may improve performance (Fang et al., 2020) and executives are assumed to work for the success of the firm (Davis et al., 1997). The third hypothesis; H3: The presence of a large shareholder moderates the relationship between decision-making dominance in the board and agency costs, is not supported. The presence of a large shareholder is not statistically significant. Therefore, it does not moderate the relationship between decision making dominance and agency cost. While theoretical literature suggests that large shareholders can reduce agency costs by influencing board decisions (Jensen & Meckling ,1976), regression results do not provide strong evidence for this mediation effect. Finally, the hypothesis; H4: The presence of a large shareholder moderates the relationship between decision-making dominance in the management team and agency costs, is not supported. The presence of a large shareholder has a positive effect on agency costs but not statistically significant. The literature is consistent with the resource dependence theory, which states that large shareholders can effectively influence management decisions and thereby influence agency costs (Wijethilake & Ekanayake, 2019).

Table 4: Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
X_1	-0.055*	-0.143*	-0.012	0.005	0.009	0.037	-0.055	-0.143*
	(0.033)	(0.082)	(0.059)	(0.105)	(0.079)	(0.124)	(0.034)	(0.074)
X_2	0.078***	0.049	-0.007	-0.031	-0.037	-0.049	0.078***	0.049
	(0.029)	(0.047)	(0.037)	(0.056)	(0.040)	(0.060)	(0.028)	(0.042)
X_1*M	-	0.103	-	-0.018	-	-0.030	-	0.103
	-	(0.087)	-	(0.101)	-	(0.108)	-	(0.080)
X_2*M	-	0.036	-	0.026	-	0.013	-	0.036
	-	(0.042)	-	(0.046)	-	(0.049)	-	(0.039)
C_1	0.070***	0.071***	-0.057	-0.057	-0.232***	-0.231***	0.070***	0.071***
	(0.020)	(0.020)	(0.037)	(0.037)	(0.053)	(0.054)	(0.020)	(0.020)
C_2	-0.347***	-0.352***	-0.324***	-0.325***	-0.290***	-0.290***	-0.0347***	-0.352***
	(0.053)	(0.053)	(0.039)	(0.039)	(0.040)	(0.040)	(0.052)	(0.052)
Industry	yes	yes	yes	yes	no	no	yes	yes
Year	yes	yes	yes	yes	yes	yes	yes	yes
Constant	2.191***	2.223***	5.286***	5.277***	8.796***	8.778***	2.191***	2.223***
Pooled	yes	yes	no	no	no	no	no	no
RE	no	no	yes	yes	no	no	no	no
FE	no	no	no	no	yes	yes	no	no
Robust	no	no	no	no	no	no	yes	yes
R^2	0.2169	0.2193	0.1997	0.2004	0.0057	0.0058	0.2169	0.2193
Groups	-	-	205	205	205	205	-	-
Obs.	2369	2369	2369	2369	2369	2369	2369	2369

Note: This table presents the regression results with Agency Cost as the dependent variable. X1 represents board decision-making dominance, while X2 represents management decision-making dominance. The interaction terms X1*M and X2*M capture the combined effect of board and management dominance with the presence of a large shareholder, respectively. C1 and C2 are control variables representing firm size and firm age. Models (1), (2), (7), and (8) are estimated using Pooled OLS, with Models (7) and (8) incorporating robust standard errors. Models (3) and (4) use Random Effects regression and include the interaction terms, whereas Models (5) and (6) use Fixed Effects regression excluding industry controls. Industry and year fixed effects are included as indicated. Statistical significance is denoted by *, **, and ***, corresponding to the 90%, 95%, and 99% confidence levels, respectively.

5. Conclusions

This study examines the impact of decision-making dominance within corporate boards and management teams on agency costs in Sri Lankan firms. With a particular focus on whether the presence of large shareholders moderate this relationship using a panel data set that includes 200 firms from 2011 to 2023 for listed companies in Sri Lanka

The theoretical foundation of this study is grounded primarily in agency theory, which explains how the separation of ownership and control can lead managers to pursue their own interests rather than shareholder wealth. Shareholder theory suggests that the firm is looking to maximize the wealth of its shareholders while resource dependency theory suggests that firms may rely on external factors making them vulnerable to environmental pressure.

The findings reveals that board decision-making dominance does not increase agency costs emphasizing that the corporate governance code of Sri Lanka encourages dual leadership structure and board balance. In contrast managerial dominance shows a positive relationship with agency costs. When it comes to the role of large shareholders it is revealed that they do not moderate the relationship between corporate decision-making dominance and agency costs. The results suggest that large shareholders influence is not strong enough to establish a mediating role given that the lack of shareholders' activism in Sri Lanka.

The study concluded that board dominance, in isolation, does not significantly influence agency costs indicating dual leadership structure and board balance. However, managerial dominance shows a positive relationship with agency costs, highlighting the potential risks associated with concentrated decision-making power. On the other hand, large shareholders do not significantly affect agency costs by providing effective monitoring and reducing inefficiency. This emphasizes the need for organizations to focus on increasing shareholder participation and enhancing balanced governance structures to improve overall performance. The results suggest that internal governance structures are necessary, and involvement of large shareholders is essential to drive effective governance and minimize agency costs.

The implications of these findings are important for corporate governance practices. Organizations should prioritize increasing shareholder participation as a means of leveraging their influence to reduce corporate costs. This can be achieved by creating mechanisms that facilitate active shareholder participation in governance processes. Additionally, it is critical to establish a balanced power structure within boards and management teams to prevent potential inefficiencies. Effective governance requires active shareholder participation and well-structured internal power distribution to achieve optimal performance and efficiency.

This study provides an agenda for future research. Future studies may investigate how the influence of board and managerial dominance varies across different industries. This can provide insight into whether industry-specific factors affect the effectiveness of governance implementation and their relationship with agency costs. Examining how regulatory changes affect the relationship between governance structures and agency costs could also provide valuable clues, mainly restrictions on managerial behavior. Understanding how legal actions taken against top managers can affect the governance structures and reforms of other firms.

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Appendix 1: Variable Measurements

Variable	Acronym	Measurement	Source
Dependent Variable			
Agency Cost	Agent. Cost.	Agency cost is measured by a composite index which combines several agency costs proxies; higher capital expenditure (*Cap. Exp.*), lower dividend payout ratio (*Div. Pay.*), lower leverage (Leverage), lower ownership concentration (*Own. Concen.*), higher free cash flow (*Free Cash Flow*), inefficient asset utilization (*Asset. Utili.*), and higher operating expenses (*Operate. Exp.*). All proxies are taken as binary variables. When they are present, value is taken one, otherwise zero. Values of each dummy are aggregated to develop the index. *Cap. Exp.* (capital expenditure by total assets) equals one if the capital expenditure is higher than the median of the sample and zero otherwise, *Div. Pay.* (Common dividends by net income) is one if dividend payout ratio is below the median of the sample; *Leverage* (total debt by total equity) is one if leverage is lower than the median sample leverage; *Own. Concen.* takes a value of one if there is no single share block (10% or more) is shareholder (who is not a director); *Free Cash Flow* (free cash flow by total assets) is equals one if the free cash flow is higher than the sample median. Free cash flow is: [earnings before interest and taxes (1-tax rate) + depreciation and amortization – investments (including M&A expenditure) +/- changes in net working capital]; *Asset. Utili.* (Sales by total assets) equals one if asset utilization ratio is lower than the median; *Operate. Exp.* (operating expenses by sales) equals one if the ratio is higher than the sample median.	Annual Report/CEO Note/ Corporate Governance section
Independent Variables			
Decision Making Dominance in Boards	Board Domi.	Decision making dominance in board is presented as a composite index which accounts for several board characteristics such as CEO duality (CEO Dual.), Executive directorship (Exec. Direct.), Family directorship (Fam. Direct.), Founding chairman (Found. Chair.), and Ethnic homogeneity (Ethn. Hetro.). All characteristics are taken as binary variables. When they are present, value is taken one, otherwise zero. Values of each dummy are aggregated to develop the index. *CEO Dual.* equals one if the CEO holds board chair position, *Exec. Direct.* equals one if the majority of directors are executive directors, *Fam. Direct.* equals one if the majority of directors are family directors, *Found. Chair.* equals one if the founding chairman is still present, *Ethn. Hetro.* equals one if the majority of directors belong to the same ethnicity.	Annual Report/CEO Note/ Corporate Governance section
Decision Making Dominance in	Manag. Domi.	Decision-making dominance in management team is represented by a composite index. It considers several characteristics of the CEO which enable him/ her to be dominant in the top management team. CEO share ownership (CEO Own.), CEO tenure (CEO Tenu.), CEO cross directorship (CEO Cros.), CEO expertise knowledge (CEO. Exper.), and CEO Masculinity (CEO Mascu.).	Annual Report/CEO Note/ Corporate

Management Team		All characteristics are taken as binary variables. When they are present, value is taken one, otherwise zero. Values of each dummy are aggregated to develop the index. *CEO Own.* equals one if the CEO and his family own 5% or more of the equity, *CEO Tenu.* equals one if the CEO's tenure is higher than the sample median tenure, *CEO Cros.* equals one if CEO holds cross directorships, *CEO. Exper.* equals one if the CEO has obtained a master's degree or professional qualification, CEO Mascu. equals one if the CEO is a male.	Governance section
Moderating Variable			
Presence of a Large Shareholder	Larg. Shareh.	It equals one if a large shareholder (25% or more of equity) is present and otherwise zero.	Annual Report/CEO Note/ Corporate Governance section
Control Variables			
Firm Size	Size	Natural logarithm of total assets.	Annual Report/CEO Note/ Corporate Governance section
Firm Age	Age	Natural logarithm of firm age since listing status.	Annual Report/CEO Note/ Corporate Governance section

Unveiling the Influence of Sustainability Control Systems on the Adoption of Circular Economy Business Models: A Mixed Method Approach

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Abstract

Inspired by the limitations on the impact of sustainability controls on Circular Economy Business Models (CEBM), this research seeks to evaluate the effects of Sustainability Control Systems (SCS) on CEBM. This study employed an explanatory sequential mixed-methods approach in two phases, focusing on manufacturing companies in Sri Lanka. Data collected via a survey were analyzed using descriptive and inferential statistics in the quantitative phase, and semi-structured interviews were analyzed using thematic analysis in the qualitative phase. The results indicate that while the adoption rate of SCS is high, most companies have not yet aligned with the phases of a circular economy. Therefore, CEBM adoption remains insufficient in Sri Lankan manufacturing companies, and SCS shows no significant impact on CEBM adoption. The take-transform phase is predominantly embraced by firms when adopting the circular economy, while the use phase is the least adopted. While companies' sustainability control systems are closely aligned with their primary business operations, there is a noticeable lack of emphasis on Circular Economy objectives. Organizations are found to engage in CE activities unintentionally, viewing them as components of a broader sustainable strategy. Moreover, these companies often mimic competitors in adopting sustainability practices without acknowledging the need to adjust sustainability systems to enable sustainable operations. Policymakers, professional bodies, and academic institutions should collaborate to create an enabling environment that fosters corporate adoption and integration of circular economy business models in developing economies.

Keywords: Business models, Circular Economy, Manufacturing, Mixed method, Sri Lanka, Sustainability controls

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1. Introduction

Traditional business practices, characterized by the "take, make, and dispose" model, have led to substantial environmental damage and resource waste in their pursuit of financial growth and value (Ünal et al., 2019). In order to overcome the shortcomings of traditional business practices, scholars advocate for the adoption of innovative business models such as the Circular Economy (CE) (Kennedy & Linnenluecke, 2022) to advance sustainable development (Carraresi & Bröring, 2021; Centobelli et al., 2020; Urbinati et al., Chiaroni, & Chiesa, 2017). The CE, as an emerging sustainability strategy (Nyam, Ayeleru, Ramatsa, & Olubambi, 2024), holds promise in maximizing resource utilization (Kuzma & Sehnem, 2023) and minimizing waste (Johansson & Henriksson, 2020; Svensson & Funck, 2019). Circular Economy Business Models (CEBM) describe how businesses create value through CE strategies, such as cleaner production or sustainable solutions (Antonioli et al., 2022), within the CE framework (Ghisellini et al., 2016). As such, CEBM is known as a strategy for capitalizing on CE business structures and integrating operations into the business model (Asgari & Asgari, 2021; Mallick et al., 2023; Stahel, 2016).

Despite the growing literature on the CE, the strategic implementation of CEBM remains largely unexplored. While empirical evidence demonstrates the utility of sustainability systems in facilitating the implementation of specific strategies such as CSR and safety (Arjali`es and Mundy, 2013; Wijesinghe et al., 2023), there is limited understanding of their usefulness in implementing CEBM for organizational sustainability. This is an important consideration, as in the business strategy literature, many scholars underscore the need to align business models and sustainability systems when organizations pursue a particular strategy (Aaltola, 2018; Ruiter, De Feijter, & Wagensveld, 2022). Since sustainability systems provide mechanisms for managers to ensure that resources are gathered (Bhuiyan, Baird, & Munir, 2022) and utilized effectively and efficiently to fulfill the organization's goals (Simons, 2019), they are essential to CEBM implementation. They ensure the monitoring and controlling of resource consumption (Fatimah, Govindan, Sasongko, & Hasibuan, 2024; Seles et al., 2022), adherence to circularity principles, provision of practical tools and metrics to assess CE initiatives, and mitigation of risks associated with CE initiatives (Ruiter et al., 2022). Additionally, sustainability systems appropriately drive employee behavior so that decisions and actions align with the organization's goals and CE strategy (Bisbe & Otley, 2004). Additionally, research has demonstrated that sustainability systems are essential to the creation and implementation of comprehensive, sustainable environmental plans, policies, and programs such as CE (Epstein & Roy, 2003; Perego & Hartmann, 2009).

Despite the importance of sustainability systems for CEBM, there is a paucity of studies that explore how sustainability control systems affect their adoption. Additionally, only a few studies have examined the current state of CE adoption, the surrounding environment, and the opportunities, challenges, and realities of implementing CE in developing nations (Kirchherr et al., 2023). Against this backdrop, this paper examines the degree of adoption of CEBM and sustainability controls in Sri Lankan manufacturing companies and explores how sustainability control systems influence CEBM adoption in developing countries, using a mixed-methods approach and Sri Lanka as the study setting.

Choosing Sri Lanka as the study context is significant as developing nations play a crucial role in achieving sustainable development, but often lag in adopting CE practices compared to developed countries (Ahmed, Mahmud, & Acet, 2022). Despite being a relatively new concept in Sri Lanka, many organizations have expressed interest in integrating CE principles into their operations to reduce waste (Agrawal et al., 2021) and environmental impact (Bekchanov & Mirzabaev, 2018). Moreover, Gunarathne et al. (2021) emphasize that, to enhance organizational sustainability performance, top enterprises in Sri Lanka have an urgent need to adhere to environmental management and CE principles. However, concerns persist about integrating CE principles into business operations in Sri Lanka, making it an intriguing setting to explore the impact of sustainability on CEBM adoption.

In exploring new research areas such as CE and CEBM, researchers should use all available approaches to understand the problem, without focusing solely on a single paradigm (Aguilera et al., 2021; Creswell & Hirose, 2019). This means that the limitations of one approach will be offset by the advantages of the other approach when both quantitative and qualitative data are used. Furthermore, this method widens and deepens the researcher's understanding of a research problem. Qualitative data is required to understand better statistical results (Creswell & Hirose, 2019) and to provide context, nuance, and understanding of statistical links. Thus, to address the research problem comprehensively, a mixed-method approach is employed.

This study makes several important contributions to the extant literature: First, it empirically highlights how organizations can strategically use sustainability controls to implement their CEBM strategies. This is important, as scholars highlight the possibility of utilizing sustainability control systems to play an important role in sustainable business model innovations such as CEBM (Antonioli, Ghisetti, Mazzanti, & Nicolli, 2022a; Jabbour & Santos, 2008; Kalmykova, Sadagopan, & Rosado, 2018; Ormazabal et al., 2016). Second, this study extends Simons' (1995) levers of control framework to explore the use of sustainability controls in the context of CE. In doing so, it develops the concept of SCS (see Section 2.2). Hence, the present study adds to the growing body of research that uses sustainability control frameworks to investigate the relationship between organizational controls and sustainable practices (Gunarathne et al., 2021; Wijesinghe et al., 2023). Third, this research contributes to methodological approaches to the study of CEBM by employing a mixed-methods ('explanatory sequential method') approach, which provides a rich account of the attendant intricacies and nuances when organizational control systems are involved in CEBM adoption.

The rest of the paper is organized as follows: Section Two surveys the literature relating to the study by synthesizing two areas: CEBM and sustainability control systems. Section Three presents the study's methodology, followed by the findings in the next section. Section Five presents the discussion, and the last section contains the conclusion.

2. Literature Review and Hypothesis Development

2.1 Circular Economy Business Model (CEBM)

The CE has the potential to catalyze transformations in traditional business models (Pereira et al., 2022). According to published work (Vallet-Bellmunt et al., 2023), Compass (Tsalis,

Stefanakis, & Nikolaou, 2022), indices, and phases (He & Mai, 2021) have all been used to examine the degree of CEBM implementation. *Take-transform*, *use*, and *recovery* are the three main phases of CEBM adoption, which entail moving from the linear "take, make, use" model to the circular "take, make, use, and recover" model (Elisha, 2020; Dieleman et al., 2019). According to Tsalis et al. (2022), these three phases, introduced by Ormazabal et al. (2018), provide a solid framework for CEBM, aid in alignment with the Sustainable Development Goals (SDGs), and help to strengthen the link between business model innovation and CE (He & Mai, 2021). Most importantly, these phases can be implemented concurrently, without waiting for the maturation of others (Olaizola et al., 2020).

The "take-transform phase" underscores the importance of maximizing the responsible and efficient use of biological and technical resources (Dieleman et al., 2019; Ormazabal et al., 2016). It promotes selecting suppliers and materials with an environmental focus (Haleem et al., 2021). By using circular or biodegradable materials, such as polyester and glass, that can be reused across many value chains (Poponi, Arcese, Ruggieri, & Pacchera, 2023), businesses can improve their environmental performance and minimize pollution (Ormazabal et al., 2016).

During the "use phase," businesses utilize CEBM to prolong product lifecycles by providing maintenance or after-sales services and educating customers on how to use products for extended periods (Diez-Cañamero & Mendoza, 2023). In addition, this stage entails implementing green marketing tactics, segmenting the market, offering product-service systems, and informing customers and end users about eco-labeling and zero-waste certification, among other green features (Saha, Dey, & Papagiannaki, 2022).

According to Dieleman et al. (2019) and Ormazabal et al. (2016), the "recovery phase" emphasizes using waste heat, reusing industrial waste, obtaining used goods from customers, and selling byproducts generated in company processes. Moreover, Ormazabal et al. (2016) note that companies in industries such as construction, mechanical, electrical, and perishable goods sometimes encounter difficulties creating an intense recovery phase of the CE, especially if they do not have control over the final product. To reduce resource consumption and adverse environmental impacts, sustainability-focused controls must be strengthened to implement CEBM effectively.

2.2 Sustainability Control Systems (SCS)

Sustainability management controls represent a distinct subset of management controls focused on environmental and social issues (Burritt & Saka, 2006; Gond et al., 2012; Johnstone, 2019). Without the gathering, analysis, and management of sustainability data and goals, businesses cannot effectively pursue strategies such as CE (Bebbington et al., 2017; Bebbington & Unerman, 2018; Crutzen & Herzig, 2013). Consequently, sustainability controls become pivotal in determining the success of CE strategic implementations (Wijethilake, Munir, and Appuhami, 2017). Moreover, organizations need to apply sustainability controls to achieve the strategic objectives of their circularity initiatives. Therefore, this study proposes the concept of sustainability control systems (SCS) as the management control system to be implemented in organizations following CE strategies.

The literature argues that a combination of sustainability controls has a more significant impact on sustainable strategy implementation than individual controls alone (Gschwantner & Hiebl, 2016). The levers of control framework developed by Simons (1995) offers a comprehensive understanding of sustainability management control in businesses, treating the system as a whole rather than as a collection of individual controls. This framework discusses the role of management control in executing emergent strategies, such as CE, and in responding to emerging opportunities and strategic uncertainties associated with CEBM (Ruiter et al., 2022). According to Simons (1995), control of business strategy, such as CEBM, is achieved by integrating four constructs from the levers of control framework. They are (see Section 3.2 for more details of these constructs):

- 'Diagnostic control systems' reward employees appropriately, track their performance, and motivate them to ensure they are motivated to fulfill company goals.
- 'Interactive controls' encourage discovery and learning, allowing new tactics to evolve as players throughout the organization respond to perceived possibilities and hazards.
- 'Belief systems' publicly share and reaffirm to provide the corporation with its fundamental values, direction, and goals.
- 'Boundary systems' prevent undesirable conduct and lower organizational risk by designating the space in which organization members can operate.

Effective administration of a CE strategy requires balancing the multiple uses of sustainability control systems, which is essential to any strategy's success (Arjaliès & Mundy, 2013; Widener, Gliedt & Tziganuk, 2016). The levers of control framework is utilized in this study for several reasons. First, it focuses primarily on using sustainability control systems to drive strategy renewal, supporting both mainstream and sustainable strategies (Abernethy & Brownell, 1999; Arjaliès & Mundy, 2013; Bruining, Bonnet, & Wright, 2004; Kober, Ng, & Paul, 2007). Through the creation of a CE, managers utilize sustainability control systems to support the renewal of mainstream company strategy and to manage sustainable strategy (Arjaliès & Mundy, 2013). Second, it emphasizes managers' responsibility to ensure the successful implementation of the desired strategies while remaining receptive to strategies emerging from other business units (Abernethy & Brownell, 1999; Kober et al., 2007). Third, it offers an analytical tool for examining how managers confront strategic uncertainty through management control systems (Simons, 1995). This is important because adopting a CEBM inevitably creates strategic ambiguity, which presents new risks and opportunities for the business (Schaltegger et al., 2015). A further illustration of the applicability of the levers of control framework in solving CE issues is the conceptualization of sustainability control systems, which yield varying degrees of integration of sustainability within the organizational strategy (George et al., 2016). To put it briefly, the levers of control framework's emphasis is on the multifaceted applications of management control systems aimed at illuminating how SCS influence sustainable strategy.

2.3 Hypotheses Development

As per Simons (1995), in the levers of control framework, diagnostic control systems are formal feedback mechanisms utilized to monitor organizational outcomes and correct deviations from pre-set performance standards (Langfield-Smith, 1997). They play a crucial role in implementing intended strategies to ensure the predictable achievement of goals (Simons, 1994). Simons (2000) outlines two primary justifications for employing diagnostic control systems: first, to execute strategies efficiently, and second, to conserve limited managerial time. This is because making decisions that align with the organization's objectives and strategy can be challenging (Simons, 1995).

Diagnostic control systems scrutinize whether the current strategy aligns with business innovations such as CEBM (Parida, Burström, Visnjic, & Wincent, 2019). Conversely, within diagnostic controls, managers must personally establish and negotiate goals with subordinates to ensure the organization achieves its strategic innovations (Simons, 1995). Evaluating these goals against predetermined criteria is deemed necessary to advance the implementation of the CEBM strategy. Diagnostic controls suggest that the final step focuses on validating and executing a CEBM that aligns with overarching objectives related to financial, environmental, and social benefits (Parida et al., 2019). Consequently, in line with the above arguments, the following hypotheses were formulated.

H_1: Diagnostic control systems have a positive influence on CEBM adoption.

According to Simons (1995), managers can cultivate innovation within the company through interactive control systems. These systems are defined as "formal systems used by top managers to regularly and personally involve themselves in subordinate decision-making activities" (Simons, 1994, p.17). Organizations are advised to maintain flexibility in the face of significant unexpected disruptions in the external environment. Consequently, strategic uncertainties —various factors and situations that may invalidate an organization's current strategy —form the basis for interactive control systems (Simons, 1995).

Simons (1995) suggests that an organization's top management can explore novel projects such as CEBM through interactive control systems. These mechanisms describe how senior management encourages employees to generate new ideas in the CE and to effectively implement them (de Padua et al., 2019). Such bottom-up, interactive control systems facilitate creative problem-solving and are crucial in adopting CEBM (Persis et al., 2021). Thus, the following hypothesis was formulated.

H_2: Interactive control systems have a positive influence on CEBM adoption.

Both planned and spontaneous strategies can be influenced by belief systems (Simons, 2000). Belief systems are described as "the explicit set of organizational definitions that senior managers communicate formally and reaffirm regularly to provide the organization’s basic values, purpose, and direction" (Simons, 1995, p. 12). They clarify for company members how the company generates value and what standard of performance is expected of them. Belief systems can help individuals within an organization understand which actions to take and where to seek guidance when issues arise with strategy control. Organizations often reassess

their business models to align them with the CE strategy. Parida et al. (2019) assert that the transition to a CEBM occurs in response to an updated strategy. An organization's successful shift to a CEBM is supported by a strong vision of sustainability strategy and circular principles, in particular. Therefore, Urbinati et al. (2017) emphasize that a clear vision is essential for the transformation process. Persis et al. (2021) argue that the success of adopting a CEBM hinges solely on individual contributions, which can be influenced by vision. Accordingly, the following hypothesis was formulated.

H_3: Belief systems have a positive influence on the CEBM adoption.

Boundary systems are tools organizations use to communicate to their members the behavior condoned by upper management (Simons, 1995). According to Simons (1994), they are "formal systems used by top managers to establish explicit limits and rules which must be respected" (Simons, 1994, p.17). Top management employs these systems to ensure that actions deemed too risky or not aligned with the strategic direction are not utilized to implement the realized strategy (Simons, 1995; 2000). Boundary systems, therefore, delineate the limits on the types of actions that belief systems promote. Their significance is underscored by the fact that businesses cannot rely solely on laws and regulations, as compliance with those requirements alone may not shield companies from actions that could result in financial loss or even bankruptcy (Arjaliès & Mundy, 2013).

Boundary controls prevent individual actions that are detrimental to the strategic decision of sustainability (Arjaliès & Mundy, 2013). In other words, boundary systems ensure that CEBM aligns with the corporation's strategy and objectives (Arjaliès & Mundy, 2013). However, these boundaries are not fixed but evolve as organizations seek innovative solutions (Barros & Ferreira, 2023). Existing literature has also highlighted the importance of business model boundaries. According to Arjaliès and Mundy (2013), reckless actions by individuals could expose a business to unacceptably high risks, jeopardizing the company's reputation. Hence, boundary systems play a significant role in business model transformation such as the adoption of CEBM. Considering this argument, the following hypothesis was formulated.

H_4: Boundary systems have a positive influence on CEBM adoption.

According to Simons (1995), control of business strategy is achieved through the integration of four constructs of the levers of control framework. The literature suggests that management control systems should be tailored to align with the organization's business strategy (Macintosh & Daft, 2019; Otley, Broadbent, & Berry, 1995; Simons, 1995). Business models are intrinsically linked to strategy, and evolving strategy is intertwined with innovation in business models (Hultberg & Pal, 2021). Another definition of a CE is a sustainable development plan aimed at addressing pressing issues such as resource scarcity and environmental degradation (Heshmati, Abolhosseini, & Altmann, 2015). Therefore, when an organization adopts a CE strategy, its business model must change, necessitating modifications to its management control systems. Based on this rationale, this study examined the relationship between SCS in totality and the CEBM. In this light, the following hypothesis was developed.

H_5: SCS has an impact on CEBM adoption.

Based on the preceding hypotheses, the study's conceptual framework was established as shown in Figure 1.

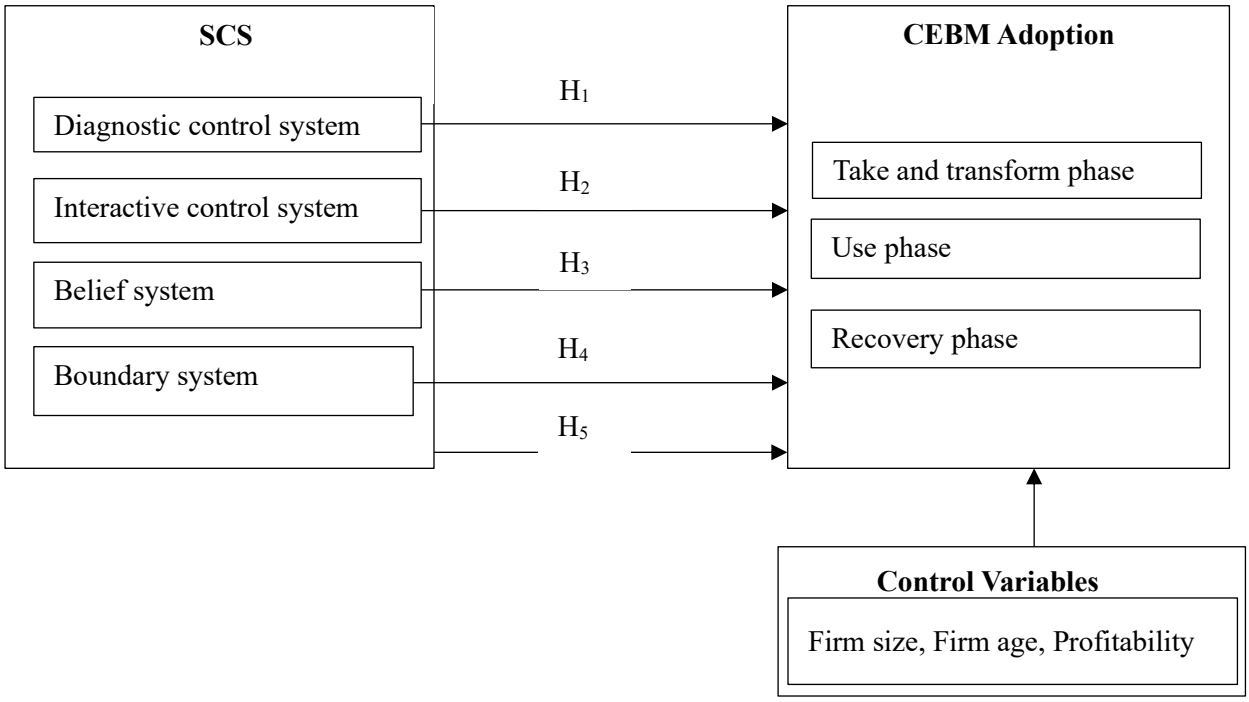

Figure 1: Conceptual Framework

3. Methods

3.1 Study Design

The current study aims to identify the extent of CEBM implementation and SCS adoption and to examine how SCS adoption affects CEBM implementation. While the goals mentioned can be pursued using quantitative research methods, this approach might not fully capture the reasons underlying the observed statistical relationships (Timans et al., 2019). Nevertheless, the outcomes of the quantitative phase can be enriched and extended by integrating qualitative information, resulting in a more nuanced understanding of the findings (Creswell & Hirose, 2019). Aguilera et al. (2021) suggest that a mixed-methods approach yields a more precise and thorough analysis by addressing the 'why' behind the statistical outcomes. Given the study's objective, which is to explore current circumstances and real-world instances of companies' engagement with CEBM, a suitable approach combines positivism and interpretivism. Consequently, this study utilizes a mixed-methods approach, specifically the 'explanatory sequential method' (Creswell & Hirose, 2019).

When qualitative data are required to explain statistical findings—regardless of their significance—the explanatory sequential method appears beneficial (Morgan & Carcioppolo, 2014). This approach entails first gathering and evaluating quantitative data, then gathering and assessing qualitative data. As a result, the methodology uses different stages for qualitative and quantitative data (Ivankova, 2015). Accordingly, in this study, to explore the statistical conclusions drawn from the quantitative data in greater detail, qualitative interview questions were developed. Previous researchers have employed similar approaches to investigate the

fundamental causes of acceptance or rejection of specific hypotheses or complexities in sustainability-related studies (Weerasinghe et al., 2023).

3.2 Sample

This study's first phase included selecting 137 companies engaged in manufacturing activities that were listed on the Colombo Stock Exchange. As suggested by García-Sánchez et al. (2021), the sample was later reduced to 96 manufacturing firms that have implemented corporate communication strategies related to sustainability via their websites or annual reports. Manufacturing businesses were chosen because they are seen as a sector facing major obstacles in its transition to sustainability (Bhakar et al., 2018) and as having the ability to make a substantial contribution to the CE (Kumar et al., 2019). A questionnaire was used to gather information for the study of the connection between the adoption of CEBM and SCS.

Table 1 Demographic characteristics of respondents and respondents' companies.

Demographic variable	**Category**	**Frequency**	**Percentage**
Respondent profiles			
Gender	Male	41	55.4%
	Female	33	44.6%
Current position of the respondent	Top-level management	5	6.8%
	Middle-level management	23	31.1%
	First-level management	46	62.2%
Company profile			
Annual profit (LKR millions)	Below 1,000	8	10.8%
	1,001 – 5,000	36	48.6%
	5,001 – 10,000	22	29.7%
	10,001 – 15,000	8	10.8%
	Above 15,000	0	0%
Company age (Years)	Below 40	12	16.2%
	41 – 60	11	14.8%
	61- 80	26	35.1%
	81 – 100	21	28.3%
	Above 100	4	5.4%
Company size (LKR billions - Total assets)	Below 100	16	21.6%
	101-500	39	52.7%
	501-1,000	19	25.7%

To avoid the survey being considered spam, it was sent to the selected sample via LinkedIn connections and email, as these methods foster a professional, trustworthy relationship with the survey participants (Ormazabal et al., 2018). Initially, managers within the selected companies with a comprehensive understanding of CE phases and sustainability control systems were identified. The questionnaire was then emailed to these selected personnel.

Following multiple rounds of personal follow-ups, 80 responses were received. Six responses were discarded due to incomplete data (refer to Table 1 for more details). The usable response rate for the survey was recorded at 77%.

Semi-structured interviews were used in the study's second phase to elicit interpretations of the regression-based statistical results (Kuo et al., 2019). Two business executives and academic specialists reviewed the comprehensive interview guide used for these interviews (see Appendix I for a condensed version). Furthermore, according to Ertz et al. (2019), factors like believability, transferability, dependability, and conformability were used to evaluate the rigor of the study's second stage. Six interviews were conducted with management personnel who expressed willingness to participate in the second phase of data collection and who were well-versed in SCS and CEBM (see Table 2). The interviews ranged from 40 to 75 minutes, with an average of 1 hour per session. With participants' consent, digital recordings and transcriptions of each interview were created for the study.

Table 2 Summary of the interviews

Interview No.	**Position of the respondent**	**Industry sector**	**Duration (minutes)**
IN 1	Group Finance Director	Material	75
IN 2	Senior Manager – Operations	Capital Goods	55
IN 3	Senior Executive – Operations	Consumer Durable and Apparel	65
IN 4	Senior Manager – Sustainability	Utilities	40
IN 5	Head – Sustainability	Material	45
IN 6	Chief Accountant	Material	60

3.3 Measurement of constructs

Following the recommendations of Olaizola et al. (2020), this study measured the degree of adoption of CEBM among Sri Lankan manufacturing companies across the three phases of the CE —take-transform, use, and recovery —suggested by prior scholars (Ormazabal, Sandoval, Leal, & Jaca, 2018). To gather data, the questionnaire developed by Ormazabal et al. (2018) was used, with responses evaluated on a Likert scale. Accordingly, the questionnaire was developed following the guidelines provided by Widener (2007) and Bedford (2015), with a Likert scale utilized for data collection. An overview of the variables included in this study is presented in Table 3.

Table 3 Survey items and measurement of constructs

Variable CEBM	Measurement items	Source/s
Take – transform	• Our company monitors suppliers' compliance with environmental legislation. • When choosing suppliers, our company considers environmental purchasing criteria. • Our company has set environmental standards to reduce energy, water, and raw material consumption during the design and development of its production processes. • Our company's production materials are designed with biodegradability in mind. • The non-biodegradable materials we utilize in our production are intended for recycling, remanufacturing, or reuse.	
Use	• Our company offers product after-sales services. • Our company offers the product for rent. • Our company offers product maintenance services.	Ormazabal et al. (2018)
Recovery	• Our company converts non-recyclable waste materials into energy. • Waste heat is recovered and used as energy by our company. • Our company extends the life of industrial resources such as oils, acids, and lubricants by treating them (e.g., filtration, soaking). • Our business recovers the products our clients no longer need. • Our company sells the industrial materials (by-products) it produces, such as plastics, oils, packaging, and sub-chemicals.	
SCS diagnostic controls	• Our company employs strategies to maintain a regular, consistent schedule for sustainability and CE initiatives. • The sustainability/CE activities of my subordinates are given a regular, frequent agenda by our company through the use of budgets and performance measures. • Our company takes steps to facilitate ongoing discussions and challenges with peers and subordinates over the underlying data, hypotheses, and action plans. • Our company employs strategies to highlight strategic uncertainties —variables that could render the current strategy obsolete or create opportunities for new strategic initiatives.	Widener (2007), Bedford (2015)

	• Our company employs strategies to promote and ease communication and information exchange about sustainability and CE with subordinates.
Belief system	• Our company has formal documents that outline the organization's mission, direction, and sustainability/CE principles. • Our company actively communicates the sustainability and CE key principles to its employees. • Our company commits to the long-term goals of upper management by using formal statements of sustainability/CE values. • Our company uses formal statements of sustainability/CE values to motivate and guide employees as they look for new prospects.
Boundary controls	• It is our company's policy to specify appropriate behavior through its codes of conduct or similar statements. • Specific areas or restrictions on opportunity searches and experimentation are outlined in our company's corporate policies or guidelines. • The top management team of our company actively communicates to subordinates the risks and actions that they should avoid. • Regardless of the outcome, our company penalizes employees who take risks or engage in behavior that violates organizational policy.
Interactive controls	• Our company's operations use metrics to track advancement toward critical performance targets linked to sustainability and CE. • Our company reviews key areas of sustainability/CE performance using budgets and performance metrics. • Our company uses metrics to pinpoint crucial performance factors related to sustainability and CE. • To address deviations from predetermined performance targets, our company employs measures to offer information.

In this study, three control variables were selected: firm size, firm age, and profitability. It is often noted that larger companies tend to attract public attention, which may drive them to adopt CEBM (Manes-Rossi & Nicolo, 2022). Therefore, firm size was measured using total assets. To address the skewed distribution of this variable, a natural logarithm transformation was applied (Kuo, Chiu, Chung, & Yang, 2019). The older the firm, the greater its tendency to adopt a sustainability strategy (Sipola, Saunila, & Ukko, 2023). Over the years, firm age has shown mixed relationships with voluntary adoption of a sustainable business model (Urba, Sinurat, Djailani, & Farera, 2020). Firm age was measured using the years since incorporation (Urba et al., 2020). The variable was logarithmically transformed to account for skewness. Early studies have indicated a link between a firm's profitability and its propensity to adopt voluntary sustainable business models (Bedford, Malmi, & Sandelin, 2016). This is because profitable companies are often better positioned to allocate resources towards sustainable measures. Hence, profitability in the present study was measured using return on assets, calculated as profit before interest and taxes divided by total assets (Urba et al., 2020).

3.4 Data analysis

Regression models have been commonly utilized in sustainability literature to examine the influence of SCS on corporate strategy (L. A. Henry, Buyl, & Jansen, 2019). Consistent with this approach, multiple regression analysis was employed in this study to assess the relationship between SCS and CEBM uptake. To choose the best multiple regression method, the Hausman test was employed (Stolzenberg, 2004).

In the second stage of the study, thematic analysis was employed to analyze the interview data (Braun & Clarke, 2016). The transcribed interview data were used to construct initial codes, which were further refined to yield a final set of codes. These codes were then combined to create themes that explain how SCS affects the adoption of CEBM. Aligning with the theoretical underpinnings of thematic analysis (Braun & Clarke, 2016), this study developed themes that shed light on the statistical association between specific diversity features and CEBM adoption. Given the relatively limited attention to SCS in the sustainability literature, qualitative data were incorporated to complement the quantitative findings and underscore their significance (Opferkuch, Caeiro, Salomone, & Ramos, 2022).

4. Results

4.1 Descriptive statistics

The descriptive statistics in Table 4 suggest that the majority of SCS consisted of diagnostic controls ($\bar{x}$ = 4.16), interactive controls ($\bar{x}$ = 4.26), belief systems ($\bar{x}$ = 4.09), and boundary systems ($\bar{x}$ = 4.20). Moreover, many respondents had considered establishing a complete control system ($\bar{x}$ = 4.17) rather than controlling sustainability operations with individual controls.

Table 4 Descriptive statistics

Variable	Mean	Standard deviation	Min.	Max.
Diagnostic controls	4.16	0.551	3.00	5.00
Interactive controls	4.26	0.708	2.00	5.00
Belief systems	4.09	0.733	2.00	5.00
Boundary systems	4.20	0.724	2.00	5.00
SCS	4.17	0.219	2.00	5.00
Take-transform	3.77	0.511	3.00	5.00
Use	2.55	0.763	2.00	4.00
Recovery	3.74	0.631	3.00	5.00
CEBM	3.35	0.405	3.00	4.00
Firm size (Rs. Bn) (log)	1.58	0.248	1.00	1.88
Firm age (No. of years)	6.07	0.993	4.20	8.75
Profitability (%)	0.089	0.156	0.74	0.12

According to the interview results, since the companies have paid attention to the SDGs, they are already maintaining SDG-driven sustainability control systems. This has also been reflected in the interviews. In support of this view, respondents stated;

> To achieve the SDGs, we frequently review our control systems. (IN 2)
>
> We see that our competitors align with sustainability trends, and to stay competitive, we also set sustainability key performance indicators (KPIs). A set of controls supports these. (IN 4)
>
> Our teams are evaluating the financial and non-financial impacts of our sustainability activities using pre-set controls for each operational category. (IN 6)

As Table 4 indicates, a significant number of respondents have adopted the take-transform phase ($\bar{x}$ = 3.77) of the CEBM, compared to the use ($\bar{x}$ = 2.55) and recovery ($\bar{x}$ = 3.74) phases. This suggests that the use phase is the least adopted phase of the CEBM among most manufacturing companies in Sri Lanka, and that all practices show a low level of adoption. According to the interview results, the main reason is companies' focus on cost reduction through sustainable production processes and waste management during the take-transform phase. Several respondents expressed their views in support of this fact as follows;

> We try to align most of our production activities to sustainability KPIs. The main reason is that we believe it will lead to significant cost reductions. (IN 2)
>
> We agreed to implement an eco-friendly production system, and this was the first step towards an eco-friendly business model. On the other hand, that is a massive cost saving too. (IN 5)
>
> We have saved a lot by using recycled water in production for years now. However, extending the product's lifetime with a coating incurs a cost to the company. (IN 1)
>
> The use of the product is beyond our control. So, it is not easy to decide which provisions we need for maintenance or after-sales services. (IN 3)

4.2 Statistical analysis with interview results

The regression model was not significant at a 5% significance level, as shown in Table 5. Overall, SCS failed to demonstrate a significant association with CEBM adoption ($p = 0.312$, $p > 0.05$). The qualitative study mentioned above also demonstrates that SCS does not affect the adoption of CEBM.

Table 5 Regression results

	Unstandardized coefficients		**Standardized coefficients**		
	Beta	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	2.474	0.400		4.943	0.000
Belief system	-0.150	0.138	-0.187	-0.998	0.052
Boundary system	0.011	0.008	0.065	0.208	0.136
Diagnostic controls	0.339	0.209	0.607	1.624	0.130
Interactive controls	0.162	0.119	0.286	1.352	0.209
SCS	0.442	0.523	0.312	1.762	0.058
LogFAge	-0.180	0.166	-0.110	-1.083	0.283
LogFsize	-0.035	0.041	-0.086	-0.859	0.394
Profitability	-0.395	0.270	-0.151	-1.463	0.148

The findings indicate that there is no significant association between belief systems and the adoption of CEBM ($r = -.187$, $p > .05$). In explaining this, the respondents emphasized during the interviews that a belief system is not a facilitator of CEBM adoption. However, companies with a thorough understanding of sustainability can support the implementation of a sustainable business model within an organization. Echoing these sentiments, a respondent stated;

> We have greater awareness of sustainability than CE. Hence, we only consider sustainability in the goal-setting process. (IN 1)

The study's regression analysis revealed no relationship between boundary controls and CEBM adoption ($\beta = 0.65$, $p > 0.05$). The participants also emphasized that boundary controls neither assist nor impede the incorporation of CE into the business model. Companies believe that strict boundaries blunt innovative ideas, which are essential for business model innovation. Moreover, experience is the tool that shapes behavior towards a sustainable business model. In supporting this, respondents stated;

> Boundaries frame people's thinking capacity. It affects productivity. (IN 6)
>
> For example, a long-time employee may know what to do and what not to do due to their expertise. As a result, they produce better resolutions for an eco-friendly business system. (IN 4)

The interactive controls do not indicate a significant impact on CEBM adoption ($r = .286$, $p > .05$). Interviewees stated that the interactive controls of SCS are primarily focused on the primary business activity rather than on sustainability goals. They expressed the following ideas;

> The organization's priorities are set by top-level management, and most of the time, it is profit. So, interactive controls are set to ensure that aspect. (IN 4).
>
> To address uncertainty, implementing sustainability solutions, such as CE, is important. However, profit is key. (IN 5)

Similarly, the regression findings demonstrate that diagnostic control has no impact on the adoption of CEBM ($\beta = .607$, $p > .05$). During the interviews, it was stated that diagnostic controls ensure the organization's main goal achievement and rewards. Sustainability is still not a priority in the goals list of many organizations. Interviewees expressed that;

> Most of our budgets are dedicated to primary business operations, and only slight attention has been given to sustainability KPIs. (IN 6)
>
> Project management systems monitor the output of the departments and divisions. It hardly covers sustainability or any CE aspects. (IN 1)

5. Discussion

The findings of the current study reveal a heightened level of SCS adoption among Sri Lankan manufacturing firms. This inclination is primarily attributed to the proactive alignment of SDGs with their business models, echoing the insights of Nosratabadi et al. (2019). Motivated by a commitment to sustainable business practices, as evidenced by prior research (Beusch et al., 2022; Ghosh et al., 2019), companies are leveraging SCS to improve their sustainability objectives. Furthermore, these companies have identified the need to move beyond traditional sustainability control systems to achieve sustainability KPIs (Crutzen et al., 2017). Despite the size of the company, to address stakeholder values, most companies tend to work towards sustainability, at least for its symbolic value (De Villiers et al., 2016). However, it is noteworthy that, while SCS are employed to foster sustainable business models, the adoption of CEBM appears less pronounced, a trend not confined to Sri Lanka (Svensson & Funck, 2019).

The results of the current study further reveal that Sri Lankan manufacturing firms have a low level of CEBM implementation. However, this is not exclusive to Sri Lanka. Halog and Anieke (2021) highlight that companies' commitment to adopting CEBM remains low in developing countries. Similarly, Daddi, Ceglia, Bianchi, and de Barcellos (2019) and Kumar et al. (2019) note that many manufacturing firms are at a rudimentary stage in adopting CEBM. Even large firms show a minimum commitment toward CE (Romero-Perdomo et al., 2023). This can be attributable to the lack of solid guidance and experience in CEBM adoption (Virmani, Saxena, & Raut, 2022). Though there is guidance on sustainable value creation through business models, no clear guidance is provided on CEBM adoption. In line with CEBM, companies extend their existing business models rather than develop new, sustainable models (Izzo, Ciaburri, & Tiscini, 2020). Hence, it appears to have more symbolic meaning than significant impact (Delaney et al., 2021). It was also evident that CEBM is embedded in organizations'

sustainability strategies (Gunarathne et al., 2021). Supporting this, Bartie et al. (2021) point out that companies adopting CEBM generally implement a sustainability strategy.

In addition, the degree of CEBM adoption is considerably higher in the take-transform and recovery phases among Sri Lankan manufacturing companies, and the majority of their activities in these phases are addressed through environmental and other sustainability-related laws. Companies adhere to the country's environmental and sustainability-related laws in production and consumption, not only to comply with requirements but also to increase productivity and efficiency in resource use (Prieto-Sandoval, Jaca, & Ormazabal, 2018). The use phase was the least adopted CE phase, and this is because most companies prioritize the production stage over later parts of the supply chain, similar to the findings of Opferkuch et al. (2021)

The statistical analysis of results demonstrated that CEBM strategy uptake is unaffected by SCS. This suggests that the implementation of the sustainable strategy is not significantly impacted by the sustainability control system (Nikolaou & Tsagarakis, 2021). This connection is due to the low level of CEBM adoption. The qualitative analysis of the statistical findings also supported the non-significant link. The findings therefore supported rejecting H5, which states that SCS affects CEBM adoption. According to the interviews, a lack of awareness and exposure, and the absence of a well-established framework to follow are the two main reasons identified for the insignificant impact of SCS on CEBM adoption.
Additionally, the lack of government attention to CEBM promotion can be a reason for non-adoption in the Sri Lankan context. As per Willekes, Wagensveld, and Jonker (2022), insufficient technical knowledge for developing sustainable business models leads to weak strategic innovation. Without having solid guidelines or experience, companies might not know how to link the CE to their sustainability control systems.

The outcomes also revealed that decisions regarding CEBM adoption are unaffected by diagnostic controls. The qualitative investigation lent credence to this conclusion by highlighting that CEBM is not a primary goal of organizations. Similarly, Ryen et al. (2022) stressed the insignificance of diagnostic controls for business model innovation. However, according to Müller-Stewens, Widener, Möller, and Steinmann (2020), diagnostic controls may favorably influence strategic innovations. Nevertheless, diagnostic controls have little influence on Sri Lanka's adoption of CEBM. As a result, H_1 was rejected. According to the interviews, one reason for the insignificant impact of diagnostic controls could be the difficulty in setting targets for adopting CEBM.
Furthermore, diagnostic controls remain ineffective in strategy implementation in the absence of pre-set targets (Willekes et al., 2022). These will complicate monitoring outcomes related to CEBM adoption. Moreover, a lack of experience in broader sustainability makes it difficult for companies to see the bigger picture created by CE. Hence, firms often narrow their focus to the primary operations.

Businesses rarely prioritize implementing sustainable strategies (Conlon, Jayasinghe, & Dasanayake, 2019), and even less so CE within those strategies (Melnychenko & Savenkoa,

2023). Melnychenko and Savenkoa (2023) found that interactive controls have an insignificant effect on sustainability strategy implementation. However, Bradley et al. (2020) found that strategic feedback systems, tracking new ideas, and positioning the organization in the market are significant in implementing strategic innovations. Based on the study's results, H_2 is not supported, and it can be concluded that interactive controls may not have a substantial impact on CEBM adoption. The insignificant impact of interactive controls may stem from individual managers' personal values, which may make them reluctant to assume a sustainability role within an organizational setting. As per the interviews, the lack of interest in the integration of social and environmental initiatives into the business model and the lack of personal discretion (of a manager) on sustainability can contribute to the low level of sustainable business model adoption (Gusmerotti et al., 2019). Furthermore, some researchers show that having top management that does not appreciate the integration of sustainability will discourage sustainable business model innovations (Gusmerotti et al., 2019). As long as organizations do not see CEBM as a solution to strategic uncertainties, they will not adopt interactive controls.

According to the statistical results, a belief system alone is insufficient to enable the incorporation of the CE into the business strategy. As a result, H_3 was rejected. This result conflicts with that of M. Henry et al. (2021), who contend that a strong belief system is more effective at overcoming the challenges of implementing business model innovations. Nonetheless, the adoption of CEBM can be significantly facilitated by additional internal triggers associated with belief systems, such as supportive corporate policies, middle management dedication, funding, rewards, audits, and KPIs (Pavlyuk et al., 2023). Also, raising awareness through vision and mission statements is crucial to the successful implementation of a sustainability strategy (Gusmerotti et al., 2019). This supports the argument that the belief system will prioritize and generate interest in CEBM when there is a dedicated sustainability arm. Not including CE components in the company's belief system symbolizes a downgrade in sustainability.

The study also showed that the adoption of CEBM is unaffected by boundary controls. Companies frequently set loose boundary controls, believing that strict controls will not affect employees' cognitive capacity and will not restrict the generation of sustainability resolutions (Yu, Khan, & Umar, 2022). Additionally, Yu et al. (2022) state that employees with greater field experience contribute significantly to sustainability strategies, as they have a better understanding of the boundaries within which they work. By contrast, Saputra, Tambunan, and Yulianto (2023) suggest that boundary controls are associated with higher rates of sustainability strategy implementation. However, the statistical results of this study do not support H4. As per the interviews, tight boundary controls do not motivate innovative business ideas.
On the other hand, members with slack boundary controls may bring novel initiatives and ideas to approach the CEBM. As per Bedford et al. (2016), the lack of a robust mix of boundary controls within sustainability control systems may explain a firm's lower level of adoption of innovative business strategies; furthermore, awareness and exposure increase over time. Thus, the boundary controls of sustainability control systems, which are not adequately exposed to the CE, may impact the low level of CEBM adoption.

6. Conclusions

The results of this study indicate a low level of overall CEBM adoption among Sri Lankan manufacturing firms, despite a higher level of SCS adoption. Interestingly, no connection was observed between individual sustainability controls — such as belief systems, boundary controls, interactive controls, diagnostic controls, or the total SCS —and the adoption of CEBM. These quantitative findings were supported by the qualitative investigation, suggesting that the lack of observable association may be attributed to the low degree of CEBM adoption. In light of these findings, the study suggests that while sustainability control systems in companies remain closely aligned with their primary business operations, there is a noticeable absence of significant prioritization of CE objectives, despite engagement in sustainability initiatives. Many organizations seem to adopt sustainability practices merely to imitate competitors, without recognizing the need to adapt sustainability control systems to support sustainable operations. Moreover, CE activities are often undertaken unknowingly, perceived as part of a broader sustainable strategy rather than as a distinct concept within organizational strategies.

These findings provide valuable insights for stakeholders, particularly investors, to assess corporate contributions to a CE. Managers are urged to reconsider corporate contributions to a CE and modify business models to better incorporate a CE, given the limited adoption of CEBM. Training and capacity building at the corporate level may help integrate CEBM effectively into SCS, unlocking its potential and financial rewards.

The study calls upon national regulatory and policy-making authorities to establish a corporate agenda for CEBM to promote business involvement within the CE. At the same time, professional organizations can encourage businesses to support CEBM. Additionally, academic institutions are encouraged to update their curricula to include CE, thereby enhancing students' knowledge of CEBM. Collaboration among business organizations, government officials, and academia is deemed essential to promote CEBM in developing countries like Sri Lanka.

Finally, the study's findings should be interpreted in light of its several limitations, which offer potential for future research. First, this study has only considered firms that had corporate communication on sustainability. Hence, future research can also consider companies that lack robust corporate communications on sustainability to determine whether these firms exhibit a different magnitude of CEBM or SCS. Second, this study considered the manufacturing companies listed on the Colombo Stock Exchange. Hence, future studies can be conducted across different industries or geographical locations to test the conceptual framework using a larger sample. Third, this study employed data collected from one person per manufacturing firm. However, future studies could consider interviewing several company managers with diverse knowledge of CEBM and SCS. Fourth, this study chose levers of control to quantify SCS. To gain further insight into the relationship between SCS and CEBM adoption, future studies can also consider other sustainability control system structures, such as the sustainability control package introduced by Malmi and Brown (2008). Finally, this study has used Ormazabal et al.'s (2018) three-stage model to gauge the CEBM phases and assess the

degree of adoption. Future studies can consider other approaches investigated in the literature to measure CEBM implementation.

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Appendix 1 – Summarized interview guide.

Section 01- Degree of adoption of CEBM

1. Briefly explain how you perceive the CEBM.
2. Does your company apply environmentally friendly purchasing criteria (ex: consideration of suppliers' compliance with environmental legislation) now? Or will your company be considering this in the future?
3. How does your company reuse, recycle or remanufacture non-biodegradable materials?
4. How does your company pay attention to reducing the consumption of raw materials, water, or energy in the design production process?
5. The findings of our survey study reflected that the 'use phase' of a CEBM (after-sales services, rental services, and maintenance services for the product) is the least practiced in manufacturing companies in Sri Lanka. Can you explain why this phrase is not frequently practiced?
6. Does your company have a process to convert non-recyclable waste materials into energy? Can you elaborate?
7. Recovering/ recollecting the products that your customers no longer use (empty containers/bottles made of glass, plastic, etc.) is one of the trends used among manufacturing organizations in the world in the process of adopting CEBM. Does your company have such a process?
8. Does your company have a process to commercialize the by-products?

Section 02- Impact of management controls on the degree of adoption of CEBM

1) Companies have rarely used this in the process of adopting CEBM. Does your company have such initiatives to make sure that your company adopts CEBM successfully?
2) Companies have rarely used this in the process of adopting CEBM. Does your company have such initiatives to make sure that your company adopts CEBM successfully?
3) Companies have rarely used this in the process of adopting CEBM. Does your company have such initiatives to make sure that your company adopts CEBM successfully?
4) In a company that successfully adopts CEBM, they frequently monitor the progress of critical performance targets, review key areas of performance, changes in critical performance variables, and deviations in previously set targets. Does your company have such initiatives to make sure that your company adopts CEBM successfully?