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Research article

Proactive sustainability strategy and corporate sustainability performance: The mediating effect of sustainability control systems

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A B S T R A C T

This study examines to what extent corporations use sustainability control systems (SCS) to translate proactive sustainability strategy into corporate sustainability performance. The study investigates the mediating effect of SCS on the relationship between proactive sustainability strategy and corporate sustainability performance. Survey data were collected from top managers in 175 multinational and local corporations operating in Sri Lanka and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). SCS were observed to only partially mediate the relationship between proactive sustainability strategy and corporate sustainability performance. The mediating effect of SCS is further examined under three sustainability strategies; environmental and social strategies reveal a partial mediation, while the economic strategy exhibits no mediation. The study also finds that (i) a proactive sustainability strategy is positively associated with SCS and corporate sustainability performance and (ii) SCS are positively associated with corporate sustainability performance.

1. Introduction

Corporate responsiveness toward sustainability issues is influenced by growing internal and external sustainability concerns, such as regulatory pressures, the increasing sense of the top management's social and ethical responsibility, new business opportunities, and cost factors, such as a carbon tax (Aragón–Correa and Rubio-Lopez, 2007; Phan and Baird, 2015). Researchers argue that corporations are increasingly motivated to proactively integrate sustainability issues into strategy rather than to merely comply with regulatory requirements (Aragón–Correa and Rubio-Lopez, 2007; Bhupendra and Sangle, 2015; Christmann, 2000; Hart, 1995; Phan and Baird, 2015; Sharma and Vredenburg, 1998). Theoretically, proactive sustainability strategy[1] improves corporate sustainability performance through efficient use of resources, increased cost advantage, reduced waste and discharge, promotion of social reputation, improved customer preferences, and generation of new innovative capabilities (Banerjee, 2001; Bhupendra and Sangle, 2015; Christmann, 2000; Judge and Douglas, 1998; Sharma and Vredenburg, 1998). However, despite the growing momentum and perceived benefits of proactive sustainability strategy to address sustainability challenges, the literature is relatively silent about which internal managerial processes translate proactive sustainability strategy into corporate sustainability performance (Arjaliès and Mundy, 2013; Lisi, 2015). Essentially, do the systems put in place to deliver sustainability strategies result in sustainability outcomes?

This study examines to what extent corporations use sustainability control systems (SCS) to translate proactive sustainability strategy into corporate sustainability performance. SCS, such as eco-controls, are a part of environmental management accounting[2] and a specific application of management control systems.[3] An important assumption in the management control systems

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[1] Aragón–Correa and Rubio-Lopez (2007, p. 358) identify "proactive environmental strategy" as the "systematic patterns of voluntary practices that go beyond regulatory requirements". Referring to Torugsa et al. (2013), this study uses the term "proactive sustainability strategy" including all three sustainability dimensions: environmental, economic, and social.

[2] Environmental management accounting is defined as "the management of environmental and economic performance through the development and implementation of appropriate environmental related accounting systems and practices" (IFAC, 1998, p. 3).

[3] Management control systems refer to "formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities" (Simons, 1995, p. 5).

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literature is that corporations should adapt management control systems in line with strategic directions and priorities (Henri, 2006; Ittner and Larcker, 1997; Langfield-Smith, 1997). The emphasis given to strategies should also be reflected in management control systems to support decision-making and motivate employees' contribution to the implementation of strategy. The alignment between strategy and management control systems facilitates the implementation of strategy and the achievement of strategic objectives by mitigating risks and uncertainties, which eventually leads to improved corporate performance (Ittner and Larcker, 1997). However, the question that remains unanswered is whether these traditional financially oriented management control systems facilitate the emerging proactive sustainability strategy, and if so to what extent corporations use SCS to implement proactive sustainability strategy.

A small but growing body of literature suggests that SCS not only have a potential role in supporting top management's implementation of a proactive sustainability strategy by disseminating sustainability core values and measuring sustainability performance but also by minimizing sustainability strategic risks and avoiding uncertainties associated with sustainability strategies (e.g., Arjaliès and Mundy, 2013; Gond et al., 2012; Henri and Journeault, 2010; Kerr et al., 2015). Looking beyond proactive sustainability strategy implementation, the use of SCS also enables corporations to manage sustainability threats and opportunities and to respond to stakeholders' sustainability demands by enhancing the transparency and accountability of operational activities (Arjaliès and Mundy, 2013; Phan and Baird, 2015).

Prior studies in this context contribute from different perspectives to understanding the role of SCS in corporate strategies. For instance, Ditillo and Lisi (2016) reveal that proactive corporations are more likely to integrate SCS with traditional control systems in implementing a sustainability strategy, whereas this is not the case in reactive corporations. Examining the moderating impact of enabling and controlling uses of management control systems on the relationship between environmental innovation strategy and organizational performance, Wijethilake et al. (2016) find that while the enabling use of management controls has a positive impact, the controlling use of management controls negatively moderates the relationship. Referring to a natural resource-based view of the firm, Journeault (2016) suggests that the eco-control package fosters the development of environmental capabilities, such as eco-learning, environmental innovation, stakeholder integration, and shared environmental vision and in turn improves corporate performance. Following a case study approach, Wijethilake et al. (2017) explore how corporations use SCS in proactive strategic responses to institutional pressures for sustainability. The authors reveal that corporations use SCS in their proactive strategic responses, from acquiescence to manipulation. However, the extant literature provides less evidence on the extent to which corporations use SCS in translating corporate sustainability strategies into corporate sustainability performance.

For example, in a review of the role of management accounting and sustainable development, Joshi and Li (2016, p.1) conclude that “there is relatively little empirical research on what motivates corporations to pursue different sustainability strategies, and how managers implement effective management control systems to achieve sustainability”. Joshi and Li (2016) emphasize the necessity of examining the use of SCS, such as sustainability balanced scorecard, eco-control, or sustainability management control systems, in translating the chosen sustainability strategy into corporate performance. Supporting the argument proposed in this study, Ditillo and Lisi (2016, p. 142) underline that “little is known about the control mechanisms set up by organizations in relation to their sustainability strategies and initiatives”. In responding to these claims in the extant literature, empirical evidence in this study provides rich insights into the use of SCS in translating proactive sustainability strategy into corporate sustainability performance. In particular, the findings in this study allow us to understand the various uses of SCS in difference sustainability strategies.

The extent to which corporations use SCS to enable the implementation of proactive sustainability strategy is theoretically underpinned by the natural resource-based view of the firm (Hart, 1995) and the levers of control framework (Simons, 1995). Hart (1995) argues that the extent to which corporations integrate the natural environment into the strategic process leads to sustainable competitive advantage. However, 15 years after the introduction of this proposition, Hart and Dowell (2011, p. 1470) claim that “the academic literature on the link between sustainable development strategies and firm performance is virtually nonexistent”. This deficiency raises concerns regarding not only what is needed to link proactive sustainability strategy and corporate sustainability performance but also how to build the relationship. Simons' (1995) levers of control framework facilitates the top management's implementation of proactive sustainability strategy by revealing this missing link.

The examination of the use of SCS to implement proactive sustainability strategy addresses several important limitations in the current literature and practice. First, the lack of formal managerial processes for implementing proactive sustainability strategy is a major impediment for corporations' achievement of corporate sustainability performance, resulting in a conflicting relationship (González-Benito and González-Benito, 2005; Thornton et al., 2003; Wagner et al., 2002; Wagner and Schaltegger, 2004). Top management may be interested in investing in sustainability projects but unaware of how to execute them. This may increase environmental cost and risk, generate no clear payoffs, and decrease customer satisfaction through inability to provide innovative products and services, such as environmentally friendly, green products (Aragón–Correa and Rubio-Lopez, 2007; Epstein and Buhovac, 2014). The core argument in this study is that corporations' use of well-designed SCS enables them to effectively translate proactive sustainability strategy into corporate sustainability performance.

Second, while the few existing SCS studies in sustainability strategy largely focus on the *design* characteristics of SCS in the strategic process (Durden, 2008; Epstein and Wisner, 2005; Perego and Hartmann, 2009; Pondeville et al., 2013; Riccaboni and Leone, 2010; Rodrigue et al., 2013), they pay less attention to the *use* of SCS in implementing sustainability strategy. Whereas past SCS studies considerably contribute to the design characteristics of SCS and overlook the use of SCS, this study uses the levers of control framework and provides empirical evidence to support the use of SCS in implementing proactive sustainability strategy.

Third, most prior studies on the relationships among proactive sustainability strategy, SCS, and corporate sustainability performance focus on individual aspects of sustainability strategy and performance (mostly environmental strategy and environmental and economic performance, e.g., Lisi, 2015; Russo and Fouts, 1997; Sharma and Vredenburg, 1998). While this study agrees that studies based on a piecemeal approach are to develop the discipline and provide deeper insights, such an approach is less likely to provide a comprehensive view of corporate sustainable development. This study provides empirical evidence and a comprehensive view of sustainable development and attempts to resolve previous conflicting findings concerning proactive sustainability strategy and corporate sustainability performance.

Fourth, while most of the current sustainability strategy and SCS studies contribute to understanding sustainability issues, most are qualitative, conceptual, and based on developed economies

(Arjaliès and Mundy, 2013; Gond et al., 2012; Kerr et al., 2015). Only a few are quantitative and based on surveys (Dias-Sardinha et al., 2002; Epstein and Wisner, 2005; Perego and Hartmann, 2009). Importantly, Crutzen and Herzig (2013) claim that this strand of literature largely neglects the Asian context and emerging economies. This raises both contextual and conceptual concerns: (i) the generalizability of the use of SCS in sustainability strategy implementation (cf. Crutzen and Herzig, 2013) and (ii) the applications of the natural resource-based view of the firm in the context of the bottom of the pyramid (Chan, 2005; Hart and Dowell, 2011). From the theoretical point of view, while past SCS studies occasionally use traditional theories, such as institutional theory, legitimacy theory, contingency theory, agency theory, and stakeholder theory (Durden, 2008; Perego and Hartmann, 2009; Pondeville et al., 2013), the resource-based view of the firm is largely ignored (c.f. Crutzen and Herzig, 2013). This quantitative study integrates SCS applications within the natural resource-based view of the firm and provides empirical evidence from the bottom of the pyramid to support sustainable development efforts (Hart and Dowell, 2011; Prahalad and Hart, 2002).

2. Background literature and hypothesis development

Fig. 1 illustrates the research framework. The study hypothesizes that SCS mediate the relationship between proactive sustainability strategy and corporate sustainability performance. The framework for the empirical analysis includes four models: one model examines proactive sustainability strategy and corporate sustainability performance by integrating all three sustainability principles, and three models examine environmental, economic, and social sustainability strategy and performance separately.

2.1. Proactive sustainability strategy and corporate sustainability performance: a natural resource-based view perspective

The resource-based view of the firm suggests that internal resources and capabilities that are rare, valuable, inimitable, and non-substitutable lead to sustainable competitive advantage (Barney, 1991). Hart (1995) proposes a natural resource-based view of the firm by highlighting the limitations of the resource-based view in capturing the resources and capabilities that lead to competitive advantage when corporations interact with the natural environment. Specifically, Hart (1995, p. 991) emphasizes that “it is likely that strategy and competitive advantage in the coming years will be rooted in capabilities that facilitate environmentally sustainable economic activity — a natural resource-based view of the firm”. The natural resource-based view of the firm proposes three interconnected strategies that lead to sustainable competitive advantage: pollution prevention, product stewardship, and sustainable development (Hart, 1995).

Pollution prevention strategy aims to prevent waste and emissions during the production process instead of cleaning at the end, which eventually associates with reducing product and service costs (Hart, 1995; Hart and Dowell, 2011). Product stewardship strategy expands the pollution prevention strategy to the entire product life cycle, including stakeholders. It creates sustainable competitive advantage by strategically preventing the negative impacts of environmental concerns (Hart, 1995; Hart and Dowell, 2011). Sustainable development strategy, which considers environmental, economic, and social sustainability, focuses on maintaining environmentally friendly production processes for an indefinite future (Hart, 1995; Hart and Dowell, 2011). In particular, this strategy aims at implementing sustainability that benefits stakeholders in less-developed countries and contributes to the product life cycle by various means (Hart, 1995; Hart and Dowell, 2011). Hart (1995, p. 997) claims that “firms (either multinational or local) that are focused on generating short-term profits at the expense of the environment are therefore unlikely to establish long-term positions in the developing world”.

Following Torugsa et al. (2013), this study investigates proactive sustainability strategy in terms of environmental strategy, economic strategy, and social strategy, which include all three strategies discussed in the natural resource-based view of the firm. Environmental strategy assures that human activities do not harm land, air, and water resources (Bansal, 2005; Torugsa et al., 2013). Corporations implement environmental management strategy to reduce the size of their ecological footprint by integrating environmental considerations into operations (Steurer et al., 2005; Torugsa et al., 2013). Economic strategy includes the “creation and distribution of goods and services … to raise the standard of living around the world” (Bansal, 2005, p. 198). According to Steurer et al. (2005), economic sustainability strategy includes financial performance and long-term competitiveness. Value creation is a function of products and services, and thus, the effectiveness and efficiency of products or services improves created value. Social strategy ensures the equal rights of members of society to access resources and opportunities (Bansal, 2005; Torugsa et al., 2013). Aspects of social sustainability strategy include equality within the corporation, international equity, internal social improvements, and external social improvements (Steurer et al., 2005).

The extant literature proposes different ratings and indices to evaluate the achievement of sustainability goals. In a recent study, Siew (2015) reviews corporate sustainability reporting ratings and indices including KLD, EIRIS, SAM, Dow Jones Sustainability Index, MSCI ESG indices, FTSE4Good index, Bloomberg ESG disclosure scores, and Trucost. KDL measures corporations' environmental,

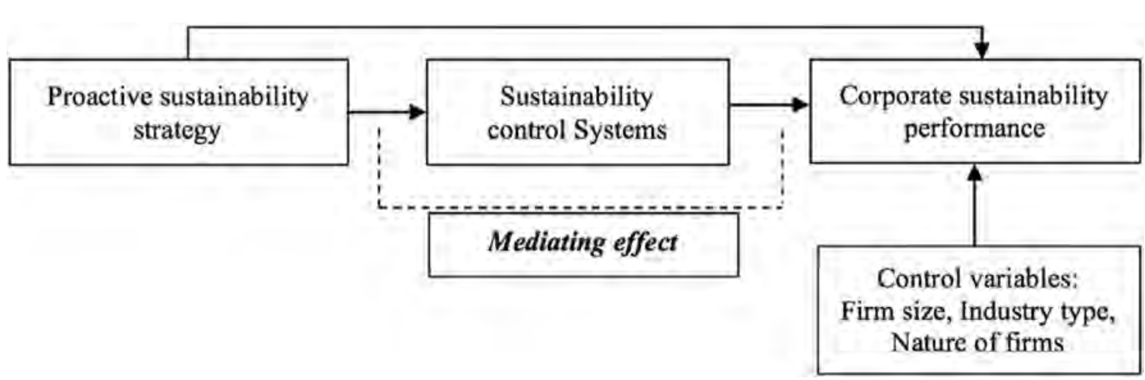

Fig. 1. Conceptual framework.

social, and governance performance. EIRIS facilitates environmental, social, and governance research with tools of analysis focusing on empowering responsible investors (EIRIS, 2017). SAM mainly focuses on sustainability investing, providing products and services including in-house asset management, sustainability indices, corporate sustainability assessments, and active ownership and engagement. Launched in 1999, the Dow Jones Sustainability Index plays a major role in measuring the sustainability performance of leading global corporations (Siew, 2015). Corporations considered in this index are selected through a comprehensive assessment of both general and industry specific sustainable economic, environmental, and social measurements and trends. MSCI ESG indices support investments in environmental, social and governance projects. The index also helps institutional investors benchmark, compare, and manage environmental, social, and governance investment performance (MSCI, 2017). The FTSE4Good index series helps corporations to measure environmental, social, and governance performance. Transparent management and well-defined sustainable measurements make FTSE4Good indices appropriate for measuring sustainable investments in terms of financial products, research, reference, and benchmarking (FTSE, 2017). Bloomberg ESG disclosure scores rank corporations by considering the disclosure of quantitative and policy-related environmental, social, and governance data. The index also provides data approximately 120 measures for more than 10,000 public listed companies around the globe. Trucost provides environmental, social, and governance data and insights to support sustainable investment strategies and helps identify transformative, sustainable solutions for future issues (Trucost, 2017). Referring to Bansal (2005), corporate sustainability performance is recognized as the outcome of these three proactive sustainability strategies.

Proactive sustainability strategy positively influences corporate sustainability performance in terms of cost advantage (Christmann, 2000), enhanced competitiveness through unique capabilities (Bhupendra and Sangle, 2015; Sharma and Vredenburg, 1998), manufacturing and environmental performance (Klassen and Whybark, 1999), creation and acquisition of new competencies, financial and environmental performance (Aragón-Correa et al., 2008; Judge and Douglas, 1998), waste reduction and cost savings, quality improvements in product and process (Banerjee, 2001), and competitive advantage (Porter and Kramer, 2006).

However, several recent studies reveal negative and neutral impacts within these relationships. For instance, Bansal (2005) finds a negative relationship between financial performance as a control variable and sustainable corporate development. Similarly, Wagner and Schaltegger (2004) find positive, negative and neutral effects of shareholder value-oriented strategies on environmental and economic performance and competitiveness. While Thornton et al. (2003) reveal inconsistent relationships between environmental performance and profitability, Wagner et al. (2002) study suggests that the relationship between environmental and economic performance is uniformly negative. Accordingly, the conflicting and inconclusive relationship between proactive sustainability strategy and corporate sustainability performance emphasizes the necessity of further investigating the use of SCS to translate proactive sustainability strategy into corporate sustainability performance (Joshi and Li, 2016).

2.2. Sustainability control systems, sustainability strategy, and performance

The existing literature classifies different indicators to examine the role of management control systems in sustainability. Gond et al. (2012) identify seven SCS tools that are used with respect to management control systems: (i) sustainability planning; (ii) sustainability budgeting and environmental budgeting; (iii) environmental/material flow cost accounting and sustainable value added; (iv) environmental performance evaluation systems and material and energy flow accounting systems; (v) sustainability performance measurement and Sustainability Balanced Scorecard; (vi) socio-eco-efficiency analysis and environmental investment appraisal, and (vii) reward systems based on multidimensional performance systems. Passetti et al. (2014) examine the frequency of use of sustainability accounting by proposing eight environmental tools: (i) environmental budget; (ii) environmental cost accounting; (iii) environmental life-cycle assessment; (iv) environmental performance indicators; (v) social budget; (vi) social performance indicators; (vii) eco-efficiency analysis, and (viii) sustainability reports. Wijethilake et al. (2017), in their study exploring the use of SCS in strategic responses to institutional pressures for sustainability, employ three sustainability control systems, namely, specifying and communicating objectives, performance monitoring, and performance measurement systems.

Similarly, there is a growing tendency to use Malmi and Brown's (2008) control package framework in examining the use of management control systems in sustainability. For instance, Lueg and Radlach (2015), Journeault (2016), and Sundin and Brown (2017) examine the role of management control systems in sustainable development using cultural controls, planning, cybernetic controls, reward and compensation, and administrative controls. Extant studies also (e.g., Epstein and Wisner, 2001; Figge et al., 2002) refer to planning, budgeting, cost accounting systems, performance measurement systems, Balanced Scorecard, socio-eco-efficiency analysis, and investment appraisal to examine the use of management control systems in sustainability. In a similar perspective, Schaltegger (2011) presents sustainability management controls referring to the Sustainability Balanced Scorecard, which shows how corporations use key performance indicators and related information in sustainability. In particular, Schaltegger's (2011) sustainability management controls include five different variations: (i) finance oriented; (ii) market oriented; (iii) process oriented; (iv) knowledge and learning oriented, and (v) non-market oriented. Consistent with the current study, Arjaliès and Mundy (2013) refer to Simons' (1995) levers of controls to examine the use of management control systems in the formulation and implementation of corporate social responsibility strategy. Wijethilake et al. (2016) also employ the levers of control framework to investigate a moderating role of enabling and controlling uses of management control systems on the relationship between environmental innovation strategy and organizational performance.

While the traditional finance-focused management control systems play a critical role in implementing organizational strategies (e.g., Henri, 2006; Ittner and Larcker, 1997; Langfield-Smith, 1997; Simons, 1995), researchers argue that management control systems have an important role in overcoming complexities associated with implementing sustainability strategies (Arjaliès and Mundy, 2013; Crutzen and Herzig, 2013; Epstein and Buhovac, 2014; Gond et al., 2012; Passetti et al., 2014). SCS support strategic decision making in responding to sustainability challenges. Epstein and Roy (2001, p. 593) propose that “the alignment of strategy, structure, and management systems is essential for companies to both coordinate activities and motivate employees towards implementing a sustainability strategy”. Perego and Hartmann (2009) find that environmental strategy affects performance measurement systems through financial quantification and sensitivity of managerial actions. Pondeville et al. (2013) reveal that corporations with considerable ecological environmental uncertainties are less likely to develop a proactive environmental strategy, environmental information systems, or formal environmental management control systems. However, proactive environmental corporations are more likely to develop environmental management control systems. Accordingly, this study predicts that the extent to which corporations integrate sustainability issues into strategy is positively associated with the use of SCS (cf. Chenhall, 2003; Langfield-Smith, 1997; Perego and Hartmann, 2009).

SCS assist managerial decision making by identifying, collecting, and analyzing financial and non-financial information about sustainability concerns associated with corporations' operating activities. Well-designed SCS may help corporations to specify and communicate sustainability objectives, monitor sustainability performance through feedback and controls, and motivate employees to participate in sustainability projects and practices by rewarding and appraising their sustainability achievements. Previous research provides empirical evidence supporting a positive impact of SCS use on corporate sustainability performance (e.g., Henri and Journeault, 2010; Judge and Douglas, 1998; Lisi, 2015). From the sustainability strategy perspective, SCS support corporations in achieving improved corporate sustainability performance by strengthening the alignment of business strategy, sustainability strategy, and respective value drivers (cf. Henri and Journeault, 2010). Arjaliès and Mundy (2013) claim that SCS enable top management to achieve sustainability strategic objectives by identifying and managing threats and opportunities involved with corporate social responsibility strategy and forming risk management practices. Accordingly, this study predicts that the extent to which corporations use SCS is positively associated with corporate sustainability performance.

2.3. The mediating effect of sustainability control systems between proactive sustainability strategy and corporate sustainability performance: a levers of control perspective

Levers of control, namely, belief systems, boundary systems, diagnostic control systems, and interactive control systems, demonstrate how top management uses management control systems to manage strategic elements of core values, risks to be avoided, performance evaluations, and strategic uncertainties (Simons, 1995, 2000). Simons (1995) emphasizes that the maximum use of the levers of control depends on corporations' ability to simultaneously use the four levers together rather than individually. This study uses levers of control because these control elements are well recognized not only in strategy in general, but in sustainability strategy in particular (Arjaliès and Mundy, 2013; Gond et al., 2012; Kerr et al., 2015; Rodrigue et al., 2013).

2.3.1. Belief systems

Simons (1995, p. 34) proposes belief systems as "the explicit set of organizational definitions that top managers communicate formally and reinforce systematically to provide basic values, purpose, and direction for the corporation". Formal belief systems that communicate corporations' values, purposes, and future directions, for example, include vision and mission statements, credos, and statements of purpose (Simons, 1995, 2000).

Top management can integrate sustainability objectives into core values to reflect strategic perspectives, motivations, and responsibilities towards customers, employees, local communities, and all stakeholders at large (Jollands et al., 2015). Sustainability core values guide, encourage, and inspire commitment towards sustainability goals through a proactive sustainability strategy when rules and policies alone are insufficient. Examining core values as a management control, Jollands et al. (2015) find that sustainability core values help corporations to step forward and take effective actions in achieving sustainability objectives. To make proactive sustainability strategy realistic, Hart (1995) suggests that it is essential for corporations to communicate a shared vision not only within corporations but also among the broader stakeholders. Communicating a sustainability vision helps provide a consistent picture of stakeholders' interests and intentions concerning a corporation's sustainability commitment (Aragón–Correa and Rubio-Lopez (2007). Supporting this view, Epstein and Buhovac (2014, p. 74) propose that "a corporate sustainability mission and vision statements should be adopted to convey the corporate commitment throughout the corporation". Corporations' ability to integrate sustainability core values into mission helps them to strategically address sustainability pressure, rather than react on an ad hoc basis (Porter and Kramer, 2006). Thus, belief systems have a critical role in implementing proactive sustainability strategy by supporting the dissemination of sustainability core values (Arjaliès and Mundy, 2013; Kerr et al., 2015).

2.3.2. Boundary systems

According to Simons (1995, p. 39), boundary systems "delineate … the acceptable domain of strategic activity for organizational participants". Boundary systems aim to avoid various risks associated with strategy implementation by imposing limits and boundary conditions on employees' opportunity-seeking practices (Simons, 1995; Widener, 2007; Mundy, 2010). Communicated through codes of conduct, strategic planning systems, and operational systems, boundary systems allow freedom for employees to innovate and achieve objectives within a particular predefined context (Widener, 2007).

The implementation of proactive sustainability strategy is associated with various internal and external risks, such as poor quality of products and processes, overuse of valuable resources, and non-compliance with health and safety standards. As a way of avoiding sustainability strategic risk, top management can integrate sustainability practices and dimensions into internal structures and decision-making policies (Arjaliès and Mundy, 2013; Bansal, 2005). They can also define specific tasks to be performed by employees within the strategic process and delegate responsibilities and authorities to capable employees (Epstein and Roy, 2001; Haugh and Talwar, 2010). Hart (1995, p. 1000) argues that "in firms that do not have well-developed quality management processes, there could be barriers to implementing pollution prevention". Kerr et al. (2015) find that corporations use strategic boundary systems as quality management systems, for instance, maintaining zero environmental incidents, zero lost time injuries, ISO 14001 systems, and compliance with resource consents as ways of minimizing sustainability strategic risks. However, Aragón–Correa and Rubio-Lopez (2007) contend that the effectiveness of using these standards as a source of differentiation depends on the credibility of standards and stakeholder confidence, such that the certification becomes the objective in itself and not just a marketing label.

Corporations may also face various sustainability risks from stakeholders, such as increasing demands for transparent and visible business operations, disclosure of compliance, and sustainability reporting. Hart (1995) suggests that corporations should also comply with voluntary codes of conduct to show stakeholders that the corporation commits to sustainability. As suggested by Arjaliès and Mundy (2013), corporations can comply with internal and external voluntary guidelines such as international agreements and industry, professional, and corporation-specific codes, e.g., Global

Reporting Initiative, Eco-management and Audit Scheme, UN Code of Conduct on Transnational Corporations, and OECD Guidelines for Multinational Enterprises. Corporations' integration of sustainability into boundary systems may support the implementation of a proactive sustainability strategy within the corporate scope and strategic boundaries.

2.3.3. Diagnostic control systems

Simons (1995) indicates that by using pre-set standards, top management employs diagnostic control systems as formal feedback for performance evaluation and motivating, monitoring, and rewarding employees. Diagnostic controls provide an expectation that employees will accomplish and comply with tasks to achieve corporations' objectives (Widener, 2007). The success of any strategy can only be realized if performance is clearly observed and measured. Diagnostic control systems can support the implementation of a proactive sustainability strategy by defining sustainability goals through pre-set standards, planning effective resource allocations and effective output measures, and linking incentives to sustainability goal achievement. Aragón–Correa and Rubio-Lopez (2007 p. 376) emphasize that "environmental proactivity requires a fully controlled approach covering different dimensions, including short- and long-term performance consequences". They suggest that the success of proactive sustainability strategy depends on corporations' ability to exclude environmental cost by efficient investments in environmental projects. Therefore, evaluating the adequacy of internal resources and capabilities is fundamental to the implementation of a proactive sustainability strategy (Aragón–Correa and Rubio-Lopez, 2007).

Kerr et al. (2015) find that corporations use Balanced Scorecard and triple bottom line reporting as a diagnostic control system to measure sustainability performance including environment management systems, risk reports, health and safety, and green measures. Leading corporations committed to sustainability also employ operational practices, such as life cycle assessment and social audits, to assess the environmental impacts of operations (Epstein and Roy, 2001). Beyond financial measures, managers can also use sustainable performance measurement systems to monitor and control sustainability performance (Dias-Sardinha et al., 2002). Moreover, incentives and rewards based on multidimensional systems can be established to appreciate, encourage, and evaluate achievements in integrating sustainability performance of divisions, facilities, and individuals (Epstein and Roy, 2001). However, underdeveloped key performance indicators are often barriers to integrating sustainability into control systems. While a challenging task, a corporation's ability to measure sustainability performance- and diagnostic-based corrective actions on pre-set standards may lead to goal achievements.

2.3.4. Interactive control systems

Top management uses interactive controls to focus attention and enhance dialogue and learning among employees as a means of minimizing strategic uncertainties and identifying opportunities (Simons, 1995). Top managers consider interactive controls as regular personal involvement with employees' decision-making activities (Simons, 1995, 2000).

Proactive sustainability strategy often faces various uncertainties, as such strategy brings new risks and opportunities to the corporation (Schaltegger and Burritt, 2010). Gond et al. (2012) propose that corporations may use interactive control systems to trigger sustainability learning and stimulate sustainability strategic renewal. Haugh and Talwar (2010) suggest four ways to enhance employees' awareness and interactions with sustainability: (i) sustainability learning should not be restricted to top management, as it is a corporation-wide requirement; (ii) collaborative programs promoting sustainability should connect all areas of the corporation; (iii) sustainability learning procedures should focus on both knowledge and practical aspects, and (iv) a sustainability learning cycle should be able to address prospects for social learning and development of learning systems for efficient integration into long-term strategy. While allocating enough time and resources for sustainability training courses and workshops is important, tools such as annual reports, booklets, intranet, and internet can also be used to deliver the importance of sustainability internally and externally by encompassing a wider range of stakeholders (Haugh and Talwar, 2010). Moreover, managers can also use interactive controls to incorporate views from external stakeholders, such as communities, NGOs, and investors, to uncover strategies overlooked by internal groups and receive feedback to promote the existing strategy (Arjaliès and Mundy, 2013). Kerr et al. (2015) find that managers use the Balanced Scorecard and triple bottom line as interactive control systems in a sustainability context to interact with subordinates in preparing sustainable development reports and performance reviews and building relationships with stakeholders, such as investors, government authorities, managers for environment health and safety, risk and partner relations, and corporate affairs.

Interactive control systems may also support top management in communicating sustainability information related to changes in innovative technologies, growing customer demands for sustainability products, suppliers' compliance with sustainability standards, competitors' sustainability strategies, and employees' sustainability skills. Hart and Dowell (2011, p. 1468) emphasizes that "managerial attention and the framing of environmental issues have also been identified as affecting firms' abilities to profitability enact environmentally proactive strategies. The natural resource-based view suggests that these factors are vital in developing a sustainable development strategy". However, the way corporations recognize interactions with the natural environment as a threat or opportunity is considerably influenced by managers' and employees' cognitive framing of environmental issues (Tenbrunsel et al., 2000). Furthermore, cross-functional coordination within the corporation and the top management's continued support are also important determinants in developing new products that are environmentally friendly (Aragón–Correa and Rubio-Lopez, 2007). By recognizing strategy as patterns of action to avoid strategic uncertainties, interactive control systems play an important role in the proactive sustainability strategy implementing process. Accordingly, each aspect of the four levers of control has a critical role in supporting proactive sustainability strategy as a means of achieving corporate sustainability performance. The study proposes the following hypothesis to support the above proposition:

Hypothesis 1. The relationship between proactive sustainability strategy and corporate sustainability performance is positively mediated by sustainability control systems.

3. Sample and data collection

A survey was distributed to 700 large-scale multinational enterprises and local corporations, as they are more likely to implement proactive sustainability strategy and formal management control systems (Henri, 2006; Pondeville et al., 2013 [4]). Target

[4] The sample corporations were selected with minimum of 50 employees. Pondeville et al. (2013) identify corporations with more than 20 employees as large-scale corporations and ensure the implementation of environmental management control systems.

corporations were randomly selected from databases of listed companies in the Colombo Stock Exchange, the Ceylon Chamber of Commerce, the National Chamber of Commerce Sri Lanka, the International Chamber of Commerce Sri Lanka, and the Board of Investments Sri Lanka. To ensure the accuracy of the responses and findings, special attention was paid to identifying corporations with a high public profile and commitment towards sustainability, for example, corporations that publish sustainability reports, corporate social responsibility reports, or a similar type of sustainability or corporate social responsibility disclosure in annual reports or on websites.

Surveys were distributed in June 2014 by post and online to one member of the top management of the sampled corporations. Participants in this study include chief executive officer, general manager, managing director, chief operating officer, chief financial officer, sustainability managers, or other senior managers engaged in the formulation and implementation of proactive sustainability strategy and management control systems. Table 1 shows the demographic profile of organizations and respondents. Of the 175 participating corporations, 78.3% were local corporations and 21.7% were multinational; 45.1% were from the manufacturing sector and 54.9% from the service sector. While 67.64% of the respondents were chief executive officers, managing directors, general managers, divisional directors, or chief financial officers, 28.42% were senior managers and heads of department.

Dillman's (2000) survey design methods were employed in the design and distribution of the survey. Of the total 202 (28.85%) received surveys, 27 were removed because of incomplete responses, leaving 175 with a final response rate of 25%. Survey responses with less than 5% missing data were replaced using the mean imputation method (Hair et al., 2014). Outliers, non-normality, non-response bias, and common method variance were assessed using SPSS. A two-sample *t*-test to verify the non-response bias found no statistically significant differences between online and mail respondents for all the constructs. Comparing early and late respondents revealed no significant difference, except for the environmental strategy construct. Common method bias was assessed referring to Harman's single-factor test using all the survey items, where the first factor only explains 45.2% of the total variance (Podsakoff et al., 2003). Following Hair et al. (2014), the study assessed the collinearity statistics for the inner model, as the PLS-SEM framework only consists of reflective measures. Variance inflation factors were well below the acceptable norm of 5, with a highest value of 2.85, and confirmed the absence of significant collinearity among constructs. As a whole, the results support the absence of significant non-response, single source bias, and collinearity issues.

Table 1
Demographic profile of organizations and respondents.

Item	Categories	%	Item	Categories	%
Profile of organizations:					
Nature of company	Local	78.3	Employees	Below 100	16.6
	MNEs	21.7		100–1000	47.4
Industry category	Manufacturing	45.1		1000–10,000	28.6
	Services	54.9		Above 10,000	7.4
Profile of respondents:					
Position	CEO/MD/GM	38.82	Experience	Below 5 years	22.9
	Directors/CFOs	28.82		5-10 years	17.7
	Senior managers	28.42		10-20 years	36.0
	Managers	7.06		Above 20 years	23.4
Educational background	PhD	3.4	Gender	Male	85.1
	Masters	49.7		Female	14.9
	Bachelors	18.3	Age	Below 30 years	10.9
	Professional	28.6		30-40 years	28.6
Place of education	Local	78.3		41-50 years	29.1
	Overseas	21.7		Above 50 years	31.4

3.1. Measured items and measurement scales

Various steps were taken to develop and validate measures of the variables. Survey items were adapted from the existing literature with appropriate amendments for the proactive sustainability strategy and SCS context. The survey instrument was further improved by a comprehensive review and pilot testing by 25 academics and researchers in management accounting and sustainability. Table 2 provides the measurement items under each construct and the factor loadings and descriptive statistics of each construct.

Referring to prior measurements, the study measures proactive sustainability strategy as a second-order reflective-reflective hierarchical construct in terms of environmental strategy, economic strategy, and social strategy dimensions (Bansal, 2005; Steurer et al., 2005; Torugsa et al., 2013). In the 5-point Likert scale consisting of 12 items, four items account for environmental strategy; three items account for economic strategy, and five items account for social strategy. Hart (1995, p. 998) proposes the natural resource-based view of the firm and associated propositions based on two fundamental concepts: “(a) the linkage between the natural-resource-based view and sustained competitive advantage and (b) the interconnections among the three strategies”. The nature of interconnectedness, characterized as path dependence and embeddedness (or overlapping), supports the operationalization of proactive sustainability strategy as reflective-reflective constructs (Hart, 1995; Torugsa et al., 2013). This view is consistent with the “interchangeable” nature of reflective constructs (Hair et al., 2014). Further, this is also in line with Gallardo-Vázquez and Sanchez-Hernandez's (2014) operationalization of three dimensions of corporate social responsibility strategy as a second-order reflective-reflective construct. Three separate models are also examined to test the three sustainability dimensions individually.

The study operationalizes SCS as a second-order hierarchical construct that consists of four first-order levers of control: belief, boundary, diagnostic, and interactive controls. A 5-point Likert scale of 23 items was adapted to measure SCS based on the existing literature (Henri, 2006; Widener, 2007; Arjaliès and Mundy, 2013): 6 items for belief systems, 5 items for boundary systems, 6 items for diagnostic control systems, and 6 items for interactive control systems. Following Simons' (1995) key argument that the success of using levers of control depends on the interplay among four levers rather than on their individual use, the study operationalizes constructs as a reflective-reflective. This is also consistent with the way Speklé et al. (2014) operationalized the intense use of four levers of control as a second-order reflective construct. While Speklé et al. (2014) measured interactive control systems as formative constructs with different multidimensional properties, this study measures interactive control systems using six relatively similar items and operationalized as a reflective construct. As suggested by Speklé et al. (2014), studies that are interested in examining the balanced use of levers of control should operationalize the construct using formative measures.

Consistent with Gallardo-Vázquez and Sanchez-Hernandez's approach for corporate social responsibility strategy measurement (2014), the study evaluates corporate sustainability performance as a reflective-reflective second-order hierarchical construct in terms of environmental, economic, and social performance. Of the 18 items in 5-point Likert scale, 8 refer to environmental performance, 4 to economic performance, and 6 to social performance (Bansal, 2005). Corporate sustainability performance is also examined as a

Table 2
Psychometric properties for first-order and second-order constructs.

Constructs and respective indicators	Loadings
Proactive sustainability strategy	
Alpha: 0.934 CR: 0.943 AVE: 0.580	
Environmental strategy	
Alpha: 0.895 CR: 0.927 AVE: 0.760 R^2: 0.757 β: 0.870 $p < 0.01$ Mean: 3.81 SD: 0.888	
Promoting sustainable resources management (e.g., renewable energy)	0.849
Reducing emissions into the air, water and ground	0.882
Promoting and preserving biodiversity	0.869
Minimizing the environmental consequences of products and services	0.887
Economic strategy	
Alpha: 0.910 CR: 0.943 AVE: 0.847 R^2: 0.768 β: 0.876 $p < 0.01$ Mean: 3.58 SD: 0.860	
Promoting sustainability innovations	0.902
Engaging in sustainability learning and knowledge management	0.916
Developing sustainability business processes	0.943
Social strategy	
Alpha: 0.915 CR: 0.936 AVE: 0.746 R^2: 0.727 β: 0.853 $p < 0.01$ Mean: 4.20 SD: 0.692	
Ensuring health and safety of employees	0.864
Investing in human capital development	0.859
Promoting ethical behavior and protecting human rights	0.892
Avoiding controversial, corrupt, or cartel activities	0.886
Promoting corporate citizenship	0.836
Sustainability control systems	
Alpha: 0.963 CR: 0.966 AVE: 0.559	
Beliefs systems	
Alpha: 0.885 CR: 0.913 AVE: 0.636 R^2: 0.771 β: 0.878 $p < 0.01$ Mean: 3.50 SD: 0.910	
Vision and mission statements	0.794
Strategic plans and policies	0.837
Sustainability reports, corporate social responsibility reports, annual reports, etc.	0.754
Company-wide conferences, forums, workshops, and training sessions, etc.	0.840
Intranet, websites, posters, booklets, etc.	0.794
Top management communications (e.g., minutes of board meetings)	0.761
Boundary systems	
Alpha: 0.900 CR: 0.927 AVE: 0.718 R^2: 0.805 β: 0.897 $p < 0.01$ Mean: 3.77 SD: 0.845	
Regular assessments of sustainability code of conducts	0.863
Ethical and professional guidelines	0.769
Guidelines on sustainability related best practices	0.924
Global Reporting Indicator (GRI)	0.763
Internal sustainability policies, structures, and activities	0.905
Diagnostic control systems	
Alpha: 0.878 CR: 0.908 AVE: 0.624 R^2: 0.831 β: 0.912 $p < 0.01$ Mean: 3.24 SD: 0.984	
Standardized reporting processes (e.g., GRI and UN Global compact)	0.776
Environmental Management Systems (EMS)	0.851
Benchmarking sustainability practices with competitors	0.779
Top management's reviews of performance achievements	0.801
Environmental and social audits (both internal and external)	0.826
Use of management tools (e.g., Kaizen, Hoshin Kanri, 5s, and Just in Time)	0.695
Interactive control systems	
Alpha: 0.934 CR: 0.948 AVE: 0.755 R^2: 0.865 β: 0.930 $p < 0.01$ Mean: 3.34 SD: 0.935	
Top management regularly pays attention to sustainability control practices	0.902
Top management regularly interprets information on sustainability practices	0.902
Operating managers are frequently involved in sustainability practices	0.891
Regular meetings with top sustainability managers and operational managers	0.893
Exchange with stakeholders of best practices to share sustainability innovations	0.884
Use of intranet systems for communities of practitioners	0.729
Corporate sustainability performance	
Alpha: 0.942 CR: 0.949 AVE: 0.525	
Environmental performance	
Alpha: 0.921 CR: 0.936 AVE: 0.646 R^2: 0.892 β: 0.945 $p < 0.01$ Mean: 3.79 SD: 0.789	
Chose inputs from sources that are remediated or replenished	0.783
Reduced environmental impacts of production processes or eliminated environmentally damaging processes	0.866
Reduced operations in environmentally sensitive locations	0.814
Reduced likelihood of environmental accidents through process improvements	0.881
Reduced waste by streamlining processes	0.849
Used waste as inputs for own processes	0.691
Disposed of waste responsibly	0.783
Handled or stored toxic waste responsibly	0.745
Economic performance	
Alpha: 0.670 CR: 0.820 AVE: 0.604 R^2: 0.584 β: 0.764 $p < 0.01$ Mean: 3.53 SD: 0.709	
Worked with government officials to protect the company's interests	0.792
Reduced costs of inputs for same level of outputs	0.826
Sold waste product for revenue	Deleted
Created spin-off technologies that could be profitably applied to other areas of the business	0.708

Table 2 (*continued*)

Constructs and respective indicators	Loadings
Social performance	
Alpha: 0.903 CR: 0.925 AVE: 0.674 R^2: 0.810 β: 0.900 $p < 0.01$ Mean: 3.74 SD: 0.772	
Considered interests of stakeholders in investments by creating a formal dialogue	0.800
Communicated the firm's environmental impacts and risks to the public	0.764
Improved employee or community health and safety	0.797
Protected claims and rights of local community	0.871
Showed concern for the visual aspects of the firm's facilities and operations	0.851
Recognized and acted on the need to fund local community initiatives	0.839
Instrumental variable	
Alpha: 0.650 CR: 0.811 AVE: 0.588 Mean: 3.99 SD: 0.786	
Risks of non-compliance with legal requirements	0.738
Sustainability related legal and regulatory compliance (e.g., Environment Protection Licences - EPL)	0.802
Emergence of new sustainability regulations	0.760

separate construct of the above three dimensions.

The study also controls for corporation size, industry type, and the nature of the corporations (Henri, 2006; Henri and Journeault, 2010; Lisi, 2015; Pondeville et al., 2013). Size is measured using the number of employees. Industry type (1 = manufacturing or 0 = services) and nature of corporation (1 = local or 0 = multinational) are measured using dichotomous variables.

3.2. Assessment for endogeneity

Endogeneity arising from simultaneous causality seems to be a problem in this study. The study uses instrumental variable estimation to account for endogeneity (Larcker and Rusticus, 2010). The study employs a three-item construct that measures sustainability regulatory compliances as the instrumental variable[5] (see Table 2). While the study agrees with the view that regulatory compliance is essential to operate a business, such standard compliance is less likely to generate competitive advantage, as all organizations in a particular industry are expected to comply with it. A valid instrumental variable (i) must not be correlated with the equation's disturbance process and (ii) must be highly correlated with the endogenous regressors (Larcker and Rusticus, 2010).

The validity of the instrumental variable is assessed using (i) overidentification tests: Sargan statistics (0.018, p-value 0.894)[6], Hansen's J statistics (0.012, p-value 0.912),[7] and F-test (203, $p = 0.000$)[8] (Larcker and Rusticus, 2010); (ii) underidentification tests: Anderson canon. corr. LM statistic (124.43, $p = 0.000$) and Kleibergen-Paap rk LM statistic (42.42, $p = 0.000$); (iii) weak identification test statistics of Cragg-Donald Wald F statistic (203.00) and Kleibergen-Paap rk Wald F statistic (208.49) together with Stock-Yogo's critical values (Stock and Yogo, 2005). These values are well above the Stock-Yogo's critical values at all levels (19.93 at 10%, 11.59 at 15%, 8.75 at 20%, and 7.25 at 25%; Stock and Yogo, 2005). These results confirm the rejection of the null hypothesis of underidentification, confirming the weak instrument validity of the instrumental variable. This validates the use of sustainability regulatory compliance as the instrumental variable (Larcker and Rusticus, 2010).

The Durbin-Wu-Hausman specification test is used to assess the existence of an endogeneity problem in the PLS-SEM model (Hausman, 1978). The small chi-square value (chi-square 0.270) and insignificant p-value ($p = 0.603$) of Hausman tests confirm the non-rejection of the null hypothesis. The Hausman specification test is also assessed for individual models, yielding consistent results: environmental sustainability (chi-square 0.000, $p = 0.993$); economic sustainability (chi-square 0.197, $p = 0.657$), and social sustainability (chi-square 3.34, $p = 0.068$). The above specification tests support the absence of significant endogeneity problems in the PLS-SEM model.

4. Analyses and results

4.1. Analysis

The study uses SmartPLS 3.0 to test the hypothesis using PLS-SEM analysis. PLS-SEM estimates path models with latent constructs for indirect measurement using multiple indicators (Hair et al., 2014). The PLS consists of two models: (1) a measurement model (outer model) that examines the relationship between latent variables and associated manifest variables and (2) a structural model (inner model) that examines the relationships between latent variables (Chin, 1998). All constructs were examined using a repeated indicator approach (Hair et al., 2014).

Various analyses were conducted to verify the adequacy of the measurement model in terms of reliability, convergent validity, and discriminant validity (Chin, 1998). As shown in Table 2, factor loadings for most of the measurements are greater than 0.7, and all the measurements are significant at $p < 0.01$ (Hulland, 1999). Cronbach's Alpha, composite reliability (CR), and average variance extracted (AVE) mostly exceed the acceptable thresholds of 0.7, 0.7, and 0.5, respectively (Fornell and Larcker, 1981). These findings ensure the acceptable convergent validity of all the indicators (Chin, 1998).

To assess discriminant validity, Fornell and Larcker criteria, cross-loadings, chi-square differences, and confidence interval analyses were used. Table 3 shows that construct intercorrelations in the model do not exceed the square root of the AVE, with the exception of the correlation between diagnostic systems and interactive systems (Chin, 1998; Fornell and Larcker, 1981). According to Hair et al. (2014), this exception is acceptable, as these two items are lower-order constructs of the second-order SCS construct. Cross-loadings analysis reveals that all the items are loaded to the respective constructs. A chi-square difference test and confidence interval analysis further validate the discriminant validity (Anderson and Gerbing, 1988). Chi-square differences range from 28.479 to 199.53; each has one degree of freedom and is statistically significant at $p < 0.01$. The lower significant chi-square values in the unconstrained model verify the discriminant validity among all the compared dimensions. The analysis reveals the absence of the value 1.0 in the confidence intervals, confirming the discriminant validity among all of the compared dimensions. As a

[5] Kenny (2015) suggests that in SEM analysis, if the effect of variable X on variable Y is mediated by variable M, variable X can be used as the instrumental variable to estimate the effect of M on Y. However, in this study, as the proactive sustainability strategy has a direct link with corporate sustainability performance, the study introduces a separate instrumental variable to the SEM model.

[6] First-stage regression.

[7] 2-Step GMM estimation.

[8] First-stage regressions.

Table 3
Intercorrelations of the latent variables for the first-order constructs and square root of AVE.

Constructs	1	2	3	4	5	6	7	8	9	10	11
1. Environment strategy	0.872										
2. Economic strategy	0.712	0.920									
3. Social strategy	0.560	0.612	0.863								
4. Belief systems	0.632	0.708	0.456	0.797							
5. Boundary systems	0.587	0.661	0.481	0.761	0.847						
6. Diagnostic systems	0.695	0.738	0.451	0.712	0.746	0.790					
7. Interactive systems	0.663	0.752	0.467	0.728	0.766	0.834[a]	0.869				
8. Environment performance	0.687	0.607	0.488	0.525	0.509	0.579	0.585	0.804			
9. Economic performance	0.529	0.514	0.364	0.425	0.392	0.484	0.444	0.672	0.777		
10. Social performance	0.692	0.670	0.686	0.581	0.616	0.643	0.678	0.732	0.588	0.821	
11. Instrumental variable	0.504	0.536	0.485	0.588	0.692	0.662	0.656	0.480	0.355	0.551	0.767

[a] First-order construct of SCS.

whole, these indicators support the acceptability of the psychometric properties of the measurement model in terms of reliability, convergent validity, and discriminant validity.

4.2. Assessment of structural model

The structural model is analyzed in two steps: (i) assessing the path coefficients (Table 4) and (ii) assessing the indirect effects through intervening variables (Table 5). SmartPLS facilitates the bootstrapping procedure to estimate the significance of relationships referring to *t*-statistics together with estimated means and standard errors. A path-weighting computational option was selected to estimate the inner model, as it is the standard weighting scheme that generates the highest variance of the dependent variables (R^2) for endogenous latent variables (Hair et al., 2014). Five thousand bootstrapping resamples were employed.

Table 2 shows the analysis of the first-order and second-order reflective constructs of proactive sustainability strategy, SCS, and corporate sustainability performance. The proactive sustainability strategy construct exceeds all acceptable criteria (Alpha = 0.934, CR = 0.943, and AVE = 0.580) and satisfactorily represents the path coefficients of first-order constructs of environmental strategy ($\beta = 0.870$), economic prosperity ($\beta = 0.876$), and social strategy ($\beta = 0.853$). R^2 values of all first-order constructs are very strong, with the lowest value being 72.7%. This evidence supports the use of proactive sustainability strategy as a second-order construct to represent all three elements of the sustainability strategy. All the path coefficient estimates for the four first-order SCS constructs (belief $\beta = 0.878$, boundary $\beta = .897$, diagnostic $\beta = 0.912$, and interactive $\beta = 0.930$) are positively significant at $p < 0.01$. R^2 values of all first-order levers of control constructs are above 77%. Values of Alpha, CR, and AVE for the four constructs are above 0.7, 0.7, and 0.5, respectively, and surpass the thresholds of acceptable criteria. The use of SCS as a second-order hierarchical construct confirms that the four levers of control significantly support the SCS construct to capture the overall mediating effect. The corporate sustainability performance (Alpha = 0.942 CR = 0.949 AVE = 0.525) construct consists of three first-order constructs of environmental performance ($\beta = 0.945$, $R^2 = .892$), economic performance ($\beta = 0.764$, $R^2 = .584$), and social performance ($\beta = 0.900$ $R^2 = 0.810$), where all three constructs strongly support the construct.

Table 4 shows the PLS-SEM bootstrapped parameter estimates and evaluations of the structural paths for the four measurement models: (i) corporate sustainability (integrated model), (ii) environmental sustainability strategy, (iii) economic sustainability strategy, and (iv) social sustainability strategy. The results show that all the main path coefficients are positively significant under all four models at $p < 0.01$ and $p < 0.05$, except one path: the relationship between SCS and economic performance, which is significant at $p < 0.10$. However, of all control variables, only industry type has a significant impact on environmental performance.

Table 5 presents the results concerning the mediating effect of SCS on the relationship between proactive sustainability strategy and corporate sustainability performance. The mediating analysis was conducted ensuring the conditions proposed by Baron and Kenny (1986). As shown in Table 5, SCS is established as a partial mediator, except in the economic sustainability model, which shows no mediation impact. Sobel z-statistics (Sobel, 1982) were used to test the significance of the mediating effect and indicate that except for the economic sustainability model, the mediating effects of all three models are significant at $p < 0.05$. Variance accounted for (VAF) was also analyzed to reveal the magnitude of the indirect impact of SCS (Hair et al., 2014). VAF confirms that SCS partially mediate the relationship between proactive sustainability strategy and corporate sustainability performance, except in the economic sustainability model. While the highest partial mediating effect is found in the social sustainability model (34.4%), the lowest effect is found in the corporate sustainability model (21.3%). As a whole, SCS explain less than half of the total effect of proactive sustainability strategy on corporate sustainability performance.

Various measures were also examined to assess the relevance of significant relationships and predictive capabilities of measurements, which determine the goodness-of-fit in PLS (Chin, 1998; Hair et al., 2014). As shown in Table 5, R^2 values range from 26.4% to 88.4%. Q^2 values generated through the blindfolding procedure range from 0.146 to 0.490, well above zero, and therefore confirm the predictive relevance of all four path models. Proactive sustainability strategy has the highest effect (f^2) on corporate sustainability performance (0.402). While social strategy (0.390) and SCS (0.401) have a strong effect on social performance, environmental strategy has a medium effect on environmental performance (0.248). All other exogenous constructs reveal small effects on their respective endogenous constructs. While the q^2 for the predictive relevance of social strategy (0.167) and SCS (0.174) reveal a medium effect on social performance, the relative impact of all other exogenous variables on endogenous variables is small.

5. Discussion

This study investigated the mediating role of SCS on the relationship between proactive sustainability strategy and corporate sustainability performance. SCS are found to only partially mediate the relationship between proactive sustainability strategy and corporate sustainability performance. The mediation effect of SCS is examined under three sustainability models, where the environmental and social sustainability strategies reveal a partial

Table 4
Structural model assessment.

Endogenous constructs	R^2			Q^2
Corporate sustainability model				
Sustainability control systems	0.586			0.323
Corporate sustainability performance	0.637			0.328
Environmental sustainability model				
Sustainability control systems	0.512			0.282
Environmental performance	0.524			0.327
Economic sustainability model				
Sustainability control systems	0.884			0.490
Economic performance	0.280			0.151
Social sustainability model				
Sustainability control systems	0.264			0.146
Social performance	0.638			0.424
Relations coefficients	Path	t-values	f^2	q^2
Corporate sustainability model				
Proactive sustainability strategy → Corporate sustainability performance	0.605***	7.268	0.402	0.112
Proactive sustainability strategy → Sustainability control systems	0.765***	24.728		
Sustainability control systems → Corporate sustainability performance	0.216**	2.336	0.052	0.015
Control variables				
Firm size → Corporate sustainability performance	0.036	1.174		
Industry type → Corporate sustainability performance	−0.090**	2.046		
Nature of the firm → Corporate sustainability performance	−0.004	0.087		
Environmental sustainability model				
Environmental strategy → Environmental performance	0.507***	5.641	0.248	0.114
Environmental strategy → Sustainability control systems	0.715***	18.185		
Sustainability control systems → Environmental performance	0.230**	2.449	0.050	0.021
Control variables				
Firm size → Environmental performance	−0.012	0.26		
Industry type → Environmental performance	−0.136***	2.668		
Nature of the firm → Environmental performance	0.031	0.617		
Economic sustainability model				
Economic strategy → Economic performance	0.347***	3.471	0.057	0.027
Economic strategy → Sustainability control systems	0.215***	3.492		
Sustainability control systems → Economic performance	0.213*	1.854	0.022	0.009
Control variables				
Firm size → Economic performance	−0.010	0.299		
Industry type → Economic performance	0.005	0.078		
Nature of the firm → Economic performance	−0.017	0.247		
Social sustainability model				
Social strategy → Social performance	0.453***	7.244	0.390	0.167
Social strategy → Sustainability control systems	0.514***	9.199		
Sustainability control systems → Social performance	0.463***	7.502	0.401	0.174
Control variables				
Firm size → Social performance	0.053	1.427		
Industry type → Social performance	−0.024	0.538		
Nature of the firm → Social performance	−0.022	0.456		

Notes: $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$ (two-tailed). Effect size: f^2 and q^2 0.02 = Small, 0.15 = Medium 0.35 = Large).

mediation, and economic sustainability strategy shows no mediation. Other findings include (i) proactive sustainability strategy is positively associated with SCS and corporate sustainability performance and (ii) SCS are positively associated with corporate sustainability performance. These findings are consistent in all four models.

The partial and absent mediation impacts convey an important message for organizations by highlighting the need to enhance the use of SCS to effectively implement proactive sustainability strategy. SCS have an emerging role in facilitating the implementation of proactive sustainability strategy (Arjaliès and Mundy, 2013; Crutzen and Herzig, 2013; Gond et al., 2012). For instance, Passetti et al. (2014, p. 295) conclude that at present, "sustainability accounting is in a relatively early phase of development and the lack of engagement by most firms is negative for the construction of a more balanced relationship between business and environmental and social issues". However, one possible reason for the partial mediation could be other management control system variables, such as informal controls not considered in this study (Lisi, 2015).

The study shows that the use of SCS to implement different proactive sustainability strategies does not have the same impact on all corporate sustainability performance measurements (environmental, social, and economic performance; Henri and Journeault, 2010). Importantly, when forecasting sustainability performance, corporations need to make sure that they implement appropriate internal managerial control systems to support different proactive sustainability strategies. Failure to do so may have unexpected performance implications. Therefore, it is suggested that the top management take a more proactive approach to implementing sustainability strategy by integrating the three sustainability dimensions into the traditional financially oriented management control systems.

The study concludes that corporations' ability to use multiple levers of control together has the potential to support the implementation of proactive sustainability strategy (Simons, 1995, 2000). The significant positive relationship between SCS and corporate sustainability performance is consistent with Lisi (2015), who finds that environmental performance measures positively influence economic performance; however, it is inconsistent with Henri and Journeault (2010), who find that eco-control has no direct effect on economic performance. Nevertheless, Henri and Journeault (2008) reveal an indirect impact through contextual indicators. However, the interpretation of the use of SCS should consider the contextual conditions within which corporations operate (Henri and Journeault, 2010). Conclusions without such considerations would lead to misinterpretation of theoretical relevance, ignore prevailing economic conditions, and even mislead managerial decision-making. While this study focuses on large-scale local and multinational manufacturing and service corporations, most of the corporations are currently in transition, moving from financially oriented traditional management control systems to SCS. Moreover, corporations operating in Sri Lanka seem to have relatively fewer sustainability issues (e.g., greenhouse gas emissions) because of the nature of the economy. For instance, according to the Ceylon Electricity Board, by December 2013, 48% of the country's electricity

Table 5
Mediating effect of sustainability control systems.

Models	Direct effect	Indirect effect	Total effect	Sobel test	VAF
Proactive sustainability strategy → Corporate sustainability performance	0.605***	0.165**	0.770***	2.288**	21.3%
Environmental strategy → Environmental performance	0.507***	0.164**	0.671***	2.375**	24.5%
Economic strategy → Economic performance	0.347***	0.046	0.393***	1.617	11.7%
Social strategy → Social performance	0.453***	0.238***	0.691***	5.849***	34.4%

Notes: $^{**}p < 0.05$, $^{***}p < 0.01$(two-tailed). Variance accounted for (VAF): VAF>80% Full mediation, 20% ≤ VAF≤80% Partial mediation, VAF<20% No mediation.

demand was powered by hydroelectricity. Therefore, this study highlights the merits of understanding the contextual implications of using SCS to support proactive sustainability strategy. More specifically, multinational organizations operating in the BoP context should account for this fact.

The results also reveal that proactive sustainability strategy is positively and significantly associated with corporate sustainability performance in terms of the environmental, economic, and social perspectives (e.g., Banerjee, 2001; Christmann, 2000; Judge and Douglas, 1998; Klassen and Whybark, 1999; Sharma and Vredenburg, 1998). This contributes to resolving the previous inconclusive outcomes on the link between proactive sustainability strategy and corporate sustainability performance (e.g., González-Benito and González-Benito, 2005; Joshi and Li, 2016; Thornton et al., 2003; Wagner et al., 2002; Wagner and Schaltegger, 2004). In addition, this confirms the applicability of the natural resource-based view of the firm in the developing economy context (Chan, 2005). The comparative analysis shows that the proactive environmental sustainability strategy is more likely to generate higher performance compared to social and economic strategies. It helps top management to keep the corporation from prioritizing a particular sustainability dimension (e.g., environmental) and ignoring others by integrating sustainability issues into strategy. However, both multinational and local corporations operating in developing countries may be encouraged to learn that their ability to integrate sustainability issues into strategy has great potential to achieve improved performance.

In summary, this study's research design, the results, and contextual implications contribute to the environmental management accounting and strategic management literature in the following important and distinct ways. First, current environmental management accounting studies do not provide clear evidence on the formal managerial processes for implementing the proactive sustainability strategy as a means of achieving corporate sustainability performance. By proposing the extent to which corporations use SCS to translate proactive sustainability strategy into corporate sustainability performance, this study establishes a link between proactive sustainability strategy and corporate sustainability performance using SCS. Second, responding to many recent calls for studies, this study advances the use of environmental management accounting applications in the corporate sustainable development process (Arjaliès and Mundy, 2013; Gond et al., 2012; Perego and Hartmann, 2009; Schaltegger and Burritt, 2010). More specifically, it shows that SCS have an important role in supporting sustainability strategic decision making by responding to corporation's strategic changes. Third, past SCS literature in sustainability strategy has largely focused on the design characteristics of SCS and overlooked the use of SCS in implementing sustainability strategy. Referring to the levers of control framework, this study provides empirical evidence to support the use of SCS to implement the proactive sustainability strategy. In turn, it extends Simons' key proposition that the interplay of four levers of control positively influences the implementation of the proactive sustainability strategy (Arjaliès and Mundy, 2013; Gond et al., 2012). In doing so, this study provides empirical evidence and a comprehensive view of sustainable development and attempts to resolve previous inconclusive findings regarding proactive sustainability strategy and corporate sustainability performance (Joshi and Li, 2016). Finally, the study integrates SCS applications within the natural resource-based view of the firm and provides empirical evidence from the bottom of the pyramid context.

6. Conclusions

This study contributes to enhancing the understanding of the use of SCS in translating proactive sustainability strategy into corporate sustainability performance by providing a comprehensive analysis of environmental, social, and economic sustainability dimensions. Given the partial mediating impact of SCS on the relationship between proactive sustainability strategy and corporate sustainability performance, it is suggested that corporations take a more proactive approach to implementing sustainability strategy using SCS. In light of this, the current study outlines the importance of examining the use of SCS from a comprehensive perspective that guides corporations in assessing their approach to sustainability management. Accordingly, it helps corporations identify the appropriate SCS as a means of achieving corporate sustainability performance through effective implementation of a proactive sustainability strategy. More specifically, the study highlights the importance of belief, boundary, diagnostic, and interactive control systems in implementing a proactive sustainability strategy. Given the importance of SCS in implementing a proactive sustainability strategy, managers should be aware that merely integrating sustainability issues into strategy might not help corporations to achieve corporate sustainability performance goals. In addition, special attention should be given to integrating sustainability into management control systems to facilitate the implementation of strategy. It should be noted that the alignment of proactive sustainability strategy and operations of other internal functional departments is crucial for effective strategy implementation. The internal alignment will help top management systematically address external sustainability concerns.

The findings should be interpreted within the limitations associated with internal and external validity. First, the term “sustainability” is a vague concept, where no consensus has yet been established on what the specific properties and boundaries are in measuring proactive sustainability strategy, SCS, and corporate sustainability performance constructs. All the variables examined in this study refer to sustainability, including proactive sustainability strategy, SCS, and corporate sustainability performance. Moreover, study participants' understanding and perception of SCS and the usefulness of SCS in sustainability management may vary depending on industry and country-specific contextual factors. While the study invested considerable efforts and time in developing measurements, and the PLS-SEM analyses meet most of the acceptable criteria, there is still room for measurement errors. This possibility should be considered in interpreting the study results. Future studies may also extend other perspectives by integrating additional attributes and properties into these constructs.

Second, while this study investigates the interplay among four levers of control together, it only examines the use of formal management control systems. Examining only some of the controls might lead to model underspecification. Thus, future research may integrate evidence from formal and informal controls and other management control system frameworks. Third, from the natural resource-based view of the firm, while this study examines the proactive sustainability strategy, there is an emerging need to examine the impact of dynamic sustainability capabilities on sustainability performance (Aragón–Correa and Sharma, 2003; Bhupendra and Sangle, 2015; Hart and Dowell, 2011). Fourth, the Hausman test for endogeneity conducted does not completely rule out reverse causality. Hence, it is recommended that future management accounting studies consider state-of-the-art approaches such as natural experiments to address endogeneity. Finally, common responses and the survey method of gathering data also create potential for bias.

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