

Supply Chain Environmental Sustainability and Corporate Financial Performance: The Mediating Role of Supplier Involvement

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Abstract

The growing concern over environmental degradation and resource depletion has led to a shift in supply chain (SC) management towards sustainability, resulting in the emergence of sustainable supply chain (SSC) management (SSCM). In this paper, we investigate the relationship between SC environmental sustainability (SCES), supplier involvement, and corporate financial performance (CFP). Specifically, we explore whether and how SCES influences CFP, and whether supplier involvement mediates this relationship. To achieve this, we conduct a study using bootstrap-based structural-equation modelling to analyze a sample of 110 Taiwanese manufacturing firms, with 1,000 resamples used to enhance the reliability and validity of the results. Our findings indicate that SCES has a significant positive impact on CFP, highlighting the importance of environmental sustainability for firms seeking to achieve superior financial performance. Furthermore, we find that SCES positively influences supplier involvement, which in turn affects CFP. This suggests that supplier involvement is an important mechanism through which SCES contributes to CFP. Our analysis also reveals that supplier involvement mediates the relationship between SCES and CFP, providing empirical evidence that supplier involvement plays a key role in translating sustainability initiatives into financial performance. Overall, our study provides important insights into the benefits of SSCM and highlights the importance of supplier involvement in achieving sustainable and financially successful supply chains. The implications of our findings for researchers and practitioners are discussed, and future research directions are identified.

Keywords

Supply chain, Environmental sustainability, Financial performance, Supplier involvement

1. Introduction

Given the growing demand for sustainability from customers, shareholders, and government regulations, companies are increasingly dedicating resources to foster collaboration and cooperation in sustainability-related aspects throughout their supply chains. This strategic approach aims to enhance economic, environmental, and social performance, as noted by Kim and Schoenherr (2018). In this evolving landscape, effective management of supply chains (SCs) has transformed into a pivotal element for corporations striving to maintain their competitiveness in the global market, as emphasized by Ortas et al. in (2014). Unsurprisingly, there is a substantial body of research (e.g., Cheng et al., 2021, Narimissa et al., 2020; Schaltegger and Burritt, 2014) delving into sustainability challenges within supply chain management (SCM). These studies are committed to fulfilling the principle of meeting present needs while safeguarding the potential of future generations to meet their own requirements, echoing the sentiment expressed by the World Commission on Environment and Development (WCED) in 1987.

For example, the work of Ashby et al. (2012) involves a systematic review of 134 articles on SCM, focusing on the social and environmental dimensions of sustainability. Their findings suggest that due to its more process-driven nature, integrating environmental sustainability into SC practices could be comparatively more feasible. Similarly, Ortas et al. (2014) adopt the Granger causality model to explore the connection between sustainable supply chains (SSC) and corporate performance. Drawing from a dataset of 3,900 companies extracted from the Datastream database, their research highlights the presence of a reciprocal causal relationship between SSC performance and overall company financial performance.

Applying structural equation modeling (SEM), Luzzini et al. (2015) investigate the impact of dedication to sustainability on environmental and social aspects, as well as cost performance. Utilizing survey responses obtained from 383 procurement executives, their study reveals robust associations between a commitment to sustainability and the fostering of collaborative capabilities, both within and between firms. Moreover, the research identifies significant connections between inter-firm collaborative capabilities and enhanced environmental, social, and cost performance.

Subsequent work by Jadhav et al. (2019) conducts a study utilizing SEM to explore the interplay of SC coordination and commitment in shaping SSC performance. Analyzing data collected from 154 SC managers, their findings indicate that SC coordination impacts the environmental sustainability performance of the SC through the intermediary role of internal SC sustainability practices. Meanwhile, SC commitment directly affects both the environmental and social performance of the SC. In a similar vein, Kamble et al. (2021) present evidence that blockchain technologies exert an influence on SSC performance by way of mediating SC integration. This conclusion arises from a SEM analysis encompassing 253 managers from 187 companies in the automotive and auto-component manufacturing sectors.

While an extensive body of SC literature (e.g., Belhadi et al., 2022; Blome et al., 2014; Cheng et al., 2021; Jadhav et al., 2019) delves into sustainability-related challenges, relatively scant attention has been paid to examining the impact of environmental sustainability within SCs on a company's performance. Notably absent is research exploring the intricate relationship linking SC environmental sustainability (SCES), supplier engagement, and corporate financial performance (CFP). Thus, the primary goal of this study is to investigate the influence of SCES on CFP, employing structural equation modeling (SEM) and the bootstrapping resampling technique.

2. Research Hypotheses

In order to examine the interplay between SCES and CFP within the context of supplier involvement, we present a mediated model illustrated in Figure 1. The core concept of this model posits that elevated SCES within a firm fosters enhanced engagement from the firm's suppliers, ultimately leading to improved financial performance for the firm.

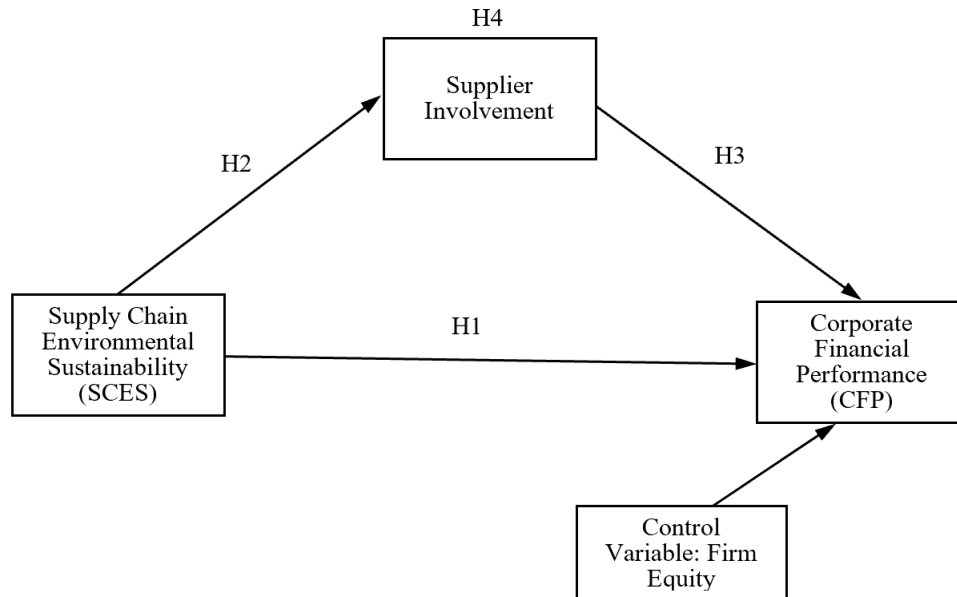


Figure 1. Hypothesized relationships of SCES, supplier involvement, and CFP

The efficacy of environmental sustainability stands as a fundamental component of corporate governance, as highlighted by Luzzini et al. (2015). Likewise, the role of environmental sustainability in predicting successful supplier engagement within SCs is crucial, potentially exerting an impact on overall firm financial performance, as demonstrated by Jadhav et al. (2019). Consequently, this research anticipates that a strong emphasis on high-quality environmental sustainability within SCs will foster superior supplier involvement and operational performance. Hence, this research predicts that exceptional supplier involvement will translate into improved corporate financial outcomes. In accordance with this, the hypotheses of the study are as follows:

Hypothesis 1: SCES positively affects CFP.

Hypothesis 2: SCES positively affects supplier involvement.

Hypothesis 3: Supplier involvement positively affects CFP.

Put differently, it's plausible that the relationship between SCES and CFP could be mediated by supplier involvement. Consistent with earlier research (e.g., Jadhav et al., 2019; Luzzini et al., 2015), there is a growing consensus that as companies acknowledge the importance of sustainability within their operations, involving suppliers in these initiatives becomes a pivotal factor in achieving favorable financial results. As a result, this study hypothesizes:

Hypothesis 4: SCES positively affects CFP through the mediating effect of supplier involvement.

3. Methods

3.1 Participants

To investigate the proposed hypotheses, a survey research design is employed. A total of 1,000 potential participants are identified and contacted using databases from the Ministry of Economic Affairs. Out of these, 118 individuals participated, resulting in an 11.80% response rate

The survey questionnaire draws upon well-established item scales identified through a thorough examination of existing literature in the domains of environmental sustainability and SCM. It comprises two distinct sections. The initial section encompasses open-ended inquiries aimed at gathering contextual details about the participants and their respective companies, encompassing factors such as gender, professional tenure, company dimensions, and industry affiliations. The subsequent section comprises a series of multiple-choice queries, employing a seven-point Likert scale for respondents to articulate their responses.

After eliminating survey responses with incomplete information, a total of 110 valuable samples were retained from manufacturing companies across 14 diverse industry sectors. These sectors encompass chemicals, biotechnology, petrochemicals, automotive, textiles, food, rubber, optoelectronics, semiconductors, electrical distribution, electronics, iron and steel, electric machinery, as well as construction and building materials.

3.2 Performance measurement model and analysis

SCES (with a Cronbach's α of 0.897) is assessed using five-item scales derived from Giannakis and Papadopoulos (2016). Supplier Involvement (with a Cronbach's α of 0.905) is gauged through three-item scales adapted from Devaraj et al. (2007). CFP is quantified using three-item scales drawn from Huang et al. (2011) and Kaplan and Norton (1992). The comprehensive survey questionnaire can be provided upon request.

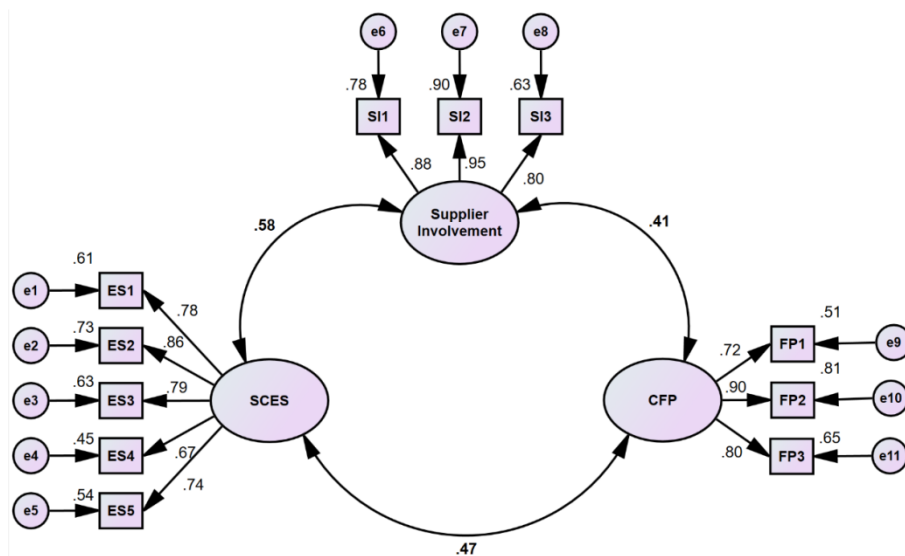


Figure 2. Performance measurement model with 1,000 resamples for standardized parameter estimation

Utilizing confirmatory factor analysis (CFA) with 1,000 resamples (refer to Figure 2), it is evident that all the factor loadings for the measurement items of SCES, Supplier Involvement, and CFP exhibit significance ($p < 0.01$), with values all exceeding 0.67. These values surpass the threshold of 0.5 established by Hair et al. (2009), thereby affirming a robust convergent validity for all item scales within the performance measurement model. The resulting measurement model shows an exceptional fit to the data, as indicated by IFI = 0.992, TLI = 0.990, CFI = 0.992, Chi-square/DF = 1.151, and RMSEA = 0.034.

Subsequent to conducting the CFA, this study utilizes a bootstrap-based SEM approach to examine the hypotheses.

4. Research Results

Figure 3 illustrates the outcomes of hypotheses 1 to 3 through implementation of the bootstrap-based SEM technique employing 1,000 resamples. The model's RMSEA stands at 0.046. The Chi-square/DF ratio is 1.269, whilst the IFI, TLI, and CFI values are 0.983, 0.978, and 0.983, respectively. These indices, according to Chen (2023), point toward a satisfactory model fit. Among the three path coefficients, one demonstrates high significance at $P < 0.001$, another exhibits significance at $P < 0.05$, and the remaining one is noteworthy at $P < 0.10$.

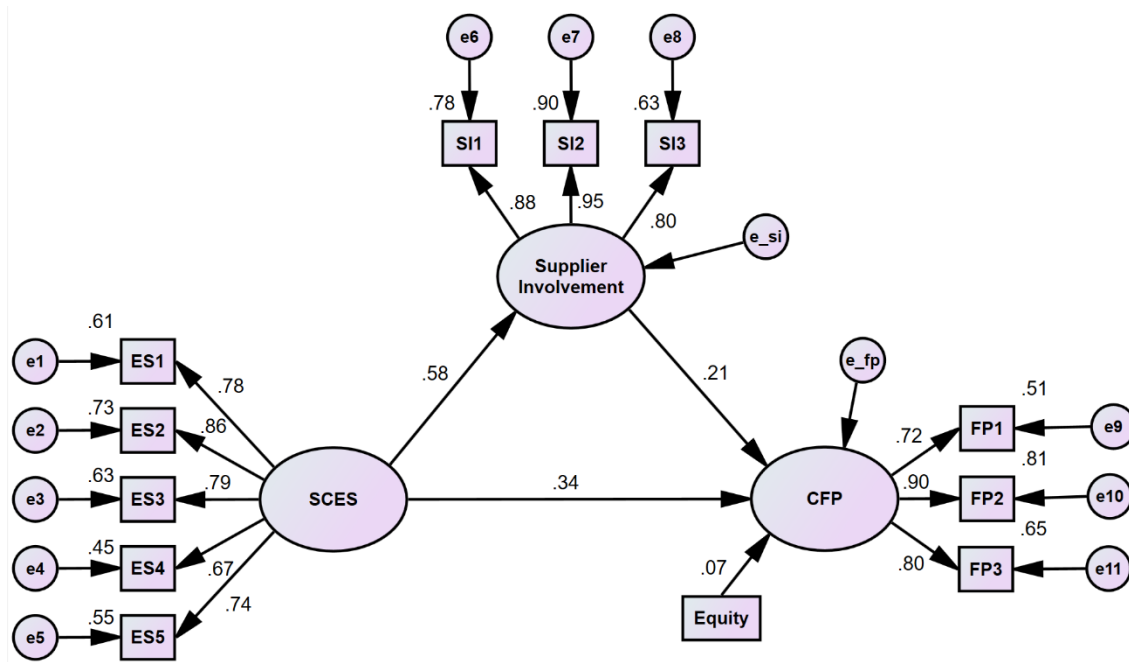


Figure 3. Structural relationships of SCES, supplier involvement, and CFP with 1,000 resamples for standardized parameter estimation

Specifically, the path coefficient connecting SCES to CFP stands at 0.34, reaching significance at the 0.05 level. This result supports hypothesis 1, which posits a positive influence of SCES on CFP. Correspondingly, the path coefficient linking SCES to Supplier Involvement is 0.58, exhibiting significance at the 0.001 level, thereby affirming the validity of hypothesis 2, which suggests a positive effect of SCES on supplier involvement. Likewise, the path coefficient associating Supplier Involvement with CFP is 0.21 at the significance level of 0.10, providing evidence for the acceptance of hypothesis 3, proposing a positive impact of Supplier Involvement on CFP.

Table 1 presents the findings from the bootstrap-based mediating analysis of supplier involvement, involving 1,000 resamples. The table reveals that the indirect effect is 0.121, reaching significance at the 0.06 level. This suggests that supplier involvement acts as a mediator in the connection between SCES and CFP. Additionally, the bias-corrected 90% confidence interval (CI), spanning from 0.011 to 0.295 and not encompassing zero, serves to

reinforce the test outcome, thereby affirming the acceptance of hypothesis 4. This hypothesis asserts that SCES positively impacts CFP through the mediating effect of supplier involvement.

Table 1. bootstrap-based mediating analysis of supplier involvement with 1,000 resamples

Variables and Sources	Products of Coefficients	P-value	Bias-Corrected 95% CI	
			Lower	Upper
SCES → Supplier Involvement → CFP	0.121	0.06	0.011	0.295

5. Discussion and Conclusion

The findings presented in this study, underscoring the significance of environmental sustainability for corporate financial results, align with previous research findings (e.g., Ashby et al., 2012; Jadhav et al., 2019; Kamble et al., 2021; Luzzini et al., 2015; Ortas et al., 2014). This research serves to broaden the existing understanding of the connections among SCES, supplier involvement, and company financial performance.

Specifically, this study delves into the interrelated dynamics among environmental sustainability, supplier involvement, and company financial performance. Employing a bootstrap-based SEM to examine a cohort of 110 Taiwanese manufacturing firms, the research establishes that environmental sustainability exerts a substantial impact not only on supplier involvement but also on the financial performance of these companies.

The research results of this study have several managerial implications. First, the findings underscore the importance of integrating sustainability considerations into strategic decision-making processes. Organizations that prioritize environmental sustainability initiatives are more likely to experience improved financial project performance. Managers should thus recognize that sustainable practices are not merely altruistic endeavors, but strategic imperatives that can lead to enhanced profitability.

Second, supplier involvement emerges as a pivotal factor in the pathway from sustainability to financial project performance. To fully harness the potential benefits, managers must actively engage with suppliers to foster collaboration and alignment of goals. This entails selecting suppliers that share the organization's sustainability values, and working closely with them to integrate sustainable practices throughout the supply chain.

Third, our findings suggest that fostering a sustainability-oriented mindset among employees is integral to achieving positive financial performance outcomes. Managers should therefore champion sustainability as a core value, embedding it within the company's mission, vision, and day-to-day operations.

In sum, the linkage between environmental sustainability, supplier involvement, and corporate financial performance offers a wealth of insights for managerial practice. Organizations that recognize the intertwined nature of these elements can strategically position themselves for long-term success. By cultivating a sustainability-focused culture, businesses can unlock a new paradigm where financial prosperity and environmental stewardship go hand in hand.

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Biography

Hong Long Chen is a full professor in the department of Business and Management at the National University of Tainan, Taiwan. Dr. Chen is a member of the Tau Beta Pi Engineering Honor Society. He holds a Ph.D. from the University of Florida, and has worked for several engineering firms. His research interests include project management, supply chain management, corporate finance, and performance management. His papers have been published in various journals such as *Supply Chain Management: An International Journal*, *International Journal of Production Economics*, *International Journal of Operations & Production Management*, *Journal of Real Estate Finance and Economics*, *Journal of Management in Engineering*, *International Journal of Project Management*, and *Journal of Business Economics and Management*. He has received the Award of Ministry of Science and Technology Subsidized College Awards for Special Research Talents several times. He is also an editorial board of *International Journal of Project Management*.