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Linking Sustainable Supplier Selection to Firm's Sustainable Performance: The Moderated Mediating Role of Supplier Development and Leadership for Functional Integration

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Abstract: This study aims to investigate the moderated mediation model in which leadership support for functional integration complements sustainable supplier selection to enhance a firm's sustainability performance by promoting sustainable supplier development practices. We tested the proposed hypothesis using 289 data collected from multiple sources of manufacturing firms. Our results reveal that sustainable supplier selection indirectly enhances a firm's sustainability performance via sustainable supplier development practices. In addition, our results highlight that leadership support for functional integration strengthens this indirect relationship. This study contributes to the sustainability management literature by providing insights into how firms promote sustainability performance by combining leadership with sustainable supplier management.

Keywords: leadership support for functional integration; sustainable supplier selection; sustainable supplier development; sustainable performance

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1. Introduction

Sustainable development that integrates environmental and social issues with economic aspects has been an increasingly important issue to academic researchers and business practitioners [1,2]. The external and internal pressures arising from sustainable concerns change the traditional supply chain into a sustainable supply chain that pursues sustainability goals [3,4]. Furthermore, since long-term sustainable development creates numerous business opportunities to enhance competitiveness by seeking new markets and value-added solutions, firms have paid more attention to developing sustainability performance in the supply chain [5]. Sustainability performance refers to achieving the triple bottom line, including environmental, social, and economic performance [6]. The environmental performance takes into account efficiency in resource recycling and reduction of pollution and waste. Social performance concerns human rights and labor practices. Economic performance means operational and financial performance, such as quality, cost, delivery, and revenue performance [7]. Given the increasing importance of sustainability issues, supply chain researchers have also investigated the antecedents of sustainability performance from the perspective of sustainable supplier management.

When managing sustainability, it is difficult for buying firms to guarantee their sustainability without ensuring their suppliers' sustainability. Researchers have found that sustainable supplier selection and assessment practices positively affect environmental and social performance [8–10]. Furthermore, collaborative practices with supply chain partners can improve firms' sustainability performance [11–16]. Previous studies highlighted that sustainable supplier management is a vital enabler for achieving the desired sustainability performance by focusing on supplier selection, evaluation, and collaboration. In addition, the literature on sustainable supplier management started focusing on sustainable supplier

development because the suppliers' ability to manage sustainability can directly impact the focal firms' sustainability performance [17,18]. Sustainable supplier development practices refer to the buying firm's initiative practices to improve sustainable supplier performance or capability to meet two or more elements of the triple bottom line, which involves economic, environmental, and social performance [19–21]. Fan, Xiao, Zhang and Guo [16] found that sustainable supplier development could improve firms' sales performance by enhancing customer satisfaction. Sancha, et al. [22] emphasized that implementing supplier development practices enables the suppliers to be more socially responsible. Researchers also tried to provide appropriate processes for sustainable supplier development to guide practitioners to improve the suppliers' capability of achieve environmental and social performance [23,24]. However, relatively few researchers examined the antecedents of sustainable supplier development. For instance, Sancha, et al. [25] examined how institutional pressures (i.e., coercive, regulatory, and normative) influence the adoption of sustainable supplier development. Although much research has focused on sustainable supplier management, there is still a lack of understanding of how sustainable supplier development is encouraged and facilitated. This study examines the antecedent and consequences of sustainable supplier development to fill this research gap. Specifically, according to the resource-based perspective [26,27], our study focuses on enhancing sustainability performance by exploring how sustainable supplier selection facilitates a firm's sustainability performance via sustainable supplier development practices. Although sustainable supplier selection is necessary to obtain the critical resources for sustainability, little is known about its mechanism for improving the buying firms' sustainable performance. Furthermore, according to the knowledge management perspective [28], the sustainable supplier selection process generates information about supplier capabilities through supplier assessment and evaluation, which helps to implement the appropriate sustainable supplier development practices. The knowledge and information flow from sustainable supplier selection enhances the knowledge sharing about sustainability and further promotes sustainability performance in the complicated business context. Therefore, this study investigates the indirect mechanism that links sustainable supplier selection to sustainable performance via sustainable supplier development practices.

Furthermore, considering the importance of functional integration in the supply chain [29], our study proposes that leadership support for functional integration moderates the relationship between sustainable supplier selection and development practices. Functional integration within the organization is needed to meet the requirements of the buying firm, but diversity and differences between individuals with different functions result in conflict and problems. Up to this point, the role of leadership has been crucial for functional integration [30,31]. When leaders support functional integration through communication and encouragement, individuals are more likely to respond to the different aspects and knowledge, which leads to increasing resources and knowledge sharing. According to the knowledge management perspective, knowledge sharing and flow strengthen the relationship between sustainable supplier selection and sustainable development practices. Moreover, the interaction effect of sustainable supplier selection and leadership support for functional integration may transmit to sustainability performance via sustainable supplier development practices. Figure 1 shows the conceptual research model of this study.

Overall, our study attempts to contribute to the literature on sustainable supplier management in some ways. First, our study adds to the evidence of the importance of sustainability links in the supply chain, including sustainable supplier selection and development practices. Second, our study suggests a mechanism that links sustainable supplier selection to sustainability performance via sustainable supplier development practices. Finally, by examining the moderated mediation model in which leadership support for functional integration has a moderating role, our study provides new insights for implementing sustainable supplier management more effectively.

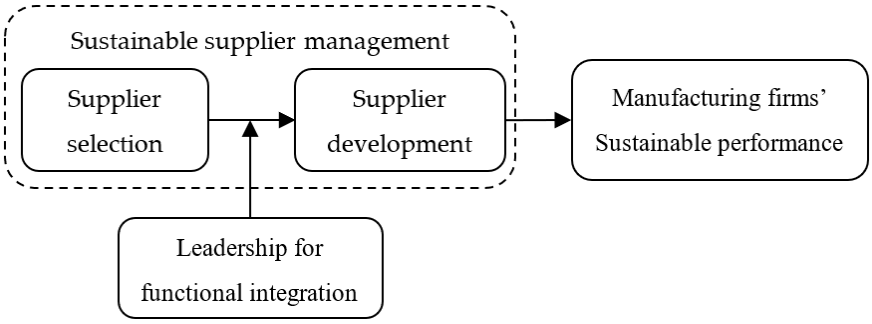

Figure 1. Conceptual research model.

2. Hypotheses Development

2.1. Mediating Role of Supplier Development in the Relationship between Supplier Selection and Sustainable Performance

Supplier selection and evaluation is the first stage of supplier management [32]. When the performance of an existing supplier is not enough to meet the buyer's requirement, it is necessary to evaluate new suppliers and identify their capability to select anew. Traditionally, supplier selection focuses on economic-based values such as cost, quality, and delivery times [33,34]. However, recently it has started to consider the importance of environmental and social issues [20,35–38]. In this study, sustainable supplier selection refers to the process of identifying, evaluating, and selecting the appropriate suppliers for sustainability [39]. According to the resource-based view, supplier selection provides the key resources for improving the buying firm's performance [40]. When the buying firm identifies and selects an appropriate supplier with particular capabilities and expertise and effectively integrates the obtained supplier's capabilities with its own, the supplier's capabilities can be a source of the buying firm's competitive advantage. Furthermore, when the resources from the sustainable supplier are scarce and non-substitutable for the buying firm's specific sustainable needs, it provides better value and competence for the sustainability of the buying firm.

Although the sustainable supplier has the potential to provide valuable resources, in an uncertain business environment, it is necessary to continuously develop the supplier's capabilities and performance for the buying firm's long-term sustainable goals. Given the uncertainty and costs of searching for new suppliers, the buying firm needs to improve the performance and capabilities of the supplier to achieve their competitive advantage through supplier development practices [32,41,42]. Furthermore, since the buying firm makes more effort to select a sustainable supplier, it will likely pay more attention to developing its capabilities and performance. On the other hand, when choosing suitable suppliers for sustainability, it is essential to assess their capabilities and performance for advancing the sustainable goals of the buying firm [43,44]. The buying firm selects sustainable suppliers through evaluation and certification before initiating sustainable supplier development practices and then identifying where supplier development efforts are needed [41]. According to the knowledge management perspective, the supplier selection process provides valuable information for implementing supplier development practices to improve the suppliers' performance and capabilities in line with the buying firms' objectives and reduce early supplier risk through clear assessment [45,46]. Therefore, sustainable supplier selection with evaluation and certification for sustainability facilitates sustainable supplier development practices by providing valuable information for the supplier's needed improvements.

Since sustainable supplier development practices are designed for the buying firm's sustainability requirements, well-implemented sustainable supplier development is helpful for both suppliers and buyers to improve sustainability performance. Sustainable supplier development practices can help the supplier consider achieving environmental and social goals by providing technological support and professional personnel regarding

environmental and social issues [20,47,48]. Increasing visits and problem-solving assistance facilitate the transfer of specific knowledge for better performance [46,49]. A close relationship and collaboration between supplier and buyer through sustainable supplier development practices can help with the adoption and development of environmental technologies, improving environmental performance and increasing economic performance by reducing operational costs and creating new business opportunities [50,51]. Moreover, sustainable supplier development practices enable the sharing of valuable knowledge with social standards for sustainability and enhancing social performance for both the supplier and the buyer [52]. Indeed, researchers have found that sustainable supplier development can improve economic [53,54], environmental [45,51,55], and social performance [51,56]. In sum, from the knowledge management perspective, the initiatives and actions such as communication, information sharing, and personal assistance that the buying firm provides can enhance the sustainability performance of both supplier and the buying firm. In other words, the capabilities and performance of sustainable suppliers improved by a buyer's sustainable supplier development practices can contribute to the sustainability performance of the buying firm. The more effort the buying firm puts into selecting suppliers for sustainability, the more likely the buying firm will put effort into initiating sustainable supplier development practices. Then, sustainable supplier development practices facilitate the capability and performance of suppliers through technical assistance and personal support with specific knowledge and resources of sustainability, which contribute to the buying firm's sustainability performance [40]. Therefore, we posit that sustainable supplier development practices mediate the relationship between sustainable supplier selection and the buying firm's sustainability performance.

H1: *Sustainable supplier selection indirectly enhances a firm's sustainability performance by facilitating sustainable supplier development practices.*

2.2. Moderating Role of Leadership Support for Functional Integration

Functional integration focuses on the coordination or information sharing among different functions [31,57]. Information sharing and coordination enhance technical improvements and increase individual commitment and motivation, advancing the firm's performance [58]. Furthermore, functional integration uses diverse resources and information from different functions for a specific project with more creative thinking and brings out benefits for their common goals. Functional integration in the supply chain especially leads to the success of the firm's overall strategy for quality and innovation [59,60] and enhances sustainable competitiveness [61].

However, the diversity and differences between individuals from different functional areas can easily create conflicts and stress. The ambiguity of roles and resources also incurs difficulties in achieving high performance. Therefore, leadership is critical to the success of functional integration. The leader can promote functional integration by using communication and resolving conflicts. The leadership support for functional integration can break away from existing knowledge sources and competition and help to explore new sources and competitiveness. When leadership supports functional integration, information and knowledge are more likely to be shared, which leads to seeking a better way for unstable environments [62]. As a dynamic capability, functional integration supported by leadership facilitates the transformation of disparate knowledge and information into integrated resources, enhancing the firm's performance [63].

According to the knowledge management perspective, knowledge generation and sharing are critical in sustainability development [28]. Since functional integration facilitates the sharing of information and the generation of creative ideas, exploring new markets and products for sustainability is beneficial, leading to more sustainable development for the supplier. When leaders pay more attention and make more effort to achieve functional integration, the information and knowledge obtained through sustainable supplier selection are more likely to be used in sustainable supplier development. Therefore, leadership

support for functional integration interplay with sustainable supplier selection and more efficiently enhances sustainable supplier development practices. Furthermore, leadership support for functional integration may strengthen the indirect effect of sustainable supplier selection on sustainability performance via sustainable supplier development practices.

The leadership support for functional integration also breaks down functional barriers and facilitates communication, coordination, and collaboration among various functional departments [31,64]. Sustainable supplier selection and development practices require cross-functional collaboration [17,25,42]. By leveraging the functional collaboration and expertise of different functions, firms can perform more comprehensive supplier assessments, enhancing the effectiveness of sustainable supplier selection in promoting sustainable supplier development.

In addition, leadership support for functional integration helps various functional departments align with business strategies. Previous studies emphasized that sustainable supply chain management requires an alignment of shared goals, visions, and strategies across different functions [65–67]. Leadership support for functional integration may play an important role in facilitating the positive relationship between sustainable supplier selection and development practices by leveraging shared goals, visions, and strategies among functions, subsequently enhancing sustainable performance. Thus, we suggest that leadership support for functional integration strengthens the indirect effect of sustainable supplier selection on sustainability performance via sustainable supplier development practices.

H2: *Leadership support for functional integration moderates the indirect effect of sustainable supplier selection on a firm's sustainability performance via sustainable supplier management practices, such that the indirect effect is stronger when the leadership support for functional integration is high.*

3. Methods and Results

3.1. Data Collection and Measurement

We used the data set from the fourth round of the High-Performance Manufacturing (HPM) project to examine the proposed moderated mediation hypothesis. Researchers from 15 countries and regions have joined this project to collect survey data specializing in three manufacturing industries (i.e., machinery, electronics, and transportation). The survey questionnaire was developed in English. Then, researchers translated it into each local language and went through a back-translation process to ensure the accuracy of the translation. Recent literature has described the data collection process of the HPM project [68]. One of the authors in this study also participated in the data collection process. A total of 330 plants submitted responses. After dropping 32 responses due to missing data, we used 289 samples to conduct regression analysis.

The measurements of our major constructs were adapted from existing literature. To measure sustainable supplier selection, 3 items were adapted from Mousavi and Mousavi [69] by focusing on supplier selection criteria based on environmental and social factors. Four items for sustainable supplier development practices were adapted from Picasso, et al. [70] and Wang, et al. [71]. According to Epstein and Widener [72], sustainability performance was measured using the four items in terms of economic, environmental, and social aspects. The four items for leadership support for functional integration were adopted from Morita, et al. [73]. All items were framed using the Likert 5-point scale. Table 1 presents all the constructs and the measurement items.

In addition, several control variables (i.e., firm size, R&D intensity, brand image, and industry factor) were included in the research model. We measured firm size using the natural logarithm of the number of employees. R&D intensity was measured by the percentage of sales spent on R&D, from a 1 (i.e., significantly lower than leading competitors) to a 5 (i.e., significantly higher than leading competitors). The brand image was measured by positioning the brand image of the products relative to those of leading competitors, from a 1 (i.e., significantly lower) to a 5 (i.e., significantly higher). Lastly, machinery and electronics were included in the form of dummy variables.

Table 1. Construct measurement and confirmatory factor analysis.

Construct		Loading
Sustainable Supplier Selection		
SSS1	Environmental certification, such as ISO 14001 [74]	0.850 ***
SSS2	Ethical employment practices	0.656 ***
SSS3	Use of sustainability practices, such as recycling and reuse	0.754 ***
Sustainable Supplier Development Practices		
SSDP1	Encouraging suppliers to improve the environmental performance of their processes	0.906 ***
SSDP2	Visiting suppliers' plants or ensuring that they are not using sweatshop labor	0.650 ***
SSDP3	Providing design specifications to suppliers in line with environmental requirements (e.g., green purchasing, black list of raw materials)	0.681 ***
SSDP4	Co-development with suppliers to reduce the environmental impact of the product (e.g., eco-design, green packaging, recyclability)	0.728 ***
Sustainability Performance		
SP1	Environmental performance	0.705 ***
SP2	Regulatory performance	0.686 ***
SP3	Revenue performance	0.520 ***
SP4	Corporate reputation/image	0.771 ***
Leadership Support for Functional Integration		
LSFI1	Our top management emphasizes the importance of good inter-functional relationships.	0.535 ***
LSFI2	Our managers do a good job of solving inter-functional conflicts.	0.704 ***
LSFI3	We are encouraged to communicate well with different functions in this plant.	0.683 ***
LSFI4	Our managers communicate effectively with managers in other functions.	0.655 ***

Significance level: *** $p < 0.001$.

3.2. Reliability and Validity

Table 2 presents the exploratory factor analysis (EFA), including the major constructs of this study: sustainable supplier development practices (SSDP), sustainable performance (SP), leadership support for functional integration (LSFI), and sustainable supplier selection (SSS). The EFA extracted four factors, explaining 63.245% of the total variance. In addition, as shown in Table 3, Cronbach's α and composite reliability values of all the constructs were higher than 0.7, indicating good construct reliability. Then, we conducted a confirmatory factor analysis (CFA) to test convergent validity. CFA results revealed that all the constructs showed acceptable fit ($\chi^2/df = 1.741$, RMSEA = 0.051; CFI = 0.971; TLI = 0.945; GFI = 0.936; NFI = 0.903), and factor loadings were significant and greater than 0.535 (see Table 1). Table 3 also shows that the average variance extracted (AVE) values were above 0.611 and larger than the squared correlation coefficient of each construct, ensuring convergent and discriminant validity.

Table 2. EFA results.

	SSDP	SP	LSFI	SSS
SSS1	0.215	−0.035	0.100	0.822
SSS2	0.102	−0.019	0.113	0.798
SSS3	−0.050	0.187	0.081	0.644
SSDP1	0.837	0.270	0.046	0.122
SSDP2	0.781	0.039	0.067	0.113
SSDP3	0.659	0.315	0.148	0.065
SSDP4	0.806	0.169	0.084	0.003
SP1	0.142	0.782	0.165	−0.035
SP2	0.041	0.816	0.088	0.061
SP3	0.291	0.539	−0.002	0.036
SP4	0.277	0.766	−0.004	0.122
LSFI1	0.040	0.064	0.676	0.070
LSFI2	0.151	0.039	0.748	0.084
LSFI3	0.088	0.047	0.773	0.008
LSFI4	0.001	0.080	0.752	0.162

Table 3. Descriptive analyses, reliability, and validity.

Construct	1	2	3	4	5	6	7	8
1. SSS	**0.684**							
2. SSDP	0.28 **	**0.611**						
3. SP	0.09	0.46 **	**0.678**					
4. LSFI	0.25 **	0.21 **	0.18 **	**0.622**				
5. Firm size	0.03	0.24 **	0.17 **	0.01				
6. R&D intensity	0.17 **	0.11 *	0.14 **	0.06	−0.01			
7. Brand image	0.22 **	0.13 **	0.07	0.26 **	−0.11	0.27 **		
8. Machinery	0.14 *	0.06	−0.08	−0.06	0.06	0.10	−0.05	
9. Electronics	−0.15 **	−0.10	−0.01	−0.06	0.06	−0.04	0.05	−0.59 **
Mean	3.785	3.177	3.980	3.937	6.255	3.309	3.867	0.380
S.D.	0.742	0.845	0.543	0.555	0.928	0.957	0.878	0.486
Cronbach's α	0.793	0.824	0.761	0.734				
CR	0.837	0.818	0.868	0.836				

Notes: Value on the diagonal is the square root of AVE, * $p < 0.05$, ** $p < 0.01$.

3.3. Analysis Results

Hypothesis 1 proposed that sustainable supplier development practices (SSDP) mediate the relationship between sustainable supplier selection (SSS) and sustainable performance (SP). Table 4 shows the regression results. The results show that sustainable supplier selection positively affects sustainability performance (β = 0.095, $p < 0.05$; Model 4). The results of Model 2 indicate that sustainable supplier selection has a significantly positive effect on sustainable supplier development practices (b = 0.277, $p < 0.001$). In Model 4, the impact of sustainable supplier selection on sustainability performance positively affects sustainability performance (b = 0.095, $p < 0.05$). However, after controlling the direct effect of sustainable supplier selection in Model 5, the direct effect is weakened and insignificant, while sustainable supplier development practices are positively associated with sustainability performance ((b = 0.275, $p < 0.001$). These results indicate that sustainable supplier development practices fully mediate the relationship between sustainable supplier selection and sustainable performance, supporting Hypothesis 1.

Table 4. Results of regression analysis.

		SSDP		SP	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	1.048	0.327	0.015	2.707	2.648
Firm size	0.231 ***	0.221 ***	0.197 ***	0.109 **	0.048
R&D intensity	0.071	0.048	0.039	0.076 *	0.063 *
Brand image	0.137 *	0.087	0.065	0.016	−0.008
Machinery	−0.031	−0.066	−0.026	−0.206 *	−0.188 *
Electronics	−0.181	−0.136	−0.084	−0.095	−0.057
SSS		0.277 ***	0.269 ***	0.095 *	0.018
SSDP					0.275 ***
LSFI			0.137		
SSS × LSFI			0.293 *		
R^2	0.099	0.153	0.180	0.091	0.246
Adjusted R^2	0.083	0.135	0.156	0.072	0.227
F	6.245 ***	8.474 ***	7.658 ***	4.721 ***	13.091 ***

Notes: sample number = 289, *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Hypothesis 2 proposed the moderated mediation effect in which the indirect effect of sustainable supplier selection on sustainability performance via sustainable supplier development practices would be moderated by leadership support for functional integration. As shown in Table 4, the interaction effect of sustainable supplier selection and leadership support for functional integration (LSFI) on sustainable supplier development practices

is positive and significant (b = 0.293, $p < 0.001$; Model 3). Figure 2 also shows that the effect of sustainable supplier selection (SSS) on sustainability performance is stronger as the leadership support for functional integration increases. Then, we used the PROCESS macro model 7 to test the moderated mediation effect. As shown in Table 5, the moderated mediation index is significant (index = 0.043, 95% BC CI: [0.011, 0.085]). The results also show that the indirect effects are strengthened as the leadership support for functional integration increases. Figure 3 provides evidence of the conditional indirect effect of sustainable supplier selection on sustainability performance via sustainable supplier development practices at different levels of leadership support for functional integration. These results support Hypothesis 2.

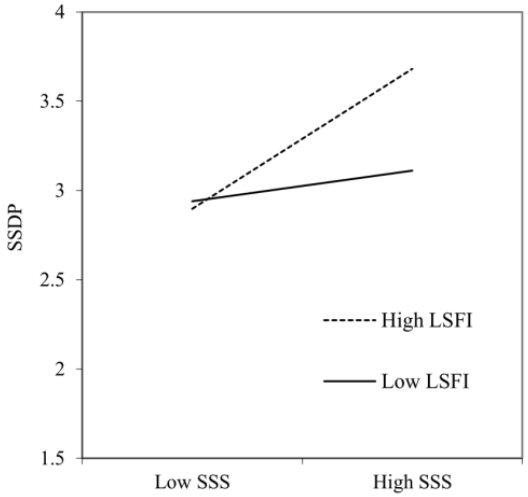

Figure 2. The moderating effect of leadership support for functional integration (LSFI).

Table 5. Conditional indirect effects at a different level of LSFI.

Moderator	Boot Indirect Effect	Boot SE	BC 95% CI	
			Lower	Upper
LSFI				
3.375	0.013	0.013	−0.009	0.043
3.962	0.039	0.014	0.015	0.070
4.500	0.062	0.021	0.026	0.108
	Moderated mediation Index: 0.043	0.019	0.011	0.085

SE: standard error; BC CI: bias-corrected confidence intervals.

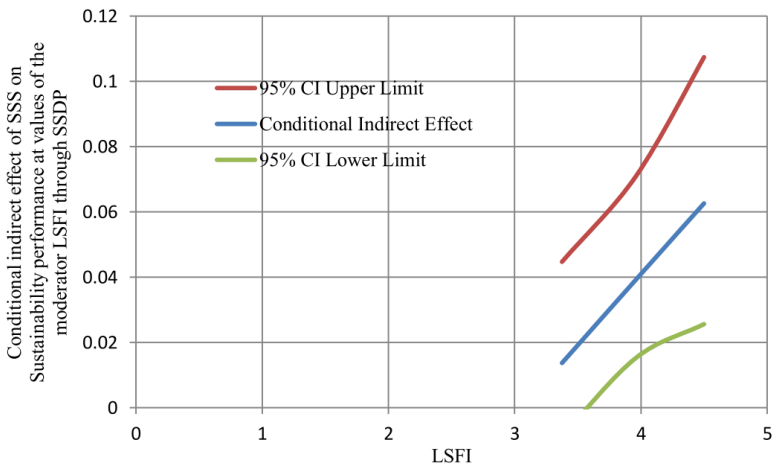

Figure 3. The presence of moderated mediation effect.

4. Discussion

Based on the resource-based view and knowledge management perspective, this study empirically examined a moderated mediation model in which we investigated how leadership support for functional integration and sustainable supplier selection jointly impact sustainable supplier development that further influences sustainability performance. Our results revealed that the effect of sustainable supplier selection transfers to sustainability performance through sustainable supplier development practices. In addition, leadership support for functional integration moderated this indirect effect, such that the indirect impact of sustainable supplier selection on sustainability performance via sustainable supplier development practices was more substantial for high levels of leadership support for functional integration.

4.1. Implications for Research

The results of this study expand our understanding of how firms leverage sustainable supplier selection and development to promote their sustainable performance more effectively. First, our findings confirm previous studies emphasizing the vital role of sustainable supplier development practices in promoting buying firms' sustainable performance [23,24,75]. The general supplier development literature is well documented as an effective way to benefit buyers and suppliers in terms of improved supplier performance [76] and focal firms' operational performance [17,77]. Similarly, the results of this study show that sustainable supplier development is positively associated with buying firms' sustainable performance, leading to improvements in environmental, social, and economic performance. In line with previous studies, our findings provide evidence that sustainable supplier development practices (e.g., buying firms' technological support, financial investment, and personnel training to enhance their suppliers' capability in managing sustainability) can increase suppliers' motivation and capabilities in satisfying buying firms' sustainability requirements, thereby resulting in improved sustainability performance.

Second, our findings contribute to sustainable supplier management literature by affirming that sustainable supplier development practices mediate the relationship between sustainable supplier selection and sustainable performance. Supplier development is viewed as an integrative mechanism that provides technical assistance and collaboration to suppliers after selecting suppliers and positively impacts the buying firm's performance [21,40]. This study introduces sustainable supplier development practices as an intermediate mechanism linking sustainable supplier selection to sustainable performance. According to the knowledge management perspective, our findings suggest that sustainable development practices triggered by sustainable supplier selection are more likely to promote the buying firms' sustainability performance by transferring and sharing valuable knowledge for sustainability. Our findings support the critical role of sustainable supplier management in sustainability by combining sustainable supplier selection with subsequent sustainable supplier development practices.

Finally, this study reveals that the mediating effect of sustainable supplier development practices varies depending on the level of leadership support for functional integration. Although many researchers have found functional integration's various benefits and barriers [60], few have investigated the moderating role of leadership for functional integration in a sustainable supply chain. This study fills a gap in the literature by examining the moderating role of leadership support for functional integration in the relationship between sustainable supplier selection, sustainable supplier development practices, and sustainable performance. We found that leadership support for functional integration strengthens the indirect effect of sustainable supplier selection on sustainability performance via sustainable development practices. According to the knowledge management perspective, generating and integrating knowledge through functional integration promote the transportation of the knowledge flow from sustainable supplier selection to enhance sustainability performance via sustainable development practices. The results of this study expand our understanding of the important leadership role in implementing sustainable supplier management more effectively.

4.2. Implications for Practice

Manufacturing firms are increasingly considering not only low cost, best quality, and on-time delivery but also environmental and social issues to maintain their competitiveness [39]. Our findings also provide such manufacturers with some practical implications. First, selecting the appropriate sustainable supplier is an essential factor influencing sustainability performance. Therefore, manufacturing firms should make more effort to design and implement sustainable supplier selection processes by considering economic, environmental, and social criteria. Second, our findings suggest that sustainable supplier development is a mediator through which sustainable supplier selection indirectly influences sustainable performance. Thus, manufacturing firms need to develop and improve their suppliers' sustainable capabilities to transfer sustainable supplier selection benefits to sustainable performance more efficiently. In other words, manufacturing firms must prioritize sustainable supplier selection and development as their supplier management strategy to improve sustainability performance. Third, regarding the importance of knowledge and information in sustainable supplier management, the leadership should pay more attention to functional integration. Functional integration would not only facilitate the knowledge flow from the supplier selection process to supplier development but also enhance the motivation and satisfaction of members by resolving conflicts from different functions, thereby strengthening the effectiveness of sustainable supplier management. By leveraging the leadership roles in promoting functional integration, firms can implement sustainable supplier selection more effectively to improve sustainable performance via sustainable supplier development.

5. Conclusions

This study investigates the leadership role in influencing indirect mechanisms linking sustainable supplier selection to sustainable performance via sustainable supplier development. The results of this study show that leadership support for functional integration plays an important role in managing supplier sustainability more effectively, resulting in a more sustainable performance. Although our study found that sustainable supplier selection enables the buying firm's sustainable supplier development practices and sustainable performance, other potential antecedents may exist, such as specific investment, power dependence, and the firm's policy. Future research might explore which factors promote sustainability in the supply chain to expand our understanding of what drives and how to implement sustainable supplier management. Additionally, this study used the data collected from buying firms. Future research is needed to involve suppliers' standpoints and examine the effectiveness of implementing sustainable development practices. Furthermore, the moderated mediation mechanism of our study needs to be examined in various contexts, such as firm, team, and individual characteristics, to improve the effectiveness of sustainable supplier management.

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