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The Mediating Role of Structural Social Capital on the Relationship Between Internal Environmental Management and Sustainable Performance

Che Sobry, Suheil[1*], Abidin, Rahimi[2], &Hasnan, Norlena[3]

[1]School of Technology Management and Logistics, Universiti Utara Malaysia, 06010 Sintok, Kedah, MALAYSIA
[2]School of Technology Management and Logistics, Universiti Utara Malaysia, 06010 Sintok, Kedah, MALAYSIA
[3]Universiti Utara Malaysia, Kuala Lumpur, MALAYSIA

Email Address:
suheilchesobry@gmail.com (Che Sobry, Suheil), a.rahimi@uum.edu.my (Abidin, Rahimi), norlena@uum.edu.my (Hasnan, Norlena)

*Corresponding author: Che Sobry, Suheil

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Abstract: Increasing demand for green initiatives and issues of sustainability has recently necessitated a paradigm shift in the way firms, particularly those in the manufacturing sector, conduct their operations. Therefore, Green Supply Chain Management (GSCM) was developed to integrate environmental management approaches within manufacturing organizations. GSCM's internal environmental management and social capital through collaboration of supply chain partners can be viewed as fundamentally comparable in that social capital is accumulated through the process of firms constructing social interactions in current networks. However, the number of GSCM studies that incorporate a social capital approach, especially empirical studies, remains limited in term of quantity. To determine the relationship between internal environmental management, structural social capital, and sustainable performance, this study was performed. This study aims to evaluate the mediating effect of structural social capital on the relationship between internal environmental management and sustainable performance. Malaysian manufacturing companies that are ISO14001 accredited were surveyed. Respondents submitted a total of 106 questionnaires that were deemed suitable for data analysis using Partial Least Squares-Structural Equation Modelling (PLS-SEM). Internal environmental management was found to have a significant correlation with structural social capital. Additional research utilizing PLS bootstrapping has revealed that structural social capital significantly mediates the relation between internal environmental management and sustainable performance. In addition to contributing to theoretical knowledge, the results would be useful for delivering new insights to management regarding their environmental goals and maintaining successful performance under the pressure of stakeholders, customers, and environmental standards.

Keywords: Green supply chain management, manufacturing, internal environmental management, structural social

1. Introduction

Recent demand growth for green initiatives and sustainability-related issues has necessitated a paradigm shift in how firms, particularly those in the manufacturing sector, conduct their operations (Buffa et al., 2018). Environmental laws, climate change, and green consumerism have prompted businesses to re-evaluate their supply chain practices (Vijayvargy et al., 2017). Due to these external obligations, firms are motivated to change their managerial behaviours and practices toward greener supply chain via environmental audits, certification of ISO 14001, and collaboration with their supply chain partners regarding environmental initiatives (Wu et al., 2012).

Over time, the importance of analysing sustainable performance has grown. The concept of sustainable performance is founded on three crucial pillars: economic, environmental, and social performance (Abdul-Rashid et al., 2017). It guarantees that firms balance their economic, environmental, and social performance holistically (Afum et al., 2020). Carter and Rogers (2008) provided a framework for integrating sustainable performance into the supply chains. They found that addressing more than one dimension of sustainable performance (economic, environmental, and social) yields better results and acknowledging all three areas of the triple-bottom-line is the best solution.

**Corresponding author: author@organisation.edu.co*

In the context of green supply chain management (GSCM), the integration of supplier, manufacturer, and customer is essential in ensuring improved sustainable performance. In fact, the collaboration is mutually required across the entire supply chain and can be described as 'secondhand" regulations (Lee & Klassen, 2008). Consequently, they added that the firms that possess a high level of sustainable performance would gain competitive advantage, improved corporate's image, and increase the living quality of community. Dey et al. (2011) also underlined that commitment of top management through internal environmental management is paramount to the success of GSCM as a supply chain is the single largest cost in any manufacturing firms.

The internal environmental management and social capital can be understood to be fundamentally parallel to one another in which social capital is accumulated through a process of firms building social relationships in ongoing networks. The existing GSCM' internal environmental management study, however, still has limitations for some aspects (Lee, 2015). Organizational theories are important to be applied in GSCM scope as those theories provide valuable source of theoretical underpinning for deepening research in literature (Sarkis et al., 2011), thus, a considerable opportunity exists for an extension of GSCM research utilizing the organizational theories (Lee, 2015). The social capital is believed to be promising for strengthening research in GSCM (Sarkis et al., 2011). However, the number and scope of GSCM studies considering internal environmental management approach, in particular empirical studies, remain limited. In addition to that, previous studies tend to focus on some of the aspects of sustainable performance and less of these studies present a simultaneous approach which include the dimensions of economic, environmental, and social (Abdul-Rashid et al., 2017). Therefore, studies that provide empirical evidence to make industrial practitioners and managers holistically embrace GSCM' internal environmental management and its related benefits such as superior reputation, and sustainable performance are worth pursuing (Afum et al., 2020).

2. Literature Review

2.1 Sustainable Performance

In the past ten years, there has been a surge in the number of scholars interested in investigating sustainable performance due to its growing importance. Elkington (1994) came up with the term "sustainability" and characterized it as the incorporation of economic, environmental, and social aspects into the business perspective. According to Guan, Cheng, and Ye (2010), sustainability in the context of supply chain management is "a modern management pattern emphasizing on the integration of the economy, environment, and society through all the processes including procurement, producing, packaging, transportation, storage, consumption, and disposal of the end-of-life product, supported by supply chain management technology, with the ultimate goal of achieving the sustainable development of the economy." The triple bottom line concept is based on the idea that businesses should consider environmental and social factors rather than focusing solely on economic value (Elkington, 1998).

Sustainable performance occurs when a firm creates continuing value for its stakeholders and shareholders while keeping up with environmental requirement (Brent' & Labuschagne', 2004). Afum et al. (2020) added that sustainable performance ensures firms to holistically balance their economic, environmental, and social performance. There are few essential aspects of firm's sustainable value which are keeping the customers and shareholders happy and doing well for the environment and society. These cultures in a firm would be able to encourage high performance among employees and make optimum use of existing assets in ways that have good outcomes for the economic, environment, and society (Dunphy, 2011). These three pillars are critical in embracing the entire concept of sustainable performance to run a successful business not only now, but also for the future (Eweje, 2011). Therefore, performance measurement from sustainable perspective enables firms to assess and improve their efforts related to environmental and social developments at all levels in their supply chain while simultaneously generating value for its shareholders (Cankaya & Sezen, 2019).

2.2 Internal Environmental Management

Internal environmental management is referred to "environmental management practices conducted within a company" (Rao & Holt, 2005). Wu (2013) described internal integration as "level of integration in combining and improving information and internal resources in the company to generate knowledge sharing beyond the boundaries of individual functions or departments in reducing and preventing pollutions". Communication and cooperation are crucial to successful environmental practices as GSCM involves all departmental boundaries between and within organizations (Aspan, 2000). Zhu et al. (2008) also stressed about the influence of coordination across functional department within the entire supply chain to improve environmental management.

This approach includes the commitment of top management, as well as support from middle management and other employees, is critical for the successful implementation of GSCM in industries (Green et al., 2012; Ghazilla et al., 2015). Coordination and employee awareness of sustainable dimensions are critical in the implementation of the GSCM concept (Toke et al., 2012; Dashore & Sohani, 2013). Financial decisions play an important role in the implementation and adoption of GSCM practises in industries (Rao & Holt, 2005; Raut et al., 2017).

Most of the time the implementation and adoption toward environmental practices internally seem to be the main issue (Zhu, Geng, & Lai, 2010). However, the GSCM practices like minimizing wastes and attracting customer cooperation for eco-design of product for instance, would require internal coordination mechanisms (Zhu et al., 2010).

There are many firms going toward environmental direction these days with their environmental management systems, environmental auditing of departments, internal evaluation of environmental reports, and certification of ISO 14001 (Klassen & Johnson, 2004; Zhu et al., 2010). Therefore, cooperation from within the organization is essential to ensure sustainable performance, economically and socially as well as achieving environmental objectives.

2.3 Structural Social Capital

Social capital is a community action idea that strives to improve the effectiveness, quality, and sustainability of operations. Coleman (1990) defined social capital as "a variety of entities having two characteristics in common: they all consist of some aspect of social structures, and they facilitate certain functions of individuals who are within the structure." Coleman describes social capital as social-structural resources that serve as a capital asset for the individual. Nahapiet and Ghoshal (1998) later referred social capital as "available or potentially available resources from the network of relationships in individual or community".

The underpinning theory of social capital for deepening research is applied in this study for numerous reasons. Little attention has been paid to social capital in the GSCM literature (Wu et al., 2012). Social capital is also believed as one of important underlying variables to correlate GSCM' internal environmental management and performance outcome (Sarkis et al., 2011; Lee, 2015). Lastly, past findings (e.g., Abidin et al., 2013) has proven the significance of social capital and organizational performance relationship. This study however is focused only on structural social capital. According to Lawson et al. (2008) and Lee (2015), social capital is not easily defined as it is a multi-dimensional concept, and it is difficult to operationally separate the cognitive dimension from the structural dimension. The structural element also emphasizes more on the collaboration in GSCM as reciprocal practices through network ties and network configuration. From the context of green supply chain management, structural social capital connects all the partners such as supplier and manufacturer (Lee, 2015).

Structural social capital involves the network of relations, the properties of the social system, and describes the impersonal configuration of linkages between people or units (Nahapiet & Ghoshal, 1998). It refers to "the pattern of connections between actors that is, who you reach and how you reach them" (Burt, 1992). This dimension is characterized by network ties and network configuration; the presence of network ties between actors and network configuration are the most important facets of this dimension (Nahapiet & Ghoshal, 1998). Network ties are connections between organizational members that enable information flows and act as channels for resource and knowledge exchanges (Subramaniam et al., 2013). On the contrary, network configuration refers to the configuration of the ties and the pattern of linkages. From the context of green supply chain management, structural social capital connects all the partners such as supplier, manufacturer, and customer.

2.5 GSCM' Internal Environmental Management and Social Capital

GSCM is a mutual practice that necessitates collaboration and cooperation among supply chain partners to improve environmental performance through operational activities. In other words, through frequent communication, knowledge transfer, and information exchange among supply chain partners, GSCM activities lead to a high degree of social capital (Lee, 2015). Regarding environmental requirements, better mutual understanding and cooperation among suppliers, manufacturers, and customers can minimize potential conflicts between them (Wu & Ragatz, 2010), and consequently strengthen their relationships.

The higher the level of joint activities or supports, the more likely the manufacturer is to perceive its suppliers as partners than as contractors (Krause & Ellram, 1997). Likewise, through integration of GSCM practices like technical assistance, training, joint events, and direct involvement, the suppliers are likely to perceive the manufacturer as long term partnership and commitment (Krause et al., 2007), and therefore build a stronger relationship. Referring to these findings, it is found that to date, the correlation between internal environmental management and structural social capital from the perspective of manufacturer is still unclear. Based on the proposition that internal integration is central to improve collaboration among supply chain partners on green performance (Zhu et al., 2008). Therefore, we posit that:

2.6 Structural Social Capital and Sustainable Performance

The linkage between social capital and sustainable performance have been explained through several studies (e.g., Lee, 2015; Wu et al., 2012), but still considered very limited in numbers. Social capital contributes and positively influences firm's economic performance (Putnam, 1993). The findings from Lee (2015) also have found that structural social capital is significantly correlated to dimension of sustainable performance. Earlier study from Wu et al. (2012) suggested social capital as one of driving factors toward the implementation of GSCM practices and the success of firm's performance. Based on the findings and prior literatures, the correlation of structural social capital and sustainable performance are expected. The hypotheses that explain this relationship are as follows:

H2 Structural social capital has significant positive influence on economic performance.
H3 Structural social capital has significant positive influence on environmental performance.
H4 Structural social capital has significant positive influence on social performance.

Recently, Lee (2015) has examined the mediating effect of social capital on GSCM and environmental performance. He found that GSCM influences environmental performance through social capital accumulation among supplying firms. In specific, structural social capital also mediates the relationship between GSCM and environmental performance. He investigated the aspect of structural social capital and it was focused only on environmental and operational performance, not the three dimensions of sustainable performance. However, his work has provided such significant implication about the correlation between social capital and environmental performance and the mediating role of social capital. Hence, we propose hypotheses as below:

H5 Structural social capital significantly mediates the relationship between internal environmental management and economic performance.

H6 Structural social capital significantly mediates the relationship between internal environmental management and environmental performance.

H7 Structural social capital significantly mediates the relationship between internal environmental management and social performance.

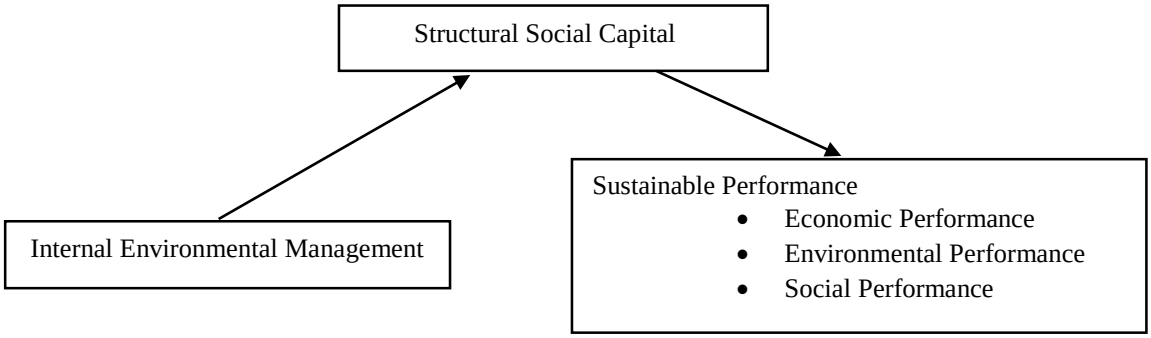

Figure 1. Research Framework

3. Research Methodology

3.1 Development of Survey Questionnaire

The questionnaire is the primary research instrument in this study. A series of structured questionnaires was then created to collect empirical data that will be used to examine the hypotheses. The most frequent data collection methodology is survey data collection via questionnaire due to its capacity to cover many respondents and its low cost (Zikmund, 2000). The measurement items used in the survey consist of existing measures taken from the literature which were validated by previous researchers. The respondents were requested to indicate the extent to which they perceive and agree with the level of internal environmental management, social capital, and sustainable performance in their organizations. Hence, a five-point scale ranging from 1 (low) to 5 (high) and 1 (strongly disagree) to 5 (strongly disagree) were used. The five-point scale is just as good as any, and an increase from five to seven or nine points on a rating scale does not improve the reliability of the ratings, where the anchors like unimportant to important and low to high are frequently used (Elmore & Beggs, 1975). The measurement items for internal environmental management were adopted from Green, Inman, Sower, & Zelbst (2019), structural social capital was adopted from Lee (2015), and sustainable performance was adopted from Abdul-Rashid et al. (2017) and Eltayeb et al. (2011).

3.2 Research Sampling and Data Collection Method

The sampling method's primary goal is to obtain a representative cross-sectional sample of the overall population (Cavana, Delahaye, & Sekaran, 2001). A larger sample size improves statistical power, making it easier to discover a significant link or relationship between the difference and sample size (Loewenthal, 1996). The population of this study consists of all Malaysian manufacturing companies that are certified in ISO 14001. Referring to Federation of Malaysian Manufacturers (FMM) directory in August 2019, a total of 453 ISO 14001 certified manufacturing firms were identified and used as the sampling frame. Each firm or company selected as sample has been represented by personnel from management level who had been appointed as in dealing or taking care of EMS or ISO documentations in the company. The unit of analysis applied in this study is organization.

There are several reasons on why manufacturing firms were selected as samples of this study. Firstly, they represent the largest sector in terms of employment, sales, and contribution toward the nation and global economy (Abdullah et al., 2014). Secondly, despite being the biggest sector, manufacturing firms have been identified as the main contributor of environmental decline in Malaysia such as enormous amounts of wastes, exploitation of natural resources, and overconsumption of energy (Abdul-Rashid et al., 2017). Thirdly, certification in ISO 14001 proved that the companies were expected to be involved in the implementation of green supply chain management (GSCM) practices and aware with the requirement of environmental procedures and standards (Zailani et al., 2012). Therefore, the selection of

manufacturing firms as the sample of the study is considered as appropriate and important to accomplish the research objectives.

The survey approach was used to obtain data. A total of 106 of the 453 questionnaires given were returned. The distribution of survey questionnaires was mostly accomplished using an online survey, Google Forms. An online data gathering methodology of this type has been shown to be effective in eliciting replies from manufacturing managers (Green et al., 2012). This study applied PLS-SEM to analyse the proposed research framework. The valid response rate at 24% is considered acceptable as supported by Hair et al. (2014), who suggested that in the application of PLS-SEM, the minimum sample size should be ten times the maximum number of arrowheads pointing at the latent variables. Since five latent variables are used in this study, the sample size is deemed sufficient since it exceeds the minimum requirement. Moreover, as manufacturing managers are the main respondents for studies related to supply chain management, they are frequently under severe time and resource constraints making it difficult to achieve high response rates to surveys (Inman et al., 2011). The collection and distribution processes of the questionnaire started from September 2019 until March 2020.

4. Results

4.1 Measurement Model Assessment

Because the measuring scales used in this investigation were previously established and evaluated (Green, Inman, Sower, & Zelbst, 2019; Lee, 2015; Abdul-Rashid et al., 2017), the scales are expected to yield sufficient content validity. Convergent validity is evaluated by reviewing the standardized loadings for each of the proposed constructs where if the loadings are greater than 0.70, thus the convergent validity is considered as sufficient (Hwa et al., 2018). The standardized factor loadings are presented in Table 1. All loadings exceed the minimum requirement of 0.70, with the lowest loading of 0.70 for the sixth item of structural social capital. The discriminant validity (Fornell-Larcker criterion) is shown in Table 2. The square root of the average variance extracted (AVE) for each construct as can be seen, is higher than its correlation with any other construct.

Then, scale reliability is assessed based on Cronbach's alpha, composite reliability, and average variance extracted values as shown in Table 3. All Cronbach's alpha, composite reliability, and average variance extracted values exceed the respective recommended minimums of 0.70, 0.70, and 0.50 as recommended by Garver and Mentzer (1999) to demonstrate sufficient scale reliability. The measurement scales exhibit sufficient validity and reliability to support assessment of the hypotheses.

Table 1. Standardized Factor Loadings

Constructs	EP	ENP	IEM	SP	SCS
economic1	0.887				
economic2	0.817				
economic3	0.848				
economic4	0.870				
economic5	0.859				
economic6	0.877				
economic7	0.863				
economic8	0.711				
environmental1		0.759			
environmental2		0.775			
environmental3		0.791			
environmental4		0.798			
environmental5		0.782			
environmental6		0.836			
internal1			0.848		
internal2			0.796		
internal3			0.822		
internal4			0.833		
internal5			0.825		
internal6			0.805		

social1	0.730	
social2	0.870	
social3	0.888	
social4	0.877	
social5	0.829	
social6	0.763	
structural1		0.794
structural2		0.771
structural3		0.892
structural4		0.804
structural5		0.807
structural6		0.667
structural7		0.744
structural8		0.748

Table 2. Discriminant Validity (Fornell-Larcker Criterion)

Constructs	**EP**	**ENP**	**IEM**	**SP**	**SSC**
Economic Performance	0.843				
Environmental Performance	0.566	0.791			
Internal Environmental Management	0.450	0.624	0.822		
Social Performance	0.598	0.774	0.618	0.828	
Structural Social Capital	0.527	0.546	0.605	0.658	0.781

IEM- Internal Environmental Management, SSC- Structural Social Capital, EP- Economic Performance, ENP- Environmental Performance, SP- Social Performance

Table 3. Scale Reliability

Constructs	**Cronbach's Alpha**	**Composite Reliability**	**Average Variance Extracted (AVE)**
Internal Environmental Management	0.904	0.926	0.675
Structural Social Capital	0.907	0.925	0.609
Economic Performance	0.941	0.951	0.711
Environmental Performance	0.881	0.909	0.625
Social Performance	0.907	0.929	0.686

4.1 Measurement Model Assessment

The structural model depicts the statistical correlation between the model's constructs. The bootstrapping process with 5000 bootstrap samples and 106 examples was used to evaluate the relevance of path coefficients to prompt beta values, t-values, and p-values in determining the precision of the PLS model, as suggested by Hair et al. (2017). This study evaluated the model's fit by computing the standardized root mean square residual (SRMR). From the analysis, the model has generated SRMR values of 0.068. According to Henseler, Hubona and Ray (2016), the SRMR values should be obtained within the acceptable standards that are less than 0.08.

R-squared value specifies on how well the independent variables can predict the dependent variable. The R2 value validates the prediction power of the model (Hair et al., 2014). Table 4 indicates that independent variable (internal environmental management) can explain 36.5% of the variance on social capital. Following with 27.8%, 29.8%, and 43.3% of the variance on economic performance, environmental performance, and social performance respectively. Cohen (1988) proposed that the R-squared values should be evaluated as such; 0.26 as substantial, 0.13 as moderate, and 0.02 as weak, therefore, the current model presented the acceptable and substantial level of R2. The hypothesis test results of this study are shown in Table 5.

Table 4. Variance Explained (Coefficient of Determination)

Constructs	R Square
Structural Social Capital	0.365
Economic Performance	0.278
Environmental Performance	0.298
Social Performance	0.433

Table 5. Results of Structural Model Assessment

Hypothesis (Direct Effect)	Relationship	Coefficient	t-value	Result
H1	IEM > SSC	0.605	10.772	Supported
H2	SSC > EP	0.527	6.701	Supported
H3	SSC > ENP	0.546	8.436	Supported
H4	SSC > SP	0.658	12.138	Supported
Hypothesis (Indirect Effect)	**Relationship**		**t-value**	**Result**
H5	IEM > SSC > EP		5.609	Supported
H6	IEM > SSC > ENP		5.730	Supported
H7	IEM > SSC > SP		7.201	Supported

IEM- Internal Environmental Management, SSC- Structural Social Capital, EP- Economic Performance, ENP- Environmental Performance, SP- Social Performance

The result of H1 ($\beta = 0.605$, $p < 0.01$) indicates that internal environmental management is positively and significantly correlated to structural social capital. H2, H3, and H4 represent the relationship between structural social capital and dimensions of sustainable performance namely economic, environmental, and social performance. The results for H2 ($\beta = 0.527$, $p < 0.01$), H3 ($\beta = 0.546$, $p < 0.01$), and H4 ($\beta = 0.658$, $p < 0.01$) show that structural social capital has positive and significant influences on economic, environmental, and social performance.

This study also seeks to examine the mediation effect of structural social capital on the relationship between internal environmental management and sustainable performance. Based on the results, H5 ($t = 5.609$, $p < 0.01$) indicates that structural social capital significantly mediates the association between internal environmental management and economic performance. The similar results of H6 ($t = 5.730$, $p < 0.01$) and H7 ($t = 7.201$, $p < 0.01$) show that structural social capital also significantly mediates the relationship between internal environmental management and environmental performance, and social performance respectively. Conclusively, all hypotheses proposed in this study are supported.

5. Discussion

Internal environmental management significantly influences structural social capital. This finding suggests that internal environmental management such as commitments from senior and middle managers on GSCM and cross-functional cooperation significantly contributes toward information and knowledge exchange among supply chain partners. In Malaysian manufacturing perspective, internal environmental management should be focused to achieve high level of social capital across the supply chain. Internal environmental management is one of the elements in GSCM (Zhu et al., 2008). This significance agrees with Lee (2015) who stated that the collaboration in GSCM practices among supply chain partners is seen as a signal of long-term relationship, which will increase the level of social capital. The finding also supports the fact that internal environmental management is the main key towards successful collaboration among GSCM partners (Zhu et al., 2008), thus create a stronger relationship between partners through joint activities and continuous interactions regarding their objectives to minimize environmental impacts (Lee, 2015). Additionally, the GSCM practices like minimizing wastes and attracting customer cooperation for eco-design of product for instance, would require internal coordination mechanisms (Zhu et al., 2010). Therefore, internal environmental management should be seen as advantages and opportunities to strengthening the relationship between supply chain partners.

The objective of this study is to explore the relationship between social capital and sustainable performance. To date, there are very few studies investigating the direct effect of social capital on three dimensions of sustainable performance; economic, environmental, and social. Based on the findings, the structural social capital has significant effects on economic, environmental, and social performance. The results from H2, H3, and H4 indicate that manufacturers perceive frequent

communications, information exchange, and cooperative problem-solving with suppliers and customers as contributors toward sustainable performance. These outcomes are consistent with past study by Lee (2015), who found that structural social capital has significant direct effect on environmental performance. The significance of structural social capital also provides strong support on the basis that social capital positively influences knowledge transfer and performance (Krause et al., 2007). Therefore, these findings should be beneficial for manufacturer to not overlook on the importance of social interaction ties with their suppliers and customers. Information and knowledge exchanges between supply chain partners through collaboration as indicated by Zhu et al. (2010) can significantly improve their sustainable performance.

One of the main contributions of this study is to investigate the mediating role of social capital on the relationship between internal environmental management and sustainable performance. Based on the findings, structural social capital significantly mediates the relationship between internal environmental management and sustainable performance's dimensions. These results suggest the importance of structural social capital in determining the improvement of sustainable performance. To date, there are very few studies of GSCM involving the mediating role of social capital, however these findings are consistent with prior study by Lee (2015) who found that structural social capital significantly mediates the relationship between GSCM practices and environmental performance. The significance of structural social capital also provides strong evidence for the arguments that social capital is believed to be promising for strengthening research in GSCM (Sarkis et al., 2011; Lee, 2015).

6. Conclusion

In conclusion, the main objectives of this study which are to examine the relationship between internal environmental management and structural social capital, structural social capital and sustainable performance, and lastly to explore the mediating effect of structural social capital on internal environmental management and sustainable performance' linkage have been achieved. The application of PLS' bootstrapping has resulted the significance of structural social capital as a mediator to increase sustainable performance. Social capital offers a better understanding about how GSCM practice (internal environmental management) can contribute to higher sustainable performance of manufacturing firms. It is important to note that structural social capital plays a critical mediating role between the internal environmental management and social performance, followed by environmental, and economic performance respectively.

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