

The Influence of Green Supply Chain Management on Financial, Environmental and Operational Performance

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Abstract-The financial along with financial, environmental and operational performance is the essential part of organizational success and economic growth while green supply chain management is considered as the essential element for the financial, environmental and operational performance. Thus, the present study has examined the green supply chain management impact on the financial, environmental and operational performance of the manufacturing organization in Indonesia. The aim of the current article also includes the examination of the mediating role of environmental and operational performance among the nexus of green supply chain management and financial performance. The data of the existing study has been obtained from the employees that are related to the supply chain practices of manufacturing companies through questionnaires and smart-PLS was used for analysis purpose. The results revealed that green supply chain along with operational and environmental performance has a positive association with financial performance. The findings also exposed that the green supply chain also has positive nexus with operational and environmental performance while operational and environmental performance positively mediates among the nexus of green supply chain and financial performance. These findings provided the guidelines to the policy-makers that they should develop as well as implement the favorable policies that could increase the supply chain performance and impact on the overall performance of the organization.

Keywords; *Financial performance, Green Supply Chain Management, Environmental performance, Operational performance*

1. Background

Green supply chain management in relation to organizational performance is the most popular topic in business literature. Green supply chain management is the term which means to integrate sustainable environmental procedures within the typical supply chain [28]. The emerging environmental problems and problems of waste of material and resources have forced the authorities at different stages to adopt and implement different regulations which are stricter than earlier. On the other hand, typical and modern environmental education channels have enhanced environmental awareness in public [14]. These socio-political alterations have forced

the manufacturers to implement and execute environmental practices like clean production along with ISO 14001 certification. The regulations like RoHS Directive tend the manufacturing organizations to adopt and implement efficient environmental practices from their suppliers to their customers. Consequently, a systematic concept green supply chain management has evolved which infuses environmental aspects in supply chain management [12]. Green supply chain management consists of different environmental procedures like to acquire eco-friendly raw material, sorting out and selection of material, product design, eco-friendly manufacturing and eco-friendly production, pollution-free operations and proper management. The responsibility of green supply chain management is not to reduce the impacts of the supply chain on the environment it attempts to reduce the total environmental effect throughout the firms in the supply chain. Green supply chain management brings greater efficiency in the organizational resources, reduces the wastage of material and production, brings innovation in the operations and production, increases the rate of profitability of the organization, Creates value in the products and so on [31].

As the concern about ecological issues has been increasing in the general public, customers, and government over the world, the companies are developing a lot of eco-friendly programs and eco-friendly products like green products (Green design, green, green technology and green brands) [29]. It is very significant for the manufacturing organizations to improve their environmental awareness as the majority of the national and international customers require the manufacturing organizations to manufacture the goods which do not have hazardous and harmful substance. In Indonesia, most of the manufacturing organizations are implementing the practices of green supply chain management in their operations and production procedures, taking the emerging environmental concern of the general public and government under consideration. The majority of national and international customers are also expecting the leading manufacturing organizations to minimize the use of natural energy in the production and operational procedures so that the negative and adverse impacts of operations and production can be minimized on the

environment [1]. It is also very important for the companies which want to save costs, to run green operations and give green production. According to [16], the manufacturing organizations should implement and execute the strategies and practices of the green supply chain if they want to achieve a higher rate of financial and operational performance. For the purpose, the manufacturing companies should bring innovation in green technology and green production. Moreover, the manufacturing organizations can make their products distinctive among those of competitors, with the improvement in the quality of their products and the reduction of cost of production by introducing innovative green products and green procedures [4]. The manufacturing organizations should also take care of the quality of material used in the packaging. The material used in the packaging of goods should not be hazardous and toxic to create pollution in the environment. The analysis of the production and operational performance of the manufacturing organizations working in Indonesia has shown that the manufacturing organizations which are implementing and executing the strategies and practices of green supply chain management in their operations and productions procedures are proving a distinctive position among the competitors in the market [33]. The reason is that the practices of green supply chain bring improvement in the quality of technology, production procedures and finally in products and reduces the costs of production and operations which improves their financial position and give them competitive advantages. In Indonesia, the manufacturing organizations also take care of the quality of material used in the packaging of their products. The material used in the packaging material is not toxic or hazardous which would be harmful to the health of the general public and customers [23].

It is the era of the high rate of competition among the market rivals as suggested by the scholar [7] that the business organizations are constantly in competition with other organizations in market places along with their quality productions. The business organizations enjoy competitive advantages when their performance is better than that of other organizations. Organizational performance is in the form of environmental performance, operational performance and financial performance [22]. When there are applied the practices of green supply chain management in the partner organizations within the traditional supply chain organizations make environmental performance, as these practices help the organization to introduce eco-friendly technology, eco-friendly material, eco-friendly production and eco-friendly logistics which satisfy the environmental concerns of the general public, customers, government, and regulatory governance. The environmental performance raises the level of financial performance because people prefer to buy eco-friendly products which are free from hazardous and toxic

substances. The efficient and effective practices of green supply chain management bring efficiency in different operational areas such as operational policies, operational technology, production procedures, and logistics operations, etc [30]. In addition, the level of operational performance is linked to the rate of financial performance. The more efficient the different operational areas of manufacturing organizations, the greater is the rate of financial performance. Moreover, effective implementation of green supply chain management raises the opportunities of competitive advantages for the organizations across the chain and thereby the rate of financial performance. This paper proves its point with the help of a literature review, proper methodology, appropriate results, discussion, and conclusion.

2. Hypotheses development

Over recent decades, sustainable supply chain management has been an object of interest among scholars and researchers. Sustainable supply chain management is the management within a supply chain which looks after that all the supply chain nodes must fulfil the social, economic, and environmental criteria [24]. This argument agrees with the concept of sustainability and triple bottom line which implies that business sustainability is achieved from the perspective of social, economic, and environmental dimensions. Therefore, the sustainable supply chain must cover all these three dimensions throughout the nodes of the supply chain. However, it is much difficult to consider all these three dimensions at the same time throughout all the nodes of the supply chain. Despite the traditional complications of the sustainability term, in case of the supply chain, the point on which the researchers and managers should ponder on is not to make the supply chain sustainable (overall three TBL dimensions), but to take the triple bottom line as a measure to check the development to become sustainable as a final goal [25]. Green supply chain management is considered the subpart of sustainable supply chain management which deals with the practices of internal environmental management within the organization and the initiatives of external ecological management stressing on the collaboration across the functions of all nodes of supply chain and with the collaboration of organization's customers and its suppliers. The improvement can be brought in environmental sustainability with the implementation and execution of the practices of appropriate management within the organization and the set collaboration with the suppliers at upstream of supply chain and with the consumers at downstream of supply chain [17]. The activities of partner firms in a supply chain are very important to green supply chain management, with the integrated supply chains and initiatives consisted in inter transactions among manufacturing organizations, suppliers, and customers

along with cross-functional collaboration for the achievement of the high level of profitability in the long term period. Finally, the business organizations attain benefits from ecological management when all the organizations in the supply chain are performing in a cooperative manner having cross-company as well as cross-functional procedures designed to achieve sustainability. Therefore, the practices of green supply chain management must be carried far from departmental bounds within the organizations and among the organizations across the supply chain and ecological initiatives can be done only through collaboration and proper communications [15].

Here in this paper, green supply chain management has been used as single-dimensional constructs which deal with the collaboration of all the business organizations in supply chain for environmental betterment and ecological integration with customers and also with suppliers. It has been taken that green supply chain management is divided into internal environmental variable and external environmental variable. Dubey, [9] also reflects internal as well as external environmental management as having districts impacts, but he does not take into account the point that the practices of both internal and external ecological management have close association. Therefore, there is the requirement of a single green supply chain as all the practices of green supply chain management complement and cooperate with each other that's why green supply chain management is considered most important part of organizations' environmental management approach. Recent research has stated that ecological management as an internal environmental management strengthens its efforts having collaboration with external partner organizations in supply chain [12]. Through a number of ways, ecological information may be acquired therefore, a concerted set of the practices of green supply chain management is compulsory. In addition, the lack of certainty about the environmental issues across the partner firms can only be minimized by creating an atmosphere of trust across the chain. In Indonesia, in most of the supply chains green supply chain management is an important part of internal environmental management along with the collaboration of other organizations in chain [31].

Green supply chain management brings improvement in the environmental performance of all the organization within the chain. Efficient green supply chain management leads the business organizations within the supply chain to design their policies and practices in such a way as to achieve environmental goals [8]. Though the basic objectives of the business organizations are to earn money and to raise their position among competitors, it is understood that these basic objectives of organizations cannot be achieved until it does not care for the environmental aspects of society. Now public awareness

is getting on day by day through better social systems and up-to-date social media. They not only prefer the products of their need they also want the organizations to take care of social and environmental aspects and concerns. The policies and practices of green supply chain management help the organizations to keep an eye on the environmental concerns and to bring improvement in the environmental performance of organizations [13]. If the policies and practices of green supply chain management have been effectively and efficiently implemented and executed there is the reduction of waste material and productions, reduction of contaminating material, reduction of contaminating packaging, control on the emission of harmful gases, better quality production, and safe and proper drainage of harmful water, and proper disposal of waste material. In green supply chain management, through collaboration with the other organizations in the chain, knowledge can be attained about their eco-friendly technology, their eco-friendly procedures, and eco-friendly production [32]. In this way the knowledge acquired is used in the concerned manufacturing firm for the achievement of environmental performance. The collaboration with others in the green supply chain makes the manufacturing firm able to bring improvement in their technology, in their procedures and their production as to achieve the environmental goals. Similarly, the particular manufacturing firms can attain awareness of environmental requirements from customers with proper collaboration with them [34]. This knowledge provides a guideline to the management of how much improvement is still needed to be made for the achievement of required environmental objectives. In Indonesia, the green supply chain management is adopted and its practices prove to be much more beneficial in the achievement of environmental performance.

H1: Green supply chain management is positively associated with environmental performance.

Operational performance is the firms' performance which is measured against the prescribed and standard indicators of efficiency and effectiveness of operational strategies, procedures, practices, and technology used in this regard [3]. Operational performance is also indicated by the cycle time, rate of productivity, quality of material and production, reduction of wastes and contaminated material, the performance of logistics operations, advertisement operations, the arrangement of resources and regulatory compliance. The objectives of operational performance are the above-mentioned areas of performance that are to be improved. The strategies and practices of green supply chain management help meet objectives of operational performance. Green supply chain introduces ecologically friendly logistics for the high-speed acquisition of material and delivery of finished goods in market for sale as the green logistics are not the only pollution-free but they have improved speed which

minimizes the lead time [13]. Under the implementation of the green supply chain the green technology is used in operations which are least contaminating and improved in quality and speed, this technology brings improvement in the quality and speed of operational procedures. The efficient practices of green supply chain management prove to be beneficial in improving the quality of production as this management makes policies to reduce the wastage of material and removes the defects in the operations [32]. The green supply chain management arranges for the training of the employees to teach them how to manufacture green products and how to use green technology for the desired objectives. With the fewer chances of occurrence of defects and wastes of products quantity of production increases and quality of production improves which is the indicator of better operational performance. Green supply chain practices bring improvement in advertisement operations [6]. The advertisement campaign is effective and efficient in the presence of green material used in the production, green technology run in this regard and green speedy procedures. Hence, the implementation and execution strategies and practices of green supply chain management bring improvement in the rate of operational performance with the improvement in efficiency and effectiveness of business operations.

H2: Green supply chain management has a positive association with operational performance.

The improvement in environmental performance leads to improvement in the financial performance of the manufacturing organizations. The rate of financial performance is high when there is an increase in the rate of marketing of products and the rate of profitability [19]. The better operational performance means more marketing opportunities and more profitability thus it enhances the rate of financial performance. Due to green production, the quality of material and thereby the quality of production improves. The improvement in the quality of products raises the level of marketing as the customers prefer to buy better quality products which satisfy their needs and desires. Research proves that the products which are not contaminating and toxic attract the customers and retains the existing customers attached to these organizations. Thus, the improvement in the quality goods increases the rate of earnings of manufacturing firms and their financial performance. Similarly, the eco-friendly logistics and advertisement material which meets the requirements of regulatory governance and satisfy the environmental concern of the general public and customers increase marketing level and thereby the level of financial performance [2]. In Indonesia, the manufacturing organizations which have a high rate of environmental performance enjoy more marketing and financial performance.

H3: Environmental performance is positively linked with financial performance.

No doubt, better operational performance brings improvement in the rate of financial performance. When the different areas of manufacturing organizations are working efficiently and effectively there are more chances of marketing and profitability which are the indicators of financial performance [27]. When the workers are effectively running up-to-date technology and modern techniques, the speed of the product improves and more finished goods are available for sale within a particular period of time. And they more availability of the finished goods for sale, the more are the chances of marketing and the more marketing opportunities add to the financial performance of the manufacturing organizations. Similarly, if the production procedures are going on improved level like better quality material is used in the production and better production methods are used, not only the quantity of production improves but the quality of production is also improved which is preferred by the customers and brings rise in the marketing scale and level of profitability which means better financial performance of the firms [26]. Similarly the up-to-date and efficient logistics operations help to deliver the finished goods into the market places in time and make them easily and in time available to the customers and lead to the financial performance. In Indonesia, the manufacturing organizations having efficient and effective operational areas are making better financial performance.

H4: Operational performance positively leads to financial performance.

The adoption of green supply chain management by the partner organizations within the traditional supply chain raises the rate of financial performance for all the organizations as it helps to raise the level of marketing for the organizational products and their rate of profitability [13]. The basic objective of green supply chain practises is to satisfy the environmental concerns of customers, the general public, government, and regulatory governance and the compliance with the requirements all these stakeholders guarantees the more marketing, more profitability, and thereby more financial performance. The efficient application of green supply chain practices brings improvement in the quality of production as it motivates the organization to use eco-friendly material and reduces the wastes and defective material from the production which attracts the customers and there are more profits and there is the high rate of financial performance [18]. Green supply chain enables the manufacturing firm to use green technology to achieve environmental goals and also the employees are trained periodically that they can use green technology and green procedures it brings improvement in their performance. Thus, the use of green technology and green techniques and better employees' performance raise the opportunities for financial

performance [5]. Similarly, the eco-friendly material used in the packaging of products, in the advertisement, and the marketing procedures and the use of green logistics for the acquisition of material and delivery of goods to the market reduces the chances of spreading pollution in the environment and catch the attention of customers which further raise the level of financial performance. In Indonesia, the manufacturing organizations within the supply chain are achieving rapid financial performance with the application of the practices of green supply chain management.

H5: Green supply chain management put positive effects on financial performance.

3. Methodology

The present study aims to examine the green supply chain management impact on the financial, environmental and operational performance of the manufacturing organization in Indonesia. The aim of the current article also includes the examination of the mediating role of environmental and operational performance among the nexus of green supply chain management and financial performance. The data of the existing study has been obtained from the employees that are related to the supply chain practices of manufacturing companies through questionnaires. These surveys were sent to the respondents of the study by mail as well as a personal visit. A simple random sampling was adopted to select the respondents and distributed about 520 questionnaires but only 290 were received after twenty-five days of distribution that has rate of response about 55.77. In addition, the smart-PLS was used for analysis purpose because the complex model has been used that has double mediation analysis.

This study has one predictor named as green supply chain management (GSCM) that has eight items. In addition, two mediating variables have been taken by the study such as operational performance (OP) and environmental performance (EP) that have five and six items respectively. Finally, the present study has taken financial performance (FP) as predictive variables that have five items. These are highlighted in Figure 1.

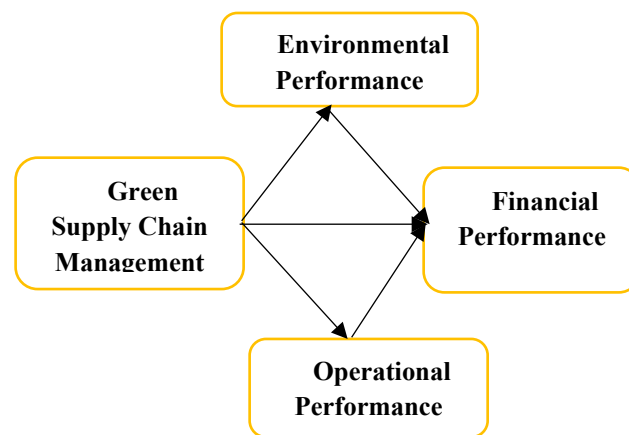


Figure 1. Theoretical framework

4. Results

The results have exposed the assessment of structure along with the measurement model. The measurement model is related to the verification of discriminant along with convergent validity. The convergent validity is verified first in the findings that are about links between items. The figures show that Alpha along with CR are cross the standard of 0.70 while AVE and loadings are also more than 0.50. These values highlighted the valid convergent validity and high nexus between items. These are shown in Table 1.

Table 1. Convergent validity

Items	Loadings	Alpha	CR	AVE
EP1	0.775	0.860	0.895	0.589
EP2	0.707			
EP3	0.737			
EP4	0.737			
EP5	0.785			
EP6	0.853			
FP1	0.740	0.798	0.868	0.623
FP2	0.752			
FP3	0.837			
FP5	0.823			
GSCM1	0.743	0.880	0.905	0.544
GSCM2	0.716			
GSCM3	0.663			
GSCM4	0.680			
GSCM5	0.744			
GSCM6	0.736			
GSCM7	0.806			
GSCM8	0.801			
OP1	0.847	0.849	0.892	0.623
OP2	0.825			
OP3	0.765			
OP4	0.724			
OP5	0.779			

The discriminant validity is also verified second in the findings that are about links between variables and the part of assessment of measurement model. The Fornell Larcker and cross-loadings method have been adopted to test the discriminant validity. The figures show that the links with variables are larger than with other variables. These values highlighted the valid discriminant validity and low nexus between variables. These are shown in Table 2 and Table 3.

Table 2. Fornell Larcker

	EP	FP	GSCM	OP
EP	0.767			
FP	0.641	0.789		
GSCM	0.568	0.622	0.738	
OP	0.642	0.654	0.552	0.789

Table 3. Cross-loadings

	EP	FP	GSCM	OP
EP1	0.775	0.471	0.530	0.433
EP2	0.707	0.624	0.407	0.709
EP3	0.737	0.405	0.349	0.379
EP4	0.737	0.458	0.361	0.480
EP5	0.785	0.434	0.442	0.439
EP6	0.853	0.518	0.495	0.471
FP1	0.507	0.740	0.439	0.525
FP2	0.457	0.752	0.450	0.427
FP3	0.538	0.837	0.545	0.554
FP5	0.517	0.823	0.521	0.547
GSCM1	0.395	0.555	0.743	0.463
GSCM2	0.420	0.376	0.716	0.298
GSCM3	0.335	0.394	0.663	0.298
GSCM4	0.400	0.410	0.680	0.390
GSCM5	0.506	0.446	0.744	0.435
GSCM6	0.467	0.496	0.736	0.396
GSCM7	0.402	0.459	0.806	0.441
GSCM8	0.413	0.502	0.801	0.490
OP1	0.591	0.579	0.474	0.847
OP2	0.515	0.518	0.443	0.825
OP3	0.420	0.406	0.372	0.765
OP4	0.417	0.452	0.421	0.724
OP5	0.559	0.591	0.454	0.779

The discriminant validity is also verified by using the Heterotrait Monotrait ratio (HTMT). The figures show that the links with variables itself are larger than with other variables because values of the ratio are not higher than 0.90. These values highlighted the valid discriminant validity and low nexus between variables. These are shown in Table 4.

Table 4. Heterotrait Monotrait ratio

	EP	FP	GSCM	OP
EP				
FP	0.762			
GSCM	0.643	0.733		
OP	0.731	0.780	0.626	

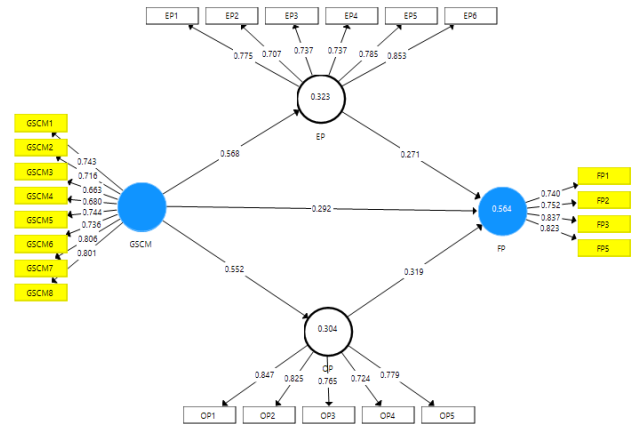


Figure 2. Measurement model assessment

The path analysis of the study exposed the nexus among the variables and the results revealed that green supply chain along with operational and environmental performance has a positive association with financial performance and accept H1, H2 and H3. The findings also exposed that the green supply chain also has positive nexus with operational and environmental performance and accept H4 and H5 while operational and environmental performance positively mediates among the nexus of green supply chain and financial performance. These are shown in Table 5.

Table 5. Path analysis

Relationships	Beta	S.D.	t-statistics	p-values
EP -> FP	0.271	0.048	5.640	0.000
GSCM -> EP	0.568	0.036	15.910	0.000
GSCM -> FP	0.292	0.047	6.279	0.000
GSCM -> OP	0.552	0.046	12.002	0.000
OP -> FP	0.319	0.052	6.166	0.000
GSCM -> EP -> FP	0.154	0.030	5.205	0.000
GSCM -> OP -> FP	0.176	0.032	5.534	0.000

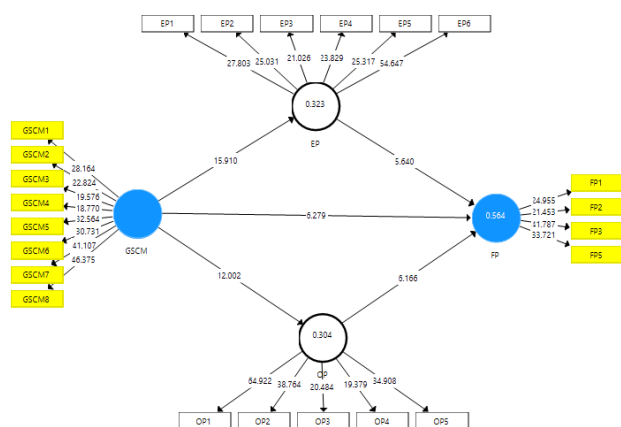


Figure 3. Structural model assessment

5. Discussion and conclusion

The results have proved that green supply chain management has a positive association with environmental performance. These results are in line with the previous studies Laari, Töyli [18] which show the importance of green supply chain management for environmental performance. The results have indicated that green supply chain management has a positive link with operational performance. These results agree with those of Lee [20] where it has been shown that green practices of supply chain management make a great contribution to the operational performance. These results have revealed that environmental performance has a positive linkage with financial performance. These results match with the past studies [10] where the positive association of environmental performance with financial performance has been shown. The findings revealed that operational performance puts positive influences on financial performance. These results match with the studies Evans [11] where the relationship between operational performance and financial performance has been shown. The results indicated that green supply chain management has a positive relationship with the financial performance of the firms. These results agree with the studies [21].

This study has made empirical implications along with theoretical implications. From theoretical perspective this paper has made a lot of contribution to the business and management-related literature by explaining the role and contribution of the practices of green supply chain in achieving environmental and operational performance and thereby financial performance. It makes empirical implication as it guides the supply chain management to adopt green practices so that financial performance can be achieved through green environmental and green operational performance. These findings provided the guidelines to the policy-makers that they should develop as well as implement the favorable policies that could increase the supply chain performance and impact on the overall performance of the organization.

The results conclude that there is a positive association between green supply chain management and environmental performance. The results show that the implementation of the practices of green supply chain management brings improvement in the rate of operational performance. It can be concluded that the environmental performance is positively related with financial performance as the environmental performance raises the marketing level and the rate of profitability which are the indicators of financial performance. In addition, operational performance brings financial performance as the efficiency and effectiveness of operations indicates more chances of marketing. Last but not the least, if the practices of green supply chain management are executed efficiently they bring improvement in the rate of financial performance.

The paper explains the practices of green supply chain management and their role in achieving the operational and environmental performance and thereby financial performance, but this discussion of green supply chain and its practices is limited. Thus, the future scholars are recommended to give greater detail to the aspects of green supply chain. This paper talks of green supply chain and its contributions only in the manufacturing organizations working in Indonesia. The future scholars should address the same topic in relation with more than one country to generalize the study. The data is collected from particular sources but future scholars should utilize more than one source to collect data.

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