



Research Article

Green Supply Chain Management Practices And Organizational Performance Of A Higher Education Institution In The Philippines

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ABSTRACT

This paper presents an assessment of a higher educational institution's (HEI) green supply chain management (GSCM) practices and its impact on organizational performance. A total enumeration approach was employed to ensure the selection of respondents aligns with the research's objectives. A total of 74 respondents were drawn from various departments within the HEI, including supervisors, officers, and top administrators, whether they were directly or indirectly involved in the institution's supply chain activities. The results of the study revealed significant insights. Notably, among the six GSCM practices assessed, only eco-design exhibited a significant positive effect on the organizational performance of the HEI. However, it is important to emphasize that the overall GSCM practices collectively exerted a significant influence on the institution's organizational performance. Organizational commitment was identified as a pivotal driving force towards a more sustainable supply chain. The study underscores the importance of the HEI's top management actively promoting and advocating for sustainability throughout the organization. This can be achieved through clear communication of their motives and active efforts to solicit support at all levels of the institution, ensuring a shared understanding of the institution's direction and current sustainability status.

INTRODUCTION

Organizations are no longer considered as a remote and self-sustaining entity. Over the years, institutions have become dependent on one another in order to suffice the ever-growing demand surrounding people as individuals or as organizations. This resulted for an organization to need other entities. The reliant nature of organizations kindled the need for supply chain management, wherein companies are now called to pay more attention in managing their supply chains for competitive advantage (Kora, 2016).

Supply chain management (SCM) is the planning and management of important activities including acquisition of materials, and manufacture and move-

ment of products. This includes coordination and partnership with other companies and ultimate consumers or users (CSCMP, 2020). It also includes management of information moving across the chain. It is also a management of a harmonized set of practices needed from material acquisition to delivery to end customers (Wisner et al., 2013). These definitions simply tell us that supply chain management is the efficient and effective administration of products that are continuously flowing from supplier to the ultimate customer or consumer. This is very critical for the focal firm to ensure that environmental and social aspects of doing business, as well as the financial efficiencies are given utmost importance. Management of information flow-





ing across the chain must also be managed.

An increase in carbon footprint of an organization may be attributed to its economic growth, and yet, it can provide its local communities with employment opportunities in the long run. (Kirchgeorg et al., 2006). In most business discussions, it is referred to as sustainability. Hence, there is a need for a real-time evaluation of three sustainability dimensions of business operations. Its intersection with supply chain management shows potential within the area of the many literatures in supply chain (Silvestre, 2016). Understanding the company's goals and mission in relation to SCM operation's effect on the social, economic and environment dimensions of sustainability is very challenging. Determining the appropriate performance indicators or measures is also a very challenging task to most managers and administrators.

Managing the supply chain has gotten much attention especially in doing business. Delivering the goods or services to customers has been a big challenge to companies. Aside from taking consideration on the effects of doing business in the environment, companies have to face a lot on the day to day basis. The need to form an organization that is self-sustaining has been getting acceptance in the business community (Basu et al., 2016). For the service industry, improvement of SCM may include responsiveness, effectiveness, and efficiency and control in providing services to customers. Thus, this concept may also be relevant to the education industry (Gopalakrishnan, 2015). For non-profit organizations like schools, there were a limited number of studies attempted to focus on supply chain management. Researchers do not recognize

that the study on supply chain management may be conducted in a school setting as well. Most often than not, supply chain models were developed for business improvement activities (Habib et al., 2008).

Green supply chain management practices and performance management in higher educational institutions (HEIs) are not given much attention. The lack of research on this area offers a real challenge in formulating a clear approach for the researcher. Majority of the research and studies are centered on assessment of performance in the manufacturing organizations or industries.

Although product-based green supply is seemingly customarily related with manufacturing organizations, there is a need to look at the environmental behavior in service industries. Public and banking segments are expected to improve their performance, particularly in the environmental side in the conduct of their supply chains. Examples of these practices are vendor management, greener procurement and waste product management. Subsequently, the qualifications created among process and product-based green supply chain is similarly appropriate to companies in each segment. Hence, companies are required to perform environment-friendly methodologies. With this premise, the total chain of supply of materials and energy required to form an item or, for most part, service delivery to the clients are now being included as part of the company policy (Kora, 2016).

Establishing a long term buyer-supplier relationship is needed to further improve the performance of both economic and environmental aspect of supply



chain. Screening suppliers for environmental performance, building environmental management capacity for suppliers through trainings and recovering products and packaging materials for reuse through development of better systems for reverse logistics were some of the initiatives that can be considered for a greener operation. Design of products and services that minimize the use of natural resource, minimal production and discharge of wastes and hazardous chemicals, reuse of recycled materials and use of renewable energy, and elimination of use of harmful chemicals do not only provide environmental benefits but businesses benefits as well.

For the past years, the HEI has embarked on major development for the school. Various projects that are being conducted in consideration to Sustainable Development Goals (SDG), and strategic intents of the present administrators are acquisition of information technology (IT) products and IT infrastructure, educational learning platforms, generators sets, ergonomic cloud chairs, chemical resistant science lab tables, eco-friendly cleaning materials and office supplies, contracting or outsourcing services such as maintenance & janitorial services, facilities management and security services. HEI also implemented various strategies relative to the achievement of SDG. First, in switching to renewable energy, HEI was able to save up to 23% on electricity cost but more importantly, was able to contribute to the decrease in the planet's temperature because renewable energies almost have very little or zero greenhouse gas emission. Second, the introduction of "Bring Your Own Device" for students and partners paved the way to the removal of computer laboratories, which resulted also to reduced

electricity and expenses in maintenance and manpower. Lastly, "Bring Your Own Container" and "No PET Policy" dramatically decreased the school's plastic and pet bottle waste production as early as its first year of its implementation.

Most of the studies conducted in relation to SCM for educational institutions focus on improving business operations, business process and competitiveness among teaching institutions (Basu et al., 2016; Hye et al., 2014). Recent studies are mostly in the international scene and not much in the Philippines. Hence, assessment of green supply chain management practices of HEI is the focus of this study.

The objective of the study, is to assess the level of green supply chain management practices and the level of organizational performance of an HEI by using the green supply chain management practices derived from various studies and research. Specifically, this research intends to determine the level of green supply chain management practices of an HEI in terms of organizational commitment, eco-design, green purchasing, green marketing, investment recovery and environmental practice. This paper also wanted to determine the level of organizational performance of an HEI in terms of social performance, environmental performance, economic performance and operational performance. The paper also aimed to determine the relationship between green supply chain management practices and the organizational performance of an HEI and how its green supply chain management practices affect its organizational performance.

The significance of the study demonstrates the im-



portance of green supply chain management practices on the organizational performance of HEI. The study brings significant insights firstly, to the HEI. The study may be of help to the school by showing the (a) assessment of the green supply chain management practices being done and its effect on the organizational performance (b) areas that need more action and improvements, and (c) impact of supply chain management towards the subject educational institution's sustainability. Moreover, the findings could be extended to the communities within and outside the institution, as the closest stakeholders. For researchers, the study will develop a greater sense of understanding about sustainability, bring practical knowledge on application of green supply chain management in its actual use, and cultivate a deeper concern for sustainability, caring for the environmental, social and economic aspects. Lastly, this research may reflect a few specific goals from the United Nations' SDGs to help start making a difference in attaining global sustainability.

Review of Related Literature

This chapter presents the concepts and literatures that support, differentiate and establish the foundation of the entire study.

Service Industry and Higher Educational Institution SCM

Managing the supply chain has come to be a crucially critical approach to increase competitive advantage in the market globally. One of the most important segments of the economy is the services industry and it has continuously been considered as the driver of

economic growth. In spite of the fact that the application of some of the best supply chain management practices from the manufacturing industry can provide advantage to the service industry, it is necessary to create a particular SCM for this industry. In the service industry, getting quality inputs from the customer-suppliers can be an incentive for providers and vice-versa. Supply chain management in the service industry is needed for various reasons such as customer satisfaction enhancement, quality result generation, operations improvement, increasing profits, superior outsourcing, handling competitive pressures, expanding significance of e-commerce, expanding globalization, and supply chain complexity development (Krishna et al., 2012).

Service activities are absolutely fundamental in making an economy work and enhance the customers quality of life. Just like education, services are performed directly for the clients or for the clients' property and it requires participation during the performance. Exceptionally few researchers conducted studies on supply chain management related to the education industry. Understanding the bounds of educational institutions' SCM activities from vendors to end-users or clients is needed to achieve and provide improvement of end customer's welfare to the society. Hence, it is all subject to a harmonious collaboration among members of the chain. Kokui Owusu-Bio et. al. (2015) highlighted the difference between the traditional manufacturing supply chains and services supply chains. More standardized controls and procedures are in place for manufacturing while more varied approach and outputs due to human involvement are always the case for the service industry. Thus, ed-



education as a service can adopt the concept of SCM specially in higher education.

Supply chain management theories and ideas are not restricted only to enhance activities in manufacturing sectors. Especially designed service based SCM is also applicable in the education sector which is also a service-based industry (Gopalakrishnan, 2015; Basu et al., 2016). Education supply chain management must be incorporated and must work together with significant sustainable supply chain management practices to be able to have a proficient and balanced performance. Developing the basic competencies and understanding in making decisions aimed at enhancing the quality of life, activities related to the triple bottom line of sustainable education must be addressed. It is very important also to get the involvement of all stakeholders of the supply chain. There should be a more collective and unified business model for higher education (Basu et al., 2016).

Some of the most recent studies include study on the sustainable procurement in Australian and UK universities by Young et al. (2016) and the study on the 18 private universities of Malaysia. The study addresses an Integrated Tertiary Educational Supply Chain Management Model (ITESCM) to achieve sustainability among the private universities in Malaysia. This highlights the role of sustainable SCM practices in various private universities.

Hassan et al. (2015) in their study on supplier performance management at higher education institutes mentioned top management as one of the barriers for supplier performance management.

The same view was raised by Basu et al. (2016) saying involvement of top management plays a high important role in achieving sustainability. Leaders who are determined in promoting a “culture of sustainability” within their organizations can promote practices which create a mutual advantage for the community, firms and environment. Collaboration with administrators plays a crucial part for clearing initial difficulties in adopting sustainability operational policy. However, in the long-term implementation of operational initiatives across sustainability within institutions, faculty and staff leaders have a tendency to have a more significant role (Vaughter et al., 2013).

In the private sector, growing interest in CSR activities of organizations drives products and services acquisition in a sustainable manner as a growing trend as well as the acknowledgment of all the risk related to it. Lack of senior management support and a model that offers realistic and useful direction on supplier engagement were some of the challenges observed in the study (Young et al., 2016).

Green Supply Chain Management Practices

Various studies have already examined the effects of green supply chain management on organizational performance. Zhu and Sarkiz (2004) used sustainable practices from internal and external aspect of the organization including return on investment and environment-friendly designs of products and services on performance improvement of Chinese enterprises under study. The correlation between GSCM practices and economic performance is positive. Same result was observed by Mumtaz et al. (2018) adding that its



implementation resulted to a decrease in environmental pollution and operational cost. Another study was conducted (Zhu et al., 2016) to confirm its validity. This time, green purchasing was added in the GSCM practices. To determine the various dimensions of the GSCM practices, a questionnaire was utilized to assess each company's strengths and weaknesses. These include internal management, green purchasing, cooperation with customers including environmental requirements, eco-design and investment recovery practices.

Saeed et al. (2018) in their study identified various kinds of pressures and assess if the internal and external green supply chain management practices have these kinds of pressures. Results also showed that internal green supply chain management is significant in improving environmental performance and at the same time, had a big effect on external green supply chain management practices. On the contrary, economic performance was positively and significantly affected by external green supply chain management. Improvement on economic performance was contributed by environmental performance.

Another study (Eltayeb et al., 2010) tried to evaluate the outcomes (intangible, economic and environmental) of the adoption of the GSCM initiatives. Results showed that green purchasing has no significant effect on any of the four outcomes. However, significant positive effect exist between reverse logistics and cost reduction only. On the other hand, a significant positive effect exists between environment-friendly design of products and the four types of outcomes. Below is the framework used in this study.

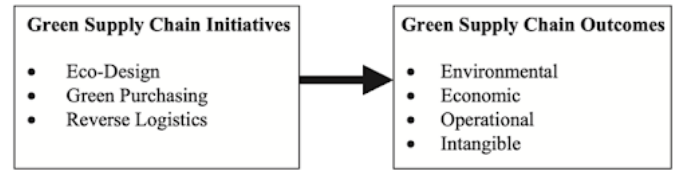


Figure 1. Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes

The same result was observed by Green (2012) when he analyzed how 159 manufacturing companies deal with the upstream and downstream members of the supply chain. Results showed that GSCM practices led to the improvement of economic and environmental performance. This in turn, completely affects the company operation, which eventually enhances the operation of the company as a whole.

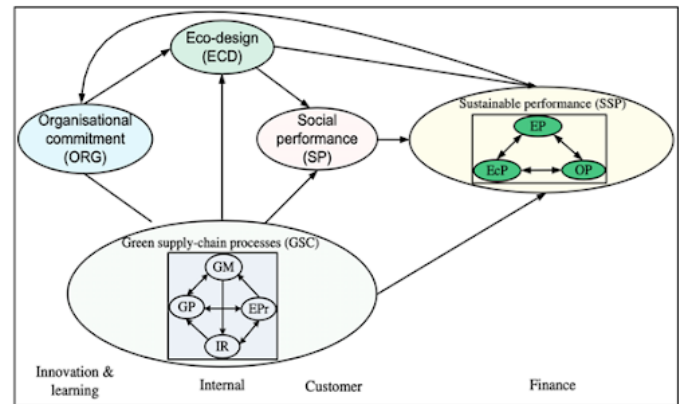


Figure 2. Collaborative NP network illustrating the causal relationship

Bhattacharya et al. (2013) showed that there is a green causal relationship between organizational commitment, eco-design, green supply chain process, social performance and sustainable performance. Figure 2 illustrates the aforementioned relationship.

A concept developed by Wang and Dai (2016) was used to investigate the influence of sustainable practices on the economic, environmental and social performance of 172 Chinese firms. Environmental and social performance was positively influenced by



internal sustainable supply chain management activities. The correlation among the three organizational performances is also positive.

A critical evaluation of literature review on green supply chain management practices was provided by Weeratunge and Herath (2018) and the dimensions of green supply chain management were identified namely: green procurement, green design and manufacturing, green distribution, reverse logistics. Yildiz Çankaya and Sezen (2019) however, used eight green supply chain management dimensions (green purchasing, green manufacturing, green packaging, green distribution, green marketing, investment recovery, internal environmental management and environmental education) to study the green supply chain management practices' effect on the sustainability performance. The findings showed that environmental performance was positively affected green supply chain management practices leading to environmental improvements. In terms of influence to social and economic performance, green supply chain management was not as effectual as expected. In the study, only three among the eight green supply chain management dimensions were correlated with economic performance. One reason that may be attributed to this is the idea that investment is required during the initial stages of green supply chain management. This has a negative impact on the cost on organizations that are starting to adopt green practices.

In a study conducted by Yu et al. (2014) on the automobile industry in China, they found that a positive and significant relationship exists between the multiple internal green supply chain management and

performance dimension. This supports their idea that green supply chain management should be assessed by the scholars and experts through the reconciliation with the downstream and upstream members of the supply chain. Essentially, it provides a systematized methodology to the growth of internal green supply chain management approach for administrators in the manufacturing sector. To be more familiar with the relationship between green supply chain management practices and company performance, Geng et al. (2016) conducted a study in the manufacturing sector in Asian Emerging Economy (AEE). The study showed that better social, economic, environmental; and operational performance can be attained through the green practices of supply chain management. Additionally, the study revealed that other factors such as company's size, type, international certifications and exportation normalized the relationships of some green supply chain management and organizational performance.

Beyene (2015) in his study, used the dimensions of green supply chain management of Bhattacharya et al. (2013). The findings revealed that respondents don't seem to count the dimensions of green supply chain management in greening the whole supply chain. The study also revealed that wastes were not properly treated before its release by most of the tanneries. One possible reason is the absence of a specific unit handling green practices although guidelines on this type of industry are very strict.

The relationship between a sustainable supply chain and financial performance of an organization was the focus of the study of Ortas et al. (2014).



Study shows that the performance affects the profit of an organization and vice versa. On the other hand, organizations' profitability relationship is unidirectional. Lastly, when the whole sample was segmented geographically and economically, various correlations appear among companies' sustainability performance and financial performance.

Kora (2016) used six green supply chain management practices and revealed that except for eco-design, there is a positive significant correlation that exists between the green supply chain management practices and operational performance. Results also revealed that only organizational commitment, eco-design and green purchasing has a predicting power on the organizational performance.

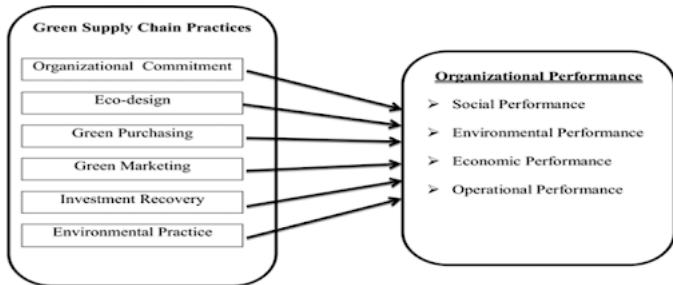


Figure 3. Operational Framework

Presented in Table 1 is the summary of the GSCM dimensions or practices from various researchers. Relative to these studies, this paper will use the green supply chain management practices used in the service oriented industry since an educational institution is also a service industry.

Table 1. GSCM Dimension Models

GSCM Dimensions	Authors	Focus of Study (Manufacturing or Service)
Organizational commitment Internal management (Environmental Management and Social Responsible Management)/ Environmental Practices	Zhu & Sarkiz (2004), Yu et al (2014), Bhattacharya et al., (2013), Wang & Dai (2016), Zhu et al., (2016), Yildiz Çankaya & Sezen (2019), Saeed et al. (2018), Beyene (2015), Kora (2016)	Manufacturing, Service
Green Purchasing Supplier monitor and assessment, supplier collaboration	Yu et al (2014), Eltayeb et al. (2010), Bhattacharya et al. (2013), Wang & Dai (2016), Zhu et al. (2016), Saeed et al. (2018), Beyene (2015), Kora (2016), Weeratunge & Herath (2018)	Manufacturing, Service
Cooperation with customers including environmental requirements	Zhu & Sarkiz (2004), Yu et al (2014), Zhu et al. (2016), Saeed et al. (2018)	Manufacturing
Eco-design practices /Green Design	Zhu & Sarkiz (2004), Eltayeb, et al. (2010), Bhattacharya et al., (2013), Zhu et al. (2016), Saeed et al. (2018), Beyene (2015), Kora (2016), Weeratunge & Herath (2018)	Manufacturing, Service
Investment recovery	Zhu & Sarkiz (2004), Bhattacharya et al., (2013), Zhu et al. (2016), Yildiz Çankaya & Sezen (2019), Saeed et al. (2018), Beyene (2015), Kora (2016)	Manufacturing, Service
Green manufacturing	Yildiz Çankaya & Sezen (2019), Weeratunge & Herath (2018)	Manufacturing
Green packaging	Yildiz & Sezen (2019)	Manufacturing
Green distribution	Yu et al (2014), Yildiz Çankaya & Sezen (2019), Weeratunge & Herath (2018)	Manufacturing
Green marketing	Bhattacharya et al., (2013), Yildiz Çankaya & Sezen (2019), Beyene (2015), Kora (2016)	Manufacturing, Service
Reverse logistics	Eltayeb, et al. (2010), Weeratunge & Herath (2018)	Manufacturing
Environmental education	Yildiz Çankaya & Sezen (2019),	Manufacturing

This research utilized the framework used by Kora in 2016 to assess the green supply chain management practices and organizational performance of an HEI. Figure 3 illustrates the conceptual framework for this



study.

MATERIALS AND METHODS

Research Design

The researcher used descriptive research design to explain and describe the characteristics of a specific subject or group (McCombes, 2020). It was used to describe the respondents' assessment on HEI in relation to the green supply chain and organizational performance.

Data Gathering

The study employed a total enumeration process wherein the respondents were chosen based on certain criteria. Following the study of Kora (2016), the employees in supervisory and managerial positions including top administrators served as the respondents in the study whether directly involved or not in the institution's supply chain activities. The researcher deliberately selected respondents of this study. The idea is to ensure that respondents would provide rational judgement or answers to the research questions and to be able to achieve the objective of the research.

Respondents of the Study

The respondents were from the various departments of the HEI from supervisors and officers to top administrators whether directly involved or not in the institution's supply chain activities. To ensure proper protocol, the researcher submitted a letter of request and secure approval from the top management. The total number of participants in the study is 74.

Data Analysis

Mean and standard deviation were used to establish the level of GSCM practices and to determine the organizational performance of the HEI. Mean is the measure of central tendency and refers to the average value of a group of numbers (Rouse, 2019) and standard deviation is a number used to tell how measurements for a group are spread out from the average (mean), or expected value (National Library of Medicine, 2006).

To determine the correlation of GSCM practices with the organizational performance of the HEI, Pearson's correlation coefficient was used. It is a measure of the linear correlation between two variables (Statistics Solutions, 2021). Multiple linear regression was used to determine how the level of GSCM practices influence the organizational performance of HEI. Multiple linear regression is a statistical technique that uses several explanatory variables to predict the outcome of a response variable. The goal of multiple linear regression (MLR) is to model the linear relationship between the explanatory independent variables and dependent variables (Kenton, 2019).

Instrument

To measure the relevant variables, an adapted survey questionnaire was employed, which was originally developed for assessing the GSCM practices of an Ethiopian Telcom in a study conducted by Kora (2016). The questionnaire was modified to suit the context of the HEI under investigation. It comprised 47 items divided into two parts. Part I consisted of 4



background information questions, while Part II contained 43 questions directly related to the study. Part II was further divided into two sections: Section A focused on GSCM practices, and Section B addressed organizational performance. In Section A, respondents indicated their responses on a scale ranging from not considering (1) to carrying out fully (5), while Section B utilized a scale from not significant (1) to significant (5).

To assess validity and reliability, a pilot test of the adapted questionnaire was conducted at another HEI involving 15 administrators in a similar setting. Internal consistency reliability was determined using Cronbach’s alpha coefficient. The obtained alpha values were compared to the following interpretations: >0.9 (Excellent), >0.8 (Good), >0.7 (Acceptable), >0.6 (Questionable), >0.5 (Poor), and <0.5 (Unacceptable) (Gliem & Gliem, 2003).

Tables 2 and 3 below showed the result of the Cronbach’s Alpha for the adapted questionnaire. The calculated alpha coefficients demonstrated that all questions measuring the independent variables for both GSCM practices and organizational performance were reliable. The overall organizational performance had an alpha value of 0.954, indicating strong internal consistency. Furthermore, the survey questionnaire as a whole exhibited a high level of reliability, as evidenced by the calculated alpha value of 0.951.

Table 2. Cronbach’s Alpha Coefficient (GSCM Practices)

GSCM Practices	Cronbach's Alpha	N of Items
Organizational Commitment	.760	4
Eco-design	.804	3
Green Purchasing	.960	5
Green Marketing	.979	4
Investment Recovery	.885	3
Environmental Practice	.934	4

Table 3. Cronbach’s Alpha Coefficient (GSCM Performance)

ORGANIZATIONAL PERFORMANCE	Cronbach's Alpha	N of Items
Social Performance	.925	4
Environmental Performance	.892	5
Economic Performance	.934	5
Operational Performance	.977	6

The researcher assured that the information collected from the respondents were used specially for research purposes only, and with utmost confidentiality. This was also included in the first part of the questionnaires informing all the respondents the intent of the researcher regarding the issue. Primary and secondary research data were stored and secured and confidential information were destroyed and disposed of securely. Ample time was given to all respondents to eliminate any unfair pressure in answering the questionnaires. Only the questionnaires with complete answers were included in the data analysis and interpretation. The researcher employed all efforts to ensure impartiality and bias in the result for this research.

RESULTS AND DISCUSSION

Level of Green Supply Chain Management Practices

Results of the study show that the organizational commitment got the highest mean of 3.77, which shows that the HEI is committed and has been carrying out these practices to some degree. This is important since top and middle management involvement is crucial for the HEI’s effort for a greener supply chain. The same result was observed in the study of Beyene (2015) where organizational commitment regarding “greening” the whole supply chain is carried out to some degree. This also supports the findings of other authors (Hoejmose et al., 2012; Habib et al., 2008; and Basu et al., 2016) that organizational commitment



plays an utmost importance in driving green supply chain management. However, results also show that there were some inconsistencies in the response of the respondents (SD 0.8216). Respondents rated it as “considering it currently” to “carrying it out fully”.

For eco-design, the mean is 3.69. This value shows that the HEI is “considering to some degree” the design of products and services with less energy consumption, considering the use of recovered materials from previous operations and application or consumption of less harmful substances on the design of the product and/or services. And with a standard deviation of 0.7739, this implies that there is a less inconsistency in the response as compared to other dimensions. This could mean that respondents considered eco-design a critical factor regarding the environmental impact of the HEI’s design of products and services. Among the six GSCM practices, green purchasing got the lowest mean of 3.36. It should be noted that the constructs under this dimension consist of items associated with the various activities of vendors in relation to greening the supply chain which the HEI has no control over. Although this means that the HEI is considering green purchasing to green the supply chain, results show that there are still some discrepancies in the response as it garnered a standard deviation of 0.9833. Green marketing got a 3.50 mean value and a 0.9331 standard deviation. Investment recovery has a mean of 3.53 and a standard deviation of 1.0099. This value shows that there are inconsistencies in the responses. Environmental practice got a 3.40 mean and 1.0550 standard deviation. This also implies inconsistencies in the responses as well.

Level of Organizational Performance

For the level of significance of the HEI’s organizational performance (Table 4), social performance garnered the highest mean of 4.09. This may infer that respondents view HEI as an institution that values the significance of positive image, CSR activities, business ethics and employment generation. Results also suggest that respondents view HEI’s performance relative to GSCM practices’ perspective is relatively significant. However, there are still respondents that don’t have much idea on the plans of the HEI regarding sustainability. This can be attributed to the inconsistencies in the responses. Hence, a more intensified effort on the information dissemination is needed to make sure that all partners and stakeholders are aware of HEI’s effort for a greener supply chain.

Table 4. Descriptive Statistics

	Mean	Standard Deviation	Verbal Interpretation
Social Performance	4.09	.7867	Relatively Significant
Environmental Performance	3.97	.9180	Relatively Significant
Economic Performance	3.84	.7749	Relatively Significant
Operational Performance	3.78	.8636	Relatively Significant
Organizational Performance	3.92	.7462	Relatively Significant

Furthermore, the highest standard deviation was recorded to environmental performance with a value of 0.9180. This value implies inconsistencies on the responses. The lowest standard deviation was registered to economic performance with a value of 0.7462.

Correlation Analysis

The strongest correlation was observed between eco-design and operational performance with an



R-value of 0.558 ($p=0.000$). Green marketing and economic performance, however, was observed to have the weakest correlation with an R-value of 0.0301 ($p=0.009$) correlation coefficient. The overall results show that a positive moderate significant correlation exists between the green supply chain management practices and organizational performance. These results suggest that any improvement in the GSCM practices will also improve the organizational performance of HEI. This was supported by the findings in the study of Geng et al. (2016). Strong and significant relationships exist amongst GSCM practices and firm performance of manufacturing companies in Asian emerging economies. Although these results were supported also by previous researchers, significant relationship were observed only to some of green supply chain management practices and organizational performance. For example, Yildiz Çankaya and Sezen (2019) revealed that among the eight practices only three were related with economic performance. Zhu and Sarkis (2004), showed that there is a significant relationship among GSCM practices. The only GSCM practice that has no significant relationship with negative economic performance is investment recovery. The authors argue that this result could be attributed to the fact that the GSCM is new to the Chinese firms and they were at the early stage of implementing it. The following discussions will provide an in-depth examination of the correlation between the independent variables and dependent variables.

Relationship between Green Supply Chain Management (GSCM) Practices and Social Performance

Table 5 shows that the relationship of green sup-

ply chain management practices and social performance of the HEI is significantly positive. Among the six GSCM practices, eco-design got the highest correlation coefficient ($r = 0.491, p = 0.000$). This revealed that respondents view eco-design as one of the GSCM practices that promotes a positive image to the HEI. Implementation of various programs such as the use of renewable energy, providing the internal and external partners and stakeholders the access to quality education such as providing scholarship and sharing best practices in teaching-learning and improving the life of partner communities and establishing partnership with the local churches and local government units to enhance social performance shows the commitment of the HEI in promoting sustainable practices. This study is consistent with the observation of other authors. Pattnaik and Pattnaik (2019) argued that health and safety conditions of the workers improve with the use of materials that are not harmful during the production process. Thus, correlation between eco-design and production and social performance is significantly positive. Use of non-harmful materials would result also in the generation of less hazardous wastes that would not cause any concerns to the people near the manufacturing company.

Table 5. Correlation Between GSCM Practices and Social Performance

	R-value	Degree of Relationship	p-value **	Interpretation
Organizational Commitment	0.447	Positive Moderate	.000	Significant
Eco-Design	0.491	Positive Moderate	.000	Significant
Green Purchasing	0.331	Positive Weak	.004	Significant
Green Marketing	0.420	Positive Moderate	.000	Significant
Investment Recovery	0.422	Positive Moderate	.000	Significant
Environmental Practice	0.460	Positive Moderate	.000	Significant

**Correlation is significant at the 0.01 level (2-tailed)





Results of other green supply chain management practices that have a positive relationship were environmental practice ($r = 0.460, p = 0.000$), organizational commitment ($r = 0.447, p = 0.000$), investment recovery ($r = 0.422, p = 0.001$), green marketing ($r = 0.420, p = 0.000$) and green purchasing ($r = 0.331, p = 0.004$). Except for green purchasing, all relationships are positively moderate. Geng et al. (2016) posed the same result as the correlation between intra-organizational environmental management and social performance is significant. Relationship between organizational commitment and social performance is significant also (Kora, 2016). The study of Yildiz Çankaya and Sezen (2019) showed that out of the eight green supply chain management practices, four (green production, green distribution and packaging, internal environmental management and investment recovery) were positively related to social performance. Social performance was positively affected by the supplier and customer pressure hence, socially responsible vendors and customers were preferred (Pattnaik & Pattnaik (2019).

Relationship between Green Supply Chain Management Practices and Environmental Performance

Green supply chain management practices and environmental performance showed that there is a significant positive correlation (Table 5). Moderate correlations were from eco-design and environmental performance, environmental practice and environmental performance and green purchasing and environmental performance with an R-value of 0.483 ($p = 0.000$), 0.448 ($p = 0.000$), 0.409 ($p = 0.000$) respectively. This could mean that respondents view the ef-

forts of HEI on the reduction of carbon footprint such as the use of renewable energy and the practice re-use, reduce and recycle programs; and the use of non-toxic materials in its operation as an initiative that drives environmental performance. This was supported by other authors in this field. Same result was observed by Zhu and Sarkiz (2004), as the results of their study showed a positive significant correlation between the external and internal sustainability practices including eco-design, and investment recovery with environmental performance.

Table 6. Correlation Between GSCM Practices and Environmental Performance

	R-value	Degree of Relationship	p-value **	Interpretation
Organizational Commitment	0.376	Positive Weak	.001	Significant
Eco-Design	0.483	Positive Moderate	.000	Significant
Green Purchasing	0.409	Positive Moderate	.000	Significant
Green Marketing	0.367	Positive Weak	.001	Significant
Investment Recovery	0.353	Positive Weak	.002	Significant
Environmental Practice	0.448	Positive Moderate	.000	Significant

**Correlation is significant at the 0.01 level (2-tailed)

Relationship between organizational commitment and environmental performance appeared to be weak. It only obtained an R-value of 0.376 ($p=0.001$). This result may suggest that although HEI top management is very much involved in greening the supply chain, HEI must put more effort to cascade the idea in a general or simple way for better understanding of the direction of the school in relation to sustainability. Such as clearly indicating the top management’s motive and to actively request support in relation to sustainability on all levels of the organization. This is consistent with the view raised by Basu et al. (2016) that to achieve a green supply chain for educational institutions, involvement of company administrators



is vital.

Green marketing and environmental performance and investment recovery and environmental performance have weak correlations with an R-value of 0.367 ($p = 0.000$) and 0.353 ($p = 0.002$), respectively. This suggested that green marketing do not affect environmental performance (Pattnaik & Pattnaik, 2019).

Other studies revealed that GSCM practices leads to decreased greenhouse gasses and operational cost. This provides improvement on environmental and economic performance, which positively effect operational performance, which enhances organizational performance (Mumtaz et.al, 2018; Green et.al, 2012). Saeed et al. (2018) had the same findings and showed that a healthy relationship exist between internal GSCM practice and environmental performance.

Relationship between Green Supply Chain Management Practices and Economic Performance

Results of this study as depicted in Table 6 shows a positive relationship among GSCM practices and economic performance. However, unlike the social and environmental performance, only two dimensions got moderate correlation namely, eco-design and economic performance with an R-value of 0.488 ($p = 0.000$) and environmental practice and economic performance with an R-value of 0.434 ($p=0.000$). This is consistent with the finding of Pattnaik and Pattnaik (2019) that eco-design can also enhance a company’s economic performance. This result suggested that environmental initiative can also influence the economic performance of the company positively.

This means that HEI’s efforts on greening the supply chain, through minimal waste production and minimal consumption of renewable energy on the design of products and reduction of water usage through construction of STP, can enhance economic performance.

The correlation of green purchasing and economic performance was significantly weak with an R value of 0.387 ($p = 0.00$). The same result was observed between organizational commitment and economic performance ($r = 0.359$, $p = 0.002$). Geng et al. (2016), however, have a different result. Their study showed a positive strong correlation among the green supply chain management practices and economic performance. They also confirmed that to bring better economic performance, adoption of internal environmental management is the key. Their study also confirmed that there is a positive strong relationship that exists between suppliers’ integration and economic performance.

Table 7. Correlation Between GSCM Practices and Economic Performance

	R-value	Degree of Relationship	p-value **	Interpretation
Organizational Commitment	0.359	Positive Weak	.002	Significant
Eco-Design	0.488	Positive Moderate	.000	Significant
Green Purchasing	0.387	Positive Weak	.001	Significant
Green Marketing	0.301	Positive Weak	.009	Significant
Investment Recovery	0.353	Positive Weak	.002	Significant
Environmental Practice	0.434	Positive Moderate	.000	Significant

**Correlation is significant at the 0.01 level (2-tailed)

Correlation between investment recovery and economic performance was also found to be weak as it only gained a R-value of 0.353 ($p=0.002$). Weak relationship was also shown between the green marketing dimension and economic performance. It has





the lowest R-value of 0.301 and a p-value of 0.009. Results from studies indicate that companies may incur additional cost during the initial implementation of green marketing practices. Investment recovery, as well, had no significant relationship on economic performance according to the study Yildiz Çankaya and Sezen (2019).

Relationship between Green Supply Chain Management (GSCM) Practices and Operational Performance

Table 8 presented the correlation between GSCM practices and operational performance revealed that a positive relationship exists between the GSCM practices and operational performance. All dimensions have positive relationships. Eco-design and operational performance got the highest R-value of 0.558, with a p-value of 0.000. Except for investment recovery and organizational performance, all dimensions showed positive moderate relationships.

Table 8. Correlation Between GSCM Practices and Operational Performance

	R-value	Degree of Relationship	p-value **	Interpretation
Organizational Commitment	0.486	Positive Moderate	.000	Significant
Eco-Design	0.558	Positive Moderate	.000	Significant
Green Purchasing	0.483	Positive Moderate	.000	Significant
Green Marketing	0.450	Positive Moderate	.000	Significant
Investment Recovery	0.323	Positive Weak	.005	Significant
Environmental Practice	0.510	Positive Moderate	.000	Significant

**Correlation is significant at the 0.01 level (2-tailed)

Worthy to note that the strongest correlation for this study was observed between eco-design and the four organizational performances specifically: social, environmental, economic and operational perfor-

mance. This finding, however, was in contrast to that of Kora (2016). Eco-design and operational performance showed a negative relationship although a positive significant correlation exists between the green supply chain management practices and organizational performance. According to Kora (2016), this is a sign of the reality that regulations on the environment can increase operation cost and subsequently decrease productivity.

Regression Analysis

To be able to determine how the GSCM practices effect HEI’s organizational performance, this study conducted a multiple linear regression analysis. Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. It can be utilized to assess the strength of the relationship between variables and for modeling the future relationship between them (Corporate Finance Institute, 2020). Furthermore, to confirm the independent variables’ predicting power on the dependent variable, a multiple linear regressions analysis was used. The following section details the result of regression analysis.

ANOVA Result for Green Supply Chain Management Practices and Organizational Performance

The ANOVA test results (Table 9) indicate that the model for this study works and is acceptable from a statistical perspective. Results reveal that the dependent variable gained 0.000 significance level, hence, this is accepted.





Table 9. ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.069	6	2.678	7.301	.000 ^b
	Residual	24.577	67	.367		
	Total	40.647	73			

a. Dependent Variable: Organizational Performance
b. Predictors: (Constant) (Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental Practice)

Model Summary and Coefficient for Green Supply Chain Management Practices and Organizational Performance

As shown in Table 10, the R Square value is 0.395 and this indicates that the model has a predicting power of 39.5%. Hence, this shows that 39.5% of the deviation in the organizational performance can be attributed to the variables included in the model. This further shows that 60.5% of the deviation in the organizational performance will be defined by other variables not mentioned in this model.

While the model’s suitability was established by the ANOVA test, the coefficient table revealed that only eco-design, among the six GSCM practices, is the only statistically significant (p=0.008). From the unstandardized beta value of 0.382, this independent variable is reasonably imperative in determining the overall organizational performance of the HEI. The rest of the independent variables are not statistically significant because the p-value is not acceptable (p>0.05), thus no significant effect on the dependent variable (overall organizational performance). This result however, was in some way, confirmed by other authors. According to Yildiz Çankaya and Sezen (2019), organizational performance was affected positively by the green supply chain management practic-

es. Improvement on all dimensions of operational performance (flexibility, delivery, quality and cost) was also affected by the green supply chain management practices (Silva & Mallikarathna 2019). Conversely, Beyene (2015) revealed that green supply chain management practices has a smaller amount of influence on social performance. However, they found out that the effect on economic performance is supplementary, hence, a positive relationship exists.

Table 10 showed that using the unstandardized beta coefficient value (b=0.382), eco-design can predict up to 38.2% of HEI’s organizational performance. Between eco-design and organizational performance, the relationship is also positive as shown in the correlation analysis.

The regression model explaining the results from IBM SPSS software is expressed by the Linear Equation: OVERALL Organizational Performance = 0.382 x Eco-Design + 1.648. The computation shows that eco-design positively affects the organizational performance (a unit increase in eco-design increases the performance of a Higher Education Institution by a positive unit of .382). This is consistent with the findings of other authors like Pattnaik and Pattnaik (2019) who revealed that eco-design positively affects the organizational performance and this is compelling evidence they are interrelated. In another study conducted by Qorri et al. (2018) using a meta-analysis approach on GSCM practices and firm performance, Eco-design has the highest impact.





Table 10. Coefficients for Organizational Performance

	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	Interpretation
(Constant)	1.648	.390		4.221	.000	
Organizational Commitment	.197	.108	.217	1.826	.072	Not Significant
Eco-Design	.382	.139	.397	2.742	.008	Significant
Green Purchasing	-.032	.139	-.043	-.232	.817	Not Significant
Green Marketing	-.088	.138	-.110	-.633	.529	Not Significant
Investment Recovery	-.100	.113	-.135	-.883	.380	Not Significant
Environmental Practice	.259	.145	.367	1.790	.078	Not Significant

(*R* = 0.629^a, *R*² = 0.395, *F* = 7.301, *p*-value = .000^b)

The same results was revealed in the study of Zhu and Sarkiz (2004) and Eltayeb et al. (2010). The results of their study proved that the green supply chain initiatives positively affect the outcomes and a significant positive effect exists between them and eco-design.

In the study conducted by Kora (2016), four GSCM practices including eco-design were found to be statistically significant and have predictive power in the organizational performance. On environmental performance, Zhu and Sarkiz (2004), and Saeed et al. (2018) also had the same findings and results showed that eco-design has direct, positive effects on environmental performance. Furthermore, Teixeira et al. (2023) studied how certain eco-friendly practices in emerging markets can impact the environment. They found that practices such as better environmental management, collaboration with suppliers, and working together across departments to make environmental improvements had a big positive effect on environmental performance.

This likewise indicates that the HEI is giving high consideration to the design of products with less energy consumption. Examples are the use of learning

management systems that eliminates the use of traditional textbooks and papers, the use technology platforms in the design of the product or services for critical business processes such as enrollment, finance and management of student information. This is a critical factor in the overall organizational performance of the HEI. To illustrate, a well-designed delivery of service using less energy or using renewable energy would create a huge impact to the HEI not only on the environmental aspect, but also on the social aspect of the institution. Stakeholders might view the HEI as an institution that values the environment, thus creating a good image for the school. This would eventually provide a huge impact on the economic performance of the institution by providing big savings in the long run.

In conclusion, the finding that eco-design is the only significant predictor of HEIs' organizational performance, this highlights its importance in GSCM practices for educational institutions. By embracing eco-design, HEIs can reduce their environmental footprint, enhance their reputation, achieve cost savings, and contribute to a more sustainable future. It is a holistic approach that aligns with the broader sustainability goals of HEIs and is essential for creating a positive impact on social, environmental, economic, and operational aspects.

CONCLUSION AND RECOMMENDATIONS

This study focuses on the relationship and effect of GSCM practices with the organizational performance of a HEI. Results of this study revealed that there is a positive relationship between the GSCM practices and organizational performance. Strongest





correlation was obtained between eco-design and all areas of organizational performance. Mostly, the correlation between GSCM practices and organizational performance is positive moderate. Thus, this study rejects the hypothesis that states “there is no significant relationship between GSCM practices and the organizational performance of the HEI”. This demonstrates that adoption of GSCM practices promotes the use of environment friendly design in the delivery of its services thus, leading to a greener supply chain. This study also revealed that only eco-design has a significant effect on the organizational performance of the HEI (i.e. social, environmental, economic and operational). Thus, it can be said that eco-design is the only significant predictor of HEI’s organizational performance. Generally, the hypothesis that states “the GSCM practices of the HEI has no significant effect in its organizational performance” is accepted.

This study suggests that currently, HEI’s supply chain management practice is moderately positive and commitment on greening the supply chain is moderate as well. Organizational commitment is one of the driving forces to a greener supply chain. Although most of the respondents recognizes the effort of the HEI, specifically the top management in greening the supply chain, other members of the of the administration are not well aware of it. Relative to this, the HEI must put a more vigorous effort to cascade the idea in a more specific way for better understanding of the direction and current status of the school in relation to sustainability. Such as clearly indicating the top management’s motive and to actively request support in relation to sustainability on all levels of the organization. Given that the HEI has participated and received

recognitions in various local and international award giving body in relation to sustainability, it would help to communicate the principles of green supply chain management practices to understand the sustainability initiatives of the HEI in the community level, by clearly identifying the key performance indicators of each functional offices.

Although the HEI has a stringent purchasing procedures, its effect on the performance of the school in terms of green supply chain management can be considered internal only. Therefore, more emphasis should be given on ensuring that suppliers are implementing green supply chain management particularly on environmental dimension. A platform should be organized so that the school and the vendors can work together towards a greener supply chain. A procedure on how to identify suppliers that are using eco-friendly materials, biodegradable materials, recycling, proper disposal of hazardous wastes and reverse logistics, should be in placed as well.

Ultimately, to further improve the organizational performance, the HEI must set reasonable eco-design approaches specially in the early stage of the design process. Potential environmental impact should be considered when designing a product or service. High consideration on how the stakeholders will interact to the product or services must be done including the materials to be used, the technology and the amount of energy to be used during the product or the service’s life cycle. Eco-design should be included in the mix of strategies of the HEI. One particular recommendation is to come up with a manual or standards of using environment friendly materials that must be



set up at every functional level. It should be included in the operations manual of each department to genuinely check that all the activities are anchored in the sustainability initiatives of the school. Therefore, this should be part of the regular monitoring and review of a particular office handling sustainability.

This study was focused on assessing the correlation between and the effect of green supply chain management practices and organizational performance of the HEI. Further study including all stakeholders (external and internal) is recommended for a more wholistic approach on GSCM. Essentially, results of this study offered supplementary insight to the growing interest of green supply chain management practices, and how its implementation can influence the organizational performance of an educational institution.

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