

# Strategic orientation, green supply chain management practices, and organizational performance: Basis for sustainable campus operation framework

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## Abstract

This study evaluates and explores the relationship between strategic orientation (SO), green supply chain management practices (GSCMP), and organizational performance (OP) in higher education institutions (HEIs). The study employed the Pearson Correlation and Hierarchical Multiple Linear Regression using SPSS version 28 to answer the identified objectives. The research data were obtained from the 220 administrators of 5 higher educational institutions in CALABARZON and the National Capital Region through a structured questionnaire. Results indicated a strong correlation between SO, GSCMP, and OP. The results also showed that the GSCM practices exist as a partial mediator in the interaction between SO and OP. The collective consensus among HEIs on strategic orientation underscores the importance of aligning strategies with green supply chain initiatives. This pioneering study investigates how strategic orientation and green supply chain management practices impacted organizational performance in higher education. The framework developed and the insights gained from this research can offer valuable factors to strengthen environmental initiatives, thereby enhancing the sustainability of campus operations to new heights.

**Keywords:** green supply chain management practices, organizational performance, strategic orientation, higher education institutions, sustainable campus operation

## **Strategic orientation, green supply chain management practices, and organizational performance: Basis for sustainable campus operation framework**

### **1. Introduction**

In recent years, sustainability has become pivotal for success across industries, including private Higher Education Institutions (HEIs). Amid the growing urgency to combat climate change, HEIs are increasingly embracing sustainability as a core philosophy to enhance sustainable campus operation. Initiatives such as waste reduction and strategies targeting Sustainable Development Goals (SDGs) reflect their commitment to environmental stewardship. Sustainable campus operation in these institutions integrates environmentally responsible practices into all aspects of campus life, from energy efficiency to waste reduction and eco-friendly infrastructure. This involves investing in energy-efficient lighting, purchasing non-hazardous materials, implementing recycling programs, and constructing LEED-certified buildings. Beyond infrastructure, HEIs promote sustainability through academic and community engagement initiatives, fostering environmental literacy and empowering future generations. Despite challenges like limited resources and resistance to change, adopting sustainable practices is crucial for ecological integrity and societal well-being. By leading by example, HEIs can inspire positive environmental stewardship and drive transformative change towards a sustainable future.

Many higher education institutions (HEIs) actively engage in global sustainability initiatives like the UN's Higher Education Sustainability Initiative (HESI), advocating for the integration of sustainability principles into teaching, research, and campus greening efforts ([sustainabledevelopment.un.org](https://sustainabledevelopment.un.org), n.d.). Furthermore, HEIs frequently align themselves with organizations such as the Sustainability Tracking, Assessment & Rating System (STARS) and the Association for the Advancement of Sustainability in Higher Education (AASHE), demonstrating their commitment to comprehensive sustainability endeavors. Higher education institutions have made strides towards achieving sustainable campus operation by integrating sustainability practices into their institutional mission, vision, and decision-making processes. These efforts encompass a range of initiatives, including incorporating technology into teaching methods (Dalla et al, 2021), optimizing waste management (Ndua, 2018), implementing waste reduction programs (Abdulghaffar et. al.,2021), and adopting renewable energy and eco-conscious facility management (Cai et al., 2017).

Establishing strategic goals and practices within the daily operations of educational institutions becomes crucial for long-term success (Ramos-Monge et al, 2017). Green supply chain management takes center stage as a cornerstone of an organization's sustainability journey. Amid mounting pressures on higher education institutions (HEIs) to elevate global competitiveness (Abdelfattah, 2022), these institutions play a multifaceted role in society's growth and well-being (Ramos-Monge et al., 2017; Kohl et al, 2022). Their impact extends beyond classrooms, influencing environmental conservation and sustainable development (Ramos-Monge et al, 2017). Consequently, HEIs stand as vital drivers of progress towards Agenda 2030 and beyond (Fia et al, 2022). However, harnessing the full potential of higher education institutions to become living laboratories for sustainability remains an aspiration that requires realization (Kohl et al, 2022). In light of the environmental benefits conferred by green SCM, its adoption has become known as a strategic imperative. By controlling energy-intensive processes, the emission of carbon dioxide (CO<sub>2</sub>) and hazardous gasses can be minimized. As CO<sub>2</sub> emissions escalate, adopting environmentally friendly practices has become indispensable to halt the adverse effects on our planet (Agility Group, 2021)-and adopting greener practices is imperative (Syamimi et al., 2019).

Consequently, with growing concerns about environmental degradation and its profound impact on the planet, organizations are increasingly recognizing the importance of embracing strategic orientation and adopting GSCM practices to enhance business sustainability performance (Habib et al., 2020). The adoption of such

practices not only improves sustainability but also fosters long-term viability and overall organizational performance. While environmental sustainability has become a paramount concern, green SCM has become a known strategy to mitigate negative environmental effects. While existing studies have explored the effect of strategic orientation on various aspects of higher educational institutions, these studies predominantly focus on market orientation (Bugandwa, 2009) and entrepreneurial orientation (Cvijić et al., 2019). Nevertheless, it's essential to recognize that strategic orientation alone is insufficient for sustaining competitive advantage (Han et al., 2022). Incorporating environmental and social responsibility considerations into supply chain management is increasingly crucial for performance of the firm (Saeed et al., 2019).

Research on supply chain management in non-profit organizations, such as educational institutions has remained limited in comparison to the focus on manufacturing industries (Larrán et al., 2014). Furthermore, despite a growing emphasis on sustainability in higher education, studies predominantly concentrate on the concept of a sustainable campus (Cai et al., 2017; Kumar et al., 2018; Bridgestock, 2017; Amaral et al., 2020; Abdulghaffar et al., 2021; Dalla et al., 2021; Sugiarto et al., 2022). Yet, limited attention has been given to strategic orientation and GSCM practices' role in organizational performance within educational institutions. Moreover, in this complex relationship, the triple bottom line of sustainable organizational performance namely social, environmental and economic performance stands out as the crucial measurement in achieving sustainable campus operation. According to Hossin et al. (2021) and Abdul-Rashid et al. (2017), social, environmental, and economic performance is a pivotal measure of sustainable organizational performance. By incorporating these dimensions into the concept of sustainability within the education sector, institutions can adopt a holistic approach to enhance sustainable campus operation.

This research is driven by the need to understand how strategic orientation, green supply chain management practices, and organizational performance interact within higher educational institutions to address key issues. Understanding these relationships is essential for addressing sustainability challenges within HEIs. Furthermore, investigating how sustainable campus operation can be enhanced through strategic orientation and green supply chain management practices may empower HEIs to advance environmental stewardship. By addressing these research gaps, the researcher aims to contribute to a deeper theoretical understanding of sustainability in higher education institutions. Additionally, our findings will offer valuable insights for administrators and policymakers seeking to enhance institutional competitiveness and achieve sustainable organizational performance.

**Objectives of the Study** - This research aimed to explore the relationship among strategic orientation, green supply chain management practices and organizational performance in various HEI's as input to sustainable campus operation. Specifically, the study aimed to determine HEI's strategic orientation in terms of green entrepreneurial orientation, market orientation, and technology orientation; assessed the green supply chain management practices in terms of: internal environmental management, green purchasing, green marketing, and investment recovery; assessed the organizational performance in terms of: social performance, environmental performance and economic performance, tested the relationship among the strategic orientation, green supply chain management practices, and organizational performance; determine the mediation effect of green supply chain management practices between the relationship of strategic orientation and organizational performance. Lastly, the study aimed to develop a framework to enhance their sustainable campus operation.

## 2. Methods

**Research Design** - The researcher employed a descriptive research design to explain the attributes of a particular subject or group, as outlined by McCombes (2020). This approach was utilized to depict the respondents' evaluations of strategic orientation, green supply chain practices, and organizational performance. A causal-explanatory approach was taken to examine how the strategic orientation and green supply chain management affects the HEIs organizational performance; and HEIs green supply chain management practices on organizational performance. This approach aimed to understand if these factors interact significantly and could contribute to improving HEIs' sustainable organizational performance. Quantitative methods were used to

describe and analyze the relationships between these variables, allowing for the collection of extensive data and statistical analysis to interpret the findings. A survey instrument based on existing literature was developed to facilitate this quantitative investigation.

**Participants of the Study** - The population of the study consisted of respondents from five higher educational institutions (HEIs) in the CALABARZON and National Capital Region. Respondents include administrators from various administration and academic units. The HEIs were considered based on population size. The population sizes of these HEIs are as follows: HEI1= 55; HEI2= 108; and HEI3: 120; HEI4: 118; HEI5: 102. From a population of 503 respondents, a sample size of 219 is derived using the Raosoft sample size generator. A margin of error of 5% and a confidence level of 95% is considered in deriving the sample size. A total of 500 questionnaires were distributed among the respondents and 220 were retrieved, exceeding the required sample size. Since participation of respondents to the survey is voluntary, the data collected from HEI1 is 24; from HEI2 is 77; and from HEI3 is 43; from HEI4 is 40; and from HEI5 is 36, hence, a proportionate distribution is not observed.

**Data Gathering Instrument** - The study utilized a survey questionnaire as the research instrument to help appropriately measure the variables of the study. The questionnaire consisted of 52 items. Strategic orientation in this study focused on green entrepreneurial orientation, market orientation and technology orientation. The indicators for green entrepreneurial orientation (five items) and market orientation (five items) were adapted from Habib et al. (2020). While the indicators of technology orientation (six items) were adapted from Tseng et al., (2019) and Borodako et al. (2022).

This research focuses on four activities: internal environmental management, green purchasing, green marketing, and investment recovery, in order to assess green supply chain management practices. The indicator for internal environmental management (six items) and green purchasing (five items) were all adapted from Zhu et al. (2008). Meanwhile, the indicators of green marketing (five items) were adapted from Rubel et. al.,(2022). For investment recovery (five items), all were adapted from Zhu et al. (2008); Zhu et al. (2013) and Tseng et al. (2019). All items mentioned were modified to fit with the purpose of the study. Lastly, organizational performance refers to performance in terms of the triple bottom line namely social performance; environmental performance; and economic performance. The indicators of social performance (five items) in this study were adopted from Habib et al., (2020) while the indicators of environmental performance (six items) and economic performance (five items) in this study were also adapted from Zhu et al. (2008). The indicators were modified to fit the purpose of the study as well.

All the indicators were assessed using a four-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (4). These items were incorporated in the survey instrument. The study placed emphasis on procedures for data collection, including the study's objective, questionnaire administration, and ethical considerations. The confidentiality of all participants were duly acknowledged. Involvement in the study will be entirely voluntary, with respondents having the option to withdraw at any point without concerns about bias.

Table 1 displays the results of Cronbach's Alpha for the adapted survey questionnaire. The reliability test results show that the adapted survey questionnaire has an Excellent consistency rating with an overall Cronbach's Alpha value of 0.965. All individual variables also showed excellent ratings with a value of 0.927, 0.912 and 0.950 for Strategic Orientation, Green Supply Chain Management Practices, and Organizational Performance, respectively.

Worthy to note that while the overall reliability of the instrument is Excellent, each variable has sub variables that are rated as Acceptable, Good and Excellent. For Strategic Orientation, it was confirmed by the Acceptable results from Green entrepreneurial orientation (0.792), Good results form Market orientation (0.828), and Excellent results from Technology Orientation (0.924); for Green supply chain management practices, it was confirmed by the Acceptable results from Internal environmental management (0.731), Good results from Green Purchasing (0.811), Green Marketing (0.848), and Investment Recovery (0.850); for Organizational Performance, Good results from Social Performance (0.827), Excellent results from Environmental Performance (0.954) and

Economic Performance (0.940). Therefore, the survey questionnaire can be considered to have established a high level of reliability, thus, the researcher can now proceed to the actual survey using the aforementioned instrument.

**Table 1**  
*Cronbach's Alpha for the Adapted Survey Questionnaire*

Item	Cronbach Alpha	Remarks
Strategic Orientation, Green Supply Chain Management Practices and Organizational Performance	0.965	Excellent
Per Variable		
Strategic Orientation	0.927	Excellent
Green Entrepreneurial Orientation	0.792	Acceptable
Market Orientation	0.828	Good
Technological Orientation	0.924	Excellent
Green Supply Chain Management Practices	0.912	Excellent
Internal Environmental Management	0.731	Acceptable
Green Purchasing	0.811	Good
Green Marketing	0.848	Good
Investment Recovery	0.850	Good
Organizational Performance	0.950	Excellent
Social Performance	0.827	Good
Environmental Performance	0.954	Excellent
Economic Performance	0.940	Excellent

George and Malley (2003) provide the following rules of thumb “>0.90 – Excellent, >0.80 – Good, >0.7 – Acceptable, >0.60 – Questionable, >0.50 – Poor, and <0.50 – Unacceptable”

**Data Gathering Procedure** - The study employed a total enumeration process wherein the respondents were chosen based on certain criteria. The researcher deliberately selected respondents for this study to ensure rational judgment or answers to the research questions and to be able to achieve the objective of the research. The researcher initiated the data gathering process by sending requests to participate in the survey to various HEIs' representatives via email. The request included a brief introduction of the research topic and the purpose of the study. The letter also includes a copy of the approved questionnaire and ethical considerations. Upon receiving approval, the researcher gained permission to proceed with data collection. There were two options given to participants in relation to answering the survey questionnaire. One was through an online google form and the other is through a hard copy. Ample time was given to all respondents to eliminate any unfair pressure in answering the questionnaire. 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 of this research and ensured the confidentiality and anonymity of their responses.

**Data Analysis** - Weighted mean and rank were used to determine HEI's strategic orientation in terms of green entrepreneurial orientation, market orientation, and technology orientation; to assess the green supply chain management practices in terms of internal environmental management, green purchasing, green marketing, and investment recovery; and to assess the organizational performance in terms of: social performance, environmental performance and economic performance. The result of the Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used as part of the non-parametric tests to determine the significant relationship. Pearson Correlation and Hierarchical Multiple Linear Regression was used to determine the research objectives. All analyses were performed using SPSS version 28.

**Ethical Considerations** - To ensure proper protocol, the researcher submitted a letter of request to the top management of the identified HEIs. The researcher ensured that the information collected from the respondents would be used specifically for research purposes only and was treated with utmost confidentiality. This was also included in the first part of the questionnaires to notify all the participants of the intent of the researcher regarding the topic. Research data were stored and secured, and confidential information would be destroyed and disposed of securely.

### 3. Results and discussion

**Table 2**

*Summary Table on HEI's Strategic Orientation*

Key Result Areas	Composite Mean	VI	Rank
Green Entrepreneurial Orientation	3.28	Agree	2
Market Orientation	3.17	Agree	3
Technology Orientation	3.35	Agree	1
Grand Composite Mean	3.27	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

As per table 2, the top ranked key result area is the technology orientation with a composite mean score of 3.35 which respondents strongly agree that the HEIs has a positive orientation towards technology and it places a strong emphasis on technology as part of its strategic orientation. This suggests that the emphasis on technology likely reflects the institution's recognition of the critical role that technological advancements play in maintaining competitiveness and driving innovation in today's educational landscape. These findings align with the assertions of Ali et al. (2016), who emphasize the considerable investment in technological orientation with the expectation of favorable returns. Technological orientation emphasizes the importance of offering technologically superior products and services to meet consumer preferences, prompting firms to allocate resources towards research and development, technology acquisition, and sophisticated production methods. Technology-oriented firms, committed to innovation and advanced technologies, gain a competitive edge by delivering innovative and differentiated offerings, thus contributing to superior performance. Overall, technological proficiency is deemed essential for achieving high firm performance, necessitating firms to anticipate, adopt, and leverage technological advancements. Additionally, Agyapong et al. (2023) stress the imperative of a technology-oriented approach in enhancing profitability and improving business unit management efficiency, further underscoring the pivotal role of technology in fostering economic sustainability for organizations.

It was then followed by green entrepreneurial orientation. Its composite mean is 3.28 likewise suggests that respondents agree that the institution has a positive orientation towards green entrepreneurial practices. This implies that the HEI is actively engaged in adopting sustainable practices, aligning with the growing global emphasis on sustainability and environmental responsibility. This may stem from the increasing pressure on institutions to contribute to environmental preservation while simultaneously pursuing innovative and entrepreneurial opportunities. This is consistent with the findings of Jiang et al. (2018), who characterize green entrepreneurial orientation as a dynamic capability that drives innovation and competitive advantage in the socio-ecological economy. The third in rank among the key result areas is the market orientation with a composite mean score of 3.17. This implies that, on average, respondents agree that the institution demonstrates a market-oriented strategic orientation. Although it ranks lower than technology and green entrepreneurial orientation, market orientation still represents an important aspect of the institution's strategic approach, focusing on understanding and responding to market needs and customer preferences. This orientation is crucial in ensuring that the institution remains relevant and competitive in the educational sector by aligning its offerings with market demands.

**Table 3**

*Summary Table on Green Supply Chain Management Practices*

Key Result Areas	Composite Mean	VI	Rank
Internal Environmental Management	3.11	Agree	2
Green Purchasing	3.09	Agree	3
Green Marketing	3.08	Agree	4
Investment Recovery	3.21	Agree	1
Grand Composite Mean	3.12	Agree	

Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree

The summary on green supply chain management practices presented in Table 3 reveals an overall positive

response among respondents regarding the institution's adherence to environmentally friendly practices. The grand composite mean, derived from the four key result areas, stands at 3.12, affirming an overall agreement among respondents about the institution's commitment to green supply chain management practices. Notably, investment recovery stands out with the highest composite mean of 3.21, holding the top position. The data suggests a particularly strong affirmation for investment recovery, showcasing the institution's proficiency in this facet.

Internal environmental management, with a composite mean of 3.11, secures the second position among the four key result areas, indicating a substantial consensus that the institution excels in this aspect. Green purchasing, positioned third with a composite mean of 3.09, and green marketing, ranked fourth at 3.08, also garner agreement among respondents, albeit with slightly lower scores.

Despite slightly lower scores, internal environmental management, green purchasing, and green marketing contribute positively to the institution's comprehensive and environmentally conscious approach. In conclusion, the institution demonstrates a positive overall orientation towards green supply chain management practices, with a notable strength in investment recovery and a holistic commitment to environmental responsibility.

**Table 4**  
*Summary Table on Organizational Performance*

Key Result Areas	Composite Mean	VI	Rank
Social Performance	3.38	Agree	1
Environmental Performance	3.29	Agree	2
Economic Performance	3.20	Agree	3
Grand Composite Mean	3.29	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 4 summarizes the organizational performance in relation to the three key result areas namely social performance, environmental performance, and economic performance including ratings, verbal interpretation and ranks. The grand composite mean, calculated based on the mean scores across all three key result areas stands at 3.29. It indicates overall agreement among respondents regarding the institution's positive organizational performance. This suggests a balanced approach where the institution excels in addressing social, environmental, and economic aspects of responsibility.

Social performance emerges as the top-ranked key result area, boasting the highest composite mean of 3.38, reflecting the strongest agreement among respondents regarding the institution's success in meeting social responsibilities. This high score suggests that the institution is perceived as excelling in social performance, likely due to its initiatives and impact on community health and safety. Kumar et al. (2018) support this finding by emphasizing the role of educational institutions in fostering positive social change through sustainable practices. Their research highlights how universities can lead in social responsibility by implementing initiatives that benefit both the institution and its community.

Environmental performance closely follows as the second-ranked key result area, with a composite mean of 3.29, indicating a commendable performance in environmental responsibility. This shows that respondents view that the institution is dedicated to making meaningful contributions to environmental conservation and responsible resource management.

Economic performance, while slightly lower in mean score at 3.20, still falls within the Agree range, demonstrating positive perceptions of the institution's economic responsibility especially in making significant efforts to reduce costs associated with energy consumption, materials purchasing, waste management, and environmental compliance. This low score could be attributed to the challenges associated with balancing economic goals with social and environmental responsibilities. Kumar et al. (2018) discuss how economic performance often lags behind social and environmental performance due to the complex nature of integrating sustainable economic practices. They argue that economic responsibilities can be challenging to fulfill

effectively while maintaining strong social and environmental performance.

**Table 5***Relationship Between Strategic Orientation and Green Supply Chain Management Practices*

Variables	rho	p-value	Interpretation
<b>Green Entrepreneurial Orientation</b>			
Internal Environmental Management	0.683**	<.001	Highly Significant
Green Purchasing	0.691**	<.001	Highly Significant
Green Marketing	0.696**	<.001	Highly Significant
Investment Recovery	0.641**	<.001	Highly Significant
<b>Market Orientation</b>			
Internal Environmental Management	0.664**	<.001	Highly Significant
Green Purchasing	0.582**	<.001	Highly Significant
Green Marketing	0.620**	<.001	Highly Significant
Investment Recovery	0.576**	<.001	Highly Significant
<b>Technology Orientation</b>			
Internal Environmental Management	0.568**	<.001	Highly Significant
Green Purchasing	0.514**	<.001	Highly Significant
Green Marketing	0.581**	<.001	Highly Significant
Investment Recovery	0.506**	<.001	Highly Significant

\*. Correlation is significant at the 0.01 level

As seen in the Table 5, the computed rho-values ranging from 0.506 to 0.696 indicate a moderate to strong direct relationship among the sub variables of strategic orientation (green entrepreneurial orientation, market orientation, technology orientation) and green supply chain management practices (internal environmental management, green purchasing, green marketing, investment recovery).

There is a statistically significant relationship between strategic orientation and green supply chain management practices because the obtained p-values were less than 0.01. This suggests that institutions with stronger orientations towards green practices, whether in entrepreneurial, market-focused, or technology-oriented aspects, tend to exhibit more environmentally conscious practices in their supply chain management. This reinforces the importance of strategic orientation in influencing and promoting green initiatives within the supply chain.

The analysis reveals strong and highly significant positive correlations between green entrepreneurial orientation and all green supply chain management practices (internal environmental management, green purchasing, green marketing and investment recovery) with a rho-value of 0.683, 0.691, 0.696 and 0.641 respectively. Institutions with a stronger focus on green entrepreneurship are associated with increased emphasis on internal environmental management, green purchasing, green marketing, and investment recovery. This suggests that a proactive green entrepreneurial mindset positively influences various environmentally conscious practices within the supply chain.

Similarly, market orientation demonstrates strong positive correlations with Internal environmental management (0.664), green purchasing (0.582) Green Marketing (0.620) , and Investment Recovery (0.576). This suggests that Institutions with a heightened market-oriented focus tend to engage more in environmentally friendly practices across these dimensions, emphasizing the interconnectedness between market-driven strategies and green supply chain management practices.

Technology orientation exhibits strong positive correlations with all green supply chain management practices (internal environmental management, green purchasing, green marketing and investment recovery) garnering rho-values of 0.568, 0.514, 0.581 and 0.506 respectively. This implies that as institutions increase their focus on technology, there is a notable rise in internal environmental management, green purchasing, green marketing, and investment recovery practices. This underscores the influential role of technology in driving environmentally conscious behaviors within the supply chain.

The findings collectively suggest that institutions emphasizing green entrepreneurial, market, and



technology orientations are more likely to adopt and enhance practices related to internal environmental management, green purchasing, green marketing, and investment recovery, contributing to a greener and more sustainable supply chain. The statistically significant relationships underscore the importance of aligning strategic orientations with green supply chain initiatives. A comprehensive adoption of green practices, encompassing internal management processes, purchasing, marketing, and investment recovery, emerges as a key driver for organizations looking to enhance their environmental performance. The available body of research consistently demonstrates a positive and highly significant relationship between strategic orientation and the adoption of green SCM practices. In particular, studies by Habib (2020) and Habib et al. (2021) contribute valuable insights into the impact of green entrepreneurial orientation and market orientation on green SCM practices. Habib's (2020) study highlights the influential role of green entrepreneurial orientation in fostering green SCM practices. Findings depicted a direct and positive relationship between green entrepreneurial orientation and green SCM practices, underlining the crucial role of a green entrepreneurial mindset in driving environmentally conscious supply chain initiatives.

Furthermore, findings of the study showed that green supply chain management practices act as partial mediators, indicating their significant involvement in the relationship between green entrepreneurial orientation and broader sustainable outcomes. Expanding the focus, Habib et al. (2021) bring market orientation into the discussion. This study establishes a positive impact of both green entrepreneurial orientation and market orientation on green SCM practices. The findings suggest that firms with strong capabilities in both green entrepreneurial orientation and market orientation are more likely to engage in effective green SCM practices. Additionally, the study identifies green SCM practices as partial mediators, emphasizing their role in linking strategic orientations to sustainable firm performance. Bamgbade et al. (2023) also contribute to the discourse by exploring the effects of regulatory pressure and technology orientation on green SCM in the context of construction organizations in Malaysia. According to the study, technology orientation and green supply chain management techniques are positively correlated highlighting the relevance of technological innovation in shaping green supply chain initiatives. Furthermore, Nassani et al. (2023) and Ali et al. (2016) bring an additional layer to the discussion by delving into the technology orientation's effect on firm performance.

Nassani et al. (2023) highlight that technology-oriented firms, engaged in research, development, and the latest technology implementation, contribute to innovation performance. Ali et al. (2016) emphasize the positive correlation between Technological Orientation, new product development, and firm performance, particularly in dynamic environments with rapid technological advancements. Despite the richness of these insights, it is crucial to acknowledge the limited depth of existing research in this specific area, which poses a challenge in drawing comprehensive inferences. While the available studies consistently support a positive relationship between strategic orientation and GSCM practices, further research is needed to explore additional dimensions and uncover the nuanced dynamics of this relationship. Despite this limitation, the existing body of work collectively underscores the pivotal role of strategic orientations, particularly green entrepreneurial orientation, market orientation and technology orientation, in driving the adoption of environmentally sustainable practices within supply chain management. This emphasis on green practices aligns with the growing importance of sustainability in contemporary business strategies.

**Table 6**  
*Relationship Between Strategic Orientation and Organizational Performance*

Variables	rho	p-value	Interpretation
<b>Green Entrepreneurial Orientation</b>			
Social Performance	0.685**	<.001	Highly Significant
Environmental Performance	0.645**	<.001	Highly Significant
Economic Performance	0.636**	<.001	Highly Significant
<b>Market Orientation</b>			
Social Performance	0.530**	<.001	Highly Significant
Environmental Performance	0.543**	<.001	Highly Significant
Economic Performance	0.535**	<.001	Highly Significant

Technology Orientation			
Social Performance	0.591**	<.001	Highly Significant
Environmental Performance	0.548**	<.001	Highly Significant
Economic Performance	0.579**	<.001	Highly Significant

\*. Correlation is significant at the 0.01 level

As presented in Table 6, the computed rho-values ranging from 0.530 to 0.685 indicate a moderate to strong direct relationship among the sub variables of strategic orientation (green entrepreneurial orientation, market orientation, technology orientation) and organizational performance (social, environmental, and economic performance). There is a statistically significant relationship between strategic orientation and organizational performance because the obtained p-values were less than 0.01. This means that the highly significant relationship exists and indicates that as the institution's strategic orientation increases, organizational performance also increases.

Focusing on green entrepreneurial orientation, the strong positive correlations with social performance (0.685), environmental performance (0.645), and economic performance (0.636) highlight that as the institution's commitment to green entrepreneurial practices increases, there is a significant and simultaneous improvement in social, environmental, and economic dimensions of organizational performance. This dimension exhibits the highest rho value among the three strategic orientations.

For market orientation, the correlations with social performance (0.530), environmental performance (0.543), and economic performance (0.535) are similarly strong and highly significant. This underscores that as the institution's focus on market-oriented strategies intensifies, there is a notable enhancement in social, environmental, and economic aspects of organizational performance.

Similarly, technology orientation exhibits strong positive correlations with social performance (0.591), environmental performance (0.548), and economic performance (0.579). This emphasizes the influential role of technology in driving positive outcomes across social, environmental, and economic dimensions within the organization.

The findings collectively underscore a consistent and strong positive association between strategic orientations, whether focused on green entrepreneurship, market orientation, or technology and various dimensions of organizational performance. Institutions with higher levels of these strategic orientations are more likely to achieve superior organizational performance, contributing positively to social responsibility, environmental sustainability, and economic success. The findings presented in various studies consistently affirm a positive and highly significant correlation between organizational performance and strategic orientations. Masa'deh et al. (2018) laid the foundation for this understanding, emphasizing the beneficial link between strategic orientations and organizational performance. Examining specific orientations, the research explores the impact of green entrepreneurial orientation, market orientation, and technology orientation on organizational success. Green entrepreneurial orientation emerges as a potent driver of organizational performance, as revealed by several studies. Olawale (2019) establishes the significant positive relationship of green entrepreneurial orientation with social, environmental, and economic dimensions of organizational performance. This is further supported by Ye et al. (2022) and Tze et al. (2022), both highlighting green entrepreneurial orientation's direct and substantial impact on sustainable performance across various facets.

The study by Jiang et al. (2018) reinforces the positive influence of green entrepreneurial orientation on environmental and economic performance. Additionally, Habib (2020) indicated that green entrepreneurial orientation has a significant indirect effect on economic and environmental performance. This not only supports the findings but underscores the nuanced pathways through which green entrepreneurial orientation contributes to organizational success. Masa'deh et al. (2018) reinforces the significance of market orientation in fostering organizational development. Despite the absence of the term "green" in the description of entrepreneurial orientation, the results highlight the importance of incorporating diverse strategic orientations to augment organizational performance. Lastly, technological orientation emerges as a crucial factor, particularly in dynamic

environments with rapid technological advancements. Ali et al. (2016) emphasize the positive correlation between technological orientation and firm performance, showcasing the relevance of technological proficiency in achieving high organizational performance. This aligns with the interconnectedness of strategic orientations, emphasizing the need for adopting green and technology-focused strategies to drive overall organizational excellence.

**Table 7**

*Relationship Between Green Supply Chain Management Practices and Organizational Performance*

<b>Variables</b>	<b>rho</b>	<b>p-value</b>	<b>Interpretation</b>
<b>Internal Environmental Management</b>			
Social Performance	0.590**	<.001	Highly Significant
Environmental Performance	0.643**	<.001	Highly Significant
Economic Performance	0.631**	<.001	Highly Significant
<b>Green Purchasing</b>			
Social Performance	0.523**	<.001	Highly Significant
Environmental Performance	0.580**	<.001	Highly Significant
Economic Performance	0.617**	<.001	Highly Significant
<b>Green Marketing</b>			
Social Performance	0.596**	<.001	Highly Significant
Environmental Performance	0.663**	<.001	Highly Significant
Economic Performance	0.667**	<.001	Highly Significant
<b>Investment Recovery</b>			
Social Performance	0.648**	<.001	Highly Significant
Environmental Performance	0.662**	<.001	Highly Significant
Economic Performance	0.638**	<.001	Highly Significant

\*. Correlation is significant at the 0.01 level

Table 7 depicted the computed rho-values ranging from 0.523 to 0.667 relationship among the sub variables of green supply chain management practices (internal environmental management, green purchasing, green marketing and investment recovery) and organizational performance (social, environmental and economic performance) which indicate a moderate to strong direct relationship. There is a statistically significant relationship between green supply chain management practices and organizational performance because the obtained p-values were less than 0.01. This means that a highly significant relationship exists and suggests that higher adoption of green supply chain practices is associated with better organizational performance across social, environmental, and economic dimensions.

Results revealed that internal environmental management has a highly significant relationship with the variables of organizational performance namely social, environmental and economic performance having obtained rho values of 0.590, 0.643, 0.631 respectively. This highlights the integral role of internal environmental practices in shaping positive organizational outcomes. This implies that as institutions prioritize and enhance their internal environmental management, they experience corresponding improvements in social responsibility, environmental sustainability, and economic performance.

Similarly, green purchasing demonstrates a highly significant relationship with social, environmental, and economic performance obtaining a rho values of 0.523, 0.580, 0.617 respectively. This indicates that

organizations emphasizing environmentally friendly procurement practices tend to exhibit enhanced social responsibility, environmental sustainability, and economic performance. The strength of these correlations suggests a substantive and positive impact of green purchasing on organizational outcomes.

Green marketing also reveals highly significant correlations with social, environmental, and economic performance garnering a rho value of 0.596, 0.663, 0.667 respectively. This underscores the importance of environmentally conscious marketing practices in contributing to superior organizational performance across various dimensions. Organizations that actively engage in green marketing activities show significant improvements in three dimensions of organizational performance.

Investment recovery, with correlations ranging from 0.638 to 0.662, also exhibits highly significant relationships with social, environmental, and economic performance. This implies that organizations that effectively manage and recover investments in an environmentally conscious manner are likely to experience positive outcomes in social, environmental, and economic dimensions of organizational performance.

The results point to a constant and strong positive correlation between organizational performance and green supply chain management practices. The study supports the notion that higher adoption of environmentally friendly practices within the supply chain positively influences an organization's social responsibility, environmental sustainability, and economic performance. The results emphasize the importance of integrating green practices into various aspects of the supply chain and suggest that such efforts contribute significantly to organizational success across multiple dimensions. The double asterisks (\*\*) denote the strong statistical significance of these relationships at the 0.01 level, reinforcing the reliability of the findings.

Results of the study was also confirmed by other researches stating that GSCM practices has a direct, positive association with organizational performance specifically social performance (Pattnaik et. al.,2019; Qorri et al, 2018; Zhu et. al.,2004), environmental performance (Choi et. al.,2015; Sahoo et. al.,2020; Habib et al., 2020; Saeed et al, 2018; Qorri et al, 2018; Zhu et. al.,2004), and economic performance (Choi et. al.,2015; Habib et al., 2020; Saeed et al, 2018; Qorri et al, 2018; Pattnaik et. al.,2019; Zhu et. al.,2004). However, other authors share a different result with respect to other specific practices. Sahoo et. al.,(2020) revealed that green purchasing has no significant impact on all three dimensions of organizational performance while Yildiz et. al.,(2019) mentioned that green purchasing and investment recovery has no significant relationship with economic performance. Zhu et. al.,(2004) found in their study that the only GSCM practice that has no significant relationship with negative economic performance is investment recovery. This could be associated with the idea that GSCM practices were only at the early stage of implementation.

**Table 8**

*Mediating Effect of GSCM Practices on the Relationship between Strategic Orientation and Organizational Performance*

	r <sup>2</sup>	F-value/Sig	Unstandardized Coefficients	Beta	P-value	Interpretation
Constant			0.815		0.000	Significant
Strategic Orientation	0.563	280.976 /(0.000)	0.757		0.000	Significant
Constant			0.519		0.000	Significant
Strategic Orientation			0.296		0.000	Significant
GSCM Practices	0.673	223.592 /(0.000)	0.577		0.000	Significant

*Dependent Variable: Organizational Performance*

One of the objectives of this study is to establish a basis for sustainable supply chain practices within higher education institutions. Although extensive literature exists on strategic orientation, green supply chain management practices, and organizational performance, the majority of research has predominantly concentrated on manufacturing industries, service sectors like hospitals and hotel operation. Consequently, the researcher has developed a novel research designed specifically for higher education institutions, effectively bridging this research gap. This endeavor not only addresses the identified gap, but also yields valuable insights that can

strengthen environmentally conscious operations within higher education institutions. The researcher used hierarchical multiple linear regression to examine the mediation effects of GSCM practices.

Table 8 presents findings of the study exploring the mediating influence of green supply chain management practices on the relationship between strategic orientation and organizational performance. Firstly, the constant term in regression analysis represents the value of the dependent variable (organizational performance) when all independent variables are zero. It's statistically significant, indicating that the model's intercept is significantly different from zero. Regarding strategic orientation, the coefficient is 0.757, and it is statistically significant with a p-value of 0.000. This suggests that strategic orientation has a significant positive effect on organizational performance. This also implies that for every unit increase in strategic orientation, organizational performance is projected to rise by 0.757 units, revealing its pivotal role in driving organizational success.

Similarly, GSCM practices exhibit a significant positive effect on organizational performance, as indicated by its coefficient of 0.577 and a p-value of 0.000. This implies that improving GSCM procedures can result in considerable gains in organizational effectiveness. Since both strategic orientation and GSCM practices have significant positive effects on organizational performance, the study revealed that GSCM practices partially mediate the relationship between strategic orientation and organizational performance. This means that part of the effect of strategic orientation on organizational performance is explained by its influence on GSCM Practices.

**Table 9**

*Indirect Effects, Direct Effects and Total Effects*

	<b>Total Effects</b>	<b>Direct effects</b>	<b>Indirect Effects</b>	<b>Sobel Test (t-statistic)</b>	<b>P-Value</b>	<b>Interpretation</b>
SO→GSCMP→OP	0.7569	0.2962	0.4608	7.939	0.000	Significant

To determine if the mediation effect is significant, this study performed a Sobel test to evaluate the effect (direct and indirect) of the strategic orientation variable on performance through green SCM. As shown in Table 9, the effect is significant with a p-value of <0.05 garnering a direct and indirect effect of 0.2962 and 0.4608 respectively.

The results suggest that both strategic orientation and GSCM Practices play important roles in enhancing organizational performance. Strategic orientation directly influences organizational performance, while GSCM practices partially mediate this relationship, indicating the significance of integrating environmentally sustainable practices into strategic decision-making processes to improve organizational performance .

This finding aligns with research by Jalili et al. (2022) and Agyapong et al. (2023), who also highlight the mediating effect of GSCM practices on the association between strategic orientation and performance. For instance, Jalili et al. (2022) focus on GSCM practices' mediation in Qazvin teaching hospitals, illustrating the positive impact of green SCM initiatives on organizational performance. Similarly, Agyapong et al. (2023) explore GSCM practices' mediation on environmental orientation and sustainability performance in Ghanaian SMEs, emphasizing the indirect correlation between environmental orientation and performance facilitated by GSCM practices. Furthermore, the studies by Habib et al. (2020 and 2021) in the garments and textile manufacturing sector in Bangladesh corroborated with the findings of this study. Their research reveals the influential role of GSCM practices in enhancing sustainable firm performance, particularly driven by green entrepreneurial orientation and market orientation. Additionally, Habib et al. (2021)'s subsequent study highlights the mediating effect of GSCM practices between green entrepreneurial orientation and firm performance, aligning with the observed mediation effect in the present study. These collective findings emphasize the significance of prioritizing GSCM practices for organizational success, particularly in improving sustainability performance.

## Proposed Framework for Sustainable Campus Operation

Based on the study's findings, the researcher developed a framework for sustainable campus operation of private HEIs using the variables strategic orientation, green supply chain management (GSCM) practices, and organizational performance.

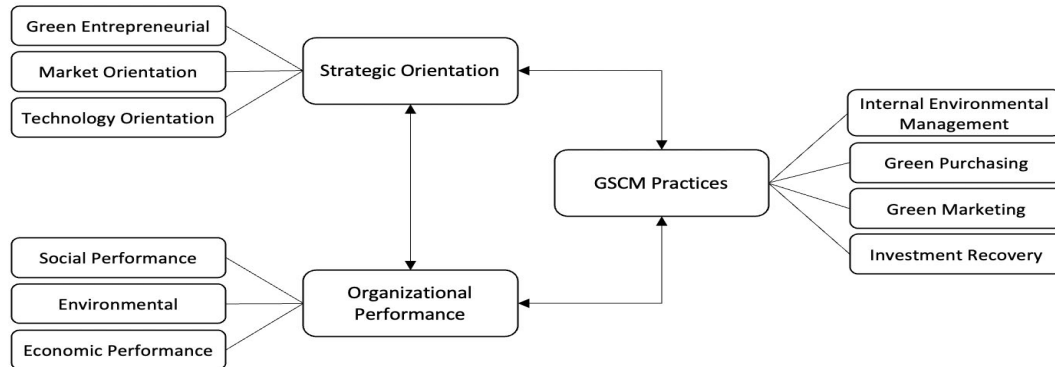


Figure 1: Proposed Sustainable Campus Operation Framework

Figure 1 shows the relationships among the three variables of the study. Green supply chain management (GSCM) practices, and organizational performance are the dependent variables while strategic orientation is the independent variables. For the strategic orientation, the dimensions include green entrepreneurial orientation, market orientation and technology orientation. For green supply chain management practices, the dimensions are internal environmental management, green purchasing, green marketing and investment recovery. Lastly, for organizational performance, the dimensions include the following: social performance, environmental performance, and economic performance.

The interconnectedness between the three variables providing a clear visualization of their dynamic relationships is presented in Figure 1. Positioned at the top, strategic orientation serves as the foundational element influencing both GSCM practices and organizational performance. It is depicted as influencing both variables, denoted by the double-headed arrows. Situated below strategic orientation is organizational performance. Both variables are connected by a double-headed arrow suggesting that they mutually influence each other. Additionally, there's a double-headed arrow between organizational performance and GSCM practices that signifies their bidirectional relationship, highlighting the interplay between the adoption of GSCM practices and the resulting organizational performance outcomes.

Data analysis also reveals an important mediating role of GSCM practices. Specifically, finding shows that green supply chain management practices partially mediate the effects of strategic orientation on organizational performance. The mediation analysis using the Sobel Test is shown in Tables 9. This suggests that strategic orientation plays a significant role in affecting organizational performance, but part of it should be channeled through the adoption and execution of GSCM practices.

The framework provides valuable insights into the critical interplay among strategic orientation, GSCM practices, and organizational performance in the context of sustainable HEI operations. It underscores the importance of aligning strategic priorities with sustainability goals and emphasizes the transformative potential of GSCM practices in enhancing organizational performance.

HEIs operate within a unique context characterized by the provision of intangible services, variability in demand, and extensive stakeholder engagement. These distinctive characteristics shape the landscape of green supply chain management within HEIs, presenting both challenges and opportunities for sustainable campus

operations. The provided insights for HEIs in relation to sustainable campus operations encompass a range of recommendations that are aligned with the result of the study and with the established principles of sustainability and supply chain management. While some of these concepts may not be entirely new, their application within the specific context of HEIs presents novel perspectives and actionable strategies for driving sustainable change. Below presents the breakdown of each insight and its potential impact on effecting change in HEIs.

1. **Strategic Orientation Alignment.** While the concept of aligning strategic orientation towards sustainability is not new, the emphasis on green entrepreneurial, market, and technology orientations within HEIs represents a nuanced approach. This alignment can drive a comprehensive and integrated approach to sustainability across campus operations, fostering innovation and resilience. HEIs can achieve this by integrating green entrepreneurial, market, and technology orientations into their organizational culture and decision-making processes.

2. **Prioritizing Internal Environmental Management and Enhancing Investment Recovery.** Prioritizing internal environmental management and enhancing investment recovery practices within HEIs is crucial for reducing waste, improving energy efficiency, and demonstrating sustainability leadership. Involvement of mid-level and top management is pivotal, ensuring integration of sustainable practices across the institution. By committing to these efforts, HEIs not only reduce their environmental footprint but also strengthen financial sustainability. This dual focus fosters a culture of environmental responsibility and drives positive impacts on both the environment and finances

3. **Emphasis on Green Purchasing and Marketing.** While the importance of green purchasing and marketing practices is widely recognized, their specific application within HEIs can drive significant changes in supply chain practices and consumer behavior. HEIs can establish and promote a unified procurement policy that prioritizes suppliers with certified sustainable practices and products. Additionally, they can showcase their commitment to sustainability through marketing campaigns highlighting eco-friendly initiatives such as zero-waste events and organic campus dining options. By prioritizing environmentally friendly products and promoting sustainability initiatives, HEIs can influence market demand and drive positive environmental impacts.

4. **Leveraging Technology for Sustainability.** The emphasis on leveraging technology to drive sustainability reflects the growing recognition of digital solutions in optimizing resource utilization and implementing sustainable practices. HEIs can harness technology to streamline operations, monitor energy usage, and implement innovative solutions for sustainable campus management. By further leveraging technology, HEIs can implement innovative solutions for classroom management and administrative operations, utilizing various platforms such as energy management systems and digital tools for monitoring students and resource consumption.

5. **Integration of Green Practices into Organizational Culture .** Fostering a culture of environmental responsibility within HEIs involves engaging stakeholders and embedding sustainability principles into decision-making processes. HEIs can integrate sustainability education into their curriculum across various disciplines, thereby fostering a culture of environmental responsibility among students, faculty, and staff. By incorporating green practices into the organizational culture, HEIs can empower individuals to adopt sustainable behaviors and collectively drive action towards sustainability goals.

6. **Recognition of GSCM Practices as Mediators.** Recognizing the mediating role of green supply chain management practices highlights the interconnectedness between strategic orientation, green supply chain management practices, and organizational performance. HEIs can create a consortium to implement a collaborative procurement strategy for shared resources such as laboratory equipment, office supplies, and other common commodities leveraging economies of scale and reducing environmental impact through bulk purchasing and centralized distribution channels. This collaborative approach can enhance supply chain efficiency, reduces costs, and supports sustainability goals across multiple institutions. HEIs can enhance their

overall performance and contribute to broader sustainability objectives by prioritizing green supply chain management practices as mediators between strategic orientation and organizational performance.

To support the implementation of these insights, HEIs are recommended to allocate funding towards sustainability initiatives, provide training and capacity building programs, foster partnerships, develop policies prioritizing sustainability, raise awareness about sustainability issues, and establish mechanisms for monitoring and evaluating sustainability performance.

#### 4. Conclusions and recommendations

There is an overall agreement among respondents regarding the institution's strategic orientation. Moreover, on average, respondents perceive a positive strategic orientation in terms of green entrepreneurial orientation, market orientation, and technology orientation. There is a positive agreement among respondents regarding the institution's adherence to green supply chain management practices in terms of internal environmental management, green purchasing, green marketing, and investment recovery. Data also revealed a positive agreement among respondents regarding the institution's positive organizational performance suggesting a balanced approach where the institution excels in addressing social, environmental, and economic aspects. There is a high significant relationship between strategic orientation and green supply chain management and organizational performance. Data indicates that GSCM practices function as a partial mediator in the relationship between strategic orientation and organizational performance. A sustainable campus operation framework was developed.

HEIs leadership and management teams may prioritize sustainability by fostering a strategic orientation across all levels, integrating green supply chain management practices into campus operations, and promoting an environmentally conscious mindset to ensure compliance with regulations and drive innovation. HEIs may foster collaboration between sustainability and marketing departments to promote collective sustainability efforts, integrate continuous monitoring and evaluation to assess GSCM practices, prioritize resource efficiency, and communicate sustainable initiatives effectively to stakeholders, thereby cultivating a culture of environmental responsibility and innovation. Heads of information and technology departments, and innovation centers may invest in technology to drive innovation and enhance technological proficiency to support the implementation of GSCM practices, resource efficiency, and energy conservation efforts. The proposed sustainable campus operation framework may be recommended for non-stock, non-profit HEIs to integrate sustainability into their supply chain management practices, to improve environmental stewardship, reduce costs, and enhance overall performance. Future researchers can explore the influence of strategic orientation on the green supply chain management practices and organizational performance within other non-profit educational institutions while also considering other dimensions of GSCM. Practices not included in this paper can be added in future studies.

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