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Green Supply Chain Management Practices in Higher Educational Institutions; an inclusive Review of Research and Future Directions

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Abstract

The integration of Green Supply Chain Management practices in higher educational institutions (HEIs) has garnered increasing attention as these institutions. The article examined the diverse factors that influence the adoption and implementation of GSCM practices in HEIs, such as regulatory compliance, top management commitment, environmental awareness, stakeholder pressure, financial considerations, technological advancements, supply chain collaboration, educational and research programmes, institutional culture, and monitoring and reporting mechanisms. The study endeavors to offer actionable insights for effective implementation and to provide a comprehensive comprehension of the drivers and barriers to GSCM in the context of HEIs by examining these factors. The study revealed the significance of an integrated sustainability approach, emphasizing the role of education, stakeholder engagement, and leadership in the development of green supply chain initiatives. By addressing financial constraints, resistance to change, curriculum integration, institutional inertia, lack of standardized metrics, and external policy barriers, HEIs can enhance their sustainability efforts. Strategic planning, strong leadership, community engagement, and the development of robust assessment tools are critical to overcoming these obstacles and advancing sustainability in higher education. As HEIs continue to evolve, their commitment to sustainability will be crucial in shaping a more sustainable future for society.

Keywords: Environmental awareness, stakeholder pressure, financial considerations, technological advancements, supply chain collaboration, educational and research programs.

Introduction

The adoption of (GSCM) practices in higher education institutions (HEIs) has a substantial impact on a variety of performance dimensions. Optimal resource management, which involves the reduction of waste and the implementation of energy-efficient systems, enhances operational efficiency and reduces utility costs. Financially, although initial investments in green technologies may be substantial, they frequently lead to long-term savings by reducing ongoing operational expenses and gaining access to financial incentives or grants. Furthermore, the implementation of GSCM practices can enhance the institutional reputation by showcasing a dedication to sustainability, which can attract potential students and fortify community connections. Nevertheless, the implementation of GSCM practices also presents challenges, including the necessity for effective change management and the complexity of integration. In general, the strategic implementation of GSCM practices in higher education institutions can result in improved operational efficiency, cost reductions, and a more robust institutional image, thereby aligning educational objectives with broader sustainability objectives.(GSCM) has gained significant traction in recent years as businesses and researchers alike recognize the necessity of integrating environmental considerations into traditional supply chain practices. One of the critical components of GSCM is green procurement, which involves selecting suppliers based on their environmental performance and their ability to provide eco-friendly materials. Studies have shown that companies implementing green procurement practices can reduce their carbon footprint and promote sustainability throughout their supply chain. Zhu, Sarkis, and Lai (2008) highlighted how firms that prioritize green procurement not only benefit from improved environmental performance but also gain competitive advantages through enhanced brand image and customer loyalty. In addition to green procurement, the literature emphasizes the importance of green manufacturing processes. These processes aim to minimize waste, reduce energy consumption, and lower emissions during production. Deif (2011), adopting green manufacturing not only helps in achieving regulatory compliance but also enhances operational efficiency and reduces costs in the long run. McKinnon (2010) concept of a circular economy is often linked with green supply chains, where the aim is to extend the lifecycle of products through reuse, refurbishment, and recycling. Guide and Van Wassenhove (2009) explored how companies can implement closed-loop supply chains to recover value from used products and materials, thus reducing waste and conserving natural resources. Despite the numerous benefits associated with GSCM, the literature also identifies several challenges in its implementation. The concept of Green Supply Chain Management (GSCM) is introduced as a novel approach to managing supply chains. The Internet is analysed in relation to its dual role as a disruptive and enabling tool for educators and students. Both individuals are now required to possess a high degree of computer competence. The academic institution has a significant role in both society and the environment. Several educational institutions have considered implementing green activities to promote environmental responsibility among students and workers. However, achieving full implementation of green supply chain management seems very improbable. This study report aims to differentiate the typical environmentally friendly strategies used in higher education and determine the extent of Green supply chain management techniques implemented in academic institutions. The researcher distinguished two primary categories of suppliers for colleges: teacher's suppliers and student suppliers. This finding is significant for higher education institutions as it emphasises their responsibility for ensuring a secure environment.

Research background

The complexity of integrating sustainability into the curriculum is also a significant challenge. Faculty members may lack the expertise or resources to develop and teach sustainability-related courses. To mitigate this, HEIs can provide professional development opportunities for faculty, encourage interdisciplinary collaboration, and establish centers or offices dedicated to sustainability education and research. Institutional inertia and bureaucratic hurdles can further deter sustainability efforts. The hierarchical and often slow-moving nature of HEIs can stifle innovation and impede the swift implementation of sustainability initiatives. Streamlining decision-making processes, fostering a culture of collaboration, and empowering sustainability committees or task forces can help overcome these administrative barriers. One significant barrier to sustainability in HEIs is the lack of financial resources. Implementing sustainable initiatives often

requires substantial upfront investment, whether in renewable energy systems, green building certifications, or sustainable transportation options. Many institutions face budget constraints, making it difficult to allocate funds for sustainability projects. As a result, sustainability initiatives are often sidelined in favor of more immediate financial concerns. To address this issue, HEIs can seek external funding through grants, partnerships, and alumni donations specifically earmarked for sustainability projects. This resistance may stem from a lack of awareness or understanding of sustainability, perceived inconvenience, or fear of change. Overcoming this barrier involves comprehensive education and engagement programs that highlight the benefits of sustainability, provide clear examples of successful initiatives, and involve the campus community in the planning and implementation process. Additionally, strong leadership and a clear commitment to sustainability from top administrators are essential to drive change. The lack of standardized metrics and assessment tools to measure sustainability performance is another obstacle. Without clear benchmarks and reporting frameworks, it is challenging for HEIs to track progress, identify areas for improvement, and communicate their achievements. External factors, such as regulatory and policy constraints, can also hinder sustainability in HEIs. Inconsistent or insufficient government policies and regulations related to sustainability can create uncertainty and limit the ability of institutions to plan and implement long-term sustainability strategies. Advocacy for stronger sustainability policies at local, national, and international levels, as well as active participation in policy-making processes, can help create a more supportive environment for sustainability in higher education. While there are significant deterrents to sustainability in higher education institutions, these challenges are not insurmountable.

Supply chain performance in higher education; an overview

Implementing green practices in the supply chain can have a significant impact on various aspects of HEI performance, including operational efficiency, cost management, and institutional reputation. Green Supply Chain Management (GSCM) is an environmental innovation that incorporates environmental considerations into supply chain management. GSCM has been more popular with both academics and practitioners. The education environment after the COVID-19 pandemic bears little resemblance to its previous state. From elementary school children receiving instruction from their parents to high school students engaging in fully virtual learning, and with lingering doubts regarding the reopening of institutions nationwide, one thing is clear: the one constant is unpredictability. The landscape of executive education in the supply chain field is still unclear, but providers in this area of adult education are already finding innovative ways to offer instruction, involve students, and recreate the in-person learning experience. Furthermore, it might be challenging to facilitate a Zoom meeting networking experience when a group of executives, some of whom may be direct rivals, are willing to openly discuss their strategy. For the majority of colleges, this included sending students to physically attend classrooms while also completing online courses, creating a hybrid learning experience. The COVID-19 pandemic has expedited the virtual education movement, forcing firms, colleges, and organisations to quickly rethink how they provide and receive executive education. Green supply chain management is necessary for multiple reasons, including optimising operations, improving outsourcing practices, maximising profits, enhancing curriculum development, implementing online assessment methods, ensuring high-quality outcomes, addressing competitive pressures, adapting to increasing globalisation, responding to the growing importance of E-commerce, facilitating live cloud recordings of teachings, meetings, and lectures, and managing the growing complexity of supply chains and other related interactions.

1. Operational Efficiency

Enhanced Logistics: By adopting green logistics practices, HEIs can streamline their procurement and distribution processes. This includes optimizing delivery routes, consolidating shipments, and using sustainable transportation options. These improvements can reduce delays, lower transportation costs, and minimize environmental impact.

Waste Reduction: Implementing recycling programs and waste minimization strategies helps in managing campus waste more effectively. For instance, composting organic waste from dining facilities and using recycled materials in campus operations can reduce landfill use and associated costs.

2. Cost Management

Financial Incentives and Grants: Many HEIs can access grants, incentives, and subsidies for implementing green practices. These financial supports can help offset the initial costs and provide additional funding for sustainability initiatives.

Risk Management: Green practices can help manage financial risks associated with regulatory compliance and environmental liabilities. By adhering to environmental regulations and reducing their carbon footprint, HEIs can avoid fines and mitigate risks related to environmental issues.

3. Institutional Reputation and Student Engagement

Enhanced Institutional Image: Adopting green practices boosts the reputation of HEIs as socially responsible institutions. This positive image can attract prospective students, faculty, and donors who value sustainability, enhancing the institution's appeal and competitive positioning.

Community and Alumni Relations: HEIs that actively pursue green practices can strengthen their relationships with local communities and alumni. Demonstrating a commitment to sustainability can lead to stronger community ties and increased support from alumni who value environmental stewardship.

4. Academic and Research Opportunities

Research and Innovation: Implementing green practices on campus can provide valuable opportunities for research and innovation. HEIs can use their sustainability initiatives as case studies for research, develop new sustainable technologies, and engage in collaborations with industry partners on green projects.

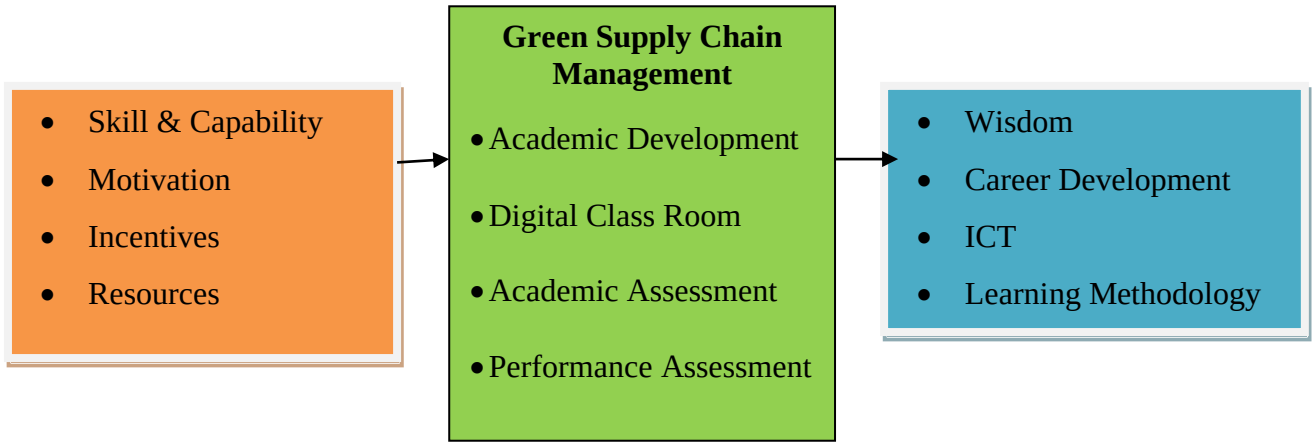
Curriculum Integration: Green practices can be integrated into academic programs and curricula, providing students with practical experience in sustainability and green supply chain management. This integration helps prepare students for careers in sustainability and related fields, enhancing the educational value of the institution.

5. Challenges and Considerations

Initial Investment and Budget Constraints: The upfront costs of implementing green practices can be a significant barrier, particularly for institutions with limited budgets. Strategic planning and seeking external funding can help overcome this challenge.

Complexity of Implementation: Integrating green practices into existing supply chains can be complex, requiring coordination across various departments and stakeholders. Effective communication, training, and change management are essential for successful implementation.

Figure: 01 Conceptual framework



Objectives

1. To identify and analyze the key factors influencing the adoption of Green Supply Chain Management practices in higher educational institutions.
2. To evaluate the role of regulatory compliance and institutional policies in promoting GSCM practices.
3. To examine the financial and technological considerations affecting GSCM adoption.
4. To explore the importance of stakeholder pressure, supply chain collaboration, and institutional culture in fostering green initiatives.
5. To provide recommendations for effective GSCM implementation in HEIs based on the findings.

Methodology of Study

Primary and secondary sources of data were employed in this investigation. A group of respondents completes a questionnaire (Google form) to obtain the fundamental data. Additionally, the researcher collected secondary data from a diverse array of sources, including newspapers, journals, books, and websites, in order to establish the theoretical and analytical framework. A sample size of 200 respondents from educational institutions was selected from the population for the study. The researcher employed a convenient sampling methodology to select the products for sampling..

Findings and Results

Organisations that have access to financial resources for environmentally-friendly projects, such as government grants, individual contributions, or internal budgets, are more inclined to use (GSCM) techniques. Moreover, the possibility of reducing costs by effectively managing resources and minimizing waste might serve as a strong incentive for institutions to adopt these practices. The implementation of GSCM may be influenced by stakeholder pressure, which includes requests from students, teachers, staff, and the community. Various variables impact the implementation of (GSCM) techniques in higher educational institutions. An essential determinant is institutional leadership and commitment, wherein the endorsement and foresight of senior executives and influential decision-makers propel the incorporation of sustainability into supply chain operations. Institutions priorities regulatory compliance and environmental policies to ensure adherence to national and local legislation concerning environmental conservation and sustainability.

Table 1
Perception towards Green Supply Chain Management practices

Sl.No.	Factors	Mean	Std. Deviation	Mean Rank
1.	Regulatory Compliance and Policies	2.39	2.975	5.63
2.	Top Management Commitment	2.69	1.242	7.83

3.	Environmental Awareness	2.54	1.198	6.51
4.	Stakeholder Pressure:	2.52	1.299	6.52
5.	Financial Considerations	2.91	1.325	7.74
6.	Technological Advancements	2.34	1.201	7.13
7.	Supply Chain Collaboration	1.82	1.008	4.43
8.	Educational and Research Programs	2.55	1.243	6.48
9.	Institutional Culture and Values	2.67	1.288	6.84
10.	Monitoring and Reporting	2.64	1.244	6.75
11.	External Partnerships and Networks	2.62	1.091	6.87

The Table 1 displays that the top management commitment is most preferred feature of the GSCM practices (7.83) ranked first followed by Financial Considerations (7.74) and third rank Technological Advancements (7.13). It involves the active and sustained support from senior executives and organizational leaders to integrate environmental considerations into all aspects of the supply chain. This commitment is reflected in the allocation of resources, the establishment of clear environmental policies, and the setting of strategic goals aimed at reducing the ecological footprint. Furthermore, their leadership can inspire and motivate employees, suppliers, and other stakeholders to engage in sustainable practices.

Table 2
Test

No. of Respondents	200
Kendall's W[a]	0.010
Chi-Square	15.260
difference	10
Asymp. Sig.	0.018

The table above indicates that the computed Chi-Square value for the degree of freedom 10 exceeds the critical threshold. Companies must carefully evaluate the costs and benefits associated with adopting sustainable practices. Initial investments may include expenditures on eco-friendly technologies, renewable energy sources, and training programs for employees. Stakeholder pressure, technological advancements, supply chain collaboration, and educational and research programs are pivotal in driving the adoption. Stakeholder pressure from students, faculty, staff, alumni, and the community compels institutions to adopt environmentally responsible practices. This pressure often manifests in demands for transparency, accountability, and the incorporation of sustainability into institutional policies and operations. Technological advancements provide the tools and innovations necessary for implementing GSCM. By leveraging these technologies, institutions can better monitor and manage their environmental impact, making GSCM practices more feasible and effective. Supply chain collaboration is another critical factor. Partnerships with suppliers, service providers, and other stakeholders facilitate the sharing of best practices and resources, enabling the adoption of sustainable practices throughout the supply chain. Educational and research programs within institutions play a significant role in fostering GSCM adoption. By integrating sustainability into the curriculum, institutions educate future leaders on the importance of green practices. Research programs focused on sustainability can lead to innovative solutions and strategies for GSCM.

Conclusion

Higher education institutions are under growing pressure to be responsible for their environmental footprint, and a determined effort by interested parties may result in the adoption of more environmentally friendly policies. Finally, it is essential to have a high level of awareness and understanding of (GSCM) inside the organization. Engaging in educational programmes, training sessions, and seminars may foster a culture of sustainability and empower staff with the essential expertise to effectively adopt environmentally-friendly practices. Institutions may enhance the integration of (GSCM) into their operations and courses by creating a sustainable environment. This will help them contribute to larger

environmental objectives. Implementing environmentally sustainable methods in supply chain management may significantly benefit higher education institutions by boosting operational efficiency, decreasing expenses, and strengthening institutional reputation. By tackling the difficulties related to implementation and using the advantages, Higher Education Institutions (HEIs) may play a role in creating a more sustainable future while making substantial enhancements in their supply chains. The financial aspects of GSCM need meticulous planning and research. The potential for cost reduction, revenue expansion, and risk mitigation make it an attractive investment for ensuring long-term company viability. Additionally, green practices can open up new revenue streams through the development of environmentally friendly products and the potential to tap into new markets that prioritize sustainability. Companies may also benefit from government incentives and tax breaks designed to promote green initiatives. Beyond direct financial impacts, GSCM can enhance a company's reputation, leading to increased customer loyalty and a stronger brand image. This reputational boost can translate into competitive advantages, potentially leading to higher sales and market share. Technological advancements, supply chain collaboration, and robust educational and research programs collectively drive higher educational institutions toward the successful adoption and implementation of GSCM practices.

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