



Barriers to Implementing Green Purchasing Practices for Manufacturing SMEs in Sri Lanka

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ABSTRACT

The Earth's natural resources, environment, and sustainability are all at risk due to the current industrial boom. The major environmental problems, such as air pollution, water pollution, and ground contamination, are being created by unorganized and hazardous manufacturing systems. Overall, manufacturing industries in Sri Lanka cause significant environmental damage, and since SMEs are mostly found in the industrial sector, this study aims to investigate why SMEs engaged in manufacturing do not adopt green purchasing practices within their operations. This quantitative study collects data from 324 SMEs and employs Partial Least Squares Structural Equation Modeling (PLS-SEM) software for the data analysis. Results indicate that financial constraint is the most affected barrier, and lack of awareness and knowledge is the second-rated barrier to adopting green purchasing practices. Moreover, results emphasize that supplier and market limitations as the third-rated barrier in this context, and organizational barriers, time and resource constraints, perceived risks and uncertainties, regulatory and institutional challenges, and technological limitations, respectively, as significant obstacles to the implementation of green purchasing practices in this business environment. Findings enable policymakers to make particular decisions on environmental conservation, i.e., reforming and enacting rules and regulations for achieving the country's sustainable development goals. Moreover, results emphasize that granting financial support and organizing awareness programs are indispensable to overcoming the major barriers confronted by SMEs in adopting green practices. Hence, this study has brought a significant empirical contribution to the body of knowledge within the manufacturing SMEs in Sri Lanka. Future studies might concentrate on developing-nation settings, looking at how businesses might get over obstacles by collaborating, innovating, and enacting supportive laws.

Keywords: Barriers, Green purchasing, Manufacturing SMEs

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INTRODUCTION

The Earth's natural resources, environment, and sustainability are all at risk due to the current industrial boom (Mitra & Datta, 2014). Although this statement was published in 2014, very recent studies (Abdulla et al., 2023; Mahagamage & Perera, 2024) have also confirmed that the situation remained unchanged. Especially, the major environmental problems, i.e., air pollution, water pollution, and ground contamination, are being created by unorganized and hazardous manufacturing systems.

However, in many developing economies, particularly in South Asia, the unorganized industrial sector is problematic despite being vital. This industry, which is dominated by small, unregulated firms, greatly contributes to environmental deterioration through excessive energy use, abnormal resource consumption, toxic emissions, and irregular waste disposal. Sri Lanka is particularly at risk as it becomes more industrialized; the growth of SMEs in a variety of sectors, such as tanning, metal finishing, dyeing, and rubber and plastic processing, has increased soil, water, and air pollution because of antiquated manufacturing techniques. Numerous negative effects on the environment and all living things have been caused by the different strategies used to increase corporate profits. Especially in manufacturing, there is a tendency to produce inferior goods to maximize profits. This is especially true when harmful chemicals are used, and the waste produced is extremely harmful to the environment. This condition is a serious problem that is especially common in underdeveloped nations. It is evident at this dynamic moment that academics and researchers across a wide range of disciplines worldwide are delving deeply into green supply chain management (GSCM) practices, particularly with a strong emphasis on environmental preservation.

Small and Medium-sized Enterprises (SMEs) serve as the backbone of Sri Lanka's economy, accounting for over 75% of all enterprises, 52% of national GDP, and approximately 45% of employment (Central Bank of Sri Lanka, 2024). Given this centrality, the adoption of sustainable and green purchasing practices (GPP) within SMEs can significantly advance the country's broader environmental and economic goals. Yet, despite mounting global urgency to reduce environmental impacts, SMEs' adoption of GPP remains suboptimal, particularly in developing economies.

Overall, manufacturing industries in Sri Lanka cause significant environmental damage, and since SMEs are mostly found in the industrial

sector, it seems a timely study to investigate why SMEs engaged in manufacturing do not adopt green practices. Therefore, since lack of literature directly related to examining the barriers to implementing GPP for SMEs in Sri Lanka, to fulfill the identified empirical gap, this study focused on investigating particular barriers to implementing GPP as one of the major GSCM practices identified by academia.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Environmental Issues Due to Manufacturing Activities

People were able to advance into the twenty-first century with the start of the Industrial Revolution. The production era begins as science and technology develop quickly. Another negative consequence of all these developments was industrial pollution. In the past, the primary pollution from industries was smoke from small manufacturers. However, the pollution level did not rise much because there were only a few manufacturers, and they only functioned for a set number of hours each day. The issue of industrial pollution began to attract greater attention as these enterprises expanded into full manufacturing and industrial facilities. Industrial pollution is any pollution that can be directly traced to industrial settings. The majority of the world's pollution may be traced back to industry. Since a manufacturing SME serves as the study's unit of analysis, this section will provide additional detail on the environmental issues associated with industry and manufacturing.

The earth's natural resources, environment, and sustainability are all at risk due to the current industrial boom (Mitra & Datta, 2014). Given the current environmental issues caused by Sri Lanka's industrial sector, this proverb is highly applicable to the country. Many manufacturing activities are contaminating Sri Lanka's major rivers, particularly the River Kelani. The International Union for Conservation of Nature's (IUCN) Country Representative notes that the banks of the River Kelani are home to 6,000 companies (Jayasekara, 2015).

SMEs are essential to Sri Lanka's economic growth, making substantial contributions to industrial production, job creation, and export revenues. Nonetheless, serious environmental issues have been raised by their quick growth and lack of regulatory supervision. As a consequence of SMEs' unsustainable supply chains and poor environmental management systems, manufacturing SMEs in the country significantly contribute to environmental contamination. Moreover, since the majority of SMEs are located in densely

populated or ecologically sensitive areas, their contribution to environmental deterioration is particularly significant.

Green Supply Chain Management Practices

Numerous studies have mentioned various GSCM dimensions. Dou et al. (2018) highlight eco-design and supplier relationship, green procurement & purchasing, green supplier development & collaboration, green logistics & transportation, and reverse logistics & circular economy as dimensions of GSCM practices. Furthermore, in a literature review of GSCM practices, Weerathunge and Herath (2018) identify several dimensions of GSCM, i.e., green management practices, green procurement, green design & manufacturing, green distribution, and reverse logistics. However, Zhu et al. (2005) consider internal environmental management practices, external GSCM practices, eco-design, and investment recovery as GSCM practices in their study conducted related to Chinese manufacturing organizations. The majority of these studies investigated the performance of the GSCM practices they mentioned. Moreover, they especially examined the environmental performance gains related to GSCM practices. These research studies emphasize that environmental issues can be at least minimized by implementing GSCM practices, especially within the manufacturing environment. Suppose a firm wishes to embrace green practices, first it should start with green purchasing (GP), i.e., the procurement of products and services that have a reduced environmental impact throughout their life cycle. In other words, by avoiding GP or procurement, a firm cannot be an environmentally friendly organization. Therefore, considering the significance of GPP and the low level of participation by SMEs in GSCM initiatives, the present study aims to identify the key barriers hindering the adoption of GPP among manufacturing SMEs in Sri Lanka.

Green Purchasing

GP, also known as sustainable procurement or ecologically preferred purchasing, has become a key component of sustainable supply chain management (SSCM). It highlights the selection of goods and services that provide social and economic benefits while reducing their negative environmental impacts (Min & Galle, 2001; Zhu & Sarkis, 2004). In today's global marketplace, GP is increasingly seen as both a strategic instrument for gaining a competitive edge and a corporate duty (Chen et al., 2017).

Concept and Definitions of Green Purchasing

GP is defined as “the purchasing of materials, products, and services that have a reduced impact on human health and the environment when compared with competing products or services” (Carter & Carter, 1998). It incorporates environmental factors into purchase decisions, including waste reduction, energy efficiency, and recyclability (Walker & Brammer, 2009). GP is a crucial component of GSCM, allowing businesses to influence upstream suppliers and lessen their overall ecological footprints (Rao & Holt, 2005).

Drivers of Green Purchasing

As one of the major GSCM practices, GP plays a vital role in both industry and research. This situation is confirmed by environment. Prior literature identifies specific drivers of GPP adoption and implementation, especially in manufacturing environments.

Regulatory Pressure: Businesses are compelled to adhere to legal frameworks by environmental rules. (Zhu et al., 2010).

Stakeholder Pressure: Demands for eco-friendly activities are growing among investors, NGOs, and customers. (Hall, 2000).

Corporate Image and Competitiveness: Businesses use GP to improve their brand's reputation and stand out in the marketplace. (González-Benito & González-Benito, 2006).

Cost Savings: Despite disagreement, some research suggest that eco-friendly purchases can reduce waste management costs and improve resource efficiency. (Min & Galle, 2001).

Benefits and Outcomes of Green Purchasing

According to an empirical study, GP improves organizational and environmental performance. Businesses in China that used GP increased resource efficiency, decreased emissions, and enhanced compliance with international norms, according to Zhu and Sarkis (2004). Additionally, GP is linked to enhanced stakeholder interactions and long-term cost effectiveness (Eltayeb et al., 2011). Government procurement laws in wealthy nations frequently require GP (Preuss, 2009). On the other hand, adoption is still restricted in underdeveloped nations like Sri Lanka because of a lack of institutional support and knowledge. Nonetheless, businesses in emerging

economies are being compelled to adopt greener practices by the growing global supply chain integration (Testa et al., 2016).

Barriers to Implementing Green Purchasing Practices

Addressing environmental issues in manufacturing industries has made the application of GPP more crucial. However, several important obstacles prevent manufacturing SMEs in emerging nations like Sri Lanka from effectively implementing these techniques. . This section reviews the literature on the eight main barriers identified in earlier research.

Financial Constraints

One of the biggest obstacles SMEs face when implementing GP methods is financial constraints. Due to limited access to cash or credit facilities, many SMEs are unable to make the large initial investments required for green technology and eco-friendly materials (Tippayawong et al., 2015; Rajapakse et al., 2022). Many SMEs in Sri Lanka find it difficult to justify these upfront expenses, particularly when there are no immediate cash rewards, according to Reynolds (2024). Hence, we hypothesized

H1: Financial constraints have a significant negative impact on green purchasing practices

Lack of Awareness and Knowledge

The advantages of GP, legal requirements, and environmental hazards are not well understood by many SME managers and staff (Ashoka et al., 2023). Their capacity to incorporate sustainable practices into procurement operations is hampered by this shortcoming. Hillary (2003) asserts that because they have little access to best practices and few training opportunities, SMEs frequently undervalue the long-term benefits of environmental management. Therefore, the following hypothesis was developed.

H2: Lack of awareness and knowledge has a significant negative impact on green purchasing practices

Supplier and Market Limitations

Another major obstacle is the availability of green products and eco-friendly vendors. Green procurement is difficult for many SMEs because they rely on local suppliers who may not offer eco-friendly alternatives (Zaman & Sedera, 2016). Additionally, Mitchell and Staelin (1994) contend that SMEs are

deterred from adopting sustainable purchasing a lack of market demand for green products. Considering this situation, we hypothesised

H3: Supplier and market limitations have a significant negative impact on green purchasing practices

Organizational Barriers

Significant barriers are internal organizational issues, such as a lack of commitment from the leadership, a poor work environment, and inadequate departmental collaboration (Sharma, 2012). Integrating sustainability into core business activities is challenging for SMEs because they frequently have informal structures and no strategic planning (Tippayawong et al., 2015; Rajapakse et al., 2022). Therefore, the following hypothesis was developed.

H4: Organizational barriers have a significant negative impact on green purchasing practices

Regulatory and Institutional Challenges

SMEs' limited adoption of GP of the results from both a lack of institutional support and lax enforcement of environmental rules. Regulations in Sri Lanka are frequently disjointed and unsuitable for SMEs (Reynolds, 2024). According to Chan et al. (2018), unclear regulations and a lack of government incentives deter SMEs from acting in an environmentally conscious manner. Hence, the following hypothesis was developed.

H5: Regulatory and Institutional challenges have a significant negative impact on green purchasing practices

Perceived Risks and Uncertainty

Many SME managers perceive GPP as risky, fearing potential disruptions to existing supply chains or increased operational costs (Geiger & Swim, 2016). Uncertainty is increased by unclear long-term advantages and results, which discourages proactive GP (Ashoka et al., 2023; Tumpa et al., 2019). Therefore, considering these findings, the next hypothesis was developed.

H6: Perceived risks and uncertainty have a significant negative impact on green purchasing practices

Time and Resource Constraints

SMEs usually have minimal operational and human resources. An additional burden is the time needed to coordinate with sustainable suppliers, train employees, and conduct research on green alternatives (Hillary, 2003). According to Tippayawong et al. (2015), a lot of SMEs put short-term survival ahead of long-term environmental objectives. Hence, we hypothesized

H7: Time and resource constraints have a significant negative impact on green purchasing practices

Technological Limitations

SMEs' capacity to embrace GP is further limited by technological shortcomings. To evaluate and track environmental performance in their supply chains, many SMEs lack the infrastructure or technical capability (Tumpa et al., 2019; Zaman & Sedera, 2016). Modern green procurement methods and processes are difficult to apply due to technological limitations.

H8: Technological Limitations have a significant negative impact on green purchasing practices

The Conceptual Framework

The conceptual framework was developed concerning the reviewed literature. Therefore, Financial constraints (FC), lack of awareness and knowledge (LAK), supplier and market limitations (SML), organizational barriers (OB), regulatory and institutional challenges (RIC), perceived risks and uncertainty (PRU), time and resource constraints (TRC), and technological limitations (TL) are act as the independent variables of the study, and GPP is the dependent variable.

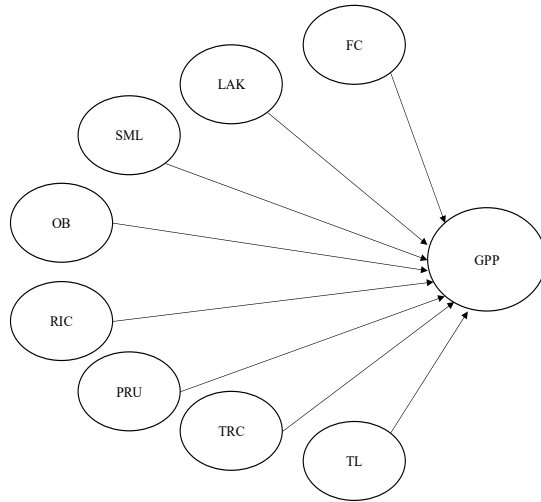


Figure 1: Conceptual Framework

METHODOLOGY

The present study employed a quantitative survey design. Data were collected using a structured questionnaire indicate their level of agreement with each item on a seven-point Likert scale. The scale ranged from 1 (Strongly Disagree) to 7 (Strongly Agree), with 4 representing a neutral position (Neither Agree nor Disagree). The questionnaire was developed based on the conceptual framework presented in the above section.

Data collection was carried out through face-to-face interviews (particularly with small enterprises), as well as via email and telephone calls. Although a large number of SMEs were contacted, only 324 respondents met the criteria to be included in the analysis. Therefore, the unit of analysis for this study is individual SME, and data were obtained by contacting a key representative of each firm—either an executive or the owner. The data were analyzed using the Friedman test to rank the eight identified barriers. Further analysis was conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM) software, while Microsoft Excel was also utilized to support the analysis process.

RESULTS AND DISCUSSION

Results of this study emphasize that financial constraints or limitations are the most significant barrier to implementing GPP within SMEs because green products and services often involve comparatively higher upfront costs, which many SMEs find difficult to justify due to their budget limitations. Moreover, the current result aligns with Abdulla et al. (2023) and Mahagamage and Perera (2024), who concluded that financial constraints are the main hindrance to embracing green practices for SMEs. Findings indicate that Lack of awareness and knowledge is the second-rated barrier to adopting GPP. Luo et al. (2021) have justified this particular result through their study, which focused on barriers to implementing green practices. Further, results of this study confirm that Supplier and Market Limitations are the third-rated barrier in adopting GPP in the context of manufacturing SMEs. Green suppliers are usually scarce, especially in developing economies, making it difficult for SMEs to source sustainable inputs (Testa et al., 2016). Moreover, this result emphasizes that SMEs in Sri Lanka have recognized organizational barriers, time and resource constraints, perceived risks and uncertainties, regulatory and institutional challenges, and technological limitations, respectively, as significant hurdles to the implementation of GPP in the business environment. Furthermore, results confirm that all eight hypotheses are accepted because the path coefficient values (β values) are greater than 0.1. The t-values of all eight hypotheses are greater than 2.58, indicating that the barriers to implementing GPP are statistically significant at a 99% confidence level. This implies that each identified barrier has a meaningful influence on hindering GPP adoption. Among these barriers, financial constraints show the highest path coefficient, suggesting it is the most critical factor hindering GPP adoption, whereas technological limitations show the lowest coefficient, though still significant. These findings line up with institutional theory, which proposes that regulatory and resource-related constraints significantly shape organizational adoption of sustainable practices.

CONCLUSION AND IMPLICATIONS OF THE STUDY

This study examined the barriers Sri Lankan manufacturing SMEs faced in adopting GPP. According to the findings of the research, the biggest obstacle is money because many SMEs find it difficult to justify the higher upfront prices of green goods and services because their limited financial resources. Lack of awareness and information about GP practices is the second most important barrier identified. This implies that many SME owners and managers may not

be fully aware of the long-term benefits or the operational procedures required to implement green initiatives. The lack of green suppliers and inadequate market infrastructure in underdeveloped nations like Sri Lanka are highlighted by the third-ranked obstacle, supplier and market restrictions, which make it more difficult for SMEs to find sustainable inputs.

Organizational barriers, time and resource restrictions, perceived risks and uncertainties, institutional and regulatory difficulties, and technological limitations were also identified by this research study as additional hurdles to the implementation of GPP. Together, these findings highlighted the complexity of the barriers SMEs face when implementing environmentally friendly procurement systems. A multi-stakeholder strategy that encompasses legislators, trade associations, and support organizations is needed to remove these obstacles. Moreover, since the entire eight barriers are significant, strategies to promote GPP must address multiple dimensions simultaneously, rather than focusing only on a single barrier. In order to facilitate the successful implementation of GPP within SMEs in Sri Lanka, it is imperative to provide financial facilities, enhance awareness through focused education and training, fortify green supply networks, and provide technology support.

GP is continuously highlighted in the literature as a crucial component of sustainable supply chains. Although market, regulatory, and strategic forces drive adoption, obstacles such as cost, supplier readiness, and lack of awareness hinder broader acceptance. Future studies might be conducted in developing-nation settings, focusing on how businesses might get over these particular hurdles by collaborating, innovating, and enacting supportive laws.

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