

Sustainable Procurement Practices in Printing SMEs: Practices, Supplier Engagement and Implementation Challenges in Northern Ghana

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Abstract

Sustainable Procurement (SP) has become crucial to Small and Medium-Sized Enterprises (SMEs) wishing to reconcile economic viability with environmental and social responsibility. The study focused on sustainable procurement practices of printing SMEs in Northern Ghana. The study was guided by the following objectives: existing sustainable procurement practices, supplier engagement in sustainable procurement, problems of implementing sustainable procurement, awareness and education on sustainable procurement, and the future of sustainable procurement. The study was based on Resource-Based View and Triple Bottom Line theories. A descriptive qualitative research design was used. The participants were purposefully selected according to their relevant knowledge and practical experience, and data saturation was reached after 25 interviews with SME owners, supervisors, procurement authorities, and production managers. Data were acquired through semi-structured interviews and thematically evaluated using MAXQDA software. The findings indicate that printing SMEs embrace sustainability through environmental impact management, enhancing procurement procedures, and formulating sustainable procurement policies. The involvement with suppliers was related to procurement decision-making, sustainability practices, sustainability certification, training, digital learning, and networking possibilities. However, competing company goals and lack of financial resources, knowledge, and training have hindered implementation. Workshops, online courses, networking opportunities, guides, and handbooks emerged as key methods in reinforcing awareness and

sustainable procurement competence. The study also points to the need for training, supportive resources, peer collaboration, and suitable policy frameworks to enhance implementation. It concludes that developing sustainable procurement within the printing SMEs will require an integrated approach including capacity building, accessible practical tools, supplier involvement, peer learning, and supportive policy initiatives. These interventions could assist printing SMEs to institutionalise responsible sourcing, enhance environmental management, and promote sustainable procurement practices in the printing industry in Northern Ghana.

Keywords

Sustainable Procurement Practices, Printing SMEs, Supplier Engagement, Sustainability, Implementation Challenges, Northern Ghana

1. Introduction

In this modern era, sustainable procurement has become an integral part of corporate practice as businesses aim to reconcile economic performance with environmental preservation and social responsibility (Agyapong et al., 2024). It incorporates environmental and social issues into purchasing decisions and considers value across the life-cycle of goods and services, moving beyond the traditional procurement approach of price, quality, and availability. Mutio and Machoka (2025) argue that sustainable procurement is thus concerned with measures such as ecologically responsible sourcing, ethical supplier selection, waste reduction, and resource-efficient purchasing.

Small and Medium Enterprises (SMEs) play a significant role in economic growth, employment, entrepreneurship, and innovation (Enaifoghe, 2023). In Ghana, SMEs are active in numerous industries such as the printing industry, with enterprises providing services in graphic design, pre-press, digital and offset printing, screen printing, packaging, publishing, signs, and post-press services (Reyes-Rodríguez & Ulhøi, 2022; Darbi & Knott, 2021). Printing SMEs thereby facilitate communication, education, advertising, branding, and knowledge sharing. However, many of them operate with very minimal capital investment and have financial and technological limits that hinder corporate development and innovation (Abor & Quartey, 2010).

Printing is especially relevant to sustainability as industrial operations are heavily reliant on paper, inks, chemicals, solvents, and energy-intensive equipment (Vade & Athalye, 2026). Aydemir & Özsoy (2020) identified that improper management of these resources can lead to the development of waste, chemical contamination, carbon emissions, and excessive energy usage. Goh et al. (2021) also stated that by implementing sustainable procedures such as using recyclable paper, environmentally friendly inks, waste recycling, energy-efficient equipment, and responsible procurement, companies can potentially lessen these impacts and

improve operational efficiency and company reputation. Ghadimi et al. (2016) note that supplier engagement is also vital as procurement decisions directly affect the sustainability features of materials and other production inputs. Sustainable supplier assessment, ethical sourcing, certification, and collaboration can thus help to integrate sustainability into SME procurement.

However, the implementation of sustainable procurement in SMEs is not without challenges despite these potential benefits (Durrani et al., 2024). The printing SMEs in Northern Ghana usually operate in resource-constrained environments where procurement decisions may be more influenced by immediate price, availability, production requirements, and financial capacity rather than environmental and social considerations (Essuman et al., 2025). According to Essuman et al., the systematic integration of sustainability into procurement decision-making might be hindered by lack of financial resources, lack of sustainability knowledge and training, limited availability of environmentally preferable materials, lack of information on suppliers, and conflicting priorities between business agendas.

An additional challenge is supplier engagement. Ghadimi et al. (2016) state that the effectiveness of sustainable procurement requires a change from traditional supplier relationships that are mainly based on price and availability to relationships that include environmental responsibility, ethical sourcing, sustainability standards, information sharing, and collaborative improvement. However, Essuman et al. (2025) noted that the extent to which printing SMEs in Northern Ghana involve suppliers in these sustainability considerations is yet to be fully explored. The study also observed that inadequate access to sustainability certification information, training, professional networks and practical recommendations may further constrain the ability of SMEs to assess and interact with suppliers on sustainability problems.

Despite growing academic interest in sustainable procurement, evidence is varied across sectors and geographical contexts. Sustainable procurement research in Ghana has been traditionally limited and centred notably in the mining and construction industries; thus the need for studies across multiple sectors, contexts and organisational settings (Opoku-Mensah et al., 2023). Similarly, studies on sustainable procurement in Ghana have mostly been on public sector organisations and institutional implementation (Adjei-Bamfo & Maloreh-Nyamekye, 2019). As such, there is less context-specific research to explain how sustainable procurement is understood and performed inside resource-constrained printing SMEs, particularly in Northern Ghana. This gap is essential since printing operations are heavily dependent on paper, inks, solvents, chemicals, and energy-consuming production processes that can generate waste, emissions, and other environmental problems (Aydemir & Özsoy, 2020; Krystosiak et al., 2024). SMEs are sometimes financially and technologically constrained at the same time, which may affect their ability to invest in sustainable materials, equipment, and procurement capabilities. Examining printing SMEs in Northern Ghana therefore provides an essential sector- and context-specific lens through which to understand the interaction between resource constraints and sustainable procurement practices.

2. Literature Review

2.1. Concept of Sustainable Procurement Practices (SPP)

Wanja and Achuora (2020) define sustainable procurement as the incorporation of corporate social, governance, and environmental obligations into decision-making and procurement processes while meeting stakeholder expectations. It aims to reduce environmental harm while increasing societal gain. Sustainability in supply chain and procurement entails making decisions that reduce environmental impact while benefiting both the enterprise and society at large. This seeks to assess issues beyond the merely financial and economic (Roman, 2017).

Walker and Brammer (2009) argue that sustainable procurement practice is consistent with the essential concepts of sustainable development, which include a healthy, egalitarian, and resilient society, environmental conservation, and effective governance (Walker & Brammer, 2012). There are many definitions of sustainable procurement. One of the common definitions of sustainable procurement is “a process by which organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis” while delivering wider societal and economic benefits and minimising environmental harm (Sustainable Procurement Task Force, 2006; Kannan, 2021).

Sustainable Procurement (SP) aims to go beyond traditional procurement procedures by using procurement principles. Procurement is the process of acquiring products, services, and/or works from suppliers (Chartered Institute of Purchasing and Supply, 2014). Sustainable Procurement is incorporated into the framework of sustainable development, but it goes beyond development. Its goals include equal opportunity, social cohesion and inclusion, personal well-being, and the specific requirements of all current and future community members.

Sustainable Procurement entails procuring products, services, and works from suppliers who provide the best overall costs and benefits in proportion to the client's needs. Organizations must meet their needs for commodities, services, works, and utilities in a way that ensures value for money throughout the lifecycle (CIPS Knowledge Summary, 2008). To generate benefits for the organization, society, and the economy while minimizing environmental impact. Sustainable procurement entails making purchase decisions that take into account the economic, environmental, and social implications. In addition to maximizing price, quality, and availability (Lefèvre et al., 2010), it considers the social and environmental implications of the product or service's origin and life cycle.

Sustainable procurement approaches include environmentally friendly sourcing, ethical supplier selection, waste reduction, resource-efficient purchasing, and adherence to sustainability requirements within SMEs (Baburajan, 2025). These strategies not only benefit the environment, but they also improve organizational competitiveness, operational efficiency, and long-term firm sustainability. According to Testa et al. (2016), SMEs are becoming more aware of the value of sustainable buying as a strategic tool for improving business reputation, customer happiness, and supply chain resilience.

2.2. Small and Medium-Sized Enterprises (SMEs) in the Printing Industry

Gherghina et al. (2020) describe Small and Medium-Sized Enterprises (SMEs) as critical contributors to economic growth, job creation, innovation, and industrial advancement in both developed and emerging economies. SMEs boost national productivity by encouraging entrepreneurship, increasing local output, and providing job possibilities for trained and semi-skilled workers (Ayyagari et al., 2007). SMEs account for a sizable share of commercial entities in Ghana and play an important role in facilitating economic activity in a variety of sectors, including manufacturing, commerce, services, and the creative industry. According to Reyes-Rodríguez and Ulhøi (2022), the printing sector relies heavily on SMEs. The printing industry includes companies that provide graphic design, pre-press, digital printing, offset printing, screen printing, packaging, publishing, sign-making, and post-press finishing services. Small and medium-sized printing businesses often operate on a small scale, have low capital investment, and use adaptive methods to respond quickly to client needs and market volatility (Abor & Quartey, 2010).

According to Ikwuta et al. (2025), printing SMEs play an important role in communication, education, advertising, branding, and knowledge transmission across society. It makes it easier to produce books, newspapers, brochures, posters, labels, calendars, business stationery, packaging materials, and promotional items for businesses, schools, government agencies, and people. According to Odoom (2016), SMEs in Ghana's printing sector make a substantial contribution to local economic development by creating jobs and encouraging entrepreneurial growth in urban and semi-urban areas. Nonetheless, SMEs in the printing industry face a variety of obstacles that jeopardize their long-term existence (Durrani et al., 2024). Financial constraints remain one of the major barriers to SMEs in developing economies. Many printing SMEs struggle to acquire contemporary machinery, adopt new technologies, and expand capacity due to limited access to credit facilities and insufficient financial support (Abor & Biekpe, 2006). In Ghana, many printing SMEs rely on personal savings or informal finance, which may not be sufficient to support business growth and stimulate technological innovation.

Historically, the printing sector has faced financial and technological challenges, but environmental sustainability has emerged as an increasingly important concern. According to Vade and Athalye (2026), printing activities frequently use paper, ink, chemicals, solvents, and energy-intensive equipment, all of which can be harmful to the environment if not effectively managed. Printing firms are under increasing pressure to implement ecologically friendly methods due to worries about waste generation, chemical disposal, carbon emissions, and excessive energy consumption (Zhu et al., 2013). As a result, sustainable business practices have become critical for SMEs in the printing industry. Sustainable strategies include the use of recyclable paper products, environmentally friendly inks, trash recycling systems, energy-efficient equipment, and sustainable procurement pro-

cedures. SME businesses that implement sustainability-focused strategies are more likely to achieve increased operational efficiency, a better corporate reputation, and a sustainable competitive advantage (Bos-Brouwers, 2010).

Procurement activities in the printing sector have a direct impact on resource consumption, supplier relationships, production efficiency, and environmental performance, making sustainable procurement techniques critical (Agyapong et al., 2024). Small and Medium-Sized printing companies that use ecologically friendly materials and work with sustainable suppliers can decrease operational waste, improve product quality, and increase consumer confidence. Walker and Brammer (2012) argue that sustainable procurement allows firms to incorporate environmental and social factors into their purchase decisions while also reaping economic rewards.

2.3. Relationship between Sustainable Procurement and SME Performance in the Printing Industry

The relationship between Sustainable Procurement and SME success is primarily addressed by the Resource-Based View (RBV) hypothesis (Rantanen, 2021), which contends that enterprises can gain a competitive advantage through unique and valuable resources and capabilities (Barney, 1991). As a result, sustainable procurement techniques such as supplier collaboration, green sourcing, and smart resource management can improve operational efficiency, lower production costs, and increase organisational competitiveness. SMEs that integrate sustainability into their procurement processes are more likely to improve productivity, customer satisfaction, and long-term business performance.

Obeidat et al. (2023) emphasized the relevance of sustainable procurement techniques in the printing industry for improving operational and environmental performance. Printing SMEs use a lot of paper, ink, chemicals, and energy-intensive machinery; thus, their purchasing decisions are critical to both cost control and environmental sustainability. The acquisition of recyclable paper, eco-friendly inks, and energy-efficient materials helps to reduce operational waste and improve production efficiency (Zhu et al., 2013). Furthermore, selecting sustainable suppliers enables printing SMEs to maintain product quality while improving organizational reputation and stakeholder trust. Empirical research has demonstrated positive relationships between sustainable purchasing practices and corporate performance. Ahi and Searcy (2015) concluded that sustainable supply chain and procurement approaches improve operational efficiency, innovation, and competitiveness. Similarly, Bos-Brouwers (2010) proposed that SMEs with sustainability-oriented business practices had better market opportunities and longer-term resilience. Sustainable procurement also reduces costs by increasing resource utilization and decreasing waste, which is crucial for financially restricted SMEs (Omowole et al., 2024).

Despite these advantages, many SMEs in the printing industry struggle to implement sustainable purchasing practices. Financial restrictions, insufficient un-

derstanding of sustainability, limited availability of eco-friendly products, and inadequate technology capabilities are all barriers to effective implementation (Moktadir et al., 2018). Infrastructural shortcomings and a lack of institutional support exacerbate these difficulties in developing countries like Ghana. Nonetheless, rising environmental consciousness and stakeholder demands are driving SMEs to adopt sustainable procurement practices as a means of improving business performance and competitiveness.

2.4. Theoretical Framework of the Study

This study is anchored in two main theories. That is, the Resource-Based View (RBV) and the Triple Bottom Line Theories.

2.4.1. Resource-Based View (RBV) Theory

The Resource-Based View (RBV) paradigm is an important concept for understanding strategic management and organizational performance. Mailani et al. (2024) posited that the Resource-Based View (RBV) hypothesis suggests that firms can achieve a sustainable competitive advantage through the effective acquisition, development, and deployment of internal resources and capabilities that are valuable, rare, inimitable, and non-substitutable. The idea of the Resource-Based View (RBV) was popularized by Jay Barney with his seminal work emphasizing organizational resources as crucial variables affecting the competitiveness and the long-term performance of companies (Barney, 1991). According to the RBV paradigm, resources are physical assets, financial resources, technological capabilities, human skills, organizational culture, management knowledge, reputation, and supplier relationships. But not all organizational resources are sources of competitive advantage. Resources need to possess a number of key strategic features called valuable, rare, inimitable, and non-substitutable (VRIN) attributes in order to be able to contribute significantly to the company's performance (Andersén, 2011).

The RBV theory has been widely used in supply chain management, procurement management, innovation, sustainability, and the performance of SMEs. The concept is that sustainability-oriented procurement competencies can act as strategic organizational resources, improving operational efficiency and competitiveness in the field of sustainable procurement (Arslan & Can, 2025). As a result, implementing sustainable procurement strategies such as green sourcing, supplier sustainability assessments, efficient resource management, waste minimization, and environmentally conscious purchasing can greatly improve organizational performance. The Resource-Based View (RBV) paradigm is especially important for Small and Medium-Sized Enterprises (SMEs) because of their normal financial and infrastructure restrictions (Lukovszki et al., 2021).

The RBV theory provides an important perspective for examining the impact of sustainable purchasing practices on the performance of SMEs in Ghana's printing industry. According to Cristóbal Andrade et al. (2012), printing SMEs conduct extensive procurement procedures for paper, ink, chemicals, printing equipment, and other production inputs. As a result, procurement capabilities such as sus-

tainable supplier selection, green sourcing, effective inventory management, and waste reduction can serve as critical strategic tools for increasing organizational competitiveness. According to [Dey et al. \(2019\)](#), SMEs that incorporate sustainability into their procurement procedures are more likely to improve operational efficiency, lower manufacturing costs, and increase customer satisfaction and organizational reputation.

2.4.2. Triple Bottom Line Theory

The Triple Bottom Line (TBL) theory is a sustainability-oriented concept that highlights the importance of enterprises balancing economic, environmental, and social goals in their operations and decision-making processes ([Wahyuni et al., 2026](#)). The theory was created by John Elkington, who proposed that the measurement of an organisation's success should not be restricted to financial success but should also include the environmental and social impact that the enterprise has ([Elkington, 1997](#)). Thus, the TBL theory extends the traditional notion of corporate performance with the three dimensions popularly known as "Profit, Planet and People".

TBL theory by [Tate and Bals \(2018\)](#) in the context of sustainable procurement practices suggests that procurement decisions should not be based exclusively on cost and quality factors but should also take into account environmental and social implications. Thus, sustainable procurement is the purchase of goods and services that takes into account the need for environmental preservation, social responsibility, and long-term economic benefit ([Walker & Brammer, 2012](#)). The TBL theory offers a good framework to understand the contribution of sustainability-oriented practices to organizational performance and competitiveness in SMEs ([De et al., 2020](#)). SMEs that include economic, environmental, and social issues in procurement and operational activities may increase efficiency, build better relationships with stakeholders, and improve the long-term sustainability of the organization. According to [Ahi and Searcy \(2015\)](#), sustainability approaches in supply chain and procurement management generally lead to enhanced operational performance, innovation, and organizational resilience.

The theory of TBL is very relevant in the printing industry in Ghana, as printing activities have significant environmental and social repercussions. Printing SMEs mainly use paper, ink, chemicals, energy-intensive machinery, and packaging materials as inputs. They might create environmental problems, including waste, pollution, and overconsumption of resources. Sustainable procurement techniques, including obtaining recyclable paper, utilizing eco-friendly inks, decreasing material waste, and selecting environmentally responsible suppliers, can assist printing SMEs in minimizing environmental impacts while boosting operational efficiency ([Wondemu, 2011](#)).

3. Methodology

3.1. Research Approach

Using a qualitative study methodology, this study investigates Sustainable Pro-

curement Practices and SME Performance in Ghana's Printing Industry. The qualitative technique was chosen because it allows for a thorough exploration of participants' experiences, opinions, and practices linked to sustainability and procurement management in SMEs (Lim, 2025). Qualitative research provides an in-depth contextual understanding of complex phenomena in organizations and society, while empirical investigations provide little information (Creswell & Poth, 2018). The technique provided the researcher with specific insights into how Sustainable Procurement Practices affect SME Performance in Ghana's Printing Industry.

3.2. Research Design

The study adopted the descriptive qualitative research design. The descriptive technique was deployed since it provided an understanding of procurement patterns, sustainability initiatives, operational challenges, and performance outcomes among SMEs in the printing industry. The design also enabled the researcher to study participants' perceptions and experiences with environmentally responsible procurement practices, as well as the consequences for company sustainability and competitiveness (Lambert & Lambert, 2012).

3.3. Study Area

The study was conducted in Ghana among printing SMEs with a focus on the firms within the Northern Region. The region's printing sector consists of SMEs involved in graphic design, digital printing, offset printing, screen printing, signage production, packaging, and allied printing services. The study topic was chosen due to the increasing presence of SMEs in the printing sector and the increasing concerns of sustainable procurement practices and operational performance in the industry.

3.4. Population of the Study

The targeted population was owners, managers, procurement officials, and production managers with SMEs in the printing industry in the Northern Region of Ghana. The participants were identified based on their deep knowledge and experience in the fields of procurement operations, supplier networks, sustainable practices, and organizational performance in their respective organizations.

3.5. Sampling Technique and Sample Size

Purposive sampling was adopted to choose participants who possessed relevant knowledge and practical experience in sustainable procurement practices within the printing industry. Purposive sampling is suitable for qualitative research because it enables researchers to choose information-rich participants who can offer a deeper understanding of the topic being studied (Patton, 2015). The principle of information power, which states that the size of a qualitative sample should be based on the relevance and richness of the information provided by participants

rather than on statistical representativeness (Malterud et al., 2016), further guided the appropriateness of the sample. Given the nature of the study and intentional sampling of participants who had direct knowledge of procurement and printing processes, the participants had much information on the research questions.

Data collection was continued until data saturation was attained, when further interviews did not reveal any substantially new topics or information related to the study (Guest et al., 2006; Hennink et al., 2017). Saturation was achieved after interviewing 25 participants, including SME owners, supervisors, procurement officials, and production managers of chosen printing enterprises in Northern Ghana. The ultimate sample size was chosen not by a pre-specified statistical sample-size computation, but rather by the adequacy and depth of information generated. **Table 1** presents the study population.

Table 1. Distribution of population, sampling and data collection instruments for the study.

Participant Category	Number	Percentage (%)	Sampling Techniques	Instrument(s)
SME Owners	5	20	Purposive Sampling	Interviews
Managers/Supervisors	7	28	Purposive Sampling	Interviews
Procurement Officers	5	20	Purposive Sampling	Interviews
Production Managers	8	32	Purposive Sampling	Interviews
Total	25	100%		

3.6. Data Collection Methods

Primary data were collected through semi-structured interviews. Semi-structured interviews were considered appropriate because they provide flexibility for participants to express their opinions and experiences while allowing the researcher to probe for clarification and detailed explanations (Kvale & Brinkmann, 2015). An interview guide was developed based on the study objectives and relevant literature on sustainable procurement and SME performance in the printing industry. The interview questions focused on current sustainable procurement practices adopted by SMEs in the printing industry, supplier engagement, constraints to sustainable procurement, awareness and education, and future directional model adopted by SMEs in the printing industry in the Northern Region of Ghana. Interviews were conducted face-to-face and, where necessary, through virtual communication platforms. With participants' consent, interviews were audio-recorded to ensure accurate data capture and transcription.

3.7. Data Analysis

The study employed thematic analysis to analyze qualitative data with the help of MAXQDA software. Thematic analysis is a systematic method used to identify, analyze, and interpret patterns or themes within qualitative data (Castleberry & Nolen, 2018). Interview recordings were transcribed verbatim, organized, and

carefully reviewed to ensure familiarity with the data.

The analysis of data followed the following stages, which include: transcription and data familiarization, coding of significant statements, identification of recurring themes, categorization of themes, and interpretation of findings in relation to the study objectives and theoretical framework. Themes that emerged from the data included current sustainable procurement practices, supplier engagement, constraints to sustainable procurement, awareness and education, and future directional model of SMEs in the printing industry.

3.8. Trustworthiness of the Study

The credibility, dependability, confirmability, and transferability criteria were used to assure the rigor and trustworthiness of the study as recommended by Yvonna Lincoln and Egon Guba (Lincoln & Guba, 1985). Credibility was established by lengthy involvement with participants and member checking to confirm responses from the interviews. The research methodologies and the interviewing process were kept with thorough documentation for dependability. Confirmability and Transferability were achieved by careful recording, transcription, and interpretation of participant responses to minimize researcher bias and detailed descriptions of the context of the study, participants, and research procedures to facilitate comparison with similar studies, respectively.

3.9. Ethical Considerations

The study was conducted in strict accordance with ethical requirements. The study purpose was conveyed to the participants before their participation, and voluntary consent was obtained. Personal identities of participants were removed from study reports and interview transcripts to guarantee the confidentiality and anonymity of participants. Participants were also advised that they could withdraw from the study at any moment without penalty.

4. Results and Discussion

This section presents the analyses of the data collected for the study. The discussion has been organized into sections to reflect the key issues identified.

4.1. Current Sustainable Procurement Practices

The current practices of firms in Ghana's printing industry within the Northern Region, as illustrated in **Figure 1** by the "Code Map" model, include managing environmental impact, refining the procurement process, and developing a sustainable procurement policy. These practices reflect a shift towards integrating sustainability into core operations.

The firm's focus on environmental impact demonstrates a growing awareness of the need to minimize its ecological footprint. Firms use structured resources like guides and handbooks, alongside workshops, to understand and address their environmental responsibilities. According to Agyemang and Ansong (2017),

such resources provide SMEs with practical guidelines for reducing waste, controlling emissions, and conserving resources. This aligns with [Sroufe and Melnyk's \(2006\)](#) findings that providing SMEs with accessible environmental standards and best practices encourages proactive steps toward sustainability. By utilizing these resources, firms not only reduce their environmental impact but also align with broader sustainability goals, contributing to a more eco-friendly industry.

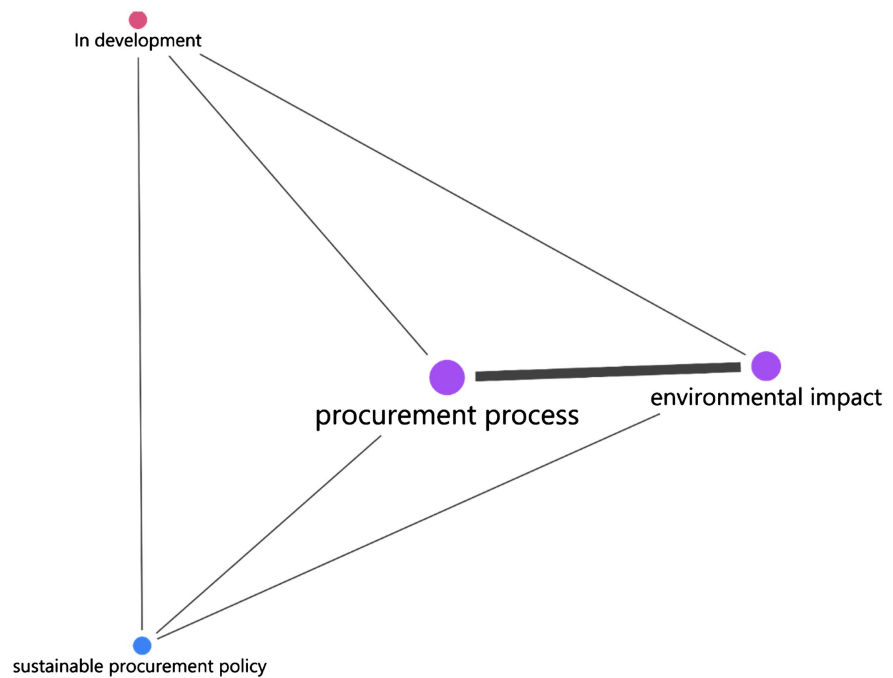


Figure 1. Code map model of current sustainable procurement practices.

In terms of the procurement process, firms are moving beyond traditional procurement practices focused primarily on cost and efficiency. Training sessions and workshops are critical for educating SMEs on aspects of procurement that include quality control, supplier assessment, and ethical sourcing. [Preuss \(2007\)](#) argues that training is essential for transforming procurement practices from purely transactional to strategic, where environmental and ethical considerations become integral. These workshops allow SMEs to evaluate suppliers not just on price but also on their adherence to sustainability standards. [Jenkins \(2006\)](#) further supports this approach, noting that sustainable procurement training fosters long-term supplier relationships based on shared environmental and social values, enhancing the strategic role of procurement in SMEs.

Finally, the development of a sustainable procurement policy is evident through the use of online courses, guides, and networking opportunities, which collectively support a more structured approach to sustainable sourcing. Online courses provide the flexibility SMEs need to gain knowledge on sustainability at their convenience, while guides offer ongoing support to reinforce sustainable procurement

practices. This combination aligns with Walker et al. (2008), who found that blended learning approaches, mixing digital and physical resources, are particularly effective for SMEs. Networking opportunities also play a significant role in sustainable procurement policy, as they allow firms to exchange best practices, learn about green procurement standards, and gain insights from peers. According to Seuring and Müller (2008), networking fosters an industry culture that supports environmental accountability, making it easier for firms to adopt sustainable procurement policies collectively.

In summary, the current practices of firms in Ghana's printing industry show a structured approach to sustainability, where environmental impact, procurement process, and sustainable procurement policy are interwoven. Literature supports this model by emphasizing that a combination of training, accessible resources, and peer support enables SMEs to build sustainable procurement into their operations. By adopting these practices, firms in the printing industry can effectively manage their environmental impact, engage in a more ethical procurement process, and develop robust, sustainable procurement policies that align with global sustainability standards.

4.2. Suppliers Engagement

This supplier engagement model, as shown in Figure 2, outlines relationships among core elements related to sustainable procurement practices for SMEs in Ghana's printing industry. The mapped codes include procurement decision-making, sustainability practices, and sustainability certification, each representing resources or mechanisms SMEs may rely on to enhance their understanding and implementation of sustainable procurement practices. The strongest connection is between sustainability practices and procurement decision-making, as indicated by the thicker line. This suggests a significant reliance on both formal training sessions and digital learning platforms among SMEs. Literature on sustainable procurement highlights that combining structured training with accessible online courses can effectively build capacity in SMEs (Agyemang & Ansong, 2017). Online courses provide flexibility, allowing SME owners and employees to learn conveniently, while workshops offer hands-on learning experiences that facilitate knowledge application. This blended learning approach is particularly beneficial for SMEs with limited access to in-person training resources, as it enables continuous skill development and reinforces sustainable procurement practices (Sroufe & Melnyk, 2006).

The link between workshops/training and networking opportunities underscores the importance of collaborative learning and industry connections in sustainable procurement. Peer interactions are frequently emphasized in the literature as a means for SMEs to exchange best practices, troubleshoot common challenges, and build a supportive network around sustainability (Preuss, 2007; Walker et al., 2008). Networking opportunities complement formal training by enabling SMEs to interact with others in their industry, fostering a community of

practice that can accelerate the adoption of sustainable practices. This peer-driven learning environment can be particularly valuable in regions where formal institutional support may be limited, as it allows SMEs to share resources and collectively address sustainability challenges.

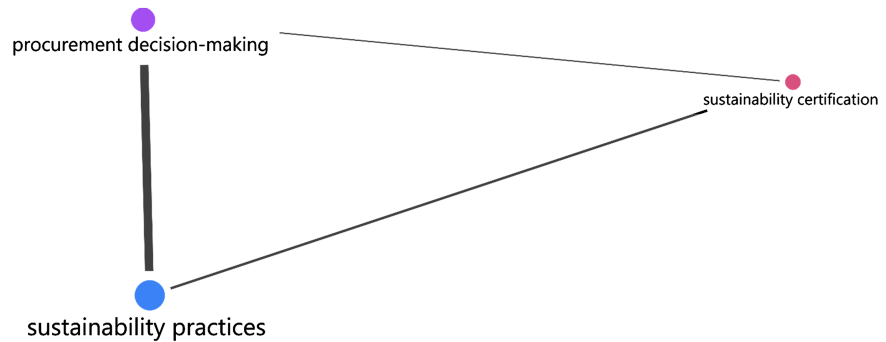


Figure 2. Suppliers engagement model.

The final connection between online courses and networking opportunities suggests that SMEs may use online platforms not only for self-paced learning but also to connect with peers and expand their professional networks. Using digital platforms for both learning and networking reflects a modern approach to sustainable procurement, where SMEs utilize technology to overcome geographical and logistical barriers (Agyemang et al., 2018). By leveraging online resources for education and community-building, SMEs can access a wealth of information and peer support, enhancing their capability to implement sustainable procurement practices.

The code map shows that a combination of online courses, workshops, and networking is essential for knowledge distribution and practice adoption with regard to the first study objective, which looks at the relationship between sustainable procurement practices and SMEs. This is supported by literature that highlights the value of peer cooperation and a variety of learning modalities (Jenkins, 2006). Regarding the second objective, which is to identify constraints, the literature and map indicate that certain SMEs may find it difficult to access these resources. Ghana's printing industry may adopt more sustainable buying methods if these gaps were filled by expanding access to a variety of training forms and creating networking opportunities.

4.3. Constraints to Sustainable Procurement

Figure 3 outlines relationships among core elements related to sustainable procurement practices for SMEs in Ghana's printing industry within the Northern Region. The mapped codes include competing business priorities, lack of financial resources, and limited knowledge/training, each representing resources or mechanisms SMEs may rely on to enhance their understanding and implementation of sustainable procurement practices.

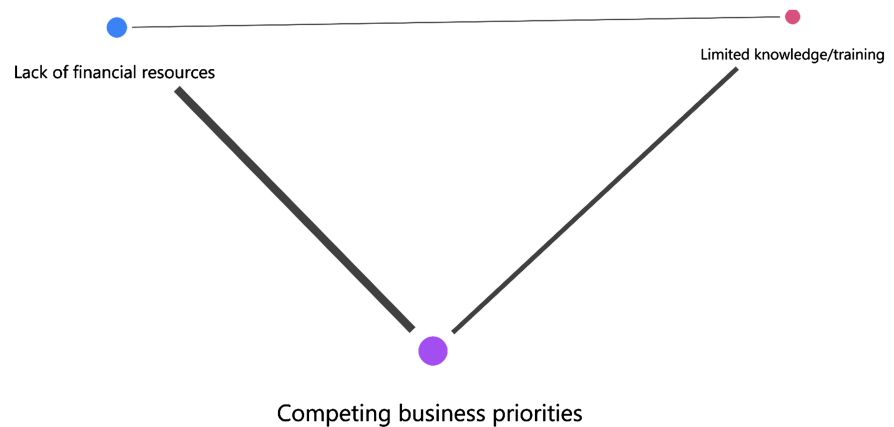


Figure 3. Constraints to sustainable procurement model.

The thicker line indicates the strongest relationship between competing company priorities and lack of financial resources. This indicates a strong dependence of SMEs on formal training programmes and digital learning platforms. This result is consistent with the research on sustainable procurement, which shows that a combination of organised training and open online courses is an efficient way to improve capacity in SMEs (Brien & Hamburg, 2014). Online courses offer SME owners and staff the chance to learn at their own convenience, while workshops provide hands-on learning experiences that enhance knowledge implementation. Such a blended learning method is particularly useful for SMEs that might not have the resources for face-to-face training, allowing for continual skill improvement and consolidation of sustainable buying practices (Callan et al., 2015).

4.4. Awareness and Education

Figure 4 shows the “Education and Training Model” that offers important insights on the factors that affect sustainable procurement practices of SMEs in the printing industry of the Northern Region, Ghana. The model identifies strong links between workshops/training, online courses, networking opportunities, and guides/handbooks, which are the resources that SMEs turn to for understanding and implementing sustainable procurement practices. Workshops/training and online courses are strongly correlated (with a frequency of 4). This implies that SMEs in this area are heavily reliant on planned training and flexible online learning opportunities. Such reliance on easily accessible teaching tools suggests a demand for diverse, practical learning resources, especially in fields with scarce formal education options. A rather strong correlation (frequency of 2) between workshops/training and networking opportunities highlights the importance.

Further connections with lower frequencies between workshops/training, online courses, networking opportunities, and guides/handbooks demonstrate that, although these resources are not as frequently interconnected, they nonetheless serve a supportive function in the sustainable procurement learning ecosystem. Guides/handbooks, for example, are probably basic references that SMEs can use to rein-

force the knowledge learned in more interactive formats such as workshops and online courses. In connection with the first research objective, the model illustrates the importance of a variety of educational and networking tools in relation to the interaction between sustainable procurement practices and SMEs. They seem to be important for the ability of SMEs to engage in sustainable procurement. The approach also indirectly indicates possible obstacles to the second objective, which is about identifying constraints, such as lack of access to training sessions, networking opportunities, or complete information. These constraints could impede SMEs' efforts to adopt sustainable procurement practices effectively. Ensuring greater access to these resources and reducing participation barriers could be pivotal in advancing sustainable regional procurement. Overall, this analysis suggests that a combination of diverse learning opportunities and enhanced accessibility to resources is essential for fostering sustainable procurement practices in Northern Ghana's printing industry.

Code Co-occurrence Model (Code Intersection)

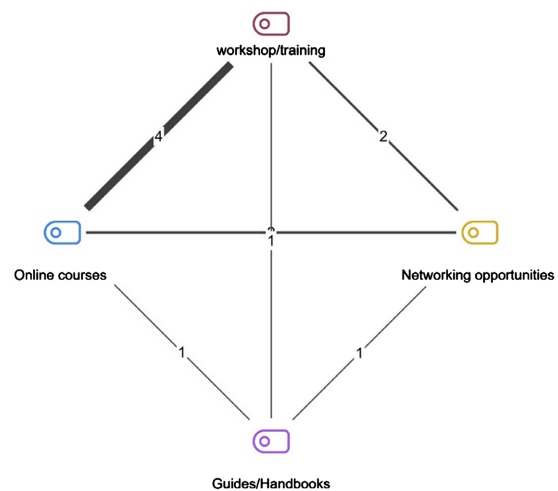


Figure 4. Education and training model.

4.5. Future Directional Model

Figure 5 is a model for the future direction, showing a network of the important components that influence the sustainable procurement practices of SMEs in the printing industry in the Northern Region of Ghana. The literature highlights the role of training, support mechanisms, peer collaboration, and policy frameworks in promoting sustainable practices in small and medium firms. Sustainable procurement methods are critical for SMEs, especially in developing countries, as they strive to achieve economic growth while simultaneously encouraging environmental stewardship and social responsibility (Walker et al., 2008; Agyemang et al., 2018).

The code map illustrates the close connection between training initiatives and helpful resources. It emphasizes the value of practical resources and capacity-

building initiatives. In order to provide SMEs with the knowledge and abilities necessary for sustained operations, training programs are crucial (Agyemang & Ansong, 2017). However, if resources like guidelines, manuals, and online materials are not continuously available, the impact of training may be diminished (Sroufe & Melnyk, 2006). For instance, according to Agyemang and Ansong (2017), the lack of frameworks and instruments to put theory into reality makes sustainable procurement difficult for SMEs in Ghana. This link demonstrates how training should be accompanied by ongoing assistance in the form of readily available resources that SMEs can use in their day-to-day operations.

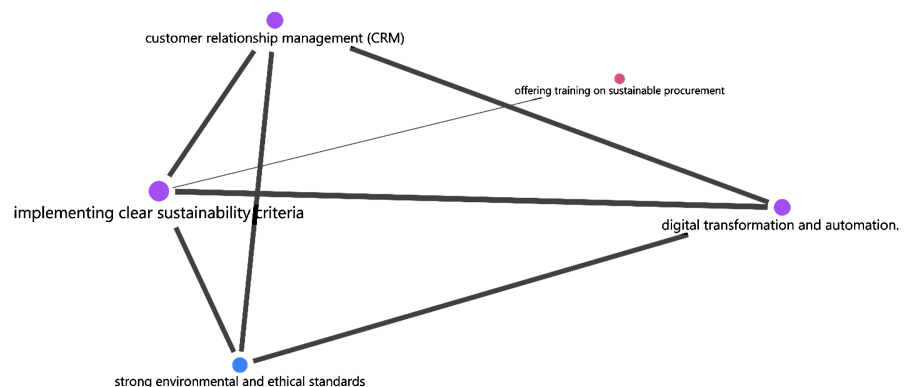


Figure 5. Future directional model.

The code map's depiction of the connection between training programs and peer collaboration reflects the literature's emphasis on the value of collaborative learning. Peer relationships have been shown to have a significant impact on the adoption of sustainable practices by creating a community of learners who share similar values (Preuss, 2007; Seuring & Müller, 2008). SMEs often benefit from settings that enable them to exchange ideas, exchange best practices, and gain knowledge from one another's experiences, especially when resources are limited (Jenkins, 2006). Peer-driven learning promotes knowledge sharing and assistance, which can help SMEs overcome common challenges in sustainable procurement, like scarce human and financial resources (Agyemang & Ansong, 2017).

The literature's conclusions about the need for regulatory support in promoting sustainable practices are reflected in the code map's policy frameworks; however, they are less integrated (Zhu & Sarkis, 2006). Obstacles like inadequate policy communication or a lack of direct regulatory incentives for smaller businesses may be the cause of SMEs' low policy engagement (Walker et al., 2008). SMEs in Ghana are typically ignorant of or lack access to legislative frameworks that support sustainable practices, which may hinder their adherence to and involvement in sustainable procurement regulations (Agyemang et al., 2018). A targeted distribution of incentives and policies that are appropriate for the capabilities and requirements of SMEs is required to close this gap.

The code map demonstrates that training, resources, and cooperation are interconnected elements that are crucial to the successful implementation of sus-

tainable practices, which is consistent with the study's primary research objective of examining the relationship between SMEs and sustainable procurement practices. This is corroborated by research that highlights the need for a comprehensive strategy for community development, education, and resource provision (Agyemang & Ansong, 2017). Together, the code map and literature highlight obstacles to the second objective of identifying constraints, such as a lack of access to policy guidelines and an excessive dependence on unofficial peer networks. Strengthening SMEs' sustainable procurement practices in Ghana's printing industry requires better policy communication, adequate training, and resource availability. According to Walker et al. (2008) and Agyemang & Ansong (2017), a comprehensive approach is required to promote sustainable procurement practices among SMEs through peer collaboration, training, supportive resources, and well-defined policy frameworks.

5. Conclusion and Recommendations

5.1. Conclusion

Based on the findings, the following conclusions have been drawn. SMEs' focus on environmental impact demonstrates a growing awareness of the need to minimize their ecological footprint. This is done by the use of structured resources like guides and handbooks, alongside workshops, to understand and address their environmental responsibilities. Therefore, the development of a sustainable procurement policy is evident through the use of online courses, guides, and networking opportunities, which collectively support a more structured approach to sustainable sourcing.

Limited knowledge and lack of financial resources may be a barrier for some SMEs to practice sustainable procurement. These gaps are therefore resolved by enhancing access to diverse training formats and fostering networking opportunities that could strengthen sustainable procurement practices within Ghana's printing industry.

In conclusion, sustainable procurement practices indirectly highlight potential barriers, such as limited access to training sessions, networking opportunities, or comprehensive informational resources. These constraints could impede SMEs' efforts to adopt sustainable practices effectively. Ensuring greater access to these resources and reducing participation barriers could be pivotal in advancing sustainable regional procurement. Hence, the combination of diverse learning opportunities and enhanced accessibility to resources is essential for fostering sustainable procurement practices in Northern Ghana's printing industry.

5.2. Recommendations

The following recommendations have been made based on the findings and the conclusions made.

SMEs can use structured resources like guides and handbooks, alongside workshops, to understand and address their environmental impact. By adopting these

practices, firms in the printing industry can effectively manage their environmental impact, engage in a more ethical procurement process, and develop robust, sustainable procurement policies that align with global sustainability standards.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no competing interests.

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