

# **Exploring the challenges and opportunities for green supply chain management in Angolan firms: a case study of three Angolan companies**

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*Abstract: In today's world, businesses are increasingly aware of the negative consequences of disregarding the environment. Therefore, promoting social and environmental responsibility has become an essential organizational strategy. Green Supply Chain Management (GSCM) is rapidly gaining momentum in Africa as a viable solution to achieving sustainability goals. However, it is crucial to address the unique challenges and opportunities that are specific to developing countries like Angola when implementing this approach. To this end, a qualitative exploratory study was conducted to investigate the challenges and opportunities for GSCM in Angolan firms. The study involved in-depth interviews with three Angolan Small and Medium-Sized Enterprises (SMEs). The results indicate that waste management, green procurement, energy management, water management, eco-design, and pollution management are the most common types of GSCM practices in Angolan firms. However, the study also revealed that companies in Angola often face challenges such as high implementation costs, lack of knowledge, absence of policies, and lack of incentives when attempting to implement green practices. Despite these challenges, the implementation of GSCM practices in Angolan firms has significant benefits. The study further highlights the need for increased awareness among suppliers and consumers about GSCM practices, particularly among SMEs. Additionally, more programs should be made available to the general population to improve awareness. Furthermore, new policies should be developed to address the environmental damage caused by human activities in the country. This study provides a basis for future research to evaluate the implementation of GSCM practices in Angola. Overall, promoting social and environmental responsibility is a crucial organizational strategy, and GSCM offers a promising solution to achieving sustainability goals in developing countries such as Angola.*

*Keywords: Green supply chain management; Challenges and Opportunities; Angola Sustainable supply chain management*

# 1 Introduction

As the demand for sustainable products steadily rises, environmental issues have become central to worldwide discussions within industrial and non-industrial forums. Green supply chain management is a crucial approach to address the environmental impact of business operations. It focuses on mitigating the environmental effect on the supply chain, which can have far-reaching implications for the well-being of our planet. However, achieving sustainable goals calls for a significant paradigm shift in the mindset and strategies of organizations, with a greater emphasis on the adoption of new and innovative methodologies that promote environmentally-friendly practices.

Green Supply Chain Management (GSCM) can be regarded as an innovative and solution-driven approach encompassing various elements that enhance different supply chain and supply chain management operations while minimizing the likelihood of damaging the environment.

In Angola, the implementation of green supply chain management is a new concept that presents a range of challenges and opportunities for companies. The country is rapidly industrializing and urbanizing, leading to various environmental problems like deforestation, pollution, and waste generation. Given the fact that Angola's economic growth depends heavily on natural resources, it is crucial to find a balance between environmental concerns and the country's economic development goals. Early efforts have been compromised by the Covid-19 Pandemic, which has caused financial difficulties that have hindered efforts to adopt sustainable practices by both the government and organizations.

This study aims to conduct a thorough analysis of three Angolan companies and their practices related to GSCM. The study aims to identify challenges and opportunities in this area and is the first of its kind to address the topic in Angola. The ultimate goal is to bridge the gap in the existing literature. The study focuses on a specific topic, and the following research questions have been formulated accordingly:

RQ1: What are the opportunities and challenges that Angolan firms face in implementing green supply chain management practices, and how can these challenges be addressed?

RQ2: Which green supply chain management practices are most commonly implemented by enterprises in Angola?

This study is organized into five distinct sections, each serving a specific purpose in exploring the topic of green supply chain management in Angola. Section 1 offers an introductory overview of the study's aims, objectives, and research questions. Section 2 discusses the theoretical background of green supply chain management both globally and in Angola. Section 3 outlines the adopted methodology. Section

4 presents and discusses the results of the three case studies. Lastly, Section 5 includes the conclusion, limitations, and suggestions for future work.

## **2 Theoretical Background**

This section aims to provide a comprehensive overview of the important aspects of green supply chain management literature. Firstly, we outline the general concept of green supply chain management by summarizing relevant studies on the subject. Following this, we explore the current literature on the implementation of "green" practices in Angola.

### **2.1 Green Supply Chain Management**

Green supply chain management is based on the principles of supply chain and supply chain management. The latter involves efficiently coordinating a complex system of operations to deliver a fully completed product to the end consumer or user [1]. As defined by Srivastava [2, p. 54], green supply chain management consists of “integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final products to the consumers, and end-of-life management of the product after its useful life.” According to Shahriarpour and Tabriz [3], the primary goals of supply chain management are customer satisfaction, demand fulfillment, and profitability. Therefore, adopting green supply chain management practices is crucial for organizations looking to meet their sustainability goals and demonstrate their commitment to protecting the environment. This management approach aims to optimize business operations to mitigate environmental impacts and reduce damages and has garnered considerable interest among professionals and scholars across various industries. In recent years, it has become one of the most desired strategies by organizations to reduce the negative impact of their business activities on the environment.

Global events such as wars, financial crises, and pandemics can inflict severe damage on our planet. The COVID-19 Pandemic, for instance, has had a significant impact on the healthcare and economic systems worldwide and has also notably influenced the implementation of GSCM. In addition, the pandemic has led to the disintegration of traditional supply chains, the demise of countless small and medium enterprises, reduced consumer demand, and fostered the development of new markets, with some being displaced along the way [4]–[6].

### 2.3 Green Practices in Angola

Despite the large number of studies conducted on green supply chain management implementation, opportunities, and challenges in regions such as Asia [7]–[10] and Europe [11]–[13], there are very few studies that focus on green supply chain management in Africa. For instance, Angola is a country with currently little to no research publications available on GSCM challenges and opportunities, making the implementation process of sustainable practices more difficult.

Like many other developing nations, Angola faces various environmental difficulties, including deforestation, soil erosion, water contamination, and air pollution. Nonetheless, the most pressing climate predicament at the moment is the drought in the country's southern provinces, which is adversely affecting agriculture and the well-being of the people living in the region [14]. This was worsened by the current economic situation in Angola, which has been affecting the growth of local companies, especially in the wake of the COVID-19 pandemic. As a result, adopting green practices has become a challenge, mainly due to financial limitations. Furthermore, the environmental problems in Angola arise due to factors such as rapid population growth, urbanization, unsustainable farming practices, poor waste management, and inadequate implementation of environmental policies. For instance, Angola has experienced a significant increase in CO<sub>2</sub> emissions, as shown in Fig 1

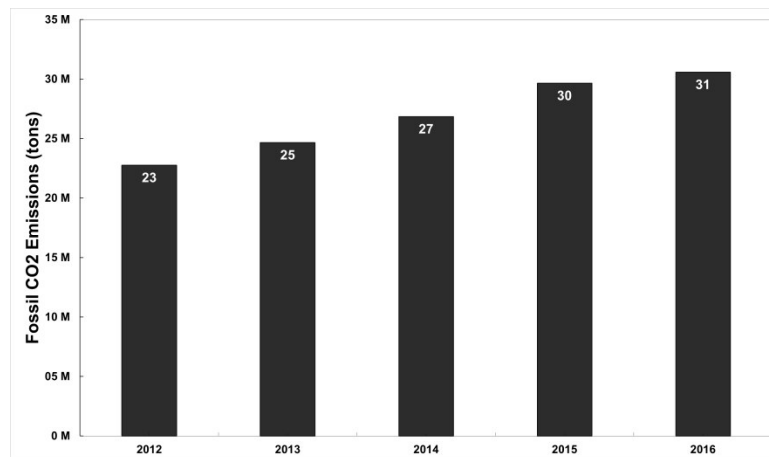


Figure 1.

Emission of CO<sub>2</sub> in Angola, 2012-2016

Source: Authors, based on Worldometer [15].

The absence of solid climate policies in Angola always posed a burden in tackling the numerous climate problems that affect the country. However, the Angolan government has set in place a framework to tackle environmental concerns through Article 39 of The Constitution of the Republic of Angola from 2010, which ensures that it has the right to live in a healthy and unpolluted environment and the duty to

defend and preserve it. Moreover, this legal framework demonstrates Angola's commitment to sustainable development. Angola relies heavily on oil and gas for its public revenue. Unfortunately, these resources have become a major focus for both local and global environmental activists. Therefore the country needs to explore new and creative ways to expand its economy, focusing on environmentally sustainable options.

### **3 Methodology and Data Collection**

This study employs an exploratory multiple-case study strategy to explore the participant experiences, uncovering unexplored challenges and opportunities in green supply chain management in Angolan firms. The research was conducted according to the recommendations of Yin [16]. Therefore, to address the study objectives, we conducted semi-structured interviews with three respondents: the CEO and two Senior Managers of the three selected companies. According to Grosseohme [17], case study research with semi-structured interviews allows researchers to ask follow-up questions and investigate the phenomenon in greater detail. Therefore, this approach was preferred for the present study.

This research is based on multiple case studies with three small Angolan companies operating in different sectors and locations. To gather data, we utilized a combination of primary and secondary sources. In the field of social sciences, it is imperative to practice triangulation, which involves using multiple data collection methods to enhance the validity and reliability of the research [18], [19]. Therefore, we collected primary data by conducting in-depth interviews with representatives of all three companies. In addition, we analyzed technical documents, reports, and articles from various internal and external sources to gather secondary data. Due to mobility restrictions, the interviews were held online through Zoom. Furthermore, the restricted number of interviews resulted from limitations in volunteers' availability and time constraints, although the obtained data was sufficient to proceed with the research.

In pursuit of a comprehensive understanding of GSCM in Angola, we engaged companies operating in distinct locations and with distinct business models. One company was based in the country's capital, Luanda, while the others were located in the second and third most populous cities, Benguela and Huambo. To ensure confidentiality and protect the participants' anonymity, all interview data were anonymized, and each company was assigned a code (CP1, CP2, CP3) for reference, as shown in Table 1.

The research conducted has some limitations. Firstly, the number of companies interviewed may not give a complete view of the current state of green supply chain management across the entire country. Secondly, the study only focused on Small

and Medium Enterprises (SMEs), so further research on larger corporations may highlight additional practices that have yet to be discussed.

Company ID	Industry	Respondent Designation
CP1	Retail	CEO
CP2	Environmental consulting	Manager
CP3	Construction	Manager

Table 1.  
 Characteristics of the firms  
 Source: Authors

To analyze the interview transcripts, we used the content analysis method with the assistance of software called Atlas.ti. This qualitative data analysis tool helps researchers analyze and code transcripts.

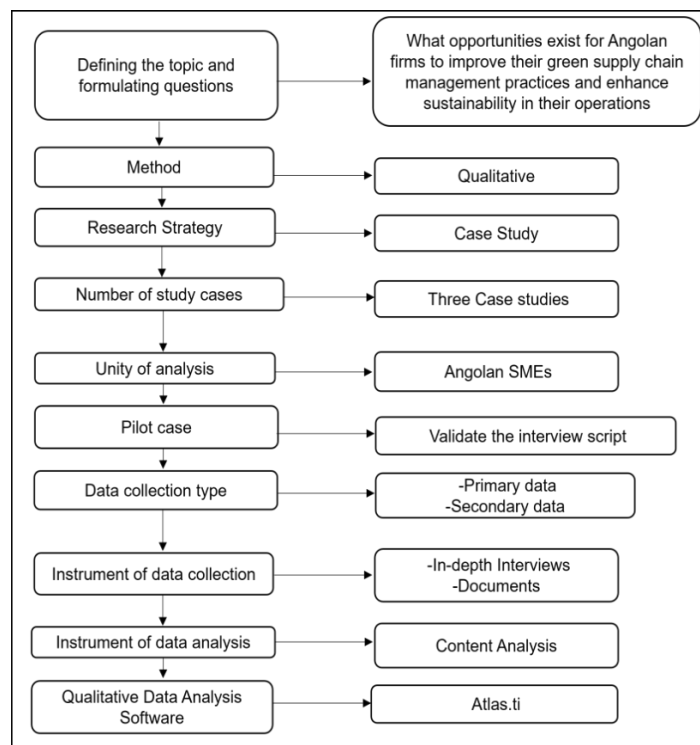


Figure 2.  
 Methodological steps  
 Source: Authors

The first step was to transcribe the interviews that we had conducted. We listened carefully to the recordings and transcribed them into a Word document. As the interviewees preferred Portuguese, we transcribed the interviews in that language and later translated them into English. The next stage involved analyzing the data for recurring themes and patterns, which we achieved by coding the textual material. We identified keywords and themes and then calculated the frequency with which they were mentioned. After segmenting the data and identifying themes and patterns, we were able to draw appropriate conclusions and recommendations by reassembling the data.

## **4 Results and Discussions**

### **4.1 Case Studies**

CP1 is a retail business that was established in 2015 by three Angolan entrepreneurs. It is situated in Benguela, which is the third most populated city in Angola and has a chain of stores across Benguela and Lobito. CP1 trades in a variety of products, such as clothing, electronics, and household goods. This year, the company expanded its operations to Bie, another city, as part of its long-term objective of expanding to all 18 provinces in Angola. After conducting interviews and analyzing documents, it was confirmed that the company has been actively implementing more environmentally-friendly practices in its business operations. This includes reducing electricity and water consumption, recycling, and green procurement. The interviews revealed that these practices have had a positive impact both internally and externally. However, the cost of implementing these practices has been a barrier to adopting more of them.

CP2 is a highly competent small and medium-sized enterprise founded in 2017 in Luanda, Angola's capital. Their expertise lies in providing top-notch environmental consulting services for engineering projects, which are innovative and secure and uphold ethical and technical standards. With their innovative solutions, CP2 strives to solve socio-environmental challenges while ensuring sustainable exploration. Furthermore, they prioritize delivering economically feasible solutions aligned with their unwavering sustainability commitment.

CP2 has gained significant recognition in the local market due to its extensive campaigns focusing on environmental issues. These campaigns have been broadcasted on public television and social media platforms. Additionally, the company offers its services across all cities within Angola. Upon analyzing the interview results and relevant documents, it was evident that CP2 is committed to implementing green practices and consistently engages in green marketing initiatives.

CP3 is a reputable construction services company founded in 2003. It is located in Huambo, the second most populous city in Angola, and is well-known for its top-notch services. The company's business model is designed to cater to low-income families, enabling them to access quality services at an affordable price. CP3 operates in three cities, including Bie and Lubango, and offers a wide range of construction and renovation services for residential and industrial projects.

In addition to providing excellent services, CP3 is committed to promoting sustainable practices in its daily operations. This includes waste, energy, and water management, as well as the use of fuel-efficient equipment. The interview and other documents provided confirm the company's commitment to sustainability.

Practices	Case Studies		
	CP1	CP2	CP3
Green Procurement	Little investment in the purchase and sale of sustainable goods	The company strategy revolves around the utilization of green products.	Little investment in sustainable materials.
Waste Management	Committed	Committed	Committed
Energy Management	Committed	Committed	Committed
Energy Management	Committed	Committed	Committed
Green Marketing	Lacking	Committed	Lacking.
Water Management	Committed	Committed	Committed
Eco-Design	Lacking	Committed	Committed
Pollution Management	Committed due to legislation	-Wide-scope actions regarding the use of eco-friendly products internally and externally. -Legislation obligations.	Committed to due to legislation

Table 2.  
Summary of case studies  
Source: Authors

After analyzing the data collected from interviews and documents, we found that all three companies have similar views on the opportunities presented by green supply chain management. Company CP2 sees sustainable practices as a way to repair the environmental damage caused by human activity. The company



emphasizes that adopting green practices can help organizations both economically and environmentally. CP1 and CP3 also view green supply chain management as an opportunity to improve their environmental impact and enhance their company's image and economic performance. All three companies confirm that implementing green practices has numerous benefits. For example, CP1 notes that some customers appreciate their green initiatives, such as providing recyclable materials in their stores, which sets them apart from other local shops. A study by Dhull and Narwal [20] reported similar results.

Although GSCM offers many benefits, companies often encounter obstacles that hinder the implementation of these practices. One such challenge is the need for more awareness and knowledge among both suppliers and buyers, making it difficult to adopt new approaches. The CEO of CP1 highlighted this issue: *“It is important to be aware of new market trends and developments as it helps to stay ahead of competitors. For a small company like us [...], neglecting to stay informed can result in falling behind and missing out on opportunities for growth and success.”*

The three corporate entities identified as CP1, CP2, and CP3 have reported other obstacles that hinder the implementation of GSCM practices. Among the factors are the cost of implementing certain practices, the lack of incentives, and the absence of local government policies that aim to standardize the implementation process. For example, the Manager of company CP3 stated: *“Without uniform policies, it becomes harder to implement it [implement sustainable practices]. We need policies that everyone can [...] and should adhere to.”*

According to the data presented in Table 2, it is evident that all three companies have implemented at least one Green Supply Chain Management (GSCM) practice. This observation suggests that GSCM is progressively gaining recognition among Angolan firms, despite its relatively early stage of development. Based on the collected data, Fig 2 displays the three companies' most commonly utilized green practices.



Figure 3.  
Most implemented GSCM practices  
Source: Authors

## Conclusions

According to the research findings, green supply chain management is still in its early stages in Angola. Despite this, several companies are already adopting green practices in their operations to mitigate the impact on the environment.

The interviews also show that three selected companies utilize green practices, mainly to abide by local laws and regulations and to gain competitive advantage. We found that the three companies employ some GSCM practices, such as green procurement, energy management, water management, waste management, and eco-design, to improve customer satisfaction, comply with local environmental regulations and improve their economic performances. However, the degree of adoption varies among each enterprise. The interviews have also highlighted the importance of raising awareness about green supply chain management among both suppliers and consumers. Consequently, there is still a need for more local campaigns that aim at promoting sustainable practices in Angola.

The economic growth of local companies in Angola has been limited by the current economic situation, particularly in the aftermath of the COVID-19 pandemic. This has presented a challenge for the adoption of green supply chain management practices, mainly due to financial constraints. In addition, various other obstacles have been identified, such as the need for a robust policy structure for climate issues, the high cost of implementation, limited knowledge, and the absence of incentives.

These barriers pose significant implications for the implementation of this management strategy, requiring significant efforts to overcome them and enable companies to focus on achieving more sustainable objectives. To achieve sustainable goals in Angola, it is important for various stakeholders to be involved, such as the government, business owners, consumers, non-governmental organizations, and academic researchers. Each stakeholder's contribution is essential to successfully implementing sustainable practices. Therefore, collaboration among stakeholders is crucial to achieve the desired outcome. The government, in particular, plays a significant role in shaping the country's adoption of green supply chain management practices by proposing and implementing efficient policies and focusing on incentivizing the population to adhere to more sustainable practices.

Based on the findings of our interviews, it is strongly advised that more companies operating in Angola begin implementing sustainable and eco-friendly supply chain management practices. This is crucial in order to stay in line with the latest industry standards and expectations and to ensure long-term success in an ever-changing business environment.

To better understand how green supply chain management practices are implemented in Angola, we recommend increasing the sample size of future studies. We also suggest using a quantitative research approach to gain a deeper understanding of how these practices affect different companies. Based on our analysis of recent research, it is clear that additional studies are needed to comprehend and implement sustainable practices in Angola fully.

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