

Green Logistics Practices in the Supply Chain and Operational Performance: Evidence of Nile Equatorial Lakes Subsidiary Action Program Coordination Unit Rusumo Construction Project

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Abstract

This research aims to find out the effect of green logistics practices on multinational firms' operational performance in Rwanda. The research aimed to evaluate the effect of a green warehouse on operational performance, determine the impact of green packaging on operational performance and estimate the impact of transportation methods on multinational company operational performance. The researchers used a quantitative research design to analyze the effects. Data were collected from 65 employees using a questionnaire survey and documentary review. To assess quantitative data, descriptive and inferential statistics were utilized to analyze data using SPSS. The findings reveal that green logistics methods are positively and significantly related to multinational construction operational performance. Furthermore, according to the correlation coefficients $r=0.728$, $r=0.796$, and $r=0.841$, there is a favourable association between green warehouse management, inventory management/green packaging, and operational performance in logistics practice. Furthermore, the study discovered by practicing green logistics, the firms boost efficiency and improve service quality, labor quality, and productivity. Given the importance of green logistics management practices in multinational corporation construction projects, stakeholders' risk analysis also is required to limit environmental and social damage to the local community caused by project activities.

Keywords

Green Logistics, Green warehousing, Green packaging, Green Transportation

1. Introduction

In recent decades, there has been an increase in demand for products and logistical services, resulting in a dramatic increase in the consumption of resources and energy as well as the emission of ecologically harmful gases and waste into the environment (Yingfei et al. 2022; Akyelken 2011). Globally, logistics and transportation service emissions account for 13% of Greenhouse Gases (GHG) emissions (Yingfei et al. 2022). Green logistics is part of an organization's activities that aims to measure and reduce the environmental impact of logistical activities. Such measures are determined by the possibility of gaining a competitive advantage in the market required by clients (Larina et al. 2021). Traditionally, the main objective of logistics was to have the right amount of materials or products in the right place (Tian 2008) mostly in a linear way. However, a more contemporary concept, the circular economy incorporates logistics into reuse, remanufacturing, recycling, and trash disposal by developing a closed-loop supply

chain (Muazu 2019). It is evolving as a method that considers the entire scope of logistics, which is the greening of both the forward and reverse segments of supply chains (Kong et al. 2021).

Green logistics practices in the supply chains are the ways to go. It remains an indirect result of policies and strategies aimed at improving the cost, efficiency, and reliability of supply chain performance (Karaman et al. 2020). It includes all activities related to the eco-efficient organization of the forward and reverse flows of information and goods from the point of origin to the final point of consumption to fulfil consumer expectations. In supply chains, green logistics practices include but are not limited to green packaging, route optimization, fuel efficiency, carbon emission measurement, and reverse logistics (Akyelken 2011). Green logistics should not only focus on activities that harm the environment but also offer tools and habits that will help the social community's betterment and speedy economic development (Bajdor 2012). For this purpose, various firms in Rwanda have implemented green logistical strategies to this end. Of course, not all businesses apply to the same extent (Kong et al. 2021). For instance, while some organizations adopt a proactive approach, others focus only on meeting regulatory obligations (Akyelken 2011). Briefly, not all organizations are eagle when it comes to green logistics.

To the best of the authors' knowledge, the relationship between green logistics practices and corporate performance is inconsistent. For example, while some studies show that green logistics is very beneficial as one of the trends in the logistics industry's future growth (Seroka-Stolka and Ociepa-Kubicka 2019), others studies showed that green logistics does not bring any economic benefit to a company (Yingfei et al. 2022; Zaninović et al. 2021). To minimize GHG emissions, the government of Rwanda put more emphasis on involving parties in the supply chains like materials suppliers, service providers, vendors, distributors, and end users who collaborate to reduce or eliminate negative environmental consequences caused by their activities (Hakuzimana 2021).

1.1. Aim and Objectives

The main objective of this study is to determine the effects of green logistics management practices on the supply chain and performance of multinational corporations (MNCs) in Rwanda. To achieve this aim, the research is guided by three objectives:

- (1) To evaluate the effects of green warehouses on MNC operational performance in Rwanda;
- (2) To determine the impact of green packaging on MNC operational performance in Rwanda;
- (3) To estimate the impact of green transportation methods on MNC operational performance in Rwanda.

2. Literature review

Logistics management is a network of interconnected enterprises that comprises freight transportation, inventory storage, material handling, information processing, and information exchange among supply chain partners involved in the transportation of goods (Akyelken 2011). The logistics management practice is a chain of integrated firms that includes freight transit, inventory storage, material handling, information processing, and information sharing among supply chain parties involved in transporting items (Muazu 2019). Green Logistics is a logistics activity that aims to reduce environmental pollution and resource consumption by utilizing advanced logistics technology in the design and implementation of transit, storage, packaging, handling, processing, and distribution (Kong et al. 2021; Zhang and Zhao 2012). Companies are adopting green logistics practices to reduce their environmental effect while improving their performance (Agyabeng-Mensah et al. 2020).

The term "green warehouse" refers to determining space, stock layout, configuration, and inventory placement (Buba et al. 2019). Recently, green warehousing seeks to reduce its environmental impact by implementing best practices such as automation, lean warehousing, and green building (Luu 2016). A study conducted in Hong Kong indicated that for an organization to achieve green warehousing more applications of digitalization like artificial intelligence (AI) Internet of things (IoT) to enhance automation and less human dependence would be needed (Wahab et al. 2018; Becerra et al. 2021). In addition, the same study indicated green warehouse requires constantly updated logistics technology and the use of machines with lower energy fuel consumption and pollution (Becerra et al. 2021). Johnson (2008) viewed carbon emissions in relation to warehouse material handling equipment and stated that data on carbon emissions and energy consumption rates in warehouse operations is lacking. The practice, managers tend to focus on a cost-of-ownership approach based on equipment cost, fuel cost, and maintenance cost rather than a broader analysis of total emission when selecting material handling equipment (Yingfei et al. 2022).

Janota et al. (2010) and Zhang and Zhao (2012) concentrated on green packaging, often known as ecologically friendly packaging, and indicated that the goal of green packaging development is to enable the use of lightweight, recyclable,

re-useable, and biodegradable materials, as well as to prevent the use of non-ecological materials. Authors like Zhang and Zhao (2012) and Yingfei et al. (2022) viewed that green packaging can only be possible if the government prohibits the use of certain packaging materials, establish a storage refund system, drafts recycling or re-use laws, provides a tax break or penalty, and limit over-packaging. The government can also establish various research institutions to evaluate packing materials and pass legislation encouraging the development of new packaging materials. Such measures will greatly help to coordinate green logistics activities (Larina et al. 2021).

Authors like Hakuzimana (2021) and Gikonyo (2022) in their studies conducted in Rwanda and Kenya respectively focused on green packaging which is also referred to as environmentally friendly packaging. They argued that packaging material could be made from natural plants that can withstand repeated use and is ready for degradation. Moreover, Green packaging is made of renewable resources that are environmentally friendly and attained by the following guidelines: reduce, reuse, reclaim, recycle, biodegradable, and improve performance (Gikonyo 2022). According to Gikonyo (2022) and Atrek and Idalou (2014), the recyclables of packaging or reusability of containers, the use of environmentally friendly materials in packaging, and the application of environmental management strategies are all variables influencing green logistics.

De Assis and Sagawa, (2018) used mathematical modelling to demonstrate the use of tools for material handling, storage management, and control helped in quick and efficient green logistics. The same study claimed that Warehouse Management System (WMS) is one of the viable options for the automation of logistic processes. The firm can achieve this by upgrading warehouse lighting with high-efficiency options, creating natural electricity, and installing rooftop or sidewall solar panels on warehouse facilities. Popular types of solar panels include mono-crystalline, polycrystalline, and thin-film panels (Larina et al. 2021). Aravindaraj and Rajan Chinna (2022) claimed that the recycling program provides employees with a sense of empowerment and contributes to green warehousing efforts, hence increasing productivity.

On the other hand, Larina et al. (2021), pointed out that "green logistics" should not only focus on actions aimed at minimizing the harmful effects on the environment, but also introduce tools and habits that will help to improve the social community and speedy economic development. Finally, the organization applying green logistics accomplishes not just cost optimization to improve service quality. It also enhances labour quality and efficiency, as well as recognition from customers and suppliers (Mak et al. 2022). Salkid (2010) claimed that the influence of transport provider interactions and customer interactions should be studied as they might have a major impact on transport uncertainty and green logistics performance. Besides, (Karaman et al. 2020) pointed out that organizations implement green logistics practices when companies integrate their human resources to provide a sustainable supply chain. It will help the organization to develop a strong relationship between internal and external stakeholders to adopt green logistics.

Green transportation is a low-emission and environmentally-friendly means of transportation. It aims to reduce greenhouse gas emissions, air pollution, noise, and space utilization, but also poverty and stimulate economic growth (Larina et al. 2021). A study conducted on Tanzanian manufacturing companies claimed that logistics is one of the tools that contribute to the national economy by creating jobs, increasing national income, and attracting foreign investment (Richard, 2020). In this respect, it is worth noting that the fundamental job of transportation logistics is to control material flows from the manufacturer to the destination on time, and transportation is the key aspect of logistics (Dametew et al. 2020). Green logistics in this context can be achieved by reducing greenhouse gases from transportation by streamlining transport activities, applying modern technology, and using lower carbon fuel (Bag et al., 2020).The elements that contribute to green transportation include, among other things, the fuel used by the transporting vehicle, the frequency of journeys, the distance to the clients, and other aspects like materials, shapes, and weight (Tuzun Rad and Gulmez 2017).

On the other hand, studies determine the relationship between green logistics and operational performance, with conflicting results. According to (Rene et al.2020), a firm that practices green logistics reaps economic benefits such as increased speed, reduced operating expenses, and increased efficiency. Sarwar et al. (2020) argues that a company's green logistics have no immediate influence on its profits or sales. While Agyabeng et al. (2020) claimed that green warehousing and logistics have no significant impact on performance outcomes but improve economic performance through supply chain sustainability. According to Hakuzimana (2021) and Aravindaraj and Rajan Chinna (2022), practising green logistics benefits corporations by reducing waste and expenses while enhancing firms' reputation and customer loyalty. (Larina et al. 2021) claimed that by practising green logistics, the organization will finally

accomplish not just cost optimization, increased service quality, enhanced labour quality, and efficiently minimizing costs but also recognition from customers and suppliers.

3. Research Methodology

The study is based on survey and the overall design is both quantitative and qualitative. It helped to measure the subject behaviour, preference, intention and opinions. It was sent to the company's employees in the form of close and open questions. The questionnaire was chosen because it helped to gain relevant information quickly and effectively.

3.1. Design population and sample

This is a population-based cross-sectional study of 65 employees from the NELSAP-CU, Rusumo project. A questionnaire survey was utilized to collect data from employees from different departments, as well a documentary review provided more insights. The researcher used a quantitative research design. The population was all NELSAP-CU staff, as the study population was small; selecting the sample was not needed. The sample size equals the study population.

3.2. Questionnaire and variable measurement

Data were collected from primary sources using the questionnaire. The respondents' opinions were measured using a Likert scale questionnaire, and the level of agreement was represented by codes: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly agree. Extra columns were added at each table of response items to enable respondents to provide extra narrative information.

3.3. Data Collection and analysis

Data were collected from primary sources using the questionnaire. Salkid (2010) indicated that primary data is the data collected specifically for the investigation at hand. The researcher employed structured questionnaires as the major source of data collection from the respondents in this study. Because it is basic and easy to grasp, the study used a five-point Likert scale. Respondents were asked to rate their level of agreement on various response items using one of five scales. The researcher organized and analyzed the data acquired using the Statistical Package for Social Sciences (SPSS). Descriptive statistics have been used to analyze the data and the findings were reported using tables.

4. Results and Discussion

4.1 Green warehouse practices on the Operational Performance

This section presents the summary of collected data (see Table 1) to understand the perceived effect of the green warehouse on the operational performance of NELSAP.

Table 1. Perceived effect of the green warehouse on the operational performance of NELSAP

No	Items	1	2	3	4	5
5	The energy system in the warehouse	6%	7%	5%	21%	61%
6	Integrated Inventory control system	23%	32%	37%	5%	3%
7	Material Handling Equipment in warehousing	8%	9%	5%	31%	47%
8	Regulated optimum temperature system	3%	4%	-	67%	26%
9	Security is provided to protect stored product	4%	17%	19%	42%	18%
10	A cost-effective transportation system is accessible	3%	8%	6%	55%	28%

According to item 5 in Table 1, 82% of respondents agree that the NELSAP-CU Rusumo project on the point of the energy system in the warehouse. The company uses minimum energy and minimize green activities that deals with lighting, air tightness and thermal insulation to ensure reduction of energy consumption in the warehouse, 13% disagreed, and 5% remained neutral. The energy system adopted as represented by 82% of the respondent makes it easier to cut electricity bills and carbon emissions. These findings are consistent with the existing findings (Agyabeg-Mensah et al.2020; Afum et al.2020) who indicated that the implementation of energy stems in the warehouse reduce costs and employee safety as well as protecting the environment. However, as seen in item 6, 55% of respondents

reported unsatisfactory inventory software control, compared to 37% who were neutral and 8% who agreed, showing an overreliance on traditional inventory management procedures. Furthermore, 78% of respondents stated that there was material handling equipment to move products, which aided in inventory transportation. Only 5% agreed with the proposition, while 17% disapproved.

In item 8, 93% of respondents agreed that orders for shipping supplies are fulfilled on time, while 7% disagreed with the assertion. This demonstrates that the NELSAP-CU Rusumo project has an effective and timely customer support mechanism. In addition, for item 9, 60% agreed that security is provided to secure stored products, compared to 19% who were neutral and 21% who disagreed. However, several products were susceptible to damage as a result of poor weather circumstances such as heavy rain and wind. Item 10 also shows that 83% agreed that cost-effective transportation methods were available, 6% were neutral, and 11% disagreed. This demonstrates that the institution prioritizes transportation cost reduction. However, it was further revealed that the mountainous nature of the country was keeping transport costs high.

Table 2. Correlation between Green Warehouse Management (GWM) and Operation Performance

		Warehouse management	Operations Management
Green Warehouse Management	Pearson Correlation	1	.728**
	Sig. (2-tailed)		.000
	N	65	65
Operation Performance	Pearson Correlation	.728**	1
	Sig. (2-tailed)		
	N	65	65

**Correlation is determined at 0.01 (2-tailed)

Table 2. The Pearson Correlation ($r=.728$) shows that there is a positive relationship between Green Warehouse Management and NELSAP-CU Rusumo project operational performance, with a PC coefficient of $r=.728$ and statistical significance at the 0.01 level. $P=0.00001$ and $r=.728>0.5$ show that a favourable modification in the Warehouse Management function improves operational effectiveness in the Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP-CU) Rusumo.

Table 3. Effect of Green Packaging Management on the operational performance

No	Items	1	2	3	5	5
11	We use recyclable packaging materials	7%	9%	68%	11%	5%
12	Bio-degradable Materials in Packaging	12%	14%	7%	29%	38%
13	There are policy guidelines to monitor the use of bio-degradable materials	4%	11%	8%	36%	41%
14	Post-consumer recycled polyethene bags from waste	45%	19%	16%	9%	11%
15	The firm has best practices in renewable resources-based packaging materials	2%	4%	7%	54%	33%
16	The firm uses the minimum possible packaging materials to save on cost	38%	32%	13%	7%	10%

It is observed in table 3 that there was a positive effect of various green packaging items on the operational performance of the NELSAP-CU Rusumo Project. Item 11 shows that 16% of respondents agreed that the NELSAP-CU Rusumo project use recycle packaging materials as per government policies. However, 68% remained neutral while 16% disagreed with the statement. This indicated that the firms surveyed do not utilize recyclable packaging materials despite government policies.

Furthermore, item 12 shows that 67% agreed that the institution has not Bio-degradable Materials. Only 7% of respondents were neutral, while 26% disagreed with the statement. The high level of the agreement (67%) shows that the NELSAP-CU Rusumo Project prioritizes steps to decrease environmental degradation by using Bio-degradable

Materials to improve product quality. Policy guidelines are also available, as evidenced by question 13, where 77% of respondents agreed versus 8% and 15% who were neutral or disagreed. This demonstrates the NELSAP-CU Rusumo Project's commitment to monitoring the use of biodegradable materials. The statement that the corporation uses minimal transportation packaging materials to safeguard the environment and decrease transportation costs were likewise disputed by 64%, compared to 9% who stayed neutral and 11% who agreed. This shows that NELSAP-CU Rusumo Project is keen on minimizing the institution's inventory costs on operations management.

Finally, item 16 shows that 70% of the respondents indicated that manufacturing firms that supply materials do not use best practices to enhance packaging optimization through reduction of packaging retaining product protection, which means increased costs and lack of proper protection is high, 13% were neutral, and 17% disagreed with the statement. It demonstrates that the firm's costs have increased, and the importance of adequate product protection is considerable. It demonstrates that manufacturing enterprises contribute to environmental damage through unsustainable packing strategies, which do not result in lower prices or increased consumer satisfaction.

4.2 Green Packaging and Operational Performance

A Pearson Correlation (PC) test was conducted based on 64 responses to establish the association between green packaging and the NELSAP-CU Rusumo project's operational performance. The results are presented in Table 4.

Table 4. Correlation between Green packaging and Operation Performance

		Green Packaging management	Operation Management
Green packaging	Pearson Correlation	1	.796**
	Sig. (2-tailed)		.000
	N	64	64
Operation Performance	Pearson Correlation	.796**	1
	Sig. (2-tailed)		
	N	64	64

**Correlation is determined at 0.01 (2-tailed)

The PC coefficient $r=.796$ in Table 4 with statistical significance at the 0.01 level indicates that there is a positive association between Green packaging and firm's operational performance. The probability (P) value of $P=0.0000.01$ and $r=.796>0.5$ show that a positive adjustment in the green packaging function improves the firm's operational performance.

4.3 Green Transport (GT) practices and Operational Performance

The purpose of this study was to explore respondents' assessments of the effect of Green Transportation on the operational performance of multinational company. The responses were constructed on a five-point Likert scale, with 1 indicating Strongly Disagree, 2 suggesting Disagree, 3 indicating Neutral, 4 indicating Agree, and 5 indicating Strongly Agree. Table 5 displays the results.

Table 5. Relationship between Green Transportation on the operational performance

No	Items	1	2	3	5	5
17	We respect environmental regulations in selecting transportations modes	6%	8%	4%	24%	58%
18	The firm Practices route mapping and planning	6%	9%	12%	33%	40%
19	The firm has adopted containerization	3%	12%	7%	32%	46%
20	The firm consolidates its supplies at scheduled intervals	5%	7%	4%	60%	24%
21	The firms use express delivery companies	12%	8%	13%	47%	20%

The study discovered that the effect between the factors was positive in the table above on how green transportation improves the operational performance of the NELSAP project. Item 17 reveals that 82% agreed that the institution

followed regulations when picking transportation options, 4% were neutral, and 14% disagreed. This demonstrates that the institution follows existing environmental rules and practices.

Similarly, item 18 shows that 73% agreed that the firm involved stakeholders in route optimization, compared to 12% who were neutral and 15% who disagreed. It is important to highlight that incorporating stakeholders is essential for increasing project buy-in and support.

In item 19, it is noted that 78% agreed that the corporation has adopted fuel efficiency methods, 7% stayed neutral, and 15% disagreed with the statement. This demonstrates that fuel efficiency is a major concern for the institution's operating performance.

Item 20 reveals that 84% agreed that the manufacturer delivered its supplies at predictable intervals, while just 4% remained indifferent and 12% disagreed. This demonstrates that the company is dependable and consistent in addressing supply chain expectations. Finally, question 21 reveals that 67% of respondents agreed that the institution's transportation and logistics department is well equipped, compared to 13% who were neutral and 20% who disagreed. This means that NELSAP-CU uses its transportation networks.

A PC test was done using 64 responses to determine the relationship between Transportation Management (TM) and the operational performance of the NELSAP-CU Rusumo project. Table 6 displays the results.

Table 6. Correlation between Transportation Management and Operation Performance

		Warehouse management	Operation Management
Inventory Management	Pearson Correlation	1	.796**
	Sig. (2-tailed)		.000
	N	64	64
Operation Performance	Pearson Correlation	.796**	1
	Sig. (2-tailed)		
	N	64	64

**Correlation is determined at 0.01 (2-tailed)

Table 6 shows a favourable relationship between Green transportation and the operational success of the NELSAP-CU Rusumo project, with a PC coefficient of $r=.841$ and statistical significance at the 0.01 level. The probability (P) value of $P=0.0000.01$ and $r=.841>0.5$ imply that a positive adjustment in the TM function improves the NELSAP-CU Rusumo project's operational performance.

Discussion

This study focused on green logistics management for improving institutional activity implementation and operational effectiveness. However, some empirical literature reveals that for some specific operations, green logistics practices continue to be a complex process involving many stakeholders, resulting in contradictory conclusions and a lack of clarity. This section presents key findings linked to the chosen empirical study.

The initial goal was to determine how green warehouses (GW) affect the operational performance of the NELSAP-CU Rusumo Project. It was discovered that the NELSAP-CU Rusumo Project organizes the warehouse using shelving rack systems, which saves time in locating materials. However, as mentioned in item 6, the institution does not use inventory software, which precludes it from reaping the benefits of green warehousing and inventory management automation. This circumstance is unfavourable for inventory management companies since it impedes information flow regarding stock availability. This is consistent with (Larina et al. 2021) who discovered that green warehouses and logistics optimize performance but also enhance it through supply chain sustainability.

Additional observations in item 8 revealed that order fulfilment is always completed on time, which improves stakeholder satisfaction. This finding is supported by Agyabeng-Mensah et al. (2020) who discovered that consolidating and delivering goods according to agreed-upon schedules helped to streamline the production and supply chain activities of the firm.

In a related development, item 10 showed that NELSAP-CU Rusumo Project used cost-effective transportation systems to reduce inventory costs and improve efficiency. This observation is corroborated by Richard (2020) who found out that using an efficient transportation system was a critical function for improved firm productivity and operational performance in the firms that were covered by the study.

The second objective was to investigate the influence of green packaging on operational performance by employing recyclable and biodegradable materials in packaging. The companies implemented ecologically friendly purchasing methods and designed goods with low material and energy consumption. The investigation found that the treatment and control of post-combustion emissions, as well as waste reduction, were incorporated into enterprises as one of the criteria to evaluate suppliers and that recyclable and reusable materials were employed, as demonstrated in items 11 and 12. (Gikonyo 2022) advised that construction companies can use green packaging to save money, improve customer happiness, save natural resources, and reinforce their competitive advantage, hence boosting operational efficiency.

In terms of guidelines, it was discovered in item 13 that the firm employs policy guidelines to supervise the usage of inventories, which has enabled the firm to strengthen its institutional culture. Fahmi et al. (2022) pointed out biodegradable packaging saves energy, and reduces the use of natural resources to make new materials. It also improves the company's public image, reduces negative environmental consequences, lowers disposal costs and landfill charges, and helps fulfil municipal and state trash reduction targets.

Under item 15, it was discovered that the firm has best practices for use of Biodegradable materials, those generated from biological rather than petroleum sources, which are perfect for meeting green packaging standards. These findings are not new in the empirical literature, as Mojumder and Singh (2021); Cooper and Schindler (2014) highlighted in their study on green supply chain management in Indian construction companies stating that although bio-based materials such as paper bags have been used for packaging, improved functionality and performance are required.

It is also noted in item 16 that the NELSAP-CU Rusumo project does not save cost using minimum packaging materials to save costs as indicated by the neutral respondents. The same is demonstrated by empirical literature (Tuzun Rad and Gulmez 2017; Mojumder and Singh 2021).

Finally, the ultimate goal was to demonstrate the impact of green transportation techniques on the Rusumo Project's operational performance (Nile Equatorial Lakes Subsidiary Action Program Coordination Unit). As item 17 demonstrates, the study discovered that the NELSAP-CU Rusumo Project followed regulations while picking transportation modes, which aided the firm in aligning its operations with the regulatory landscape. This finding is supported by Larina et al. (2021), who discovered that firms must follow green transportation management regulations to follow regulatory authorities.

Further findings (item 18) revealed that the organizations use route mapping and planning, as well as reverse logistics in their procedures. They invested in green process advocacy with the goal of eliminating waste, pollution, and environmental protection through the use of environmentally or eco-friendly logistics solutions that reduce energy consumption and pollutants to a moderate level. Mogeni and Kiarie (2016) and Betti and Basso (2019) confirmed these findings in their studies on the effects of sustainable logistics gained through logistics leverage. They also revealed that involving stakeholders in transportation planning has numerous benefits for the organization, including multiple idea generation, obtaining buy-in, and resource contribution, all of which contribute to the creation of seamless operational processes within the firm.

Similar findings in item 19 demonstrated that the company had implemented containerization, which reduced the bulkiness of inventory. Findings of Seroka-Stolka and Ociepa-Kubicka (2019) corroborate this observation by revealing that containerization is a critical function in supply chain management that assists firms in organizing their supplies in standardized quantities, sizes, and metrics, thereby reducing bulkiness, wastage, and excessive inventory costs and improving firm operational performance.

In a similar development (item 20), it was discovered that the firm transfers supply at predetermined intervals, reducing uncertainty and stockouts and thereby enhancing operational performance. This finding is also supported by Larina et al. (2021) whose empirical findings on reverse logistics capabilities and firm performance revealed that transportation

of supplies at scheduled intervals eliminated uncertainty and regular stockouts among the firms studied, thereby improving operational performance and productivity.

Conclusions and Future Research Directions

The purpose of this research was to determine the influence of green logistics practices in supply chains on the operational performance of multinational corporations in Rwanda between 2016 and 2021. The research explores the NELSAP-CU Rusumo project as a case study, with green Logistics Management practices as the independent variable and operational performance as the dependent variable.

The research was led by three specific objectives: assessing the impact of green warehousing, determining the impact of green packing, and calculating the impact of green transportation methods on MNC operating performance in Rwanda. Green Warehouse Management (GWM) refers to a collection of activities that improve warehouse operations that protect the environment. Additionally, green logistics practices in supply chains may improve operational efficiency, promote cleaner production, and reduce environmental degradation. There is a need for firms, whether they are service or manufacturing to include green processes into their operations to cut costs and increase competitiveness.

There is consequently a need for firms, whether they are service or manufacturing to include greening processes into their operations to cut operating costs and increase competitiveness.

Not all organizations implement green logistics in warehousing, packaging, transportation, and distribution. Companies that do so do not completely embrace it due to the start-up expenses associated with establishing green logistics processes. Firms should consider green logistics as a potential benefit to maintain current and future success. The government must ensure that green logistics is followed and implemented in every organization by reinforcing existing environmental protection policies to all stakeholders. Researchers can conduct additional studies and research on various green logistics dimensions that affect operational success. This research assists managers in developing green logistics knowledge and abilities in addition to the existing knowledge and skills required to manage the company at all levels.

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