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UMUTONI Milithia & Joseph Akumuntu

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[1]UMUTONI Milithia & [2]Joseph Akumuntu

[1]Master of Science in Procurement and Supply Chain Management, University of Kigali, Rwanda

[2] Senior Lecturer, University of Kigali, Rwanda

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Abstract

The purpose of this study was to assess the influence of logistics management practices on supply chain performance in the energy sector in Rwanda, with a case study of Engie Energy Access Rwanda. Specifically, the objectives aimed to determine how transport management, warehouse management and information management impact the performance of Engie Energy Access Rwanda. The study was guided by a descriptive and explanatory research design, using both quantitative and qualitative approaches. The study targeted 118 staff from various working units of Engie Energy Access Rwanda. Due to the small population size, universal sampling technique was employed, and data were collected using questionnaires and interview guides. Statistical Package for Social Sciences (SPSS) was utilized to analyze the data, and the findings were presented using descriptive and inferential statistics. The study concludes that logistics management practices significantly influence supply chain performance, as indicated by the multiple regression analysis revealing a statistically significant regression model with a p-value of less than 5%. Additionally, the resulting R2=0.699 suggests that variations in logistic management practices contribute to the performance of the supply chain in manufacturing companies. This study recommends investing in information management, as the flow or movement of materials or money is often triggered by information movement.

Keywords: *Logistics Management, Supply Chain Performance, Energy Sector, Engie Energy Access*.

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1.0. Introduction

At the global level, logistic management has been recognized for its contributions towards the movement of goods and services along the supply chain. According to Debela (2013), the ability to efficiently, inexpensively, and effectively convey goods (logistics) is viewed as critical to commercial success as well as a country's stability and capacity to compete in the globalized economy. Logistics is essential for integrating an organization's internal operations with supply chain processes to improve customer loyalty. All logistics and supply management practices that can affect organizational performance have been leveraged, with order processing management, inventory management, shipping management, handling management, and packing, and capacity network design are all things that need to be considered to have a major impact on customer satisfaction (Chiarini & Douglas, 2015).

The beginning of 2020 marked the onset of an unparalleled global health emergency triggered by the Coronavirus Disease 2019 (COVID-19). Initially reported in Wuhan City, Hubei Province of China, the outbreaks rapidly evolved into a crisis of unprecedented magnitude, characterized by its highly contagious nature, substantial fatalities, and widespread global dissemination, eventually culminating in a declared pandemic. This crisis has inflicted significant loss of life and unleashed a multitude of socioeconomic repercussions, with no apparent signs of abatement. What commenced as a localized health emergency swiftly deteriorated into a calamity with far-reaching implications on the social and economic fabric of nations worldwide.

The COVID-19 affected all countries across the world since its declaration as a global pandemic by the World Health Organization (WHO) in March 2020 (WHO, 2020a). At the outset, the pandemic disrupted manufacturing in China-where COVID-19 was first identified-causing a ripple effect throughout the global supply chains and resulted in a backlog of containers at ports and travel restrictions that resulted in a shortage of components from China. The shortage of major components usually sourced from China negatively affected manufacturing operations overseas, including in the automotive, electronics, pharmaceuticals, medical equipment, supplies, as well as consumer goods sectors (IFC, 2020). The COVID-19 pandemic has created shocks to trade flows due to transport and logistics disruptions. Currently, China occupies 60% of world supply and demand, 65% of world manufacturing, and 41% of world manufacturing exports (Baldwin & di Mauro, 2020).

Paul and Chowdhury (2021) note that by adopting logistics management practices, firms are able to significantly reduce on logistical cost as well as offering competitive products to clients at lower prices thus logistics is seen as a strategic or value-creation tool. He further referred logistics as a noticeable action in firms, due to its importance in supply management, both within and outwardly. The managing of logistics practices actions has developed treasured technique of fortifying competitive benefit and enlightening supply chain presentation.

Regionally, logistics management enables the integration of supply chain activities through improved relationships to achieve a sustainable competitive advantage (Numan *et* al., 2020). It involves the strategy of the product or services. In today's fast paced economic climate many firms increasingly realize that globalization has made the world smaller and more competitive, a change in one place impacts another quickly and customers seeks product that can respond well to their specific needs. As such, firms are now looking at securing costs, quality, technological and other

competitive environment as a strategy to pursue in a globally competitive environment. One currently popular competitive advantage for firms is to promote and provide value for its customers by performing its supply chain activities more efficiently than competitors. As a result, one area of increasing focus is on the effective logistics management of a firm's set of operations. For effective logistics management to be realized then, crucial factors with direct contacts to the customers and suppliers must be appropriately utilized (Bahramimianrood & Bathaei, 2021).

In East Africa, there is a tremendous development in logistics management. East Africa has amongst the highest freight and transport costs in the world - freight logistics costs in East Africa per Km are more than 50% higher than the USA and Europe. For landlocked countries transport costs can be as high as 75% of the value of exports. In the end, it is the producer, a farmer or a business that pays. The World Bank estimates these high costs reduce growth rates by up to 1% per annum and account for 40% of higher consumer prices across East Africa and its neighbors, affecting a consumer base of more than 250 million people. Transit times are also an important determinant of trade and the competitiveness of firms (Gumboh & Gichira, 2015).

In Rwanda, transport and logistics system is mainly concentrated in the road network. The paved roads are between the capital, Kigali, and most of the Rwandan major cities. Rwanda is also linked by road to the other countries of the Great Lakes Region, where most of the Rwandan imports and exports circulate. Rwanda has a total of 12,000 kilometers of roads, of which 1,000 are paved (MINIFRA, 2019). Transport and Logistics Sector is recognized as an "enabler" to economic growth, employment creation and improvement of quality of life of all Rwandans. The competitiveness of Rwanda in doing business in the region and internationally, and attracting foreign direct investment (FDI) depends, to a large extent, on the effectiveness and efficiency of the Transport Sector. Transport sector development is, therefore, one of the main thrusts of the national Vision 2020. It is also aligned to the National Investment Strategy as well as other development reference points reflected in the Rwanda Transport Sector Strategic Plan (2017). Rwanda's Vision 2050 is developed around 5 pillars consisting of quality of life, modern infrastructure and livelihoods, and transformation for prosperity. Transportation is essential in creating universal access to many of the rights afforded to men, women and children. The sector development is also in line with the achievement of Sustainable Development Goals (SDGs), the AU Agenda 2063 and EAC 2050 Strategy (World Bank, 2022).

Amidst the COVID-19 pandemic in March 2020, the imperative to curtail the spread of the virus while ensuring the continued operation of essential services became paramount. In this context, the Customs Administration pledged to facilitate the flow of goods and uphold supply chain integrity, all while implementing robust risk management protocols to mitigate the spread of COVID-19. Against this backdrop, the present study was conducted to evaluate the impact of logistics management practices on the supply chain performance of manufacturing industries in Rwanda, focusing on a case study of Engie Energy Access Rwanda.

1.1. Statement of the problem

Amidst the global human and economic crisis, supply chains came under intense scrutiny and encountered unprecedented challenges. In the early weeks of the year, when COVID-19 began to ravage China, attention shifted to what experts termed as 'supply shocks'. These shocks manifested

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as disruptions in the availability of goods originating from China, affecting both finished products for sale and essential components used in manufacturing processes in developed markets. Companies found themselves grappling with determining feasible production capacities and assessing the extent to which demand could be fulfilled.

As the pandemic crisis deepened and nations begun instituting lockdowns, supply chains experienced something completely new: systemic demand shocks, where people were stocking up on consumer staples in order to comply with restrictions on movements, in some cases buying months' worth of goods in a single day (Banga, *et al.*, 2020). Conversely, the government of Rwanda has strategically identified the Transport and Logistics sector as one of the key drivers of economic growth, wealth and job creation and critical for within and cross-border trade. The transport sector is a key contributor to Strategic Pillar 1 (Economic Transformation) under (i) NST1 Priority Area 2 which aims at expanding Sustainable Urbanization from 17.3% (2014) to 35% by 2024; as well as (ii) NST1 Priority Area 4 that promotes industrialization and a structural shift in the export base to high-value goods and services to accelerate exports by 17% annually (RDB, 2022). Despite the attempts by many researchers to establish the linkage between logistic management and performance in Rwanda, no empirical studies have been done investigating the logistics management practices and supply chain performance of Engie Energy Access Rwanda. This therefore creates a gap in literature that such study pursued to fill.

1.2. Objectives of the study

The objectives of the study were divided into general objective and specific objectives as follow:

1.2.1. General objective

The main objective of this study was to analyze the influence of logistics management practices on supply chain performance in ENGIE energy sector.

1.2.2. The specific objectives

The study objectives were;

i. To find out how transport management influence performance of Engie Energy Access Rwanda in Gasabo District, Rwanda
ii. To establish how warehouse management influence performance of Engie Energy Access Rwanda in Gasabo District, Rwanda
iii. To examine how information management influence performance of Engie Energy Access Rwanda in Gasabo District, Rwanda

1.3. Research Hypotheses

This study was guided by the following research hypotheses:

H_{O1}: There is no significant influence between transport management and the performance of Engie Energy Access Rwanda in Gasabo District, Rwanda.

H_{O2}: There is no significant influence between warehouse management and the performance of Engie Energy Access Rwanda in Gasabo District, Rwanda.

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H_{O3}: There is no significant influence between information management influence performance of Engie Energy Access Rwanda.

2.1. Theoretical Literature review

There is a growing and significant interest over logistics management practices and SC performance by the supply chain management academia and researchers in recent years. Various theories have been developed which describe the consequence of logistics management practices on supply chain management performance of manufacturing industries.

2.1.1. Resource - Based View Theory

In 1984, Birger Wernerfelt introduced the Resource-Based Theory (RBV), which amalgamated perspectives from Penrose (1959) and Barney (1991) in organizational economics and strategic management (Truijens, 2008). This theory posits that a firm's competitive advantage stems from its resources, which in turn determine its performance. Ling and Jaw (2011) assert that effective and efficient organizational performance relies on knowledge, processes, assets, and other firm-specific resources.

According to the Resource-Based Theory, organizations must leverage their resources to create value, employing strategies that are rare and difficult to imitate to outperform competitors. Managers play a crucial role in identifying and nurturing employees' talents, ensuring that the organization can effectively meet both current and future expectations. By capitalizing on unique resources, organizations can attain sustainable competitive advantage by adopting strategies that are distinctive and resistant to replication.

RBV emphasizes that possessing unique resources enables organizations to maintain their competitive edge and enhance performance through talent management initiatives. Furthermore, the theory underscores the importance of utilizing these unique resources in a manner that prevents competitors from replicating them, thereby adding value to the organization and reinforcing its competitive advantage.

The Resource Based View Theory is relevant to the study as it shows how the effectiveness of firm best practices depends on the utilization and exploitation of existing resources to the extent that firms have pools of under used resources, these create unique, firm-specific opportunities for exploitation. This philosophy is applicable to this study as it looks at management of resources that manufacturing firms has in order to improve product delivery or the movement of fresh inputs and finished outputs from the firm to customer's point of collection.

2.1.2. Transaction Cost Theory

The transaction cost concept was formally proposed by Ronald Coase in 1937 to explain the existence of firms. He theorized that transactions via market mechanisms incur cost, particularly the costs of searching for exchange partners and making and enforcing contracts. The firm emerges because it has lower transaction costs than the market. However, the firm cannot endlessly expand because it also has its internal (nonmarket) transaction cost, such as administrative and coordinating costs as well as the cost of preventing opportunistic behavior among employees. The latter has emerged as a significant subfield in NIE and more generally in economics – the

principal–agent problem, which is often considerable when people are employed in large businesses and government organizations (Jensen and Meckling, 1976).

Transaction cost economics is a crucial concept in the ground of strategy (Stephen & Helen, 2011) and it was developed by Oliver Williamson who was an economist. This model answers queries about why manufacturing entities exist (i.e., to minimize logistics costs), how entities describe their borders, and how they should administer processes. Based on Lozano and Valles (2013), TCE was initially established to aid regulate the proficiency in manufacturing goods and at lower charge to guarantee low prices to clients. Manufacturing firms have to offer correct quality of goods and reward to the bidder posing the lowest price. In logistic management, Transaction cost economics theory applies in manufacturing logistics total cost ownership concept which includes the purchase cost, maintenance cost, warehousing cost, transportation cost, service cost and processing cost. Manufacturing firms incurs this cost by shipment of materials from upstream level to the final customer and therefore logistics manager must carefully evaluate the tradeoff between these costs because all these either increase or reduce logistics cost.

This theory is relevant to this study since there is need to coordinate all the activities involved in getting the product to the firm so as to ensure that the integrated effort of logistics is achieved. This theory is very crucial in managing logistics organizations especially the cost associated with logistics operations because it affects the level of customer satisfaction and may even change customer perceptions and loyalty to the firm.

2.1.3. The Network Theory

The network theory is one of the grand theories for purchasing and supply management which have been introduced during the last decades. Mainly the network theory is considered to describe the relationships in which companies, suppliers, customers or buyer are engaged. The theory was first introduced during the 1970s and the 1980s and developed from the focus on relationships between just two entities, or strategic alliances, towards an approach which entails multiple relationships between different counterparts throughout the supply chain. Harland (1996) defines the network as a specific type of relation linking a defined set of persons, objects or events.

Furthermore, it was found that there are several underlying assumptions, as for instance that a central position of companies within a network could lead to competitive advantage, or that companies share information and knowledge with their partners. Moreover, in terms of the contribution to purchasing it can be said that the theory is applicable to the most important decision points. The theory helps with the demand planning through the simplification of the resource allocation reached through the settlement of strategic long-term partnerships. Moreover, companies embedded in a network have the ability to choose from a greater set of suppliers and through this can even ensure the supply of critical commodities. This theory is relevant since it described the network theory deals with the cooperation of firms with various entities, as for instance suppliers, customers or buyers throughout their supply chains.

2.2. Empirical review

The empirical literature in the study was examined per objective, as discussed in the subsequent sections.

2.2.1. Transportation Management and supply chain performance

Transportation in a supply chain refers to the movement of products from one location to another, which begins at the start of the supply chain as materials make their way to the warehouse and continues all the way to the end user with the customer's order delivered at the doorstep. Because of the importance of transportation, warehouse managers should examine transportation within their supply chains.

Kenyon and Maxell (2011) defined transportation management as overseeing of events engaged in distributing any products from vendors to the firm, warehouses or customers point of collection. Murphy and Costa (2014) pointed out that transportation management for a huge part of firm cost of production hence if firms want to have competitive edge over others, then they must ensure that their cost of logistics or moving materials and products to customer's point of collection is minimized of any firm supply chain. This is usually done by use of various modes of transport depending on factors such as transportation loads, delivery points and distribution centers (Laird, 2012). Locally, Nuahn (2017) assessed the effect of logistics and transportation practices on performance of Kenya Cooperative Creameries using a descriptive research design. The populations of the research were 177 processing firms which was sampled using a census. A questionnaire was adopted to gather the relevant data which was then examined using inferential and descriptive statistics. The research findings were that a very strong positive linkage exist between logistics and transportation practices and performance and concluded that logistics and transportation practices would result in enhanced performance.

2.2.2. Warehousing Management and supply chain performance

Warehousing refers to the activities involving storage of goods on a large-scale in a systematic and orderly manner and making them available conveniently when needed. Warehousing is one of the important auxiliaries to trade. It creates time utility by bridging the time gap between production and consumption of goods. According to Lambert *et al.* (2005) they contribute to a multitude of the company's missions, like; Achieving transportation economies (e.g. combine shipment, full-container load), achieving production economies (e.g. make-to-stock production policy),taking advantage of quality purchase discounts and forward buys, supporting the firm's customer service policies, meeting changing market conditions and uncertainties (e.g. seasonality, demand fluctuations, competition), overcoming the time and space differences that exist between producers and customers, providing temporary storage of material to be disposed or recycled (i.e. reverse logistics).

Tompkins *et al.*, (2003) cites the typical warehouse functional areas and flows as; receiving, staging for cross-docking, reserve, forward and shipping. Receiving, transfer and put away, order picking, cross-docking, and shipping. Order picking is the most labor-intensive and costly activity of most warehouses. Approximately 55% of the total warehouses operating expenses are related to order-picking operations (Bartholdi & Hackman, 2011). According to De Koster (2004), the most common order picking system is picker-to-parts systems, in which the order pickers walks or drives along the aisle to pick items. Warehouse layout is also important in achieve greater efficiencies. Minimizing travel time between picking locations can greatly improve productivity. However, to achieve this increase in efficiency, companies must develop processes to regularly

monitor picking travel times and storage locations. Warehouse layout is one important factor affecting the order picking process.

2.2.3. Information management and supply chain performance

Firms use modern technologies in various logistical processes so as to gain more visibility of their entire distribution networks and to track the movement of various inventories, trucks and identification of lots as well as seamlessly linking both supply chain upstream and downstream levels (Shi & Yu, 2013). Ristovska, et al., (2017) investigated logistics management and performance of Macedonian companies. The study sought to investigate if inventory management, Transportation, warehousing and storage management lead to effectiveness and efficiency in the researched companies. The data was obtained from both high level and middle level managers from 80 companies through questionnaires. The analysis found that inventory management, warehousing, information management, storage management and transportation management lead to reduced costs, enhance efficiency and increase competitiveness of firms while increasing customer satisfaction.

The adoption of information technology in logistics management such RFID, GPRS, wireless networks and sensors have enabled manufacturing firms have accurate information through real-time tracking of trucks on transit hence firms have been able to reduce cost associated with such transit or late deliveries resulting to unmonitored movements and inventories (Bardaki, *et al.*, 2011). In the automation, computerization has a vibrant responsibility in firm manufacturing process maximization with technology considered for playing a main part in enhancing the effectiveness of a firm through use of various technologies such as Global positioning network and vehicle trucking devices or prized software's which can be implemented throughout logistical process (Zhang, et al., 2011). For instance, business process software can be integrated to provide appropriate notifications concerning movement of products and firm's logistics machinist and customer will benefit by receiving information concerning the nature of products being moved from vendors or manufacturers, purchase quality and quantity and lastly transportation of finished outputs to the destination which saves a significant aggregate time due to the fact that manual interference is abolished (Lee & Ha, 2018). Furthermore, exact trailing aid in enlightening general process management hence the logistics function of a firm should enforce technologies for bettering production (Fasanghari, 2008).

2.3. Conceptual framework

The framework below represents connection between self-determining variables and dependent variables of the research study. The figure below shows how independent and dependent variables relate to each other. The key goal of the study is to establish the affiliation amongst logistics management practices and supply chain management performance of manufacturing industries in Rwanda.

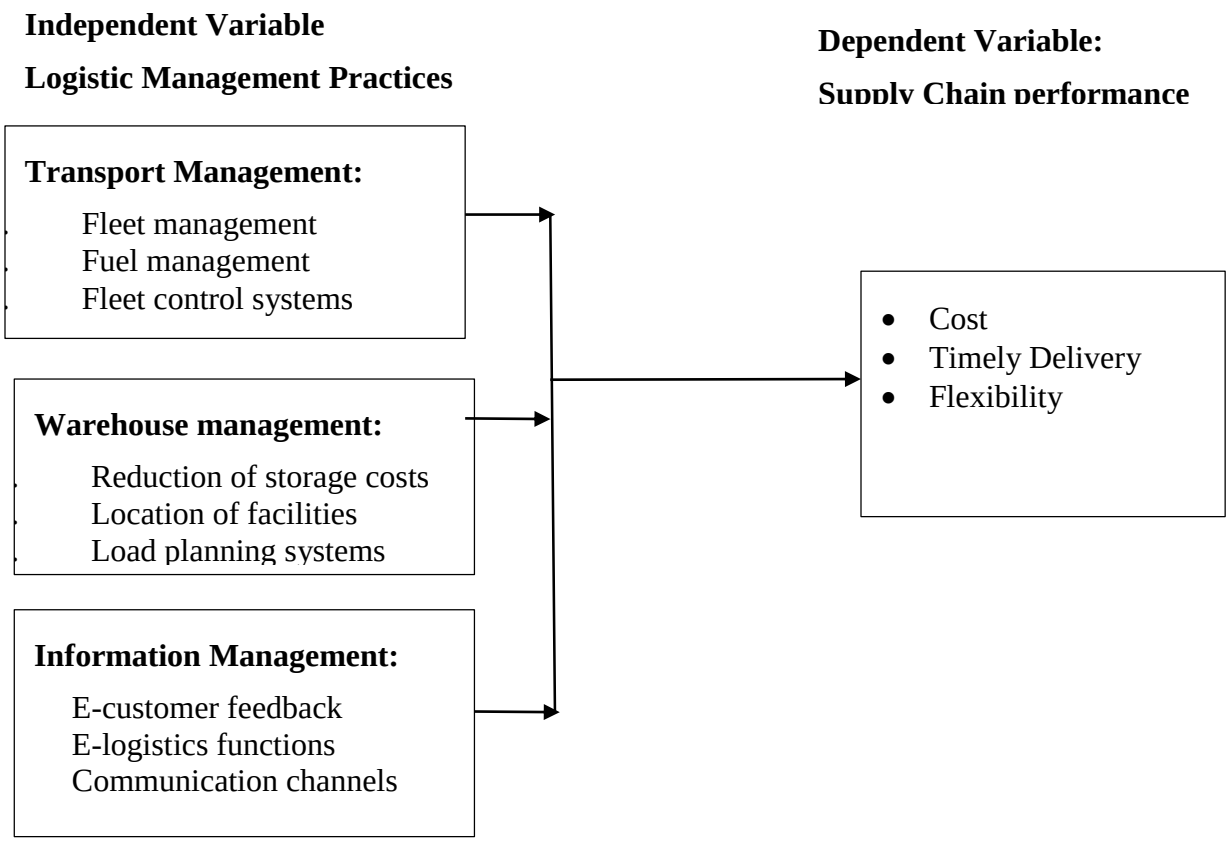

Figure1: Conceptual framework

Source: Researcher, (2023)

Figure 1 shows the conceptual framework which depicts the relationship between the independent variable and the dependent variable. In this study, the independent variable comprised of logistic management practices while the dependent variable comprised of supply chain performance. The logistics management practices were measured using three key indicators, namely, transport management practices, warehousing management and information management. These also had they sub-variables used to gather data from the participants in the study. The researcher argued that effective logistic management practices can highly improve the performance of a supply chain. Hence, a direct relationship was proposed and investigated.

3.0. Research Methodology

Descriptive and explanatory research designs were employed to conduct the study. The descriptive research design was used to present the overview of the data where patterns and relationships were identified. In addition, explanatory research design was used to give a detailed analysis of the patterns identified in the data. This was achieved using Pearson correlation analysis and multiple regression analysis. Pearson correlation was used to establish the relationship between the study variables while the multiple regression analysis measured the effect of logistic management

practices on supply chain performance. The study used quantitative research approach to quantify the problem by way of generating numerical data or data that can be transformed into usable statistics and relies responses to pre-formulated questions.

The population for the study was staff from Engie Energy Access Rwanda. The study targeted these respondents owing to the fact that they are responsible for the management of the company. At the time of the study the company had a work force of 118 employees who appeared on the payroll. These included 5 top managers 13 middle level managers, 7 supervisors, and 93 support staff in Engie Energy Access Rwanda.

A sample is a smaller group or sub-group obtained from the accessible population (Mugenda & Mugenda, 2003). The study used universal sampling method to get a sample size of 118 respondents. According to Patten (2017), universal sampling is a sampling technique in which the researcher selects the entire population as a sample. Therefore, the census sampling technique was used. In this case, the sample size was equal to the target population.

The study utilized questionnaires and interviews to gather data from various sources, aiming to address the research problem comprehensively and evaluate outcomes effectively. Questionnaires were chosen for their ability to provide authentic responses, with a structured format that ensured coverage of research objectives. Additionally, face-to-face interviews were conducted with key informants identified during primary data collection. Secondary data were sourced from Engie Energy Access Rwanda and various published materials, including journals, books, and the internet.

Data analysis was performed using descriptive and inferential statistics. According to Boone and Boone (2012), Likert scale data are analyzed at the interval measurement scale. Likert scale items are created by calculating a composite score (sum or mean) from four or more type Likert-type items; therefore, the composite score for Likert scales should be analyzed at the interval measurement scale. Descriptive statistics was recommended for interval scale items include the mean for central tendency and standard deviations for variability. Additional data analysis procedures appropriate for interval scale items would include the Pearson's correlation, ANOVA, and regression procedures.

Multiple regression analysis was used to determine whether logistics management practices influenced the supply chain performance of Engie Energy Access Rwanda. The study took the three determinant factors as independent variables and the supply chain performance as dependent variable in the regression model. The study used the following multiple regression model to establish the statistical significance of the independent variables on the dependent variable.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Whereby Y =Supply chain performance

β_0= Constant

X_1 = Transportation Management

X_2 = Warehousing management

X_3= Information management

´E = error term

β_1, β_2 and β_3 represent regression coefficients. These helped in the generalization of the findings on the relationship between logistics management practices and supply chain performance of manufacturing industry in Rwanda.

4.0. Findings – Discussion

The study findings were presented in accordance with the objectives.

4.1. Response rate

The study targeted 118 respondents drawn from the target population comprising the staff from Engie Energy Access Rwanda. The researcher distributed 118 questionnaires to the respondents (staff of the company) but only 100 questionnaires (84.7%) were returned back. Thus, the study analyzed 100 questionnaires from the respondents who participated by responding questionnaires. The research finally came up with the response rate of 100 (84.7%) respondents who participated in this study.

Table 1: Response rate for the distributed questionnaires

Description	**F**	**%**
Response	100	84.7%
Non-Response	18	15.3%
Total	**118**	**100%**

Source: Researcher, 2023

4.2. Correlation and regression analysis

Pearson's correlation is used to examine the relationship between the independent variables (IVs) and the dependent variable (DV). Correlation coefficients are able to provide a numerical overview of the direction and strength of the linear relationship between the IVs and DVs. Pearson's correlation coefficients (r) range from -1 to +1 for the indication of positive or negative correlation. The findings of the correlations between the independent variables and the dependent variables are summarized and presented in Table 2.

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Table 2: Correlation between independent variables and dependent variable (N=100)

Performance	Pearson Correlation	1.000			
	Sig. (2-tailed)				
Transport Management	Pearson Correlation	.662**	1.000		
	Sig. (2-tailed)	0			
Warehouse Management	Pearson Correlation	.736**	.105**	1.000	
	Sig. (2-tailed)	0.000	0.000		
Information Management	Pearson Correlation	.813**	.014**	.175**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field research, 2023

According to the findings reported in Table 2, the Pearson correlation analysis showed that transport management (r=0.662, p=0.000) is positively and significantly related to the supply chain performance. The correlation was deemed to be statistically significant since the p-value was less than 5%. Similarly, the Pearson correlation for warehouse management (r=0.736, p=0.000) is also positively and significantly related to the supply chain performance. The correlation was also statistically significant since the p-value was less than 5%. Lastly, the Pearson correlation for information flow management (r=0.813, p=0.000) is positively and significantly related to the supply chain performance. The correlation was also statistically significant since the p-value was less than 5%.

The findings therefore revealed that all the three indicators of logistic management significantly influence the performance of supply chain. Generally, the correlation analysis showed that there is a positive and statistically significant relationship between logistics management practices and supply chain performance at Engie Energy Access Rwanda. These findings are consistent with the findings of Tabeni (2006) who conclude that whatever improvement is done in respect of inbound logistics will help to enhance business performance in terms of increased revenue generated in a very cost-effective way.

4.3. Multiple regression Analysis

A multiple regression analysis was performed in this section to identify the predictor and its contribution towards the supply chain performance. It aims to determine the prediction of a single dependent variable from a group of independent variables. The multiple regression analysis was

performed with all the assumptions complied with. The results of the multiple regression are presented in the tables that follow.

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836[a]	.699	.689	.25384

a. Predictors: (Constant), Transport Management, Warehouse Management, Information Management

Source: Field research, 2023

Table 3 shows the quantity of variance that is explained by the predictor variables. The first statistic, R is the multiple correlation coefficient between all the predictor variables and dependent variable. In this model, the value is 0.836, which indicates that there is a great deal of variance shared by the independent variables and dependent variables. The next value, R^2=0.699, is simply the squared value of R. This is frequently used to describe the goodness of fit or the amount variance explained by a given set of predictor variables and its value is 70.6 % of the variance in the supply chain performance is explained by logistic management practices in the model. Adjusted R^2=0.699, indicating that approximately 69.9% of the variance in the supply chain performance is explained by the logistics management practices. The Std. Error of the estimate is 0.25384, which means that, on average, the predicted values from the model are expected to deviate from the actual values by approximately .25384.

Table 4: Significance of Independent variables (ANOVA Table)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.344	3	4.781	74.204	.000[b]
	Residual	6.186	96	.064		
	Total	20.530	99			

a. Dependent Variable: Performance

b. Predictors: (Constant), Transport Management, Warehouse Management, Information Management

Source: Field research, 2023

Table 4 indicated standard regression which provides the significance of the prediction of individual predictor variables on the dependent variable. Those variables are Transport management, warehouse management and information management. The table shows the output analysis and whether there it has a statistically significant difference group mean. As seen, the

model (F=74.204, p=0.000) was found to be significant at 5% since the p-value (p=0.000) was less than the 5% threshold Therefore, logistic management practices significantly influence the performance of supply chain at Engie Energy Access Rwanda.

Table 5: Regression coefficients and significance of the independent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.094	.200		5.479	.000
	Transport Management	.108	.062	.140	1.742	.085
	Warehouse Management	.196	.071	.248	2.772	.007
	Information Management	.380	.074	.521	5.127	.000

a. Dependent Variable: Performance

Source: Field research, 2023

Information presented in Table 5 evidenced that all the indicator variables used in this research to study the logistic management practices were all statistically significant. This implied that they individually have significant contributions to the performance of supply chain of EEA Rwanda. The regression model was thus formulated as $Y=1.094+ 0.108X_1 + 0.196 X_2 + 0.380X_3 +\varepsilon$ Where y= Supply chain performance, X_1, X_2 and X_3 represented the transport management practices, warehouse management practices and information management practices. The regression coefficients are useful to know which of the different independent variables is more important in contributing to the performance of supply chain in manufacturing companies. They are used in comparison of impact of any independent variable on the dependent variable.

As indicated in regression coefficients table, information flow management (β_3=0.380). had the highest regression coefficient followed by warehouse management practices (β_2=0.196) and transport management (β_1=0.108). This revealed that information flow within the logistic management would greatly influence the supply chain performance for manufacturing companies. The information is important to facilitate the necessary communication among different players in the supply chain. The regression output above shows that Transport management, warehouse management and information management predictor variables are statistically equal to significant. This shows the regression of independent variables are associated with supply chain performance. Multiple analysis regression result above indicates the influence of independent variables based on the regression coefficient.

These results concur with the findings of Khaled (2017) who did a study on the connections existing amongst logistics practices and functioning business performances by sampling all SMEs manufacturing metals products and equipment's in Turkey. The study concluded amid various challenges encountered that subcontracting and premeditated partnership practices does not have uninterrupted bearing on administrative performance, but then can obligate straight impact on SMEs' operative performance.

4.4. Hypotheses Testing

Hypothesis testing is used to examine a regression analysis test. Regression test will be used to examine the effect of independent variable on dependent variable. The hypothesis testing was performed by using SPSS tool and the result is as presented in Table 6.

In statistics significance testing the p-value indicates the level of relation of the independent variable to the dependent variable. If the significance number found is less than the critical value also known as the probability value (p) which is statistically set at 0.05, then the conclusion would be that the model is significant in explaining the relationship; else the model would be regarded as non-significant

Table 6: Summary of Hypotheses

S/N	Hypothesis	Rule	P-Value	Comment
1	H_{o1}: There is no significant influence between transport management and the performance of Engie Energy Access Rwanda in Gasabo District, Rwanda	Reject Ho if p value <0.05	p<0.05	Transport management has a significant influence with and the performance of Engie Energy Access Rwanda
2	H_{o2}: There is no significant influence between warehouse management and the performance of Engie Energy Access Rwanda in Gasabo District, Rwanda	Reject Ho if p value <0.05	p<0.05	Warehouse management has a significant influence with the performance of Engie Energy Access Rwanda
3	H_{o3}: There is no significant influence between information management influence performance of Engie Energy Access Rwanda	Reject Ho if p value <0.05	p<0.05	Information management has a significant influence with the performance of Engie Energy Access

Source: Primary data, 2023

The regression R value obtained, in which r = 808[a] (see Table 6) represented the correlation coefficient of the model whose order value > 0. This illustrates that the incorporation of many variables improved the model when analyzing the influence of logistics management practices on supply chain performance. The adjusted r^2 value of, r = 0.699, also indicates that the multiple linear regression model could explain for approximately 70% of the variations in performance of Engie Energy Access Rwanda. This indicates that the logistics management practices have a great effect on supply chain performance of Engie Energy Access Rwanda. To identify the independent variables that were mostly responsible for effective devolution in the area, the beta value was used.

5.0. Conclusions

Based on the findings presented in previous sections, the study draws the following conclusions. From the descriptive statistical analysis result regarding the state of logistics management practice in Engie Energy Access Rwanda the study concluded that all the logistics management practices (warehouse management practices, transportation management practices and information flow management) were practiced occasionally. In addition, the study concluded that logistics management practices contributed to supply chain performance to a moderate extent. Further, the empirical analyses have shown that transport management practices are key components of logistic management practices. The study concludes that there is need for effective TMP in logistic companies to ensure improved performance of their supply chain. Moreover, the relationship analysis showed a strong positive correlation between transport management practices and performance of supply chain. Some of these practices include fleet control, car tracking practices and fuel management.

In relation to the relationship between logistics management practices and supply chain performance, the study concluded that there is a positive and significant relationship between logistics management practices and supply chain performance at Engie Energy Access Rwanda. Furthermore, all logistics management practices namely warehouse management practices, transportation management practices and information management practices and supply management practices have strong relationship with supply chain performance of Engie Energy Access Rwanda. It was also observed that warehouse management is a significant component of logistic management. The use of warehouse management practices such as efficient stockkeeping, space management load planning and location facilitation significantly influence the performance of supply chains of logistic companies in Rwanda. With regards to information flow, the empirical analyses revealed a positive effect on the performance of supply chain in the logistic companies. The availability of information on a timely manner tend to improve the performance of these organizations.

6.0. Recommendations

The study recommends that the company should consider implementing a fleet control system and adopting cost-effective transportation strategies. This would help optimize transportation efficiency and reduce costs associated with logistics operations. Additionally, investing in computer applications, internet connectivity, and information communication systems is crucial. These technologies can improve information flow within the organization's systems and enhance operational efficiency. Moreover, modern technology should be embraced to ensure timely relay

of transport issues to control centers, thus facilitating better decision-making and coordination in transportation activities.

Furthermore, the study recommends that EEA Rwanda should prioritize coordination in its transport mechanisms. This involves focusing on cost reduction, speed, and consistency in transportation practices. By improving coordination, the company can optimize the benefits derived from its logistical system, leading to enhanced supply chain performance. Additionally, the adoption of auto-ID technologies should be considered to improve accuracy and efficiency in information flow. Investing in warehouse management is also recommended to ensure effective storage and logistics planning. Lastly, given the impact of the COVID-19 pandemic, the company should explore flexible inventory management options and enhance warehousing practices. This would help mitigate risks associated with inventory management and improve overall supply chain resilience and performance.

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