

 <p>ISSN NO. 2320-5407</p>	<p>Journal Homepage: - <a href="http://www.journalijar.com">www.journalijar.com</a></p> <h2 style="text-align: center;">INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</h2> <p style="text-align: center;">Article DOI: 10.21474/IJAR01/18975 DOI URL: <a href="http://dx.doi.org/10.21474/IJAR01/18975">http://dx.doi.org/10.21474/IJAR01/18975</a></p>	
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### RESEARCH ARTICLE

## INFLUENCE OF TRANSPORTATION PROCESS ON SUPPLY CHAIN PERFORMANCE OF SELECTED MANUFACTURING INDUSTRIES IN RWANDA A CASE OF ADMA INTERNATIONAL

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### Manuscript Info

#### Manuscript History

Received: 25 April 2024  
Final Accepted: 28 May 2024  
Published: June 2024

#### Key words:-

Transportation Process, Supply Chain  
Performance, Manufacturing Industries,  
Adma International, Rwanda

### Abstract

**Background:** This research aimed to assess the influence of transportation on supply chain performance of manufacturing industries in Rwanda, a case study of ADMA International. This research: examined the effect of fleet management process on supply chain performance in ADMA International; assessed the effect of route planning on supply chain performance in ADMA International; and determined the effect of order processing on supply chain performance in ADMA International.

**Materials and Methods:** Both descriptive survey and correlational research designs were used in this study in order to facilitate the accomplishment of the aforementioned goals. The target population of this project was 141 people that included 21 ADMA International employees working at the head office; and 120 customers (suppliers and distributors) of ADMA International that operate in each of the secondary cities in the country including Kigali city. The other cities were: Huye, Musanze, Nyagatare and Rubavu. This study made use of a variety of methods, including surveys, interviews, written records, and other institutional reports, in order to collect research data. SPSS, a software used for descriptive statistics, was used to examine the data in order to determine whether transportation has an impact on supply chain performance of manufacturing industries in Rwanda. In this study, we considered both inferential and regression analyses in order to assess the strength of the link that exists between the study variables.

**Results:** From the findings, the following were discovered: ( $\beta_1 = 0.410$ ,  $t = 2.108$ ,  $p = 0.013 < 0.05$ ;  $\beta_2 = 0.206$ ,  $t = 1.779$ ,  $p = 0.017 < 0.05$ ;  $\beta_3 = 0.425$ ,  $t = 1.214$ ,  $p = 0.011 < 0.05$ ). This refers to the fact that 1 per cent increase in transportation practices in form of fleet management, route planning and order processing will lead to 0.410, 0.206, 0.425 and 0.558 increase in supply chain performance of ADMA International. Therefore, the regression model showed that supply chain performance was  $1.347 + 0.410 \text{ Fleet management} + 0.206 \text{ Route planning} + 0.425 \text{ Order processing}$ . From these findings, all the hypotheses were rejected. In accordance with the study's conclusions, the researcher suggested that ADMA management be engaged for the supply chain and prerequisite in order to handle the complexity and rising customer expectations. The supply chain process's planning and control should

be strengthened by ADMA management. Furthermore, ADMA management ought to keep developing a competitive infrastructure, utilizing global logistics, and matching supply and demand. In summary, the research findings suggest that raw material transportation has an impact on the supply chain of manufacturing businesses at ADMA based on an analysis of the data collected there.

**Conclusion:** While ADMA's product quality and quantity are important competitive advantages in the market, the research shows that competitive transit times and dependable raw material suppliers that don't require longer than four weeks for delivery, depending on the source, should distinguish the ADMA supply chain. The transportation of raw materials is correlated with the supply chain of manufacturing industries at ADMA, according to research using the Pearson correlation.

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## ..... **Introduction:-**

Due to the critical role that transportation plays in a business's success, supply chain management strategies and approaches must consider this aspect. Transportation methods guarantee that the supply chain runs smoothly and allow deliveries to reach their intended destinations on time (Andyss, 2020). Since the beginning of human history, transportation has undergone constant evolution. The human foot was the first form of transportation, and people used to walk great distances for deliveries or to get to destinations. The ability to adjust to various surfaces was the first advancement made to this mode of transportation.

To prevent slipping on the ground, residents of places with snow and ice, for instance, wore attachments that resembled spikes. Because they were aware that logs and trees float on water, the people hollowed out the middle of the logs to create a sort of seating area (Lestantyo, 2017). Boats were the earliest means of transportation invented in an attempt to cross water. The first people to cross the sea are said to have been the settlers of Australia, who arrived there between 60,000 and 40,000 years ago, while there is evidence that sailing expeditions took place as early as 900,000 years ago. The first boats that are known to exist were basic log boats, often called dugouts, that were constructed by hollowing out a tree stump. Artifacts from between 10,000 and 7,000 years ago provide evidence for these floating vehicles (Havelaar, 2019).

The freight and logistics sector, which contributes 8.6% of GDP, is a vital part of the national economy because of the established transportation system. Australia's expanding economy is supported by a freight and logistics sector that is effective, sustainable, and economical and is made possible by collaborations with all tiers of government (Pang et al., 2018). Transportation networks aided in connecting the expanding country during the 19th century as the United States expanded across the continent. Travelers and manufactured and agricultural items were transported between farms, villages, and cities by rivers, roads, canals, and railroads in order of precedence. Different local and regional economies were shaped in part by transportation ties (Umble, Greens & Ramos, 2019). Transportation networks would not form the national economy until the end of the century.

Public transportation has a vast and intricate supply chain that spans the whole nation, providing jobs for thousands of Americans who make everything from wheels to seats, windows, communications equipment, and tracks. Without a consistent flow of projects, the suppliers and companies that create or manufacture parts for transit systems would have to close or reduce their operations (Faleti & Myrick, 2018). More than 2,000 years ago, the Romans established the first road system in Britain! In order for the Romans to expand their empire over Britain, they needed highways, which are still in use today.

The Industrial Revolution led to important advancements in transportation during the 18th and 19th centuries. The Industrial Revolution, which started in Britain, witnessed the development of sophisticated manufacturing and machinery that revolutionized global trade and production of goods, supporting supply chains in the process (Woo, 2018). More sophisticated forms of transportation were also developed in connection with these technological advancements to meet the needs of the developing world. During the Industrial Revolution, the first bicycle was made, the first motorways were invented, and the first car was built. Thanks to technological advancements and

other improvements, the transportation system that was already in place has significantly enhanced over time (Gul, 2018). Like other nations, India's transportation system primarily comprises of air, sea, and land transportation, which all assist the supply chain. The majority of Indians are reported to use public transportation as their main form of transportation on the roads, and India boasts some of the most extensively utilized public transportation networks globally. India has one of the busiest and second-largest road networks in the world (Pandey, 2019). As of 2015, 8.225 billion passengers and more than 980 million tons of freight were transported annually.

According to IATA data, Indian aviation is the fastest-growing sector in the world. Bangalore, with a 65% national share, is the country's largest aviation manufacturing base, which is useful for supply and chain management. Indian aviation is primarily separated into military and civil aircraft. When people discovered wheels, the history of transportation underwent a significant transformation, which also aided in the development of supply chain management (Sarikas & Weerakkody, 2019).

African logistics startups are altering the way commodities move across the continent, according to WTO (2021). A new age of economic prosperity in Africa is expected to be ushered in by the African Continental Free Trade Agreement (AfCFTA). The historic deal, which goes into effect in May, would establish the largest free trade area in the world since the WTO. The unrestricted movement of commodities across national borders is a must for the AfCFTA's revolutionary potential, and this is something that only the logistics industry can help achieve. Both small-business owners and large corporations have long bemoaned the shoddy state of supply chains and logistics throughout the continent. By lowering border tariffs, the AfCFTA will help businesses operating throughout the continent, although lowering logistics costs will still be hampered by the continent's \$130–170 billion infrastructure gap. However, difficult obstacles can lead to great opportunity; hundreds of African businesses are addressing the region's logistical issues. Three trends—closing the urban-rural divide, digitizing logistics, and the continuous growth of B2B logistics companies—will influence the future of logistics in African markets, according to a new Nyageng'o (2020) poll of logistics tech companies throughout the continent.

One of the main engines of growth, according to the Rwandan government, is the transportation industry. The African Development Bank (AfDB) and it worked closely together to publish the "Rwanda Transport Sector Review and Action Plan in 2013." This comprehensive strategy begins with an evaluation of the nation's transportation industry and goes on to discuss opportunities and strategies for overcoming obstacles.

The plan's last section identifies strategies for luring private sector investments to assist in funding the projected USD 11,388 Mio investment program for 2013–2030. Rwanda developed the 2013 Economic Development and Poverty Reduction Strategy (EDPRS II) under the guidance of the plan. Priorities that were substantiated included enhancing the quality of travel and upkeep of the road network, creating an efficient air transportation infrastructure, and turning Rwanda into a regional hub for freight logistics (MININFRA, 2018). As a result, the purpose of this study is to evaluate how transportation affects the manufacturing supply chains in Rwanda, using ADMA International as a case study. The main objective of this research was to assess the influence of transportation on supply chain performance of manufacturing industries in Rwanda. It was guided by the following specific objectives:

1. To examine the effect of fleet management on supply chain performance in ADMA International;
2. To assess the effect of route planning on supply chain performance in ADMA International;
3. To determine the effect of order processing on supply chain performance in ADMA International.

### **Theoretical Framework**

This sub segment titled theoretical framework consists of concepts, together with their explanations, and existing theories that are used for this particular study. This section demonstrates an understanding of theories and concepts that are relevant to the topic of this research and relates it to the broader subject of the matter.

### **Resource Based Theory**

The Resource Based Theory propounded by Birger Wernerfelt in 1984 is regarded as one of the theories of strategic management that is widely referenced particularly because of its practical relevance to lean supply chain management practices. With paying attention to the achievement of a competitive advantage through internal resources, the resource-based view became one of the grand theories of economics. According to Hoffmann (2017), "the resource-based theory examines the link between a firm's internal characteristics and organizational performance in automotive industry".

The resource-based view examines the application of a variety of tangible and intangible resources as the foundation for a competitive advantage. Resources must be diverse and stationary in order for the competitive edge to be sustained. According to the resource-based perspective theory, supply chain participants should work together to achieve higher performance and market supply chain performance. According to this hypothesis, companies' ability to maintain growth and market share depends on the resources supplied by stakeholders. The adage "the whole is greater than the sum of its parts" is also emphasized by resource-based philosophy. It is particularly crucial to understand that the creation of overall strategic resources frequently involves taking a number of strategies and resources that are easily replicable and combining them in a way that makes them difficult to replicate. For instance, the airline's reliance on a single model of aircraft and its distinctive passenger boarding procedure (in larger centers, WestJet loads passengers through both front and rear airplane doors, reducing turnaround time) complement the company's culture and combine to create a unique business model whose performance is unmatched in the Canadian manufacturing sector (Pérez-Dasilva et al., 2013).

Porter (2019), in general, focuses on how organizations establish and eventually preserve a competitive advantage, which is similar to the resource-based view. He argues that the competing dynamics in an industry are more expansive than just competitor companies and that rivalry is not just limited to other participants. As a result, the theory unmistakably highlights an externally focused approach, emphasizing the necessity for the firm to be positioned in accordance with the analysis of industry competitive dynamics, opportunities, and threats. As a result, it also seems contradictory since the resource-based view adheres to the reasoning that the business exercises power and so becomes the success factor, yet the competitive framework primarily concentrates on the industry and products as the determinant of profitability and a competitive advantage.

### **Transaction Cost Theory**

Although Ronald Harry Coase first emphasized the importance of transaction cost theory in 1937, the formal development of TCT began in earnest in the late 1960s and early 1970s as an attempt to comprehend and make empirical predictions regarding vertical integration. Over the course of its more than 50-year existence, TCT has grown to become one of the most significant theories of management. It addresses many internal aspects of a company's operations, including corporate governance and organization design, in addition to the size and scope of the company. Essentially, TCT is an organizational efficiency theory that asks how to structure and manage a complex transaction to reduce waste. According to Aaltonen et al. (2018), the efficiency aim requires determining the alternative that best fits the essential elements of the transaction, or the relatively superior organizational arrangement.

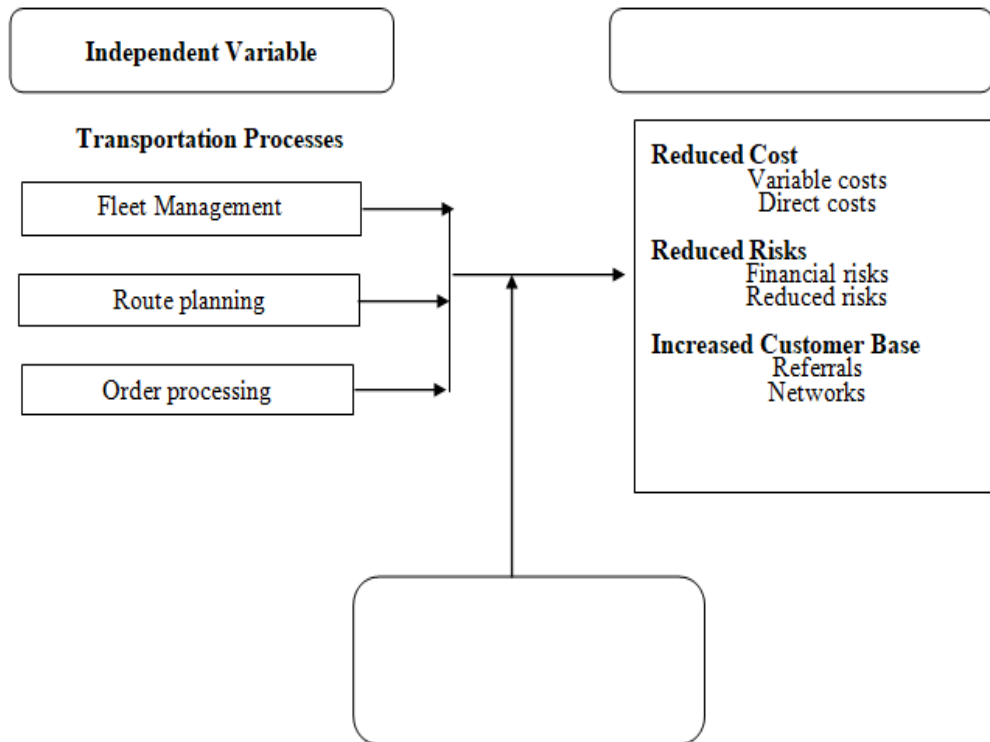
The theory's roots are in supply chain management. The focus on "the interaction between economic entities" is what Freeman (2014) claims to be the shared goal between supply chain management and transaction cost theory (TCT). Although TCT is a generic theory of how exchange relationships and economic organization are governed, it pays special emphasis to the make-or-buy choice, which is frequently referred to as "the canonical transaction." TCT is easily adaptable and pertinent to supply chain management and operations research because of this focus. In fact, TCT is not only one of the organization theories used and quoted the most in operations and supply chain management research, but it is also acknowledged that it has the ability to guide future studies. We have two key goals for this study. One is inspired by the fact that there are occasionally grave misunderstandings of TCT in both the supply chain and general management literature. By going over the main ideas, underlying presumptions, and theoretical reasoning of TCT, we want to shed light on these misconceptions.

### **Conceptual Framework**

Subdividing the sub-variables into even smaller pieces, this section graphically represents the concepts discussed. The following chart provides a breakdown of these factors.

This was created using Mukhopadhyay's (2021) conceptual framework ideas for creating the graphical representations of this research voyage. The concept of a framework to summarize and direct the research has been widely used as a tool for supply chain and transportation performance. This is because the framework, when presented graphically, offers quick access to the most important variables and performance indicators. Pletikosa & Michahelles (2018) refer supply chain management to Resource Based Theory; and the experience which represents labels describing an approach to the research; a conceptual overview.

The conceptual framework thus outlines the 'key factors, constructs and variables-and the presumed relationships among them' (Pletikosa & Michahelles, 2018). The model is a simple flow chart establishing the relationships between the constructs of the study variables. The two variables of this study like they were presented in the conceptual framework include transportation components and supply chain performance. This conceptual framework as well supported by other theories that include Transaction Cost Theory (TCT) and System Theory. These theories enhanced thoughtful about both transportation basic components and supply chain performance aspects for effective and efficient application of the study variables.



**Figure 1:-** Conceptual Framework.

**Source:** Researcher (2023)

## Research Methodology:-

### Research Design

Both descriptive and correlational research designs were used in this research. According to Mugende and Mugende (2013), correlational research design presents how historical events are connected in order to draw conclusions about causal relationships between factors, while descriptive research is the investigation in which quantitative data is collected and analysed to describe the specific phenomenon in its current trends. Hence, in this study, descriptive design was used to assess the effectiveness of transportation and supply chain performance level, whereas correlational was opted so as to determine the relationship between the study variables.

### Population of the Study

The target population of this project was 141 people that include 21 ADMA International employees working at the head office; and 120 customers (suppliers and distributors) of ADMA International that operate in each of the secondary cities in the country including Kigali city. The remaining cities are Rubavu, Nyagatare, Huye, and Musanze. Population, according to Williaman (2015), is a compound word that refers to the total number of examples of the kind that are the focus of your investigation. The most effective approach to study any population is to collect data from all aspects of it; to achieve this, a thorough study of a small, well-defined, and easily accessible population is required. The researcher of this study believes the targeted population is the right group of people since they are much well conversant with the subject at hand.

**Table 1:- Target Population Distribution.**

Population category	Location	Supervisors	Ordinary	Total
Employees	Head office	4	17	21
Customers (Distributors and Suppliers)	Kigali	5	46	51
	Huye	2	14	16
	Musanze	2	12	14
	Nyagatare	3	15	18
	Rubavu	4	18	21
	Huye	4	17	141

Source: ADMA International (2023)

### Sampling Size and Sampling Technique

This study considered using all the target population equivalent to one-hundred forty-one (141) as sample size. According to Graham and Marshal (2015), a sample is a selection of entities from a larger group in order to infer some attribute of the larger group. The Sampling technique to be used in this research is called universal sampling or census method whereby all the 141 respondents from the population was selected. This type of sampling was used because the target population was not large, hence it's manageable by the researcher.

### Data Collection Methods:-

This section presents the instruments the researcher considered to collect the research data and they are all presented below;

#### Data Collection Instruments

There are several ways of collecting research-required information. However, this study focused on two techniques and which included the questionnaire and interview.

#### Questionnaire

A questionnaire is a tool for collecting data from respondents through question and other prompt series (Cooper and Schindler, 2013). The researcher uses questionnaires tailored to the study's aims to collect primary data. The selected employees' opinions were measured using a Likert-scale questionnaire. The supply chain performance in various categories were rated using the same system. The responses were categorized as "strongly agree," "agree," "neutral," "disagree," and "strongly disagree" on a Likert scale (SD).

#### Interview

In an interview, one person (the interviewer) asks another (the interviewee) a series of questions in order to elicit responses from the interviewee (Cooper and Schindler, 2013). When some respondents meet time constraints due to a busy schedule, this method of data collection was adopted. ADMA International's management teams was the intended recipients of the interview guide's unstructured queries.

#### Procedures of Data Collection Instruments

In a scientifically sound method of selecting questionnaire participants, the researcher took care to avoid repeatedly selecting the same people in order to eliminate any appearance of bias or conflict of interest. The researcher gave out questionnaires to all one hundred and forty-one (141) participants, and he made careful to help any of the respondents who might have trouble understanding the questions. On an important note, the questionnaire was majorly aimed at collecting respondents' views on how they appreciate the transportation measures in the selected locations and how these controls help in improving supply chain performance.

In this case, the interview, the head of supply chain at ADMA International was tasked to briefly describe the background of the transportation factors, company's strategies in setting up different transportation factors; on improving them and how they think this contributes to the supply chain performance. An interview guide with structured questions were addressed to ADMA International management.

### Research Findings:-

#### Response Rate

A response rate is the degree to which all sample members are included in the final data set. It is computed by dividing the total number of interviewees by the total number of sample participants. The study's sample size was

141 in collecting data; and all 141 of them responded – which gave a response rate of 100%. Research respondents included the 21 ADMA International employees working at the head office; and 120 customers (suppliers and distributors) of ADMA International that operate in each of the secondary cities in the country and Kigali city.

### Demographic Characteristics of Respondents

In this study, personal identification such as age, gender, education level, areas of responsibility and working experience was considered.

#### Gender

The participants were instructed by the researcher to provide precise details on their gender. Every responder was questioned regarding his or her gender; the results are displayed in the table below.

**Table 2:-** Distribution of Respondents by Gender.

Respondents by gender	Frequency	Percentage	Mean	Standard Dev
Female	67	47.5	4.48	0.312
Male	74	52.5	4.45	0.337
<b>Total/Average</b>	<b>141</b>	<b>100.0</b>	<b>4.47</b>	<b>0.3245</b>

**Source:** Primary data (2023)

Table 2 shows that 47.5% of respondents were female and 52.5% of respondents were male. The results made it evident to the researcher that there were more male respondents than female respondents. Besides being unequal in terms of number, the research covered both genders which made the study more professional since the females were at least 30% of the entire population. The study's findings were also given as the mean and standard deviation; the average mean, which is 4.47, falls into the category of very high means, indicating that there is substantial evidence supporting the fact. There was a 0.332 standard deviation. However, the results support Gul's (2018) recommendation that research is more reliable when the respondents are approached from diverse backgrounds, including varied marital statuses, religions, ages, and educational levels.

#### Age

Requesting information about their age groups, the interviewees were asked precise questions by the researcher. The table below displays the results that were obtained from the respondents.

**Table 3:-** Distribution of Respondents by Age.

Age of respondents	Frequency	Percentage	Mean	Standard Dev
20-30	22	15.6	4.20	0.398
31-40	81	57.4	4.41	0.371
41-50	30	21.3	4.24	0.617
Above 50	08	5.7	3.84	0.487
<b>Total/Average</b>	<b>141</b>	<b>100.0</b>	<b>4.17</b>	<b>0.468</b>

**Source:** Primary data (2023)

Table 3 makes it abundantly evident that respondents between the ages of 31 and 40 made up the biggest percentage of the sample, at 57.4%. This showed that the majority of ADMA International employees and distributors who were still sufficiently young and mature to participate in the research gave honest information. Further down this age range are those aged 20–30, 41–50, and above 50, with respective percentages of 21.3%, 15.6%, and 5.7%.

Additionally, the standard deviation was 0.468 and the mean was 4.17, which collectively explained that there is significant evidence supporting the claim. Since the study included respondents who are generally regarded for delivering reliable information, credible findings were anticipated. These findings gave the researcher confidence in his research results. Findings were in line with a study by Cooper and Schindler (2019) who stated that in a circumstance where the respondents are still young, energetic and vibrant, better study findings are realized unlike engaging aged study respondents.

### Educational Level

In order to determine the respondents' capacities to examine their own actions, the researcher also took into account their educational backgrounds.

**Table 4:-** Distribution of Respondents by Education Level.

Education levels	Frequency	Percentage	Mean	Standard Dev
Master degree	8	5.7	4.21	0.431
Bachelor degree	52	36.9	4.28	0.411
Secondary	81	57.2	4.16	0.383
<b>Total</b>	<b>141</b>	<b>100.0</b>	<b>4.27</b>	<b>0.408</b>

**Source:** Primary data (2023)

Presented in table 4 are the study findings for a question asked on the education level which was included so that researcher understands the reasoning capacity of the respondents and the results as revealed, it is clearly elaborated that 57.2%, 36.9% and 5.7 % are for the respondents who had pursued secondary level, bachelor degree and master degree respectively. The lowest level was found to be secondary education or high school; and most of these cited that were taking up bachelor degree. This shows that the study dealt with the intellectual employees who were only able to derive on the study targets. The study results presented in form of means, the results were found to be 4.27 while the standard deviation was also at the average of 0.408. Furthermore, the results support the recommendations made by Hajizedeh (2016), who pointed out that when contacted respondents originate from a variety of social, political, and economic backgrounds, research is more credible than it would otherwise be.

### Working Experience

When asked how long they had been working and contributing to the pension plan, every sample respondent gave the information shown in the table. The facts were presented in the table as a percentage and were thereafter thoroughly explained beneath the table, as seen below.

**Table 5:-** Distribution of Respondents by Working Experience.

Working experience	Frequency	Percentage	Mean	Standard Dev
Less than 1 year	17	12.1	4.01	0.337
1 to 2 years	24	17.0	4.21	0.331
2 to 5 years	31	22.0	4.33	0.328
Over 5 years	69	48.9	4.54	0.324
<b>Total</b>	<b>141</b>	<b>100.0</b>	<b>4.273</b>	<b>0.330</b>

**Source:** Primary data (2023)

Table 5 shows that, of the 141 respondents, 69 respondents, or 48.9%, had worked at ADMA International or distributed ADMA International products for more than five years. The remaining 31 respondents, or 22.0% of the total, said they had worked for between two and five years. Furthermore, 12.1 percent of the respondents had contributed to ADMA International for less than a year, and 17.0% of the respondents had worked for these hotels for one to two years. The aforementioned results demonstrate that the study's participants, who included a case study of ADMA International, had sufficient experience to assess how transportation affects industrial sectors' supply chains.

In the same vein, the findings revealed a fact that the respondents were competent enough and this was confirmed in terms of mean and standard deviation at average of 4.237 and 0.330 respectively. In addition, the study results indicated that they had worked quiet enough and this was the time for them to reap what they save since at this age; they are unable to assist themselves any more. Hence, it's important to assess to analyze the impact of transportation on supply chain of manufacturing industries in Rwanda; taking a case study of ADMA International.

### Descriptive Statistics

This section presented descriptive statistics which were also presented in line with the study's specific objectives. As a result, the purpose of this study's part is to give facts that support the four goals. For improved display and analysis, the results were given as mean and standard deviation in tables.



### Respondents' Views on Fleet Management

The respondents' level of appreciation for the influence of fleet management on ADMA International's supply chain is covered in this subsection. The results are presented in table 4.8 and are expressed as mean and standard deviation.

**Table 6:- Respondents' Views on Fleet Management.**

Statements	Mean	Standard Deviation
Fleet management enables ADMA International to monitor fleet activities and make decisions about proper asset management.	3.36	0.481
ADMA International carries out vehicle tracking, monitors driver behavior, fuel consumption and manages vehicle maintenance.	4.55	0.312
By following international regulations, incidents can be recorded in a logical database for use in policymaking.	3.35	0.473
Fleet management helps ADMA International to meet compliance requirements, improves efficiencies, and reduces costs.	4.51	0.340

**Source:** Primary data (2023)

The researcher aimed to evaluate respondents' level of appreciation for the influence of fleet management on ADMA International's supply chain based on the study results shown in table 4.7. The results, which are displayed in the above table as mean and standard deviation, indicate how closely the individual replies to the means were spaced out, with all standard deviation values being above 0.312 but less than 1. The results of this study are therefore trustworthy. Additionally, the mean results were 3.36, 4.55, 3.35, and 4.51; these results demonstrated high and very high means, which explains why there is significant proof of the fact among the relevant practices.

As a result, fleet management procedures were observed and appeared to be operating normally, just as they should in any manufacturing sector. Furthermore, the outcomes are consistent with the research findings of Arslanturk, Newman, and Aggarwal (2020), who studied supply chain performance and fleet management in Indonesian manufacturing firms. By controlling the determinants of environmental uncertainty in the supply chain, the study aimed to ascertain the relationship between supply chain management practice and the performance of its chain eyes.

The findings demonstrated how supply chain management methods impact the chain's performance as well as how environmental uncertainty factors influence the relationship between supply chain management practices and performance. Businesses should be able to plan their technical and operational supply chain management procedures if they have a thorough awareness of the variables that affect supply chain performance. In a similar vein, research by Paxton (2019) on the Aberdeen Group Supply Chain Performance Survey indicates that 65% of businesses seek to improve or obtain the capacity to dynamically align their supply chain based on customer profile data.

**Inventory Reduction:** Compared to just 23% of non-consumer market companies, 50% of consumer market companies stated reducing stocks through improved visibility of incoming supplies and upstream inventories. Harnessing customer data can be challenging at times due to a combination of industry dynamics and customer expectations. The massive volume of consumer data is simply one aspect of the issue in businesses that move quickly, such as consumer packaged products and food and beverage. Supply chain velocity demands that any analysis of client data be completed promptly in order to meet demand. As a result, the researcher, who discovered that fleet management affects supply chain performance in Rwandan manufacturing companies, confirmed every claim made regarding fleet management.

### Respondents' Views on Route Planning

The respondents' level of appreciation for the effect that route planning has on ADMA International's supply chain is shown in this section. To aid in comprehension, the results are later described beneath the table.

**Table 7:- Respondents' Views on Route Planning.**

Statements	Mean	Standard Deviation
Route planning allows ADMA International to provide a more efficient delivery service.	4.05	0.316
Route planning helps ADMA International operations to minimize costs and maximize profits	4.27	0.372
With the help of route planning, administration ADMA International can forego some of the no longer necessary routes and programs.	4.68	0.363
Incorporating route planning protocols into the workplace aids the ADMA International in making more informed decisions.	4.03	0.322

**Source:** Primary data (2023)

The achieved study results were related to an understanding of the influence of route planning on the supply chain performance in ADMA International, as indicated by the data shown in table 7. The study results, which are displayed above in the form of the mean and standard deviation, demonstrated that all of the standard deviation values were over 0.316 even though they were less than 1, indicating how closely the means corresponded to the individual replies. The means of this study are therefore thought to represent a reliable estimate of the mean spreading.

Additionally, the mean findings were 4.05, 4.27, 4.68, and 4.03; this relatively high mean indicates that there is considerable proof of the fact among the relevant practices. As a result, the researcher discovered that route planning procedures are a component of supply chain performance. The procedures were also widely accepted.

The results of a research by Shekhar (2019) in South America, which examined the impact of route planning on the supply chain performance of South American manufacturing companies, corroborate the findings. It was discovered that factories in South America that carried out certain specific phases upon justification performed better than those that did not. Such elements have made it easier to adopt and authorize management controls at the departmental level in the production and manufacturing industries of Argentina and Colombia, in addition to advances in transportation operations and technical advancements.

Additional research findings acquired from the Brazilian industry emphasized the significance and challenges associated with road safety management measures that are advocated by over 87.3% of the population, potentially impacting supply chain performance. The results of the poll show that over 79.7% of managers are ultimately in charge of ensuring that route safety procedures in the manufacturing industries in Brazil and other countries in the region are adopted.

According to additional research findings from a study by Murphy (2020), more businesses are integrating technology into their supply chain management systems today in order to be competitive worldwide and stay on the cutting edge of a complex business world. Customers now have high expectations for quality and service and have grown more demanding in recent years. Supply chain managers have also realized that they may keep tight control and stay ahead of the competition by utilizing the newest technologies to ensure greater responsibility and visibility. Information technology (IT) and communication technology in supply chain management (SCM) are growing exponentially, and this has a significant impact on how supply chain network flow decisions are optimized for increasing organizational competitiveness, raising service levels, decreasing inventory, cutting supply chain costs, and lowering electronic risks (e-risks). IT in SCM is also necessary to achieve integration and efficient information sharing inside and across enterprises. It is sufficient to realize that there is proof of the influence of route planning on supply chain management, as all of the comments in the set were both strongly and in agreement.

#### **Respondents' Views On Order Processing**

Here, the researcher sought to find out the respondents' perceptions regarding the influence of order processing on ADMA International's supply chain. The study's findings were displayed in table 4.10 and subsequently explicated beneath the table for better comprehension.

**Table 8:-** Respondents' Views on Order Processing.

Statements	Mean	Standard Deviation
The most serious problem in current ordering process is lack of contact between different parties	4.14	0.382
ADMA International has sufficient use of information system during the order process	3.38	0.431
ADMA International implements, and controlling the efficient, effective flow and storage of goods, services	4.35	0.311
Aware of the need of reporting operational issues to higher-ups, all employees can now do so thanks to the training provided to them	4.27	0.349

**Source:** Primary data (2023)

The results show how much respondents value the influence of order processing on ADMA International's supply chain, as shown in table 8. The study results, which are displayed above in the form of the mean and standard deviation, demonstrated that all of the standard deviation values were over 0.311 even though they were less than 1, indicating how closely the means corresponded to the individual replies. The means of this study are therefore thought to represent a reliable estimate of the mean spreading. In addition, the mean results showed that order processing was effective. These mean findings included 4.14, 3.38, 4.35, and 4.27; the high mean demonstrates that there are actual problems with ADMA International's order processing procedures.

In the same line, Arslanturk et al. (2020) observed that in India, despite the growing interest in supply chain management (SCM), our understanding of the subject issue and order processing is still limited, largely due to inadequate attention being placed to theory building. This paper aims to tackle the issue at hand by highlighting several significant flaws in the current body of literature concerning the conceptualization, operationalization, and modeling of supply chain management. It also identifies possible reasons for these inadequacies and provides suggestions for enhancing theory development in this field. In particular, it shows that the SCM construct has been interpreted narrowly from the standpoint of a specific traditional firm function; among other operationalization issues, it shows that the construct validity is threatened by inadequate pre-operational explication of the content domain; and the dominant conceptual SCM models primarily emphasize the relationship between practices and performance while ignoring the relationship between context and practices.

Hoffmann (2017) conducted research into the order processing and supply chain performance of Brazilian manufacturing industries. It was discovered that shippers are fighting more and more for carrier capacity in today's competitive trucking industry. In order to maintain their competitiveness, shippers want a top-notch transportation management system that includes dock appointment scheduling. When carriers receive comparable rates from two different shippers, they will choose the shipper who requires the least amount of time to load or unload, which is another way that bad dock management can affect a shipper's capacity. The study also discovered that when clients' orders are processed efficiently, manufacturing companies' supply chains function better.

### Inferential Statistics

This subsection utilizes SPSS to illustrate the relevance of the relationship between the research variables, which in this case are supply chain performance and transportation, as the study's independent and dependent variables.

### Correlation Coefficient Analysis

This made it easier for the researcher to comprehend how strongly the study's independent variables are correlated with one another.

**Table 9:-** Correlation Coefficient Analysis.

Model	Variables	Transportation	Supply Chain
Spearman's rho	Transportation	Correlation Coefficient	1.000
		Sig. (2-tailed)	.717**
		N	.001
			141

Supply chain	Correlation Coefficient	.717**	1.000
	Sig. (2-tailed)	.001	.
	N	141	141

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

Another name for the Spearman Correlation Coefficient is Spearman's rho. Usually,  $r_s$  or the Greek letter rho ( $\rho$ ) is used to represent it. Every correlation analysis provides a single number between -1 and +1 that represents the degree of association or co-occurrence between the variables. The correlation coefficient is the name given to this value. As per Fa et al. (2015), a positive correlation coefficient signifies a positive association between the two variables, whilst a negative correlation coefficient conveys a negative relationship.

From the SPSS spearman correlation analysis results indicated in the Table 9, the value of  $r_s=0.717$  while  $P$  value=0.011 which is less than a significance level of (0.05) and this which explains that there was a strong, positive monotonic correlation transportation and supply chain performance of manufacturing companies ( $r_s= .717$ ,  $n = 141$ ,  $P < .011$ ). From the spearman coefficient analysis, it was learnt that transportation in terms fleet management, route planning and order processing have strong relationship on supply chain performance in manufacturing companies in Rwanda; and ADMA International in particular.

### Multiple Regression Model

In order to assess the study's regression and confirm the importance of the relationship between the dependent and numerous independent variables, the multiple regression model was used in the research. To examine the correlation between the research variables, the model included the model summary, the ANOVA, and the summary of the coefficients. The researcher was able to ascertain the relationship between changes in the independent variables and changes in the dependent variable with the aid of regression analysis.

**Table 10:-** Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.901 <sup>a</sup>	.812	.783	.3160

a. Predictors: (Constant) fleet management, route planning and order processing

According to the model summary, there is a high positive correlation between the research variables, as indicated by  $R=.901^a$ , with a  $R$  squared of 0.812. This indicates that fleet management, route planning, and order processing contributed to an 81.2% variation in supply chain performance. This indicates that other factors influenced by supply chain performance account for 18.8% of the total. The model summary indicates that there is, therefore, a significant and positive association between the studied variables.

**Table 11:-** Analysis of Variance (ANOVA).

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.991	3	.664	3.354	.013 <sup>a</sup>
	Residual	27.169	137	.198		
	Total	29.160	140			

a. Dependent Variable: Supply chain performance

b. Predictors: (Constant), fleet management, route planning and order processing

From table 11, ANOVA test, it was learnt that  $P$ -value was recorded at 0.013 which is much less than alpha value that is placed at the value of 5% (0.05), hence an indication of significance positive influence between research variables. Furthermore, the results of the ANOVA study clarify that the multiple regression models work well with the data. Therefore, the significance value, which was likewise less than 0.05, suggests that the study's model was fit and statistically significant for predicting the variables under investigation.

**Table 12:-** Summary of Coefficient Results.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.347	.827		1.628	1.000
Fleet management	.679	.322	.410	2.108	.013
Route planning	.612	.344	.206	1.779	.017
Order processing	.843	.694	.425	1.214	.011

a. Dependent Variable: Supply chain performance

Table 12 presents results as regards to the standardized Beta Coefficients whose purpose was to give a measure of the influence of each variable to the model. From the findings, the following were discovered: ( $\beta_1 = 0.410$ ,  $t = 2.108$ ,  $p = 0.013 < 0.05$ ;  $\beta_2 = 0.206$ ,  $t = 1.779$ ,  $p = 0.017 < 0.05$ ;  $\beta_3 = 0.425$ ,  $t = 1.214$ ,  $p = 0.011 < 0.05$ ). This refers to the fact that 1 per cent increase in transportation practices in form of fleet management, route planning and order processing will lead to 0.410, 0.206, 0.425 and 0.558 increase in supply chain performance of ADMA International. Therefore, the regression model becomes: Supply chain performance = 1.347 + 0.410 Fleet management + 0.206 Route planning + 0.425 Order processing. From these findings, all the hypotheses were rejected.

The study findings supported the findings of a number studies; and in particular, in a research accomplished by Phannindra et al (2020) which included 1,068 completed surveys that stretched across all industries and geographies. Regarding supply chain management practices and perceptions, the data collection that was gathered was the biggest and most complete that has ever been found anywhere. The statistics demonstrated an expansion in demand's volume, complexity, and urgency. Big data analytics is by far the most disruptive technology in supply chains. SKU counts are rising as a result of digital demand, which also fragmented fulfillment methods and speeds up cycle times. More than 50% of the respondents claimed that the CEO saw supply chains as equal partners in the company's success, alongside sales and product management.

Anatan (2020) claims that supply chain performance and fleet management in Indonesian manufacturing firms are comparable. By controlling the determinants of environmental uncertainty in the supply chain, the study aimed to ascertain the relationship between supply chain management practice and the performance of its chain eyes. The findings demonstrated how supply chain management methods impact the chain's performance as well as how environmental uncertainty factors influence the relationship between supply chain management practices and performance. Businesses should be able to plan their technical and operational supply chain management procedures if they have a thorough awareness of the variables that affect supply chain performance.

## Conclusion:-

The researcher came to the conclusion that transportation has an impact on the supply chain of the industrial industries at ADMA based on the findings. This study's primary goal was to ascertain whether transportation had an effect on the supply chains of the industrial industries at ADMA. Following an analysis of the data gathered at ADMA, the research findings show that raw material transportation has an effect on the supply chain of the industrial industries at ADMA.

### Effect of Fleet Management on Supply Chain Performance In ADMA International

Regarding fleet management, the results show that, while ADMA's high product quality and volume are important differentiators in the market, the ADMA supply chain should be distinguished by competitive raw material transit times from suppliers that don't require more than four weeks, depending on the source. The transportation of raw materials is correlated with the supply chain of manufacturing industries at ADMA, according to research using the Pearson correlation.

### Effect of Route Planning On Supply Chain Performance in ADMA International

After analyzing the data gathered at ADMA, the research findings about route planning showed that ADMA uses air and sea transportation for raw materials, and it never travels farther than two weeks from a source. And despite certain shortcomings in inventory management, the supply chain operation is proceeding smoothly. Consequently, it was determined that transportation significantly affects the manufacturing industries' supply chains.

### Effect of Order Processing On Supply Chain Performance In ADMA International

Given that, ADMA mostly relies on air transportation, which is more expensive than other modes of transportation, the cost component of order processing needs to be updated. As a result, order processing is regarded as a precise approximation of mean spreading.

### References:-

1. Andyss, R. (2020). Renewed focus on organizational performance in hotels. Performance theory. London: Oxford University Press.
2. Arslanturk M. Newman R. A, Aggarwal B. (2020). Impact of Transportation on Corporate Performance in Manufacturing Companies. Berlin: Brussels.
3. Barahona, L and Elizondo, M. (2019). Adapting the SERVQUAL Scale to Transportation and Its Empirical Investigation (Vol. Vol. 26(6). Social Services Research.
4. Bourne, H. (2018). Transportation Management in Supply Chain Effect. Daryaganj. New Delhi: Sultan Chand & Sons.
5. Cooper, H and Schindler, N. (2013). Research Methodologies (2nd edition ed.). New York: Pinkwell publishers.
6. Dugdale, B. & Lyne, V. (2018). Transformed focus on Organizational performance in SCM Performance theory. London: Oxford University Press.
7. Faleti, M and Myrick, L. (2018). Supply Chain Management in Organizations. 8th edition, New .
8. Graham K & Marshal L. (2015). Methodes de recherché en Sciences Sociales (10e Edition ed.). Paris: Lourousse.
9. Graham, T. (2015). Supplies control systems, designing quality performance services for the. Dell : public use. Trinidad .
10. Gul, J. (2018). Best Practices in transportation and finance management (1, ed.). London : Routledge.
11. Havelaar, M. (2019). Finance and Supplies Management Decisions and the Service Delivery (3rd edition ed.). Kampala: Business Publishing Group.
12. Hoffmann. (2017). Evaluation of Internal Audit on efficiency (3 ed., Vol. 1). Journal of Finance and Economics.
13. Horneff, J, Ghalley, N and Phill, F. (2016). Factors Affecting Efficiency of Local Government. (Vol. 1(3). Journal of Finance and Economics.
14. Huppert, N. (2017). Supplies management and service Efficiency: Gaps in the Malaysian Public. Institutions, Oakland: SAGE Publications.
15. Khan, W. (2018). Supplies Performance Management in Organization. Daryaganj, New Delhi: Sultan Chand & Sons.
16. Kwebena, L. (2018). Supplies safety research: Three Theoretical Perspectives and Criteria for Selective Integration (Vol. 15(1). Journal of Hotel Management Research.
17. Lee, M. (2017). A Question of Values of Transportation Management. (2ed.). London: British library.
18. Lestantyo, H. (2017). Effect of Supplies safety control processes in the State and SCM Governance. Public Journal: WellComp.com Publishers.
19. Mayers, M. (2018). Organizational performance against Finance Management (2nd edition, ed., Vol. 32:4 ). New Delhi: Vikas Publishing House.
20. Mugende O. M & Mugende A.G. (2013). Modern Research Methods in, 2th edition, MC grow hill. Irwin.
21. Muhumuza, K. (2018). Hotel sector and Financial Information. Kampala: Business Publication Group.
22. Muigai, G. (2019). Supplies and its management. (8, ed.). New York: Indica center.
23. Mukhopadhyay, M. (2021). The relationship between internal controls and supplies safety system hotel management sector (Vols. 12-14). Journal of finance.
24. Murphy, W. (2020). Supplies Safety Management in Public Institutions. Daryaganj. New Delhi: Sultan Chand & Sons.
25. Naale et al. (2018). Understanding the Research Process and Methods. Nairobi: Moran (EA): Publishers Ltd.
26. Ngugi J, and Mugo I. (2019). Procurement dynamics in Government Institutions (1st edition ed.). New York: Diamond Publishers.
27. Nyageng'o. (2020). Adapting the Effective Planning for Efficiency in hotel services: an empirical investigation (Vol. Vol. 66(8)). Social Services Research.
28. Osagbemi E & Aderibigbe, H. (2018). Procurement Decisions in Hotel industry ( 2nd Edition ed.). Kampala: Business Publishing Group.

29. Pandey, D. (2019). Improved focus on Organizational performance. Performance theory. London: Oxford University Press.
30. Pang K. Ibrahim, M and Dauda, T. (2018). Supplu Chain performance in relation to Transport safety (4th edition ed.). Dictionary le petit Robert.
31. Paxton, J. (2019). Transport Safety Control systems and performance development. Sunderland. MCC records.
32. Phannindra et al. (2020). Transport safety control processes as metric for corporate performance (Vols. 3 (1), ISSN ). Published by: International Journal of Sustainable Development Strategies.
33. Pletikosa & Michahelles (2018). Transportatio Efficiency: Gaps in the manufacturing industry,. Oakland: SAGE .
34. S, W. (2018). Transportatio Efficiency: Gaps in the manufacturing industry, Oakland: SAGE .
35. Sarikas M and Weerakkody, K. (2019). Best Practices in Supplies Preparation and finance (st edition ed., Vol. 1). London: Routledge: management.
36. Shekhar. (2019). Performance Target Settings and Effective Performance Measurement in Nigerian Manufacturing Industry (3 ed., Vol. 1). Journal of Finance and Economics.
37. Silva and Ariyarathna. (2019). Evaluation of Internal Audit and efficiency (7 ed., Vol. 3). Journal of LocalGovernments and Economics.
38. Suberu, J. (2020). Transport control processes Management of Government Companies. California: Prentice-hall.
39. Umble K, Greens J and Ramos, B. (2019). Information Systems and the Expectations from Public.
40. Wolfgang, H. (2019). Understanding IT application in Supplies Management. A survey of .
41. Woo S. (2018). Transportatio Efficiency: Gaps in the manufacturing industry,. Oakland: SAGE Publications.