The Effect of Third Party Logistics Service Providers on Supply Chain Performance in Rwanda Manufacturing Companies: A Case of Bralirwa Limited

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ABSTRACT: Supply chains are becoming more international and sophisticated. The development of third party logistics (3PL) service can help supply chain to achieve cost reduction and shorten lead time simultaneously. This study seeks to found out the impact of third party logistics service providers on supply chain performance of the manufacturing companies in Rwanda; the general objective of this study is to investigate on the effect of 3PL service providers on supply chain performance in Rwanda manufacturing companies, a case of BRALIRWA Ltd; with specific objectives as follow: To determine the effect of lead time, warehousing management, cost reduction and transportation management on procurement performance of BRALIRWA Ltd. The study used Descriptive Research Design. The target population is 580: Logistics staff, top management, finance staff, operations staff, human resource staff and suppliers of Bralirwa Ltd while the sample size considered is 58 which represents 10% of the target population. Data was processed using descriptive statistics where SPSS version 23, was used for data processing to establish the effect of independent variables on the dependent variable. The study found out that lead-time, warehousing management, cost-reduction and transportation management influenced supply chain performance generally to a great extent. The study findings with regression analysis revealed, the influence of 51.6% of third party logistics on supply chain performance in Bralirwa Ltd.

Key words: Third party logistics, supply chain performance, lead time, cost reduction, warehousing management, transportation management.

I. INTRODUCTION

This chapter of the research project represents background of the study, statement of problem, research objectives both general and specific objectives, research hypotheses, justification of the study and scope of the study.

Background of the study

As per Spencer Stuart’s consultant, the transportation industry and third-party logistics service providers are indispensable to companies around the world. Spencer Stuart’s consultants know that executives in this cyclical, competitive and fast-moving industry must go well beyond simply transporting people and products from Point A to B. A relationship between a shipper and third party which, compared with the basic services, has more customized offerings, encompasses a broad number of service functions and is characterized by a long-term, more mutually beneficial relationship (Xu Yang, 2014). According to Boyson, S., Corsi, T., Dresner M., & Rabinovich, E. (2009) a 3PL provider can fulfill the demands for advanced logistics services, in the field of transportation, warehousing, freight consolidation and distribution, inventory management, cross docking, product returns, order management, and logistics information systems.

(Shengjun Gao, 2013) States that the core competitive advantage of a 3PL provider comes from its ability to integrate those logistics services to help its customers manage their whole distribution systems.

Third Party Logistics

Third Party Logistics (3PL) providers are service providers who offer logistics solutions to ensure effective and efficient performance of supply chain management. Companies outsource the services of 3PL for many reasons including; to gain access best practices, to improve service quality, to control logistics cost, to increase speed, to properly manage its resources, to spread its risks and to focus on issues that are very much crucial to their existence and future growth. Third Party Logistics (3PL) has many interpretations and definitions. Gadde & Hultén (2009), define 3PL provider as the external company to carry out the logistics functions that have conventionally been executed within an organization.

There are various definitions and interpretations of 3PL. First, Council of Logistics Management defines logistics, is the process of planning, implementing, controlling the efficient and effective flow, storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer’s requirements. Logistics management tries to have the “right product”, in the “right quantity”, at the “right place”, at the “right time”, with the “right cost. Hertz and Alfredsson (2012) define third party logistics...
service provider as “an external provider who manages, controls, and delivers logistics activities on behalf of a shipper”. Third Party Logistics provider is evolving from a predominately transactional role to one that is more strategic in nature (Green, Turner, Roberts, Nagendra, & Wininger, 2008; Forrest et al., 2008). The business model of 3PL is essentially based on the creation of customized logistics services which enables 3PLs to differentiate from the traditional transportation market and access higher margins (Large, Kramer & Hartmann, 2011). The number of 3PL providers has been increasing rapidly in both the developed and the developing economies.

The 3PL industry developed in the 1970’s when during a time of expanding globalization and an increased use of information technology. These trends resulted in increased demands on firms, and possibilities for companies to operate more competitively in the marketplace. The first generation 3PL’s (1970’s- 1980’s) offered services such as transportation, brokerage, and shipping. Second generations 3PL’s (1980-1990) were mostly asset or non-asset-based companies with increased service offerings. The third generations 3PL’s (2000 onwards) were mostly web-based 3PL’s with increased supply chain integration (Nemoto & Tetzuka, 2007).

3PL typically concentrates in integrated warehousing and transportation services that can be scaled and customized to customer needs based on market conditions and the demand and delivery service requirements for their products and materials. 3PL is evolving from a predominately transactional role to one that is more strategic in nature. Some of the characteristics of 3PL’s are that they perform a variety of outsourced logistics matters, provide customized services, and handle multiple activities. These may involve transportation, distribution, warehousing, material handling, inventory control, packaging and inspection (Harrison, A. & Hoek, R.V, 2008).

Global Perspective of Third Party Logistics

To compete effectively, organizations must constantly improve their performance by reducing costs, lead time, enhancing quality, and differentiating their products and services (Waiganjo, 2013). The Third-Party Logistics (3PL) industry worldwide has continued its growth from 1970s and has been increasing its importance as a means of coping with rapid changes in the global competitive environment (SoonHu, 2010), Germany and United States of America (USA) were the first countries to adopt and practice the use of 3PL to improve supply chain performances (Boyson et al., 2009). Over time these 3rd party logistics service providers (3PLs) expanded their services to cover specific geographies, commodities, modes of transport and integrated their existing warehousing and transportation services, becoming what we now know today as a “3PL” (Christopher, 2012). In the USA, the most renowned retail stores Wal-Mart and Bentonville Ark are best in practice firms that adopted the use of 3PL service providers. Gibson and Cook (2011) explains that with the adoption of 3PL services, Wal-Mart has managed to implement real-time integration of distribution system into ‘host’ system leading to accurate and timely data reporting adding value to the distribution and marketing operations of the retail store. This has also resulted in reduced inventory costs through improved management.

In the United Kingdom, Seas Holdings the acquisition of 3PL service providers has enabled the company to improve customer service through shorter shipment times. This has also seen productive gains through logistics being managed more effectively through the application of technology. Murphy (2011) reports that Kingfisher plc (UK) flexibility to respond quickly to changing market trends, changing business environments, and peak periods without major disruptions to distribution operations all emanate from experienced and qualified 3PL service providers the company has chosen to work with. Coca cola South Africa gives credit of its supply chain performances improvement to economies of scale through sharing resources, volume shipping discounts, and increased shipment visibility by the use of 3PL services (Rao & Young, 2013). Gibson and Cook report that this is an approach Procter and Gamble in South Africa is also exploring to improve its logistical and supply chain activities.

Local and regional perspective of Third Party Logistics

In Rwanda third party logistics is still at infancy stage however there are some 3PL companies include DHL, Global Forwarding, Bolloré Africa Logistics etc. Kenya has a good number of successful companies that use 3PL service providers. In the public sector, companies such as East African Breweries Limited, Kenya Airports Authority, Kenya Pipeline Company use 3PL to coordinate and integrate their supply chain operations. In the private sector, Nakumatt Holdings and Tusker Mattresses Retail Chain in the retail industry and Simba Cement Company and Savannah Cement Company in the Cement manufacturing industry are best example of companies in Kenya that have employed the services of 3PL (Samson, 2012; Owano, 2013). According to Saliba (2013) Kenya retail industry has managed to stay on competitive edge through acquisition of services of skilled and experienced 3PL service providers such as DHL and Kuenhe Nagel.

Background of BRALIRWA Ltd

BRALIRWA limited is a public company limited by shares since 9th June 2010 incorporated in the Republic of Rwanda under the law no7/2009 of 27th April 2009 relating to companies and registered by the Registrar General Office under no 100004348. BRALIRWA Limited was the first company listed on the Rwanda Stock Exchange (RSE) as from 31st January, 2011. BRALIRWA Limited is a proudly Rwandan company with roots in the country that date back over 56 years to 1959 when the Company’s flagship Rwandan beer brand, Primus, was first produced in Gisenyi. Today, Bralirwa is a regionally and internationally recognized brewer and

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soft beverage manufacturer with an expanding portfolio of alcoholic and non-alcoholic beverages. The Company’s mission is to become a world class sustainable beverage producing company in Rwanda with high quality brands that satisfy needs and give enjoyment to their consumers, while respecting their people, society and environment in which they live.

BRALIRWA’s Core values include: Passion for Quality as a subsidiary of Heineken N.V. and license holder of The Coca-Cola Company, BRALIRWA ensures that everything it does or produces is of a high quality. BRALIRWA continually aims to obtain and maintain its internal and external quality standard (e.g. ISO).

Enjoyment for life BRALIRWA participates in making life more enjoyable by producing high quality beers and sparkling beverages and marketing them responsibly through innovative sponsorships, advertising and countrywide promotions. Respect for People, Society and the Environment we live in as an integral part of the local and global communities in which it operates, BRALIRWA is very respectful of the laws and regulations of the countries where it is active and it also pays attention to different cultures and to environmental preservation.

Statement of problem

In the world of distribution and third-party logistics, advancing technologies, globalization, rising fuel prices and security concerns are raising the stakes for transport and logistics companies. Delivery time is the single biggest factor influencing the performance of the supply chain processes and supply chain in general, which means managers need to take care to reduce it as much as possible. The shorter the lead time, the faster the products can be sold and the easier it will be for the company to increase profits. Shorter lead times are beneficial for all parties. According to authors such as Kroes and Ghosh, (2010); Jiang and Qureshi (2006), the results of logistics outsourcing is still vague and an unexplained puzzle hence the basis of this study. BRALIRWA Ltd revenue showed sustained growth of 5.6% to Frw 88.8 billion in 2016 from Frw 84.1 billion in 2015, despite a slight decrease of our total sales volume by 1.4%. The volumes were impacted by our soft drink price increase executed in August 2016 in a competitive market environment. This was the first price increase for our soft drinks portfolio in five years and the slight decrease in volumes was in line with expectations. To compensate for the increase in fixed costs from operations and logistics, at a time when the currency depreciation is raising the raw material and other costs, Bralirwa Ltd had to pass on some of these costs through a price increase on its soft drinks portfolio. Despite lower volumes, driven by both affordability issues and a competitive market, Bralirwa Ltd managed to deliver revenue growth. Supported by strict cost management, Bralirwa Ltd mitigated the impact on results from operating activities. Consequently, Bralirwa Ltd’s results from operating activities declined by 7.0% from Frw 13.0 billion to Frw 12.1 billion and profit and total comprehensive income for the year 2016 declined by 80.3% from Frw 7.1 billion to Frw1.4 billion, resulting in some earnings per share of Frw1.36. (BRALIRWA LTD Annual report, 2016).

Objectives of the Study

General Objective

The general objective of this study is to investigate on the effect of 3PL service providers on supply chain performance of BRALIRWA Ltd.

Specific Objectives

To determine the effect of lead time on supply chain performance of BRALIRWA Ltd
To find out the effect of warehousing management on supply chain performance of BRALIRWA Ltd
To establish the effect of cost reduction on supply chain performance of BRALIRWA Ltd
To assess the effect of transportation management performance of BRALIRWA Ltd

Research Questions

How does lead time affect supply chain performance in BRALIRWA Ltd?
Does warehousing management affect supply chain performance in BRALIRWA Ltd?
To what extent does cost-reduction influence supply chain performance in BRALIRWA Ltd?
Does transportation management affect supply chain performance in BRALIRWA Ltd?

Justification of the study

Other manufacturing companies: The effect of 3PL service providers on organizational performance in manufacturing companies in Rwanda is a study which will benefit manufacturing company on improvement of money value, quality of service delivery; efficiency and effectiveness.

Government: The study would assist the government to have the holistic approach of ensuring growth and development of logistics providers in supply chain management performance in manufacturing companies in Rwanda. The study would provide relevant information that would help the government and other regulatory bodies to formulate and implement such policies that would facilitate effective strategic management on logistics providers. The findings of this study would also help the policy makers to review and develop policies that would guide logistics industry in Rwanda.

Academician and researchers: The study will provide a theoretical and empirical framework for research in 3PL with BRALIRWA Ltd and will contribute to the body of knowledge since it will be reference material for future researchers and academicians. They should find the study methodology and subsequent results rich enough to guide future research. Further, the study will act as an impetus to reignite interest in this critical area of study.
Stakeholders: The stakeholders might use the research findings to evaluate the managerial strategies and the extent to which they affect the 3PL in advent of improving its performance. Suppliers: Suppliers to manufacturing companies and is directly or indirectly affected by the operation of these companies. The companies that integrate 3PL service providers are able to responsive to customers changing needs that include quality of service and products. They will also benefit from reduced prices as a result of reduced operation costs and internal sourcing of product distribution. Additional community benefits that may arise as a result of good performance of manufacturing companies.

Scope of the study

The study was carried out at Brasserie et Limonaderie du Rwanda (BRALIRWA ltd) head office located at Kicukiro, Kigali town and the target population is: top management, procurement, finance and human resource staff, suppliers and stakeholders because they are the ones who have a great role in supply chain performance of the organization. The target population of the study is 580 personnel within BRALIRWA Ltd, out of the above a sample size of 58 were studied. BRALIRWA Ltd is appropriate area for the study because is the manufacturing company in Rwanda which is dealing with 3PL service providers and supply chain performance for good service delivery.

II. RESEARCH METHODOLOGY

Introduction

This chapter discusses the research design that was used, the target population, sampling methodology, data collection and data analysis method to be employed. The pilot validity and reliability of the research instruments was discussed.

Research design

The research design constitutes the blue print for the collection, measurement and analysis of data, (Kothari, 2005). This research used descriptive research design. This kind of research design aims at generating information after the event has occurred. The research design looked at the reasons why the situation behaves the way it is. The reason for this choice was based on the knowledge that case studies are the most appropriate for examining the processes by which events unfold, as well as exploring causal relationships and they also provide a holistic understanding of the phenomena (Durrheim, 2014). The design utilized both qualitative and quantitative approaches. Qualitative approach includes use of interviews, while a quantitative approach involves use of descriptive statistics generated with frequency tables, graphs, and Charts. These approaches were adopted to enable the researcher to get and analyze relevant information concerning people’s opinions about the effect of 3PL service providers on supply chain performance in Rwanda manufacturing companies, case of BRALIRWA Ltd.

Target population

Population refers to an entire group of persons or elements that have at least one thing in common. Population also refers to the larger group from which a sample is taken (Orordho, 2004). Study population is a complete set of individuals, cases or objects with some common observable characteristics. The study population included respondents from Logistics department, top management, finance staff, operation staff, human resource department, and suppliers of the company. Seeing as no significant better results can be obtained through a census of the entire study population of 580, a representative sample size of 58 respondents were selected to save both time and money.

Sample design and sample procedures

A sample is a set of observations drawn from a population by a defined procedure. The sample represents a subset of controllable size. Samples are collected and statistics are calculated from the samples so that one can make implications or extrapolations from the sample to the population. The sample was drawn from the population that represents the employees and suppliers of BRALIRWA Ltd. This research adopted a stratified random sampling technique in selecting the sample. The technique produces estimates of overall population parameters with greater precision and without bias because the numbers are random (Mark Saunders, et al, 2009). The use of sample enables the researcher to save time and costs associated with studying the entire population (Mark Saunders, et al, 2009). This also involved random selection of respondents from each stratum. Mugenda and Mugenda (2013) states that sampling is the process of extracting a group of respondents from a target population who was used to generalize and represent the whole population.

For the researcher to get the appropriate sample frame, the researcher used stratified and simple random sampling design, where in stratified, the target population was divided into different strata’s/ small groups i.e. S1+S2+S3+S4+S5+S6 =N (different strata’s i.e. ministries make the target population) (Zikmund, 2003). According to Mugenda and Mugenda (2013) 10% of the target population represents an adequate sample for the study. The selected respondents were issued with questionnaires.
Table 3.1: Sample Frame

<table>
<thead>
<tr>
<th>Department</th>
<th>Target Population (N)</th>
<th>(10%N)</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics department</td>
<td>122</td>
<td>12.2</td>
<td>12</td>
</tr>
<tr>
<td>Top management</td>
<td>64</td>
<td>6.4</td>
<td>7</td>
</tr>
<tr>
<td>Finance staff</td>
<td>100</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Operation department</td>
<td>132</td>
<td>13.2</td>
<td>13</td>
</tr>
<tr>
<td>Human resource staff</td>
<td>48</td>
<td>4.8</td>
<td>5</td>
</tr>
<tr>
<td>Suppliers</td>
<td>114</td>
<td>11.4</td>
<td>11</td>
</tr>
<tr>
<td>TOTAL</td>
<td>580</td>
<td></td>
<td>58</td>
</tr>
</tbody>
</table>

Where

\[ n = \frac{N \times (100 - e)^2}{100} \]

\[ \text{Calculation } = 10\% \]

\[ \text{Level of confidence } = 95\% \]

The sample size was to be:

\[ \frac{N \times 10}{100} = 58 \]

**Data collection instruments**

According to (Mugenda & Mugenda, 2013) data collection is the means by which information is obtained from the selected subject of an investigation. The main instrument for data collection was structure questionnaire that allowed for uniformity of responses to questions. Questionnaires give the study comprehensive data on a wide range of factors. Closed-ended questions were used. Questionnaires allow for greater uniformity in the way questions are asked and ensure greater compatibility in the responses. The study also used secondary sources of information such as books and online business journals.

**Reliability and validity of research instrument**

**Validity of research instrument**

Validity is concerned with whether the findings are really about what they appear to be about (Mark Saunders et al, 2009). It is concerned with how accurate data obtained in the study represents the variables of the study. For a data collection instrument to be considered valid, the content selected and included must be relevant to the need or gap established. Before the actual study, the questionnaire was discussed with supervisors. The feedback from the supervisors were considered in modifying the questionnaires. Validity is the accuracy and meaningfulness of implications, which is based on the research results.

**Reliability of research instrument**

Reliability states to the extent to which your data collection techniques or analysis procedures would yield consistent findings (Mark Saunders et al, 2009). If a researcher administers a test to a subject twice and gets the same score on the second administration as the first test, then there is reliability of the instrument (Mugenda and Mugenda, 2013). The test re-test technique was performed to estimate the reliability of the instruments. This involved administering the same test twice to the same group of respondents who were identified for this purpose.

**Data analysis and presentation**

After data collection, data was checked for completeness, accuracy, errors in responses, omissions and other inconsistencies. The data then was coded using numerals in order to put them in limited numbers of categories. The data was processed using SPSS software version 23. Data was then classified, tabulated and summarized using descriptive measures: percentages, mean, standard deviation, and frequency distribution tables while tables were used for presentation of the findings.

**Regression analysis model**

Multiple linear regression analysis was used to determine the effect of 3PL service providers on supply chain performance in Rwanda manufacturing companies. In this section the study represents the regression results. Regression was used to determine the relationship between the lead time, warehousing management, cost reduction and transportation management with supply chain performance of BRALIRWA Ltd.

The model is represented by:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \]

Where \( Y \) = supplier chain performance,

\( X_i \) are the variables, for \( i=1, 2, 3, 4 \)

\( \beta_i \) are the slope coefficients, for \( i=1, 2, 3, 4 \)

\( \beta_0 \) is the intercept and \( \epsilon \) is the random error.
III. RESEARCH FINDINGS AND DISCUSSION

Introduction
Chapter four is a presentation of analysis of data obtained from the fielded items in the study questionnaire. It shows the response rate and further presents the analyzed data using the SPSS software. Regression Analysis was used to investigate the effect of third party logistics service providers on supply chain performance in Rwanda manufacturing companies a case study of BRALIRWA Ltd. Supply chain performance (dependent variable) is explained by the lead-time, warehousing management, cost-reduction and transportation management (independent variables). The data was collected exclusively from the questionnaire as the research instrument. The questionnaire was designed in line with the objectives of the study

Reliability Test
Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda & Mugenda, 2009). During the pilot study, two repeat mailings of the instrument were carried out to improve the overall response rate before sending the actual instrument to allow for pre-testing of the research instrument. Cronbach’s alpha for each value was established by the SPSS application and evaluated against each other at a cut off value of 0.7 which is acceptable according to Cooper (2008). According to table 4.1 all the values were above 0.7 which concludes that the data collection instrument was reliable.

Table 4.1: Reliability test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
<th>No of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-time</td>
<td>.725</td>
<td>2</td>
</tr>
<tr>
<td>Warehousing management</td>
<td>.711</td>
<td>2</td>
</tr>
<tr>
<td>Cost-reduction</td>
<td>.814</td>
<td>3</td>
</tr>
<tr>
<td>Transportation management</td>
<td>.713</td>
<td>2</td>
</tr>
</tbody>
</table>

Response Rate
Fifty-eight (58) questionnaires were distributed to the operations and logistics, human resource and Finance, top management staff and suppliers of the organization. Out of the 58 questionnaires sent, 49 were fully filled contributing to a response rate of 84.48 %. A response rate of above 60% is acceptable (Kothari, 2004).

Table 4.2: Response Rate

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>49</td>
<td>84.48%</td>
</tr>
<tr>
<td>Non response</td>
<td>9</td>
<td>15.52%</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>100</td>
</tr>
</tbody>
</table>

Demographic information of respondents
As part of the demographic information, the researcher requested the respondents to indicate gender, age, level of education, experience working with Bralirwa Ltd and departments.

Gender distribution of the Respondents
The study sought to find out the gender of the respondents. From the findings as shown in figure 4.1, 59.2% of the respondents were male while only 40.8% of the respondents were female. This response indicates that there is a strongly acceptable distribution of gender. In addition, it shows that both genders were fine involved in this study and thus the findings of the study did not suffer from gender bias.

Figure 4.1: Gender distribution of respondents

Age distribution of the Respondents
The study sought to find out the gender of the respondents. From the findings as shown in figure 4.2, the majority of respondents 51% were in range 35-44 years old, 40.8 % of the respondents were in range of 25-34 years while 8.2% of respondents were in range of 45-55 years old.
Level of education

Education is paramount in enabling the respondents to conceptualize issues related to supply chain performance. It was established from the study that 63.3% of the respondents had bachelor’s degree, followed by 18.3% of respondents had high school certificate, 14.3% of respondents had postgraduate degree while only 4.1% of respondents had schooling level; this means the researcher has interacted with knowledgeable respondents and this increases reliability of data. This is shown in Figure 4.3 below.

Respondents’ working experience

Respondents with enough period of service were more experienced and were in a position to explain processes and activities involved in supply chain management. They had adequate and enough working experience and were in a better position to understand the organizations activities as well. 32.7% of respondents had experience between 11-15 years, followed by 30.6% of respondents had experience of 6-10 years, then 20.4% of respondents had experience of 16-20 years while 16.3% had less than 5 years of experience. This, therefore, shows that most of the respondents had wide knowledge and experience on supply chain management.

Findings of descriptive analysis from Study Variables

Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple tables’ analysis, they form the basis of virtually every quantitative analysis of data.

Lead-time

The study sought to determine the effect of lead-time on supply chain performance of BRALIRWA Ltd. Lead-time is one of the key points of supply chain management. The table 4.3 shows the perception of respondents on the effect of lead-time on supply chain performance.

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The study sought to establish the effect of cost-reduction on supply chain performance of BRALIRWA Ltd. Cost-reduction is also one of the key drivers of supply chain management. The table 4.5 shows the perception of respondents on the effect of cost-reduction on supply chain performance.

From table 4.5, most of the respondents agreed to the fact that cost reduction as a result of third party logistics affects supply chain performance of manufacturing companies in Rwanda. This is evident from the table where 71.4% of respondents agreed to moderate extent, 22.4% of respondents agreed to great extent while 6.1% of respondents agreed to small extent that transactional cost affects supply chain performance of Bralirwa Ltd with Mean of 3.1633 and Std. Deviation of 0.51425. When asked whether profit margin affects supply chain performance in manufacturing companies in Rwanda; the majority 63.3% of respondents agreed to great extent, 44.9% of respondents agreed to great extent while only 6.1% agreeing to moderate extent.

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Table 4.3: Respondents’ perception on lead-time

<table>
<thead>
<tr>
<th>Lead-time</th>
<th>Not extent</th>
<th>Small extent</th>
<th>Moderate Extent</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-time delivery</td>
<td>0%</td>
<td>0%</td>
<td>4.1%</td>
<td>67.3%</td>
<td>28.6%</td>
<td>4.2449</td>
<td>0.52164</td>
</tr>
<tr>
<td>Delivery reliability</td>
<td>0%</td>
<td>0%</td>
<td>12.2%</td>
<td>79.6%</td>
<td>8.2%</td>
<td>3.9592</td>
<td>0.45457</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>0%</td>
<td>0%</td>
<td>6.1%</td>
<td>44.9%</td>
<td>49%</td>
<td>4.4286</td>
<td>0.61237</td>
</tr>
</tbody>
</table>

From table 4.3, majority of the respondents agreed to the fact that lead-time results of third party logistics supply chain performance of manufacturing companies in Rwanda. This is evident from the table where 67.3% of respondents agreed to great extent, 28.6% of respondents agreed to very great extent while 41.1% of respondents agreed to moderate extent that on time delivery affects supply chain performance of Bralirwa Ltd with Mean of 4.2449 and Std. Deviation of 0.52164. When asked whether the delivery reliability affects the supply chain performance in manufacturing companies in Rwanda; the majority 79.6% of respondents agreed to great extent, followed by 12.2% of respondents agreed to moderate extent while 8.2 % of respondents agreed to very great extent with Mean of 3.9592 and Std. Deviation of 0.45457. When asked whether customer satisfaction affects supply chain performance, the majority, 49% of respondents agreed to very great extent, 44.9% of respondents agreed to great extent while only 6.1% agreeing to moderate extent with Mean of 4.4286 and Std. deviation of 0.61237. Summarily with on time delivery, delivery reliability, and customer satisfaction as a result of lead-time affect significantly the supply chain performance of Bralirwa Ltd.

Warehousing management

The study sought to find out the effect of warehousing management on supply chain performance of BRALIRWA Ltd. Warehousing management is also one of the key drivers of supply chain management. The table 4.4 shows the perception of respondents on the effect of warehousing management on supply chain performance.

Table 4.4: Respondents’ perception on warehousing management

<table>
<thead>
<tr>
<th>Warehousing management</th>
<th>Not extent</th>
<th>Small extent</th>
<th>Moderate Extent</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>0%</td>
<td>0%</td>
<td>8.2%</td>
<td>51%</td>
<td>40.8%</td>
<td>4.3265</td>
<td>0.62543</td>
</tr>
<tr>
<td>Inventory handling</td>
<td>0%</td>
<td>2%</td>
<td>65.3%</td>
<td>28.6%</td>
<td>4.1%</td>
<td>3.3469</td>
<td>0.5969</td>
</tr>
<tr>
<td>Product packaging</td>
<td>0%</td>
<td>16.3%</td>
<td>63.3%</td>
<td>20.4%</td>
<td>0%</td>
<td>3.0408</td>
<td>0.61098</td>
</tr>
</tbody>
</table>

From table 4.4, most of the respondents agreed to the fact that warehousing management affects supply chain performance of manufacturing companies in Rwanda. This is evident from the table where 51% of respondents agreed to great extent, 40.8% of respondents agreed to very great extent while 8.2% of respondents agreed to moderate extent that storage affects supply chain performance of Bralirwa Ltd with Mean of 4.3265 and Std. Deviation of 0.62543. When asked whether inventorying handling affects supply chain performance in manufacturing companies in Rwanda; the majority 65.3% of respondents agreed to moderate extent, followed by 28.6% of respondents agreed to great extent and 4.1% of respondents agreed to very great extent while 2% of respondents agreed to small extent with Mean of 3.3469 and Std. Deviation of 0.5969. When asked whether product packaging affects supply chain performance, the majority, 63.3% of respondents agreed to moderate extent, 20.4% of respondents agreed to great extent while 16.3% agreeing to small extent with Mean of 3.0408 and Std. deviation of 0.61098.
while 4.1% of respondents agreed to small extent with Mean of 3.6327 and Std. Deviation of 0.60187. When asked whether service provider cost affects supply chain performance, the majority, 59.2% of respondents agreed to moderate extent, 30.6% of respondents agreed to great extent, 6.1% of respondents agreed to very great extent while 4.1% agreeing to small extent with Mean of 3.3878 and Std. deviation of 0.67133.

### Table 4.5: Respondents’ perception on cost-reduction

<table>
<thead>
<tr>
<th>Service</th>
<th>Not extent</th>
<th>Small extent</th>
<th>Moderate Extent</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transactional cost</td>
<td>0%</td>
<td>6.1%</td>
<td>71.4%</td>
<td>22.4%</td>
<td>0%</td>
<td>3.1633</td>
<td>0.51425</td>
</tr>
<tr>
<td>Profit margin</td>
<td>0%</td>
<td>4.1%</td>
<td>30.6%</td>
<td>63.3%</td>
<td>2%</td>
<td>3.6327</td>
<td>0.60187</td>
</tr>
<tr>
<td>Service provider cost</td>
<td>0%</td>
<td>4.1%</td>
<td>59.2%</td>
<td>30.6%</td>
<td>6.1%</td>
<td>3.3878</td>
<td>0.67133</td>
</tr>
</tbody>
</table>

### Transportation management

The study sought to establish the effect of transportation management on supply chain performance of BRALIRWA Ltd. Transportation management is also one of the key drivers of supply chain management. The table 4.6 shows the perception of respondents on the effect of transportation management on supply chain performance.

### Table 4.6: Respondents’ perception on transportation management

<table>
<thead>
<tr>
<th>Transportation management</th>
<th>Not extent</th>
<th>Small extent</th>
<th>Moderate Extent</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fleet management</td>
<td>0%</td>
<td>4.1%</td>
<td>10.2%</td>
<td>53.1%</td>
<td>32.7%</td>
<td>4.1429</td>
<td>0.76376</td>
</tr>
<tr>
<td>Safety of product</td>
<td>0%</td>
<td>6.1%</td>
<td>63.3%</td>
<td>22.4%</td>
<td>8.2%</td>
<td>3.3265</td>
<td>0.71844</td>
</tr>
<tr>
<td>Tracking good system</td>
<td>0%</td>
<td>16.3%</td>
<td>59.2%</td>
<td>18.4%</td>
<td>6.1%</td>
<td>3.9388</td>
<td>5.88575</td>
</tr>
</tbody>
</table>

From table 4.6, the majority of the respondents agreed to the fact that transportation management as results of third party logistics affects supply chain performance of manufacturing companies in Rwanda. This is evident from the table where 53.1% of respondents agreed to great extent, 32.7% of respondents agreed to very great extent while 10.2% of respondents agreed to moderate extent while 4.1% of respondents agreed to small extent that transactional cost affects supply chain performance of Bralirwa Ltd with Mean of 4.1429 and Std. Deviation of 0.76376. When asked whether safety of products affects supply chain performance in manufacturing companies in Rwanda; the majority 63.3% of respondents agreed to moderate extent, followed by 22.4% of respondents agreed to great extent and 8.2% of respondents agreed to very great extent while 6.1% of respondents agreed to small extent with Mean of 3.3265 and Std. Deviation of 0.71844. When asked whether tracking good system affects supply chain performance, the majority, 59.2% of respondents agreed to moderate extent, 18.4% of respondents agreed to great extent, 6.1% of respondents agreed to very great extent while 16.3% agreeing to small extent with Mean of 3.9388 and Std. deviation of 0.78575.

### Supply chain performance

The study sought to know the extent of achievement of profitability, service quality and customer responsiveness as a result of third party logistics service providers for the supply chain performance of Bralirwa Ltd. From the findings in the Table 4.7 below it shows that the firm has realized a comprehensive range of benefits resultant from working with third party logistics service providers. Among the listed comprise: profitability, service quality and customer responsiveness.

### Table 4.7: Respondents’ perception on supply chain performance

<table>
<thead>
<tr>
<th>Supply chain performance</th>
<th>Not extent</th>
<th>Small extent</th>
<th>Moderate Extent</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>0%</td>
<td>0%</td>
<td>26.5%</td>
<td>65.3%</td>
<td>8.2%</td>
<td>3.8163</td>
<td>0.56544</td>
</tr>
<tr>
<td>Service quality</td>
<td>0%</td>
<td>2%</td>
<td>24.5%</td>
<td>63.3%</td>
<td>10.2%</td>
<td>3.8163</td>
<td>0.63487</td>
</tr>
<tr>
<td>Customer responsiveness</td>
<td>0%</td>
<td>0%</td>
<td>20.4%</td>
<td>51%</td>
<td>28.6%</td>
<td>4.0816</td>
<td>0.70228</td>
</tr>
</tbody>
</table>
Majority of the respondents agreed to the fact that third party logistics service providers leads supply chain performance. 65.3% of respondents agreed to great extent, followed by 26.5% of respondents who agreed to moderate extent and 8.2% of respondents agreed to very great extent that profitability as result of third party logistics service providers, affects supply chain performance of Bralirwa Ltd with Mean of 3.8163 and Std. Deviation of 0.56544. When asked whether third party logistics service providers impact the service quality as characteristics of supply chain performance of Bralirwa Ltd, 63.3% of respondents agreed to great extent, followed by 24.5% of respondents agreed to moderate extent, 10.2% of respondents agreed to very great extent while 2% of respondents agreed to small extent with Mean of 3.8163 and Std. Deviation of 0.63487. When asked whether third party logistics service providers increase customer responsiveness as characteristics of supply chain performance of Bralirwa Ltd, 51% of respondents agreed to great extent, followed by 28.6% of respondents agreed to very great extent, 20.4% of respondents agreed to moderate extent with Mean of 4.0816 and Std. Deviation of 0.70228. These views imply that third party logistics service providers are very crucial for supply chain performance in Bralirwa Ltd.

**Regression Analysis**

A multivariate regression model was applied to determine the form of relationship between third party logistics service providers and supply chain performance in Bralirwa Ltd. The predictors were lead-time, warehousing management, cost-reduction and transportation management. The results are presented below.

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.781a</td>
<td>.619</td>
<td>.516</td>
<td>.2961</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), lead-time, warehousing management, cost-reduction, transportation management.

The Adjusted R2 is the coefficient of determination and states how the dependent variable varies with the independent variables. The results in Table 4.8 show an adjusted R2 value of 0.516. This implies that there was a variation of 51.6% between the supply chain performance in Bralirwa ltd and the predictors. This wants to mean that the independent variables: lead-time, warehousing management, cost-reduction and transportation management explained 51.6% of supply chain performance in Bralirwa at a 95% confidence level.

**ANOVA**

Analysis of variance (ANOVA) was done to establish the fitness of the model used. The ANOVA table shows that the F-ratio (F=28.369, p=.000) was statistically significant. This means that the model used was appropriate and the relationship of the variables shown could not have occurred by chance.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>12.651</td>
<td>4</td>
<td>3.264</td>
<td>4.629</td>
<td>.003a</td>
</tr>
<tr>
<td>Residual</td>
<td>79.408</td>
<td>129</td>
<td>0.672</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>92.059</td>
<td>133</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), lead-time, warehousing management, cost-reduction, transportation management
b. Dependent Variable: Supply chain performance

According to Mugenda & Mugenda, 2009, ANOVA is a data analysis procedure that is used to determine whether there are significant differences between two or more groups or samples at a selected probability level. An independent variable is said to be a significant predictor of the dependent variable if the absolute t-value of the regression coefficient associated with that independent variable is greater than the absolute critical t-value. The study used ANOVA to establish the appropriateness of the regression model to give reliable results. An f-significance value of p=0.003 was established. This shows that the regression model has a less than 0.003 likelihood (probability) of giving a wrong prediction. Hence the regression model has a confidence level of above 95%. The value of the critical F is 2.08, this value is less than the calculated F value of 4.629 thus the regression model is reliable.

**Dependent variable: Supply chain Performance**

Results in Table 4.10 above shows that there is a positive relationship between supply chain performance and all the predictors as shown by the beta coefficients: lead-time (β = 0.296), warehousing management (β = 0.393), cost-reduction (β = 0.479), transportation management (β = 0.466). The following regression equation was established:

\[ Y = 0.156 + 0.296X_1 + 0.393X_2 + 0.479X_3 + 0.466X_4 \]
The study further found out that there is a significant relationship between the supply chain performance and three of the variable as shown: lead-time (p=0.005<0.05), warehousing management (p=0.002<0.05), cost-reduction (p=0.000<0.05) and transportation management (p=0.000<0.05). This therefore implies that lead-time; warehousing management, cost-reduction and transportation management services offered by third party providers significantly enhance supply chain performance in Bralirwa Ltd. A unit increase in either of these services would definitely increase or improve the supply chain performance in the company.

### IV. SUMMARY, CONCLUSION AND RECOMMENDATIONS

**Introduction**

This chapter presents the summary of the research work undertaken, and on the basis of the study findings draws conclusions about the study’s objectives and makes recommendations as an outgrowth of the study. Additionally, it discusses the implication (s) of the findings on the effect of third party logistics service providers on supply chain performance in manufacturing companies in Rwanda and concludes by suggesting area (s) for further research.

**Summary**

The main purpose of this study was to establish the effect of third party logistics service providers on supply chain performance of Bralirwa Ltd. The study employed a descriptive research design and used questionnaire to collect primary data from employees and suppliers of Bralirwa Ltd Kigali Head Quarter. The study based its findings on the data from 49 respondents, this was 84.48% of the total 58 respondents issued with questionnaires. The study considered supply chain performance as dependent variable and lead-time, warehousing management, cost-reduction and transportation management as its independent variables. The study findings with regression analysis revealed, the influence of 51.6% of third party logistics on supply chain performance in Bralirwa Ltd.

The respondents indicated that lead-time provided by the third-party logistics influenced supply chain performance of Bralirwa to a great extent. The regression analysis results established that there was a positive and statistically significant relationship between lead-time and supply chain performance. On warehousing management; the study established that Bralirwa Ltd had third party logistics provider who stores products and inventory handling on behalf of the company. And the respondents agreed to moderate extent warehousing services provided by 3PL influenced supply chain performance of Bralirwa Ltd. And the regression analysis results revealed that was a positive and statistically significance relationship between warehousing management and supply chain performance. The respondents also agreed that the 3PL service providers ensured that the company products get to the market at the right time and it also enhanced efficient tracking and tracing of goods.

On overall the respondents reported that cost-reduction influenced supply chain performance to a great extent. The regression analysis results showed a positive and statistically significant association between distribution management and supply chain performance. On the effect of transport management, the respondents agreed that transport services provided by the third party enhances service quality along the supply chain; reduced operation costs of the company and enhanced efficient flow of products from the firm to the market. The study also found out that the transportation services provided by the third party were reliable and that they had enhanced warehouse efficiency, safety of the products. On overall the respondents revealed that transport management services by a third party influenced supply chain performance in Bralirwa Ltd to a great extent. The regression analysis results found a positive and statistically significant relationship between transportation management and supply chain performance.

**Conclusion**

The study concludes that there is a positive and statistically significant relationship between supply chain performance and all four (4) predictors include: lead-time by the fact that third party service providers lead on time delivery of products, delivery reliability which enhance customer satisfaction. There is a positive and
statistically significant association between supply chain performance and warehousing management by the fact that third party logistics provides storage of products, products handling but little on product packaging. There is a positive and statistically significant relationship between supply chain performance and cost-reduction by the fact that 3PL service providers reduced transactional cost and service provider cost and increased profit margin of all involved parties in Bralirwa ltd. There is a positive and statistically significant relationship between supply chain performance and transportation management. Transportation services enhanced supply chain performance through fleet management along the supply chain, enhanced tracking good system and enhanced safety of products from the company to the market.

**Recommendations**

This study recommends that organizations and companies especially manufacturing companies recognize the potential contribution of 3PL firms and take advantage of opportunities to address organizational needs. There is a need to strategically analyze the needs of the company and the non-core business so as to make informed decisions of the right logistics services to outsource. It’s dominant to design appropriate logistics management practices in line with the organizations.

**Areas for Further Research**

This study was not exhaustive by any means and therefore it is recommended that another study be replicated in other sectors of the economy, such as ministries, government institutions and private sector. This is because third party logistics system in Rwanda is still at early stage and therefore it provides a rich research field that is still growing activities.

**V. REFERENCES**

The role of transportation in logistics chain and commerce, Vincent Kirenga Munanira and Patrick MULYUNG

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