STATISTICAL ANALYSIS OF THE GROSS DOMESTIC PRODUCT REVENUE PERFORMANCE OF THE AIRLINE TRANSPORT IN COMPARISON TO ROAD TRANSPORT IN UGANDA

BY

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SEPTEMBER 2018
DECLARATION

I Tumusabe Faith Patricia do declare that this dissertation is my original work and it has never been submitted to any University or Institute of Higher Learning for any academic award.

Sign: ............................................ Date ........................................

TUMUSABE FAITH PATRICIA
APPROVAL

This dissertation has been submitted for examination with my approval as the supervisor.

Dr. John Bosco Asiimwe, Makerere University

Date: 24/09/2018 Sign: _____________________
DEDICATION

I dedicate this research report to my family who have been supportive during my academic struggle.
ACKNOWLEDGEMENT

In a distinguished manner, I would like to acknowledge the professional and unending guidance that I received from my supervisor, Dr. John Bosco Asiimwe. I highly appreciate the good guidance that has helped enlarge my knowledge base and without whom this dissertation would not have been a reality. May the Almighty God reward him abundantly.

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The purpose of this study was to compare the GDP revenue performance of the airline transport in comparison to road transport in Uganda. The research objectives that guided this study were to compare the GDP revenue performance from the airline transport with that from road transport in Uganda and to compare the volatility in GDP revenue performance of the airline transport with that of road transport in Uganda. This study used a comparative research design to address the objectives and it was entirely quantitative approach to collect data about GDP revenue performance of the air transport mode and road transport mode. In this study, the data population was all the data about Uganda’s GDP revenue performance of the mostly used transport modes that include Uganda’s air transport and road transport. This study used secondary data from statistical abstracts about Uganda’s GDP revenue performance for the air and road transport that had been already compiled by Uganda Bureau of Statistics (2002 to 2017) to collect data for the period from 1997 to 2016. The comparative analysis involved using t-tests to compare Uganda’s GDP revenue performance for the air and road transport.

Findings revealed a significant difference in the mean scores for GDP revenue performance for air transport and GDP revenue performance for road transport during the period 1997 to 2017. This study established that generally the GDP revenue performance for the airline transport and road transport in Uganda increased during the period 1997 to 2017. However, the GDP revenue performance of the road transport was higher compared to that of the airline transport throughout the period. Lastly, volatility results showed that a significant difference in variability of GDP revenue performance for air transport and GDP revenue performance for road transport during the period 1997 to 2017. However, the variation of GDP revenue performance of the road transport were larger compared to the airline transport during the period. Thus, the contribution of road revenue performance to GDP was more unreliable compared to the contribution of airline revenue performance to GDP.

It was concluded that the Uganda government should continue improving the GDP revenue performance for both airline transport and road transport through increasing the volume of traffic for both transport modes in terms of both the quantity of goods and passengers as well diversification of business handled by both transport modes. This is because both modes of transport are importance to the economic development of Uganda. However, more improvement efforts are required for the airline transport given that its contribution was less compared to the of road transport. The government of Uganda should try as much to reduce that large variability in GDP revenue performance of the road transport. It needs to ensure a stable flow of road traffic by addressing the season variability that affect the volume of traffic by road.
LIST OF ABBREVIATIONS

CAA : Civil Aviation Authority
EIA : Entebbe International Airport
JIT : Just-in-Time
ROI : Return on investments
RVR : Rift Valley Railway
UNCTAD : United Nations Conference on Trade and Development
WTP : Willingness-to-pay
CHAPTER ONE
INTRODUCTION

Background to the Study
This study was analysis of the gross domestic product revenue performance of the airline transport in comparison to road transport in Uganda. The transport sector is one of the most crucial sectors in the country as other sectors depend on it either directly or indirectly. Uganda is served by various forms transport modes, which include air transport, road, railways and water (Kavuma, 2013; Ministry of Works and Transport, 2013). However, air and road transport are the most used forms of transports in Uganda.

Both air and road transport have experienced an increase in the growth in Uganda’s transportation industry with the resultant increase in the number of vehicles, flights and cargo flows as reported by 2010 (New Vision Reporter, 2010). About 95% of the country’s goods and 99% of passenger traffic use roads.

Road transport remains the most dominant mode of transport in Uganda. It comprises about 10,000 km of classified main roads (trunk, secondary and tertiary), about 25,000 km of district (feeder) roads, 2,800 km of urban roads and 30,000 km of community access roads. In order to enhance access to services and markets as well as stimulate economic activities, the government accords high priority to the transport and maintenance of national roads. Government has now embarked on transport of the Northern Kampala Bypass, which will provide an alternative route to traffic from the Kenya/Uganda border that are bound for southern and western Uganda and the Democratic Republic of Congo, Rwanda and Burundi. This road is also part of the Northern Corridor, which is an important road link in the country network, over which 90 per cent of Ugandan imports and exports are transported.

On the other hand, international passengers into Uganda were 966,045 in the 2009/10 fiscal year. Domestic aviation travelers were 14,627. Passenger traffic through Entebbe International Airport (EIA) has been on a rising trajectory throughout the period 2005 to 2014. Since 2010, the average growth in passengers has been 10% with a spike in growth in 2012 to 15%. The year 2014 however experienced a decline in passengers at -0.8%. It is nonetheless expected for more air traffic to pass through EIA because of the ongoing modernization of the airport.
The majority of passengers passing through EIA are international passengers. They represent 98% of the total passengers going through EIA. Although there has been recent growth in domestic passenger numbers, they however remain inconsequential to overall totals. After Kenya, passengers from Europe represent the most significant air traffic at EIA at 19% (of which London contributes 4%), followed by the Middle East at 17%. East African passengers account for 38% of air traffic at EIA.

Combined passenger traffic throughout the up country’s airports is less than 30,000 passengers, highlighting the small scale of operations. However, high growth is expected because of ongoing investment, which saw 2013 passenger numbers grow by 66%. This was mainly attributed from the Arua aerodrome which constitutes over 58% of all upcountry passenger traffic.

Cargo through EIA is made up of imports, exports and mail cargo. Growth shot up in 2012 to 15% but came down to -5.56% in 2014. The bulk of cargo is made up of exports of fish while mail cargo remains undeveloped but is growing at 8% per annum. Gross cargo from EIA which includes imports and exports grew by 4.5% from 2010 to 2013. It however dropped significantly in 2014 by 5.6% and this was a result of reduced imports and exports demanded. This was also partially due to the reduced auxiliary costs of importing and exporting through sea freight, improved infrastructure at select ports and the improved processing times, which reduced transit times by 30%.

Airlines on the continent carried about 788,500 tons of total global freight carried in 2012, representing 1.8% of total air freight shipment. Growth in freight has been the norm in the African market with 11.7% growth in 2012. The Middle East and Africa are recorded as having the highest year-on-year air freight growth and this presents substantial opportunity for new carriers in these markets.

Thus, because of investment by the government in these air and road transport including improvement in GDP revenue performance of both modes of transport, a comparison of their performance is required to determine their contribution to the national gross domestic product (GDP). This comparison will provide a unique opportunity to measure the contribution of these two modes of transportation to the national GDP. Economic classifications are based on
the dominance or lack of dominance of one or more sectors in terms of the relative contribution of a sector to GDP (US Chamber of Commerce, 2010).

**Problem Statement**

The GDP revenue performance of the road and airline transport is important in that it indicates how the two transport modes contribute to the overall national GDP. In addition, if the GDP revenue performance of road transport or airline transport is stable, it has number of advantages over the other transport mode, concerning attraction of investments and policy intervention. Since the end of the 1990s, larger investments have spent annually to maintain and improve the air and road transport system in the Uganda to benefit passenger and freight transportation. As such, the volume of freight has grown over past few years and still keeps increasing. Moreover, the air and road transportation in Uganda have increasingly become the most sought after modes of transport by both business and leisure customers. Any business development or growth contributes to the economic growth of a country. However, when an important business such as the air and road transport experiences significant challenges, the economy faces the threat of a downfall (Arbore & Busacca, 2009; Kandampully & Suhartanto, 2010; Lai & Chen, 2011), thus the need for this study. For instance, the unsatisfactory performance by air and road transport in Uganda presents a significant loss to the government and in particular, it impacts negatively on the economy of the country. Thus, it was good to understand, how the two mostly used transport modes in Uganda, that is air and road transport, contributed to the nation’s GDP.

**Purpose of the Study**

The purpose of this study was to compare the GDP revenue performance of the airline transport in comparison to road transport in Uganda.

**Research Objectives**

The following research objectives guided this study:

1. To compare the GDP revenue performance from the airline transport with that from road transport in Uganda

2. To compare the volatility in GDP revenue performance of the airline transport with that of road transport in Uganda
Research Hypotheses
The following research hypotheses were tested:

1. There is a significant difference between the GDP revenue performance trends of the airline transport with that of road transport in Uganda
2. There is a significant difference between the volatility in GDP revenue performance of the airline transport with that of road transport in Uganda

Scope of Study
The content scope focused on comparing the GDP revenue performance of air and road transport modes. The time scope was limited to the period from 1997 to 2017 based on the availability of related to the GDP revenue performance of air and road transport that was obtained from statistical abstracts compiled by Uganda Bureau of Statistics.

Significance of Study
The study may help in determining how the air and road transport contribute to Uganda GDP, which may be helpful to national policymakers and implementers who may use the findings to revisit policies on these two mode of transport. Better policies may end up being formulated and implemented to improve the performance of these modes of transport. The findings and recommendations from this study may be of great significance to the researcher because she may gain a deeper understanding of the concept. The researcher hopes that this study may form a basis for further research on the GDP revenue performance of the air and road transport. This may lead to the generation of new ideas or knowledge that may be used by other researchers in Uganda and the rest of the world.
CHAPTER TWO
LITERATURE REVIEW

This chapter presents the literature review according to the objectives of the study. It first presents literature on GDP revenue performance of transport modes then literature on revenue/profit volatility as indicated the research objectives of this study.

GDP revenue performance of Transport Modes

Share of the transport sectors in gross domestic product

Gross domestic product (GDP) is widely accepted as the most comprehensive measure of the size of an economy (Fang & Han, 1997). GDP as a measure of production represents the final results of the production activities of resident producer units (Han & Fang, 1998). From production perspective, GDP is the sum of gross value added of resident producer units (institutional sectors or, alternatively, industries). From demand perspective, GDP is equal to the sum of the final uses (or non-production uses or all uses except intermediate consumption) of goods and services (measured in purchasers’ prices) (Han & Fang, 2000). From demand perspective, the major components of GDP are consumer expenditures, government expenditures, capital investment, and net exports (Mačiulis, Vasiliauskas & Jakubauskas, 2009). These components are also often referred to as final demand, to be distinguished from intermediate demand. From supply perspective, GDP consists of every industry’s value added, which includes labor compensation (wage and salary), business taxes, corporate profits, and depreciation of fixed capital. GDP measured as total value added and as total final demand (or expenditure) is identical. In other words, GDP is a basket of goods and services supplied to final demand by industries or the sum of value added created by industries. The two are equal in value.

Transportation is essentially a certain type of services provided through operating vehicles and moving goods or people over the public system of roads, railroads, water ways, air ways, etc (Mačiulis et al, 2009). Transportation, as a component of the economy, naturally is often measured against GDP. To provide a rough indication of the real resources involved in the transportation sector over time, governments display the share of the transport sectors in GDP over a period (Glaeser & Kohlhase, 2004). In popular press as well as in policy discussions, measures of transportation in relation to GDP are often cited to illustrate the importance or contribution of transportation to the economy.
The striking feature of these figures is the trend in the share of the transport sector in GDP. This trend in the share of the transport sector may decline or increase or it may be stable or unstable (Sharma, Hazra & Chitkara, 2007). In other words, the share of GDP attributed to transportation changes by a certain percentage based of values of a certain period say every year. Thus, it possible to compare different modes of transport share to GDP and be able to determine that mode that contributes most or least compared to other modes (Han & Fang, 1998). This approach will be used in this study when comparing the GDP revenue performance of air and road transport of Uganda. While these numbers may be striking, they may reflect the increased or decreased importance of non-traded services rather than an increase or decrease in the importance of transportation.

Transportation is intrinsically related to GDP but GDP is also a commonly used yardstick (Mačiulis et al, 2009). Therefore, both relational and non-relational measures for transportation may be built in relation to GDP. However, relational measures are far more common and non-relational ones tend to be misused or misinterpreted as relational ones. This study focused exclusively on relational measures when comparing GDP revenue performance of air and road transport of Uganda.

Transportation GDP can be defined as the sum of value added generated in all forms of transportation operations, whether or not those operations are classified as part of transportation industries (Han & Fang, 2000). Transportation GDP counts all parts of GDP that have originated in transportation operations. Therefore, it is a more comprehensive measure of transportation’s contribution to GDP. This is particularly useful for transportation analyses since other often-used measures of transportation, such as ton-kilometers, gasoline use, and transportation accidents cover the whole universe of transportation operations.

**Revenue/profit volatility**

Volatility can be described as anything that is changeable (Gangl, 2005). The more the variable fluctuates over a period, more volatile the variable. Volatility indicates how much and how quickly the price of an asset changes. The volatility concept is important to describe dispersion from expected revenue (Gottschalk & Moffitt, 1994).

Volatility may be described as a phenomenon, which characterizes changeableness of a variable under consideration (Gottschalk & Moffitt, 2009). Volatility is associated with
unpredictability and uncertainty. The term is synonymous with risk, and hence high volatility is thought of as a symptom of market disruption.

A mismatch exists between how changes in revenue are experienced by businesses and how research often classifies those changes. The primary measure of volatility used in the literature is the standard deviation of revenue change in a study period (Jenkins, 2011), which classifies all change in revenue as volatile. For example, stable, upward movements, like those received from an annual raise, are measured as volatility even though most people would consider this rising revenue, not volatility.

The other measure of volatility decomposes the volatility defined by the permanent revenue framework into two parts, one that is volatile and another that is smooth and directional (Gangl, 2005). Volatility is then measured as the standard deviation of revenue change from a business’s own revenue trend line. While a revenue trend line is not the same as mobility, it may be used to create a measure of mobility. The difference between the first and last period of revenue from the estimated trend line within a study period produces a measure of mobility that is almost identical to the measure of mobility produced by the raw difference in revenue in that same study period. This is referred to as the ‘revenue trend’ framework.

Both frameworks have been used to explore the relationship between volatility and inequality across businesses (Gottschalk & Moffitt, 1994; Gangl, 2005). Further, the revenue trend framework has also been used to examine the cross-national relationship between mobility and inequality (Gangl, 2005).

The importance of earnings volatility for a firm’s value has long been recognized in the accounting and finance literature. Such volatility can have an impact through its relation to the expected cash flows (earnings) (Dichev & Tang, 2005). Studies directly test the link between the value of a firm and earnings volatility. Barnes (2001) found that earnings volatility is negatively related to firm value measured by the market-to-book ratio. Allayannis et al. (2005) show the same relation holds but only before controlling for cash flow volatility.

Risk management theories propose several explanations for why a reduction in earnings volatility can increase the value of the firm through higher expected earnings (Bartram, 2000). Firstly, the probability of financial distress and its expected direct and indirect costs
increase with earnings volatility. Secondly, higher earnings volatility tends to reduce the supply of internal funds and so increases the likelihood of facing external funds that are more expensive.
CHAPTER THREE
RESEARCH METHODOLOGY

Introduction

This chapter presents the approaches the researcher used to gain information on the research problem. It includes the research design, study population, sample size and sampling techniques, procedure of data collection, data analysis and measurement of variables.

Research Design

The researcher design is the blueprint for conducting the study. Designing a study helps the researcher to plan and implement the study in a way that will help the researcher to obtain intended results, thus increasing the chances of obtaining information that could be associated with the real situation (Burns & Grove, 2001). This study used a comparative research design to address the objectives earlier stated in chapter one. The comparative research design that used in this study involved comparing two group of data (that is GDP revenue performance) between two groups of data (that is air transport mode and road transport mode). According to Mills, Van de Bunt and De Bruijn (2006), comparative research is a research methodology that aims to make comparisons across two or more than two sets of data. Comparative research, simply put, is the act of comparing two or more things with a view to discovering something about one or all of the things being compared.

This study used entirely quantitative approach to collect data about GDP revenue performance of the air transport mode and road transport mode. Quantitative research methods are research methods dealing with numbers and anything that is measurable in a systematic way of investigation of phenomena and their relationships (Amin, 2005). Researchers typically select the quantitative approach to respond to research objectives requiring numerical data, which is the case in this study. What constitutes a quantitative research method involves a numeric or statistical approach to research design. The methodology of a quantitative research maintains the assumption of an empiricist paradigm (Creswell, 2003). The research itself is independent of the researcher. As a result, data is used to objectively measure reality. Quantitative research creates meaning through objectivity uncovered in the collected data.
Study Population
The study population refers to is all the individuals or units of interest (Hanlon & Larget, 2011). Polit and Hungler (1999) referred to the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. In this study, the data population was all the data about Uganda’s GDP revenue performance of the mostly used transport modes that include Uganda’s air transport and road transport. Thus, this study focused on the GDP revenue performance of these two transport modes.

Data Collection
This study used secondary data from statistical abstracts about Uganda’s GDP revenue performance for the air and road transport that had been already compiled by Uganda Bureau of Statistics (2002 to 2017) to collect data for the period from 1997 to 2016. This was because each statistical abstracts contained data for the previous five periods excluding the year of publication of that statistical abstract. For example, the 2002 statistical abstract contained data for the period 1997 to 2001 while the 2017 statistical abstract contained data for the period 2012 to 2016. In other, words, this study involved utilization of existing data about Uganda’s GDP revenue performance for the air and road transport. According to Johnston (2014), secondary data is one type of data that has already been collected by someone else for a different purpose to that of another researcher using it. Similarly, Hakim (cited by Johnston, 2014) defined secondary analysis as any further analysis of an existing dataset which presents interpretations, conclusions or knowledge additional to, or different from those presented in the first report on the inquiry as a whole and its main results.

In this study, the data about Uganda’s GDP revenue performance for the air and road transport had already been compiled by the Uganda Bureau of Statistics. However, the purpose of this already compiled data to the Uganda Bureau of Statistics was not to use it at the time of it compilation to compare Uganda’s GDP revenue performance for the air and road transport, which was the purpose of this study as stated in chapter one.

In a time where vast amounts of data are being collected and archived by researchers or organizations all over the world, the practicality of utilizing existing data for research is becoming more prevalent (Andrews, Higgins, Andrews & Lalor, 2012; Smith, 2008; Smith et al., 2011). According to Johnston (2014), the utilization of this existing data provides a viable option for researchers who may have limited time and resources and this empirical exercise
applies the same basic research principles as studies utilizing primary data and has steps to be followed just as any research method.

The major advantages that were associated with using secondary data in this study were the cost-effectiveness and convenience it provided (Smith, 2008). Since someone else has already collected the data, the researcher for this study did not have to devote a lot of financial resources to the collection of data given that it accessed from internet at a very small cost. The researcher for this study gained access to and utilize larger datasets about GDP revenue performance for Uganda’s air and road transport covering the period from 1997 to 2017. The larger data samples are more representative of the target data population and will allow presenting findings that are of higher validity and more generalizable.

The use of existing data sets quickened the pace of data collection for this study because some of the most time consuming step of a typical research project, such as developing data collection instruments and measurement of variables were eliminated (Doolan & Froelicher, 2009). Utilizing existing data allowed data collection to be completed and findings to be produced much faster (Magee, Lee, Giuliano & Munro, 2006).

Data Quality Control
Data quality control related to establish the validity and reliability of data about Uganda’s GDP revenue performance for the air and road transport in this study. Validity refers to the extent to which the researcher collects the right information about issues being investigated and is conducted prior to data collection and reliability refers to the extent to which data collected is consistent with other data sources (Amin, 2005). Therefore, to ensure data quality, this study begun with the revisiting the research objectives, then the identification of the dataset, and thorough evaluation the dataset. These steps are explained in the following sub sections and supported with existing literature.

Revisiting how the research objectives were formulated
The key to secondary data analysis is to apply theoretical knowledge and conceptual skills to utilize existing data to address the research objectives (Johnston, 2014). In particular, data quality will be ensured in this study by first revisiting how the research objectives are formulated in this study to determine if data collected is about Uganda’s GDP revenue performance for the air and road transport in general. This is guided by Johnston (2014)
emphasis that the key to utilizing secondary data is to apply theoretical knowledge and conceptual skills to utilize existing data to address the research objectives.

**Identification of the datasets**

The second stage will be identification of the datasets by determining if the already compiled data by Uganda Bureau of Statistics can be categorized into two sets that Uganda’s GDP revenue performance for the air and road transport. Most research begins with an investigation to learn what is already known and what remains to be learned about a topic (Creswell, 2009); including related and supporting literature, but one should also consider previously collected data on the topic (Doolan & Froelicher, 2009). Data may already exist that can be utilized in addressing the research objectives (Johnston, 2014), which is the case in this study. In the case of this research, an in-depth data review of the areas of interest was conducted examining the previous and current work of experts who compiled about Uganda’s GDP revenue performance for the air and road transport.

One of the key to using existing data to ensure that data quality control so that it can be effectively utilized for secondary research to generate meaningful answers is that the secondary data should have a good fit between the research objective and the already compiled dataset (Doolan & Froelicher, 2009; Magee et al, 2006). In this study, the research objectives fitted well with that of the original study since it was possible to categorize the datasets compiled by Uganda Bureau of Statistics into two categories that included Uganda’s GDP revenue performance for the air and road transport. This enabled to make comparisons on the two modes of transport. Therefore, after establishing that the primary data compiled by Uganda Bureau of Statistics adequately addresses the research objectives of this study, it was utilized for analysis.

**Evaluating the Dataset**

The third stage in ensuring data quality control when secondary data is evaluation of the dataset to ensure the appropriateness to the research topic and objectives (Smith, 2008). In this study, the evaluation of the secondary dataset to ensure that it was suitable to address the objectives as stated in the first chapter of research involved thorough evaluation the dataset by comparing if the data about Uganda’s GDP revenue performance for the air and road transport compiled by Uganda Bureau of Statistics was similar or different from that compiled by responsible authorities in air and road transport. Thus, in this study, the closer the similarity in data compiled by Uganda Bureau of Statistics to that compiled by
responsible authorities in air and road transport was used to ensure that good quality data was analyzed according to the objectives of this study.

The advantage is that the data that already exist in some form and can be evaluated for appropriateness and quality in advance of actual use (Doolan & Froelicher, 2009). Doolan and Froelicher (2009) proposed a reflective approach to evaluate the data in a stepwise fashion, which will be followed in this study. Therefore, the following evaluative steps were followed in order to determine the appropriate match of the dataset compiled by Uganda Bureau of Statistics to the research topic of this study.

Before using the already compiled dataset for this study, the first thing was to reflect on the purpose of this study to determine if the already compiled data was about Uganda’s GDP revenue performance for the air and road transport. It was important to determine the purpose of the already compiled because this could influence the general context of the study (Doolan & Froelicher, 2009; Magee et al., 2006). It is also important to know about the agency or individual(s) that collected the information and the similarities or differences in their goals for compiling the data and the researcher contemplating using the secondary data (Boslaugh, 2007). The researcher for this study developed a professional relationship with the organizations and people who compiled the secondary data and through maintaining contact ascertained the data collection process that was used to compile the data.

The second stage was to find out who was responsible for collecting the information because this enabled to establish whether information compiler was knowledgeable in issues related to Uganda’s GDP revenue performance for the air and road transport. According to Johnston (2014), in addressing the question of who was responsible for collecting the information the secondary researcher has the benefit of a relationship with the primary data compiler team. Because of this, the secondary data compilers are well-respected in terms of their knowledge on issues related to data that was used by the secondary researcher and had a reputation for excellence to ensure data integrity.

The third stage was finding out what information was actually collected to determine if it was exactly about Uganda’s GDP revenue performance for the air and road transport. It is vital for the secondary researcher to have access to adequate documentation from the primary research, including protocols and procedures followed in the collection of the data (Clarke &
It was established in this study that the primary data compiler team kept detailed documentation that provided evidence of careful and consistent data collection.

The fourth stage was to determine when the information was collected. In any research, the time when the data is collected must be considered (Boslaugh, 2007). Survey data may be several years old before it is released and available for use by others or it cover the period the secondary research is interested (Boslaugh, 2007).

The fifth stage was to assess the consistency of the information obtained from one source with information available from other sources. It is mandatory for the secondary researcher to obtain all documentation of the processes and protocols followed by the primary data compiler, including all coding materials, and any publications that are related to the data (Boslaugh, 2007; Clarke & Cossette, 2000). Finally, it is paramount that the secondary researcher has access to the raw dataset in order to perform new analyses and to consider and account for all of the aforementioned possible concerns (Boslaugh, 2007). The researcher of this study accessed and utilized all documentation on the collection of the data and information found in publication, and in addition, consulted the information officers handling the primary data in order to complete this evaluation. It was beneficial to have multiple sources to bolster confidence in findings.

**Data Analysis**

This study used quantitative data analysis where time series analysis and comparative analysis were conducted. The time series analysis were used to discover systematic patterns in the Uganda’s GDP revenue performance for the air and road transport to explain the past behavior of the performance of these two modes of transport.

The comparative analysis involved using t-tests to compare Uganda’s GDP revenue performance for the air and road transport. Thus, in this study, the goal of comparative analysis was to determine if there was a significant difference in Uganda’s GDP revenue performance for the air and road transport using the t-test. The reason why the t-test was used in this study was because it was appropriate statistical analysis given that this study was about comparing two groups of data that is Uganda’s GDP revenue performance for the air and road transport. The t-tests offer an opportunity to compare two groups on scores (Amin,
In this study the t-test was a type of inferential statistic, that is, the analysis went beyond just describing the numbers provided by data about GDP revenue performance for the air and road transport to draw conclusions about these numbers. To do this, the t-test analyzed the difference between the two means (that the mean for GDP revenue performance for the air transport and the mean GDP revenue performance for road transport) derived from the different group scores. The t-tests tell the researcher if the difference between two means is larger than will be expected by chance (that is, statistically significant).
CHAPTER FOUR
PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

Introduction
This presents, analyzes and interprets the results from Uganda Bureau of Statistics Statistical Abstract about GDP revenue performance of the airline transport and road transport during the period 1997 to 2017. The chapter is divided into two sections. The first section presents results about the difference in GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017. The second section presents and discusses the results about the difference in volatility in GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017.

Comparison of GDP Revenue Performance of the Airline Transport and Road Transport in Uganda

The section presents, analyzes and interprets results about GDP Revenue performance of the airline transport and road transport in Uganda. The results are presented in the following Table.

Table 1: GDP Revenue performance of the airline transport and road transport

<table>
<thead>
<tr>
<th>Year</th>
<th>Airline transport</th>
<th>Road transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>31,567</td>
<td>224,510</td>
</tr>
<tr>
<td>1998</td>
<td>31,930</td>
<td>245,401</td>
</tr>
<tr>
<td>1999</td>
<td>35,664</td>
<td>275,972</td>
</tr>
<tr>
<td>2000</td>
<td>40,093</td>
<td>316,483</td>
</tr>
<tr>
<td>2001</td>
<td>43,475</td>
<td>355,621</td>
</tr>
<tr>
<td>2002</td>
<td>48,489</td>
<td>383,065</td>
</tr>
<tr>
<td>2003</td>
<td>65,896</td>
<td>428,865</td>
</tr>
<tr>
<td>2004</td>
<td>69,998</td>
<td>472,692</td>
</tr>
<tr>
<td>2005</td>
<td>80,698</td>
<td>585,801</td>
</tr>
<tr>
<td>2006</td>
<td>98,366</td>
<td>702,433</td>
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<td>2007</td>
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<td>602,000</td>
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<td>2008</td>
<td>210,000</td>
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</tr>
<tr>
<td>2009</td>
<td>203,000</td>
<td>867,000</td>
</tr>
<tr>
<td>2010</td>
<td>217,000</td>
<td>894,000</td>
</tr>
<tr>
<td>2011</td>
<td>264,000</td>
<td>1,081,000</td>
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<tr>
<td>2012</td>
<td>337,000</td>
<td>1,248,000</td>
</tr>
<tr>
<td>2013</td>
<td>432,000</td>
<td>1,365,000</td>
</tr>
<tr>
<td>2014</td>
<td>489,250</td>
<td>1,489,500</td>
</tr>
<tr>
<td>2015</td>
<td>556,500</td>
<td>1,654,000</td>
</tr>
<tr>
<td>2016</td>
<td>643,750</td>
<td>1,838,500</td>
</tr>
<tr>
<td>2017</td>
<td>741,000</td>
<td>2,033,000</td>
</tr>
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</table>

Findings in Table 1 show that the variations of GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017. Overall, it is shown that there was an increase of GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017.
transport in Uganda during the period 1997 to 2017. The results are presented in Figure 1 for better analysis and interpretation.

![Figure 1: GDP Revenue performance of the airline transport and road transport](image)

Findings in Figure 1 show that although both GDP revenue performance of the airline transport and road transport increased during the period 1997 to 2017, the GDP revenue performance of the road transport was higher compared to that of the airline transport throughout the period. Furthermore, the GDP revenue performance of the road transport increased with larger amounts compared to the amount in the airline transport during the period. These findings were subjected to a t-test as shown in Table 2.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Type of transport</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Airline transport</td>
<td>Road transport</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>228,842</td>
<td>847,993</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>221,046</td>
<td>558,046</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>-4.727</td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>26.1252</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Difference</td>
<td>-619,151</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results in Table 2 show 21 sets of GDP revenue performance data were compared on the two types of transport (that is, airline transport and road transport). Findings reveal that the mean GDP revenue performance for airline transport (mean = 228,842) was lower compared to the
mean of GDP revenue performance for road transport (mean = 847,993). These findings corroborate the findings in Table 1 and Figure 1 given that they also show a lower GDP revenue performance for air transport compared to the GDP revenue performance for road transport during the period 1997 to 2017. In addition, Table 2 shows that standard deviation of GDP revenue performance for airline transport (SD = 221,046) was smaller compared to the standard deviation of GDP revenue performance for road transport (SD = 558,046). Thus, the standard deviation shows that a smaller variation of in GDP revenue performance for airline transport compared to the GDP revenue performance for road transport. The t-test shows a significant difference ((t(df = 26.12520) = -4.727, p = .000) in the mean scores for GDP revenue performance for air transport (mean = 228,842, SD = 221,046) and GDP revenue performance for road transport (mean = 847,993, SD = 558,046).

Comparison of Volatility in GDP Revenue Performance of the Airline Transport and Road Transport in Uganda

The section presents, analyzes and interprets results about volatility in GDP Revenue performance of the airline transport and road transport in Uganda. The results are presented in the following Table.

Table 3: Volatility in GDP revenue performance of the airline transport and road transport

<table>
<thead>
<tr>
<th>Year</th>
<th>Airline transport</th>
<th>Road transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>363</td>
<td>20,891</td>
</tr>
<tr>
<td>1999</td>
<td>3,734</td>
<td>30,571</td>
</tr>
<tr>
<td>2000</td>
<td>4,429</td>
<td>40,511</td>
</tr>
<tr>
<td>2001</td>
<td>3,382</td>
<td>39,138</td>
</tr>
<tr>
<td>2002</td>
<td>5,014</td>
<td>27,444</td>
</tr>
<tr>
<td>2003</td>
<td>17,407</td>
<td>45,800</td>
</tr>
<tr>
<td>2004</td>
<td>4,102</td>
<td>43,827</td>
</tr>
<tr>
<td>2005</td>
<td>10,700</td>
<td>113,109</td>
</tr>
<tr>
<td>2006</td>
<td>17,668</td>
<td>116,632</td>
</tr>
<tr>
<td>2007</td>
<td>67,634</td>
<td>-100,433</td>
</tr>
<tr>
<td>2008</td>
<td>44,000</td>
<td>143,000</td>
</tr>
<tr>
<td>2009</td>
<td>-7,000</td>
<td>122,000</td>
</tr>
<tr>
<td>2010</td>
<td>14,000</td>
<td>27,000</td>
</tr>
<tr>
<td>2011</td>
<td>47,000</td>
<td>187,000</td>
</tr>
<tr>
<td>2012</td>
<td>73,000</td>
<td>167,000</td>
</tr>
<tr>
<td>2013</td>
<td>95,000</td>
<td>117,000</td>
</tr>
<tr>
<td>2014</td>
<td>57,250</td>
<td>124,500</td>
</tr>
<tr>
<td>2015</td>
<td>67,250</td>
<td>164,500</td>
</tr>
<tr>
<td>2016</td>
<td>87,250</td>
<td>184,500</td>
</tr>
<tr>
<td>2017</td>
<td>97,250</td>
<td>194,500</td>
</tr>
</tbody>
</table>
Findings in Table 3 show that the variations in volatility in GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017. Findings show that the rate of change in GDP revenue increased from 363 in 1998 to 17,407 in 2003, then decreased to 4,102 in 2004, followed by an increase from 10,700 in 2005 to 67,634 in 2006, followed again by a decrease to -7,000 in 2009 and then an increase to 97,250 in 2017. On the other hand, the GDP revenue performance for road increase from 20,891 in 1998 to 116,632 in 2006, followed by a decrease to -100,433 in 2007, then an increase 122,000 in 2009, then a decrease to 27,000 in 2010 and lastly by an increase to 1194,500 in 2017. The variations of the GDP revenue performance is much cleared shown in Figure 2.

![Figure 2: Volatility in GDP revenue performance of the airline transport and road transport](image)

Findings in Figure 2 show that a smaller variation in the GDP revenue performance of the airline transport compared to that of road transport. Throughout the period 1997 to 2017, both GDP revenue performance of the airline transport and road transport are shown not be consistent with years increasing while other years decreasing.

**Table 4: Volatility in GDP revenue performance**

<table>
<thead>
<tr>
<th>Type of transport</th>
<th>Airline transport</th>
<th>Road transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Mean</td>
<td>35,471.65</td>
<td>90,424.50</td>
</tr>
<tr>
<td>SD</td>
<td>35,422.71</td>
<td>75,848.61</td>
</tr>
<tr>
<td>t</td>
<td>-2.93572</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.006</td>
<td></td>
</tr>
<tr>
<td>Mean Difference</td>
<td>-54.953</td>
<td></td>
</tr>
</tbody>
</table>
Results in Table 4 show 20 sets of volatility in GDP revenue performance data were compared on the two types of transport (that is, airline transport and road transport). Findings reveal that the mean volatility in GDP revenue performance for airline transport (mean = 35,471.65) was lower compared to the mean volatility in GDP revenue performance for road transport (mean = 90,424.50). These findings corroborate the findings in Table 3 and Figure 2 given that they also show a lower volatility in GDP revenue performance for air transport compared to the volatility in GDP revenue performance for road transport during the period 1997 to 2017. In addition, Table 2 shows that standard deviation of volatility in GDP revenue performance for airline transport (SD = 35,422.71) was smaller compared to the standard deviation of volatility in GDP revenue performance for road transport (SD = 75,848.61). Thus, the standard deviation shows that a smaller variation of in volatility in GDP revenue performance for airline transport compared to the volatility in GDP revenue performance for road transport. The t-test shows a significant difference (t(df = 38) = -2.93572, p = .006) in the mean scores for volatility in GDP revenue performance for air transport (mean = 35,471.65, SD = 35,422.71) and GDP revenue performance for road transport (mean = 90,424.50, SD = 75,848.61).
CHAPTER FIVE
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Introduction
This presents discussion, conclusions and recommendations about GDP revenue performance of the airline transport and road transport during the period 1997 to 2017. The chapter is divided into four sections. The first section presents the discussion about the difference in GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017. The second section presents discussion about the difference in volatility in GDP revenue performance of the airline transport and road transport in Uganda during the period 1997 to 2017. The third section presents conclusions. The fourth section presents recommendations.

Comparison of GDP Revenue Performance of the Airline Transport and Road Transport in Uganda
Findings revealed a significant difference (t(df = 26.12520) = -4.727, p = .000) in the mean scores for GDP revenue performance for air transport (mean = 228,842, SD = 221,046) and GDP revenue performance for road transport (mean = 847,993, SD = 558,046). In this study, there was an increase in both the airline transport and road transport GDP revenue performance in Uganda during the period 1997 to 2017 was established. Although both GDP revenue performance of the airline transport and road transport increased during the period 1997 to 2017, the GDP revenue performance of the road transport was higher compared to that of the airline transport throughout the period.

The findings of this study, therefore, show that the economic impact of road transport in Uganda was greater compared to that of airline transport. The economic impact of transportation modes is measure in the benefits they bring to economic growth and the economies of scale created (Banister & Berechman, 2005).

The reason why GDP revenue performance for road was higher compared to that of airline transport in Uganda might be due huge differences in monetary costs of these two modes of transport. According to Butuner (2015), comparing the two modes, the expected carrier costs for road transport are slightly lower than while the airline system has the highest carrier costs. This is not surprising given the energy requirements to keep a plane airborne and the high cost of aircraft relative to road transport (Feng, Li & Shen, 2015). Take note of an interesting
trade-off between infrastructure and carrier costs: rail has very high infrastructure costs, but relatively low carrier costs (Cervero & Duncan, 2002). In contrast, air travel has low infrastructure costs, but higher carrier costs. Thus, the amount of contribution of any transport mode to GDP is a factor of the costs involved (McQuaid & Grieg, 2003). If costs are too high, the contribution of the transport mode to the GDP performance is likely to be lower. Therefore, it is argued in this study the reason why in Uganda the road transport contribution to GDP was higher compared to that of airline transport was because the costs involved in road transport are much lower compared to the costs in the airline transport.

Another reason why in Uganda GDP revenue performance for road was higher compared to that airline transport in the economical transportation of these modes. According to Feng et al (2015), road transport is the most economical transportation mode due to its low energy consumption and low costs. Low energy consumption makes road transport economical compared to airline transport. Low cost and low pricing of the road transport make them profitable compared to airline.

**Comparison of Volatility in GDP Revenue Performance of the Airline Transport and Road Transport in Uganda**

Findings revealed a significant difference \((t(df = 38) = -2.93572, p = .006)\) in the mean scores for volatility in GDP revenue performance for air transport \((mean = 35,471.65, SD = 35,422.71)\) and GDP revenue performance for road transport \((mean = 90,424.50, SD = 75,848.61)\). There was a smaller variation in the GDP revenue performance of the airline transport compared to that of road transport. Throughout the period 1997 to 2017, both GDP revenue performance of the airline transport and road transport were unstable during the period 1997 to 2017.

Basing Gangl (2005) explanation, it argued that there was less fluctuates in GDP revenue performance of the airline transport compared to that of road transport over a period 1997 to 2017. The volatility concept is important to describe dispersion from expected revenue (Gottschalk & Moffitt, 1994). In this study, the GDP revenue performance of the road transport was more unpredictability and uncertainty compared to that of air transport in Uganda. The higher volatility in the GDP revenue performance of the road transport implies that it has a less reliable contribution to Uganda’s GDP compared to the contribution of the airline transport (Gottschalk & Moffitt, 2009).
Basing on Dichev and Tang (2005) explanation, it argued in this study that the higher volatility of the Uganda’s road transport GDP revenue can have a higher negative impact through its relation to the expected cash flows (earnings) compared to that of the air transport. Studies directly test the link between the value of a firm and earnings volatility. Barnes (2001) found that earnings volatility is negatively related to firm value measured by the market-to-book ratio. Allayannis et al. (2005) show the same relation holds but only before controlling for cash flow volatility.

**Conclusions**
Findings revealed a significant difference in the mean scores for GDP revenue performance for air transport and GDP revenue performance for road transport during the period 1997 to 2017. This study established that generally the GDP revenue performance for the airline transport and road transport in Uganda increased during the period 1997 to 2017. However, the GDP revenue performance of the road transport was higher compared to that of the airline transport throughout the period.

Lastly, volatility results showed that a significant difference in variability of GDP revenue performance for air transport and GDP revenue performance for road transport during the period 1997 to 2017. However, the variation of GDP revenue performance of the road transport were larger compared to the airline transport during the period. Thus, the contribution of road revenue performance to GDP was more unreliable compared to the contribution of airline revenue performance to GDP.

**Recommendations**
The Uganda government should continue improving the GDP revenue performance for both airline transport and road transport through increasing the volume of traffic for both transport modes in terms of both the quantity of goods and passengers as well diversification of business handled by both transport modes. This is because both modes of transport are importance to the economic development of Uganda. However, more improvement efforts are required for the airline transport given that its contribution was less compared to the of road transport.
The government of Uganda should try as much to reduce that large variability in GDP revenue performance of the road transport. It needs to ensure a stable flow of road traffic by addressing the season variability that affect the volume of traffic by road.
REFERENCES


