IMPACT OF INNOVATION ON BUSINESS PERFORMANCE: THE CASE OF ZIMBABWE UNITED PASSENGER COMPANY (ZUPCO).

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DEDICATION

This project is dedicated to my husband, Charles Zishiri and son, Morven Zvikomborero. Thank you for the support you gave me throughout this project.

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I would like to thank my father, Mr Zephania Mabaye and my mother, Mrs Doreen Zandonda for the support and encouragement they gave me throughout my studies.

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ABSTRACT

Zimbabwe United Passenger Company (ZUPCO) is a government run public enterprise whose mandate is to provide safe and reliable passenger transport services to rural and urban populace. The company has not been able to execute its mandate as a result of operational and viability challenges which resulted in down scaling of operations, fleet abandonment, non-maintenance and employee retrenchments. In January 2019, the government went on a recapitalization drive of the company which resulted in the injection of a new fleet, innovation of operations by subcontracting other players and introduction of electronic ticketing as well as subsidization of the company's operations. The main objective of this study was to find out if the introduction of innovation (subcontracting and electronic ticketing) had an impact on ZUPCO's business performance. Literature shows that subcontracting can be a success if fares are set at reasonable levels and that if managed well can reduce costs like the case of Curitiba which resulted in more people opting for public transport and its per capita fuel consumption reduced by 30%. Literature also shows that Electronic ticketing was successful in Singapore as it resulted in revenue security and brought about convenience for both operators and consumers. Literature also highlights performance indicators that can be used to ascertain business performance and these include operating ratio, passenger volumes, revenue and operating costs among others. The researcher used observations and document analysis to gather data. The study used purposive sampling to select the sample of participants. The major research question was to establish the effectiveness of innovation in improving business performance at ZUPCO. The objectives of the study were met and independent samples t-test which were conducted showed that the innovation improved business performance. The study indicated that the Information Technology department of the company should help in ensuring that electronic ticketing does not face a still birth due to system failure and disruptions and that the government should minimize its interference in the operations, of the company.

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ABBREVIATIONS AND ACRONYMS

A/CEO ……Acting Chief Executive Officer

BMTC …… Bengaluru Metropolitan Transport Corporation

BRT ……Bus Rapid Transit system

CBD……Central Business District

CSC ……Contactless Smart Cards

CSFs ……Capital Success Factors

EPKM …….Earnings Per Kilometre

GPS …….Global Positioning System

IT ……Information Technology

KPI …… Key Performance Indicators

PPP …….Public-Private Partnership

SACCOs …….Savings and Credit Cooperative Organizations

SPSS ……Statistical package for Social Sciences

SWOT …….Strength, Weakness, Opportunities and Threats

ZIMRA……Zimbabwe Revenue Authority

ZUPCO ……...Zimbabwe United Passenger Company

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The transport sector is an essential economic sector in Zimbabwe, facilitating the movement of goods and passengers in the country. It can be likened to the circulatory system without which the economy just becomes grounded. It allows the easy ferrying of almost all employees from their homes to their work places where each doing their part steers economic development of any nation. Being such a vital link of the macro-economic performance of the Zimbabwean economy, it is the expectation of every economic player that this sector operates as sustainably and effectively as possible. This is especially true for public operators like Zimbabwe United Passenger Company (ZUPCO). In Zimbabwe, 88% of the workforce use public transport to and from work every day, others to school and other different destinations. The Zimbabwean government saw the importance and need for a government run public company that should be affordable, reliable and convenient and set up ZUPCO, established under the Road Transportation Act (Chapter 13:10) of 1988 as a state enterprise.

Innovation is the application or introduction of a new technology or method for doing something that helps an organisation remain competitive and meet customer demands. Innovation happens when an organisation solves an existing problem or performs an existing business process, product or service in a radically different way that generates something highly beneficial to those who perform the process, those who rely on the process or both. Innovation can generate value to either internal customers, including employees or the actual organisation itself, or it can create value to external customers, including business partners, end users or actual consumers. Values stemming from innovation include reducing the time it takes to produce a product or perform a service, increasing the number of products produced or services provided within a time frame; and reducing the costs per product

produced or service provided. Additionally, innovation can generate significant gains in product quality and service levels.

For slightly over a decade now ZUPCO has been facing tough operational and viability challenges which have resulted in down scaling, fleet abandonment, non-maintenance and employee retrenchments. Government had to step in and subsidise the operations of the parastatal, pouring in millions of dollars in a capacity resuscitation attempt. Ironically this lofty financing did not give much life to the company. Transport woes griped the nation with persistent price fare hikes on almost daily basis especially with other private public transport operators, putting the transport service out of reach for many commuters. Because ZUPCO's fleet had greatly dwindled and had no capacity to cater for all commuters, the government came up with an innovative idea of subcontracting other transport operators to operate under ZUPCO in providing urban transport to the commuting public. Other players came on board with a system to enhance the company's financial soundness through the use of new electronic ticketing system, reducing the handling of cash by the conductors.

The purpose of this research will be to assess the impact of innovation on business performance being employed by Zimbabwe United Passenger Company (ZUPCO) in improving its operations. The parastatal has experienced a roller coaster ride in its operations as they have been characterized by flourishing and vibrant periods as well as periods of critically depressed and difficult phases of operations. This proposal will focus on the background, research objectives and questions, hypothesis, justification and preliminary literature among other issues.

1.1 Background

In most developing countries buses are the major mode of urban transport, often the only one affordable to the urban poor. They can provide a very efficient means of moving large numbers of people with considerable flexibility in order to meet demand. Yet despite their vital role, bus services in many places fall short of demand. Systems are frequently overstretched, uncomfortable and unreliable, very often this is because they are restrained by regulation and inefficient practices which in turn lead to high costs and losses. As a result,

heavy subsidies are usually required. Although subsidies may be introduced to maintain a desirable level of service at certain fares, experience shows that subsidies are inclined to inhibit investment and expansion (Otha, 1998). This is because demand inevitably increases faster than budget revenues so that subsidies cannot go on expanding. Although public corporations generally find it difficult to be viable, there are some that operate along commercial lines that have proved to be viable and profitable and are able to be financially self-supporting when fares are set at reasonable levels to the extent that people spend less than 10% of their income (Bombay, Madras and Coimbatore, 2003).

In the case of Curitiba, the total of approximately 2000 buses transport people daily. According to Birk and Zegras (1993), Curitiba buses carried 50 times more passengers on transport. The bus system was so efficient that per capita fuel consumption was 30% lower than in eight other comparable Brazilian cities. This measure of success is clearly an achievement and reflects the overall success of this innovative move. The number of people preferring to use buses in comparison to those using cars has also been on the increase (Cannell, 2003). In a study involving six Brazilian cities namely Sao Paulo, Rio De Jenairo, Curitiba, Brasilia, Salvador and Campinas, (Berni and Bajay 1998) made the following conclusion: "concerning urban planning and its relation with urban mass transport, no doubt the example of the city of Curitiba should be followed not only by the other five cities but by large and medium cities facing high and continuous population growth".

This study comes from a background of continued loss making and capacity dwindling at the parastatal. The organisation's cash flow statements have been showing that operating costs have on most occasions been higher than the revenue generated. This mismatch between revenue and expenditure has seen the entity on numerous occasions being spoon-fed by the government, putting pressure on the government. Despite collecting cash, the company has been struggling to meet its wage-bill obligations. From a huge fleet of 300 buses in 2011, the organisation had only 25 operational buses as of January 2019. The dwindling of the ZUPCO fleet might be attributable to non-maintenance of the fleet. ZUPCO Ltd is a state-owned passenger transport organisation in Zimbabwe. It was originally formed in colonial Rhodesia under the name of Harare United Omnibus Company Limited and later became ZUPCO Ltd

after independence in 1985. The head Office is located just outside the Central Business District (CBD) at number 109 Belvedere Road. Its primary mandate is the provision of passenger transportation services. It operates urban, long distance and cross border routes. Until recently, the company's operations were heavily biased towards rural and cross boarder passenger transportation. This has since changed to mostly urban operations, a sector which the company enjoys a large market share in terms of clientele base. The company's operations are governed by the government through the Ministry of Local Government, Public Works and National Housing.

ZUPCO inherited a robust asset base and extensive infrastructure across the whole country and has depots in every province of the country. At its peak in the mid 1980's, the company was a major player in the transport sector and employed over 7,500 people country wide with a fleet compliment of over 1,500 buses. In the late 1980's, ZUPCO's operations started to consistently decline and service provision deteriorated. In 1990, the Zimbabwe government adopted the Economic Structural Adjustment Programme (ESAP), an IMF supported financial outline programme which upheld for the advancement of the economy. ESAP had prescribed the change of parastatals like ZUPCO to become self-run business entities that would never again trouble the state for subsidies. In spite of the fact that the government held entire proprietorship, ZUPCO was now a stand-alone entity and expected to settle on business choices that would guarantee sustainability and profitability just like the other private players. ZUPCO continued to struggle. The urban transport situation which was heavily depended on ZUPCO plunged into a crisis of great proportions. The government of Zimbabwe deregulated the urban transport sector in 1993 and introduced private players to manage the situation. For the very first time the organization had to face competition.

Things continued to worsen for an already struggling ZUPCO. The organization retrenched workers in 1994 in an effort to cut costs and continue operating but was not successful. In 2004 and 2005, the government came up with a plan to assist the organisation to get Scania buses from Pioneer Motor Company and Isuzu buses from Kenya under a government ensured plan. The government hoped that would infuse life into the debilitated organization but the company only operated for a few years and hit rock bottom again. Once again

ZUPCO had to cut its labour force in a bit to cut costs and remain afloat during the period 2009 and 2010.

Once again, to try and ease the operational challenges faced by the organisation, the government assisted the company to get offshore funding again in 2011 which resulted in the company acquiring 300 buses which were delivered in batches of 50's and 100's during the period 2011 to 2015 from FAW China. Barely a few years after that, ZUPCO was back on its knees again and barely visible on the market. This gave private players the opportunity to increase their market share and dominate the sector since ZUPCO was nowhere to be seen.

The government intervened again by availing buses for ZUPCO in January 2019 so that a stable transport system would be available to undertake urban and rural operations. This resulted in the adoption of a newly invented bus management system to track the ZUPCO fleet and curb corruption. Part of the bus management system included the e-ticketing system which is in the form of a 'tap and go' card which aims to ensure that cash handling by bus crews and passengers is reduced and this also reduces stealing of cash thereby increasing collection and accountability of revenue. This aimed to ensure that all the revenue generated is accounted for.

1.2 Research Problem

The invisibility of ZUPCO, once a major player in the transport business, on the roads in the recent years has been a huge concern to the general public, especially those that once enjoyed the excellent services that the company used to offer. Most of the company's depots country wide look like scrap yards, full of deserted and abandoned non-functioning buses, which make the bulk of its fleet. Clearly buses that are out of service represent a substantial loss of earnings and a waste of capital resources. Of the ones on the roads, the majority's condition is not so perfect, needing either minor or major services that can be long overdue at most times. Some repairs and maintenance are also a necessity on numerous buses. Shortage of spares, lack of incentives and poor fleet maintenance have also been a common sight at the organisation. The company's financial statements show that losses are more prevalent than

profits. The servicing of the wage bill at the company has also been a challenge in recent times.

According to the Zimbabwe Independent newspaper of 24 May 2019, ZUPCO used to operate a reliable fleet but this has since stopped due to failure to service its fleet. There has also been reports in the media of cases of pilferage by bus crews in the organization during the time of analogue ticketing system (The Herald 28 May 2019). Some conductors lost their jobs last month when it was realised that they had been stealing cash on duty. From the supplier side, there have also been litigations against ZUPCO as there have been non-payment of dues, non-adherence to agreed payment plans and payment for consumables by ZUPCO. Even now there are still issues of this nature in the courts that need resolution. On a number of occasions, the company's corporate account has been garnished by Zimbabwe Revenue Authority (ZIMRA). The continual revision of the company's payment plans to regulatory authorities is also a pointer that the organization is struggling financially. Faced with such an array of challenges, there often has been talk of the intention to retrench some employees as a survival strategy by the company.

Table 1.1 shows the company's declining revenues, increasing operating expenses and losses at the company. This shows that there was a challenge in the revenue collection of the company as well as in covering their operating expenses which affected their business negatively.

Table 1.1 ZUPCO financial statements: 2013-2018

Year	Revenue	Comprehensive income/loss	Operating expenses
2013	$34,988,248	$1,651,443	$12,799,504
2014	$29,709,177	$3,923,424	$10,521,553
2015	$19,043,119	($3,288,366)	$11,167,734
2016	$10,691,845	($6,725,154)	$12,055,823
2017	$8,033,011	($9,350,508)	$8,508,963
2018	$8,044,433	($3,216,727)	$5,792,758

Source: *ZUPCO Financial statements 2013-2018.*

Since the company's operations have been going down throughout the years due to a decline in revenue generation and collection which resulted in it incurring losses, there is need to assess whether its adoption of innovation is the right strategy for the challenges faced hence the need to assess the impact of innovation on business performance.

1.3 Research Objectives

The aim of the study was to assess the impact of innovation on business performance in the transport sector focusing on ZUPCO for the period 2018-2019.

Specific Objectives

The study was guided by the following objectives

1. Identify the types of innovations that have been implemented at ZUPCO to improve business performance.
2. Determine the extent of reduction in revenue pilferage.
3. Measure improvements in revenue since the adoption of the new innovative ways of operating.
4. Establish the level of government involvement in the operations of the entity and its impact on business performance.
5. Identify operational challenges of the adopted innovations.

1.4 Research Questions

Main Research Question

How effective has innovation been in improving business performance at ZUPCO?

Research Sub Questions

i) What innovations have been implemented at the organisation?
ii) How has pilferage faired?
iii) How has revenue improved since adoption of the new innovative ways of operating?
iv) What is the extend of government involvement in the operations and its impact on business performance?
v) What are the operational challenges of the adopted innovations?

1.5 Hypothesis

The study's hypothesis was:
H0: Innovation has no impact on business performance.
H1: Innovation has an impact on business performance.

1.6 Rationale of the study

This study contributes to the operations literature in the transport industry. It helps to understand the theoretical relationships between innovation and business performance which is useful in refining managerial expectations on the type of innovations to adopt in operations. This may help managers understand the effectiveness of innovation in improving business performance. The research is significant as no such study has been undertaken in Zimbabwe more so, at ZUPCO. The research will be significant to the Transport industry at large and ZUPCO in particular as it will inform them on how to improve revenue generation, collection and reduce pilferage.

The study will also add to the knowledge board of the developers of the technology as it will help in identification and plugging of loopholes within the system in order to improve revenue generation and the system's effectiveness. The study will also inform stakeholders and government on the level of involvement that is required for the optimal functioning of the entity. This research can also be used by other students doing their research of similar nature in terms of the variables being looked at in this research. It can be used as a basis for their research or can be used for comparative purposes in terms of results. Other technology developers may be motivated to develop other innovative technologies that helps increase effectiveness of organizational operations.

1.7 Scope of Research

This research assesses the impact of innovation on business performance in the transport sector focusing on ZUPCO, Harare. This research looks at business performance focusing on key performance indicators (KPI) which are operating costs, revenue and profit among others. In the Transport industry business performance can be established by looking at issues such as fleet growth, maintenance and market share. The research covered the period 2018- 2019. The respondents were selected from ZUPCO Harare.

1.8 Dissertation Outline

Chapter One

It explains the outline of the research, includes a brief explanation of the research background and provides justification for the selection of the study area. This chapter comprises explanation of the study aim and objectives, and comprises structure of the research.

Chapter two

Constitutes a literature review, and accordingly, contains analysis of models and theoretical frameworks that have been previously introduced to the research area. It highlights viewpoints of other authors regarding the research area and contains definitions of main terms and explains search strategy for the secondary data.

Chapter Three

This chapter details data collection methods, sampling methods, philosophies and also highlights data collection techniques adopted by the researcher. It also looks at ethical considerations.

Chapter four

Analyses the data collected during the research and interprets the findings of the research.

Chapter Five

Concludes the work and condenses the degree of accomplishment of research aim ad objectives summarises the level of achievement of research aim and objectives. This chapter includes affirmation of limitations of the study and features scope of future studies in the same research area.

1.9 SWOT analysis

Strengths

Subcontracting will work in the company's favour as the parastatal has infrastructure distributed nationwide to support its increasing fleet as well as increase coverage in the country. Use of the tap card ensures safety of the company's revenue as hijacking of generated money from conductors will no longer be possible and it also reduces cash handling by crews thereby reducing cases of stealing.

Weaknesses

Poor selection criterion of buses to subcontract is a major weakness as most buses being contracted will have outlived their useful life and will be prone to breakdowns which reduces their operational time hence affecting revenue generation. Batteries in tap machines not lasting throughout the day result in conductors collecting cash due to the unavailability of the tap machines which makes the company lose out on benefits of reduced cash handling.

Opportunities

The company has a ready market which is makes it easy to introduce other transport services. Increased investor interest in the company increase revenue generating potential. The economy is migrating from use of physical cash to plastic money and the use of tapcard has come at an opportune time which makes it easier for customers to embrace it.

Threats

Poor road network is a threat to the company's business as it increases costs for servicing buses which results in reduced fleet availability thus failure to service customers. Currency instability results in the company losing out on time value of money as it takes time for fares to be adjusted in line with the rate of inflation.

1.10 Chapter Summary

The chapter looked at the background of the company and the challenges it faced. The challenges were identified through the Strength, Weakness, Opportunities and Threats (SWOT) analysis. The organization faced operational and viability challenges several times until innovative measures were put in place to resuscitate it. The chapter also looked at the problem statement and the objectives of the research and its significance. While being a synopsis of the dissertation, the chapter also offers the groundwork for chapter two in which literature relevant to innovation and business performance is going to be reviewed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter explores the concept and the literature on innovation and its impact on business performance. The chapter first defines the concept of innovation. The review looks at the types of innovation that were implemented at ZUPCO which are e-ticketing and subcontracting including cases of where similar innovations were adopted and the results thereof. Government subsidies and its role will also be looked at as they have a bearing on the performance of the transport sector. The research will also look at business performance indicators in the transport industry as they show an organization's performance.

2.2 Definition of the phenomena

2.2.1 Innovation.

Drucker (1985), defines innovation as the specific tool for entrepreneurs, the means by which they exploit change and opportunity for a different business or service. It is capable of being presented as a discipline, capable of being learned and being practiced. Edosomwan (1989), also defines innovation as the introduction of a new product, process or service into the marketplace while Girifalco (1991), mentions that innovation is the process by which an invention is first brought into use. It involves the improvement or refinement of the invention, the initial design and production of prototypes. The importance of innovation in creating competitive advantage and improving organizational growth cannot be understated (Innovation, 1987). Covin Si Slevin (1991), Lumpkin and Dess (1996), and Knox (2002) define innovation as a process that provides added value and a degree of novelty to the organization, suppliers and customers, developing new procedures, solutions, products and services and new ways of marketing. Downs and Mohr (1976), notes that features of innovation vary according to the organization considered as some organizational

characteristics vary depending on the type of innovation considered. They further note that these features are called secondary characteristics of innovation.

Innovation happens when an organisation solves an existing problem or performs an existing business process, product or service in a radically different way that generates something highly beneficial to those who perform the process, those who rely on the process or both (Stenberg, 2016). Innovation can generate value to either internal customers, including employees or the actual organisation itself, or it can create value to external customers, including business partners, end users or actual consumers (OECD, 1991). Values stemming from innovation include reducing the time it takes to produce a product or perform a service, increasing the number of products produced or services provided within a time frame, and reducing the costs per product produced or service provided. Additionally, innovation can generate significant gains in product quality and service levels.

Innovation according to Alexander and Van Knippenberg (2014) can be a catalyst for growth and success of a business, but this depends on the type of innovation and as such innovations are of different kinds: product innovation, process innovation, technological innovation, and management systems innovation processes. Products innovation, according to Shu et al. (2016) is the introduction of new products by a firm to the target market and is in essence a new product from development activities. Process innovation according to Ayhan, Öztemel, Aydin and Yue (2013) refers to the act of performing an activity in a new way while using specific change tools to transform the manufacturing processes. It also entails the adoption of technologically and significantly improved production method. Technological innovation according to Howell (2005) is any improvement in the current manufacturing technologies or inventions of new technologies. Lastly, management systems innovation processes and principles create long-lasting advantages and at the same time generate a lot of drastic changes in the competitive capacity of the manufacturing firms.

Economists focused of two main types of innovation which are process and product (OECD, 1991). It is further noted that product innovation is the act of bringing something new to the

market place that improves the range and quality of products on offer while process innovation is a new way of making or delivering goods or services.

This study notes that innovation is the application or introduction of a new technology or method for doing something that helps an organisation remain competitive and meet customer demands. It will also consider the innovation implemented at ZUPCO as a process innovation as it is meant to transform operations of the entity.

2.2.2 Electronic ticketing (e-ticketing)

Electronic ticketing is a form of electronic business that gives another conveyance channel for different types of tickets e.g. for public transport, for long distance travel by train or airplane (Haneberg, 2008). E-ticketing uses various gadgets like smart card or cellular phone. An electronic ticket is used to replace the old multi-layered paper tickets as it saves paper, no ticket to lose, no shipping charge and easier check in (Haneberg, 2008) Electronic ticketing has been developed as an evolution of credit cards with magnetic stripe due to concerns of inefficiency in information management and control of the operations (Lübeck, Wittmann and Battistella, 2012). Other writers define electronic ticketing as a paperless electronic document used for ticketing passengers while others define it as a means of documenting the sale, tracking usage of passenger transportation without requiring the issuance of paper value documents. For the purpose of this research electronic ticketing will be defined as digital record of ticketing transactions which reduces use of paper.

2.2.3 Performance Indicators

Performance indicators are what will be used to measure the actual results of an organization to determine its performance (Performance, 2005). A performance indicator is a qualitative or quantitative unit of measurement or parameter to be assessed against a set standard or scale, (www.international.gc.ac, accessed 26/09/2019). Key performance indicators are important for they give an indication to the operational direction of the company for

assessment of business viability, sustainability and continuity or operational efficiency and they vary depending on companies or industries priorities or performance criteria, (www.investopedia.com, accessed 29/09/2019). The main component of the annual financial statements which is the profit and loss account is used to determine the performance indicators of an organisation (Teodo, 2013). Key Performance indicators (KPI) are a crucial critical requirement for achieving goals and targets of an organisation. They provide evidence that a result has been achieved and measure progress by noting changes at different times (GoZ, 2012).KPI gives information on areas of the business that need improvement or adjustments and areas that are doing well (Pont, 2011).

2.2.4 Subcontracting

Subcontracting occurs when an economic operator that has been awarded a public contract entrusts another entity with the performance of part of the works or services that are the subject matter of that contract (Procurement, 2016). More than one sub-contractor may be used by the contractor. It is further mentioned that although the subcontractor is involved in the execution of part of the contract, it is the main contractor that is ultimately responsible and liable to the contracting authority for the proper execution of the contract. Subcontracting may be useful where the contractor does not have the capacity or resources to perform the contract. Subcontracting is also defined as a business arrangement by which one firm contracts with another firm for a given production cycle, one or more aspects of production design, processing, manufacture, construction or maintenance work (Com- and Programme, 2013).

2.3 Performance Indicators

Most cities in developing countries rely heavily on the use of buses as the major means of mobility, particularly for the urban poor. Even in cities with extensive rail networks, the majority of trips are made on buses or minibuses. An estimated 900 million trips a day were being made in buses in the developing cities in year 2000, by 2020 that figure will have at

least doubled (Polder *et al.*, 2012).With so many people affected, it is not surprising to find the quantity and quality of bus services as a worldwide topic of considerable concern.

Certain conditions are generally present when bus services are financially viable and of a reasonable standard. This conclusion is based on the examination of a large number and a wide variety of bus services throughout the developing world (Franco-Santos *et al.*, 2007). Important aspects to consider include ownership of bus services and the variety of vehicles and services, as well as cooperation and competition and their impact on viability, business performance and standards. Governments can play a role in improving bus services, and various degrees of regulation and freedom are needed to enhance the opportunities for viable bus services (World Bank Group, 2016). A set of basic indicators can be used to measure and monitor the performance and quality of bus services so that deficiencies and opportunities for improvements can be readily identified (Franco-Santos *et al.*, 2007).

In India, the Bengaluru Metropolitan Transport Corporation's (BMTC's) efforts to enhance and augment bus services in Bengaluru have historically been aided by its ability to recover its costs of operating the bus system, generating capital to further invest in newer, better buses and improved technology and innovations to make commuting for Bengalureans faster, simpler and more comfortable (Mukherjee, Toshniwal and Mulukutla, 2017). In this regard, BMTC was hampered by losses between 2012 and 2015, making scarce quick capital when it was needed the most; to swiftly increase the city's bus fleet to incentivise commuting by public transport to tackle growing congestion in the city. Fortunately, however, several measures undertaken by the Corporation have enabled it to improve upon its goal of breaking even for the year 2015-16, paving way for increased service enhancements. Most fundamentally, BMTC's efforts to attract commuters to bus services across 2015-16 resulted in a major improvement in average bus load factors**,** increasing from 68% in the preceding (2014-15) year to 74% for the assessment year 2015-16; these higher passenger volumes contributing to improved revenues and earnings per kilometre (EPKM**)** (Mukherjee, Toshniwal and Mulukutla, 2017)**.**

Equally important, however, are numerous measures taken by the Corporation over the years to utilise infrastructure more efficiently, finance operations more innovatively, leverage its commercial assets, and prevent revenue leakages through e-ticketing. Some of these initiatives are procurement of diesel through tender process, subcontracting other private players to work under BMTC, online payment to suppliers and electronic ticketing. While the latter facility has enabled the Corporation to save INR 24 million annually, the discounted diesel cost has reduced BMTC's expenses by around INR 123 million every year when compared to purchasing diesel at regular rates (CSTEP, 2015). This aside, the supplier also provides state-of-the-art refuelling facilities. It is thus now possible to remotely analyse the frequency and amount of fuel provided to each bus, severely curbing opportunities for fuel pilferage. BMTC, thus, has managed to return to profitability without having to burden passengers with increased fares; rather, by increasing non-traffic revenue and reducing costs through a series of innovations. The corporation is also implementing a robust Information Technology (IT) system that includes Global Positioning System (GPS) in all buses, electronic ticketing, and a smartcard for cashless transactions on all its buses (Bhardwaj *et al.*, 2018).

Much of the information gathered on bus services suggests that the form of ownership and degree of competition are major factors in the financial viability of bus services. Generally, privately owned bus services are found to cost much less than publicly owned services. With competition, both cost effectiveness and quality of services are enhanced. Both the operational and financial performance of public bus corporations can be improved if they operate on commercial lines with a measure of independence (Rakesh *et al.*, 2019).

2.3.1 Cost of Services

An examination of a large number of bus services in developing countries reveals that generally the cost per unit of output (passenger kilometre) for privately owned services is roughly half that of publicly owned services. Even when private and public buses are operating in the same city under similar conditions, this difference in cost prevails (Pi *et al.*,

2018). There are several reasons why private bus operations are generally more cost effective than public corporations.

2.3.2 Staffing Levels.

One of the primary reasons for the high cost of publicly owned services is that they are frequently overstaffed (Furth, Hemily, Muller, and Strathman, 2006). It is not uncommon to find public bus corporations with staffing ratios (staff per operating bus) in excess of eight, and very often between 10 and 15 or even higher. On the other hand, private operations have staffing ratios of about five or even as low as two or three in the case of owner-drivers or small family enterprises (CTA, 2013)

Table 2.1 Comparison of Costs (Private and Public Bus Services operating in the same city: 2010 Data)

City	Ownership	Type of bus	Fleet	Fleet Utilisation	Stuff / bus ratio	Fare/5km	Cost pass/km USc	Revenue:Cost Ratio
Calcutta	Public	Large SD, DD	1,100	64	20.7	0.04(G)	1.9	0.46
	Private	Large SD	2,200	86	4.0	0.04(G)	0.7	1.10
	Private	Small SD	950	88	3.8	0.08(G)	1,0	1.35
Ankara	Public	Large SD	900	65	6.0	0.12(F)	2.5	0.67
	Private	Large SD	200	95	2.6	0.12(F)	1.2	1.70

Jakarta	Public	Large SD,DD	1,940	59	14.5	0.13(F)	1.8	0.50
	Private	Large SD	550	76	7.25	0.13(F)	0.9	1.20
	Private	Mini	3,365	80	5.5	0.13(F)	1.2	1.45
Karachi	Public	Large SD	790	40	12.4	0.04(F)	2.8	0.49
	Private	Regular SD	1,320	72	6.4	0.04(F)	1.0	1.15
Accra	Private	Mini	3,980	80	5.7	0.06(F)	1.3	1.30
	Public	Large SD	44	24	28.2	0.13(G)	_	0.51
	Private	Regular SD	665	73	5.5	0.18(G)	_	1.40
Sao Paulo	Public	Large SD/Art	3,280	82	7.6	0.26(F)	_	_
	Private	Large SD	5,850	90	5.1	0.26(F)	_	_

"Staff/Bus Ratio" is in respect of operating buses

SD = Single Deck Buses F = Flat Fare DD = Double Deck Buses

Art = Articulated Buses C G Graduated Fares (i.e., related to distance)

Source: *World Bank surveys and studies*.

The high staffing ratios of public corporations as shown in Table 2.1 often arise because redundant staff cannot be laid off or retired, due either to government regulations or union influence. This can be a cause of very considerable losses, particularly when bus services are reduced and staffing ratios thus increase. Also, public corporations often have excessive layers of management and use elaborate administrative procedures employing large clerical

and accounting staffs (Furth, Hemily, Muller, and Strathman, 2006). Such arrangements add considerably to overhead and may impair rather than enhance, productivity.

2.3.3 Rates of Pay.

Employees of public corporations generally earn higher rates of pay and receive more fringe benefits than their counterparts in private enterprises (CTA, 2013). In cases where staff of private enterprises receive higher take-home pay, it is usually because they work longer hours, are more productive, and may share in the profits (CTA, 2013). Private enterprises tend to choose small buses that involve less stringent requirements for driving permits than larger buses, the choice of public corporations. As a result, drivers of small buses are more readily available and can be paid less, thus improving the viability of private enterprises.

2.3.4 Productivity

Of considerable influence on the level of viability is the extent to which buses are put to productive use. A particular characteristic of private bus enterprises is that they are highly motivated to keep their vehicles fully operational (Currie, 2006). Repairs and maintenance are dealt with expeditiously, usually being undertaken overnight or during off-peak periods; minor repairs one of ten made by drivers on the spot (Currie, 2006). Driver absenteeism, if any, is minimal in the private sector. As a result, private operators achieve a high level of utilization of their buses, it is not uncommon to find at least 80-90 percent of private bus fleets in operation during peak periods. On the other hand, with a few notable exceptions (mainly in India), public bus corporations are rarely able to out shed more than 60-70 percent of their bus fleets in peak periods (Furth *et al.*, 2006). In addition, the number of public buses in service during the day is often substantially reduced because of a high rate of breakdowns.

When compared to private buses, the lower proportion of public buses in service can be attributed to a lack of incentives, a high level of absenteeism, poor maintenance, and a

shortage of spares. Clearly, buses that are out of service represent a substantial loss of earnings and a waste of capital resources (Muller, 2014). With much higher staffing ratios, staff productivity is naturally much lower in public corporations than in private enterprises. Measured in terms of passenger-kilometres per staff member, per day, staff productivity for the average public corporation, at 500-600, is roughly half that of private enterprises, at 1,100-1,300 (Mehndiratta, 2014).

2.3.5 Revenue Losses.

Many public transit corporations are plagued by a loss of revenue due to faults or irregularities in the fare collection system, adding seriously to their other losses (CTA, 2013). Apart from the lost opportunities to collect more revenue by better routing, scheduling, and standards of service, direct revenue losses often termed revenue leakages arise because passengers evade payment of fares, e.g., they avoid the collector, travel on the outside of buses or simply refuse to pay; bus crews are tardy in the collection of fares, either because it is arduous or difficult, as in the case of large crowded buses. Also, they may not be prepared to tackle fare evaders; the penalties are insufficient to deter evasion; fares collected are stolen by bus crews or other staff (Imran, 2006). According to (Imran, 2006), revenue leakage of 10-15 percent in public transit companies is not uncommon. Leakage has been estimated to be as high as 30 percent in some cases. But even at comparatively small levels, revenue leakage can spell the difference between making a profit and incurring a loss (CIRT, 2002).

2.3.6 Passenger Volumes.

A significant indicator of productivity is the number of passengers carried in relation to the capacity of the system. Measured in terms of the average number of passengers per operating bus per day, a reasonably well-managed bus company should produce results of 95 to 100% (CIRT, 2002).

2.3.7 Fleet Utilization.

The proportion of a bus fleet that can be put into service each day has a direct bearing on the productivity of the system. It is indicative of the effectiveness of bus maintenance, spares and procurement, and stock keeping as well as staff recruitment and management. Fleet utilization, expressed as a percentage of total fleet, is usually calculated by dividing total buses running during the morning or evening peak period by the total fleet size (excluding any buses that are beyond repair). With adequate maintenance and staff management, it should be possible to achieve fleet utilization of between 80-90 percent (Imran, 2006). Fleet utilization may fall well short of this range because of a lack of maintenance facilities or skills, problems over the supply of spare parts, tires, or fuel, or where there are labour or union problems. Such problems can be seen in the public corporations in Accra, (fleet utilization 24 percent) and Calcutta (64 percent) (Muriungi, 2013). On the other hand, very high utilization can be achieved, for example, 95 percent by private operators in Seoul, when repairs and maintenance are carried out by adequately equipped, skilled mechanics working on buses overnight or during off-peak periods (Muriungi, 2013).

2.3.8 Vehicle - kilometres.

A further indication of the productivity of a bus fleet is the total distance travelled by buses in service, i.e., vehicle-kilometres. This is usually expressed in terms of average kilometres per operating bus per day (Bhan, (2015). (Vehicle-hours of operation provide another measure, but details of operating hours for each bus usually are not readily available.) Vehicle-distance can be measured and verified from a number of sources, such as tachometer readings, route distances and trips, and fuel consumption (Nyiendo, 2014). For a reasonably run bus service, the average kilometres per bus per day should be in the region of 210-to-260 (Tiwari, 2002). The results, however, will be greatly influenced by traffic and road conditions, hours of operation, breakdowns, the number of stops, and the turnaround time. Examples that fall well outside this range are provided by the public corporation buses in Calcutta, at 120 kilometres per bus per day, and the private bus services in Seoul at 340 (Najman, 2016). In Calcutta, both traffic and road conditions along the corporations' bus

routes are poor and staff incentives are inadequate. In Seoul, in addition to comparatively good traffic and road conditions, productivity is enhanced by highly motivated operators (Bhan, 2015).

2.3.9 Breakdowns in Service.

An indication of maintenance and driving standards is the proportion of buses that break down in service and require either assistance from a mobile repair unit or attention at the depot. A reasonably well-maintained fleet would expect to have breakdowns at a rate of not more than 8-to-10 percent of buses in operation each day (Tiwari, 2002). In addition to poor quality of maintenance and driving skills, traffic congestion, bad road conditions, and tropical climatic conditions are particularly inclined to give rise to breakdowns and need to be taken into account when assessing this measure of performance.

2.3.10 Cost of Bus Services.

The costs of bus services are mainly dependent on local labour and fuel costs, but are greatly influenced by the efficiency of operation and management and by traffic and road conditions. The total cost of bus services (operating costs, depreciation, and interest) in mixed traffic and bus-only lanes should be in the region of USc2 - 5 per passenger-kilometre, and in segregated bus ways, involving appreciable infrastructure costs, USC5 - 8 per passenger-kilometre (Imran, 2006).

2.3.11 Operating Ratio.

In order to be self -sufficient and avoid subsidies, revenue should cover costs and show a small surplus to stimulate investment and growth. To meet these requirements, the operating ratio (total revenue divided by operating costs, including depreciation) should be in the region of l: l-to-1.08:1 (Litman, 2004).

2.4 The Need for a paradigm shift in public transport financing.

In order to guarantee the basic profit rate of operators, as well as keep the ticket prices at low levels, subsidies are usually needed for the sustainable development of a public transport system. However, research has shown that increasing public transport subsidy requirements have created a financial burden for governments. Financial constraints will affect bus frequency and bus size, which will affect viability of the business (Alam and Warda, 2017). Governments at all levels have to face the problem of maintaining service quality and keeping the transit fares at low levels based on limited financial resources. Encouragingly, introducing private capital in government transport companies provides a potential solution to the performance and viability of these organisations (Imran, 2006). Private sector can contribute in terms of financial support, technical skills, innovation, technology advances, specialist knowledge, and efficiency. This is done through Public-Private Partnership (PPP). The definition given by the World Bank group is 'a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance'.

Osei-Kyei and Chan (2018) reviewed the studies of capital success factors (CSFs) for implementing PPP from 27 top-tier academic journals from 1990–2013. The most identified success factors are risk allocation and sharing, strong private consortium, political support, community/public support, and transparent procurement. A sound financial system and regulations of private sectors should improve efficiency of resource utilisation, since private sectors can gain more profits and enhance competitive power if they make use of passenger resources more efficiently, (Osei-Kyei, 2018). More profits are what the private sectors want. This investment model considers passenger value, generates more profits and should be more conducive to private capital investment in public transport (Chan, 2018).

2.5 Subcontracting

In a number of developing countries, city authorities have successfully dealt with very unprofitable routes by employing private operators on contract. The public bus corporation responsible for bus services in Istanbul has found most routes to be unprofitable (Com- and Programme, 2013). To overcome substantial losses and because of its inability to meet growing demand, the corporation employs private operators on contract to meet a large part of its commitments. Not only do the private operators make profit on these "unprofitable" routes at the same fares that the corporation charges, but they also pay 10 percent of their revenue to the municipality. Similarly, in Bangkok most of the public corporation's routes are unprofitable. Bangkok Mass Transit Authority (BMTA), with losses of $40 million in 1995, turned increasingly to the private sector to run routes on a contract basis (Rakesh *et al.*, 2019). Under the contract, the private operators, using their own bus or buses leased from BMTA, supply services at specified performance levels and fares. Even at the low standard fares that apply to all services in Bangkok, they are able to make a profit. In addition, BMTA receives over $12 million per annum in payments from contracted private operators.

2.5.1 Subcontracting in Bangkok

Thailand's Bangkok is a booming metropolis with nearly11 million people. Although the city is reasonably well served by major radial highways, it lacks suitable secondary roads and access roads, precluding efficient use of the road system as a whole (Rakesh *et al.*, 2019). The shortage of these roads forces local traffic to use the main roads and results in traffic congestion, needless detours, resulting in high vehicle operating costs. Over two-thirds of motorized passenger trips in Bangkok are made by bus or minibus (Mukherjee, Toshniwal and Mulukutla, 2017). The major supplier by far is the Bangkok Mass Transit Authority (BMTA), which has a fleet of 7,960 large single-decker buses, one of the world's largest. According to (Bhardwaj *et al.*, 2018), BMTA is the result of its post 1987 decision to consolidate bus services, which then consisted of 30 private and two state-run bus companies. There are some 5,000 minibuses working in Bangkok, 60 percent of which operate on side roads, while the rest compete directly with BMTA. Many illegal minibuses,

believed to number around 15 000, are in operation. Taxis number about 17,000 and are unmetered. There are more than 8,000 “sam1ors” or “tuktuks” (small three-wheeler passenger vehicles), which are very popular and permitted to operate anywhere, and 4,000 “silors’ (small four wheelers) which operate only on side streets. With the creation of BMTA, the government hoped to rationalise routes, schedules, and fares, develop modern management practices, provide better service; and reduce congestion through the use of bus lanes. Some improvements were made, but BMTA was in serious financial difficulties after it lost the equivalent of $58.4 million in 2007 and $43.5 million in 2008 (Mukherjee, Toshniwal and Mulukutla, 2017).The losses have eroded the company’s capital base and without funds to renew the fleet, buses are aging and deteriorating (Rakesh *et al.*, 2019). The company has not been able to buy new buses. In 2008, 81 percent of the fleet was operational.

A key problem that faced BMTA was its inability, for political reasons, to raise fares. Previous efforts had sparked such unrest that fare hikes were rescinded, despite the fact that fares in Bangkok were among the world’s lowest ($0.07 flat fare charged by BMTA and minibuses) (Bhardwaj *et al.*, 2018). It has been estimated that BMTA would have to add 25 percent to current fares in order to break even. That imbalance between revenues and operating costs drained the company’s resources to the point that BMTA could not save the minimum required to renew its rolling stock. Also hindering the company’s financial performance was its size. Rather than achieving economies of scale, costs rose substantially due to the difficulties of managing such a large and complex organisation with excessive wage bills, absenteeism, and labour policy constraints, fleet deterioration, maintenance issues etc.

One solution that showed some promise was the decision by BMTA to make increasing use of private contractors. Some 950 buses are operated either under ‘joint ventures’ or are fully owned and operated by the private sector under BMTA control. BMTA received an average of $23,000 per bus from private operators in 2008. The number of private minibuses licensed to operate in Bangkok has also been increased. This venture has seen BMTA returning to profitability, efficiency and improved performance, despite the fact that they are required to keep to the same low BMTA fare structure. Increased private sector operations could help fill

the gap that was bound to occur as BMTA itself became increasingly unable to meet growing demand.

2.5.2 Subcontracting in Jamaica

In Kingston, Jamaica, after the Jamaica Omnibus Service was taken over by the government, productivity dropped and costs rose to the extent that by 1983 the service was costing the government over $1 million every month in deficit financing. All routes were unprofitable. At this point the government leased the assets of the service to the private sector, which once again turned "unprofitable" routes into "profitable" ones and produced a small amount of revenue for the government.

2.6 Electronic Ticketing

The common problem that all operators faced with the traditional ticketing system was loss of revenue due to money passing through a lot of hands namely from conductor to bus drivers, to the person collecting it among others (Sheikh *et al.*, 2018). Sector players and operators say that up to 35 per cent was being lost in the hands of conductors, drivers and accountants under the old fare payment system (Mut-Puigserver *et al.*, 2012).With the Tap and Go system, the bus operators have now recovered such bus revenue and it has also helped to reduce the cost of operations. It also helped eliminate the challenges of fake notes and loss of revenues as conductors, drivers and accountants would connive and swindle some of the day's earnings (Arnone *et al.*, 2016).

Silverster (2008) in his research 'The Evolution of e-payments in Public Transport' depicted that Singapore, Netherlands, France and Sweden stand to be the best countries in which cashless mode of payment has been very successful respectively. The introduction of contactless smartcards (CSC) for fare payments in April 2002 was a major public-transport innovative initiative for Singapore and the number of cards in circulation by 2017 had grown

exponentially to about 18 million. The use of CSC in fare collection has not only proven cost effective, but has also increased reliability, revenue security and convenience for both operators and consumers. For example, the life-cycle cost, including capital, operation, and maintenance, has been reduced to less than 5% by extensive use of e-payments and by removing all ticket capturing mechanisms of mechanical gates, and the resultant 7% saving for stored-value cards has been passed on to commuters.

Misango, Njeru and Kithae (2015), are of the idea that the use of cashless payment systems if adopted would ensure efficient transport, enhance service delivery and hence increase profits for various stakeholders and entrepreneurs who have ventured into this business. By taking physical money out of the hands of bus operators and passengers, price gouging, fare evasion, fraud, pilfering and police corruption vanish as investors and governments can more securely rely on consistent, fully accounted for revenue (Pearson and Ranta, 2016). Gachanja (2015), noted that developed countries such as London, Italy and Rome have put in place state of the art technology, modern methods and process in the transport sector to enable effective and efficient services for passengers through the use of machines and smart cards. Marsden and Stead (2011), however indicate that for modern techniques to be accessible and beneficial for all, it should not be cumbersome to use but understood by all. Dekkers and Rietveld (2007) in their study on electronic ticketing in public transport point out that most cities such as London that uses the SquidCard.com mobile ticketing and Paris have employed electronic ticketing and done away with paper ticketing for revenue collection maximization and for ease of travelling and faster services.

According to Mezghani (2008), despite the phenomenal growth of smartcards for revenue collection, most systems are proprietary and lack adherence to standards. In Singapore, these types of problems are compounded by separate contact and contactless stores-value card systems. Consequently, lack of competition keeps transaction costs high. Also, with a dedicated payment system, transport providers bear the high cost of installing and supporting the value-added infrastructure (Dekker, 2007).

2.6.1 Electronic Ticketing in Kenya

African countries have also tried to implement the use of cashless payment systems but some registered little success due to lack of an effective follow up mechanisms (Bhan, 2015). The cashless payment system in Kenya has been in place since early 80's. The transport sector under the government company then, Kenya Bus Service issued ticket paper tokens to passengers that were generated by use of an electronic device strip machine as indicated by Wangalwa (2015) and this improved access to public transport. The system was then adopted by Double M Bus Service and City Hoppa Bus Companies among others, who used a magnetic ticketing system to generate receipts in 1990 onwards, according to Nyiendo (2014). Samuel and Emaculate (2014), in their research on 'cashless payments in Kenya' resolved that the quest for *Matatu* e-Ticketing system in Kenya was going to be viable and a workable project if implemented in phases.

The promise of eliminating corruption, theft and inefficiency by going cash-free seemed to be Kenya's perfect solution to its chaotic matatu bus system. The matatus are owned by SACCOs, or Savings and Credit Cooperative Organizations, but they are operated by private individuals who must pay SACCOs a fixed daily rate. Matatu owners complained that operators were stealing revenue, and corrupt police officers were pulling aside matatu operators for the slightest of infractions, real or imagined and demanding bribes (Dekker, 2007). To fix these problems, Kenyan legislators in 2014 mandated that all matatus in Nairobi become cashless. Equity Bank partnered with Google to introduce BebaPay, a cashless payment card for transit services. The Kenyan government, solution vendors, and matatu owners believed the new system would increase revenue flow and maximize efficiency (Giriffit, 2018). Over a million Kenyans purchased transit cards, but while many saw it as a panacea to matatus' ills, customers too ran into issues. The system had in fact become less interoperable for passengers, as several competing transit cards from brands like Safaricom M-Pesa and TaptoPay were introduced to different bus lines. Until they fixed the issue a year later, passengers had to wait for certain buses that would accept their particular transit card. With all matatu operators abandoning the new system soon enough, the cashless matatu experiment crashed and burned. But Kenya did not completely fail. The more

formalised rail system has fully gone cashless, for example. The transition was far easier when done by a central state corporation (Bhatt, 2017).

2.6.2 Electronic Ticketing in Rwanda

In Rwanda, Kigalli, the Tap and Go cashless bus fare payment system is operated by AC Group. In developing markets, the most successful transitions to cash free transportation systems have been home-grown private-public partnerships, and Rwanda serves as the best example of that. Kigali's transportation system was beset with many of the same problems as in Kenya with lost revenue of up to 40 percent due to fraud, fare evasion, and pilferage (World Bank Group, 2014). The facility has already enabled bus companies to cut costs, improve revenue collection and service delivery, bus operators and AC Group. The system aimed at increasing customer base by 60 per cent in 2018 through upcoming projects. By end of 2018, there was revenue growth of 42% which the AC group officials attributed to this innovation (Bhatt, 2017). It has also helped the public transport sector to become more efficient and become more liquid and more self-financing and sustaining. But Rwanda took a much different approach in designing a cash-free transaction system by embarking on a private-public partnership instead of the Kenyan government's clumsy efforts to force private matatu operators to use separate private companies to process their transactions.

The Rwandan government awarded AC Group, a Rwandan tech start-up, with the contract to design a cashless transit payment system. Consulting with the government, commuters, as well as bus operators allowed AC Group to tailor the system to all constituents. The Tap & Go system managed to increase revenue by over 30 percent and speed up daily commutes. The Rwandan News Times of January 09, 2018 reported that the number of commuters using Tap and Go cards has grown significantly from 300,000 in 2016 to 2 million subscribers as of the end of 2017. There are now over 2 million Tap & Go users in Rwanda. In Cameroon where AC Group has expanded their operations there are about 1 million subscribers to the tap and go cashless system.

2.6.3 Electronic Ticketing in Nigeria

In Nigeria, after the Lagos Connect card was first launched in November 2017, the Nigerian government introduced interoperable payment cards in its BRT system to combat widespread fraud. While Myanmar's Yangon Bus Public Company reports fare losses of about 15,000 Kiryat per bus per day, the company originally selected to implement a cashless payment system, Excel KC Myanmar Co. Ltd, had its tender revoked for not following the stipulations of the agreement, forcing the country to go back to the drawing board with a new tender winner. But the country continues to aim to go fully cashless in transportation in 2022, (Filani, and Abumere, 1993).

2.7 Subsidies

In most countries, public transport subsidies only emerged during the second half of the 20th century when ownership and use of private cars grew rapidly and the cost of public transport rose as a result of relative increase of labour costs (Button, 2012). Consequently, governments decided to cover the deficits in public transportation by some kind of subsidy scheme.

First, subsidies may be necessitated to meet the social function of public transport. Vulnerable groups like low income households, persons without a driver's license, elderly and persons with disabilities, need public transport to avoid problems of social exclusion. Second, public transport subsidies are perceived to be second-best instrument to deal with urban transport challenges resulting from car use when the possibilities of directly addressing these problems are restricted. A third view for subsidizing public transport is the issue of economies of scale needed to keep marginal costs below average costs (Dekker, 2007). Hence, marginal cost pricing –being welfare optimising, would lead to deficits to be covered by subsidies. A fourth argument based on the belief that public transport has some positive externalities for instance an upsurge in passenger volumes leads to a supply response of increased frequencies and this leads to reduction of scheduling costs of both new and existing

travellers. Most subsidies schemes have been criticised especially because they are non-selective benefiting everybody even those that do not need them (Rietveld, 2005). Further criticism comes from the belief that subsidizing public transport brings about inefficiency, hampering the materialization of all the potential benefits (De Borger and Kerstens, 2000). Tiwari (2002) and Pucher et al. (2004) are of the opinion that efficient bus services and lower government subsidies can be realised through privatisation of public transport services. Tiwari (2002) substantiates this assertion by his findings that large-scale privatisation of buses in New Delhi increased the capacity of transport. Pucher et al. (2004) seconded Tiwari's argument in his report that showed that the privately-run services in Indian cities showed higher productivity, higher revenues per bus km of service and lower operational costs. They concluded that privatization has great potential to improve the transport sector efficiency, but if only accompanied by institutional capacity-building to ensure integrated network of public transport services.

Frequently, economies of scale are put forward as an argument for subsidies by high capacity bus systems in the hope that patronage will lead to financial viability and sustainability. But such patronage often divert patronage from more efficient systems and build pressures to extent the subsidised and less efficient systems. Under these circumstances, the more efficient systems may have to be curtailed, may lose viability, and eventually may also have to be subsidised. Because the anticipated benefits of subsidies usually fall far short of the expectations, more subsidization is needed. One of the main causes of subsidies failing to achieve expected results is that the existence of subsidies removes the incentive to reduce costs or to increase revenue. This in turn usually leads to further inefficiencies, grater deficits and need for further subsidies. In most cases, the goal of subsidies has been only partially achieved. A study by Transport and Road Research Laboratory showed that:

Where subsidies were introduced, patronage increased because of more intensive use of public transport by existing users rather than because of more users;

Subsidies designed to reduce fares and improve service and business performance have had limited success;

In most cases, increased subsidies have resulted in lower productivity and substantial leakages of the subsidy into larger staff wages and unit costs;

In most of the countries studied, once introduced, subsidies have substantially grown.

Despite the heavy burden subsidies place on financial resources of governments, the full implication and long-term concerns are rarely taken into consideration. A review of the public transport sector by the World Bank revealed that subsidies seldom are planned or appraised and that the actual effects in some cases are quite different from those intended.

Most public bus corporations experience large losses and rely heavily on subsidies. Very few are able to cover basic operating costs, and even fewer are able to make a profit as shown in Table 2.2.

Table 2.2: Public corporations' deficits

City	Year	Deficit (US$ million)
Abidjan (SOTRA)	1985	27.0
Accra (OSA)	1984	0.25
Bangkok (BMTA)	1985	42.0
Cairo (CTA)	1985	69.0
Karachi (KTC)	1983	7.3
Madras (PTC)	1986	2.0
Tunis (SNT)	1985	22.0

Source: World Bank studies.

2.8 Responsibilities of government

There are certain features of bus operations that call for government intervention or regulation and cannot be left to market forces or to operators themselves to control. In addition, there are a number of measures that governments can take to improve the chances of bus services being financially viable and capable of meeting the needs of the public.

2.8.1 Safety

There is a need to ensure that bus passengers are carried safely and that danger to other road users is avoided. This can be achieved through a system of driver licensing and testing. Both initial and periodic testing needs to be undertaken, and drivers should be required to attain standards appropriate to the size and type of vehicles they are to be permitted to drive (SPAD, 2011). Satisfactory licensing systems recognise that drivers of large, high-capacity buses will need higher driving standards and more experience than, for example, minibus drivers. Similarly, vehicles need to be subjected to initial and periodic testing to ensure that they are roadworthy and can safely carry the permitted number of passengers, with an adequate safety margin (SPAD, 2011).

2.8.2 Environmental Impact.

In providing conditions that lead to financial viability and satisfactory standards, for bus operators, there is likely to be a tendency for large concentrations of buses along major corridors and at terminals (Pucher, Korattyswaroopam, and Ittyerah, 2004). If high levels of pollution are to be avoided, then it will be necessary to establish and enforce appropriate exhaust emission standards for buses. The air pollution and noise created by buses also need to be taken into account in the location of terminals and depots.

2.8.3 Traffic Control.

High concentrations of buses, if uncontrolled, are likely to aggravate the congested traffic conditions that exist in most cities, increasing the bus turnaround time. This can be overcome by establishing and enforcing traffic regulations that avoid indiscriminate loading and unloading of bus passengers along busy routes and intersections (Iles, 2005). It is important for the viability of bus services that such restrictions be coupled with the reservation of space for buses to handle passengers both on and off the street.

2.8.4 Cooperatives.

Governments can help by encouraging operators to set up cooperatives or route associations and by ensuring that the legal framework exists for such organisations to be established and to function effectively. They need to have authority to coordinate the activities of operators who wish to be involved, to purchase spares and vehicles, undertake training, and to operate depots and terminals (Kittelson and Associates). Regulations also need to recognise that the cooperatives may represent operators in their dealings with government and city authorities.

2.8.5 The Road Network.

A vital element for successful bus systems is the availability of well-maintained road networks. Poorly paved or maintained roads add very significantly to bus operating costs and journey times (Rietveld, 2005). Hence, they have a direct impact on viability, business performance and standards of service. As a result, it is important that city authorities ensure that bus routes are paved and improved to standards suitable for frequent bus movements. Also, the network needs to be extended to provide access for buses into new and growing development areas. Of considerable importance is that the system of bus routes as a whole, needs to be kept in a good state of repair (Wangalwa, 2015).

2.8.6 Traffic Management.

To assist with the efficient operation of bus services, there is need to avoid congestion and improve the overall flow of traffic by providing effective traffic management and control (Feibel, Charles, and Walters, 2010). This usually involves traffic signs and signals, channelized intersections, facilities for pedestrians, parking and street trading controls, and minor road improvements. Also, in order to make the most effective use of available road space there are clear advantages in introducing some form of demand management.

2.8.7 Priority for Buses.

City authorities can make substantial improvements to both the viability and standards of bus services by providing priority for buses in the form of "bus only" lanes or exclusive rights-of way (World Bank Group, 2014). Buses may also be given priority by special phases at traffic lights and exclusive turning movements at intersections. This has been undertaken in many cities and has resulted in bus services being speeded up considerably. In addition to improving service to the public, these measures have reduced operating cost and, in some cases, have made it possible to reduce fares (World Bank Group, 2014).

2.8.8 Termini and Depots.

While the existence of several different operators in a city may have significant benefits, the provision of a convenient network of routes for their passengers is often inhibited by the lack of suitable locations for termini and interchange facilities (Armstrong-Wright and Thiriez, 2016). City authorities can assist by allocating suitable sites for this purpose and by constructing or coordinating the construction of the necessary facilities. These are sometimes provided on direct repayment or leased to associations of operators (Armstrong-Wright and Thiriez, 2016). Alternatively, individual operators may pay a monthly or daily fee, or pay each time they use the facilities. Depots, together with maintenance and servicing facilities, can be made available in the same way. The collective provision of these services may produce certain economies of scale, provided overhead does not become excessive.

2.8.9 Financing Bus Purchases.

Operators in many countries have difficulties purchasing buses and spares because of import restrictions and a lack of foreign exchange or financing facilities (Tang and Sun, 2012). The government can help by providing suitable banking services designed to make it easier for legitimate' bus operators to obtain loans and foreign exchange for the purchase of buses and spares. The use of special funds disbursed through commercial banks and the relaxation of

import restrictions and exchange regulations in several countries (Mexico, Sri Lanka, and others) has had a marked effect on the availability of buses, reduced fares, improved efficiency and the standard of services (Tang, 2014). Taken together, the infrastructure and facilities provided by governments can have a very significant impact on the quality and viability of bus services. In most cases, considerable savings in operating costs can be achieved and passed on to users in the form of reduced fares and this may reduce the need or the magnitude of subsidies, giving relief to the government.

2.9 Conceptual framework for the study

From the surveyed literature, this study proposes the conceptual framework in the diagram below for innovation to improve business performance. The approach proposes that for innovation to succeed or fail, it depends on other independent and mediating variables for an improved business performance.

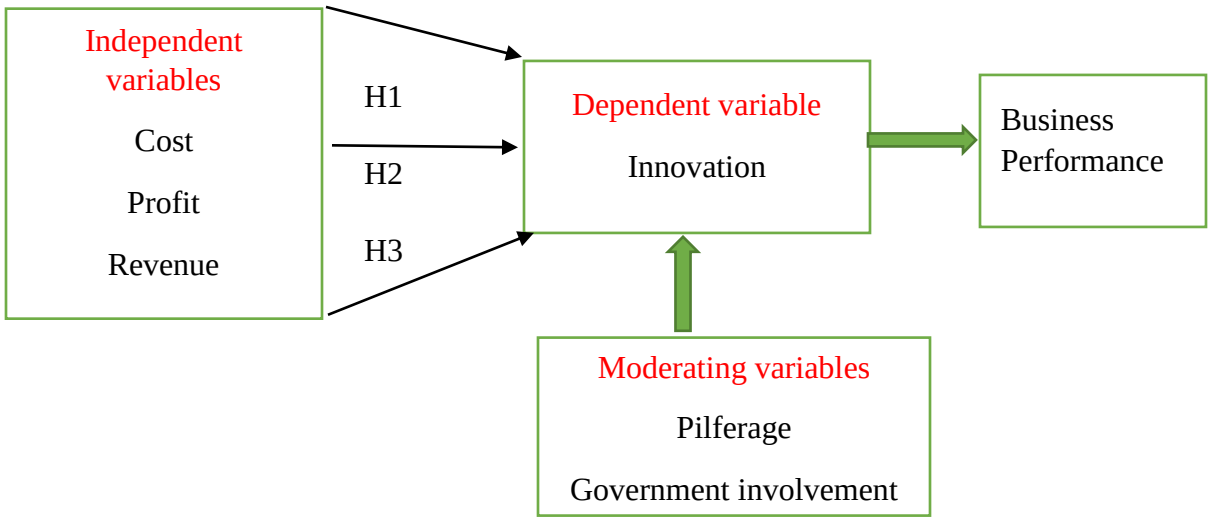


Figure 2.1 Conceptual Framework

2.10 Chapter conclusion

The chapter looked at the definition of the main key phenomena which are innovation, electronic ticketing, subcontracting and performance indicators. Performance indicators were discussed as they affect business operations. Subsidies and the role of government in the transport industry were looked at as they affect business performance. Cases where e-ticketing and subcontracting were implemented have also been discussed and lastly the conceptual framework of the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses how the study was carried out in order to achieve the research objectives. The aim of the study is to assess the impact of innovation on business performance in the transport sector. This chapter includes the research methodology of the dissertation. In more details, in this part the author outlines the research strategy, the research method, the research approach, the methods of data collection, the selection of the sample, the research process, the type of data analysis, the ethical considerations and the research limitations of the project.

3.2 Research Strategy

The research strategy held with respect to this dissertation will be a case study. According to Gillham (2000), a case study is an investigation to answer specific research questions which seek a range of different evidences from the case settings. Yin (2003) defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined". Over the past few years, the case study research strategy has evolved to become a useful tool to examine trends in many scientific disciplines. This research strategy is particularly useful when trying to test theoretical models or hypothesis by applying them in real world scenarios and testing them if they actually work. Essentially a case study is a detailed study of a particular scenario or case rather than a comprehensive statistical survey. It narrows down a wide field of research into one easily researchable topic. It also serves a purpose of giving indications and allow further explanation and hypothesis creation without necessarily completely answering a question. As a result, the explanatory case study aims to

answer ‘how’ or ’why’ questions over occurrence of events. This type of case study focuses on phenomena within the contexts of real-life situations.

A case study was chosen because this research strategy involves an up-close, in-depth, and detailed examination of a subject of study (the case), as well as its related contextual conditions at a particular public transit company. A case study gives more realistic and credible responses compared to purely statistical surveys. This dissertation is an empirical inquiry that investigates the impact of innovation in the public transit sector within its real-life context at ZUPCO and the case study strategy is most ideal. The other reason for this choice of a research strategy is its flexibility. A case study may introduce new and unexpected results during its course and lead to the research taking a new direction as opposed to a pure scientific study that tries to prove or disapprove a hypothesis. In a case study there may be a single or multiple case studies with quantitative evidence. It also relies on various sources of data and benefit from the prior development of theoretical propositions. Case studies can be based on any mix of quantitative and qualitative evidence. Numerous pieces of previous academic research exist regarding the impact of innovation in the public transit, not only for the bus industry, but also in the rail and air modes around the world. As a result, the proposed research took the form of a new research but on an existing research subject. This study does not seek to generalize its findings across to fit the larger public transit sector population or ecosystem.

3.2.1 Case Study Protocol

The case study protocol contains the data collection instrument and incorporates the procedures and general rules that were followed in using the data collection instrument. By employing a case study protocol to guide the study, the integrity, credibility and reliability of this study was increased. The case study protocol incorporated a number of components, namely:

- **Outline of the case study**. The outline of the case study incorporated a literature review, case study objectives and issues; tangible resources creating sources of sustainable competitive advantage.

- **Field procedures**. Field procedures include credentials and access to the case study sites, general sources of information, and procedural reminders. In this study, the A/C.E.O of ZUPCO was the entry point into firm and the gateway to reaching the selected key informants.
- **Case study questions**. Case study questions included the specific research questions the investigator developed for collecting data and the sources of data and information needed for answering each question. In this study, an interview rationale and semi-structured interview schedule guided data collection, preparations and analysis, which were developed from theory.
- **A guide for the study report**, including the outline, format of the narrative, and specifications of any bibliographical information and other documentation provided.

3.3 Research Method

In order to satisfy the objectives of the dissertation, a quantitative research was held. Quantitative research utilizes questionnaires, surveys and experiments to gather information that is then translated into numerical values which can be analysed statistically (Hittleman and Simon, 1997). From the conceptual construe in chapter one and two, financial and operations data can be easily transformed into numerical form then converted and processed mathematically to give useful information. The goal in conducting this research study is to determine the relationship between an independent variable and the dependent or outcome variable within an organisation. Stakes, (2014), notes that one of the major differences between qualitative and quantitative methods is that qualitative research is inductive and quantitative research is deductive. The methodology of a quantitative research maintains the assumption of an empiricist paradigm (Creswell, 2003). The research itself is independent of the researcher. Resultantly data is utilized to measure reality without bias. Quantitative research generates meaning through objectivity in data collection stage. On the other hand, descriptive study establishes only associations between variables while an experimental study establishes causality. The aim in this study is to produce results in the form of statistics that is meaningful and, therefore, useful. The choice of this research method was necessitated by the research's inclinations to deals in numbers, logic, trends and an objective stance. The

researcher's aim is to categorise data elements, count them, and construct statistical models and explain the observations. She knows clearly in advance what she is looking for. All aspects of the study are carefully designed before data is collected. The researcher uses tools, such as questionnaires or equipment to collect numerical data like computers. Data is in the form of numbers and statistics. With objectivity, the research seeks precise measurement and analysis of the impact of innovation on business performance, e.g., uses surveys, questionnaires etc. Quantitative data is more efficient, able to test hypotheses. The researcher tends to remain objectively separated from the subject matter.

The main characteristics of the quantitative research method are the following:

- Structured instruments are usually used to collect data.
- Large samples are drawn from the study population and this form the basis for the results.
- The research study can usually be replicated or repeated, given its high reliability.
- There is a clear definition of the research question to which objective answers are sought.
- Study aspects are designed before data is collected.
- Numerical data and statistics are often arranged in tables, charts, figures, or other non-textual forms.
- Project can be utilised to sum up ideas all the more broadly, anticipate future outcomes or investigate causal relationships.
- Tools like questionnaires and computer software are used to gather numerical data.

3.4 Research Approach

A deductive research approach was adopted for the purpose of this study. The researcher began by collecting data that was relevant to performance indicators at ZUPCO. Once sufficient amounts of data had been gathered, the researcher proceeded to scrutinize and analyse the data. At this stage, the researcher was seized with the need to find the relationships in the data and to develop theories that explain those trends. A deductive

approach to research is characteristically linked with scientific investigation. The researcher explored existing theories from previous studies regarding the phenomenon under study and then tested the hypothesis that emerged from those theories.

3.4.1 Deductive Research

Deductive research approach explores a known theory or phenomenon and tests if that theory is valid in given circumstances. It has been noted that "the deductive approach follows the path of logic most closely. The reasoning starts with a theory and leads to a new hypothesis. This hypothesis is put to the test by confronting it with observations that either lead to a confirmation or a rejection of the hypothesis (Denzin & Lincoln, 2005). Moreover, deductive reasoning can be explained as "reasoning from the general to the particular". In other words, deductive approach involves formulation of hypotheses and their subjection to testing during the research process. The deductive approach will be used in this study as there is need to explain causal relationships between variables.

3.5 Research Paradigm

According to Terre Blanche and Durrheim (1999), the research process has three major dimensions: ontology, epistemology and methodology. Positivist paradigm which falls under ontology and relying heavily on experimentation is going to be used for this research because the tap and go and the subcontracting innovations were adopted on experimental basis. In chapter one of this research, hypotheses were put forward in propositional form about the causal relation between innovation and business performance. The researcher sought to gather empirical evidence, analyse it and formulate a theory that explains the effect of the independent variable on the dependent variable. The approach to analysing data like already

alluded to is deductive, where a hypothesis is proposed, then it is either confirmed or rejected depending on the results of statistical analysis. The purpose is to measure, control, predict, construct laws and ascribe causality (Cohen et al., 2007). If it could be proved that there is a cause and effect relationship between the independent and the dependent variable, then a theory will be formulated for wider applicability which will illustrate the causal relation between variables.

To be able to do this, the researcher has to make sure that it was indeed the two mentioned innovations that positively influenced business performance at ZUPCO. For the theory to be robust, it has to be able to withstand efforts to refute it empirically. Positivist research often generates numerical data. Gall et al. (2003) sum this up cogently when they say: The use of quantification to represent and analyse features of social reality is consistent with positivist epistemology. Because this epistemology assumes that features of social reality have a constancy across time and settings, a particular feature can be isolated and it can be conceptualized as a variable, that is, as an entity that can take on different values. These values can be expressed as numerical scales (Gall, 2003). The quantitative data that this positivist researcher uses to answer research questions and formulate theories can be collected through standardised calculations and large or small-scale surveys using closed ended questionnaires. The numeric data that are generated through these methods are subjected to descriptive or inferential statistical analysis.

3.6 Data collection methods and tools

For the purpose of this research, both primary and secondary data sources were utilised. In-depth unstructured and personal interviews aimed at identifying emotions, feelings, and opinions of participants regarding subcontracting scheme and the tap and go fare payment systems were employed. Personal interviews had the advantage of personal and direct contact between the interviewer (the researcher) and respondents and offered high response rate (Fisher, 2005, Wilson, 2003). Additionally, the flow of the interview is made flexible using unstructured interviews thereby leaving space for generation of conclusions that were not

initially meant to be derived regarding the research subject. However, if an interview is not managed well it may deviate from the pre-specified research aims and objectives (Gill and Johnson, 2002). An interview guide, with semi structured questions was prepared and used as a tool towards the satisfaction of research objectives, but additional questions were made as they came up during the course of the interviews.

A questionnaire with both close and open-ended questions was used to test the rating of various attributes and this helped in reducing the number of related responses in order to obtain more varied responses. The questionnaire was self-administered with the managers, drivers and conductors of ZUPCO. The selected respondents were expected to fill in, giving their views, perceptions regarding the types of innovation under investigation. All items or statements were measured through a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). To maximize the reliability and validity of the questionnaire, questions generated from the interview were pretested on a sample of 3 managers, 10 drivers and 7 conductors at ZUPCO.

The participants were asked to fill out the initial surveys based on operational and financial performance of public transport company. The preliminary review took about fifteen to twenty minutes to finish. By administering the pre-test, the researcher made sure that the objects investigated in the study revealed actual communications and expectations from the participants interviewed. Outcome of the pre-test analysis proved that the respondents viewed some of the items as measured in almost the same manner, which made it necessary for some minor changes in both the questions and the wording of the items.

3.6.1 Document and record review

This is a source of secondary data. Data is mined from existing and reliable documents such as financial statements and other sources of information. Financial and operational reports of the organisation will be reviewed to establish the cause and effect relationship between the

variable being studied. The researcher gained better appreciation of the research area or subject when she got organizational internal documents such as waybills, operational monthly reports, financial reports and analysis schedules for synthesis. It allows calculation of financial and operational ratios. Taking a look into other documents or researches as pointed out in chapter two as a source, provided a glimpse of the subject under study from different angles making it possible to compare and contrast data sets or elements.

3.7 Sample Selection

The technique of purposive sampling was employed to build up the sample for the study. This method belongs to the category of non-probability sampling techniques, whereby members are selected based on what they know, their relationships or expertise as far as the research is concerned (Freedman *et al*., 2007). In this study, sample members who were selected had special relationship with the tap card and the subcontracting scheme, sufficient and relevant work experience in the transport. They were also actively involved in numerous initiatives and partnerships and had a background and understanding of raw data concerning transportation services. Within this context, the participants of this study were executives of ZUPCO management, conductors, accounts department, IT department, risk department, operations department and consultants.

Table 3.1 shows the variables that will be researched in order to assess the impact of innovation on business performance of ZUPCO.

Table 3.1 Research Variables

Sample Goals	Criteria	Measure	Data Collection		Formula	Purpose of measure
			Data element needed	Possible data source/technology		
Increase service while enhancing fiscal stability	Efficiency	Revenue kms per square km	Revenue kilometre	Schedule data	Revenue kilometre/ Service area size	Coverage of revenue service
			Service area size	Census, other secondary sources		
Ensure the long-term viability and stability of the service	Service	Operating ratio	Operating expenses	In-house documents, including financial data, operations logs, schedule data, etc.	Total Operating expenses/ Net Revenue, Multiply by 100	Lesser operating ratio, the better it is for t a lower ratio indicates it is carrying out its operations efficiently.
			Net Revenue	Electronic fare box, Smartcards, In-house documents, including financial data		

		Fare box recovery ratio	Fare revenue	Electronic fare box, Smartcards, Manual counting	Fare revenue/ total operating expenses	Percentage of direct operating costs that are recovered through the fares paid by the riders
			Total operating expenses	In-house documents, including financial data, operations logs, schedule data, etc.		
		Operating expense per capita	Total Operating expenses (Operating budget)	In-house documents, including financial data, operations logs, schedule data, etc.	Operating expense/ Service area population	Resource commitment to transit by the community
			Service area population	Census, other secondary sources		
		Operating expense per passenger km	Total operating expenses	In-house documents, including financial data, operations logs, schedule data, etc.	Operating expense/ Passenger kms	Impact of trip length on performance
			Passenger kms	Survey		
		Operating expense per passenger trip	Total operating expenses	In-house documents, including financial data, operations logs,	Operating expense/	Efficiency of transporting riders, both on

				schedule data, etc.	Passenger trips	how service is delivered and the market demands for the service
			Passenger trips	Electronic fare box, manual counting		
		Operating Expense per revenue hour	Total operating expenses	In-house documents, including financial data, operations logs, schedule data, etc.	Operating expense/ Revenue hours	Efficiency of transporting riders, factoring vehicle speed
			Revenue hours	Schedule data		
		Operating expense per revenue km	Total operating expenses	In-house documents, including financial data, operations logs, schedule data, etc.	Operating expense/ Revenue kms	How efficiently service is delivered
			Revenue kms	Schedule data,		
Increase market share of transit	Service Effectiveness	Passenger trips per capita	Passenger trips	Electronic fare box, manual counting	Transit boardings/ Service area population	Transit utilization within the service area
			Service area population	Census, other secondary sources		
		Passenger trips revenue hour	Passenger trips	Electronic fare box, manual counting	Transit boardings / Revenue hours	Resource consumed in providing service
			Revenue hour	Schedule data		

			Passenger trips	Electronic fare box, manual counting	Transit boardings / Revenue kms	Supply of revenue service provided based on the level of demand
			Revenue km	Schedule data		
		Passenger trips per VOMS	Passenger trips	Electronic fare box, manual counting	Transit boardings / VOMS (Period)	Supply of service provided based on the level of demand during peak hours
			Vehicles operated in maximum service	Schedule data, fleet data		
		Vehicle kms per capita	Vehicle kms	Fleet data, Operation logs, Schedule data, manual counting	Vehicle kms/ Service area population	Supply of service provided based on the demand within the service area
			Service area population	Census, other secondary sources		
Ensure the long-term viability and stability of the service	Vehicle Utilization, Asset Management and State of Good Repair	Missed trips due to operation failures	Missed trips due to operation failures	Schedule data, Manual counting, In-house documents, including fleet data, maintenance logs	Number of missed trips due to operation failures	Reflects maintenance quality, loss in revenue and service shortage due to operation

						failures
		Number of repeat breakdowns per month	Number of repeat breakdowns per month	Manual counting, In-house documents, including fleet data, maintenance logs	Number of repeat breakdowns per month	Reflects maintenance quality
		Revenue kms between failures	Revenue kms	Manual counting, In-house documents, including fleet data, maintenance logs	Revenue kms/ Total road calls	Reflects maintenance quality and asset condition; reflects passenger experience
			Total number of failures	Schedule data		
		Spare ratio	Fleet size	Manual counting, In-house documents, including fleet data	Fleet size – Vehicles operating in maximum service/ fleet size	Reflects service reliability, ensuring adequate service supply
			Vehicles operated in maximum service	Schedule data, fleet data,		

	Operating Efficiency	Operating cost per trip	Operating cost	Schedule data, in-house documents	Operating cost/Total actual trips operated	This indicator measures average cost to run a scheduled trip from origin to destination. Lower value suggests better cost efficiency.
			Total trips operated	Schedule data, in-house documents		
		Operating cost per passenger-km	Operating cost	Schedule data, in-house documents	Operating cost/Total passenger Kms	Measures the cost required to deliver every kilometre a passenger travels. As operating cost is largely fixed (e.g. manpower cost, fuel cost) once the route and schedule are determined, a
			Total passenger kms	Schedule data, in-house documents		

						higher ridership and longer trip distance would lead to higher operational efficiency.
		Passenger trips per effective vehicle km	Total number of passengers carried	Schedule data, in-house documents	Total passengers carried/ eff. Kms	This indicator measures average no. of passenger trips per bus per km. Higher the value, higher is the system efficiency and vice versa.
			Effective vehicle kms	Schedule data, in-house documents		
		Revenue per passenger	Total revenue	Schedule data, in-house documents	Total traffic revenue/Total passengers carried	measures average money paid by each passenger for using the service
			Total passengers carried	Schedule data, in-house documents		

		Passengers per eff. vehicle km	Passengers carried	Schedule data, in-house documents	Total passengers carried/ Total effective Kms	Measures passengers moved per effective km. Higher value suggests better revenue generation
			Total kms travelled	Schedule data, in-house documents		
		Fare box Ratio			Total traffic revenue/ total cost	

3.8 Data Analysis

Data analysis involves turning data gathered into information. Responses from questionnaires were analysed using the Statistical package for Social Sciences (SPSS) version 25. Cronbach's Alpha coefficients were used to measure internal consistency reliabilities of the measuring instrument. Statistical analysis was done and it included regression and correlation analysis, relationships between variables and also measured the quality of the relationships. Simple interrelations helped the researcher determine linking variables and establishing causality. Bar graphs and frequency tables were used in descriptive data analysis and presentation.

3.8.1 Data sources

The main aim of this research study is to show whether the implementation of innovation has contributed significantly on business performance in the transport sector in Zimbabwe with specific interest on ZUPCO. The data were obtained from organizational internal documents such as waybills, operational monthly reports, financial reports and analysis schedules for synthesis, thereby allowing for calculation of financial and operational ratios. The sample data was split into two subsamples; the Before-Innovation and After-Innovation datasets. The principal aim was to evaluate the impact of innovation on business performance of ZUPCO. The graphical method and moving average smoothing approaches were implemented to reveal dynamics in business performance after the introduction of innovations. The independent samples t-test procedure was used to assess whether the cost structure after the innovations is significantly different from the cost structure prior to innovations. The pre and post Innovation data is time series. Both the time series plot and the moving average smoothing technique are time series methods. The pre-innovation period comprised of monthly operational data for January 2018 to February 2019 while the post-innovation period covered the period starting in March 2019 to December 2019. The evaluation process looks at the types of innovation that were implemented at ZUPCO in 2019 which are e-ticketing and subcontracting. The Key Performance Indices (KPIs) considered for the purpose of this study include; cost, revenue and profit.

3.8.2 Moving averages

The classical method of time series decomposition originated in the 1920s and was widely used until the 1950s. It still forms the basis of many time series decomposition methods, so it is important to understand how it works. The first step in a classical decomposition is to use a moving average method to estimate the trend-cycle, so we begin by discussing moving averages.

3.8.3 Moving average smoothing

A moving average of order mm can be written as

$$\hat{T}_t = \frac{1}{m}\sum_{j=-k}^{k} y_{t+j}$$

where $m = 2k + 1$. That is, the estimate of the trend-cycle at time t was obtained by averaging values of the time series within k periods of t. Observations that are nearby in time are also likely to be close in value. Therefore, the average eliminates some of the randomness in the data, leaving a smooth trend-cycle component. We call this an m-**MA**, meaning a moving average of order m.

The t-tests were conducted as follows;

3.8.3.1 Paired Samples t-test Procedure

The Paired Sample T-test is a statistical method used to contrast two population means when two samples are related. In 'before-after' studies, a control group and matched pairs samples are used in a paired sample t-test.

The formula for a paired sample t-test is shown below:

$$t = \frac{\sum d}{\left(\frac{\sqrt{n(d^2 - (\sum d)^2)}}{n-1}\right)}$$

A. Testing the Balance of Trade Before and After Implementation of SADC FTA

The balance of trade was computed from the formula given below;

$$Balance\ of\ Trade = Value\ of\ Exports - Value\ of\ Imports$$

Data analysis was carried out in three stages:

A1: First stage: Examine the underlying trends in the data before and after the implementation of the free trade area in SADC. This preliminary investigation of the data involved calculating averages before and after the implementation of FTA in SADC.

A2: Second stage: calculate standard deviations before and after the implementation of the FTA.

A3: Third stage: analyse performance differences that occurred using paired t-test with a significance level (α) = 0.05/2.

3.8.3.2 Independent Samples t-test procedure

B. Testing the Sales Turnover Before and After Implementation of SADC FTA

Data analysis was carried out in three stages:

B1. First stage: Examine the underlying trends in the data before and after the implementation of the free trade area in SADC. This preliminary investigation of the data involved calculating averages before and after the implementation of FTA in SADC.

B2. Second stage: calculate standard deviations before and after the implementation of the FTA.

B3. Third stage: analyse performance differences that occurred using independent samples t-test with a significance level (α) = 0.05/2

Data analysis and statistical procedures

The t-tests were conducted as follows;

Paired Samples t-test Procedure

A. Testing the Cost Structure Before and After Implementation of innovation

Data analysis was carried out in three stages:

A1: First stage: Examine the underlying trends in the data before and after the implementation of innovation at ZUPCO. This preliminary investigation of the data involved calculating averages before and after the implementation of innovation.

A2: Second stage: calculate standard deviations before and after the implementation of innovation.

A3: Third stage: analyse performance differences that occurred using paired t-test with a significance level (α) = 0.05/2

Independent Samples t-test procedure

B. Testing the Revenue Performance Before and After Implementation of innovation

Data analysis was carried out in three stages:

B1. First stage: Examine the underlying trends in the data before and after the implementation of innovation at ZUPCO. This preliminary investigation of the data involved calculating averages before and after the implementation of innovation.

B2. Second stage: calculate standard deviations before and after the implementation of innovation

B3. Third stage: analyse performance differences that occurred using independent samples t-test with a significance level (α) = 0.05/2

C. Testing the Operating Efficiency (OE) Before and After Implementation of innovation

Data analysis was carried out in three stages:

C1. First stage: Examine the underlying trends in the data before and after the implementation of innovation at ZUPCO. This preliminary investigation of the data involved calculating averages before and after the implementation of innovation.

C2. Second stage: calculate standard deviations before and after the implementation of the innovation

C3. Third stage: analyse performance differences that occurred using independent samples t-test with a significance level (α) = 0.05/2

3.9 Validity and Reliability

According to the positivist approach, research is deemed to be of good quality if it has internal validity, external validity, reliability and objectivity (Guba & Lincoln, 2014). Reliability refers to the extent to which your data collection techniques or analysis procedures will yield consistent findings while validity is concerned with whether the findings are really about what they appear to be about (Saunders, Lewis and Thornhill, 2009). A pilot study was done to achieve the validity of the questionnaire. Face validity was achieved by pretesting the questionnaire with 3 managers, 10 departmental employees and 7 conductors at ZUPCO. Consistence was tested using Cronbach Alpha and a value above 0.60 should be acceptable.

3.10 Ethical Considerations

Ethical issues in research are critical aspects for the success of the research. According to Saunders, Lewis and Thornhill (2009) ethics refers to the appropriateness of your behaviour in relation to the rights of those who become the subject of your work or are affected by it. This means that there is need to ensure that the research is designed in a methodologically sound and morally defensible way to all those who are involved. However, what is morally defensible behaviour is affected by broader social norms of behaviour (Zikmund, 2000). The researcher took the following into consideration:

- Information gathered was for academic purpose only.
- The purpose of the research was explained to all respondents.

- Permission was sought from the Acting Chief Executive Officer by way of a letter from the academic institution.
- Confidentiality of data from respondents was maintained.
- Objectivity of the researcher was maintained to avoid bias.
- Voluntary participation and the right to withdraw partially or completely from the process was observed.
- Respondents participated on the basis of informed consent.
- The use of offensive, discriminatory or other unacceptable language was avoided.

3.11 Limitations of the study

It was not easy to get some of the respondents to complete the questionnaire as some had to be out on their daily operational duties while others viewed the information as confidential. Some of the questionnaires were not returned. The fact that the researcher works for the company contributed positively in earning trust from the respondents. The research being a case study means that it is limited in terms of scale and context therefore the results cannot be generalised to other organisations as information obtained is organization specific. The research was conducted in an unstable and inflationary environment. The data collected might have been distorted because of currency instability and various foreign exchange regimes that prevailed. Generalising the results of the study to stable economies is thereby made difficulty.

3.12 Conclusion

The chapter focused on issues to do with methodology of the research. Research strategy and approach concepts were discussed as well as some literature review to justify the use of the methodology in the research. Data collection methods and tools were also looked at. Issues of validity and reliability of data collection instruments were considered when selecting the instruments. The main focus was on the application of the methodology in order to get useful data. The next chapter presents and discusses the research findings.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION OF RESULTS

4.0 Introduction

The study sought to assess the impact of innovation on business performance in the transport sector focusing on ZUPCO. The business performance measures considered include revenue performance, operational costs and operating efficiency. The chapter initiated by exploring the influence of e-ticketing system, subcontracting and government interference on business performance. The subsequent sections then examined the impact of innovation on operational costs, revenue performance and operating performance of the transport organisation. The analysis was done using the IBM SPSS Statistics 25 and Microsoft Excel 2013.

4.1 Examining the influence of electronic ticketing system on business performance

Table 4.1: E-ticketing

Electronic ticketing system	**Mean**	**Standard Deviation**
Electronic ticketing system has minimised revenue leakages in form of pilferage	4.55	0.23
Electronic ticketing system has minimized labour costs.	4.87	0.76
Electronic ticketing system has improved operating efficiency of business	4.08	0.65
Overall Statistics	**4.5**	**0.5467**

Source: IBM SPSS Statistic version 25

Findings shown in Table 4.1 reveal that the majority of the respondents strongly agreed that the electronic ticketing system has significantly minimised revenue pilferage**.** This is evidenced by a mean score of 4.55 and a corresponding standard deviation of 0.23. This standard deviation implies that the majority of the respondents held a similar position that the e-ticketing system has significantly reduced revenue leakages in form of pilferage.

A mean score of 4.87 implies that the majority of the respondents strongly agreed that the electronic ticketing system has significantly minimised manpower costs. This is supported by a standard deviation of 0.76 which implies that the majority of the respondents shared the similar view that the electronic ticketing system has minimized labour costs.

The majority of the respondents agreed to the submission that the electronic ticketing system has significantly improved operating efficiency of business (mean score = 4.08 and standard deviation of 0.65). However, the majority of the respondents disagreed that the electronic ticketing system has significantly improved revenue performance of business. This is evidenced by the majority of the respondents who objected the assertion that the e-ticketing system has improved revenue for the business. The major concern of the respondents was on the pricing system and over reliance on government subsidies.

The overall mean score is 4.5 implying that the majority agreed that the electronic ticketing system have significantly impacted on business performance.

4.2 Assessing the influence of subcontracting on business performance

Table 4.2 Subcontracting

Subcontracting	**Mean**	**Standard Deviation**
Subcontracting the company has managed to share operational costs with a third party	4.05	0.6
Subcontracting has impacted positively on service efficiency.	4.56	0.7
Subcontracting is a risk management practice whereby the organisation has transferred operational risk	4.08	0.5
Overall Statistics	**4.23**	**0.6**

Source: IBM SPSS Statistic version 25

Findings shown in Table 4.2 reveal that the majority of the respondents strongly agreed that by subcontracting, the company has managed to share operational costs with a third party**.** This is evidenced by a mean score of 4.05 and a corresponding standard deviation of 0.6. This standard deviation implies that the majority of the respondents held a similar position that by subcontracting, the company has managed to share operational costs with a third party.

A mean score of 4.56 implies that the majority of the respondents strongly agreed that subcontracting has impacted positively on service efficiency. This is supported by a standard deviation of 0.7 which implies that the majority of the respondents shared the similar view that subcontracting has impacted positively on service efficiency.

Subcontracting is a risk management practice whereby the organisation has transferred operational risk (mean score = 4.08 and standard deviation of 0.5).

The overall mean score is 4.23 implies that the majority agreed that the process of subcontracting have significantly impacted on business performance.

4.3 The extent of government involvement and its impact on business performance

Table 4.3 Government Interference

Government Interference	**Mean**	**Standard Deviation**
Interference in the form of subsidies have boosted revenue for the organisation	4.04	0.1100
Government involvement has been beneficial as it rescued the organisation from collapse	3.87	0.6500
Continued government involvement will boost business performance	1.44	0.1120
Overall Statistics	**3.7833333**	**0.2907**

Source: IBM SPSS Statistic version 25

Findings shown in Table 4.3 reveal that the majority of the respondents agreed that government interference in the form of subsidies have boosted revenue for the organisation**.** This is evidenced by a mean score of 4.04 and a corresponding standard deviation of 0.11. This standard deviation implies that the majority of the respondents held a similar position that subsidies have boosted revenue for the organisation.

A mean score of 3.87 implies that the majority of the respondents agreed that government involvement has been beneficial to the organisation as it rescued the organisation. This is supported by a standard deviation of 0.65 which implies that the majority of the respondents shared the similar view that government involvement has rescued the organisation.

The majority of the respondents disagreed that continued government involvement will boost business performance (mean score = 1.44 and standard deviation of 0.112).

The overall mean score is 3.78 implying that the majority agreed that government involvement have significantly impacted on business performance.

4.4 Assessing the impact of innovation on business performance

The main aim of this research study is to show whether the implementation of innovation has contributed significantly on business performance in the transport sector in Zimbabwe with specific interest on ZUPCO. The data were obtained from organizational internal documents such as waybills, operational monthly reports, financial reports and analysis schedules for synthesis, thereby allowing for calculation of financial and operational ratios. The sample data was split into two subsamples; the Before-Innovation and After-Innovation datasets. The principal aim was to evaluate the impact of innovation on business performance of ZUPCO. The graphical method and moving average smoothing approaches were implemented to reveal dynamics in business performance after the introduction of innovations. The independent samples t-test procedure was used to assess whether the cost structure after the innovations is significantly different from the cost structure prior to innovations. The pre and post Innovation data is time series. Both the time series plot and the moving average smoothing technique are time series methods. The pre-innovation period comprised of monthly operational data for January 2018 to February 2019 while the post-innovation period covered the period starting in March 2019 to December 2019. The evaluation process looks at the types of innovation that were implemented at ZUPCO in 2019 which are e-ticketing and subcontracting. The Key Performance Indices (KPIs) considered for the purpose of this study include; cost, revenue and profit.

4.5 Investigating the impact of innovation on operational cost

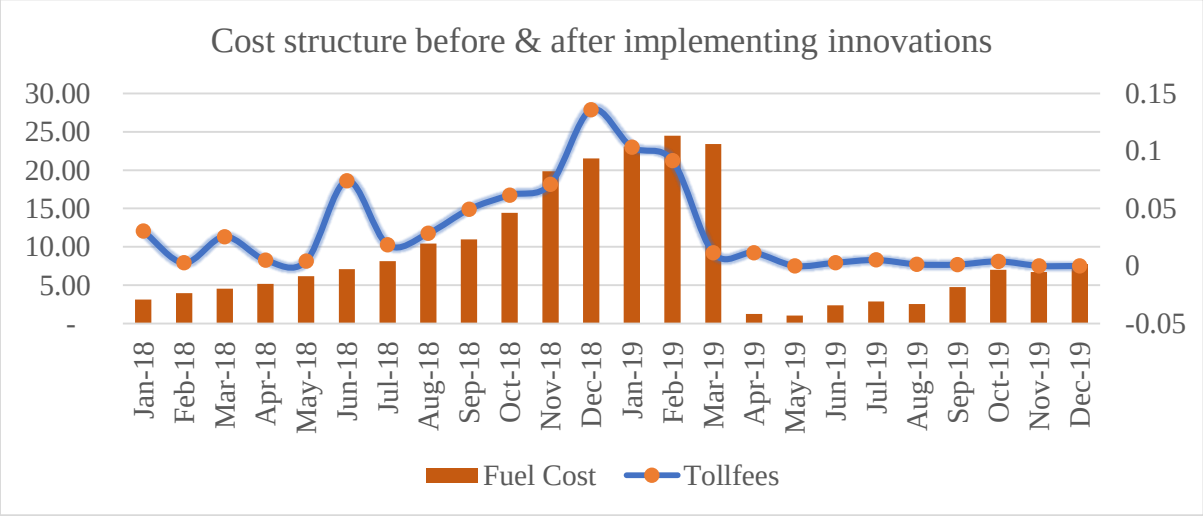
The second objective of this research was to evaluate the effect of innovation on operational costs. To achieve this objective the study explored the changes in the operational cost structure of the function after the implementation of the aforementioned innovations. The exploration was done using the Graphical method and the moving average approach. The

Graphical method was adopted to show whether there was a structural break or adjustment in the data between the two periods. The study initiated the analysis by conducting a preliminary investigation of these data to reveal underlying trends in operational costs for ZUPCO before and after the implementation of innovations. The graphs in figure 4.1 illustrates the underlying trends inherent the value of costs for the period 2018 (prior innovation period) to 2019 (post innovation period).

4.5.1 Graphical Method presentation of cost trends

The multiple time series plots display observations on the y-axis against equally spaced time intervals on the x-axis. They are used to evaluate patterns, knowledge of the general trend and seasonal behaviours in data over time. The time series plots of monthly values of fuel costs and toll fees for ZUPCO are displayed in Figure 4.1 below:

Figure 4.1: The trends in operational costs



Source: Author's compilation from ZUPCO internal records

4.5.1.1Fuel cost trend analysis before the establishment of innovations

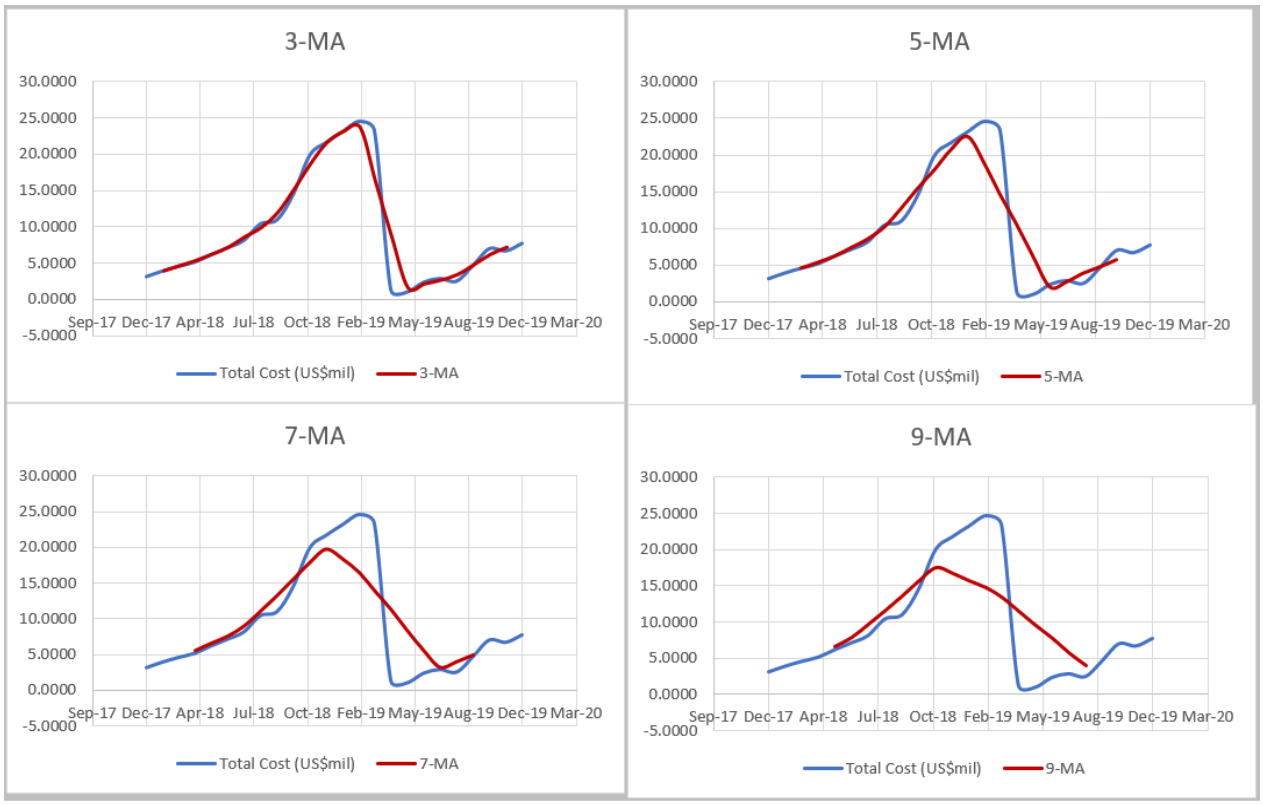
Results shown in Figure 4.1 reveal that for the pre-innovations period, the cost of fuel (bars in red) for ZUPCO was comparatively higher relative to the corresponding values after the implantation of innovations into the sector. The findings show evidence of positive contribution. Figure 4.1 also show a significant decline in Toll fees (blue line graph) after the

introduction of innovations since the function has intensified its urban operations and scaled down on operations outside towns and cities. There has been a slight increase in fuel costs since September 2019 as the organisation has started to focus on longer routes outside cities. It can therefore be clearly deduced that the introduction of innovations has benefitted the organisation tremendously with respect to reduced costs. To further evaluate this effect of innovations the study used the moving average smoothing technique.

4.5.2 Underlying trends in balance of total cost data

Notice that from Figure 4.2 the trend-cycle (in red) is smoother than the actual total cost data (blue line graph) and captures the main movement of the time series without all of the minor fluctuations.

Figure 4.2: Different moving averages applied to the total cost data.



Source: Author's compilation

The order of the moving average determines the smoothness of the trend-cycle estimate. In general, a larger order means a smoother curve. Figure 4.3 shows the effect of changing the

order of the moving average for the total cost data. Simple moving averages such as these are usually of an odd order (e.g., 3, 5, 7, etc.). This is so they are symmetric: in a moving average of order $m = 2k + 1$, the middle observation, and k observations on either side, are averaged. But if m was even, it would no longer be symmetric, thus the study opted for an odd m.

Across all orders of MA, the smoothing technique shows a sharp decrease in operational cost after implementation of innovations. With this in mind it can therefore be inferred that there is sufficient evidence from the sample that the innovations implemented at ZUPCO has resulted with notable decline in operational costs of the transport company.

4.5.3 To evaluate the impact of innovation on operational cost for ZUPCO

The study employed the independent samples t-test procedure to test whether the cost structure for the organisation has changed significantly after the implementation of innovations into the transport sector. The results of the independent samples t-test are shown below;

Table 4.4: Independent Sample Statistics

Group Statistics

	Period	N	Mean	Std. Deviation	Std. Error Mean
Operational Costs Structure	Before implementation of innovations	14	11.693207	7.6681655	2.0494034
	After implementation of innovations	10	5.977610	6.5855120	2.0825217

Source: IBM SPSS Statistics 25

Independent Sample Statistics showed that the mean cost before implementation of innovations was relatively high at US$11.69 million, while the average after implementation was found to be comparatively low at 5.98 million US dollars. The mean after implementation was lower 48.9% lower than before implementing the innovations. It can therefore be loosely inferred that the cost structure for ZUPCO has significantly changed after the implementation of the innovations. To ensure proper inference the study conducted an independent samples t-test to examine whether this 48.9% difference between the two

means is significant. The independent samples t-test procedure was therefore conducted as a formal inferential statistics approach to examine the significance of this structural shift in cost structure.

4.5.4 Independent samples t-test procedure

Formulation of hypothesis

H0: There was no significant change in Cost Structure of ZUPCO after the implementation of innovations.

H1: There was a significant change in Cost Structure of ZUPCO after the implementation of innovations.

The rejection criterion states that if the probability value corresponding to the t-statistic of the test is lower than 0.05 we reject H0 otherwise we fail to reject H0. Since the descriptive statistics of the test together with the graphical approach have revealed that the cost structure improved after the implementation of innovations, the independent samples procedure tests the statistical significance of the difference between two cost structures.

Table 4.5: Independent Samples t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Operational Costs Structure	Equal variances assumed	1.725	0.00203	1.905	22	0.007	5.7156	2.9996501
	Equal variances not assumed			1.956	21.144	0.0064	5.7156	2.9218062

Source: IBM SPSS Statistics 25

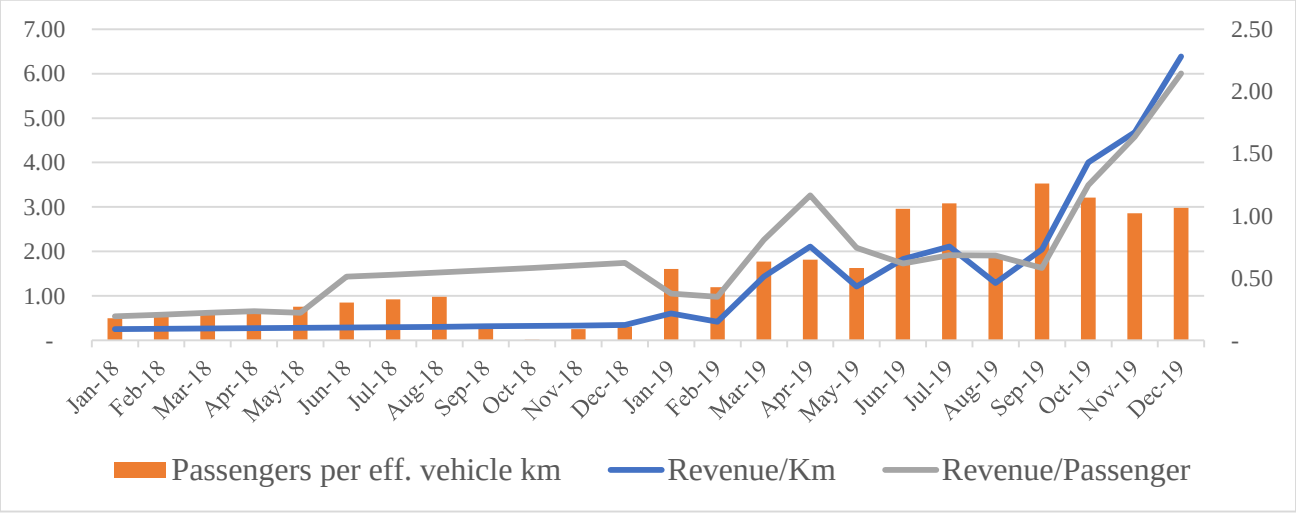
The findings shown in Table 4.5validates the results of the moving average approach. The results indicate that there is a significant difference between cost structure after implementation of innovations and that before implementation. The difference between mean cost before implementation and after implementation is positive (5.7156). The probability value corresponding to the t-statistic for this test 0.007 (less than 0.05). This implies that H0

is rejected at the conventional 5% level of significance and conclude that there is sufficient evidence from the sample that there was a significant decrease in mean operational costs after implementation of innovations. Both the electronic ticketing system and subcontracting initiatives has resulted with a 48.9% decrease in costs.

4.6 Investigating the influence of innovation on revenue performance

The third objective of this research was to evaluate the influence of innovation on revenue performance. To achieve this objective the study explored the dynamics in revenue figures after the implementation of the aforementioned innovations. The exploration was done using the Graphical method and the moving average smoothing approach. The graphs in figure 4.3reveals the underlying trends inherent the revenue levels for the period 2018 (prior innovation period) to 2019 (post innovation period).The Key Performance Indicators for revenue performance include; Revenue/Km; Passengers per eff. vehicle km and Revenue/Passenger.

Figure 4.3: Investigating changes in revenue performance prior/post implementation periods



Source: Author's compilation

Findings illustrated in Figure 4.3 above show that there is a notable rise in revenue performance after the implementation of innovations. It can therefore be deduced that the introduction of the e-ticketing system and the subcontracting strategy has yielded positive

gains with respect to revenue performance. This submission is supported by a clustered chart in Figure 4.3.

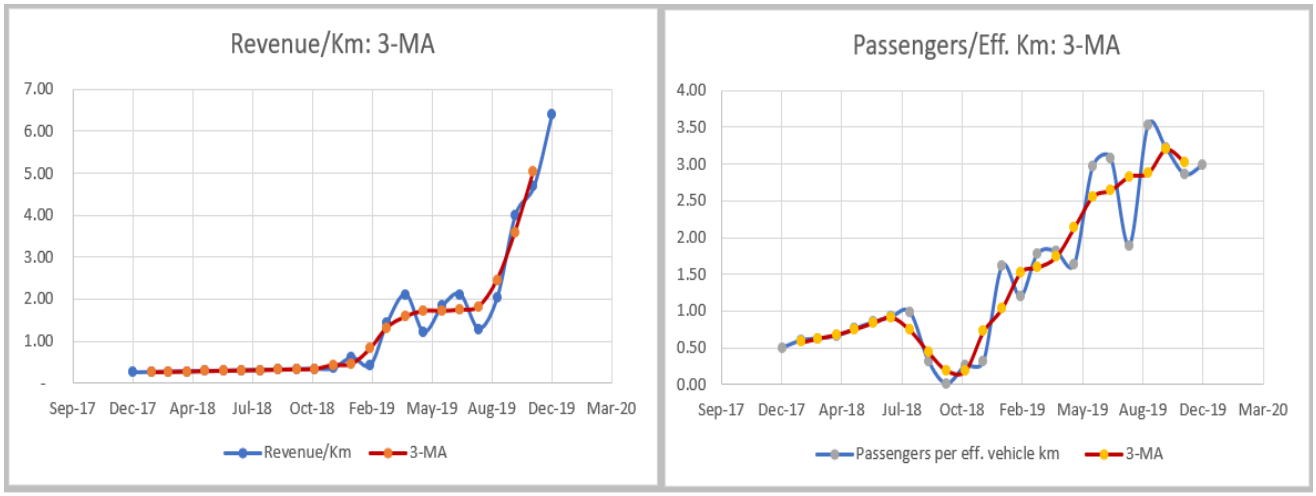
4.6.1 Moving average smoothing

To reveal underlying trends in the revenue performance indicators (Revenue/Km; Passengers per eff. vehicle km and Revenue/Passenger) the study employed the moving average smoothing technique. The results of the 3-MA smoothing are shown in the line plots below.

4.6.1.1 Revenue per km

Findings shown in Figure 4.4 below reveal that for the period prior to the implementation of innovations at ZUPCO the revenue per kilometre (km) did not register any growth. The indicator was constant. However, immediately after the innovations were implemented there was an abrupt increase in revenue per km. The smoothed 3-MA graph show that there was a significant increase in revenue per km and this increase is attributed to the implementation of innovations at ZUPCO.

Figure 4.4: Revenue per km



Source: Author's compilation

4.6.1.2 Passengers/Eff. Km

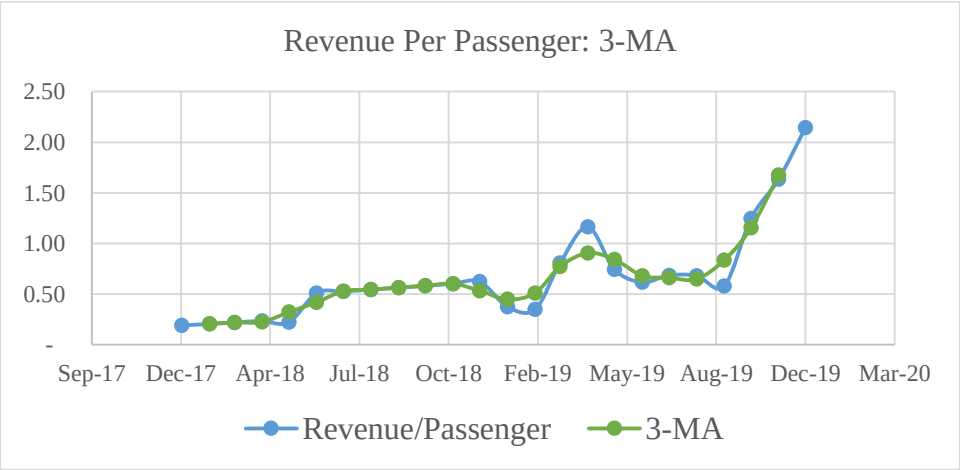
This indicator measures passengers moved per effective km. Higher value suggests better revenue generation (Jadhav, 2016). According to Jadhav (2016) this metric measures revenue

generation. Findings shown in Figure 4.3 reveal a slow decline in passengers per effective mileage for the period prior implementation. This result therefore indicates that before the innovations were put in place the transport utility experienced poor revenue generation. The 3-MA plots show that after the implementation of innovations there was a significant rise in passengers per effective vehicle mileage. This result however reveals that the innovations contributed positively towards revenue generation.

4.6.1.3 Revenue per Passenger

This metric measures the average money paid by each passenger for using the service (Volkova, 2010). The findings shown in Figure 4.5 below reveal that prior implementation period was associated with low revenue per passenger while the post implementation data show a significant increase in revenue per passenger. It can therefore be inferred that there is sufficient evidence from the sample that the implementation of innovations at ZUPCO has significantly improved its revenues with respect to revenue per passenger. The MA smoothing curve show that there was an upward trend in revenue per passenger. The minimum value of the metric is 0.190782462 dollars per passenger and it was realised before the implementation of new innovations. The maximum value on the other hand is 2.143541361 dollars per passenger and it happened during the post implementation period.

Figure 4.5 Revenue per passenger



Source: Author's compilation

From the moving average smoothing plots, it can be deduced that the adoption of new innovations has contributed tremendously towards boosting the revenue performance for the transport company understudy. The metrics used to measure revenue performance included Revenue/Km, which measures revenue generation per unit mileage; Passengers per eff. vehicle km, which measures passengers moved per effective km and Revenue/Passenger which measures the average money paid by each passenger for using the service. All the three metrics showed comparatively higher values after the implementation period. The period before implementation of innovations has resulted with relatively lower values implying that the company experienced poor revenue generation. It can therefore be concluded that there is sufficient evidence from the sample that the implementation of innovations at ZUPCO has improved revenue performance for the transport utility. The independent samples t-test procedure was employed to assess whether there is a statistically significant difference between revenue performance prior implementation period and post implementation period. A statistically significant difference would imply that the innovations impacted positively on firm revenue.

4.6.1.4 To evaluate the impact of innovation on Revenue per km for ZUPCO

The study employed the independent samples t-test procedure to test whether the revenue per km for the organisation has changed significantly after the implementation of innovations into the transport sector. The results of the independent samples t-test are shown below;

Table 4.6: Independent Sample Statistics

Group Statistics

	Grouping	N	Mean	Std. Deviation	Std. Error Mean
Revenue per km	Revenue/Km Before Implementation	12	.2908	.03029	.00874
	Revenue/Km After Implementation	12	2.3433	1.78389	.51497

Source: IBM SPSS Statistics 25

Independent Sample Statistics showed that the mean revenue/km before implementation of innovations was relatively low at 0.29 dollars, while the mean revenue/km after implementation was found to be comparatively higher at 2.34 dollars per km, which is 87.6%

rise. This implies that the implementation of the innovations has resulted with a significant increase in mileage revenue.

4.6.1.5 Independent samples t-test procedure

Formulation of hypothesis

H0: There was no significant change in mileage revenue after the implementation of innovations.

H1: There was a significant change in mileage revenue after the implementation of innovations.

The rejection criterion states that if the probability value corresponding to the t-statistic for the test is lower than 0.05 we reject H0 otherwise we fail to reject H0. Since the descriptive statistics of the test together with the graphical approach have highlighted a significant difference between mileage revenue before and after the implementation of innovations, the independent samples procedure tests the statistical significance of this difference.

Table 4.7: Independent Samples t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Revenue per km	Equal variances assumed	16.9750	0.0000	-3.9850	22.0000	0.0010	-2.0525
	Equal variances not assumed			-3.9850	11.0060	0.0020	-2.0525

Source: IBM SPSS Statistics 25

Findings shown in Table 4.7 above show that the probability value for the t-statistic is 0.001 which is significant at 5% test level. It can therefore be concluded that the implementation of innovations at ZUPCO have significantly improved its mileage revenue (revenue per km).

4.6.1.6 To evaluate the impact of innovations on Passengers per effective km

The study used the independent samples t-test procedure to test the significance of the difference between the means of this metrics before and after implementation periods.

Table 4.8: Independent Samples t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Passengers per effective km	Equal variances assumed	26.9750	0.0000	-2.7985	22.0000	0.0011	-2.7305
	Equal variances not assumed			-2.7985	11.0060	0.0320	-2.7305

Source: IBM SPSS Statistics 25

The metric measures the revenue generation per unit mileage. The findings shown in Table 4.8 approves the findings in the preceding sections. The results indicate that there is a significant difference between passengers/km before implementation of innovations and after the implementation. The difference between the means is positive implying that the mean passengers per km has increased significantly after the implementation of innovations. This therefore implies that the revenue generation capability was enhanced by the innovations.

4.6.1.7 To evaluate the impact of innovations on Revenue/Passenger

The study used the independent samples t-test procedure to test the significance of the difference between the means of this metrics before and after implementation periods.

Table 4.9: Independent Samples t-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Revenue/ Passenger	Equal variances assumed	26.9750	0.0000	-3.7985	22.0000	0.0401	-2.6305
	Equal variances not assumed			-4.7985	11.0060	0.0420	-2.6305

Source: IBM SPSS Statistics 25

The metric measures the revenue generation per passenger. The findings shown in Table 4.9 validates the findings shown in the 3-MA plot. The results indicate that there is a significant difference between revenue/passengers before implementation of innovations and after the implementation. The difference between the means is positive implying that the mean revenue per passenger has increased significantly after the implementation of innovations. This therefore implies that the revenue generation capability was enhanced by the innovations.

It can therefore be safely inferred that the implementation of innovations at ZUPCO was a strategic move since all the three metrics showed higher values. Higher values entail that the innovations enhanced revenue generation capacity for the transport firm.

4.7 To evaluate the impact of innovation on Operating efficiency of ZUPCO

The study employed the independent samples t-test procedure to test whether the operating efficiency for the organisation has improved significantly after the implementation of innovations into the transport sector. The KPIs for operating efficiency were; Operating Ratio; Operating Cost/Trip; Operating cost per passenger-km and the Passenger trips per effective vehicle km. The results of the independent samples t-test are shown below;

Table 4.10: Independent Sample Statistics

	Before Implementation	After Implementation	
Efficiency metrics	**Mean value**	**Mean value**	% Change
Operating Ratio	0.676608381	0.902144507	133%
Operating Cost/Trip	128.7956934	95.4042173	74%
Operating cost per passenger-km	1.571877902	2.095837203	133%
Passenger trips per effective vehicle km	1.782070783	2.376094377	133%

Source: Author's compilation

Findings shown in the table 4.10 show that the operating ratio has increased significantly after the implementation of the innovations. This is evidenced by the mean score of 0.902 which is 33% higher relative to the operating ratio prior implementation. The results reveal that the operating cost per trip has also decreased significantly. This is supported by a 26% decrease in the value of the metrics after implementation of the innovations. However, the operating cost per passenger per km has increased significantly as evidenced by the 33% increase realised after the implementation of innovations. The innovations have a positive impact on passenger trips per effective vehicle. The mean value of the metrics showed a 33% rise in passenger trips. From the findings it can therefore be safely inferred that the implementation of the innovations has significantly improved the Operating efficiency for the transport company.

4.8 Discussion of findings

The study results coincide with the findings of the research by Volkova (2010), (Malau, 2017) and (Tarmidi, 2010) who found that innovation in form of ICTs tend to enhance performance of airlines through reduction in manpower costs, increase in revenue, improved operational and service performance.

4.9 Conclusion

The chapter initiated by exploring the influence of e-ticketing system, subcontracting and government interference on business performance. It was identified that both the electronic ticketing system and the process of subcontracting has significantly boosted business performance. The chapter then went on to assessing whether implementation of innovation has significantly impacted on reducing operational costs, maximising revenue performance, enhancing operating efficiency of business. It was identified that the implementation of innovation has significantly boosted business performance.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The subsequent sections in this chapter presents the achievement of research aim and objectives, conclusions, answer to research questions, contributions, recommendations, generalization of findings and research limitations based on the findings of the study. Section 5.2 highlights the initial aim and objectives of the study as well as its rationale. Section 5.3 focusses on the conclusions of the study, while section 5.4 proffer answers to research questions. Section 5.5 outlines the theoretical, methodological and empirical contributions of the research. Section 5.6 focuses on policy recommendations while section 5.7 focuses on managerial recommendations. Generalisation of findings cover section 5.8. Limitations of the study are covered in section 5.9. The chapter culminates by presenting the areas for further study in section 5.10.

5.2 Achievement of research aim and objectives

The study aimed at analysing the impact of innovation on business performance. From the study findings, it had been identified that innovation significantly boosted business performance with respect to reducing costs, increasing revenue as well as enhancing the firm's operating efficiency.

Objective 1: Examining the influence of electronic ticketing system on business performance

The first objective of this study aimed at examining the influence of e-ticketing on business performance. To achieve this objective the study used mean and standard deviation to ascertain the perceptions of the respondents on the extent to which business performance is being impacted by the introduction of the e-ticketing system. Findings shown in chapter 4

reveal that the majority of the respondents strongly agreed that the electronic ticketing system has significantly minimised revenue pilferage. This is evidenced by a mean score of 4.55 and a corresponding standard deviation of 0.23. This standard deviation implies that the majority of the respondents held a similar position that the e-ticketing system has significantly reduced revenue leakages in form of pilferage.

A mean score of 4.87 implies that the majority of the respondents strongly agreed that the electronic ticketing system has significantly minimised manpower costs. This is supported by a standard deviation of 0.76 which implies that the majority of the respondents shared the similar view that the electronic ticketing system has minimised labour costs. The majority of the respondents agreed to the submission that the electronic ticketing system has significantly improved operating efficiency of business (mean score = 4.08 and standard deviation of 0.65). However, the majority of the respondents disagreed that the electronic ticketing system has significantly improved revenue performance of business. This is evidenced by the majority of the respondents who objected the assertion that the e-ticketing system has improved revenue for the business. The major concern of the respondents was on the pricing system and over reliance on government subsidies. The overall mean score is 3.99 implying that the majority agreed that the electronic ticketing system have significantly impacted on business performance.

Objective 2: Assessing the influence of subcontracting on business performance

The second objective sought to assess the influence of subcontracting on business performance. Findings shown in chapter 4 reveal that the majority of the respondents strongly agreed that by subcontracting, the company has managed to share operational costs with a third party. This is evidenced by a mean score of 4.05 and a corresponding standard deviation of 0.6. This standard deviation implies that the majority of the respondents held a similar position that by subcontracting the company has managed to share operational costs with a third party. A mean score of 4.56 implies that the majority of the respondents strongly agreed that subcontracting has impacted positively on service efficiency. This is supported by a standard deviation of 0.7 which implies that the majority of the respondents shared the similar view that subcontracting has impacted positively on service efficiency. Subcontracting is a risk management practice whereby the organisation has transferred

operational risk (mean score = 4.08 and standard deviation of 0.5). The overall mean score is 3.95 implies that the majority agreed that the process of subcontracting have significantly impacted on business performance.

Objective 3: The extent of government involvement in the operations and its impact on business performance

The third objective sought to examine the extent of government involvement in the operations and its impact on business performance. To attain to the solution the researcher used mean and standard deviation. Findings reveal that the majority of the respondents agreed that government interference in the form of subsidies have boosted revenue for the organisation**.** A mean score of 3.87 implies that the majority of the respondents agreed that government involvement has been beneficial to the organisation as it rescued the organisation. This is supported by a standard deviation of 0.65 which implies that the majority of the respondents shared the similar view that government involvement has rescued the organisation. The majority of the respondents disagreed that continued government involvement will boost business performance (mean score = 1.44 and standard deviation of 0.112). The overall mean score is 3.78 implying that the majority agreed that government involvement have significantly impacted on business performance.

Objective 4: Assessing the impact of innovation on business performance

The main aim of this research study is to show whether the implementation of innovation has contributed significantly on business performance in the transport sector in Zimbabwe with specific interest on ZUPCO. The data were obtained from organizational internal documents such as waybills, operational monthly reports, financial reports and analysis schedules for synthesis, thereby allowing for calculation of financial and operational ratios. The sample data was split into two subsamples; the Before-Innovation and After-Innovation datasets. The principal aim was to evaluate the impact of innovation on business performance of ZUPCO. The graphical method and moving average smoothing approaches were implemented to reveal dynamics in business performance after the introduction of innovations. The independent samples t-test procedure was used to assess whether the cost structure after the innovations is significantly different from the cost structure prior to innovations. The pre and post Innovation data is time series. Both the time series plot and the moving average

smoothing technique are time series methods. The pre-innovation period comprised of monthly operational data for January 2018 to February 2019 while the post-innovation period covered the period starting in March 2019 to December 2019. The evaluation process looks at the types of innovation that were implemented at ZUPCO in 2019 which are e-ticketing and subcontracting. The Key Performance Indices (KPIs) considered for the purpose of this study include; cost, revenue and profit. The findings of the study revealed that after the implementation of innovation the operational cost level declined, revenue performance was improved and operating efficiency was increased relative to the period prior implementation.

5.3 Conclusions

Based on the study findings the following conclusions were made;

5.3.1 Innovation significantly reduced operational costs

Both the graphical approach and the moving average smoothing technique revealed that the implementation of innovation has resulted in decreasing operating costs. The period prior to the implementation of innovation was marred with high operational costs. After the implementation of innovation, the operational costs tumbled significantly.

5.3.2 Innovation significantly improved revenue performance

Both the graphical approach and the moving average smoothing technique revealed that the implementation of innovation has resulted with improved revenue performance for the business. The period prior to the implementation of innovation was marred with poor revenue performance. After the implementation of innovation, the revenue performance improved significantly. The independent samples t-test procedure revealed that the mean values for the metrics used to measure revenue performance were relatively lower before implementation of innovation compared to the period after implementation.

5.3.3 Innovation significantly improved operating efficiency for the business

Both the graphical approach and the moving average smoothing technique revealed that the implementation of innovation has resulted in improved operating efficiency for the business. The period prior to the implementation of innovation was marred with poor operating efficiency. After the implementation of innovation, the operating efficiency improved significantly. The independent samples t-test procedure revealed that the mean values for the metrics used to measure operating efficiency were relatively lower before implementation of innovation compared to the period after implementation.

5.3.4 Continued government involvement is perceived to be detrimental to business performance

The majority of the respondents indicated that though government involvement is welcome, continued government interference is viewed as an impediment to business performance.

5.4 Answer to research questions

Research question 1: What is the effect of electronic ticketing system on business performance?

The findings shown in chapter 4 revealed that the electronic ticketing system significantly contributed towards improving business performance.

Research question 2: What is the effect of subcontracting on business performance?

Findings shown in chapter 4 reveal that the majority of the respondents strongly agreed that by subcontracting, the company has managed to share operational costs with a third party. The majority of the respondents strongly agreed that by subcontracting the organisation has boosted its service efficiency. Subcontracting is a risk management practice whereby the organisation has transferred operational risk. The overall mean score achieved was 3.95 implying that the majority of the respondents agreed that the process of subcontracting have significantly impacted on business performance.

Research question3: What is the extent of government involvement in the operations and its impact on business performance?

The third question prompted the researcher to evaluate the extent of government involvement in the operations and its impact on business performance. To attain to the solution the used the mean and standard deviation of responses. Findings reveal that the majority of the respondents agreed that government interference in the form of subsidies has boosted revenue for the organisation. A mean score of 3.87 implies that the majority of the respondents agreed that government involvement has been beneficial to the organisation as it rescued the organisation. This is supported by a standard deviation of 0.65 which implies that the majority of the respondents shared the similar view that government involvement has rescued the organisation. The majority of the respondents disagreed that continued government involvement will boost business performance (mean score = 1.44 and standard deviation of 0.112). The overall mean score is 3.78 implying that the majority agreed that government involvement have significantly impacted on business performance.

5.5 Contribution

This study sought to add literature to the pool of available knowledge about the influence of innovation on business performance for ZUPCO.

5.5.1 Theoretical contribution

Currently, there is a relatively scanty research on the effect of the electronic ticketing system and subcontracting on performance of firms in the transport sector with special interest on ZUPCO. This study fills this gap by providing first-hand data and empirical analysis on the impact of innovation (e-ticketing and subcontracting). The findings of this study will also provide relevant information on sustainable business growth and development that can be used not only for firms in the transport industry but even for firms in any kind of industry.

5.5.2 Methodological contribution

The methodological contribution of this study is the adoption of moving average smoothing to complement and act as a cushion for results obtained from the independent samples t-test procedure. A research by Malau (2017) solely depended on independent samples t-test

procedure to ascertain the impact of innovation on business performance. The moving averages approach have a strength in that it smoothens the series without losing its general trend.

5.5.3 Empirical contribution

The study results coincide with the findings of the research by Volkova (2010), (Malau, 2017) and (Tarmidi, 2010) who found that innovation in form of ICTs tend to enhance performance of airlines through reduction in manpower costs, increase in revenue, improved operational and service performance.

5.6 Policy recommendations

Based upon study findings the following policy recommendations are given;

5.6.1 Do not hasten privatisation

The majority of the respondents disagreed that government involvement has boosted business performance. Findings shown in Table 4.1 in Chapter 4 reveal that the majority of the respondents agreed that government interference in the form of subsidies has boosted revenue for the organisation**.** This is evidenced by a mean score of 4.04 and a corresponding standard deviation of 0.11. This standard deviation implies that the majority of the respondents held a similar position that subsidies has boosted revenue for the organisation.

A mean score of 3.87 implies that the majority of the respondents agreed that government involvement has been beneficial to the organisation as it rescued the organisation. This is supported by a standard deviation of 0.65 which implies that the majority of the respondents shared the similar view that government involvement has rescued the organisation.

This therefore implies that a premature privatisation of the organisation might have an adverse effect on business performance. It is therefore necessary for government to keep on assisting the organisation so that it maintains its survival.

5.6.2 Minimise government interference

Even though government involvement is perceived to be of great help to the organisation, continued interference was identified to have a negative impact on business performance. To that end, the study recommends that the government must disengage itself from participating in the affairs of the public transport company in the long run.

5.7 Managerial recommendations

From this backdrop it is recommended that the companies should have its Information and Technology teams to aid in ensuring that the electronic ticketing system does not face a still birth due to system disruptions and failure.

5.8 Generalisation of findings

It was identified from the sample that implementation of innovation has resulted with a significant decrease in mean operational costs for the business. Both the electronic ticketing system and subcontracting initiatives has resulted with a 48.9% decrease in costs. Independent Sample Statistics showed that the mean revenue/km before implementation of innovations was relatively low at 0.29 dollars, while the mean revenue/km after implementation was found to be comparatively higher at 2.34 dollars per km, which is 87.6% rise. This implies that the implementation of the innovations has resulted with a significant increase in mileage revenue. The results on the impact of innovation on revenue generation indicate that after the implementation of innovation the revenue generation capability of the organisation was enhanced. Findings also show that the operating ratio has increased significantly after the implementation of the innovations. This is evidenced by the mean score of 0.902 which is 33% higher relative to the operating ratio prior implementation. The results reveal that the operating cost per trip has also decreased significantly. This is supported by a 26% decrease in the value of the metrics after implementation of the innovations. However, the operating cost per passenger per km has increased significantly as

evidenced by the 33% increase realised after the implementation of innovations. The innovations have a positive impact on passenger trips per effective vehicle. The mean value of the metrics showed a 33% rise in passenger trips. From the findings it can therefore be safely inferred that the implementation of the innovations has significantly improved the Operating efficiency for the transport company. The study results coincide with the findings of the research by Volkova (2010), (Malau, 2017) and (Tarmidi, 2010) who found that innovation in form of ICTs tend to enhance performance of airlines through reduction in manpower costs, increase in revenue, improved operational and service performance.

5.9 Research limitations

The limitations of the study are the usage of the data belonging to the years 2018-2019. The prior implementation data may have been impacted by several other factors which have been excluded from the data. For instance, revenue generation and operating efficiency might have been adversely affected by macro-economic instability in the country due to elections which were held mid-2018.

5.10 Areas for further study

For further research areas to do with safety, environmental impact of the growing fleet, accidents and comfort of passengers need to be investigated to fully ascertain the wider scope of business performance.

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APPENDICES

QUESTIONNAIRE FOR CONDUCTORS

University of Zimbabwe

Dissertation Topic

An assessment of the impact of Innovation on Business performance: The case of ZUPCO.

Dear Respondents,

My name is Sandra Ruva Mabaye, a final year student with the Graduate School of Management at the University of Zimbabwe. I kindly request you to participate in this study I am conducting to assess the impact of innovation on business performance. The study is being done in partial fulfilment of the requirements for the Masters in Business Administration degree.

I am kindly asking for your support in completing the questionnaire attached to this letter. The findings will be confidentially treated and will only be used for the purpose of this study. If you require any clarification on this study, do not hesitate to contact the researcher on the following mobile number 0775 176 912. I would be grateful to have the completed questionnaire not later than 18 December 2019.

Your cooperation is greatly appreciated.

Sandra Ruva Mabaye

MBA Graduate Student (University of Zimbabwe)

SECTION A: DEMOGRAPHIC INFORMATION: (Tick the appropriate)

1. Sex

Female	
Male	

Department

Operations	
Finance	
Human resources	
Engineering	
Audit & Risk	
I.T	

Age

Below 30 years	
30- 40 years	
41-50 years	
Above 51 years	

2. Level in the company

Top management	
Middle management	
Lower management	
Supervisor	
General staff	

Period of service

0-5 years	
6-10 years	
11-15 years	
16-20 years	
21 years and above	

3. Current position held **(Please state) ……**
4. Please tick your highest level of qualification.

Ordinary level	
Advanced level	
Diploma	
Degree	
Post Graduate	
Other (s) - specify	

RIDERSHIP MEASURES

1. Has total ridership been growing with growth of fleet? **Yes/ No**
2. Has passenger miles and passenger trips increased? **Yes/No**
3. To what extend have you met the transit demand? ……
4. Average days per week that transit service is available……
5. Ridership and service areas have increased **Yes/ No**
6. What is your average occupancy per bus? …….

INTERNAL COST MEASURES

For the questions to follow, may you rank your opinion on a Likert scale of 1-5 as guided below:

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

E-TICKETING

INTERNAL COST MEASURES	1	2	3	4	5
It's easy to load money into the tap card					
There has been decline in pilferage due to the use of tap machines and tap cards					
Revenue collection has increased as a result of use of tap cards					
Tapping is quick and easy					
Network problems in the use of tap machine are a common occurrence					
The use of tap machines has curbed non-payment of fares					

Recommendations for ZUPCO

……
……
……
……
……

Thank you for participating in this project. Your valuable input and time are greatly appreciated.

QUESTIONNAIRE FOR MANAGEMENT

University of Zimbabwe

Dissertation Topic

An assessment of the impact of Innovation on Business performance: The case of ZUPCO.

Dear Respondents,

My name is Sandra Ruva Mabaye, a final year student with the Graduate School of Management at the University of Zimbabwe. I kindly request you to participate in this study I am conducting to assess the impact of innovation on business performance. The study is being done in partial fulfilment of the requirements for the Masters in Business Administration degree.

I am kindly asking for your support in completing the questionnaire attached to this letter. The findings will be confidentially treated and will only be used for the purpose of this study. If you require any clarification on this study, do not hesitate to contact the researcher on the following mobile number 0775 176 912. I would be grateful to have the completed questionnaire not later than 18 December 2019.

Your cooperation is greatly appreciated.

Sandra Ruva Mabaye

MBA Graduate Student (University of Zimbabwe)

SECTION A: DEMOGRAPHIC INFORMATION: (Tick the appropriate)

5. Sex

Female	
Male	

Age

Below 30 years	
30- 40 years	
41-50 years	
Above 51 years	

Department

Operations	
Finance	
Human resources	
Engineering	
Audit & Risk	
I.T	

6. Level in the company

Top management	
Middle management	
Lower management	
Supervisor	
General staff	

Period of service

0-5 years	
6-10 years	
11-15 years	
16-20 years	
21 years and above	

7. Current position held **(Please state) ……**
8. Please tick your highest level of qualification.

Ordinary level	
Advanced level	
Diploma	
Degree	
Post Graduate	
Other (s) - specify	

SECTION B

VEHICLE DATA

Please fill in your answers in the spaces provided.

1. Since the coming in of private players to work under you, how has your fleet grown? ……
2. What is the composition of your fleet in terms of the types or sizes/capacity of the vehicles that you have? …….
3. On average how any trips do you make do you make as a company per day? ……
4. What fraction of your fleet can you say is in need of maintenance? …….. and what percentage of that is getting the services or maintenance per week or month (as required)? ……
5. Do you have vehicles that have gone beyond their net book value in your fleet, **Yes/ No** and if so, how many are they, …… and what kind of problems do they present?
   …….
6. What part of the day do you carry out your maintenance works? ……...

VEHICLE OPERATING COST

1. How easy or difficulty has it been servicing or carrying out maintenance work on the fleet?
   ……..
2. In terms of market share, how much are you servicing now ……, and what is your projection in the next 5 years? ……

OPERATIONS

1. What fraction of your fleet is available during peak hours? …….
2. What can you say has been the trend in terms of ridership since the introduction of private players to provide public transit services? ……
3. What has been the trend concerning tape card uptake and usage? ……..
4. What fraction of the passengers use the tap card and cash? …….
5. How many incidences of non-payment do you encounter per day? ……..
6. What percentage of your buses have conductors with tap machines? ……
7. What challenges do you encounter using the tap machine and how often? ……
   ……

VEHICLE OPERATION

1. What is your worker bus ratio? ……..
2. On average how many breakdowns do you encounter and how long does it take to get them attended to? ……
3. On average how many people do you carry per day? …….
4. What challenges do you encounter using leased buses? …….

…….

FINANCIAL

1. How have cases of pilferage declined since introduction of the tap card? ……..
2. What revenue percentage increase can be attributed to tap card usage? ……

3. What percentage of your debt have you serviced to date? ……
4. What has been the trend of your operating ratio on monthly intervals? …… ……..
5. Has there been a change in the way debt is serviced since subcontracting and e-ticketing introduction? ……..
6. What are appropriate funding levels? ……
7. What is the return on investment for the project? …….
8. How has the revenue grown since the program started running? ……..

RIDERSHIP MEASURES

7. Has total ridership been growing with growth of fleet? **Yes/ No**
8. Has passenger miles and passenger trips increased? **Yes/No**
9. To what extend have you met the transit demand? ……
10. Average days per week that transit service is available……
11. Ridership and service areas have increased **Yes/ No**
12. What is your average occupancy per bus? …….

INTERNAL COST MEASURES

For the questions to follow, may you rank your opinion on a Likert scale of 1-5 as guided below:

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

INTERNAL COST MEASURES	1	2	3	4	5
Passenger per vehicle mile cost have declined					
Passenger per vehicle hour have declined					
Total operating cost per passenger have declined					
Total expense per vehicle revenue mile have declined					
Fuel economy has improved					
The company has a vehicle vetting system to decline use of old buses					
The company has an age limit to its fleet					
Unit operating cost reduced with the growth of the fleet					
Cases of pilferage have declined					
Worker bus ratio has declined					
Private Public Partnership is boosting the performance of the company					
The average age of the fleet is directly related to operational costs					
Is the program(sub-contracting) achieving its intended goals?					

E-TICKETING

INTERNAL COST MEASURES	1	2	3	4	5
It's easy to load money into the tap card					
There has been decline in pilferage due to the use of tap machines and tap cards					
Revenue collection has increased as a result of use of tap cards					
Tapping is quick and easy					
Network problems in the use of tap machine are a common occurrence					
The use of tap machines has curbed non-payment of fares					

ASSET MANAGEMENT MEASURE

1. What is the average age of your fleet? ……..
2. What is the percentage of vehicle's useful life remaining? ……
3. What is your number of mechanical failures per month? ……
4. What is the percentage of vehicles operated in maximum service? ……
5. What is the distance between vehicle failures? ……
6. Scheduled maintenance is carried out for all vehicles that are due. **Yes/ No**
7. Capacity utilization of fleet is 90% plus. **Yes/ No**

Recommendations for ZUPCO

……
……
……
……
……

Thank you for participating in this project. Your valuable input and time are greatly appreciated.

QUESTIONNAIRE COVER LETTER

GRADUATE SCHOOL OF MANAGEMENT
UNIVERSITY OF ZIMBABWE

TREP Building
Mt Pleasant
Harare, Zimbabwe

Email: info.uzgsm@gmail.com
Tel: 263-0242- 333521/2

4th March 20202

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: ACADEMIC RESEARCH LETTER FOR MS SANDRA MABAYE (R171228)

This letter serves to confirm that Ms Mabaye is a bona fide Master of Business Administration (MBA) student at the Graduate School of Management (GSM), University of Zimbabwe (UZ). She is carrying out a research in partial fulfillment of the requirements of the MBA degree programme.

We kindly request you to provide her with the information she needs to complete her research. Please note that only aggregated data will be used in the final analysis. Please also note that the Graduate School of Management upholds high levels of confidentiality and ethical standards in conducting research, and therefore, the information that you provide will be used for academic purposes only and will not be disclosed to third parties.

Yours faithfully.

GRADUATE SCHOOL OF MANAGEMENT
UNIVERSITY OF ZIMBABWE

DR W. P. MKUMBUZI
DIRECTOR, GRADUATE SCHOOL OF MANAGEMENT
/fg

ZIMBABWE UNITED PASSENGER COMPANY LIMITED
2020 -03- 04
Director, Finance and Administration
109 Belvedere Road, Harare
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Approved
4/3/20