

**CASHLESS PAYMENT SYSTEMS AND OPERATIONAL EFFICIENCY OF
PUBLIC TRANSPORT IN NAIROBI.**

BY

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**A Research Project report submitted to the School of Business, University of Nairobi,
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**A Research Project report submitted in Partial Fulfilment of the Requirements for
the Award of the Degree in Masters of Business Administration,**

School of Business, University of Nairobi,

DECLARATION

This research project report is my original work and has not been submitted for an award of a degree in any other University.

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SUPERVISOR'S APPROVAL

This research project report has been submitted for examination with my approval as the University Supervisor:

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Supervisor: Ms Zipporah Kiruthu

DEDICATION

I dedicate this project report to God almighty who has seen me through this far. I also dedicate this project to my beloved mother Hildah Ephraim who has been my pillar of strength and who has toiled in every way and encouraged me every step of the way to see me succeed. To my dearest son Jayden Baraka who has been affected by the strains of this quest. Thank you. God bless you abundantly.

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ABBREVIATIONS AND ACRONYMS

ATM	Automatic Teller Machines
PIN	Personal Identification Number
PSV	Public Service Vehicles
SACCO	Savings and Credits Cooperatives
SMS	Short Message Services
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
USD	United State Dollars

ABSTRACT

The study explores the cashless payment systems and operational efficiency of public transport in Nairobi. More specifically the study sought to achieve three main objectives. First, was to establish the cashless payments systems commonly used by public transport operators in Nairobi, secondly was to determine the enablers of implementation of cashless payments system Kenyan Matatu industry and thirdly was to determine the benefits of cashless payment systems to passengers and public service vehicles operators in Kenya. To achieve these objectives, the study collected primary data from the 100 sampled Saccos using the administered questionnaires. Stratified simple random sampling was used to select the sample size from the sampling frame of the registered public service vehicles operating within Nairobi City. Collected data was analysed using SPSS software. The study findings were that the cashless payment systems that have existed in Nairobi in the past are beba pay, jinice, abiria card and Mpesa platforms. However, none of these platforms is currently being used by the public services vehicles in Nairobi. Regarding the enablers of implementation of cashless payment system in the public transport industry, the study identifies the key enablers to be stakeholder involvement, card interoperability across different payment platforms customer sensitization and enhancing security against any possible technological threats in the system. Lastly on the benefits of the cashless payment systems the study findings conclude that the use of the cashless payment enhances efficiency by reducing the time taken in collecting fare from passengers and looking for change, minimize the risk of cash theft by the service crew and enables the passengers in planning for their transport expenditures.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The role of an efficient transport system in any economy cannot be overstated given its spill over and the multiplier effects in the entire economy. An efficient transport system is core for lowering the cost of doing business, necessitating mobility of factors of production, movement of goods and services from the point of production to the markets just to mention a few. In urban centers, an efficient transport system is essential in necessitating movement of goods and people. Any inefficiency in urban transport system would as such cost the economy immensely. This study was inspired by the inefficiency of the Kenyan matatu industry especially with issues of conductors failing to give change and unfair hikes of fare at peak times. A number of measures have therefore been proposed and some adopted in attempt of streamlining the urban transport. One of such measures has been the introduction of cashless payment in the urban public transport system (Tupac, 2003)

In the recent past decades, transport system worldwide especially the public transport has undergone unprecedented change mainly leveraging on the novelty of technology. One of such developments leveraging on technology has been the introduction of e- payment platform in the public transport. This is underpinned on the backdrop of increasing efficiency in making payments, shift towards a cashless economy which comes with reduced costs such as cost of holding cash and accountability in terms of the revenue generated. Ajayi and Ojo (2006) asserts that cashless systems provide a secure, convenient and affordable platform for payment; factors that led developed countries to shy away from paper payments to cashless payment (Humphrey, 2004).

Cashless payment technology has the potential to allow two important dimensions to be addressed at the same time: on the demand side, it represents an opportunity for financial inclusion among a population that is underserved by traditional services. On the supply side, it opens up possibilities for service industries to deliver a great diversity of services at low cost to a large clientele of the poorest sections of society and people living in remote areas, (Trim & Tanudjaja, 2013).

The adoption of cashless payment system in any economy is hinged on a number of theories which have been fronted with regard to the same with the popular theories in this field being the Theory of Reasoned Action and Technology Acceptance Model (TAM) and Theory of Planned Behavior. Both of these theories draw on Fishbein and Ajzen's earlier 'theory of reasoned action by Fishbein & Ajzen (1975), Innovation Diffusion Theory by Roger (1982), Social Cognitive Theory by Bandura (1986), and most recently, the Unified Theory of Acceptance and use of Technology (Davis, 1989).

1.1.1 Cashless Payment Systems

Payment systems can generally be categorised into cash payment system and cashless payment systems. Over decades since the invention and adoption of money as medium of exchange, the cash payment system has largely dominated the payment systems in the world. However, of late the non – cash payment has been on the rise owing to the shortcomings of the cash payment system revolving around cost of handling cash, efficiency in payments among others. According to the World Payments Report, global non-cash transactions volumes reached 357.9 billion in 2013, a 7.6 percent annual growth. The fastest rate of growth was 37.7 percent in emerging Asia, led by China. In Latin America, they grew 8.6 percent, a decrease considering the 11 percent of the previous year.

However, Amromin and Chakravorti (2009) asserts that despite the strong growth in the adoption of electronic payments throughout the 1990s and the early part of the twenty-first century, cash usage remains significant in most OECD countries. They find that greater consolidation in the retail industry also contributes to lower transactional demand for cash, suggesting that larger merchants may be better able to absorb the fixed costs of accepting electronic payments.

According to Kiwanuka (2016), cashless fare systems have been introduced in a number of countries globally. For instance, the United Kingdom, United States of America as some of the countries that have adopted cashless fare systems in public transport industry. In addition, cities such as London, Tokyo, Singapore, Paris and Rome have implemented state of the art modern technology and systems in the transport sector especially in the use of e-ticketing and smart card payment systems as indicated by Dekkers and Rietveld (2007). In

Europe for example, most countries have an electronic ticketing system for transport and improved online booking as found out by Blythe (2004). The difficulty however arises when companies and transit systems do not agree on the common form of e-ticketing that can be used among several modes of transport.

Globally, mass transit agencies such as railway and road transport companies in Canada and Scotland; have been using stored value prepaid cards for electronic ticketing since the 1970s as found out by Ezell (2010). By late 80's and in 1990s, this technology began changing from traditional magnetic stripe type of appliance to innovative smart cards. In London for example SquidCard.com, offers a smart card bicycle program for renting purposes. A study conducted by Blythe (2004), indicated that smart card ticketing is available in a number of United Kingdom cities such as Glasgow, Aberdeen, Chester and Edinburg among others. African countries such as Rwanda have tried to implement the use of cashless payment system since 2015 but with little success as found out by Bhan (2015). South Africa introduced the MUVO card for commuters in 2014 but it did not quite pick up according to a report by Lamikanra and Young (2015) in their study on 'payment systems in Africa'. Further, looking at the developing economies, Rwanda and Kenya are on the record for having tried to implement the cashless systems indifferent sectors, with Rwanda implementing the cashless fare systems in the transport sector.

However, despite the perceived benefits likely to accrue to the stakeholders with the implementation of the cashless payment system in the public transport, its implementation is not free from challenges. Some of the challenges include lack of buy –in from the operators mainly the drivers and conductors. This is because, the introduction of cashless payment system ids likely to seal the loopholes of cash theft and misappropriation that they could be benefiting from. Secondly is lack of interoperability of the systems. Lack of synchronization of e – payment platforms with different payment cards (credit card, debit card and other forms of smart cards) is likely to hinder the seamless operation of e – payment system (Lubanga et al, 2017).

1.1.2 Operational Efficiency

Recent studies highlight the multiplier effect of cashless payments on GDP growth of a country. The growth in cashless payments fuel the economy. The literature suggests two prominent direct benefits of cashless payments. One is lowering the costs of storing and processing physical currency and increased tax collection. Bolt et al. (2008), using payment and banking data between Netherlands and Norway (1990–2004), estimate that using cashless payment instruments may save 0.7 billion Euro in bank costs for Norway (0.35% of GDP in 2004) and 2.9 billion Euro for the Netherlands (0.61% of GDP). This means that, on a discounted basis over time, shifting from 90% paper-based instruments and cash to 90% electronic and card instruments could save about 2300 Euro per person in each country. Kruger and Seitz (2014) estimate the cost by simply multiplying a representative hourly wage rate and the total number of ATM withdrawals per year. They indicate a significant saving if an economy graduates to cashless payments.

In the transport sector, similar benefits can be deemed to emanate from cashless payment as those that accrue to other sectors such as banking. To the passengers, cashless payments are more likely to benefit from a quicker, cheaper and more convenient method of paying their bus fare, simply by tapping. To the public service vehicles operators, cashless payment helps in cutting costs of operations and improve service delivery. Further, it helps reduce the inconvenience of carrying change (in terms of coins) for the bus fare on the part of commuters. Further, is its contribution to the sector by making the sector become more efficient as well as improve cleanliness of buses by elimination of paper tickets. One more thing would include the contribution towards curbing the circulation of fake currency majorly the notes.

To the owners of the public service vehicles, use of cashless payments is more likely to curb losses of revenue due to money passing through a lot of hands namely from conductor, to bus drivers, to the person collecting it among others. This enhances efficiency in revenues collections as well as enabling the owners to objectively work on their expected cash flows. Cashless platform would also enable the owner to track on real time basis how much money they have made at any particular point, instead of waiting for unverified info from the employees

1.1.3 Public transport in Kenya

The transport industry is one of the industries that has a significant effect on the economic growth and development of a nation (Weisbrod & Reno, 2009). Public transport provides mobility and access to areas of interest to people. People engage public transport services when they want to get access to areas of employment, retail, education, health and recreational facilities, as well as community facilities (Republic of Kenya, 2009). Since the movement of people and goods must occur on day-to-day basis in a working economy, it is certain that the transport sector holds a very critical role to any given nation or society. This importance of the transport sector attracts numerous investments for people who may want to reap the guaranteed returns (Oira & Makori, 2015).

Public transport includes all modes of transport available to the public, irrespective of ownership (White, 2002). Public transportation comprises all transport systems in which the passengers do not travel by private means. It plays an important role in achieving sustainability and efficient mobility. However, there are many reasons why people do not use public transport to its full potential. The classical factors in this context are time and money (Wardman and Waters, 2001). Public transport systems play an important role in providing transportation mobility to a significant portion of the community, while at the same time combating traffic congestion, reducing carbon emissions, and promoting compact, sustainable urban communities. Public transport systems play an increasingly important role in the way people move around from one place to the other.

Taking a global outlook, In United State of America, public transport is largely institutionally committed to the government monopoly model. The overwhelming majority of public transport service is provided by government monopolies. Perhaps the most important reason that the government monopolies have survived is that, public transport policy largely nationalize it. For the case of Japan, in the large urban areas, most transport services (bus and rail) is provided by private companies on a commercial (non-subsidized) basis (Cox 2001).

According to Claudia et al (2015) in developed economies, transport investments and improved transport technology over the last century have resulted in a continuous decline

in transport costs, which in turn stimulated growth and economic development. In low- and middle-income countries, the current potential for transport investments and policies to boost sustainable and inclusive growth through declining transport costs also appears to be large. This is especially the case given significant backlogs of transport infrastructure investment in both rural and urban areas, weak governance and inadequate regulations in the transport sector, and rising social costs in terms of congestion, pollution and accidents, especially in emerging large cities.

A review into Kenya's public transport reveals the soon after independence in 1964, the Kenya Bus Services (KBS) operated in the country till the early 90s, using paper ticket tokens. Some late adopters of the same were DOUBLE M, CITY HOPPA bus companies. The use of paper tickets in public transport is spread around the world, especially in the developing countries. The magnetic strip ticketing system that was later introduced in the late 1990s on the information systems platform was classified into two types: Automatic belt drive ticketing and Manual sweep- motion of the ticket by the passenger.

The magnetic strip technology soon run into many problems that were more related to politics and corruptions in procurements than its acceptability. The target, however, were the middle class who would board special buses enroute to work or schools. Contactless ticketing appeared in the new millennium and used Radio Frequency Identification (RFID) or Near Field Communication (NFC) technology to establish a communication between the card and the validation device. To date, these are mainly found in the developed world today. Mobile ticketing systems is a new concept, first witnesses in Netherland Tram Services around 2008. It makes use of the passenger's mobile phone for the payment of travel cost. In return mobile tickets are issued using SMS (short text message) or mobile barcodes.

The Cashless Payment System launched on November 2014 and which was to take effect on 1st July 2015, was seen as a cost-saving innovation that if effectively implemented would have revolutionalized the public transport sector. It would have empowered commuters with flexibility in terms of time management, cost regulations at peak or off-

peak hours and improved commuter services by eliminating the risk of lost, stolen tickets or loss of money through dishonest conductors.

The Legal Notice No. 219 of The National Transport and Safety Authority Act (No.33 of 2012), Section 7 (f), published by the Ministry of Transport and Infrastructure on 17th December, 2013, partly read: “Every operator of licensed public service vehicles shall ensure that passengers are issued with tickets or receipts for fare paid and, as from the 1st July, 2014, operates a cashless fare system”. Nevertheless, this directive has not been implemented to date and public service vehicles in Kenya still continue to adopt cash based payment systems. It is clear that the proposed cashless system is one that was hurriedly implemented without a clear understanding of its impact to the transport sector and its viability. Therefore, this study hopes to facilitate a growing dialogue around this directive. At present, there are three main companies that handle cashless payments for PSVs on trial basis: MY 1963 Jinice, owned by MOA; Beba Pay, which is a joint venture between Equity Bank and Google; and Abiria Card, a joint venture of Kenya Bus Service and Kenya Commercial Bank.

1.2 Problem Statement

The cashless payment system concept is an untapped opportunity with a vast range of digital services, including tracking of defaulters and criminals thus impacting on the efficiency in the public transport system in the long run. The new concept aims at using the available mobile money platform that is already widely been adopted by the public, thus, adapting the Check-in/check-out (CICO) methodology. With the cashless system, the drivers would no longer carry cash and it could bring down corruption on roads by 70 per cent. The planned migration from cash to virtual payments has seen an increase in the number of players positioning to cash in on the cashless fare system. This adoption is hinged on the notion that cashless payment system enhances efficiency in the transport system.

In attempt by the government to organize and streamline the public transport the NTSA had published regulations to all Matatu owners to form Savings and Credit Cooperatives (SACCOs) to implement and start using cashless fare system by 1st July 2014 (NTSA,

2014). The matatu SACCOs that installed the system no longer use the system. They cite the challenge as the failure of service providers to share infrastructure platform. A number of research work around payment system in Kenya's public transport industry do exist. A survey of the local studies with regard to public transport sector efficiency reveals that a number of studies in this area have been conducted. Asingo (2004) studied the institutional and organizational structure of Public Road transport in Kenya and asserts that the industry is characterized by numerous shortfalls such as inconsistent fares, unnecessary fare hikes during peak hours, dishonest Matatu crew, insecurity and inadequate means of transport among others just to mention a few. Further, Ngu (2014) on the Kenya's public transport industry focused on the regulations governing the industry and conclude the failure to comply with the traffic regulations due to competition among PSVs. However, both of the studies failed to address the aspect of the cash payment system as one of the alternative solutions toward addressing some of the inefficiencies facing the industry. It is evident that, as it stands not much is currently spoken of the cashless payment system in the public transport system in Kenya ever since the publishing regulations by the NTSA instructing all public service vehicles to introduce and implement cashless fare systems in the year 2014.

Therefore, scanty literature exist with regard to how the system was to be implemented and so far what has been done, what's pending and if so what has delayed the pending issues toward the realization of the full implementation of the system. Against this backdrop of the shortcomings of the local; studies in this areas, this study sought to fill in this gap by analyzing the implementation of the cashless payment system and efficiency in the public service transport in Kenya with an aim of unearthing the current status as well as focusing of the challenges facing the implementation of cashless payment systems for the public service vehicles in Kenya.

1.3 Objectives of the study

The main objective of the study was to investigate the operational efficiency of the cashless payment system for public service vehicles in Kenya a case study of Nairobi City.

1.3.1 Specific objectives

More specifically, the study sought:

- (i) To establish the cashless payments systems commonly used by public transport operators in Nairobi, Kenya.
- (ii) To determine the enablers of implementation of cashless payments system in Kenyan Matatu industry.
- (iii) To determine the benefits of cashless payment systems to passengers and public service vehicles operators in Kenya.

1.4 Significance of the Study

The significance of the study is three fold: first is the significance to the concerned policy makers and institutions. Two years upon the implementation of the directive for adoption of cashless payment system in the public service vehicles from the government, little can be seen to have happened in terms of its pick up. As such an inquiry into the viability of the initiative from the underpinning factors behind its performance would be core in informing the review of either the strategy used to implement the initiative or the review of the strategy as a whole would be beneficial to the concerned stakeholders. These include institutions such as matatu owners' association, National Transport and Safety Association and ministry of transport. Secondly is the importance to the providers of the operating framework upon which the cashless payment system rides on. The findings of the study would be crucial in determining the viability of the investment that the banks have to put in against the revenue generated from the cards. Thirdly, is the contribution to the existing body of literature in this field. The study would provide a platform for further research in this field.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature to the area covered by the study. The chapter entails theoretical literature upon which the study is anchored on, review of related empirical literature, conceptual framework and summary of the knowledge gap.

2.2 Theoretical Literature Review

A number of theories have been fronted with regard to the adoption of cashless payment system in the economy. From the literature, each of these theories is underpinned on numerous studies that have focused on the intention to adopt or to use a specific information technology. This study analyzed three of the theories namely: Diffusion of Innovation Theory, Disruptive Innovation Theory and Technology Acceptance Theory.

2.2.1 Diffusion of Innovation Theory

Rogers' (1995) Diffusion of Innovation (DOI) theory is a popular model used in information systems research to explain user adoption of new technologies. Rogers defines diffusion as 'the process by which an innovation is communicated through certain channels over time among the members of a social society' (Rogers, 1995). An innovation is an idea or object that is perceived to be new (Rogers, 1995). According to DOI, the rate of diffusion is affected by an innovation's relative advantage, complexity, compatibility, trial ability and observability. Rogers (1995) defines relative advantage as 'the degree to which an innovation is seen as being superior to its predecessor'. Complexity, which is comparable to TAM's perceived ease of use construct, is 'the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand'. Compatibility refers to 'the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters'. Trial ability is the 'degree to which an idea can be experimented with on a limited basis'. Finally, observability is the 'degree to which the results of an innovation are visible' (Rogers, 1995). The diffusion theory is relevant

because it explains the reason why public transport operators adopt technical innovations. One of the reasons why public transport operators adopt technical innovations is relevant advantage. This means that public transport operators who adopt technical innovations have relatively better financial advantage than those who do not.

This theory was essential in understanding the rate of diffusion of the cashless payment platform among the public road transport stakeholders in Kenya. More specifically, the theory informed on the issues to do with technology interoperability. The more compatible the technologies are, the higher the rate of diffusion and the opposite is true. Further the theory was core in enhancing the understanding of ease of use of the system. The more ease the system is in usage, the higher the rate of diffusion among the users.

2.2.2 Technology Acceptance Theory

According to Chau and Hu (2001), the Technology Acceptance Model (TAM) is a widely used theory in information system field and presents a theoretical contribution towards understanding technology adoption. TAM aims to explain how the user can select a given technology and adopt it in their day to day use. According to Chuttur (2009), Technology Acceptance Model also defines how the consumer of a given service uses an innovation to improve performance or efficiency over time. The theory clarifies that when users are introduced to a new technology, a number of factors influence their adoption decision; and the user only adopt an innovation that is beneficial, easy to use and one that improves his or her job performance.

This theory was applicable in examining how the perception and acceptance of cashless payment platform among the matatu owners and operators and even the customers has influenced the implementation of the platform. Any form of discontent with the system would imply laxity in buying it in by the user meaning that implementation would be adversely affected. As such the technology acceptance model helped us in capturing how the matatu owners and operators' perceptions ended up influencing the cashless payment platform in the public road transport in Nairobi.

2.3 Empirical Literature Review

It is possible to specify a vast number of empirical studies looking into implementation of e – payment in mainly analysis factors affecting the acceptance of the mobile payment by consumers applying Technology Adoption model and its extensions (Constantiou et al., 2006; Goeke and Pousttchi, 2010; Kim et al., 2010; Shin, 2009; Wu and Wang, 2005). Overall, the contribution of these studies is in identification and quantitative tests of factors affecting the intention to use cashless payments mainly the mobile payments. The most commonly tested factors are perceived ease of use of the service, trust in mobile payment service provider, perceived risks, perceived security, perceived usefulness, and cost of the service. Schierz et al. (2010) identified that the factor “perceived compatibility” of the TAM model has a substantial effect on customer intention to use mobile payment services. Specifically, Finnish researchers (Mallat et al., 2009) were looking into adoption of mobile ticketing and have specified the following factors affecting service adoption: ease of use, perceived usefulness, compatibility, mobility, and use context.

Davidson (2013) found that the most important factor explaining whether consumers are likely to use a mobile payment service is ease of use. In addition, relative advantage, high trust, low perceived security risks, higher age, and lower income were associated with a positive view on adopting the service. He also concluded that companies aiming to launch mobile payment services must understand that consumers put high importance on reliability of such services and that trust in services is built via learning process. If consumers learn to use the service, the probability they also start to trust it increases. This means that the launch of services must be designed as learning processes for consumers and merchants.

Mobile payment services can be seen as a platform providing mobile services and bringing together two groups of users: retailers or merchants (as service providers) from one side and customers from another side. These two different groups are linked to each other by the network effect phenomenon and represent a two-sided market (Eisenman et al., 2006). Hence, availability of ubiquitous infrastructure is one of the most critical factors for the wider penetration of an innovative payment solution. In terms of the theory of network

externalities, mobile payment is an example of network goods” and deals with an infrastructural dilemma or the “chicken and egg” problem (Van Hove, 1999).

On one hand, merchants are not willing to invest in the development of infrastructure without critical mass of consumers while consumers, at the same time, would not adopt mobile payment services if they cannot be used everywhere (Mallat, 2007). A number of studies addressing problems of organizational technology acceptance when mobile payments are integrated with m-commerce or related areas. Obstacles to the adoption of business-to-business applications using the example of e-markets are explored in works implemented by Johnson (2010). The author specified the following barriers: risk perception, lack of knowledge, trust, the size of a firm, and readiness of organization to adopt a new service.

Olatokun and Igbindion (2009) used diffusion of innovation (DOI) theory to investigate the adoption of Automatic Teller Machines in Nigeria. They found out that the constraints relative advantage, complexity, observability, compatibility, and Trial ability were positively related to attitude to the use of ATM cards in Nigeria. Olorunsegun (2010) used cluster sampling technique to study the impact of electronic banking in Nigerian banking system. He found out that a bank has an effective electronic banking system which has improved its customer’s relationship and satisfaction. A study carried out by Krairit, Choomongkol, & Krairit, (2004), also found out that smart cards used in the transport sector requires the use of a card or a device that allows trips to be deducted once they take place

This introduction of electronic payment system for the purchase of tickets may serve as the initial stage on which to incorporate new advances and improve performance (Poiani & Stead, 2015). They further say that in order for adoption to be a success, it is necessary to combine the range of factors that interact and comprise the system such as social aspects and management control. The ease and convenience of purchase afforded by smart cards attract more passengers since the passenger use less money in the long run; because the best cost for a given trip is calculated per distance as described by Chakirov and Erath (2011). The time for boarding is minimized, the customer gets efficient services since the

tickets can be purchased in advance, the business owner gets return on investment, while the government is able to get it tax since the smart cards can rely on time deduction instantly online.

Another form of e-ticketing is the Mobile ticketing which is basically a virtual form of ticket that is held on cellular phones, tablets or personal digital assistants (PDAs) and can be ordered and obtained from any location such as shopping stores or telecommunication outlets (Ezell, 2010). E-ticketing makes the integration method easier to carry through because it can manage a more complex price and fare system as described by Graham and Mulley (2012). In addition, the system can include rules for transfer rights in order to be more attractive. A study done by the European Commission (2007) found out that long-distance journeys can be made cheaper by integration and flexibility in modes of transport.

Dekkers and Rietveld (2007) studied Electronic Ticketing in Public Transport in Netherlands' rural areas. The findings of the study assert that the service is most attractive for semi frequent public transport users. The participants were also asked for their willingness-to-pay (WTP) for additional mobile services. This WTP level turned out to be rather low so we must conclude that it would be difficult to develop additional services as a profit centre in order to make the ticketing commercially feasible. The most interesting additional service was en-route real-time travel information. A regression analysis of WTP for this service revealed that it depends positively on features of travel behavior such as the number of transfers per trip.

Graham and Mulley (2012) studied Public transport pre-pay tickets in Sydney. Using empirical data collected from two surveys of passengers of a private bus operator in northern Sydney this study analyses the ticket purchasing behavior of passengers both before the fare reform, when passengers only had access to operator-specific prepay products, and post-MyZone, when the new standardized prepay products were available. The results clearly show there are significant differences in the characteristics of passengers using multi-modal versus pay-as-you-go tickets and that this difference is driven largely by age, income and whether or not the journey involved interchange.

Graham and Mulley (2012) states that prior to MyZone, prepay users were easily predicted and the fare and ticket reform was successful in transitioning some cash users to prepay but prepay users were no longer predictable unless separated into prepay product groups. This suggests that a policy designed to exploit the supply-side benefits associated with cashless services needs to consider that introducing only one prepay product did not address the market need of frequent users. The study concludes that passengers who continued to pay cash after the fare and ticket reform showed high sensitivity to public transport cost and are those passengers with the lowest incomes. As such, this raises policy questions of how to mitigate against the upfront costs often associated with prepay to transition less affluent, but frequent passengers, onto cashless ticketing.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research methodology to be adopted by the study. More specifically, the chapter looks at the research design, the sample and sampling procedures, data collection instruments, data collection methods and techniques that were used to meet the research objectives.

3.2 Research Design

The study utilized a combination of research design in order to achieve the intended objectives. It is a framework for specifying relationships between the variables in the study and gives an outline of each procedure from the hypotheses to the analysis of data (Cooper & Schindler, 2014). In this study, a blend of both qualitative and quantitative research designs was employed. The study adopted an exploratory and descriptive research design. This was informed by the fact that the study sought to explain in details on how viable the use of cashless payment system in the public transport system is for ensuring operational efficiency. By this the study shed light into the level of adoption of the cashless system in the public transport and more in particular the favorable factors that need to be put into place if the implementation of the system is to come into fruition.

3.3 Target Population

The study target was the registered Public Service Vehicles Saccos operating in Nairobi city. The target population in this case was 197 Public Service Vehicles SACCOs registered in Nairobi (National Transport and Safety Authority, 2015). Therefore, the sampling frame was 197 registered Public Service Vehicles SACCOs operating in Nairobi city.

3.4 Sample and Sampling Procedures

From the sampling frame, probabilistic sampling techniques were applied to select the sample for the study. Systematic random sampling was applied to select every second public service vehicle SACCO from a list of registered SACCOs in Nairobi. The study selected 50 percent of the target population from the registered public service vehicles operating within Nairobi for the inclusion into the sample. The amounting into 99 Sacco's being selected for the study from a target population of 197 public transport saccos.

3.5 Data Collection

In order to achieve the objectives of the study, credible data was core to necessitate analysis. To collect the data for the study, structured questionnaires were administered to the selected Public Service Vehicles Saccos. Questionnaires were administered by the researcher. This implies that the interviewer interviewed the interviewees and recorded all the answers to the questions. This enabled the interviewer to seek for clarifications for the unclear responses as opposed to drop and pick method. The administered questions were preferred since they enabled the administrator to probe for answers into the questions. In addition, administered questionnaires gave an opportunity for seeking clarifications from the respondents. Lastly, by administration of the questionnaires, this increased the response rate to the questionnaires. Questionnaires were administered to the management of the Saccos. As such anybody within the management of the Sacco was qualified to answer the questions.

3.6 Validity and Reliability of the research Instruments

Validity of research instrument, is defined as the extent to which a test or instrument measures what it is intended or supposed to measure (Mbwesa, 2006). This Study adopted content validity. Here there is agreement that a scale logically appears to reflect accurately what it purports to measure. This ensures that the instrument is covering what it is intended to cover (Mbwesa 2006). To improve validity, the researcher translated the interview schedule from English into Kiswahili and/or the local language where necessary to ensure that the respondent fully understands the questions at hand.

Reliability of research instruments is the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda and Mugenda, 1999). To ensure reliability in data collection the questionnaire included some questions linked to each other to gauge on the consistency of the responses hence avoiding any contradicting responses by the respondent. Any questionnaire found to have contradicting responses with regard to the linked questions was to be dropped out during the questionnaire screening upon the conclusion of the data collection exercise.

3.6 Data Analysis and Presentation

The quantitative data that was generated during the field study was checked, edited, organized and computer coded so as to reduce the mass of data obtained into a form suitable for analysis. This was then analyzed using Statistical Package for Social Sciences (SPSS) version 20. The qualitative data received from the responses was coded to convert it into quantitative data for analysis. From the coded data, analysis was conducted to generate frequency tables, graphs and charts in accordance to the questions in the tool.

3.7 Ethical Considerations

To ensure objectivity and upholding ethics in the study, a number of issues needed to be addressed. First, an official letter to conduct the study was sought from the university. A consent from the management of the selected Saccos was also sought prior to administering the questionnaire. The participation of respondents was therefore on a voluntary basis and participants were free to withdraw consent or discontinue participation at any point during the process with no consequences to the participant. All participants were informed of the nature and proceedings of the study, were assured of anonymity. The respondents were assured that the research is being carried out as fulfillment of the requirements for an academic program and would not be used for any other purposes outside the academic program.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter focuses on the analysis and interpretation of the data that was collected. Specifically, the chapter covers descriptive statistics as per the study questionnaire. Further the chapter discuss the results of the findings based on the specific research objectives

4.2 Descriptive statistics

Results on the responses by the Sacco of operation assert that majority of the responses were from City Hoppa Sacco that accounted for 11 percent of the total responses followed by Embassava Sacco at 8 percent. Buruburu, Astrabel, Compliant, Dakika, Double M, Kimao, Lopha, Nawasuku, Nazigi Sacco, all accounted for 6 percent each. However, least responses came from operators of Seven City, Umoiner and Super Metro who accounted for 4 percent of the total responses each.

Table 4.0.1: Response by Sacco of operation

Sacco	Frequency	Percent	Cumulative
Astrabell Sacco	6	6	6
Buruburu Sacco	6	6	12
City Hoppa Sacco	11	11	23
Compliant Sacco	6	6	29
Dakika Sacco	6	6	35
Double M Sacco	6	6	41
Embassava Sacco	8	8	49
Indimanje Sacco	5	5	54
KBS Sacco	5	5	59
Kimao Sacco	6	6	65
Lopha Sacco	6	6	71
Nawasuku Sacco	6	6	77
Nazigi Sacco	6	6	83
Seven City Sacco	4	4	87
Super Metro Sacco	4	4	91
Umoiner Sacco	4	4	95
Unified Sacco	5	5	100
Total	100	100	

The responses based on the route of operation assert that majority of responses were from vehicles operating along Ngong road at 30 percent followed by Thika road at 27 percent. Mombasa road comes third at 24 percent of the total responses. However, the least of total responses came from the vehicles operating along Outering/ Jogoo road (**Figure 4.1**).

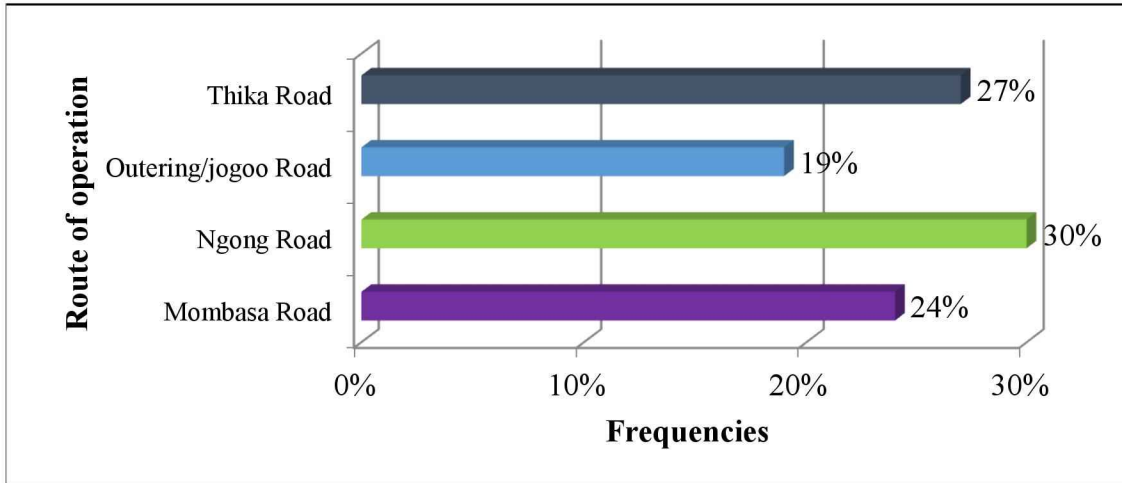


Figure 4.1: Response by route of operation

The analysis of the years of experience asserts that majority of the respondents who were mainly drivers and partly conductors had an experience of 4 years at approximately 18 percent (**figure 4.2**). Further, results evident that over 50 percent of the drivers / conductors had work experienced of between 2 and 5 years (**figure 4.2**) along their respective Saccos of operation.

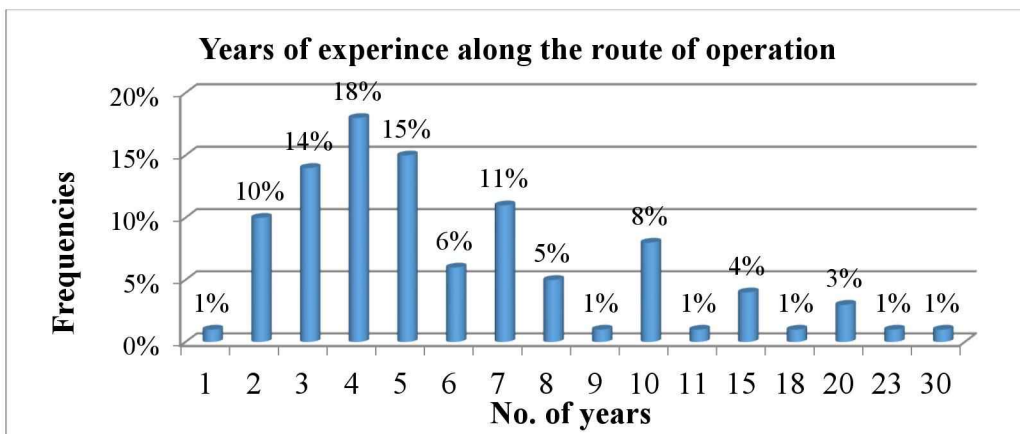


Figure 4.2: Response by number of years worked in the current matatu Sacco

An inquiry on the operator/s awareness of the cashless payment in public sector transport in Kenya results indicate that an overwhelming of 80 percent are aware of cashless payment in public sector transport in Kenya against 20 percent who were unaware (**figure 4.3**).

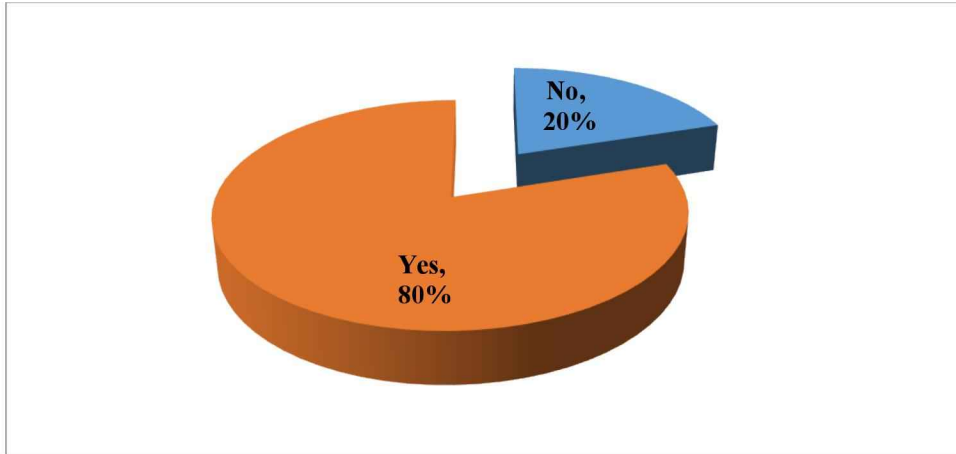


Figure 4.3: Awareness on the cashless payment in public sector transport in Kenya

Out of the 80 percent who are aware of cashless payment in public sector transport in Kenya a majority of 48.15 percent cited that they are aware of beba pay platform, 18.52 percent were aware of the abiria card platform, 12.35 percent were conversant with jinice payment platform while 7.40 percent were not aware of any specific cashless payment in public sector transport in Kenya. For the 13.58 percent of the respondents who cited others, they identified Mpesa as the mode of the cashless payment in public sector transport in Kenya in their knowledge (**Figure 4.4**).

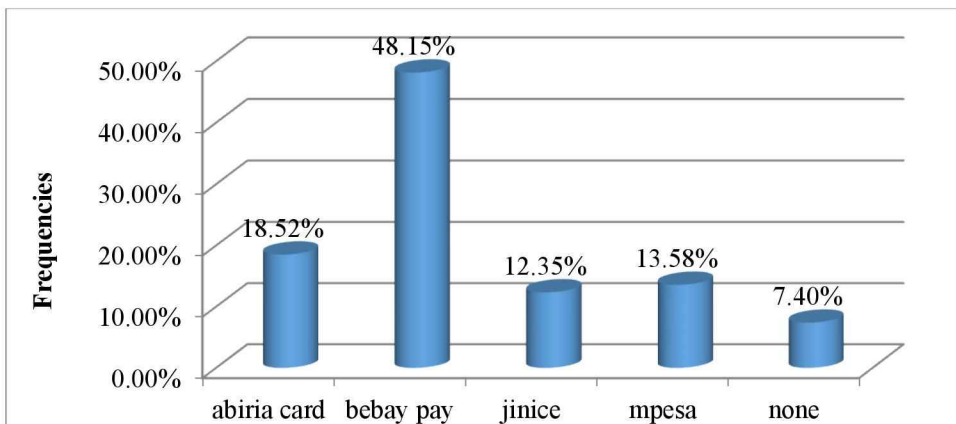


Figure 4.4: Forms of cashless payment in public sector transport in Kenya

However, on inquiry of the specific cashless payment in public sector transport that the operators are currently using, 93 percent of the respondents indicated that they are currently using none of the cashless payment platform with the 7 percent citing the using of Mpesa Paybill for collecting bus fare from the passengers.

Table 4.2: Response on cashless payment system currently being used by the Sacco

	None	Mpesa	Total
No	93	0	93
Yes	0	7	7
Total	93	7	100

For the 93 Saccos not currently using any cashless payment system, they cited the challenges hindering their usage of cashless payment system to be drivers' and conductors' resistance to the system (30.11%), unawareness on how to use the system (26.88%), Customer preference to cash payments as opposed to cashless payments (21.52%), battery of the swipe machines not lasting for long (13.98 %) and the using of the platform taking more time (7.52%) (**figure 4.5**).

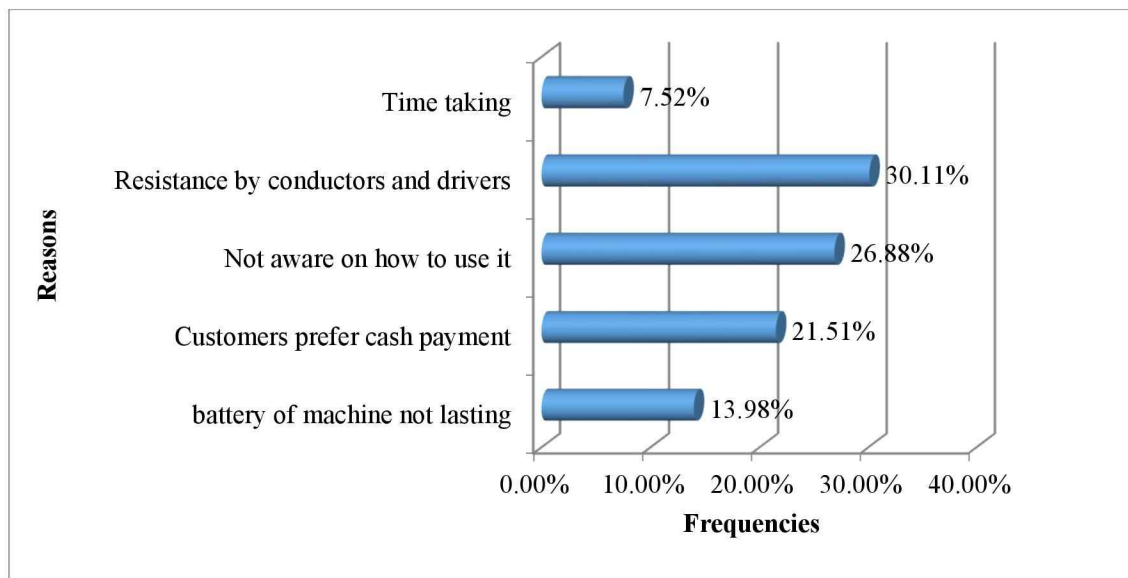


Figure 4.5: Response on challenges leading to failure to use the cashless permanent system

4.3 Findings of the study based on ratings

Upon discussing the descriptive results on the responses, the study further went on to seek information with regard to the rating of the various aspects of the cashless payment system from the respondents' point of view.

4.3.1 Findings on operational efficiency of cashless payment system

First, the study sought to find out the respondents' rating of the operational efficiency of the cashless payment systems in public transport vehicles. The findings as reported in figure 4.6 shows that the ease of use of the system promotes the implementation of cashless payment in public service transport has the highest of ranking of 1 at 37 percent but the least ranking of 5 at 9 percent. However, the likelihood of the implementation of cashless payment system in public service transport to improve quality of customer service has the highest ranking of 5 at 26 percent followed by its likelihood of to reducing the time taken in looking for change at 24 percent. Further, the likelihood of implementation of cashless payment in public service transport in reducing the cash theft had the highest ranking of 4 at 26 percent with the likelihood of the implementation of cashless payment in public service transport in reducing the time taken in looking for change having the highest ranking of 3 at 29 percent (figure 4.6).

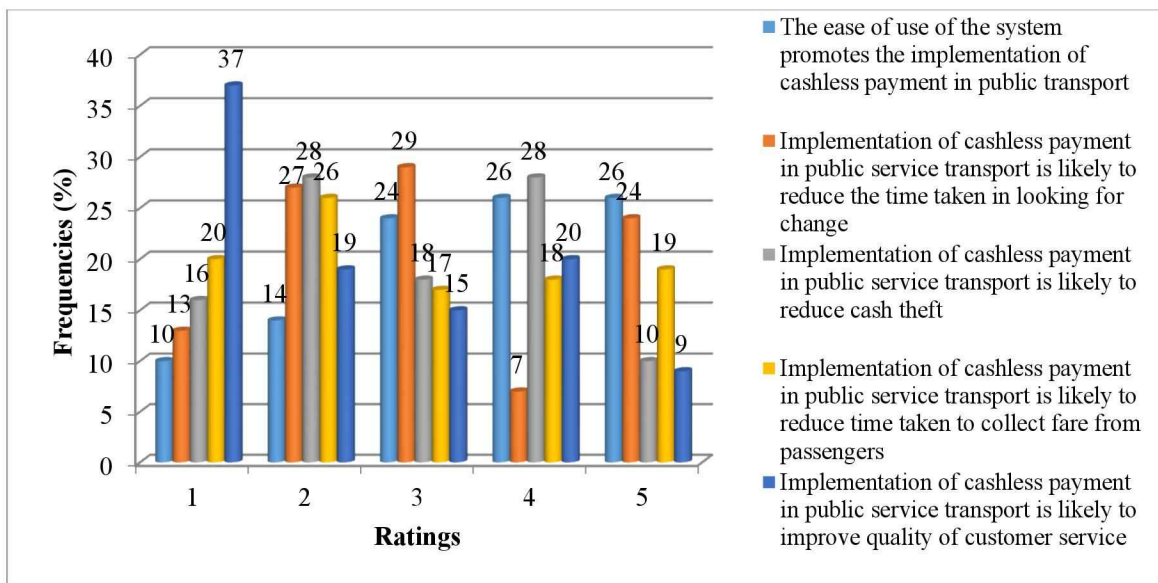


Figure 4.6: Ratings on different aspects of operational efficiency of cashless payment system

On the rating of the interoperability of the cashless payment systems, responses from the respondents assert that the ability to use the one e- payment platform for all passengers regardless of the type of the passengers’ cards had the highest rating of 5 at 49 percent. However, the likelihood of synchronization of the different e – payment platform in enhancing the implementation of cashless payment system in public service transport had the highly rated at a scale of 4 at 51 percent. Further the responses assert that the speed of transaction across different cards do not vary significantly was highly rated at a scale of 3 at 40.4 percent. The lack of interoperability in technologies of different e – payment platforms negatively affecting seamless operations of the systems had a more similar rating of 2 with the speed of transaction cross different cards does not vary significantly at approximately 33 percent. However, the lack of interoperability in technologies of different e – payment platforms negatively affecting seamless operations of the systems had the highest frequency of a rating of 1 (figure 4.7).

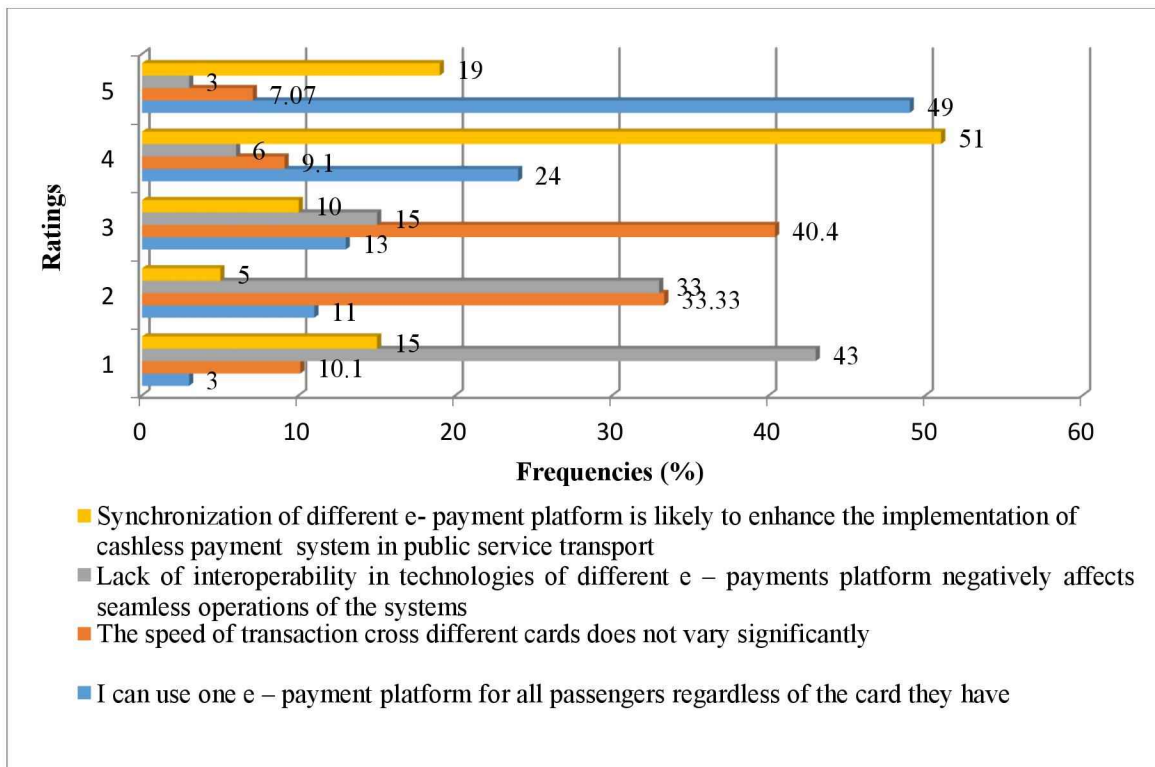


Figure 4.7: Rating of interoperability of the cashless payment systems

With regard to the rating of the cost of operating the cashless payment systems in public transport industry, the study found that the aspect of cashless payment system lowering the cost of money losses as compare to cash system had the highest rating of 1 implying the preference

for cash payments over cashless payments. However, the aspect of cashless payment system lowering the cost of operating matatu by reducing chances of corruption deals with traffic officers had the highest rating of 3 implying the preference of cashless payment in curbing corruption in the public transport industry. The cost of operating cashless system in terms of time taken to collect fare being lower compared to on cash basis was rated more at a scale of 5 compared to the other two aspects (**figure 4.8**).

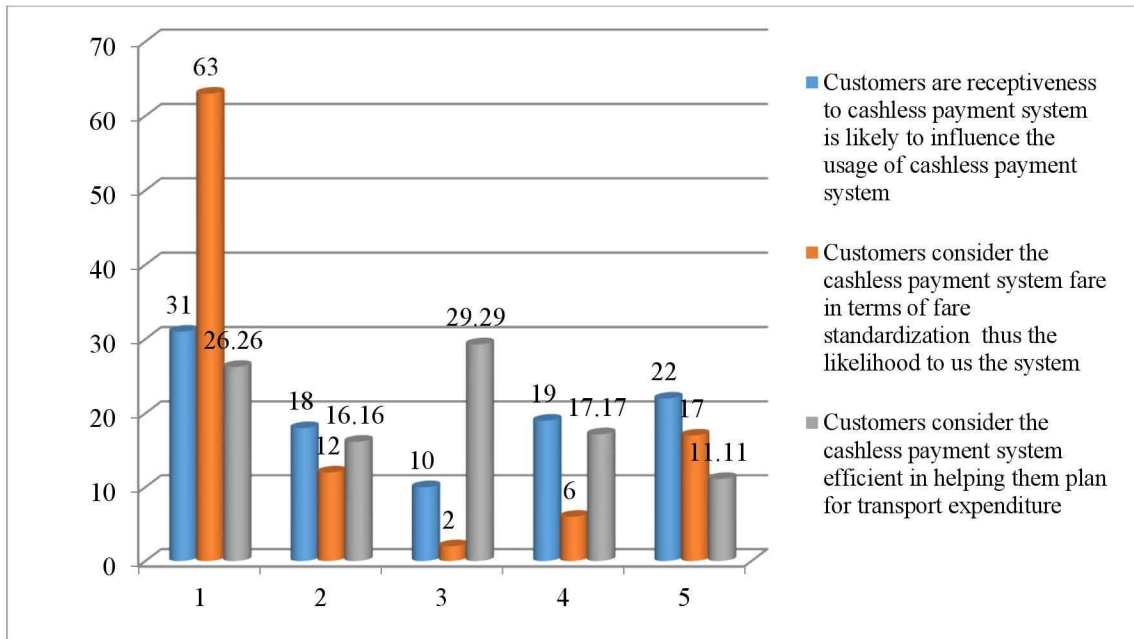


Figure 4.8: Rating of the Cost of operation

Stakeholder engagement is core for the success of the implementation of any organizational program. Thus reading the rating of the respondents' views on the Stakeholder's buy – in, the findings assert that the use of cashless fare system in helping the conductors to reduce the burden for looking for change and customers consideration of the cashless payment system fare in terms of fare standardization had the highest raking in scale of 1 at 64% and 63% respectively. However, customers' consideration of the cashless payment system being efficient in improving the quality of services in public transport had the highest rating of scale of 5 at 31 percent. Under the scale of 3, customers' consideration of the cashless payment system being efficient in helping them plan for transport expenditure had the highest frequency (**figure 4.8**).

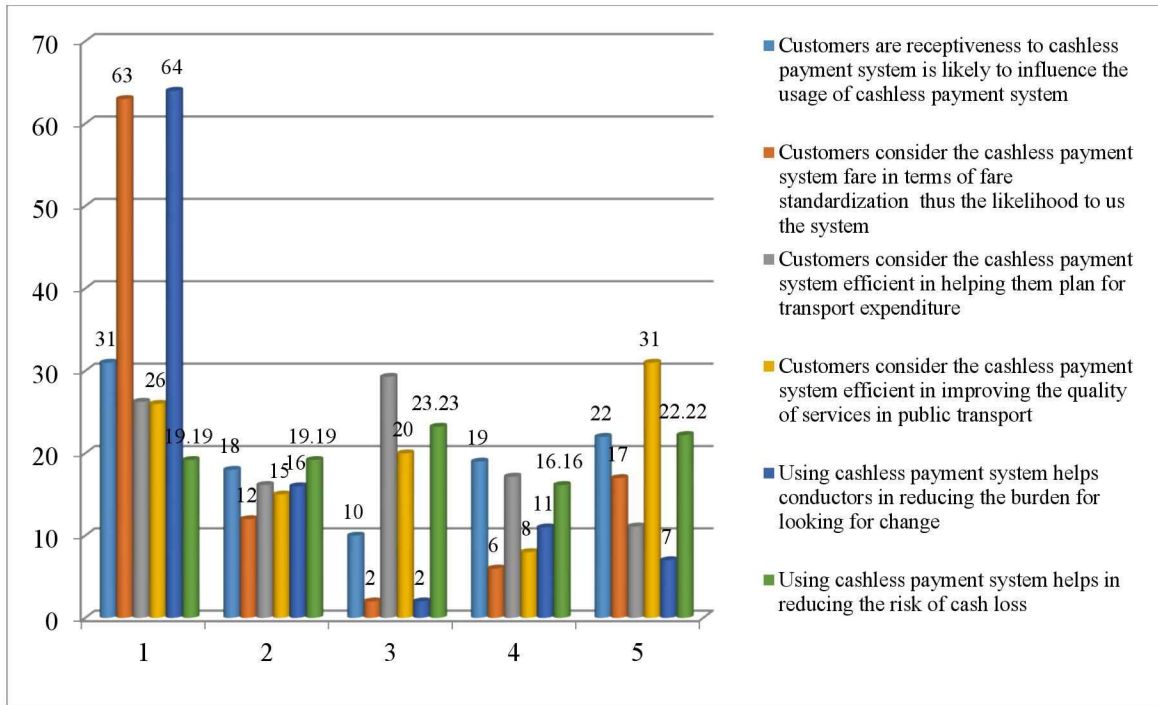


Figure 4.9: Rating of the Stakeholders' buy - in

Regarding the safety of the cashless payment system, the study findings assert that the cashless payment platform is not vulnerable to hackers that would amount to revenue losses had the highest rating of 1 at 32.32%. Further, the cashless payment platform being free from technological risk (viruses) that would amount to revenue losses was highly rated at scale of 3 with 30% frequency. Lastly, the aspect of the cashless payment platform not compromising the data on the card of the cardholder which could lead to financial loss on the part of the card holder was highly rated at scale of 2 with 33% frequency (**figure 4.10**).

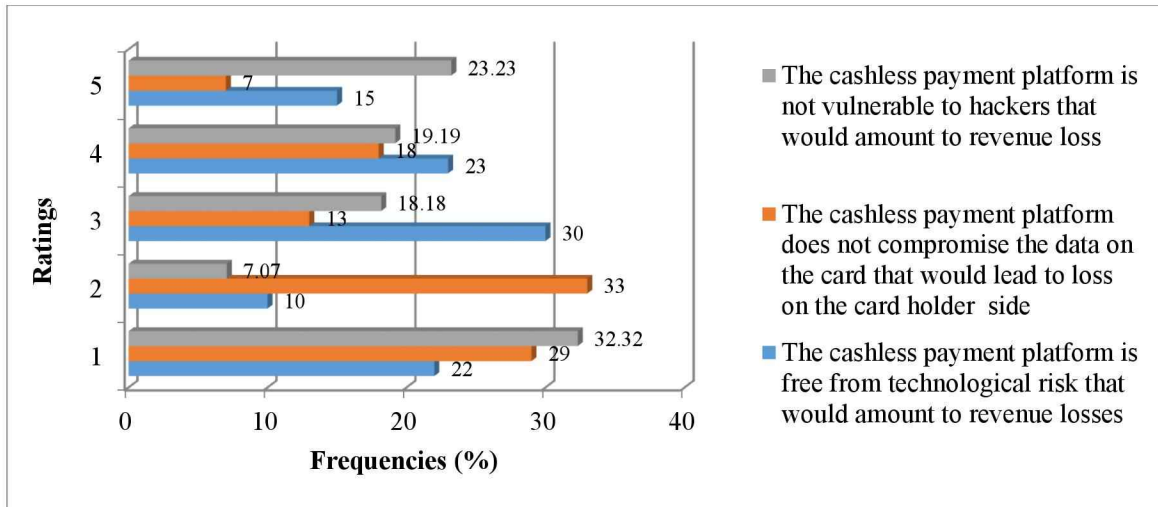


Figure 4.10: Rating of the safety of the cashless payment platform

The study inquired on the challenges facing the implementation of the cashless payment systems in the public transport system among the respondents. The findings of the study assert that 78 percent of respondents attribute the hindrances towards effective implementation of cashless payment systems in the public transport system to resistance from the service crews mainly the drivers and conductors. In addition is the resistance from the bus terminal operators given the cash kick back they demand for public service vehicles. Further, 77 percent of the respondents attribute the hindrances towards effective implementation of cashless payment systems in the public transport system to failure to involve all the concerned stakeholders. 65 percent attribute it to fear and uncertainty of job security on the service crews especially conductors and bus terminal operators. Further, 35 percent pointed out the use of different card on different vehicles as the hindrance towards the effective implementation of cashless payment systems in the public transport system with 22 percent and 18 percent citing competition from vendors and accountability of money in cards as the challenges respectively (**figure 4.11**).

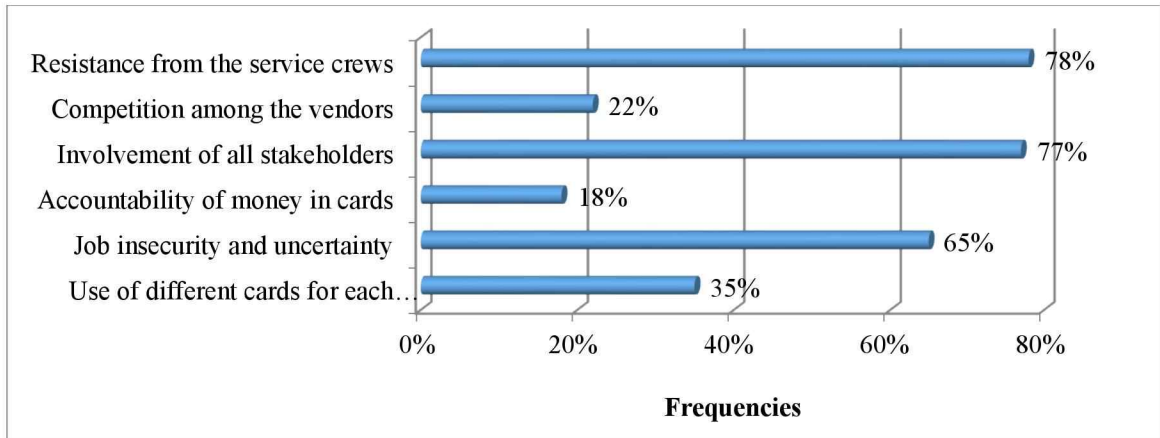


Figure 4.11: Challenges facing the implementation of cashless payment system in public transport industry in Kenya

Lastly, on the possible solutions towards effective implementation of cashless payment systems in the public transport system, the study findings conclude that proper stakeholder involvement is core in ensuring the effective implementation of cashless payment systems in the public transport system with 51 percent responses. Further customer sensitization on the benefits of using cashless payment system as opposed to cash payments is core at 28 percent. There is also the need for the harmonization of the cost of operating the system across all the card providers as well as enhancing card interoperability across different cashless payment platforms (**figure 4.12**).

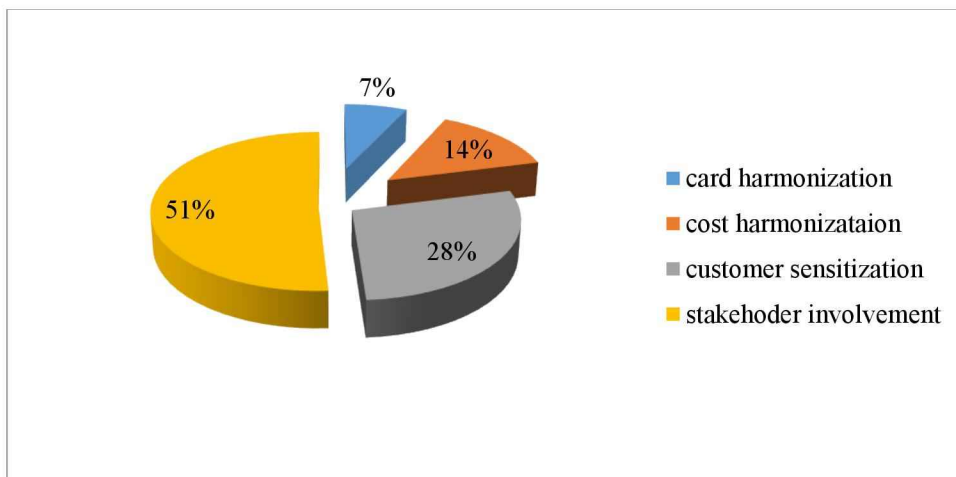


Figure 4.12: Possible solutions to the challenges highlighted above with regard to implementation of cashless payment system in public transport industry in Kenya

4.4 Findings based on the specific objectives

Based on the specific objectives, the findings of the study can be discussed as follows:

4.4.1: Objective 1: To establish the cashless payments systems commonly used by public transport operators in Nairobi, Kenya.

From the study findings, out of the 80 percent who are aware of cashless payment in public sector transport in Kenya a majority of 48.15 percent cited that they are aware of beba pay platform, 18.52 percent were aware of the abiria card platform, 12.35 percent were conversant with jinice payment platform while 7.40 percent were not aware of any specific cashless payment in public sector transport in Kenya. For the 13.58 percent of the respondents who cited others, they identified Mpesa as the mode of the cashless payment in public sector transport in Kenya in their knowledge (**Figure 4.4**). Therefore, the cashless payment systems that have existed in Nairobi in the past are beba pay, jinice, abiria card and Mpesa platforms.

4.4.2: Objective 2: To determine the enablers of implementation of cashless payments system Kenyan matatu industry.

From the study findings, the core enablers towards the effective implementation of cashless payment system in the public transport industry include: the involvement of all the relevant industry stakeholders. Secondly is the need to ensure card interoperability across different payment platforms. Further is the need for the customer sensitization as well as the service crew on the benefits of the cashless payment platforms as opposed to cash payment platforms. Of much essence also is to observe the operational efficiency of the platform by enhancing security against any possible technological threats.

4.4.3: Objective 3: To determine the benefits of cashless payment systems to passengers and public service vehicles operators in Kenya.

Based on the study of the finding, a number of benefits of the cashless payment systems to passengers and public service vehicles operators in Kenya can be deduced. First, the use of the cashless payment enhances efficiency by reducing the time taken in collecting fare from passengers and looking for change. Secondly, the use of the cashless payment minimizes risk of cash theft by the service crew. Thirdly, the use of the cashless payment enables the passengers in planning for their transport expenditures.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter presents the key findings, conclusions, limitation of the study and suggestions of further study.

5.2 Summary of Findings

This study sought to examine the operational efficiency of the cashless payment system in Kenya. More specifically, the study sought to establish the cashless payments systems commonly used by public transport operators in Nairobi, Kenya; to determine the enablers of implementation of cashless payments system in Kenyan matatu industry and lastly to determine the benefits of cashless payment systems to passengers and public service vehicles operators in Kenya. In order to achieve its objectives, the study adopted a qualitative research approach in which primary data was collected from 100 registered public service vehicles operating within Nairobi Central Business District.

The study findings assert that the known cashless payment systems in Kenya that have existed in Nairobi are: beba pay, jinice, abiria card and Mpesa platforms. However, it is notable that none of these platforms is currently being used by the public services vehicles in Nairobi. Regarding the enablers of effective implementation of cashless payment system in the public transport industry, the study identifies the key enablers to be stakeholder involvement, card interoperability across different payment platforms customer sensitization and enhancing security against any possible technological threats in the system.

Lastly on the benefits of the cashless payment systems to passengers and public service vehicles operators in Kenya, the study findings conclude that the use of the cashless payment enhances efficiency by reducing the time taken in collecting fare from passengers and looking for change. In addition cashless payment systems minimize the risk of cash theft by the service crew. Further, the use of the cashless payment enables the passengers in planning for their transport expenditures.

5.3 Conclusion

Based on the study findings a number of policy implications and recommendations can be done. From the responses, it's clear that cashless payments systems are not currently being used in the matatu industry given a number of challenges cited in the responses of the respondents. As such a number of recommendations are feasible if the effective implementation of cashless payments systems in the public transport industry in Kenya is done.

First, there is need for stakeholders' engagement to ensure that all the stakeholders are involved in the program from its inception to its implementation. One of the key challenges that persist is the resistance from public transport service crew. Therefore, with stakeholder engagement, this will ensure stakeholders buy in thus enhancing the success in the implementation of the cashless payment system in public transport industry in Kenya. Secondly is the need for sensitization of the passengers on the benefits of adopting cashless payment system. By creating awareness on the benefits accruing from cashless payment among the passengers such as enhancing financial discipline by enabling passengers plan their expenditure. This will create a buy in from passengers hence boosting the implementation of cashless payments in public transport industry.

Thirdly is the need for proper legislation by the government to promote implementation of cashless payments in public transport industry. It's evident that the implementation of cashless payment was backed by government legislation. However, there is evidence of relaxation in as much as the implementation of the legislation is concerned. This calls for the creation of a state agency that comprises of all stakeholder in the industry to oversee the enactment of the relevant legislation with regard to implementation of cashless payments systems in Kenya public transport.

Lastly is the need to lean on the technology advancement to promote interoperability of various cashless payment platforms in the public transport industry. There is need for synchronization of the cashless payment platforms to ensure seamless transactions across the platforms. This will be corrections in lowering the operating cost and the charges that

might come with the different tariffs charged by different platforms as one transacts from one platform to another.

5.4 Suggestions for Further Research

The study sought to examine the operational efficiency of cashless payment systems in public transport industry in Kenya. Based on the study findings a number of further research suggestions can be made. First, there is need for study work on comparative studies on how cashless payment systems in the public transport has been done in other countries that have succeeded and compare with the way it has implemented Kenya. This will inform the lessons learnt on how the program can be effectively implemented in Kenya. Secondly, there is need for study works around leveraging on telecommunication infrastructure in enhancing cashless payments in public transport industry in Kenya. This is informed by the fact that in the recent past telecoms have risen to been a crucial player in financial service provision in addition to banks. Banks have of late been seen to leverage on the telecoms infrastructure to offer their services. Therefore, in the awake of this realization, there is need for studies around the issue of how telecoms can be leveraged on for an effective implementation of cashless payment system within public transport industry in Kenya.

Thirdly there is a need for study work revenue leakage through the cash payment systems due to misappropriation and corruption that can be saved if cashless system is adopted. This is because a lot of income is lost in bribing traffic officers when drivers commit offences on the road. The drivers and conductors are in full control of the revenue generated and owners of Matatus may not be getting the real value from their investments. They decided what to give the owners at the end of the day which is in most cases way less than the day's earnings. This study can also capture on the issue of the tax that can be recovered from the matatu industry as a result of sealing the income leakages. Substantial tax opportunity is lost due to the leakage and the unaccounted income.

REFERENCES

- Ajayi, S. I. & O. O. Ojo (2006), -Money and Banking: Analysis and Policy in the Nigerian Context, Second Edition, University of Ibadan, Daily Graphics Nigeria Ltd.
- Davidson, N. (2013). Consumer attitudes on mobile payment services – results from a proof of concept test. *International Journal of Bank Marketing*, 32(2):13 – 27.
- Chakirov, A., & Erath, A. (2011). Use of public transport smart card fare payment data for travel behaviour analysis in Singapore.
- Constantiou, I.D., Damsgaard, J., & Knutsen, L. (2006). Exploring perceptions and use of mobile services: user differences in an advancing market. *International Journal of Mobile Communications*, 4 (3), 231-247.
- Dekkers, J., & Rietveld, P. (2007). Electronic ticketing in public transport: A field study in a rural area. *Journal of Intelligence Transportation Systems*, 11(2): 69-78.
- Eisenman, T., Parker, G., and Van Alstyne, M.W., (2006). Strategies for two-sided markets. *Harvard Business Review*, Vol. 84 (10), pp. 92–101.
- European Commission (2007). Development of integrated ticketing for air and rail transport, public consultation document. Brussels: EC.
- Ezell, S. (2010). Intelligent Transportation Systems. Retrieved from http://www.itif.org/files/2010-1-27-ITS_Leadership.pdf
- Graham, P., & Mulley, C. (2012). Public transport pre-pay tickets: Understanding passenger choice for different products. *Transport Policy*, 19(1): 69–75.
- Humphrey, D. B. (2004). Replacement of cash by cards in U.S. Consumer Payments. *Journal of Economics and Business*, 56, 211–225.
- Johnson, M., (2009). Barriers to innovation adoption: A study of e-markets. *Industrial Management and Data Systems*, 110 (2):157– 174.
- Krairit, D., Choomongkol, W., & Krairit, P. (2004). Strategic and Technology Policy Implications for e- Government: Lessons from Empirical Case Study on Information
- Legal Notice No. 219, The National Transport and Safety Authority Act (No.33 of 2012), Section 7 (f), Ministry of Transport and Infrastructure, 17th December, 2013.
- Kim, C., Mirusmonov, M., and I. Lee., (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behavior*, 26, 310–322.

- Mallat, N., Rossi, M., Tuunainen, V.K., and Öörni, A. (2009). The impact of use context on mobile services acceptance: The case of mobile ticketing. *Information and Management*, 46, 190 -195.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments – A qualitative study. *Journal of Strategic Information Systems*, 16, 413-432.
- Mbwesa, K J (2006). Introduction to management research, a student hand book. Jomo Kenyatta Foundation, Nairobi, Kenya.
- Mugenda, M. and Mugenda, G. (1999). Research Methods. Quantitative and Qualitative Approaches. Nairobi, Kenya.
- NTSA. (2015). Registered Saccos and Companies in Kenya. Retrieved from <http://www.nts.go.ke/saccolist/registeredsaccos.pdf>
- Rogers, Everett M. (1995). Diffusion of Innovations. New York: Free Press.
- Shin, D., (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior*, 25 (6):1343 –1354.
- Schierz, P.G., Schilke, O., and Wirtz, B.W. (2010). Understanding consumer acceptance of mobile payment services: An empirical research. *Journal of Electronic Commerce Research and Applications*, 9 (3), 209-216.
- Pojani, D. & Stead, D. (2015). Sustainable Urban Transport in the Developing World:
- Van Hove, L. (1999). Electronic money and the network externalities theory: lessons for real life. *Netnomics*, 1, 137-171.
- Wu J. and Wang S., (2005). What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. *Information and Management*, 42 (5): 719–729.
- Chuttur, M.Y., (2009). Overview of the Technology Acceptance Model: Origins, Developments and Future Directions. Indiana University, USA. Sprouts: Working Papers on Information Systems, 9(37).
- Tupac, G. (2003). A Meta-Analysis of Research on Information Technology Implementation in Small Business, *Journal of Organizational Computing and Electronic Commerce*.2 (13), 99 - 121

APPENDICES

Appendix 1: Questionnaire

QUESTIONNAIRE

My name is Purity Rita Muthoni masters studies at the University of Nairobi. This questionnaire is aimed at enabling me to collect data for undertaking my thesis entitled “The viability of cashless payment system for public service vehicles in Kenya: a case study of Nairobi city”. The information sought in this questionnaire was treated with confidentiality and was purely used for the intended academic work. Anonymity of the respondents was highly observed.

I therefore kindly wish to take a few of your time to go through the following questions.

Section one: Details of the respondent

Name (optional).....

Contacts (Optional).....

Matatu SACCO you are currently working in

Which route(s) does the SACCO operate.....

Number of years worked I the current matatu Sacco.....

Section two: Knowledge on the cashless payment in public sector transport

Q1. Are you aware of the cashless payment in public sector transport in Kenya?

Yes [] No []

Q2. If yes which forms of cashless payment in public sector transport in Kenya are you aware of?

Beba Pay []

MY 1963 Jinice []

Abiria Card []

None []

Others (Specify).....

Q3. Are you currently using any cashless payment system in you SACCO?

Yes [] No []

Q4. If yes which cashless payment system are you using?

Beba Pay []

MY 1963 Jinice []

Abiria Card []

None []

Others (Specify).....

Q5. If no, what are the reasons for you not using any cashless payment in you SACCO?

.....
.....
.....
.....

Section three: respondents’ rating of different aspects of operational efficiency of cashless payment system

Q6. In a scale of 1 to 5, kindly rate the following enablers where (1 = Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree)

	1	2	3	4	5
The ease of use of the system promotes the implementation of cashless payment in public service transport					
Implementation of cashless payment in public service transport is likely to reduce the time taken in looking for change					
Implementation of cashless payment in public service transport is likely to reduce the cash theft					
Implementation of cashless payment in public service transport is likely to reduce the time to collect fare from passengers					
Implementation of cashless payment in public service transport is likely to improve quality of customer service					

Section four: respondents' rating of different enablers of implementation of cashless payment system

Q7. Interoperability of the cashless payment systems

	1	2	3	4	5
I can use the one e- payment platform for all passengers regardless of the cards they have					
The speed of transaction cross different cards does not vary significantly					
Lack of interoperability in technologies of different e – payment platforms negatively affects seamless operations of the systems					
Synchronization of the different e – payment platform is likely to enhance the implementation of cashless payment system in public service transport					

Q8. Cost of operation

	1	2	3	4	5
The cost of operating cashless system in terms of time taken to collect fare is lower compared to on cash basis					
Cashless payment system lowers the cost of money losses as compare to cash system					
Cashless payment system lowers the cost of operating matatu by reducing chances of corruption deals with traffic officers					

Q9. Stakeholder's buy - in

	1	2	3	4	5
Customer's receptiveness to cashless payment is likely to influence the usage of cashless payment system					
Customers consider the cashless payment system fare in terms of fare standardization thus their likelihood to use the system					
Customers consider the cashless payment system efficient in helping them plan for transport expenditure					

Customers consider the cashless payment system efficient in improving the quality of services in public transport					
Using the cashless fare system helps the conductors in reducing the burden for looking for change					
Using the cashless fare system helps in reducing risk of cash loss/ theft which is good for matatu owners					

Q10. Safety of the e – payment platform

	1	2	3	4	5
The cashless payment platform is free from technological risk (viruses) that would amount to revenue losses.					
The cashless payment platform does not compromise the data on the card of the cardholder which could lead to financial loss on the part of the card holder.					
The cashless payment platform is not vulnerable to hackers that would amount to revenue losses.					

Q 11. What do you think are the challenges facing the implementation of cashless payment system in public transport industry in Kenya? (Tick all that apply)

Challenge	Tick
Use of different cards for each vehicle	
Job insecurity and uncertainty	
Accountability of money in cards	
Involvement of all stakeholders	
Competition among the vendors	
Resistance from the service crews	

Q12. In your own opinion what are the possible solutions to the challenges highlighted above with regard to implementation of cashless payment system in public transport industry in Kenya?

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Q13. Do you have any question or issue you would like to seek for clarification with regard to the study?

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END

Thank you so much for your time to answer the questionnaire