# PASSENGER INFORMATION SOURCES AND MATATU USERS' NEEDS: A CASE STUDY OF GITHUNGURI – NAIROBI ROUTE

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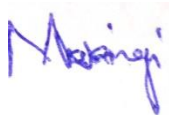
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# ABSTRACT

Travel information is important for efficient mobility and sustainable development. However, in many parts of the world especially many cities in the global south, accessible urban transport data - including basic static information on routes, stops and service quality - are scarce or missing. Whether for building mobility as a service or improving public transport, real-time passenger information is critical for seamless travel across many modes. Literature points that, overall, satisfaction and use of public transport can be increased by improving information systems, because information empowers users to make better decisions and make more efficient trips. Passenger information systems improve wayfinding and help travellers plan more efficient trips. Therefore, passenger travel information improves the way passengers interact and feel about public transport and has a direct impact on accessibility to jobs and other opportunities. Though matatus are a major mode of public transport in Kenya, passengers often have problems understanding timetables, travel time estimation due to the terrible traffic congestion especially in urban areas, route identification, real-time tracking of vehicles, efficient booking and determining fares. Those matatu users are frequently unaware of vehicle arrival and departure time, travel duration, pick up and drop off points and fares makes travel planning difficult. Thus the study sought to understand matatu users travel information needs, where they source for their travel information and to examine whether available passenger information sources are addressing matatu passenger information needs of Githunguri-Nairobi route. The study employed the service quality theory which highlights that it is critical to understand how subtle customers react to various service qualities. In order to improve the efficacy of public transport service provision, service providers should allocate resources in a way that is consistent with the primary concern of the customer which in this case is the matatu users' needs for travel information. To gain insight into what are the passenger information needs of the matatu users and how they source for travel information, the study employed a descriptive research design with quantitative and qualitative data collection approaches. The study conducted a survey with eighty five matatu users within the study area, eleven key informants and a focus group discussion with eleven matatu users within the study area. The study found that socioeconomic characteristics such as age, sex, level of education and occupation of matatu users directly influence the matatu users' needs of passenger information. Therefore there is need to consider such demographic characteristics when designing passenger information sources. Matatu users' most significant need for travel information is fares being charged during a trip, thus there is need to ensure that there is fare standardization in the matatu transport sector. The study observed that the most significant source of passenger travel information is the matatu conductors followed closely by other Matatu SACCOs employees. In this regard, it is clear that word of mouth from matatu SACCOs personnel was an important medium of passenger information provision. Furthermore, it was noted that matatu users sourced for travel information from more than one source. Thus there is need to provide multiple sources of passenger information in an integrated system to ensure that all passengers are able to access the travel information, regardless of their ability. This can be accomplished adequately by investing in a technology-enabled passenger information system. Lastly, in regards to effectiveness of passenger information sources in meeting matatu users' needs, it is clear that passenger information sources are yet to meet the intended purpose of effectively providing travel information to the matatu users within the route. This is because all the variables used to assess effectiveness of passenger information sources in meeting matatu users' needs (accessibility,

reliability, accuracy and timeliness of information sources) were rated below 50%. Additionally, though key informants from the matatu SACCOs stated that the matatu SACCOs were meeting the matatu users' needs for travel information, it is clear that there is still a gap. Some of the mechanisms proposed to ensure that passenger information sources meet matatu users' needs for travel information include: a clear understanding of the matatu users' needs to ensure that the travel information system is developed to meet their needs, taking into account the capabilities of the matatu SACCOs in providing passenger information, a clear understanding of the local context and finally, developing of information systems better suited for matatus rather than copy pasting solutions from western countries.

# CHAPTER ONE
## INTRODUCTION

Travel information is important for efficient mobility and sustainable development. However, in many parts of the world especially many cities in the global south, accessible urban transport data - including basic static information on routes, stops and service quality - are scarce or missing. Often only undocumented information of the public transport organization exists, but this is not effective for planning for millions of people in metropolitan areas (Klopp et al, 2019)[1].

The provision of high-quality passenger information is key to accessing transport services. A passenger information system is a functioning tool which provides visual and/or audio travel information to passengers on the nature and state of public transport services.

Well-functioning multi-modal public transport systems involve providing passengers with basic transit maps, transit signs, screens, and applications which allow travellers to better plan efficient trips on public transport and escape needless waiting. Growing evidence suggests the importance of this information, especially open and real-time data for public transport users and systems (Klopp et al., 2019).

Whether for building mobility as a service or improving public transport immediately, real-time passenger information is critical for seamless travel across many modes. Overall, satisfaction and use of public transport can be increased by improving information systems, because information empowers users to make better decisions and make more efficient trips (Shaheen et al. 2016). Passenger information systems improve wayfinding and help travellers plan more efficient trips. When coupled with real-time travel information, passenger information systems reduce wait times. Therefore, passenger travel information improves the way passengers interact and feel about public transport and has a direct impact on accessibility to jobs and other opportunities. This study explored passenger information sources and public transport users' needs within the context of paratransit services in Kenya using the case study of the Githunguri-Nairobi route.

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[1] Jacqueline M. Klopp, Felix Delattre, Antoine Chevre: Open Data for Inclusive Urban Public Transport Globally (June 2019) for the French Development Agency.

## 1.1 Background

Public transport in present Sub-Saharan African cities is greatly reliant on paratransit services. Paratransit services refer to the flexible road transport modes that do not follow fixed schedules. In Africa, paratransit services are described as a caliber of vehicles with chaotic management but who provide cheap, accessible and versatile transport solutions (Behrens et al, 2016). It is noteworthy that though paratransit services in Africa are negatively described in various literature, some paratransit services are run quite effectively and efficiently and are regarded as a reliable mode of transport by users.

In developed countries, paratransit services are often related to demand-responsive transport systems in areas where conventional public transportation is not available and in response to populations with special mobility needs. In developing countries, however, paratransit services are provided to serve the mobility needs of the overall population and are provided by vehicles of varying sizes from 4 seater sedans[2] to 25 seater minibuses. These minibuses are called by different names across Africa, for example, matatus[3] in Kenya and daladala[4] in Tanzania.

Paratransit services responds to the rising demand for travel from the ever increasing population of rural and urban dwellers a need that is often not fulfilled by cycling and walking. With a growing number of vehicles in cities and low regulation of routes, paratransit services quickly respond to public transport demand variations. The demand for public transport services is due to seasonal changes especially during holidays, competing forms of transport such as emergence of boda bodas[5] in Kenya and or in mobility patterns changes.

Road public transportation in Kenya goes back to the 1930s. There have been many changes since then due to population growth and urban sprawl. In 2018, road transport consisted of over 80% of passenger traffic in Kenya, while about 7% of transport is done by rail and air (Nyachieo,

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[2] Also known as Amaphela in Cape Town, South Africa
[3] The term 'matatu' is coined from the swahili word 'tatu' which means 'three'. When matatu services started in Kenya as a mode of road transport in the 1960s, matatu users paid using three coins whose value was thirty Kenyan cents for a trip.
[4] Minibus share taxi in Tanzania. Similar to the Kenyan matatu
[5] Boda bodas are bicycles and motorcycle taxis, and a term boda boda is specific to East Africa

2018[6]). There is presently no government-operated road public transport service in Kenya; in its place, road public transport is primarily provided by the paratransit system, which consists of privately-owned and operated transport service providers such as matatus, tricycles (tuk tuks), motorcycles (boda bodas), and bicycles.

Although the matatu industry often seems disorderly, it is a multifaceted system that involves a multitude of different players. Matatus in Kenya are branded by absence of fixed schedules, fluctuating fare rates, poor working conditions for matatu crews, market competition, cartels, and random stops and routes (Behrens et al, 2016). It is important to note however that there are matatus that are well run and operate on fixed schedules, clear fare rates, fixed stops and routes, trained and disciplined staff such as 2NK[7] based in Nyeri.

The term 'matatu' is coined from the Swahili word 'tatu' which means 'three'. When matatu services started in Kenya in the 1960s, matatu users paid with three coins whose value was thirty Kenyan cents per trip. Matatu services came in when the colonial and post-colonial transport services failed to serve the growing demand for urban transport. Since then, matatus have been the most significant means of transport in Nairobi Metropolitan area and the rest of Kenya (Klopp, 2014). By 2000, there were about 40,000 matatus in Kenya and about 80 percent of Kenyans using urban public transport being served by matatus (Nyachieo,2018).

Though matatus are a major mode of public transport in Kenya, passengers often has problems understanding timetables, travel time estimation due to the terrible traffic congestion in urban areas, route identification, real-time tracking of vehicles, efficient booking and determining fares. Those matatu users are frequently unaware of vehicle arrival and departure time, travel duration, pick up and drop off points and fares makes travel planning difficult.

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[6] Gladys Moraa's "Exploring Public Road Passenger Transport in Kenya: A Futuristic Utopia Or Dystopia?" . The presentation took place at Lancaster University from November 2-5, 2017. The United Kingdom.
[7] https://www.businessdailyafrica.com/bd/economy/pioneer-transport-sacco-drives-ahead-as-investors-assess-new-industry-rules--1988198

According to Caulfield and O'Mahony (2007), travellers express high levels of frustration when there are gaps in travel information. A good and dependable public transportation system is defined by how good the provision of travel information is. Having a definite arrival and or departure time, signage, and informative trip planning websites can allow a public transport user to travel efficiently. These services increase travellers' faith in using public transport services.

Passenger information can be fixed or scheduled information that changes infrequently and is used for trip planning prior to departure. An example of passenger information is a route map and/or paper timetable that is visible in stations or inside vehicles. This is a common form of Passenger Information System (PIS) in most developing countries. For instance in Kenya, route and fare information is displayed on boards which are placed on top of or beside corresponding matatus.

Passenger information can also be real-time information such as automatic vehicle location systems, which changes constantly. These type of information systems are normally used during a trip to indicate arrival and departure times, delays, stops, and changes ((Monzón et al., 2012)[8]. A good example is the passenger information display system (PIDS) at airports and railway stations. Most transport operators use integrated passenger travel information systems which provide either schedule-based information, or both schedule-based information and real-time information. Examples of passenger travel information include; routes, frequency of services, names and location of stages, operational hours, vehicles departure and arrival times, fare rates, and seat availability.

Similar to many African countries relying on paratransit as the main mode of public transport, integrated passenger transport information systems in Kenya are mainly available in air travel and the Standard Gauge Railway(SGR) but hardly in matatus or their stages. Thus, this study seeks to advance the literature base by identifying passenger information sources and matatu users' needs on the Githunguri-Nairobi Route (Route 120).

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8 Conference Paper, 2012: Real-Time Passenger Information systems and quality of bus services
Prof. Andres Monzon, Sara Hernandez, Dr. Rocio Cascajo a Transport Research Centre (TRANSyT), Universidad Politécnica de Madrid,

**1.2 Problem Statement**

Though matatus are a main mode of transport across Kenya, they have often been associated with all sorts of challenges. One significant challenge appears to be the enhancement of perceived passenger comfort and user acceptance of public transport services.

Matatu users often have challenges with unavailable timetables, travel time estimation often due to the terrible traffic congestion in most urban areas, route identification, real-time tracking of vehicles, and lack of an efficient way of booking (Monzón et al., 2012). Being unaware of vehicle arrival time, departure time, duration of travel and the current location of public transport vehicles makes the planning of travel difficult (Daskalakis & Stathopoulos, 2008).

According to Lyons et al. (2007), the type of information desired by public transport passengers varies depending on the mode of transportation and the segments of the journey. Different journey segments include pre-trip, during trip and post trip. Thus the need to understand what public transport passengers need at every stage of their journey. Studies have shown that some passengers prefer manual sources of passenger information (word of mouth), while others rely on the internet and mobile phones. In Kenya, public transport crews are a significant source of passenger information.

In the matatu industry, available passenger information includes route information and fare charts which are provided by a signboard often placed at the side of or on top of the matatu while at the stage. However, once en route it becomes difficult for passengers to know the final destination of a matatu. In such instances, a traveller has to ask the matatu crew for route and fare information.  In other instances, travellers identify the route of a matatu based on their route numbers or matatu Savings and Credit Cooperative Organization (SACCO) names which is usually not reliable due to the failure of matatus to follow a specific route, especially within Nairobi city. In most cases, matatu drivers, conductors, stage managers, and touts are the main source of passenger information. In other instances, travellers are forced to call friends and family members seeking directions on how to get to a certain direction using matatus.

In 2015, a team from the C4DLab, University of Nairobi, Columbia University and MIT developed the Nairobi Matatu Map[9] with Google. The matatu map which is linked to Google Maps, displays multiple routes, main bus terminals and matatu stages. It is thus only available to Nairobi residents with access to smart phones, limiting the usage of the map. Moreover, in 2021 the Nairobi Metropolitan Services is constructing the Green Park bus terminus[10] at Railways Club which will integrate an electronic system in the termini to keep matatu users plying the Ngong and Lang'ata routes informed of the time the buses/ matatus will be at the different pick-up stages.

Despite ongoing efforts by government agencies, non-governmental organizations, and public transportation service providers to provide travel information to public transport users, utilization of such travel information by passengers is often comparatively low, indicating that providing travel information does not always result in its use (Burkhard et al. 2013). This implies that a better understanding of the relationships between public transport users and available travel information sources is required to improve how travel information is disseminated and to ensure that it benefits public transport users (Farag & Lyons 2012). In Kenya, there is limited understanding of how matatu passengers source and utilize travel information as well as their perception of how useful the available information is pre, during, and post-trip. According to Farag and Lyons (2010, 2012) and Kambele et al., (2015), understanding travel information-seeking behaviors of public transport users has the potential to guide government agencies and public transport service providers on effective decisions regarding public transport service improvement.

## 1.3 Research Questions
1. What travel information do matatu users need along the Githunguri-Nairobi route?
2. What are the existing sources of passenger information for matatu users of the Githunguri-Nairobi route?

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[9] https://www.capitalfm.co.ke/business/2015/08/matatu-routes-now-available-on-google-maps/

[10] https://www.businessdailyafrica.com/bd/news/counties/new-city-matatu-stages-to-go-digital-3215232

3. Do the available passenger information sources address the matatu user's information needs of Githunguri-Nairobi route?

## 1.4 Overall Objective

The main objective of the study was to explore passenger information systems and public transport users' needs within the context of paratransit services in Kenya using the case study of the Githunguri-Nairobi Route (Route 120).

### 1.4.1 Specific Objectives

The study aimed to:

1. Identify the passenger information needs of matatu users of Githunguri-Nairobi route
2. Determine the sources of passenger travel information in Githunguri-Nairobi route
3. Examine whether  available passenger information sources are addressing matatu passenger information needs of Githunguri-Nairobi route

## 1.5 Study Justification

The study was motivated by the limited literature on passenger information systems in the matatu industry, despite matatus being a major means of public transport in Kenya. Also, although passenger information is essential pre-trip, during a trip, and post-trip matatu transport service providers have not invested in its provision. Passenger travel information provision in Kenya is limited to other public modes such as air travel, Standard Gauge Rail (SGR), light rail, hailing app taxis such as Uber and Taxify, which provide mobility for fewer people compared to the matatu mode of transport.

The study was conducted on Githunguri-Nairobi route which is served by two public transport SACCOs, namely Inagi and Kaka Travellers SACCOs. Public transport SACCOs are quasi-legal entities that were formed with the expectation of improving the matatu operations in Kenya. Providing travel information to travellers should be a key function but this is yet to be realized by matatu SACCOs. It is expected that the findings of this study will be useful in improving the provision of public transport services information within the study area, as well as form a basis for further research on passenger travel information and matatu users' needs in Kenya.

## 1.6 Limitation of the Study

The study was restricted to the Githunguri-Nairobi route with the anticipation that the findings of the study will be similar to other routes due to similarities in the operation of most transport SACCOs in Kenya, as well as due to cost limitations on the side of the researcher.

**CHAPTER TWO**

**LITERATURE REVIEW**

Passenger travel information in a public transport setting is information sought before, during, and after the trip to ensure a smooth journey. This information helps the traveler understand what opportunities are available for the journey. These opportunities include public transport routes, frequency of services, departure and arrival times, location and names of stations, fare rates, operational hours, and availability of seats (Nelson, 2018). This section has three major sub-sections. The first section is a review of the theoretical literature. The second section reviews the empirical literature and the final section presents the conceptual framework.

## 2.1 Theoretical Literature Review

### 2.1.1 Service Quality Theory

Consumers are becoming more aware of their needs and are demanding higher levels of service quality (Lovelock & Wirtz, 2007). Their perceptions and expectations are constantly shifting, making it difficult for service providers to effectively quantify and manage services. As a result, it is imperative for service providers to pay close attention to the most critical service features for the purposes of customer service management (Sachdev & Verman, 2004).

It is also critical to understand how subtle customers react to various service qualities. In order to improve the efficacy of service provision, service providers should allocate resources in a way that is consistent with the primary concern of the customer. Customer satisfaction is an important goal for service providers in this regard. According to Rust and Oliver (1994), satisfaction is the "customer fulfillment response," so it is viewed as an evaluation and an emotional reaction to a service. According to Geetika and Ashwini (2008), customer satisfaction is a widely accepted indicator of service quality. Grönroos (1984), notes that service quality satisfaction is typically assessed in relations to its practical and functional quality. On the other hand, according to Donabedian (1980), customers do not fully comprehend much about the practical details of a service; rather, how a service functions shapes their perception of service quality. On the other hand, measuring the perceived service quality of a service is difficult. Some researchers on the same for example, Parasuraman et al. (1985), noted that the idea is abstract and far from being

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resolved. According to Czepiel (1990), the quality of a service is the perception of a customer on if a service is meeting or exceeding what they expect. Lastly, Sachdev & Verma (2004) argues that service quality can be evaluated based on how well it meets the customer's expectation, perception, satisfaction, and their attitude. From the above discussion it is clear that service quality is still a debatable concept and thus the need to examine the dimensions of the service quality concept.

There are two major schools of thought on service quality in the literature. The first is by Grönroos (1984), of the Nordic school, who states that service quality is comprised of two dimensions of perceived service quality, the functional dimension and the technical dimension. The second is the American school, Parasuraman et al. (1988), which uses service encounter features such as tangibles, dependability, responsiveness, assurance, and empathy to frame a SERVQUAL service quality framework.

A consensus is yet to be reached upon as to which school of thought is suitable and how the two schools are related (Brady & Cronin, 2001). Therefore there is need for service providers to understand their customers' service quality expectations since they are becoming keen of the quality of the service receive.

Lehtinen (1991) argues that most services are difficult to count, measure, test and verify to guarantee quality. Principally, service quality is a conscious intangible feeling, not determined from appearances. Lehtinen (1991), states that service quality is split into process quality and outcome quality. Process quality is determined by customers as they are receiving the service, thus the perception of quality is defined by the subjective view of the customer. On the other hand, outcome quality is based on the assessment of a customer of the service results. In both perspectives, service quality is very subjective. Parasuraman et al., (1988) argues that to a customer, service quality is more problematic to determine unlike product quality. According to Lewis (1981), service quality is assessed based on the level at which the services provided meets the expectations of customers.

The study is based on the following service quality paradigm, as proposed by Parasuraman et al. (1988), in the Parasuraman, Zeithaml and Berry model (PZB Model) as the framework measure of the levels of matatu users' satisfaction with passenger information sources within the study area and assesses their emphasis on the following service quality aspects:

- Reliability: The consistency of service performances, such as provision of services on the agreed time and fulfillment of committed services.
- Responsiveness: The willingness of public transport SACCOs to provide travel information and the timeliness of the services.
- Competence: The knowledge and skills essential to provide services i.e. provision of travel information.
- Access: How easy or difficult it is to access travel information services.
- Credibility: Customers' faith that the SACCOs are genuine and trustworthy.
- Understanding the customer: The public transport SACCOs willingness to understand passengers' needs, special requests, and to identify frequent customers.

## 2.2 Empirical Literature Review

This sub-section is divided into three distinctive sections namely; types of passenger information, sources of passenger information, and passenger information and information communication technologies (ICT).

### 2.2.1 Types of Passenger Information

According to Lyons et al. (2007), the type of passenger information desired by public transport users differs by mode and segment of their journey for example; pre-trip, during a trip, and post-trip. Farag and Lyons (2010, 2012) and Kambele et al. (2015) argue that the greatest influence on public transport users' search for pre-travel information is their travel behaviour and their socio-demographic characteristics. Furthermore, Kambele et al. (2015) compare developing and developed countries using China and the United States of America as examples. In his findings, Chinese have a preference for word-of-mouth as a source of passenger information while Americans depend greatly on the Internet as a source. Farag and Lyons (2012) notes that word-of-mouth commendations are still pertinent among public transport passengers in the United Kingdom. Unlike Kambele et al. (2015), who use descriptive statistics to expound public

transportation users' pre-trip information-seeking behavior, the studies by Farag and Lyons (2010, 2012) are among the few that use a multivariate explanatory model, which is superior due to the use of multiple variables. Farag and Lyons' (2010, 2012) research focused on long-distance business and leisure trips on one end and private cars versus public transportation for unknown trips on the other, leading to the conclusion that travel behavior and socio-demographic characteristics were significant predictors.

### 2.2.2 Sources of Passenger Information

The change from traditional travel information sources such as leaflets and word of mouth to online sources is quite studied and documented especially in regards to trip planning and travel information seeking patterns of travelers (Kambele et al. 2015, Kim et al. 2015, Kim and Law 2015, Cain 2007, Beldona 2005, Fodness and Murray 1997, Lyons 1999). Additionally, research on connections between journey scheduling and internet use has been done lengthily (Kim and Law 2015, Beldona 2005). The increase in information availability and advancement of communication technologies has greatly affected the available sources of travel information at various stages of travel for public transport users.

In developed countries, momentous funding has been invested by transport service providers and tech-companies to provide travel information for multi-modal journeys, particularly for buses, metro, and rail public transport. Examples of such platforms include Citymapper, Moovit and Google maps. Additionally, Cottrill et al. (2017), notes that there is an increase in dissemination of travel information by public transport service providers via social media platforms where information is believed to be exchanged in a trustworthy, precise, and open manner.

Although the studies above show that there is growing interest in the provision of and access to travel information in the public transportation industry - particularly in buses, metro, and rail - there is currently insufficient empirical evidence in Africa of how paratransit users access travel information and at what segment of their trip.

**2.2.2.1Trip Information Gathering**

In a study that was conducted by Bachok (2007)[11] on the information needs of rail commuters (KTM Komuter services) at *Klang Valley* in Malaysia at different stages of travel. In regards to purposes of travel, the study found that about 62% of travellers were using transport services for commuting purposes (work and school).

A majority (53%) of those interviewed mentioned that they were introduced to the train services through words of mouth from family or friends, while 16% of the respondents by electronic media with print media being third with 13%. Other users stated that they learnt of the transport service because they worked, lived or shopped near the railway station.

As discussed earlier, travel information is sought out at different stages of travel namely; pre-trip, during trip and post trip. Pre-trip information is provided before starting a journey. This information can be sought from home, the workplace, or other origins. Pre-trip travel information may include routes, frequency of vehicles, departure and arrival times, location and names of stages, fare rates, operational hours, and seats availability.

Similar to the findings of Caufield, O'Mahony, *et. Al.* (2007) study, in Bachok's study, the most popular pre-trip source of travel information was the paper timetable (service guide leaflets) at 29%. The internet was cited as a source of travel information by 6%, followed by telephone at 3% of the respondents. Other sources of travel information were word of mouth while some respondents were not using any source to access travel information.

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[11] Based on a paper presented by Syahriah Bachok a PhD. Student from the *Transport Systems Centre, University of South Australia, at the* **CAITR – 2007, 29th Conference of the Australian Institutes of Transport Research, 5th – 7th December 2007.**
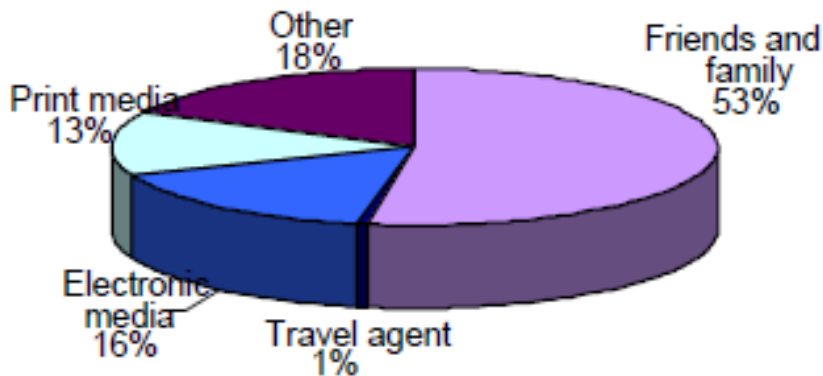
**Figure 2.1: Respondents' First Awareness Medium, n= 537; (Source: Bachok, S. 2007)**
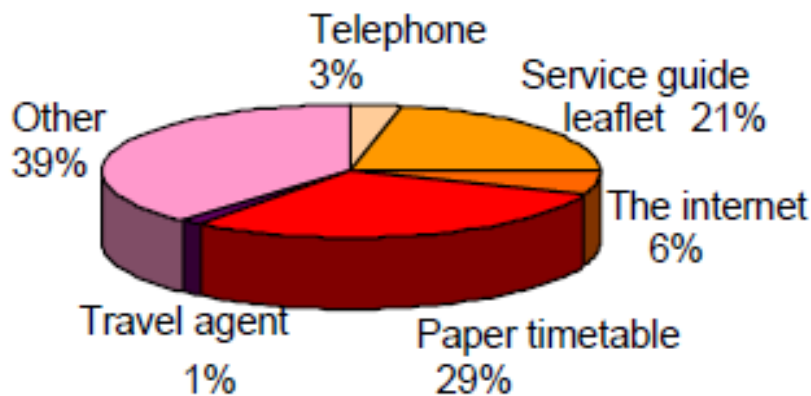


**Figure 2.2: Respondents' Pre-Trip Medium, n = 537; (Source: Bachok, S. 2007).**

Most travel information is provided at terminals and stations where most of the travellers have made some form of travelling, for example travelled from their home to the stage/station or from place of work to the station. According to Bachok (2007) there are often a number of travel information sources at stages, stops, or terminals such as public transport service provider's staff. In Bachok's research, the rail operator's travel information sources at the terminal were printed materials, voice announcements, and staff from the train company stationed to man the ticket and information desks, particularly during peak hours. 37% of respondents used static travel information displays as their primary source of travel information. While preprogrammed messages were used by 18% of respondents, platforms or rail service workers were used by 15%.

Friends and family were cited as other sources of travel information, while approximately 8% of respondents did not use any source and instead went to the rail station to wait for the next train.

On-board travel information is provided on public transportation vehicles during the trip. Such travel information includes the current location of the vehicle, the next stage, arrival and departure times, multi-modal transfers, and updates on possible delays or change in routes. According to Bachok (2007), 2/3 of the respondents stated that they received on-board travel information from train drivers' announcements. The second source of on-board information was provided by the train staff by 17%. Some users surveyed stated that they got information by looking out the windows to know the location of the train while others asked fellow passengers. Lastly, the remainder of the respondents in Bachok's study stated that they did not access travel information from any source.

It can be established that the provision of various sources of travel information is highly valued by public transport users. Nevertheless, it is crucial to note that Bachok's (2007) study did not include evaluation of the overall effectiveness of varied information media. From the study, it is clear that public transport service reputation and goodwill are quite important areas, especially since the bulk of public transport users were attracted to first utilize the rail service through word of mouth. Moreover, pre-travel information was thought valuable for trip planning since it was essential in the efficient selection of means of transport, departure time, and route of travel especially if the travel information provided is accurate and reliable. Therefore, intentionally provided travel information may be very helpful in assisting existing and potential users of public transport services to make better travel decisions.

Lastly, sign boards and public transport service providers' staff was utilized by respondents in Bachok's (2007) study as two additional sources of gathering travel information. It was noted that train users who depended on the public-address system as a source of travel information was very low. This could be due to the low frequency at which such announcements were made. Thus the need to provide public transport users with accurate and reliable travel information as well as having staff equipped with stellar customer relations and communication skills.

**2.2.3 Passenger Information and ICT**

In recent years, travel information systems have advanced significantly. A diverse range of applications developed to make travel more effective and efficient, as well as public transportation services more reliable have benefited public transportation users. The integration of multiple modes of transportation with applications, informing the departure location, departure time, arrival time, and fare rates, is one of the most significant advancements (Gossling, 2010). Moovit and Moovel are two such applications that, in addition to the aforementioned features, also include payment preferences, delay control, a wider range of transportation modes such as rental bikes or car-sharing and cross-border destination options.

Additionally, Google has digitalized the world's transport infrastructure even in the remotest of locations through Google Maps. This innovation calculates the distances between locations, identifies public transport connections, comparison of travel times, traffic flows, and real-time speed of movement. In addition, Google Maps provides routing advice and keeps track of friends and the movement of other travelers. Simple route-finding applications have been developed for cyclists to identify the quickest and easiest routes for cycling in cities, calculating distance, identifying the shortest route to a destination, and calculating travel time. Navika App, BeeLine, and Bike Citizen are examples of such apps.

In Ghana, Accra Mobility is a smartphone technology that aims to obtain knowledge of the current "*Trotro*[12]" services including operators association, routes, level of service, and basic travel pattern information in a fast and cost-effective approach. In Kenya, the Digital Matatu Project in Nairobi is a similar app that was developed to assess if mobile technology can be used to gather data on paratransit services (matatus) and whether the collected data can be converted into the General Transit Feed Specification (GTFS) data for extensive usage. In addition, Ma3Route[13] is another mobile/web/SMS based platform that crowdsources for transport data and provides public transport users with information on matatu directions, traffic flows, and driving reports. The app was developed to make travelling easier by sharing timely transport information. Though the platform hoped to improve saneness to the Kenyan roads and inform

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12 Paratransit embodied by minibuses, which constitute the main mode of public transport in Ghana.
[13] Ma3Route is simply a sheng word meaning Matatu Route.

urban planning and transport regulation, very few users of matatus in Kenya use the platform. This is because very few Kenyans know about the application. This shows the need for public transport service providers to understand what is needed by matatu users while designing travel information systems.

## 2.4 Conceptual Framework

The conceptual framework below (Figure 2.3) highlights the linkage between the dependent and independent variables of this study. The independent variable was passenger information sources while the dependent variable was matatu users' travel information needs. The intervening variable likely to influence the relationship between passenger information sources and matatu users travel information needs include the socio-economic status of the matatu users.

**Figure 2.3: Conceptual Framework**

**Independent Variable**                                    **Dependent Variable**

Passenger Information Sources
- *Matatu* operators
- SACCO offices
- Mobile phones
- Internet

Matatu Users travel Information Needs
  Traffic information
  Routes information
  Departure and arrival times
  Fare rates
  Operational hours
  Availability of seats
  Duration of travel

**Intervening Variables**

• Socio-economic influences;

  ➢ sex
  ➢ Education
  ➢ Occupation
  ➢ Age

**Source: Authors Conceptualization**

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# CHAPTER THREE
# METHODOLOGY

## 3.0 Introduction

This chapter covers the research methodology and includes the research design, study area description, target population, sampling and sample size selection, data collection, and analysis.

## 3.1 Research Design and Methodology

Orodho (2014) describes research design as a plan or a scheme that is applied to answer questions that arise from a study's research problem. Bryman (2012 pg. 45) in his book on social research methods defines research design as a "structure that guides the execution of a research method and the analysis of the subsequent data." This study used a descriptive research design which involves collecting data to answer questions concerning the present status of an area or population under study. This study identifies the Githunguri-Nairobi route users' needs for travel information and determines sources of passenger travel information, how adequate they are and areas of improvement.

## 3.2 Study Area Description, Target Population, and Selection

The study was conducted on the Githunguri-Nairobi route. The route has 37 stops departing from the Githunguri Terminal and ending at OTC (Overland Transport Company). The main stops include[14] Githunguri Terminal, Makutano, Jamaica, Njino, Ngemwa Police Post, Ting'ang'a, Ndumberi, Kiambu Stage, Kwa Ahindi, Kwa Do/Kiambu-Limuru Road Junction/Red Nova, Kirigiti, KIST, Mushroom Stage, Thindigwa, Githogoro, Runda Junction, Nakumatt Ridgeways, Ridgeway Spring, Wonderjoy, Rock City, Shark's Palace, CID, Muthaiga Golf Club Stage, Pangani Stage, and OTC terminal.

The route is served by two matatu SACCOs: Kaka Travellers Limited and Inagi Travellers SACCO. Kaka Travellers SACCO has a total of 200 registered vehicles, out of which 105 are express matatus that ply the Githunguri-Nairobi route daily. Kaka Travelers SACCO's offices

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[14] Moovit is a public transit app that gives you KBS suggested routes, real-time bus tracker, live directions, line route maps in Nairobi - https://moovitapp.com/index/en/public_transit-line-120-Nairobi-3540-856812-352374-1

are in Githunguri with booking offices at Githunguri Stage and OTC in Nairobi. The booking offices are operational every day from 6am to 6pm. Inagi Travelers SACCO has about 90 matatus with about 22 of them serving the Githunguri-Nairobi route daily with two booking offices, one in Githunguri and another at OTC. Their SACCO office is at Ikinu. The two SACCOs provide public transport services every day of the week from 4am to 10pm. The average travel time from Githunguri to Nairobi is one hour. This matatu route was selected for several reasons. First, the route serves the two counties of Kiambu and Nairobi, covering the urban and peri-urban areas of Nairobi City County, Kiambu, Ndumberi, Ting'ang'a, Ikinu and Githunguri.

Secondly, this route serves a population with diverse social and economic characteristics ideal for studying how such characteristics influence passenger information-seeking behaviour.

Thirdly, the study area was selected taking into consideration budget limitation and Covid-19 pandemic movement restrictions. The author resides within the peri-urban area and it was possible to collect data. The target population is the entire group of people in whom the researcher is interested. The study population comprised male and female matatu users of Githunguri-Nairobi route. The target population is diverse socially and economically, including students, traders, and professionals who travel between Githunguri and Nairobi for various reasons. A section of the target population travels on a daily basis while others travel on a need-be basis.

The study collected data using three methods; a survey with matatu users of the route, Key Informant Interviews (KII) with a matatu driver, a conductor, a stage attendant and a SACCO official from each of the two SACCOs within the study area. Additional KIIs were conducted with three informants with knowledge of public transport in Kenya and travel information from both the private sector and government agencies. The last method of data collection used was a Focus Group Discussion (FGD) with eleven matatu users of the route to complement the data collected through the survey on the matatu users' needs and passenger information sources.

### 3.3 Sampling and Sample size

The eligible population of this study was 5080 matatu users of Githunguri Nairobi route. This was calculated based on the number of matatus plying the route, their capacities and the average number of trips per day: Kaka SACCO runs 105 express matatus, while Inagi runs 22, giving a total of 127. Each matatu carried 8 passengers per trip based on the Covid 19 protocols. On average, each matatu makes 5 trips daily as shown on Table 3.1 below.

**Table 3.1: Eligible Population**

| SACCO | No. of Express Matatus | Capacity per matatu | Average No. of Trips | Totals |
|---|---|---|---|---|
| Kaka Travellers | 105 | 8 | 5 | 4200 |
| Inagi SACCO | 22 | 8 | 5 | 880 |
| TOTALS | | | | 5080 |

According to the Kaka Travellers SACCO chairperson during a reconnaissance study, over half of the users of the route make return trips to Githunguri in the evening. Therefore, to get the eligible population for the study, the total population of 5080 passengers was halved to get 2540 passengers.

To determine the sample size, the study utilized the Nicole Radziwell (2016), 10% sample size rule, where the sample size should not be more than 10% of the target population when the target population is known. In this regard, the sample size for the study was 254 passengers. However, due to time and resource limitation, the study utilized a convenience sample of a third of the sample size which is 85 passengers for the survey. The study also conducted key informant interviews with staff of SACCOs (2 matatu drivers, 2 conductors, 2 SACCO officials, 2 stage attendants) within the study area to determine their understanding of matatu users' information needs and the type of information SACCOs provide if any. An additional KII was conducted with 3 individuals with knowledge on public transport and travel information from both private sector and government agencies. Lastly, FGD with the matatu users of Githunguri-Nairobi route was conducted with 11 participants.

### 3.4 Data Collection Techniques & Procedures

The study relied on primary data. Interview guides were used to gather data from key informants (matatu drivers, conductors, and SACCO officials) and with four other key informants with knowledge on public transport and travel information from both private sector and government agencies. A focus group discussion guide was used to collect data from the matatu users of Githunguri-Nairobi route. Questionnaires were utilized to collect data from matatu users of Githunguri-Nairobi route.

Data collection was done at the Githunguri Stage since the two SACCOs are based in Githunguri. The data was collected over a period of one week (Monday to Sunday) at three different time slots (morning, midday and evening) on a daily basis. This ensured the capturing of data with regards to mobility dynamics of the population such as travels at peak hours and off-peak hours and at different days of the week.

### 3.4.1 Response Rate

Survey respondents comprised of 85 matatu users of Githunguri-Nairobi route, while the focus group discussion was made up of eleven matatu users of the route and eleven key informants who included SACCO officials, academia and transport professionals. The distribution of the respondents is outlined in Table 3.2 below;

**Table 3.2: Response Rate**

| Categories | Targeted | Respondents | Percentage |
|---|---|---|---|
| Survey | 85 | 85 | 100.0% |
| KII | 12 | 11 | 91.7% |
| Total | 109 | 107 | 98.97% |

From Table 3.2, it is clear that high response rates were obtained from commuters (100%). The overall response rate was 98.97%. According to Mugenda and Mugenda (2003), "... a 50% response rate is adequate, and a response rate greater than 70% is very good in descriptive studies" (p. 46). Hence, the response rate was significant to draw valid conclusions for the study. The high response rate was attributed to the fact that data collection for the survey was done throughout the week at different time slots which ensured reaching out to a varied number of

respondents during their times of travel. In regards to KIIs, some of the interviews were conducted via google meet so as to observe Covid-19 social distancing protocols. This also contributed to the high response rate as such interviews were also conducted at respondents own convenience; in the evenings after work, while away on holiday and regardless of time zones for international respondents. The FGD participants included an electrician, welder, market women (four with one living with disabilities), computer instructor, driving school instructor, teacher and two businessmen. The main themes of discussions included the matatu users' needs of travel information, sources of such information for matatu users and effectiveness of meeting the matatu users travel information needs.

## 3.5 Instrument Validity & Reliability

The questionnaire and the interview guide were validated by pretesting them in the study area with 5 respondents to find out whether the questions were clear and well understood by the targeted population. Additionally, the instruments were shared with the author's supervisor, colleagues, and other experts in research for review. This feedback was used to make necessary adjustments on the instruments for instance by removing the vague questions, spelling errors among other corrections.

## 3.6 Data Processing & Analysis

The study's data was analyzed quantitatively as well as qualitatively. Following data collection, the data was checked to see if there were any obvious flaws. The survey questionnaire data was coded and entered into a computer for analysis with Microsoft Excel and Statistical Package for Social Sciences (SPSS). Microsoft Excel was used in computation of frequencies, generation of tables, charts and graphs. While SPSS was used to cross tabulate the relation between dependent and intervening variables.

The qualitative data came from the focus group discussion and key informant interviews. Notes were taken, and the data was analyzed by grouping it according to the themes highlighted in the research questions. While the key informant interview and focus group data were thematically analyzed, to assist in elaboration of some of the information gathered through questionnaires. The unit of analysis in the study is the matatu users of the Githunguri Nairobi route since the

analysis in the study is based on what are the travel information needs of matatu users and how they seek for that information.

### 3.7 Ethical Consideration

The study revolved around four ethical principles as illustrated by Diener & Crandall (1978) in their 'Ethics in Social and Behavioral Research' book. Namely;

1.          Guaranteeing no harm to the participant
2.          Acquisition of informed consent
3.          Ensuring there is no invasion of privacy
4.          Being truthful

To meet the above ethical standards, the study ensured that respondents were informed that the study is purely for academic purposes and their confidentiality will be maintained and protected. Consent was sought from all respondents before the commencement of data collection.

The study also strictly observed and adhered to Covid-19 guidelines provided for by the Ministry of Health during data collection.

# CHAPTER FOUR
# STUDY RESULTS AND DISCUSSION

## 4.1 Introduction

Matatu users' information needs and the sources of passenger information are the central focus of this study. Though matatus are a major mode of public transport in Kenya, matatu users often have problems understanding matatu timetables, estimating the travel duration due to the terrible traffic congestion in urban areas, route identification, real-time tracking of vehicles, efficient booking, and determining fare rates. The fact that matatu users are frequently unaware of vehicle arrival and departure times, travel duration, pick-up and drop-off points, and fare being charged complicates travel planning. When there are gaps in travel information being provided by public transport agencies, travelers often express high level of frustration with the mode of transport (Caulfield and O'Mahony, 2007). A good and dependable public transportation system is defined by how good the provision of travel information is. Having definite arrival or departure times, information boards, and informative trip planning websites can allow a public transport user to travel efficiently and to increase their faith in using public transport services.

This chapter discusses various matatu users' information needs, the various sources of passenger information available and the effectiveness of passenger information sources in meeting matatu user's needs. The findings are presented on the basis of themes derived from research questions and objectives. The first theme is the passenger information needs of matatu users, which explores route-use frequency in a week, purposes for making trips, and the types of travel information sought by passengers. The second theme is the sources of passenger information, which explores at what segment of trip travel information is sought by passenger and what are the different sources of passenger information that are available in the study area. The last theme is the effectiveness of passenger information sources in meeting matatu users' needs. Specifically, this theme focuses on how accessible, reliable, accurate and timely travel information sources are, what should inform provision of passenger information, whether matatu service providers offer training to their staff on passenger information provision, and why passenger information is not a priority in the sector.

**4.2 Demographic of Matatu Users**

An individual's travel behavior has a significant impact on their travel information-seeking actions while using or planning to use public transportation services. As a result, it is critical to understand the demographic characteristics of matatu users, such as their gender, age, education level, and occupation.

Demographic data about research participants is required to determine whether the individuals in a particular study are a representative sample of the target population for generalization purposes (SAGE[15]). It also influences how respondents respond to specific questions, such as when speaking to a married woman with children versus another who is not married and has no children.

In this study, the sample population of the survey was randomly selected from the eligible population and their demographic characteristics were captured to find out how such characteristic influences the matatu users' needs of travel information

**4.2.1   Sex of Respondents**

The biological characteristic of being male or female is referred to as sex. In most cases, sex influences the types of choices and decisions that people make. Several studies have discovered numerous physical, mental, and social differences in the information-seeking behavior of men and women (Hsieh & Wu 2015; Savolainen 2013). According to Hsieh and Wu (2015), information seeking may differ depending on the sex of the user, making it a variable in the information-seeking process. The survey sought to ascertain the sex of matatu riders on the Githunguri-Nairobi route. As shown in Figure 4.1 below, the majority of study respondents (53 %) were males, while females made up 47%.

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[15] https://methods.sagepub.com/reference/encyc-of-research-design/n108.xml

**Figure 4.1: Sex of Respondents**



**Respondents' Sex**

47%   53%
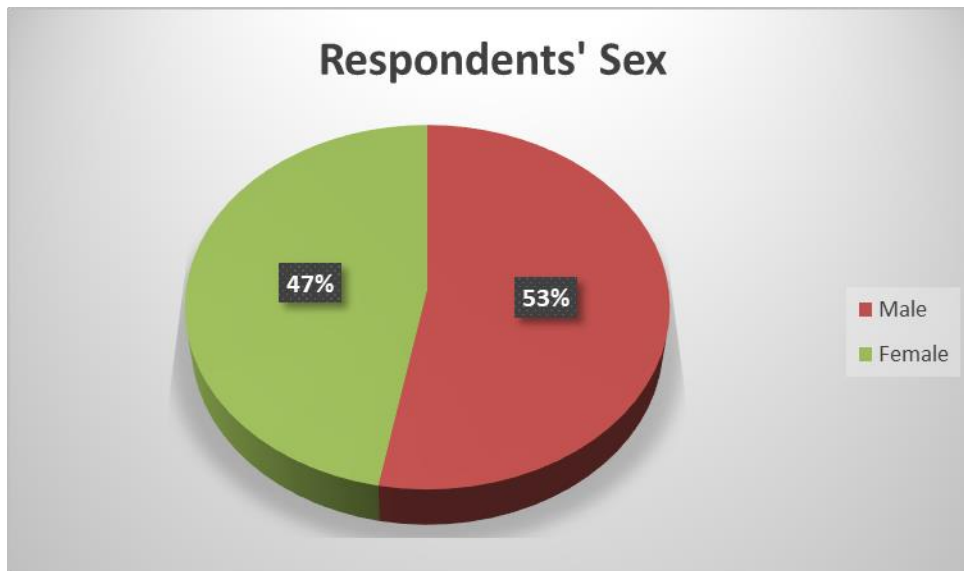
■ Male
■ Female

**Source: Field Data**

In the study by Bachok (2007), 52% of the survey respondents were male while 48% were female. Similar to the study by Bachok, (2007) there was a small variation between the percentage participation of male and female in this study (6%), though this was not pre-determined prior in the methodology.

A cross tabulation of matatu users' needs by sex of the respondents in Table 4.1 below, shows a slight difference of 0.7% between male and females who sought for traffic information. A significant percentage of females (30.6%) sought to know which route a matatu was taking compared to males (18.4%). This could explain why females more than males sought to know the names and location of stages during their journey. In addition, male matatu users (10.5%) needed information of when they will depart from a stage and when they are likely to arrive at their destination than females(5.6%) which also explains why more male than females sought for information on possible delays and duration of their trip.

**Table 4.1: Cross Tabulation of Matatu Users Information Needs by Sex of Respondents**

| | | | Sex of Respondent | | Total |
|---|---|---|---|---|---|
| | | | Male | Female | |
| **Matatu Users Information Needs** | Traffic Information | Count | 5 | 5 | 10 |
| | | % within Sex | 13.2% | 13.9% | |
| | Possible Delays | Count | 5 | 4 | 9 |
| | | % within Sex | 13.2% | 11.1% | |
| | Route Information | Count | 7 | 11 | 18 |
| | | % within Sex | 18.4% | 30.6% | |
| | Departure and Arrival times | Count | 4 | 2 | 6 |
| | | % within Sex | 10.5% | 5.6% | |
| | Names and location of stages | Count | 7 | 7 | 14 |
| | | % within Sex | 18.4% | 19.4% | |
| | Fare rates | Count | 26 | 23 | 49 |
| | | % within Sex | 68.4% | 63.9% | |
| | Operational Hours | Count | 3 | 1 | 4 |
| | | % within Sex | 7.9% | 2.8% | |
| | Availability of seats | Count | 2 | 3 | 5 |
| | | % within Sex | 5.3% | 8.3% | |
| | Duration of Travel | Count | 6 | 1 | 7 |
| | | % within Sex | 15.8% | 2.8% | |
| **Total** | | Count | 38 | 36 | 74 |
| | | % of Total | 51.4% | 48.6% | 100.0% |

In regards to fare rates, both sexes significantly sought for information for matatu fare rates. However, male passengers sought to know the fares being charged during their matatu trips more than females by 4.5%. Moreover, a substantial number of male (7.9%) matatu users sought to know the operational hours of matatus compared to females (2.8%). This can be attributed to the frequency of males travelling very early in the mornings and very late in the evenings, as opposed to females since females are often concerned of their safety and security and thus tend to avoid travelling during such times.

Based on the above findings, it can be concluded that the sex of matatu users greatly influences their passenger/travel information needs. There is need for matatu service providers to consider

sex of their customers as key in the provision of passenger information that meets the travel information needs of matatu users.

### 4.2.2 Age of Respondents

Age is an important demographic characteristic because people of the same age group frequently share many of the same experiences, values, beliefs, and attitudes. The age of the respondents was sought in this study to understand what influence age had on their travel information needs and where they sourced their travel information. The study established that majority of the respondents were between the ages of 25 to 35 years of age (45%) while minority of the respondents were 60 and above years of age (Figure 4.2). In the study by Bachok (2007), about half of the respondents were between 21 and 30 years of age.

**Figure 4.2: Age of Survey Respondents**
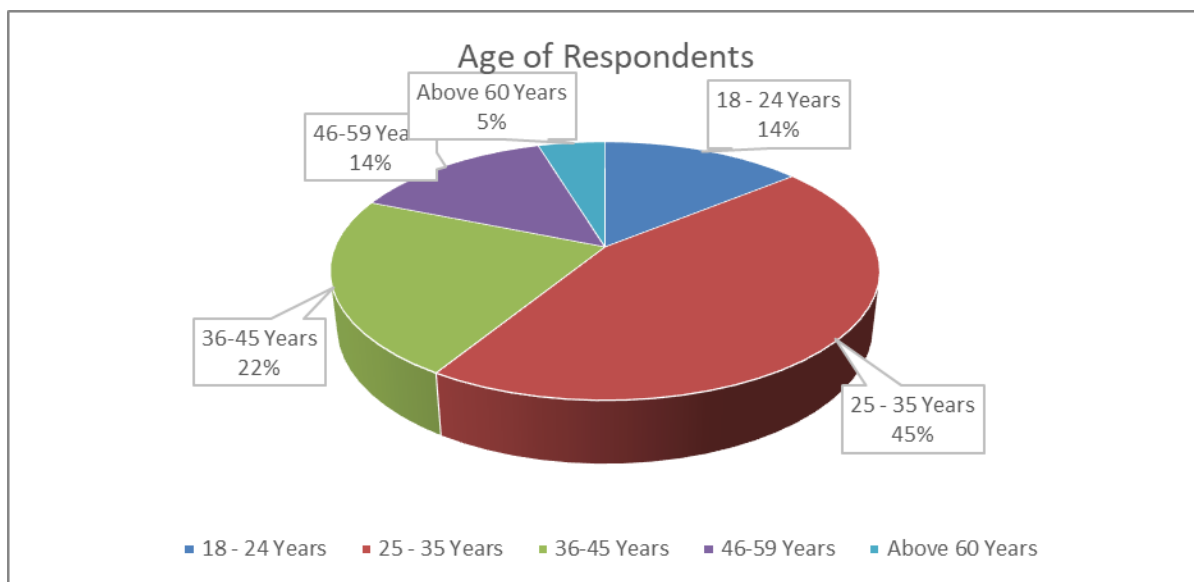


**Source: Field Data**

In the cross tabulation of matatu users' needs by age of the respondents (Table 4.2), age was categorized between those aged 18 to 35 years of age (youth) and those aged above 35 years. The findings indicate that youth (59.5%) sought passenger information more often than those aged above 35 years of age (40.5%). Respondents above 35 years of age significantly sought for passenger information on possible delays, departure and arrival times and duration of travel while the youth sought for travel information mainly for routes, names and location of stages, fare rates and availability of seats.

**Table 4.2: Cross Tabulation of Matatu Users Information Needs by Age of Respondents**

| | | | Age of respondents - categorized | | Total |
|---|---|---|---|---|---|
| | | | **18-35** | **Above 35** | |
| **Matatu Users Information needs** | Traffic Information | Count | 5 | 5 | 10 |
| | | % within Age | 11.4% | 16.7% | |
| | Possible Delays | Count | 4 | 5 | 9 |
| | | % within Age | 9.1% | 16.7% | |
| | Route Information | Count | 14 | 4 | 18 |
| | | % within Age | 31.8% | 13.3% | |
| | Departure and Arrival times | Count | 2 | 4 | 6 |
| | | % within Age | 4.5% | 13.3% | |
| | Names and location of stages | Count | 8 | 6 | 14 |
| | | % within Age | 18.2% | 20.0% | |
| | Fare rates | Count | 32 | 17 | 49 |
| | | % within Age | 72.7% | 56.7% | |
| | | % of Total | 43.2% | 23.0% | 66.2% |
| | Operational Hours | Count | 2 | 2 | 4 |
| | | % within Age | 4.5% | 6.7% | |
| | Availability of seats | Count | 3 | 2 | 5 |
| | | % within Age | 6.8% | 6.7% | |
| | Duration of Travel | Count | 3 | 4 | 7 |
| | | % within Age | 6.8% | 13.3% | |
| **Total** | | Count | 44 | 30 | 74 |
| | | % of Total | 59.5% | 40.5% | 100.0% |

These findings shows that those aged above 35 years of age were significantly keen on seeking travel information which had a time factor. They were concerned of the time they will take to travel from one location to another and sought to be made aware when delays were likely to happen during their trip. On the other hand, respondents below 35 years of age were significantly keen on how much a trip would cost.

### 4.2.3 Respondents' Education Level

For the purpose of this study, education level was categorized as no education, primary school education, secondary school education, diploma/certificate level, and degree or post graduate levels. The respondents were asked to indicate their highest level of education and most had secondary and post-secondary education as shown in Table 4.3 below.

**Table 4.3: Respondents' Level of Education**

| Level of education | Frequency | Percentages (%) |
|---|---|---|
| No Education | 0 | 0 |
| Primary | 8 | 9 |
| Secondary | 24 | 28 |
| Diploma/Certificate | 29 | 34 |
| Degree | 20 | 24 |
| Post graduate | 4 | 5 |
| Totals | 85 | 100 |

**Source: Field Data**

Respondents' education levels were classified by those without tertiary level of education and those with tertiary level of education. These classifications were used to cross tabulate matatu users' information needs by respondents' education level. Respondents with tertiary level of education (63.5%) sought passenger information more than those without tertiary education (36.5%) as shown in table 4.4 below.

**Table 4.4: Cross Tabulation of Matatu Users Information Needs by Level of education of Respondents**

| | | | Education categorized | | Total |
|---|---|---|---|---|---|
| | | | No tertiary education | Tertiary education | |
| **Matatu Users' Information needs** | Traffic Information | Count | 4 | 6 | 10 |
| | | % within Education | 14.8% | 12.8% | |
| | Possible Delays | Count | 3 | 6 | 9 |
| | | % within Education | 11.1% | 12.8% | |
| | Route Information | Count | 5 | 13 | 18 |
| | | % within Education | 18.5% | 27.7% | |
| | Departure and Arrival times | Count | 4 | 2 | 6 |
| | | % within Education | 14.8% | 4.3% | |
| | Names and location of stages | Count | 4 | 10 | 14 |
| | | % within Education | 14.8% | 21.3% | |
| | Fare rates | Count | 15 | 34 | 49 |
| | | % within Education | 55.6% | 72.3% | |
| | Operational Hours | Count | 1 | 3 | 4 |
| | | % within Education | 3.7% | 6.4% | |
| | Availability of seats | Count | 1 | 4 | 5 |
| | | % within Education | 3.7% | 8.5% | |
| | Duration of Travel | Count | 3 | 4 | 7 |
| | | % within Education | 11.1% | 8.5% | |
| **Total** | | Count | 27 | 47 | 74 |
| | | % of Total | 36.5% | 63.5% | 100.0% |

The level of education has been observed to play a role in decision-making. The findings presented above are supported by literature, such as Levinson et al. (2005), who found that less

educated patients prefer to have medical professionals make decisions for them rather than being actively involved in the decision-making process. According to Sprotles and Kendall (1986), more educated people prefer to have more information on a subject or product before making a decision. Furthermore, Ong and Tan (2010) found that education level predicted passenger preference among airline types. Thus, education level significantly influences matatu users' levels of seeking travel information. Those who are highly educated seek far more travel information, as compared to those who are less educated.

### 4.2.4 Occupation of Respondents

Among all socio-demographic variables considered, occupation status had the greatest impact on travel information-seeking behavior. The study showed that most (49%) of the respondents were using the Githunguri-Nairobi Route for business purposes, while those who used the route for commuting purposes were both below 40%, travelling namely to and from workplaces (32%), and educational institutions (14%). Commuters often make more trips in a week, as they need to travel to work or school compared to those travelling for business purposes. From the FGD, it was revealed that most of the route users traveled to Nairobi from Githunguri to purchase business supplies either in Gikomba, Eastleigh, Kamukunji or Muranga Road. Unlike the findings by Bachok (2007), which confirmed that 62% of the survey respondents used train services for commuting services (school and work), this study found that the main purpose of travel for the majority of respondents was for business purposes (Fig. 4.3).

**Figure 4.3: Occupation of Respondents**
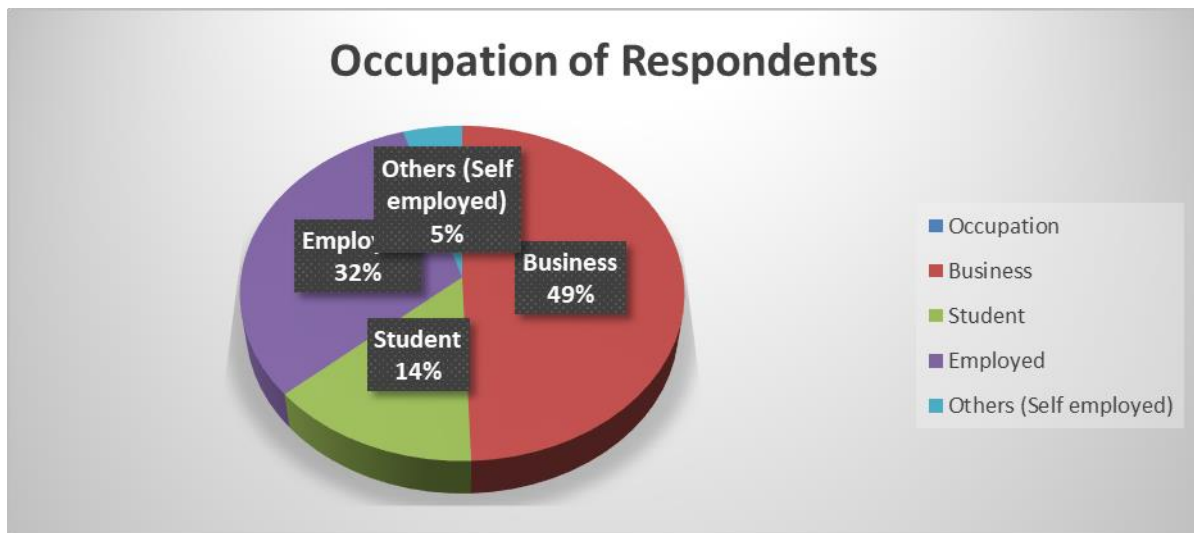
**Source: Field Data**

Respondents who are employed were keen to seek passenger information on traffic information, as compared to those who were students and in business. This can be attributed to the fact that those who are employed are time bound, as they have to get to their places of work at set time. Out of the 66.2% of respondents who sought for fare rates information, 70% of them were in business, 55% students and 64% employed, as shown in Table 4.5 below. Those who use the route for business purposes often have luggage, thus need to ensure what they will be charged to move from one location to another. As discussed earlier, traders from Githunguri travel to Nairobi to buy goods in Gikomba, Kamukunji and Eastleigh. Additionally, those employed are keen to seek fare rates since they often travel using the route on a daily basis hence any sudden change in fare being charged will affect their financial budgets.

**Table 4.5: Cross Tabulation of Matatu Users Information Needs by Occupation of Respondents**

| | | | Occupation of Respondents - categorized | | | Total |
|---|---|---|---|---|---|---|
| | | | Business | Student | Employed | |
| **Matatu Users' Information needs** | Traffic Information | Count | 5 | 0 | 5 | 10 |
| | | % within Occupation | 12.5% | 0.0% | 20.0% | |
| | Possible Delays | Count | 4 | 2 | 3 | 9 |
| | | % within Occupation | 10.0% | 22.2% | 12.0% | |
| | Route Information | Count | 8 | 3 | 7 | 18 |
| | | % within Occupation | 20.0% | 33.3% | 28.0% | |
| | Departure and Arrival times | Count | 3 | 2 | 1 | 6 |
| | | % within Occupation | 7.5% | 22.2% | 4.0% | |
| | Names and location of stages | Count | 8 | 2 | 4 | 14 |
| | | % within Occupation | 20.0% | 22.2% | 16.0% | |
| | Fare rates | Count | 28 | 5 | 16 | 49 |
| | | % within Occupation | 70.0% | 55.6% | 64.0% | |

| | | | | | | |
|---|---|---|---:|---:|---:|---:|
| | Operational Hours | Count | 1 | 0 | 3 | 4 |
| | | % within Occupation | 2.5% | 0.0% | 12.0% | |
| | Availability of seats | Count | 3 | 0 | 2 | 5 |
| | | % within Occupation | 7.5% | 0.0% | 8.0% | |
| | Duration of Travel | Count | 4 | 1 | 2 | 7 |
| | | % within Occupation | 10.0% | 11.1% | 8.0% | |
| **Total** | | Count | 40 | 9 | 25 | 74 |
| | | % of Total | 54.1% | 12.2% | 33.8% | 100.0% |

## 4.3 Passenger Information Needs of Matatu Users

Passenger information needs of matatu users are better understood through an assessment of the travel characteristics of the study respondents. In this study, the travel characteristics that were covered include frequency of travel in a week and purpose of travel.

In order to understand the information needs of matatu users on the Githunguri-Nairobi route, several questions were asked. First the study sought to understand respondents' frequency of use of the route. It was established that 58% of the respondents used the route between one – two days a week, while 26% used the route between three – five days a week, with only 16% of respondents using the route more than five days a week (Table 4.6). Matatu users' whose frequency of travel in a week is more than five days a week were mainly commute traveling to school and work.

As shown in Figure 4.3 above, 49% of respondents used the route for business purposes which entailed travelling to Nairobi to get their business supplies, thus using the route between one to two days in a week. The FGD revealed that most of those who travelled for business purposes were mainly market traders who sourced their goods in Gikomba market, Kamukunji and Eastleigh trading centres.

**Table 4.6: Frequency of use of Githunguri-Nairobi Route**

| How often do you use route 120 weekly | Frequency | Percentage (%) |
|---|---|---|
| 1-2 days | 49 | 58 |
| 3-5 days | 22 | 26 |
| More than 5 days | 14 | 16 |
| Total | 85 | 100 |

**Source: Field Data**

Secondly, the study sought to understand the purpose of trips made by respondents of Githunguri-Nairobi route (Table 4.7). It was found that 40% of respondents used the route to work (employment and business engagements), 26% for shopping purposes, 15% to attend social events, 12% for educational purposes while 7% had other purposes, including business engagements, connecting to other destinations, visiting government offices and personal issues.

**Table 4.7: Purposes of Trip**

| Purpose of trips | Frequency | Percentage (%) |
|---|---|---|
| Work | 34 | 40 |
| School | 10 | 12 |
| Shopping | 22 | 26 |
| Social events | 13 | 15 |
| Other specify | 6 | 7 |
| Total | 85 | 100 |

In order to establish the passenger information needs of matatu users, the study sought to understand if the matatu users seek travel information and their understanding of what passenger information is. 92% of the respondents answered yes while 8% of the respondents answered no to the question asking if they seek passenger information. The FGD respondents defined passenger information as information that helps an individual to move from one place to another such as information on routes, fares being charged, route diversions, and names and location of

stages. The FGD respondents further stated that such information is mainly from drivers and conductors and it is sourced at the stages before the trip. Information on fare rates was the most sought for passenger information by 66.2% of the respondents while the least cited passenger information need was availability of seat in the matatu and matatu operational hours by 6% of the respondents as shown in figure 4.4 below.

**Figure 4.4: Passenger information Needs of Matatu Users**
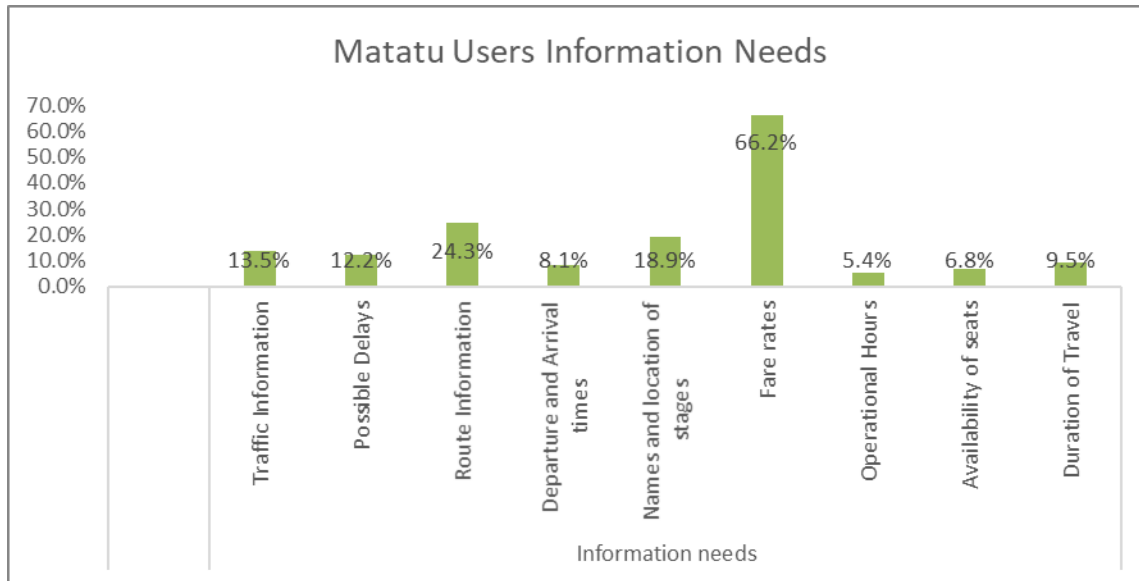


**Source: Field Data, 2021**

The study releveled that the most significant passenger information need of matatu users was the fare rates. Fare rates differ depending on the time of day (peak and off peak) and the season. Fares are high during the peak hours of travel due to the increase in demand for transport services especially in the evenings and mornings. Fare rates are hiked during events such as public holidays, since most individuals - especially those working in urban areas - travel to the rural areas for the holidays. Fares are also higher during school opening and closing days since during such times there is increased demand by pupils and students from and to boarding schools. The study revealed that matatu users who travelled on the route daily on a weekly basis were quite keen on fare discounts. The high level of seeking information on fares is therefore due to uncertainty, which is caused by a lack of government control of fares and use of paratransit.

On the other hand, the least passenger information sought was on availability of seats and operational hours of the matatus. This is because often when a matatu is not yet full to capacity the conductor will always announce the need for more passengers, often even mentioning how many passengers are needed. In addition, since most matatus within the route are booked at the booking office, the booking office attendant ensures that vehicles are booked to capacity and no extra passengers can board the matatu except when the matatu is on route.

Unlike the findings of Bachok (2007) in which only 1.2% of the respondents' sought information on fare rates, the most important passenger information needs were delay information (21.6%), departure and arrival times, and location and direction while traveling (17.6 % each). In particular, respondents in Bachok's study complained about the inaccuracy of travel information provided by train services, usually with respect to the estimated arrival and departure time. Thus, it can be acknowledged that delays were a major problem in this case, thus the need for delay information, location and direction of travel.

The FGD participants elaborated some of the survey findings noting that the information needs of matatu users included route information such as knowing if the matatu was going express, fare rates especially for those who travelled on a daily basis, how to trace lost luggage, any potential delays and if there were likely to be diversions during the trip (Figure 4.5).

**Figure 4.5: An Example of Route Diversions during the Trip**

> *"At one point I was travelling to Kiambu town form Githunguri, but the matatu diverted and used the Kirigiti route, since I had informed them that I was getting off at Kiambu, they gave me some money to take another matatu from Kirigiti back to Kiambu town."*
>
> **FGD Participant**

The FGD revealed that matatu users who used the route more than five days a week were keen on the fares being charged and often preferred using matatus that could allow for fare negotiations. In most cases, these are matatus whose fares are not collected at the booking office but by the conductors while on-route.

The most important information needs of matatu users, according to the KIIs, are fare rates and route information, followed by safety information, vehicle destinations, parcel rates, where to board a particular matatu, names and locations of stages, and incidents likely to cause delays such as police crackdowns. In addition, matatu users' information demands included knowing when the vehicle will arrive, passenger security (particularly at night), and how to switch to another means of transportation. It was noted that matatu crews should continue to offer passengers with trip information rather than assuming that they are aware. With the increase of parcel services and unaccompanied luggage services as a result of Covid-19, which has decreased traveler movement, parcel fee rates have become a significant information need for matatu users. Some matatu SACCOs have specialized in parcel services, which are frequently used by online businesses, necessitating the provision of information on the costs of transporting various parcels.

### 4.3.1 Meeting Matatu Users' Needs

It is critical to identify information needs before designing user-centered passenger information. People from all walks of life use public transportation. Passengers are a diverse group with different daily routines, different reasons for using public transportation, and diverse knowledge of a location and the public transportation system itself. Therefore it is necessary to understand the various travel needs of passengers in order to meet their information needs before, during, and after the trip.

The study sought to determine whether matatu SACCOs in Kenya were meeting matatu users' needs for passenger information. The KIIs' responses were mixed. Some, particularly those working with matatu SACCOs stated that matatu SACCOs met matatu users' needs for travel information and provided the following justifications. First, matatu SACCOs provide multiple sources of travel information to their passengers, such as sign boards, fare charts, and SACCO staff, all of which are aimed at providing travel information to their passengers. The second reason given was that matatu users are aware of their need for travel information and their rights to it, and they demand for it. Thirdly, passengers have not complained of insufficient information, thus this is a clear indication that their information needs are met. Therefore, matatu SACCOs believe that they are meeting the information needs of the matatu users.

On the other hand, the key informants who felt that matatu user' needs were rarely met by matatu SACCOs in Kenya argued that in African cities, particularly with paratransit services, passengers' needs for travel information were not being met. This was primarily due to the fact that there was no requirement to provide passengers with travel information. However, it is essential to note that Sessional Paper No. 2 of 2012 on the Integrated National Transport Policy proposed interventions that would enhance public transport service quality, reliability, improve safety and security, and increase the speed of moving people and goods, but made no mention of the provision of travel information, though it is an important aspect of transport service provision and delivery.

Due to this gap, an initiative like Digital Matatu was conceived through collaboration between American and Kenyan universities, and with Nairobi's growing technology sector. This project collected data on Nairobi's transit system, created mobile routing apps, and designed a new transit map for Nairobi, with the hope of improving the navigation of the matatu routes in Nairobi. However, not many people in Nairobi know it exist thus, its limited usage.

The second argument that matatu service providers failed to meet the needs of matatu users was that though drivers and conductors were an important source of travel information, they are not trained or equipped to provide travel/passenger information. All matatu drivers and conductors interviewed as key informants stated that they were not formally trained, but rather learnt on the job. In addition, since matatu SACCOs are not trained as transport operators, the organizations have little regard for passenger information as a critical component of the transportation services they provide. The matatu SACCOs are quasi-legal entities that were established to improve public transport services in Kenya, which should include travel information since they manage routes.

Finally, passenger information systems require financial investments. However, most matatu SACCOs have not invested in the provision of such travel information. As long as matatu SACCOs make their profit they only provide basic travel information such as fare rates, route information and in some cases, the conductors inform passengers of the names of stages during the trip.

It is important to note, however, that there is still a significant gap in passenger information provision that needs to be filled. Websites as a source of travel information, for example, are fast gaining popularity among passengers, owing to their availability at any time and from any location, as well as their adaptability for multimodal applications and multilingual interface. In most cases, a passenger must choose whether it is faster to wait for the next matatu, walk, or take a cab/boda boda to go to his or her destination. Many passengers are late for work, and students are late for class because they wait for a matatu rather than taking another mode of transportation.  This is often due to inadequate and unreliable travel information to support them in making such decisions.

User-friendly, easily available, and timely web-based PIS have shown to be beneficial in both pre-trip and en-route information. However, in Kenya, passenger information in the matatu industry is not currently digitized, making it difficult to access it away from matatu stations or stages unless a traveler has a phone number for a specific SACCO personnel. Though, one of the strategic objectives of Sessional Paper No. 2 of 2012 on the Integrated National Transport Policy was to apply ICT to transport planning, operations and management and to enhance the sectors efficiency. This is yet to be realized in the matatu sector.

## 4.4 Sources of Passenger Information

Provision of passenger information should be done in an accurate, timely and reliable manner to ensure that the needs of passengers are met and in order to facilitate a smooth journey. Unlike in many more formal public transport services such as rail services and air transport, provision of travel information in the matatu sector in Kenya is often provided for at the matatu stages, frequently by a signboard placed on a matatu or by matatu service provider staff. This section examines the segment of the journey that matatu users' source for travel information, the various sources of travel information and a review of the most useful source of travel information for matatu users.

### 4.4.1   Segment of Trip and Passenger Information

According to Lyons et al. 2007, the type of passenger information desired by transport users differs by mode and segment of their journey. Pre-travel information is sought before the trip in

order to facilitate a smooth trip, which may be summarized as "what opportunities are accessible for the trip" and, preferably, the cost (Nelson, 2018). Pre-trip passenger information can be provided at home, at work, or at other trip origins. In the matatu industry, such information is often provided at the matatu stages or stations mainly by signboards or matatu service providers' personnel while At these points, the traveller has already covered part of travel, for instances from home to the stage or from the office to the stage.

On-board or during the trip information is provided when public transport vehicles are on route. This may include the current vehicle location, names of stations or stages, service disruptions due to police crackdown or vehicle breakdown or route deviation. Such information in the matatu transport is often provided by matatu conductors or drivers. Post trip passenger information is often sought for at the end of a trip for instance how to connect to another mode of transport.

The study sought to establish at which stage of a trip passengers mainly sought for travel information. Out of the 92% respondents who sought passenger information, 56% sourced for information before the trip (pre-trip). Passenger information was mainly sought for at the stages (matatu stations) not at work or at home. This can be attributed to the fact that since travel information as discussed below was mainly sought for from conductors, travellers had to be at the stage to access the information or in rare instances call SACCO personnel for travel information.

As shown in Figure 4.6 below, 32% of respondents sought passenger information during the trip, while 5% sought travel information pre and post trip and at all segments of the trip, with the least segment of trip in which travel information was sought being post trip with only 2%.

**Figure 4.6: Segment of Passenger Information Sourcing**
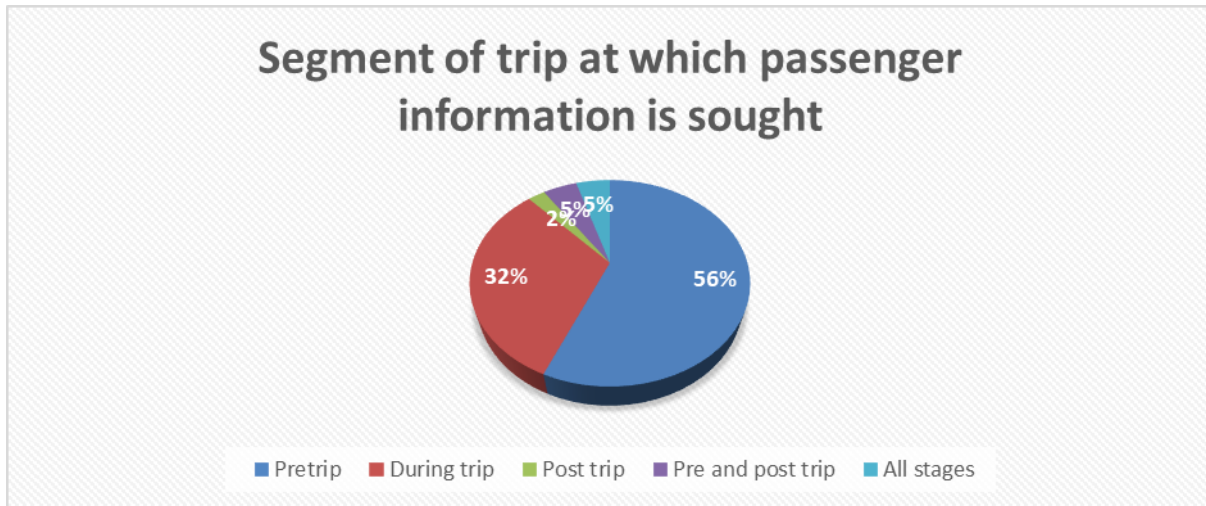


Source: Field Data

The study revealed that before the trip travel information was critical in informing passengers of the options available for a specific trip, allowing them to make more informed decisions about their journey.

The FGD revealed that travel information provided before a trip starts include wayfinding, particularly if the journey involves transferring to another mode of transport or town, fares being charged, final destination of the matatu and the route to be used. While during the trip the information sought for included names and location of stages, and reasons for disruptions or delays. Post trip information sought was mainly on how to connect to another matatu, mode of transport or destination.

KIIs revealed that passenger information is important because passengers' want to know routes, fares, start and end time of their trips on a timely manner to be able to plan and predict how their journey will be. Furthermore, passenger information is important but most public transport service providers do not know that because they assume that passengers know the system and how the system works. Thus, it is important to provide information for both routine and non-routine trips as well as providing multiple sources of travel information. The KII also elaborated the importance of providing basic information such as routes and fares. In some cases there is a

need to provide more than General Transit Feed Specification (GTFS[16]), such as safety and security information including which routes/vehicles support people with disabilities (PWDs). PWDs face a myriad of challenges while using matatus often due to the reluctance of matatu vehicles to give them the specialized facilities and transport services.

### 4.4.2 Passenger Information Sources

Public transport passenger information systems are an important part of every modern public transportation system. The availability of useful travel information is crucial for developing a user-friendly public transportation system (O'Flaherty 1997), and it can have a substantial impact on how people use public transport (Iles 2005). If a solid public transport information system is in place, potential users may be able to plan multimodal routes, cut wait times at stages/terminals, and improve general satisfaction with the service.

Passenger information can be provided via a variety of media, which range from word of mouth either from transport service provider staff, family members or friends. Passenger information can also be shared through electronic media such as radio, television, internet, and mobile phones as well as static media such as billboards, sign boards, leaflets.

The study listed the common sources of passenger information and the respondents ticked at most three responses based on priority. The study revealed that out of the 92% who sourced for passenger information, a majority of them sourced the information from matatu conductors (54%). This source was closely followed by booking office attendants (48%), stage attendants (40%), and matatu drivers (39%) as shown in Table 4.8.

**Table 4.8: Passenger information sources**

| Common sources of travel info | Frequency | Percentage (%) |
| --- | --- | --- |
| Stage Attendant | 34 | 40 |

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[16] The General Transit Feed Specification (GTFS) is a data specification that allows public transit agencies to publish their transit data in a format that can be consumed by a wide variety of software applications. GTFS is split into a static component that contains schedule, fare, and geographic transit information and a real-time component that contains arrival predictions, vehicle positions and service advisories.

| | | |
|---|---|---|
| Sign Board | 22 | 26 |
| Conductor | 46 | 54 |
| Driver | 33 | 39 |
| Booking Office Attendant | 41 | 48 |
| Website | 3 | 4 |
| Social Media | 5 | 6 |
| Mobile Phone | 8 | 9 |
| Friends | 7 | 8 |
| Other specify | 0 | 0 |

**Source: Field Data, 2021**

Unlike the findings of Bachok (2007) and Caufield, O'Mahony, *et. Al.* (2007) whose studies found that paper timetable was the most popular source of passenger information before the trip (pre-trip). The study found that matatu SACCO personnel (conductors, drivers, stage attendants and booking office attendants) were a significant source of passenger information across the stages of the trip. This can be attributed to the fact that matatu SACCO personnel were more accessible compared to other sources of travel information. Paper timetable was not a media of travel information within the study area.

In a British metropolitan environment, Yeboah et al. (2019) explored factors impacting public transportation passengers' pre-travel information-seeking activities. In order to better understand the stages of the journey at which information was sought and the information sources used, the researchers conducted surveys of public transportation passengers. While bus users are significantly associated with the use of internet sites as a source of pre-travel information, rail users rely on a variety of sources, including internet sites, word-of-mouth, and visits to a travel information desk, according to the final model's multivariate explanatory model. This thus indicates that different mode users may opt for varied media for travel information. The context of transport users influences how they source for travel information.

All the FGD participants stated that matatu conductors were the most significant source of passenger information confirming the findings of the survey. However, it was mentioned that their travel information provision depended on their personal values since there are those who provide wrong information just to get their matatus to fill up as shown in figure 4.7 below. For instance, some conductors give false fare rates to attract the customers and as soon as the matatu departs from the stage the fare rates changes.

**Figure 4.7: Example from an FGD participant on unpredictability of matatu fares**

*"I once boarded route 120 matatu from Nairobi to Githunguri. Since I am a business woman, I had some luggage and when I asked how much they will charge me for the luggage the conductor said not to worry. On arrival to Githunguri, the conductor asked me to pay Ksh. 350 for my luggage. When I asked him why this information was not given to me at the start he said I am being stubborn. After some arguing, he charged me Ksh. 200 and I had no option but to pay to avoid the push and pull."*

**FGD Participant**

It is such cases that have even resulted in passengers being pushed out of moving matatus when fare disputes arise. In other instances, passengers get into a matatu at a stage because it appears almost full only to realize that majority of the passengers are seat fillers, and not travelers.

Similar to survey respondents, the FGD participants and KIIs agreed that the most significant source for travel information was matatu conductors. Other sources of travel information in order of priority included matatu drivers, sign boards, booking office attendants, and fellow passengers, stage attendants.  Additional sources that were specified by FGD and KII participants included branding on matatus - which often includes the names of the SACCO and the routes plied by the matatu, fare charts placed inside matatus, fare payment receipts, touts, and SACCO staff uniforms which contains the name of the SACCO they work for.

Therefore, based on the above findings, it is important for passenger information strategies deployed by public transport service providers and transport authorities not to be a one size fits all strategy for travel information provision, but ensure clear understanding of the context and passenger's needs. For instance, since matatu conductors have been cited as an important source of travel information, there is need for matatu SACCOs to ensure that they equip their

conductors and other staff with the skills to accurately and reliably provide travel information to their customers.

### 4.4.3   Useful Sources of Travel Information

SACCO crews, mainly conductors and drivers were deemed the most significant source of travel information. However, using information and communication technologies can be essential in assuring passengers of the availability and reliability of the travel information system. In this regard, a useful information source should be one that provides real-time, accurate and reliable travel information.

Study participants were asked what they thought the most useful source of passenger information was and they cited matatu conductors and drivers. The study revealed that matatu SACCOs hardly conduct customer satisfaction surveys. It was stated by a majority of key informants that a survey should be conducted to understand what passenger information needs are before investing in the provision of a passenger information system. Matatu SACCOs can benefit from satisfaction surveys because they can help them better understand their customers' needs and concerns, allowing them to enhance their service standards to meet passenger's needs. Matatu SACCOs can promote client loyalty and safeguard revenue and profitability by tracking customer satisfaction and responding to issues raised by passengers during such surveys.

Moreover, some of the most practical sources of travel information that were mentioned by key informants included paper maps or billboard maps at the stations/stages, fare charts at the station and within matatus, and sign boards. Informants shared that sign boards assisted matatu users to not board the wrong matatu, unless they cannot read or understand the board. In addition, key informants also mentioned technology supported information sources such as mobile phones as well as a hybrid system that integrates different sources of travel information into one i.e. human personnel, internet, boards, and mobile phones. This is because one single information source may not be enough. A hybrid system ensures that if one source fails, another can meet different needs of matatu users.

There were mixed responses on provision of passenger information, with some key informants maintaining that ideal passenger information system in the matatu industry does not exist. When asked if there was knowledge of any public transport service provider/ matatu SACCO that was known for providing passenger information, key informants felt that such an example does not exist in Kenya and most likely not in Africa. Others revealed that some matatu SACCOs and transport companies have made good attempts to provide passenger information. These included 2NK, Mataara SACCO, Nuclear SACCO Ltd, the Old Kenya Bus Services and Easy Coach. When asked why the above companies were better at providing passenger information, informants indicated that the transport providers were well managed, had disciplined staff and had been in existence for a long time and not necessarily because they had efficient passenger information provision systems. The Old Kenya Bus Services (KBS) was a monopoly bus franchise which operated in Kenya from 1934 until its collapse in 2005 due to emergence of unregulated matatu services[17]. The bus service was reputed for defined routes and schedules. The company had an A-Z Route map at Kencom Stage which acted as a passenger information centre. According to a key informant of the study, KBS had a reliable call centre such that if a child who often relied on KBS services to travel to and from school got into the wrong bus, the child would be traced through radio. It can be concluded that the existence of varied passenger information media is highly appreciated by public transport users based on their varied needs. However, at this juncture no evaluation of the specific source of passenger information effectiveness is made since it is out of this research scope. Instead, an overall evaluation of the passenger information sources in meeting the matatu users' needs is discussed below.

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[17] https://www.bus-ex.com/article/kenya-bus-service-management-ltd

**4.5 Effectiveness of Sources of Passenger information**

This study utilizes the definition of effectiveness by Quality Research International[18] which defines effectiveness as *"the extent to which an activity fulfils its intended purpose or function"*. The study sought to determine whether the available passenger information sources served their intended function of providing travel information to matatu users along the route under consideration. To that end, the study evaluated the effectiveness of passenger information sources as rated by matatu users in terms of accuracy, reliability, accessibility, and timeliness. To have a stronger impact on decisions, travel information must be accurate, dependable, timely, and, if feasible, prescribed to help users make better travel choices (Lyons, 2006).

In order to establish the effectiveness of passenger information sources in meeting the needs of matatu users' of the Githunguri-Nairobi route, respondents were given a Likert scale where they rated aspects of passenger information sources in relation to access, reliability, accuracy, timeliness as shown on Table 4.9.

In this study, accessibility of passenger information means that passengers can easily use and interact with travel information provided by public transport service providers. While reliable passenger information refers to timely and consistent travel information. Accuracy in passenger information sources refers to ensuring consistent passenger information for all output channels, such as public transport service providers/agencies, electronic displays, journey planners, mobile phones, websites, email, SMS, Twitter, and Facebook. When passenger information is provided when it is beneficial or needed during travel, it is termed as being timely.

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[18] https://www.qualityresearchinternational.com/glossary/effectiveness.htm

**Table 4.9: Passenger information sources ratings**

| Passenger information source rating | Options | Frequency | Percentage (%) |
|---|---|---|---|
| **Access** | All the time | 37 | 44 |
| | Most of the time | 31 | 36 |
| | At times | 8 | 9 |
| | Never | 0 | 0 |
| **Reliable** | Options | Frequency | Percentage (%) |
| | All the times | 16 | 19 |
| | Most of the times | 39 | 46 |
| | At times | 18 | 21 |
| | Never | 1 | 1 |
| **Accurate** | Options | Frequency | Percentage (%) |
| | All the times | 21 | 25 |
| | Most of the times | 25 | 29 |
| | At times | 25 | 29 |
| | Never | 2 | 2 |
| **Timeliness** | Options | Frequency | Percentage (%) |
| | All the times | 23 | 27 |
| | Most of the times | 26 | 31 |
| | At times | 19 | 22 |
| | Never | 4 | 5 |

For a pleasant travel experience, having access to relevant, precise, and timely information is critical since it is key in ensuring seamless travel. A significant proportion of survey respondents confirmed that passenger information sources are accessible all the time at 44%, with none rating accessibility at 0%. In order to entice use of public transportation, the service must be as comfortable, safe, and simple to use as getting into and driving one's own car. The availability of fast and reliable passenger information across a variety of multi-media information platforms is critical in motivating modal transition from private vehicle usage to public transport services.

The study revealed that the passenger information provided by matatu SACCOs within the study area was cited as being reliable most of the times by only 46% of the respondents. This shows that there is need for public transport service providers to ensure that the passenger information is provided in a timely and consistent manner to improve its reliability. One of the most difficult challenges facing public transportation providers today is meeting passengers' needs for accurate information before, during, and after their journey. In this study, the accuracy of information sources was rated to be accurate most of the times (29%) and at times (29%). This rating is way below average which is an indication that the passenger information sources within the route often provided travel information that could not be trusted. In an earlier discussion, it was noted that some conductors gave false information in regards to fares being charged and availability of seats just to get passenger to board their matatus. Thus, there is need for matatu service providers to rethink how they provide travel information to their customers as it has a direct implication on the perception that passengers have of their services and the matatu sector. A good service quality of a public transport mode can not only retain the current ridership but also attract new users to that mode.

The study found that 31% of survey respondents felt that passenger information sources were timely most of the time, timely all the time (27%) and timely at times (22%). The findings indicate that passenger information sources within the route are far from effectively meeting the needs of matatu users. This means that the information provided by the matatu SACCOs is often provided to passengers late, making it difficult to change travel plans such as taking an alternative vehicle, route, mode of travel, or travel time. Thus, the passenger information provided by matatu SACCOs often makes effective journey planning difficult.

The FGD participants observed that passenger information sources accuracy, timeliness, accessibility and reliability often depend on each matatu or matatu SACCO. This was because some matatus are very good at providing effective travel information while others are lacking. It was cited that between the two matatu SACCOs plying the route, Kaka Travellers SACCO was better at providing reliable travel information compared to Inagi SACCO. In addition, Kaka Traveller SACCO is able to respond quickly to complaints and feedback from their customers which make them the preferred matatu SACCO on the route. From the above findings, it is clear that passenger information sources are yet to meet the intended purpose of effectively providing travel information to matatu users within the route. This is because all the variables discussed above were rated below 50% by the matatu users of the route under the options of all the times and most of the times.

### 4.5.1 Provision of Passenger Information

The study revealed that the provision of passenger information by public transport service providers should be informed by several things. First, context of the cities; understanding the cost of mobile data and the availability of smart phones can inform the provision of travel information via tech-supported platforms. This ensures that passenger information sources provided will be effective and efficient in the context.

Second, it is important to consider public transport service providers' capabilities, such as their capacity to provide needed passenger information for persons with disabilities (PWDs). Passenger information can be provided for in a variety of paper or digital formats, and can be accessed remotely, at stations and stops, or even on-board vehicles. While such information is useful for all travelers, providing it to those with disabilities is much more difficult. Therefore, understanding the capacity of public transport service provider is crucial in ensuring that the passenger information systems they provide meet the travel needs of all their clients.

Third, what should inform provision of passenger information are travellers' needs. Public transport service providers should conduct customer satisfaction surveys frequently to ensure that they understand what their customers' needs are in terms of passenger information. This knowledge is paramount in ensuring that the public transport service providers are developing

passenger information systems with passengers' needs in mind and not based on their assumptions of what the passengers need.

### 4.5.2   Training on Travel Information Provision

In order to understand if matatu SACCOs had any mechanism to ensure that their personnel were effective in the provision of passenger information, key informants (SACCO officials and personnel) were asked if there is any training that they are offered in regards to passenger information provision. All informants confirmed that training was not done. Instead, staff learns on the job. It was noted that instead of training, there would be frequent meetings to discuss any issues that may need ironing out. Some of the informants felt that matatu SACCOs had little or no regards for their workers and thus the lack of trainings.

The Ministry of Transport in Kenya acknowledges that human capacity is limited in the transport sector as indicated by one of the strategic objectives (*objective o*) of Sessional Paper No. 2 of 2012 on the Integrated National Transport Policy which include a directive to develop and promote human capacities across the transport sector and should include accreditation of all processes. The policy mandates that Kenya's Ministry of Transport collaborate with the Ministry of Education, universities, and other intermediate training institutions to identify and address human resource development needs in the road transport sector, as well as establish mechanisms to accredit transportation career paths.

### 4.5.3   Passenger Information Not a Priority in Kenya

The study sought to understand why the provision of passenger information was not a priority in the Matatu industry in Kenya. It was revealed that the provision of travel information is not as attractive as the building of road infrastructure, i.e., Bus Rapid Transit (BRT) or new highways which politicians can point to during elections. However, it is important to note that transport infrastructure is not limited to elections only, as indicated by the successes of the Old Kenya Bus Services, which has been reputed for having defined routes, schedules, fare rates, and a reliable call centre that ensures efficient trip planning.

Key informants noted that since most policy makers do not use public transport, they do not know how the system works and what is needed. Furthermore, since Kenya does not have government-run public transport services, it is difficult to coordinate various matatu services as well as monetizing provision of travel information.

In practice, public transport service providers are best suited to provide travel information. However, since SACCOs operate on different routes, there is need for public private partnerships that can support integrate travel information from all SACCOs, and ensure that more comprehensive passenger information is available. One of the ways to do this is to guide matatu SACCOs in standardizing fare rates so that it is clear how much travel costs from one location to another, enabling passengers to plan trips accordingly. As discussed earlier, there have been instances in Kenya where passengers have lost their lives over fare disputes by being pushed out of moving matatus. This can be mitigated by standardizing fare rates and making those rates well known to passengers. To facilitate this, partnerships between the matatu industry and the public sector can assist the sector by erecting a billboard at each stage that displays fare rates to various destinations, as well as other travel information.

It can be concluded that failure to provide accurate, timely and reliable passenger information contributes to vices such as touting and harassment of passengers in the matatu industry. Such vices often give the industry a bad reputation. Passenger information provision should be a shared role between public transport service providers, the county governments and the national government.

# CHAPTER FIVE

## SUMMARY CONCLUSION AND RECOMMENDATION

### 5.1 Introduction

In accordance with the research objectives, the chapter derives inferences and recommendations from the study findings. The study's findings and recommendations are important to matatu SACCOs not only in the area of the study but across the matatu industry in ensuring effective and efficient provision of travel information to matatu users and to support relevant government agencies in planning, designing and implementing integrated public transport systems in Kenya.

### 5.2 Summary Findings

The study was guided by three objectives, which included identifying the passenger information needs of matatu users of the Githunguri-Nairobi route, determining the sources of passenger travel information, and examining if the available passenger information sources are addressing matatu passengers' information needs. To achieve these objectives, the study comprised a survey, a focus group discussion with matatu users, and eleven key informant interviews. Below is a summary of the findings of the study.

### 5.2.1 Matatu Users' Passenger Information Needs

Matatu users' needs included traffic information, route information, location and names of stages, fare rates, possible delays, departure and arrival times, operational hours of matatus, availability of seats, and duration of travel. The study revealed that the most significant matatu users' need of passenger information is the fares being charged (66.2%). Fares differ depending on the time of day (peak and off peak) and the season. Fares are high during peak hours of travel due to the increase in demand for transport services, especially in the evenings and mornings. Fare rates are also hiked during events such as public holidays, school opening, and closing days. The study revealed that matatu users who travel on the route on a daily and/or weekly basis were quite keen on fare discounts. The high demand for fare information is therefore due to uncertainty due to a lack of government control of fares and use of paratransit.

In addition, the study revealed that socioeconomic characteristics of matatu users such as age, sex, education level, and occupation greatly influence how travellers sought passenger information. For instance, a cross tabulation of matatu users' information needs by sex of the respondents revealed a slight difference of 0.7% between male and females who sought traffic information. However, a significant number of females (30.6%) sought to know which route a matatu was taking as compared to males (18.4%). This could explain why more females than males sought to know the names and location of stages during their journey. On the other hand, male matatu users (10.5%) needed information on departure and arrival times more than females at (5.6%) which explains why more male than females sought for information on possible delays and duration of their trip.

In regards to age, matatu users aged between 18 – 35 years (59.5%) sought for passenger information more compared to matatu users aged above 35 years (40.5%). Matatu users with a tertiary level of education (63.5%) sought for passenger information more compared to those without tertiary education (36.5%). This indicates that education level significantly influences matatu users' levels of seeking travel information. Those who are highly educated seek for more travel information as compared to those who are less educated. Contrary to the findings of Bachok's (2007) study, in which 62% of the survey respondents used the train services for commuting services (school and work), this study revealed that a majority of travellers used the route for business purposes (49%). Out of the 66.2% of respondents who sought for fare rates information, 70% of them were in business, 55% students and 64% employed.

## 5.2.2 Passenger Information Sources

Provision of passenger information should be done in an accurate, timely and reliable manner to ensure that the needs of passengers are met in order to facilitate a smooth journey. The study examined different segments of the journey that matatu users' source for travel information, the various sources of travel information and a review of the most useful sources of travel information.

The study revealed that out of the 92% respondents who sought passenger information, 56% sourced for the information before the trip (pre-trip) at the matatu stage. Similar to the finding of Lyons (2006), the study revealed pre-trip travel information is critical for informing potential

public transportation passengers about the options available for a certain trip, allowing them to make more educated decisions about their journey. The FGD revealed that travel information provided before a trip starts includes wayfinding, especially if the journey involves transferring to another mode or town, fares being charged, final destination of the matatu and the route to be used. During the trip, the information sought for includes names and location of stages, and reasons for disruptions or delays. Post trip information sought was mainly on how to connect to another matatu, mode of transport or destination.

In regards to sources of passenger information for matatu users, the study revealed that the most significant source of travel information was the matatu conductors (54%). However, though matatu conductors are a significant source of travel information, the study revealed that conductors' provision of travel information depended on their personal values and that at times they provide wrong information just to fill their matatus. Additional sources of travel information included stage attendants (40%), sign boards (26%), drivers (39%), booking office attendants, (48%), websites (4%), social media (6%), mobile (9%), friends (8%), and others which included touts, matatu branding, staff uniforms, fare charts, and receipts. The most useful source of travel/passenger information is a system that integrates varied passenger information media, as it is likely to meet the matatu users' needs of a dynamic group such as those with special needs.

### 5.2.3 Effectiveness of Sources of Passenger information

Passengers on public transportation should have access to precise and trustworthy real-time information both before and during their trips, allowing them to plan door-to-door trips and take the most efficient departure time and route.

The study utilized the definition of effectiveness as defined by Quality Research International, "*the extent to which an activity fulfils its intended purpose or function*". The study evaluated the effectiveness of passenger information sources as rated by matatu users in terms of accuracy, reliability, accessibility, and timeliness. In this study, accessibility to passenger information sources means that passengers can easily use and interact with travel information provided by transport providers. A significant proportion of the survey respondents confirmed that passenger information sources were accessible all the times (44%), with none rating accessibility at 0%.

Reliability of passenger information sources referred to timeliness and consistency of travel information sources. The survey respondents cited sources as being reliable most of the time by only 46% of respondents. In regards to accuracy in passenger information sources in meeting the matatu users' needs, accuracy referred to ensuring consistent passenger information from all media. The accuracy of information sources was rated to be accurate most of the time and at times both at 29%. The study also found that 31% of the survey respondents felt that passenger information sources were timely most of the times, timely all the times (27%) and timely at times (22%).

The findings suggest that passenger information sources along the route fall far short of meeting the needs of matatu users. This means that information provided by matatu SACCOs is frequently provided to passengers late, making it difficult to change travel plans such as taking a different vehicle, route, mode of transportation, or travel time. As a result, the passenger information provided by matatu SACCOs frequently makes effective trip planning difficult.

## 5.3 Conclusion

The study concludes that socioeconomic characteristics such as age, sex, level of education and occupation of matatu users directly influence the matatu users' needs of passenger information. Therefore there is need to consider such demographic characteristics when designing passenger information sources. Matatu users' most significant need for travel information is fares being charged during a trip, thus there is need to ensure that there is fare standardization in the matatu transport sector.

The study observed that the most significant source of passenger travel information is the matatu conductors followed closely by other Matatu SACCOs employees. In this regard, it is clear that word of mouth from matatu SACCOs personnel was an important medium of passenger information provision. Furthermore, it was noted that matatu users sourced for travel information from more than one source. Thus there is need to provide multiple sources of passenger information in an integrated system to ensure that all passengers are able to access the information regardless of their abilities. Also, it is important to note that there is still a significant gap in passenger information provision that needs to be filled. Websites as a source of travel

information, for example, are fast gaining popularity among passengers especially in developed countries, owing to their availability at any time and from any location, as well as their adaptability for multimodal applications and multilingual linkages. User-friendly, easily available, and timely web-based Passenger Information Systems (PIS) have shown to be beneficial in both pre-trip and en-route information. In Kenya, passenger information in the matatu industry is not currently digitized, making it difficult to access travel information away from matatu stations or stages. The study, however, indicated that websites as a source of travel information are quite unpopular within the study area with only 4% of the survey respondents citing websites (Google Map) as a source of travel information. It is important to note that passenger information should be available in a barrier free format ensuring that those who are less computer literate, people with special needs, the elderly and visually impaired and deaf persons have access to the information needed as well as those who do not understand Kiswahili, a language that is used at most stages. As a result, it can be concluded that there is a need to provide multiple sources of passenger information to ensure that all passengers, regardless of ability, have access to information. This can be accomplished adequately by investing in a technology-enabled passenger information system.

Lastly, in regards to effectiveness of passenger information sources in meeting matatu users' needs, it is clear that passenger information sources are yet to meet the intended purpose of effectively providing travel information to the matatu users within the route. This is because all the variables (accessibility, reliability, accuracy and timeliness of information sources) discussed above were rated below 50%. Additionally, though key informants from the matatu SACCOs stated that the matatu SACCOs were meeting the matatu users' needs for travel information, it is clear that there is still a gap. Some of the mechanisms proposed to ensure that passenger information sources meet matatu users' needs for travel information include: a clear understanding of the matatu users' needs to ensure that the travel information system is developed to meet their needs, taking into account the capabilities of the matatu SACCOs in providing passenger information, a clear understanding of the local context and finally, developing of information systems better suited for matatus rather than copy pasting solutions from western countries.

## 5.4 Recommendations

First, the study has revealed that matatu SACCOs personnel - especially conductors and drivers - are a significant media of passenger information within the study area. Thus, the study proposes the introduction of a short-term course on passenger information to be offered at university and college levels as a requirement for licensing of matatu crew (drivers, conductors, stage attendants and booking office attendants) and the matatu SACCOs. This will be a good start towards realizing the strategic objective of the Integrated National Transport Policy which provide for such training. The training of personnel on passenger information provision will ensure that they are equipped to provide travel information as needed by different users of their transport services. Such training can be provided through a public private partnership between the National Government, institutions of higher learning and matatu SACCOs in Kenya, especially during the renewal of driving licenses and public service vehicle badges.

Second, Matatu SACCOs are very important in provision of travel information. There is a need for national and county governments to support them by providing infrastructure at the terminals such as boards that can be used to provide travel information, i.e. routes and fares. The study proposes the establishment of central travel information desks or offices at every matatu station/stage set up with the support of the respective county governments to ensure nonpartisan provision of passenger information. Such information desks or offices should house the recommended integrated travel information system and manned by trained personnel and serve all public transport service providers within the stage including matatus, tuktuks, taxis, and boda bodas.

Third, public transport service providers should conduct frequent research/surveys to better understand what matatu users' travel information needs are and how to integrate travel information from different modes of transport to support with intermodal connections. National government should establish an open data repository for this research/ survey data, to ensure that such data is accessible and useful to technology companies and private transport service providers for adequate planning, design, and implementation of travel information dissemination.

**5.4.1Areas for Further Research**

The study successfully examined the passenger information sources and matatu users' needs for travel information, with the hope that the findings and recommendations can assist Matatu SACCOs within the study area and beyond, as well as the respective government agencies, to ensure efficient and effective passenger information provision. However, there are still gaps for further research in the sector. There is a need to explore information needs of matatu users at each segment of their trip to assist in the design of effective passenger information systems as well as exploring the perception of web- based travel information system in the matatu sector. This two are therefore suggested areas for further research to ensure a more comprehensive and deeper knowledge that can facilitate organizational decision making.

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# APPENDICES
## Appendix 1: QUESTIONNAIRE FOR COMMUTERS

**Introduction**

My name is Mary Wanyua Mwangi, a postgraduate student at the Institute for Development Studies (IDS), University of Nairobi. I am conducting a study on **Passenger Information and Matatu Users' Needs: A Case Study of Githunguri-Nairobi route.** The objectives of the study are to:

1. Identify the passenger information needs of matatu users of Githunguri-Nairobi route

2. Determine the sources of passenger travel information in Githunguri-Nairobi Route

3. Examine how the available passenger information sources are addressing matatu passenger information needs of Githunguri-Nairobi route

I will greatly appreciate it if you could answer some questions. Your participation in this study is voluntary and if you agree to participate and you change your mind in the process of the interview, you can ask me to stop the interview. The information you give during the interview will remain confidential and will only be used for academic purpose. Your name will not be mentioned unless you give consent. Your assistance is highly appreciated.

May I continue with the questions?         Yes [   ]         No [   ]

Respondent's Sex (based on observation)  Male [   ]       Female [   ]

1. How often do you use route 120?
    1 – 2 days a week      [   ]
    3 - 5 days a week      [   ]
    More 5 days a week   [   ]

2. For what purpose is your most frequent (?) trip?
    Work              [   ]
    School            [   ]
    Shopping          [   ]
    Social events     [   ]
    Others (Specify)  _____
3. When travelling do you seek travel information?
    Yes   [   ]
    No    [   ]

4. If yes, what information do you seek to aid in your travel?

    Traffic information          [   ]
    Possible delays              [   ]
    Routes information           [   ]

Departure and arrival times    [   ]
Names and location of stages    [   ]
Fare rates    [   ]
Operational hours    [   ]
Availability of seats    [   ]
Duration of travel    [   ]
Other (Specify)      _____

5. At what stage of your trip do you source for travel information?
   Pre-trip    [   ]
   During trip    [   ]
   Post trip    [   ]
   Pre-trip and post trip   [   ]
   All stages    [   ]

6. Pick three most common sources of travel information that you use?

   Stage attendant    [   ]
   Sign board    [   ]
   Conductors    [   ]
   Drivers    [   ]
   Booking office attendant   [   ]
   Website    [   ]
   Social Media    [   ]
   Mobile Phone    [   ]
   Friends    [   ]
   Others (specify)      _____

7. To what extent is the travel information you receive accessible, reliable, accurate and timely? Rate the travel information in the table below by ticking;

| Travel information variables | All the times | Most of the times | At times | Never |
|---|---|---|---|---|
| Accessible | | | | |
| Reliable | | | | |
| Accurate | | | | |
| Timely | | | | |

8. What is your highest level of education?

   No education    [   ]
   Primary Education    [   ]
   Secondary Education    [   ]
   Diploma/Certificate    [   ]
   Graduate    [   ]

Post Graduate           [   ]

9.  What is your age bracket?

    <18 years        [   ]
    18-24 years      [   ]
    25-35 years      [   ]
    36 – 45 years    [   ]
    46 -59 years     [   ]
    60 + years       [   ]

10. What do you do for a living?
    Business         [   ]
    Student          [   ]
    Employed         [   ]
    Others (Specify)_____

11. Which is your most preferred Matatu SACCO on route 120?

    Kaka Travellers SACCO          [   ]
    Inagi Travellers SACCO         [   ]

Can you explain your choice above? _____
    12. Do you have any additional comment or recommendation in regards to travel information
        to the route or SACCO?

        _____

        _____

        _____

# Appendix 2: FGD Guide

**Introduction**

My name is Mary Wanyua Mwangi, a postgraduate student at the Institute for Development Studies (IDS), University of Nairobi. I am conducting a study on **Passenger Information and Matatu Users' Needs: A Case Study of Githunguri-Nairobi route.** The objectives of the study are to:

4. Identify the passenger information needs of matatu users of Githunguri-Nairobi route

5. Determine the sources of passenger travel information in Githunguri-Nairobi Route

6. Examine how the available passenger information sources are addressing matatu passenger information needs of Githunguri-Nairobi route

I will greatly appreciate if you could answer some questions. Your participation in this study is voluntary and if you agree to participate and you change your mind in the process of the interview, you can ask me to stop the interview. The information you give during the interview will remain confidential and will only be used for academic purpose. Your name will not be mentioned unless you give consent.

Your assistance is highly appreciated.

May I continue with the questions? Yes [   ]          No [   ]

1. **Passenger travel information needs**

   a. Participants awareness on Passenger information needs

      - Understanding of what is travel information

      - List the travel information needs of passengers

      - Understanding of travel information needs at different stages of travel

2. **Sources of Passenger travel information in Githunguri-Nairobi Route**

   a. Participants general views on the different sources of travel information

      - List of sources of travel information

      - Views on the most useful source of travel information within the route

      - Opinions on the best ways to provide passenger travel information

- Any experience while travelling based on provision of either good or bad travel information

3. **Participants opinions on if the available travel information sources meet the travel needs of matatu users**
   - Participants experiences with travel information sources
   - Nature of travel information provided i.e accuracy, timeliness, accessibility and reliability
   - Suggestions on how best to ensure information sources meet matatu users' needs
   - Views on whose role should be to ensure provision of effective and efficient travel information

4. **Question and any other comments on travel information and matatu users' needs**

**Appendix 3: KII Guide**

**Introduction**

My name is Mary Wanyua Mwangi, a postgraduate student at the Institute for Development Studies (IDS), University of Nairobi. I am conducting a study on **Passenger Information and Matatu Users' Needs: A Case Study of Githunguri-Nairobi route.** The objectives of the study are to:

7.  Identify the passenger information needs of matatu users of Githunguri-Nairobi route

8.  Determine the sources of passenger travel information in Githunguri-Nairobi Route

9.  Examine how the available passenger information sources are addressing matatu passenger information needs of Githunguri-Nairobi route

I will greatly appreciate it if you could answer some questions. Your participation in this study is voluntary and if you agree to participate and you change your mind in the process of the interview, you can ask me to stop the interview. The information you give during the interview will remain confidential and will only be used for academic purpose. Your name will not be mentioned unless you give consent.

Your assistance is highly appreciated.

May I continue with the questions? Yes [   ]          No [   ]

Respondent Designation_____

Respondent Sex_____

1.  What do you think are the travel information needs of matatu users?
    a.  Your thoughts on if travel information is important and which form of travel information they consider important
    b.  Opinions on travel information needs of passengers

    c.  Are the passengers' information needs met by the matatu SACCOs?

    d.   In your opinion what should informs the provision of passenger information i.e. complains

    e.  Why is travel information not a priority in Kenya?

2. Given your experience, which are the most practical ways of providing passenger travel information?
   a. Knowledge on any SACCO that is better at providing travel information

   b. Explanation on views why the SACCO is better at providing travel information

3. Understanding of travel information sources by matatu SACCOs
   a. Different sources of travel information in Kenya
   b. Opinion on usefulness of the travel information provided by public transport providers
   c. Views on the most useful source of travel information
   d. Mechanisms that can be used to determine usefulness of the travel information provided

4. Any further comments/recommendations you have in regards to matatu users and travel information?