Evaluating the sustainability of Rea Vaya System through measuring the service quality

Omphemetse Lengana
Department of Transport and Supply Chain Management
University of Johannesburg
Auckland Park, Johannesburg, SA
Phindile Mabaso
Department of Transport and Supply Chain Management
University of Johannesburg
Auckland Park, Johannesburg, SA
Bhenkumuzi Mavuso
Department of Transport and Supply Chain Management
University of Johannesburg
Auckland Park, Johannesburg, SA
Sebonkile Thaba
Department of Transport and Supply Chain Management
University of Johannesburg
Auckland Park, Johannesburg, SA
scthaba@uj.ac.za

Abstract
This study aimed at assessing the sustainability of the Rea Vaya Bus Rapid Transit (BRT) system through assessing how the seven elements of service quality affects the commuters' satisfaction with the service rendered by the Rea Vaya system, and the impact on its sustainability. The rationale for this assessment was to determine whether the system will continue to operate at a low cost for its customers, offer a high quality service that retains commuters and thus, sustaining Rea Vaya's profitability in the future. A quantitative research method was used for this study, the method allows numerical data collection and enables the study to analyse data. The use of a quantitative data collection method helped in answering the primary and secondary objectives. A questionnaire was used as a means of collecting data handed out to BRT users at selected bus stations on specific routes in Johannesburg. The target population consisted of all users of the Rea Vaya BRT system. Rea Vaya transports an average of 16 000 commuters every day (Rea Vaya, 2009). The sampling unit can be found at five of the fifty-eight Rea Vaya stations currently operational. Data analysis included getting a summary of the mass of data that will be collected and presenting the results to communicate important findings.

Keywords
SERVQUAL Model, Sustainability, BRT System, Rea Vaya

1. Introduction
A Bus Rapid Transit (BRT) is a public transportation system that conveys travellers from one destination to another, providing transport that is quicker and more effective than a customary transport mode (Engelbrecht and Bekker, 2012). Bus Rapid Transit (BRT) is an advanced type of urban traveller transportation form that is implemented rapidly at a low-to-direct cost (Deng and Nelson, 2011).
The extensive growth of bus rapid transit systems began in Curitiba (Brazil) in 1974 (Grava, 2003). As of November 2001, as many as 14 Chinese cities have implemented a number of BRT systems and currently 150 cities have implemented the BRT system globally. Currently, the BRT system internationally entails 4 300 km of routes, 280 corridors, 30 000 buses, and 6 700 stations (Cervero, 2013).
Bottleneck, greenhouse emissions, urban sprawl and an expansion in the number of accidents, are core issues of the urban transportation problem that are experienced by urban areas. Urbanisation has brought about both ecological and societal difficulties. The cities are experiencing levels of carbon emissions that are a result of congestion (Engelbrecht and Bekker, 2012). Such challenges require different solutions and can be offered by different forms of public transportation. Presently, the usage of BRT is created in nations that are potentially growing, as an optional mode of urban public transport (Haseena, 2014).

The first African BRT system was launched in Lagos, Nigeria (Gauthier and Weinstock, 2010). The BRT system was implemented to focus on improving the quality of commuters' lives within a common budget (Kaenzig, Mobereola and Brader, 2010). The Lagos BRT system was implemented using a holistic approach; the approach involved reorganising the bus industry to operate in a formal environment (Kaenzig, Mobereola and Brader, 2010). In comparison with the BRT system in Johannesburg, how the system was implemented is that there were informal taxi operators that had to be withdrawn along the BRT corridor. The government compensated the owners and they became shareholders in the new bus operating company (Deng and Nelson, 2013).

The Rea Vaya bus system is directly affected by its ability to provide service that is satisfactory to commuters in order to maintain its sustainability (Venter, 2013). For some users, Rea Vaya has created opportunities such as an efficient and accessible service; on the other hand, lack of good customer service from bus drivers and station staff are seen as setbacks in achieving good customer service (Haseena, 2014). It is important to establish that in order for the system to attract new commuters; especially those using their own cars it is critical to maintain good customer service. (Haseena, 2014).

The original concept of the BRT is somewhat less expensive than the BRT system in South Africa and its estimated fare value indicated by the Rea Vaya administrators is adequate to cover variable operating costs, but not all fleet costs (Venter, 2013). The Rea Vaya system stakeholders are the City of Johannesburg and more than 300 minibus taxi operators (McCaul and Ntuli, 2011). Initially, 585 taxis had to be withdrawn along the BRT corridor and their owners were compensated by the government and became shareholders in the new bus operating company (Deng and Nelson, 2013).

Substantial subsidy allocation by government is what promotes the BRT system's long-term sustainability but it is disturbed by the state's uncertainty to take the financial burden (Venter, 2013). The BRT system's efficiency and competitiveness to other public transits and the effect it will have on commuters are essential factors that may determine the systems' ability to provide a system that is satisfactory to commuters (Venter, 2013). For some users, Rea Vaya has created opportunities such as an efficient and accessible service; on the other hand lack of good customer service from bus drivers and station staff are seen as setbacks (Haseena, 2014). It is important to establish that in order to sustain the system sufficiently, attracting new commuters especially those using their own cars is of importance (Haseena, 2014).

Ever since the inception of the new BRT smartcard system in 2013, commuters expressed dissatisfaction (enca.com, 2013). Commuters argued that the system was not user friendly. Commuters had mentioned that the inadequate staff and out of order system forced them to alternate to other public transport modes. August 2009, is the period in which Rea Vaya was unveiled, it was meant to assist the social welfare of people with reasonable public transport. Commuters paid between R4,50 and R12 a ticket, but with the new card, there were technical faults with loading money (enca.com, 2013). Commuters claimed to have paid R100 to fill in the trips but after two days, there was no money in card (enca.com, 2013).

Commuter's dissatisfaction can be attributed to a bad service from Rea Vaya, buses take 45 minutes instead of 10 minutes to arrive at the station and there is a need for more buses to be operating (hellopeter.com, 2017). Thokoza Park in Soweto is the main station where buses connect passengers to different routes (Rea Vaya, 2017). Thokoza Park stampede has caused chaos on trunk route 1 (T1) and trunk route 2 (T2) buses, the two buses need to be divided into two lines in one station, it is a tragedy and failure with the chaos in Thokoza Park; "we will lose our lives because we want to get home or to work on time and safe". Commuters are starting to feel unsafe, this is according to 140 reviews which indicated a 64 percentage of unhappy commuters (hellopeter.com, 2017).

The government of South Africa encounters challenges to construct an exclusive public transportation framework that addresses issues of greenhouse emission, urban sprawl into the cities and large densities (Thomas, 2016). These challenges are identified in Johannesburg. The implementation of the BRT system has been addressed as government's ideal solution for countries with public transport problems (Clarke, 2013). Rea Vaya affects passengers who are reliant on urban public transport and, in addition, individuals that utilise private vehicles to get to the city of Johannesburg. By means of transportation being a fundamental component of individuals daily lives, it is essential to research on the most proficient method to enhance the framework and question the sustainability of Rea Vaya, by investigating how Rea Vaya plans to move in the future (Haseena, 2014).

The sustainability of Rea Vaya is questionable with regards to who are the stakeholders and how will the Bus Rapid system be maintained in the future. This study seeks to investigate the sustainability of Rea Vaya BRT system (Rahim, 2014). In addition, the study highlights challenges experienced by commuters and how those shortcomings discourage private car users to use Rea Vaya to commute (Togo, 2016).

2. Literature Review.

Wood (2015) defines Bus Rapid Transit (commonly known as BRT) as a system that confirms to be a rapid, profitable and effective process of urban transport that connects rapidity and the value of rail transport with the elasticity of a bus system, whilst Wu and Pojani (2016) define it as "a low cost bus-based alternative to metro and tram systems". Bus Rapid Transit (BRT) has been focused on as government's ideal solution for countries with public transport problems (Clarke, 2013). Besides allowing additional effective use of urban road areas by increasing the quantity to carry people, the BRT system provides affordable connectivity and a fast and reliable service aimed at different requirements (Lindau; Hidalgo and Loba, 2014). In a BRT system, a great number of buses drive along their own lanes, which are segmented through the city, by driving in the lanes allocated, buses can avoid all the congestion and carry a huge number of passengers' fast, safe and in comfort (TransCebu, 2016). Generally, the purpose of sustainable development became the result of extensive forces of finance and environment. This can be succesful throughout the incorporation with the recognition of financial, social and environmental matters through the administration of effective decision-making (Emas, 2015).

The significant rule for sustainable development includes, economic matters, social and environmental concerns into all forms of decision-making. The philosophy of sustainable development has incorporated decision making at its focal point (Stoddart, 2011), and the sustainability development in transport has been integrated from other forms of policy (Suleman, 2015). The environmental indications in terms of carbon emission, air pollution, energy consumption and land use are essential to sustainability. Socially, the capital dedicated to road infrastructure mostly for the middle-class citizens, could be usefully invested in the needs of the low-income citizens (Pojani and Stead, 2015). Social investment by government would equalise all citizens regardless of the level of income or social reputation in the public places. Essentially, it would permit cities to develop into a friendly place for all citizens (Pojani and Stead, 2015). A sustainable public transport framework encourages equality of urban life, a safe and secured framework that adds towards the health of the citizens mainly in cities (Schiller et al., 2010); Esson (2016) agrees that in developing nations the initial focal point should be on the connection between transport and inequality. Every citizen should be entitled to a standardised affordable and efficient public transport (Esson, 2016). Sustainable transport system can be well defined as the simple access that is essential to all citizens that is meant to be safe (Schiller et al., 2010). This entails being economic to eradicate greenhouse emissions and disposable waste around the globe, to have a good financial value and to minimise carbon emissions and reduce disposing chemicals which promote global climate change, restricts burning of natural resources to the sustainable level, reuses its mechanism, and reduces the usage of living land and the production of noise pollution (Schiller et al, 2010).

1.1 Importance of sustainability in public transport

In South African cities, the importance of sustainability has been maintained by encouraging people to walk and use bicycles and bus transit as a mode of transportation, and there is a variety of ways planned to promote public transport (Aganivanshi, 2014). Discouraging the number of vehicles on public roads is a sensitive matter to private car users but it is likely that this is an influential mechanism for developing an efficient urban, economically friendly transport system. This is because private car users are status driven and need a shift in their mind-set (Aganivanshi, 2014). According to a report conducted by Arrive Alive (2017), it is estimated that around 3.9 million individuals use transport in South Africa. The 2.5 million taxi commuters contribute over 63 percent of public transport work trips, the bus services contribute 22 percent of public transport commuters and the balance remaining is for the rail mode (Arrive Alive, 2017). There are 325 000 commuters who employ taxi services either as a feeder to other means or other public transport services (Arrive Alive, 2017). Minibus taxis are regarded as an informal transport system that makes up 67.9% of the total number of trips (Arrive Alive, 2017). The Metro bus operates 1 941 departures daily with passengers totalling 80 000 per day (City of Johannesburg, 2013).

Policy underlying public transport

The two relevant policy documents drafted by the Department of Transport are the Public Transport Strategy, and The Public Transport Action Plan, Phase 1 (Walters, 2013). The City of Johannesburg Integrated Plan supports the idea of these documents. Their aim was to make provision for the introduction of bus rapid transit (BRT) systems and develop a mode shift of 20% of car work trips to public transport networks (Johannesburg Strategic ITP Framework, 2013).

The Bus Rapid Transit (BRT) system

The BRT system has been implemented in more than 40 cities on six continents and as many systems are in planning or construction stages (Global BRT Data, 2016). The significant growth of Bus Rapid Transit (BRT) systems began in Curitiba (Brazil) in 1974 and with the achievement of an operative BRT system in Curitiba, cities got inspired to

develop similar systems. In the 1970s, North and South American continents started having similar systems. In the late 1990s, similar BRT system concepts started having a drive and BRT systems were released in Quito (1996), USA (1999) and Columbia (2000). Bogotá had a project, which started progressing around 2000, and its achievement as an advanced BRT system attracted the world. Close to 2005, 70 similar systems were implemented worldwide, based on one definition of BRT system (Adewumi and Allopi, 2013).

1.2 Importance of the BRT system and service quality

Over the world, large density cities search for sustainable methods to transport residents rapidly, proficiently and safely; the BRT system serves as one of the solutions to this problem (King, 2013). In a rapidly growing city with great innovative developments, congestion is severe on city roads. To avoid gridlock and promote sustainable economic growth, the city requires a mass transit system, for which BRT is ideally suited (TransCebu, 2016). The BRT system has continuously become an attractive public transport alternative in many countries because of its cost-effective and flexible implementation. In the existing economic state, BRT offers new opportunities for both large and small-sized urban areas to develop their transportation systems (Pedro and Macario, 2016). According to King (2013), these are the five key ways the BRT system contributes in improving the quality of lives in cities:

- Travel time savings
  With the allocated bus lanes disconnecting buses from mixed congestion, buses are allowed to travel quicker passing through the city.
- Greenhouse gases and emissions reduction
  The BRT system reduces the general amount of vehicle kilometres travelled (VKT) in a city by transporting commuters in high capacity buses that can carry approximately 160 passengers all at once.
- Traffic safety improvements
  The application of the BRT system decreases traffic crashes and fatalities in a number of ways. The overall reduction in vehicle kilometres travelled (VTK) results in a limited number of people on the road and a safer environment for drivers, walkers and cyclists. With the allocated bus lanes, there is less connection between buses and other modes of public transport, thus reducing the danger of misfortunes and deaths.
- Increased physical activities
  With the way the system is designed, longer walking distances are required. Commuters around the world consistently move through the city faster even with added time spent getting to terminals, the walking time is worth it.
- Economic benefits
  The BRT system is fast and saves money and time for commuters. The system reduces the cost of traveling operations to allow for more regular service (Racehorse et al., 2014).

The most important short and future long-term goal of all the transport systems worldwide is to advance sustainability (Janic', 2014). The ability of the system to manage growing commuters, transport demand, justifying impacts that are direct or indirect to the environment and human beings make it sustainable and efficient (Janic', 2014). Rea Vaya remains a competitive system to other modes of transport owing to its travel time benefits, travel costs impacts, service satisfaction and accessibility and benefits to lower-income residents (Vaz and Venter, 2013). Commuters in the Gauteng Province have been using the BRT system called 'Rea Vaya'. This is the first BRT system in South Africa. The BRT system, which connects Soweto and Johannesburg, was implemented on the 30th August 2009. South Africa has a number of operating BRT systems Port Elizabeth, Pretoria, Cape Town and Durban also has a progressing implementation of such a system (Adewumi and Allopi, 2013).

The theory of service quality has been mostly practical to the Rea Vaya system and defined as commuters' perception on how good Rea Vaya service meets the commuter's expectation and needs (Nandan & Geetika, 2010). Service quality in the public transport can be measured in connection with commuter's expectations, perceptions and observations (Litman 2008); The service quality for Rea Vaya includes components such as time, affordability, capacity of the buses, reliability, responsiveness, accessibility and technical constraints (Diaz, 2009). The components explain the expected time commuters spend travelling with the bus and the time Rea Vaya promised the commuters will travel (Currie, 2005). Furthermore, service quality identifies the commuter's needs by giving an exceptional service to the commuters who, in return, commuters can use complaints and criticism in order to evaluate the sustainability of the Rea Vaya, (Dell'Olio, Ibeas & Cecin, 2010). The service quality will certainly be used to meet the expectations of the commuters, precisely if it can provide the time consistency, adequate capacity for commuter's,

accessibility, safety responsiveness, affordable fares, reliability and an exceptional technical service it claims to deliver (Stradling et al., 2007).

In a trip, commuters generally have a choice of time in which they are pleased to travel. Commuter's expectations and perceptions are vital to service quality (Loke et al., 2011); they are not neutral, they are mainly based on the reality of commuting every day. Commuters expect the service to be responsive at their disposal and accessible from their designated homes to their destination (Loke et al., 2011). If a commuter anticipates a certain level of service and they perceive that the service was not delivered to their expectation, they will most definitely be dissatisfied (John, 2017.); however, in the case of Rea Vaya, even when the operation is measured by its service quality, the objection from commuters is delivered and commuters expected better service, because they are dissatisfied (Hello Peter, 2017). The main element in service quality is customer expectations (Foster, 2013); these components are formed by commuters with the directive that was influenced by Rea Vaya bus service.

Ugo (2014) argued that providing services on time and meeting the goals as assured by the organisation will significantly influence the commuters perception and satisfaction level, as well as increase customer loyalty which makes an avoidable mistake that leads to failure in delivery of quality services (Ugo, 2014), it discourages the customers' assurance and subsequently leaves a negative impact on the business service quality performance (Vilakazi & Govender, 2014). Commuter satisfaction is mostly viewed from a mental point of view, which involves the feeling of well-being and pleasure that results from gaining service from the organisation (Frey and Stutzer, 2010). Diaz (2009) outlines the seven elements of service quality for the BRT system as follows:

- Time Consistency: in respect of the travel time. This denotes the time which commuters spend traveling between stations, from point from origin to the point of destination. The time components of the BRT (Rea Vaya) includes: (i) waiting time, (ii) arrival time, (iii) the time commuters spend waiting for the bus, (iv) departure time and the travelling time. The travel time, the amount of time the passenger spent travelling using the BRT system.
- Reliability: This denotes the variance of the time spent travelling and the assurance of buses too adequately and ensure reliable service quality. Capacity: it is the number of commuters carried by Rea Vaya from different stations.
- Accessibility: this refers to the ease of accessing Rea Vaya to the convenience of commuters.
- Affordability: it is the ability to afford the cost or price of Rea Vaya.
- Responsiveness: the time spent and action taken to assist and attend to commuters' queries and to ensure the basic needs of commuters are responded to.
- Technical Constraints: this refers to any failure, delays, or constraints encountered as the result of the technical or maintenance and repairs related problems encountered by the Rea Vaya bus.

Capacity: this refers to the maximum number of passengers carried by Rea Vaya. The available space at bus stations where the commuters wait for the busses.
Rea Vaya provides a fast, safe and inexpensive public transport on a link of bus roads across Johannesburg. Rea Vaya is aimed at providing better public transport, reducing congestion on public roads, improving the environment and producing jobs (ReaVaya, 2016). The first corridor consists of a 25 km bus line with media lanes, 27 bus stations and feeder routes connecting the Central Business District and Soweto. Rea Vaya feeders are roads from outer suburbs that join the trunk route at a key station (Rea Vaya, 2016). The Johannesburg Gautrain Station handovers can happen between present rail services and the Gautrain and between the Gautrain, buses and taxis. Park Station is considered the busiest terminal in South Africa and assists different rail and road public transport modes (Gautrain, 2017). The Rea Vaya system's stakeholders include Taxi Authorities and City Representatives (Venter, 2012).

According to Bethlehem (2013), Rea Vaya should take part in lowering the level of dissatisfaction and taking back dysfunctional challenges related to urban public transport systems in South Africa. Congestion in the inner city still exists, as modal change has not happened. With all the negotiations managed by the City of Johannesburg to include the taxi industry in the Rea Vaya system, by placing them as shareholders, there is still anger and confrontation from the Taxi industry towards the Rea Vaya system (Haseena, 2014).

For some users, Rea Vaya has created opportunities such as an efficient and accessible service, though the poor customer service received from the bus drivers and the Rea Vaya station staff is seen as a problem for the system (Haseena, 2014). Individuals who own businesses next to the Rea Vaya stations found that Rea Vaya has both a

constructive and destructive effect and their businesses. The advancement of the stations has given an appealing value to the businesses, but because of the recurrence of the buses at the station, commuters do not wait for long on the platforms, resulting in the businesses having fewer customers visiting their stores (Haseena, 2014).

The need to appeal to more consumers, particularly to car users, is significant for the Rea Vaya system. The growth of a solid industry and economic standard for ongoing maintenance of a current system is an enormous task. For owners and operators to have the relevant abilities, continuous training is required, this will help maintain the success of the system (Adewumi and Allopi, 2013). The Rea Vaya system provides a reliable transport system in Johannesburg, but the system is in a premature stage, facing a number of challenges that need to be solved such as poor customer service (Haseena, 2014).

3. Problem statement

Rea Vaya bus system aims to give commuters efficient and affordable public transport (Cervero, 2013). The use of Rea Vaya has inconvenienced the commuters by not living to its expectations due to service quality, not enough buses to carry the capacity of commuters, time and technical constraints (Hellopeter, 2017). This has questioned the operation of Rea Vaya as to how it will be sustained (Haseena, 2014). These factors are crucial in ensuring the long-term sustainability and efficiency of the Rea Vaya system (Adewumi and Allopi, 2013).

4. Main research question

How does time consistency, reliability, capacity, accessibility, affordability, responsiveness, and technical constraints, as seven elements of service quality impact the Rea Vaya's commuters' satisfaction and Rea Vaya's sustainability?

4.1. Sub-questions

- How does the Rea Vaya's time consistency affect passengers' waiting, travelling and arrival time?
- Does Rea Vaya have enough bus seats (capacity) and number of stations to service large numbers of passengers?
- Is the Rea Vaya conveniently accessible and affordable to all of its commuters?
- How efficient is the Rea Vaya response rate to commuters' inquiries?
- How do technical constraints (such as bus breakdown, maintenance and bus unavailability) affect the service quality of Rea Vaya?

5. Primary research objective

The primary objective of this research is to investigate the impact that the above-mentioned seven elements of quality, have on Rea Vaya's sustainability and commuters' satisfaction level.

5.1. Secondary research objectives

The secondary objective is to evaluate the Rea Vaya's capacity and quality service level in respect of:

- Consistent compliance with expected arrival, travelling, and waiting time.
- Adequacy capacity level in respect of the bus seats and number of stations (space) required to service large number of commuters.
- Convenient accessibility and affordability service level.
- The speedily response to commuters' queries.
- The technical constraints' effect on service quality.

6. Research methodology

Quantitative is a research method that uses numerical data collection and enables the study to analyse data. It provides the results in a form of numeric method (Erikson and Kovolainen, 2015). The use of a quantitative data collection method helped in answering the primary and secondary objectives of the research in a form of a questionnaire. The questionnaires used as a means of collecting data from the sample and was handed out to BRT users at selected bus stations on specific routes in Johannesburg. Through this method of data capture, the research provided information from a limited number of individuals who were able and willing to communicate and whose opinions were then intended to be representative of a larger group of people's opinions in the same segment. The target population consists of all users of the Rea Vaya BRT system, Rea Vaya transports an average of 16 000 commuters every day (Rea Vaya, 2009). The goal was to target the number of respondents that were interviewed as commuters of Rea Vaya users. The study was conducted with respondents between the ages of 18 to 60, students travelling using Rea Vaya and working individuals, there is an estimate of approximately 6.3 per cent of metropolitan residents using Rea Vaya (Statistics South Africa, 2013). Target population is between the University of Johannesburg station and Carlton Centre station. Data collection was conducted between different Rea Vaya stations from Thokoza Park to Ellis Park route and on the

Thokoza Park to Parktown and Library Gardens East route. The sample size used for this research is a 100. One hundred and twenty five questionnaires were distributed across five stations, thirty five questionnaires at the Thokoza station, thirty five questionnaires at the Diepkloof station, twenty five questionnaires at the Art Gallery station, fifteen questionnaires at Library Gardens station, and fifteen at Carlton Centre station all on the same route.

7. Results and Analysis

6.1. Distribution and return

Data collection was conducted between different Rea Vaya stations from Thokoza Park to Ellis Park route and on the Thokoza Park to Parktown and Library Gardens East route. The sample size used for this research is a hundred. One hundred and twenty five questionnaires were distributed across five stations, thirty five questionnaires at the Thokoza station, thirty five questionnaires at the Diepkloof station, twenty five questionnaires at the Art Gallery station, fifteen questionnaires at Library Gardens station, and fifteen at Carlton Centre station all on the same route.

Table 1 shows the demographic profiles of the results, which includes age. The questionnaire consisted of 30 questions, regarding the service quality of the Rea Vaya system. The design of the questionnaire was closed ended questions and was answered using an agreement rating scale, 1-5 varying from strongly disagree (1) to strongly agree (5).

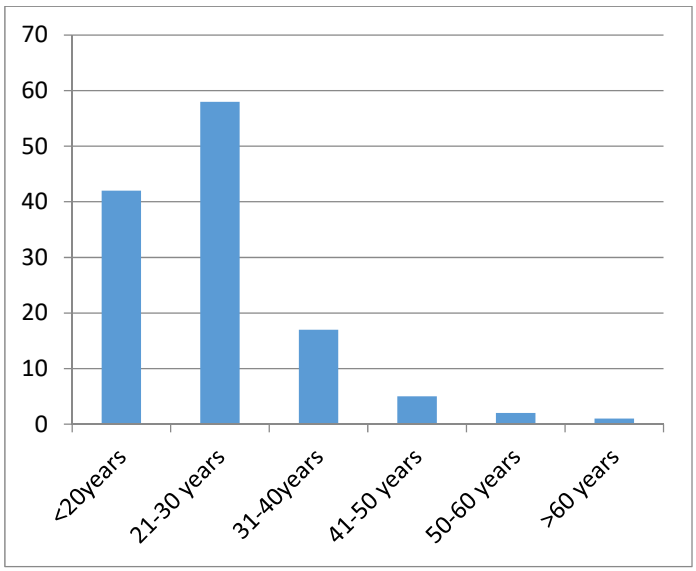

Figure 1: Demographics; age distribution of respondents

Figure 1 shows the age distribution of the respondents. The majority of respondents, namely 58 (46.4%) were between 21 and 30 years, 17 (13.6%) were from the age group between 31 and 40 years, 20 (21.1%) were from the age group between 31 and 40 years, 5 (4.0%) were from the age group between 41 and 50. Respondents between the age group of 50 to 60 and the age group of greater than 60 years contribute fewer respondents.

Table 1: Time consistency: reliability of time savings when travelling by Rea Vaya

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
On time arrival	Commuters	12	31	30	38	14	125
	%	9,6%	24,8%	24,0%	30,4%	11,2%	100,0%
Useful type of transport	Commuters	3	11	14	63	34	125
	%	2,4%	8,8%	11,2%	50,4%	27,2%	100,0%
Convenient location	Commuters	5	17	27	47	28	124
	%	4,0%	13,7%	21,8%	37,9%	22,6%	100,0%
Arrives on scheduled time	Commuters	22	58	24	16	5	125
	%	17,6%	46,4%	19,2%	12,8%	4,0%	100,0%
Waiting time is reasonable	Commuters	23	46	26	24	5	124
	Row N %	18,5%	37,1%	21,0%	19,4%	4,0%	100,0%
Arrival at the destination on time	Commuters	12	43	26	22	5	108
	%	11,1%	39,8%	24,1%	20,4%	4,6%	100,0%

From table 6 out of 125 commuters interviewed, 41.6 % commuters agreed that the buses arrived on time at the place of interest. This means 58, 4% of commuters are dissatisfied with the arrival time at their place of interest. When it comes to usefulness of the type of transport service, 77.6% of commuters agreed that it is useful yet, Rea Vaya can do better. About 60.5% of the commuters felt that the Rea Vaya buses were located conveniently within the reasonable walking distance, at least 39.5% of the commuters were not happy in this regard. Out of 125 commuters interviewed, 64% of the commuters disagreed to arriving at the scheduled time when using Rea Vaya, while 16.8% of commuters agreed that they arrived on scheduled time. When it comes to waiting time for the bus 55.6% of commuters felt that the time they wait for the bus is not reasonable and, 23.4 % were happy with the walking time. Out of 125 commuters interviewed, 50.9% agreed that they arrive on time at the destination, while 25% of commuters were not satisfied with the time Rea Vaya takes to arrive at their destinations.

Table 7 Reliability: The quality of being trustworthy or of performing steadily well

		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Total**
Service always dependable	Commuters	8	25	42	45	4	124
	%	6.5%	20.2%	33.9%	36.3%	3.2%	100.0%
Informs commuter on the availability of buses	Commuters	30	40	25	26	3	124
	%	24.2%	32.3%	20.2%	21.0%	2.4%	100.0%
Bus information such as maps available	Commuters	6	10	25	54	29	124
	%	4.8%	8.1%	20.2%	43.5%	23.4%	100.0%

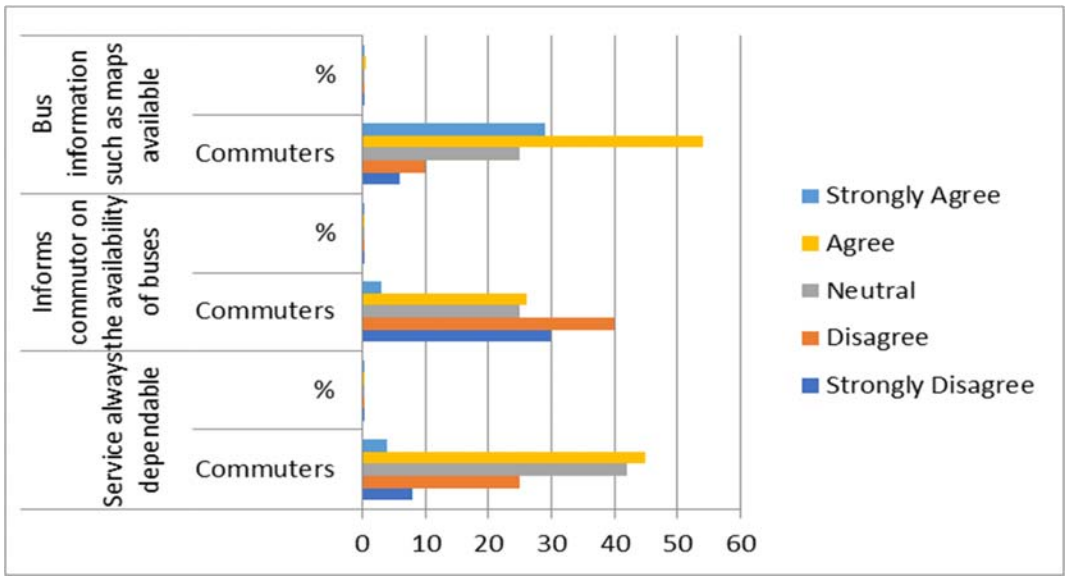

Figure 2: Reliability: the quality of being trustworthy or of performing steadily well

From table 7 and figure 2, out of 125 commuters, 39.5% agreed that the level of service is always dependable, while 60.6% commuters disagreed that they can depend on the service.
While 76.7% strongly disagreed that Rea Vaya informs commuters about the availability of the buses, which puts an emphasis on the company looking into improving the service quality and, 23.4% commuters agreed that Rea Vaya informs on the availability of the buses.
About 33.1% of commuters disagreed that bus information schedule route maps are available, while 66.9% agreed that the information on scheduled routes is available.

Table 8 Capacity: the maximum number of passengers carried

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Buses have enough space to accommodate standing commuters	Commuters	38	46	18	12	11	125
	%	30.4%	36.8%	14.4%	9.6%	8.8%	100.0%
Buses have enough seats to carry commuters	Commuters	31	50	15	22	7	125
	%	24.8%	40.0%	12.0%	17.6%	5.6%	100.0%
Stations have enough capacity to accommodate commuters waiting for the bus	Commuters	16	20	22	43	24	125
	%	12.8%	16.0%	17.6%	34.4%	19.2%	100.0%
Enough buses scheduled for my route	commuters	22	48	25	20	10	125
	%	17.6%	38.4%	20.0%	16.0%	8.0%	100.0%

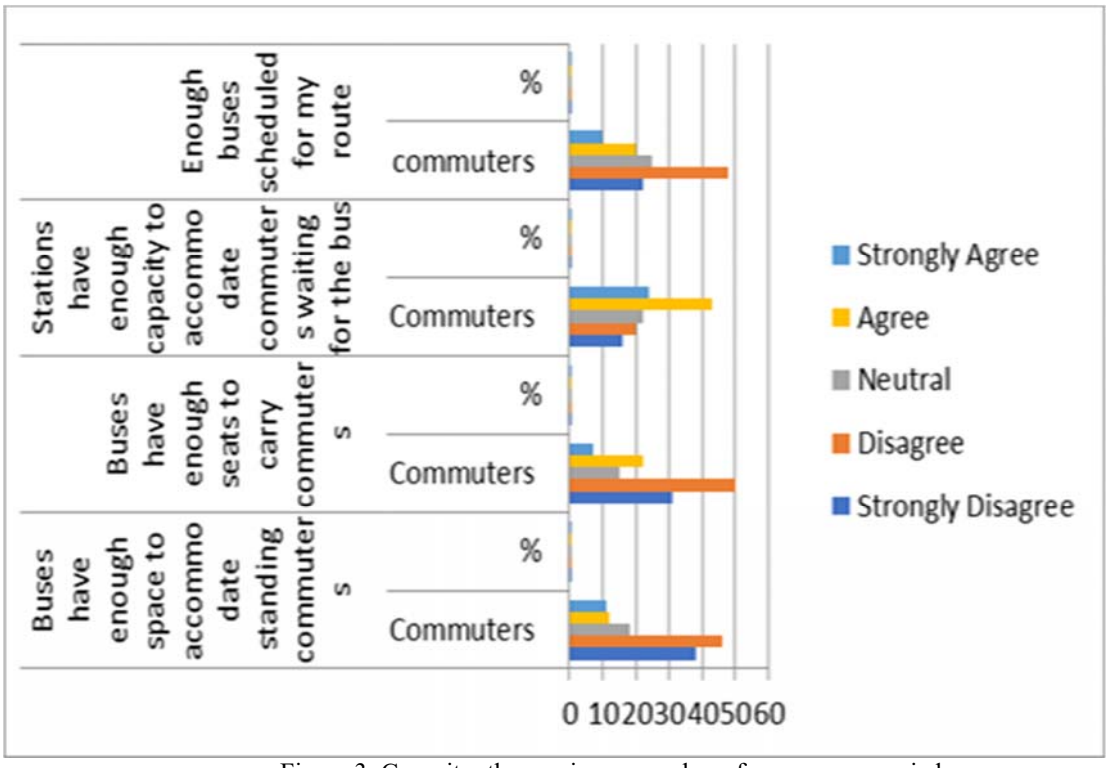

Figure 3: Capacity: the maximum number of passengers carried

From table 8 and figure 3, out of 125 commuters which constitutes 46 commuters, 81.6% strongly disagreed that the buses have sufficient space to accommodate standing commuters, which shows that the majority of commuters are not accommodated in the bus due unavailability of space. While, a minimum of 18.4% of the commuters agreed to have sufficient space for standing commuters.

Another high percentage of commuters which is 76.8% strongly disagrees that buses have enough seats to carry commuters which leads to the dissatisfaction of commuters while, 23.2% agreed that buses have enough seats to carry commuters.

About 46.4% of the commuters disagreed that the stations have enough capacity to accommodate every commuter as they wait for the bus, while 53.6% agreed that the bus accommodates every commuter.

Another high percentage of 76% disagreed that there are enough buses scheduled for commuter's routes, whilst 24% agreed that they have enough buses on the scheduled routes.

Table 9. Accessibility: the design of services for commuters within the Access points of Rea Vaya buses

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Bus stations easily accessible	Commuters	4	9	25	73	14	125
	%	3,2%	7,2%	20,0%	58,4%	11,2%	100,0%
Buses available to most areas in the CBD	Commuters	2	6	31	61	25	125
	%	1,6%	4,8%	24,8%	48,8%	20,0%	100,0%
Rea Vaya facilitates the process of bus connection fairly	Commuters	13	26	35	40	11	125
	%	10,4%	20,8%	28,0%	32,0%	8,8%	100,0%
Service access points are conveniently located	Commuters	15	20	29	53	8	125
	%	12,0%	16,0%	23,2%	42,4%	6,4%	100,0%

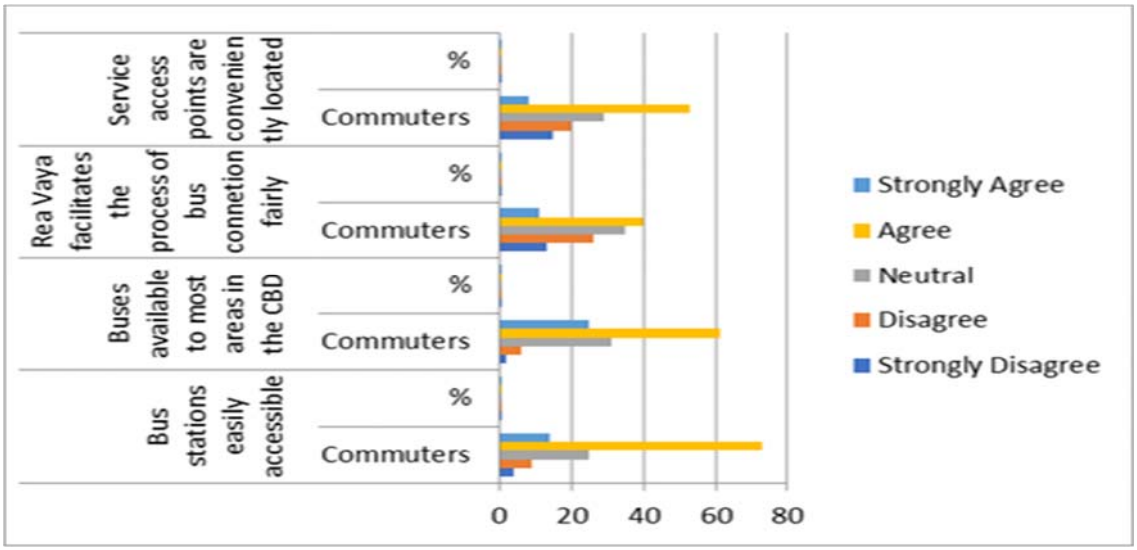

Figure 4: Accessibility: the design of services for commuters within the Access points of Rea Vaya buses

Figure 4 and table 9 on accessibility, 30.4% of commuters agreed that bus stations are easily accessible, in the meantime the total of 69.4% totally agreed that there is easy access to the bus stations.
While the minimum of 31.2% disagreed that buses are available to most areas in the central business district (CBD) and the maximum of 68.8% agreed to have access in the CBD.
The total of 64% disagreed that Rea Vaya facilitates the process of connection fairly, while 61% agreed. Therefore, 51.2% disagreed to the service access points being located conveniently, and 52.4% of the commuters agreed to the service access points being located conveniently.

Table 10: Affordability: the ability to afford the cost or price of Rea Vaya

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
commuting is affordable	Commuters	19	23	26	45	12	125
	%	15.2%	18.4%	20.8%	36.0%	9.6%	100.0%
fares are good value for money	Commuters	16	25	24	48	12	125
	%	12.8%	20.0%	19.2%	38.4%	9.6%	100.0%
commuters buy weekly/monthly tickets	Commuters	8	10	25	58	24	125
	%	6.4%	8.0%	20.0%	46.4%	19.2%	100.0%
fare increases reasonable	Commuters	29	41	24	26	5	125
	%	23.2%	32.8%	19.2%	20.8%	4.0%	100.0%

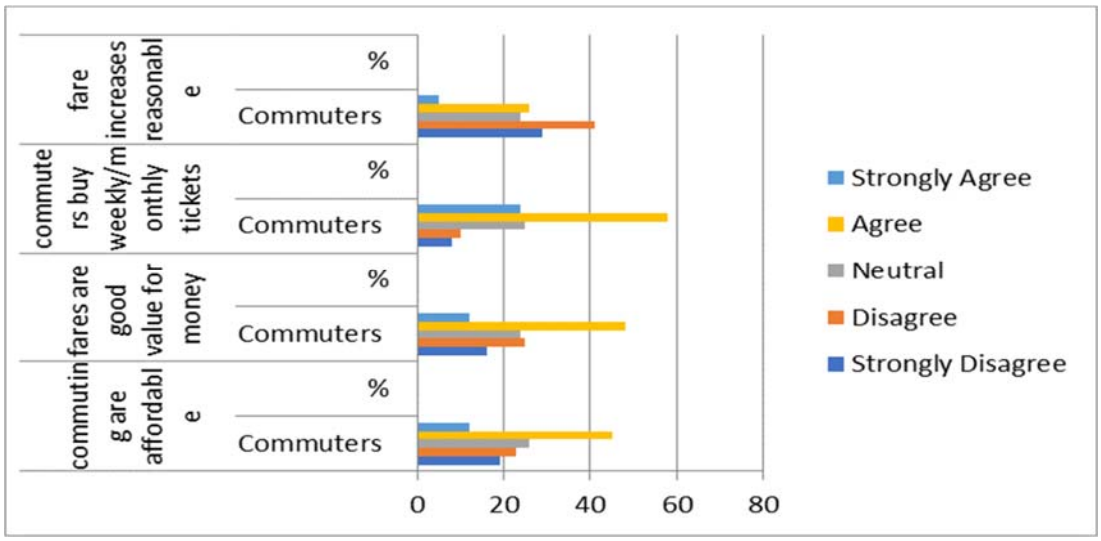

Figure 5. Affordability: the ability to afford the cost or price of Rea Vaya

Table 10 and figure 5; out of 125 commuters, 54,4% of the commuters disagreed to finding Rea Vaya commuting fares affordable while, 45,6% agreed to find the bus fares affordable.
About 52% disagreed that fares are good value for money while, 48% agreed that the fares are good value for money. Commuters of about 34.4% disagree that tickets can be bought weekly/monthly while, the difference of 65.6% agrees to buy tickets. The concerned 75.2% of commuters strongly disagreed that fare increase is reasonable however, 24.8 % agreed that the fare increase is reasonable.

Table 11 Responsiveness: willingness to help customers to provide speedy service

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Staff respond to complaints quickly	Commuters	36	35	28	24	2	125
	%	28,8%	28,0%	22,4%	19,2%	1,6%	100,0%
Staff offer well informed responses to queries	Commuters	25	45	30	20	5	125
	%	20,0%	36,0%	24,0%	16,0%	4,0%	100,0%
Commuters are treated with care and seriousness	Commuters	25	32	31	34	3	125
	%	20,0%	25,6%	24,8%	27,2%	2,4%	100,0%
Staff is willing to respond to commuters' inquiries	Commuters	22	29	38	30	6	125
	%	17,6%	23,2%	30,4%	24,0%	4,8%	100,0%

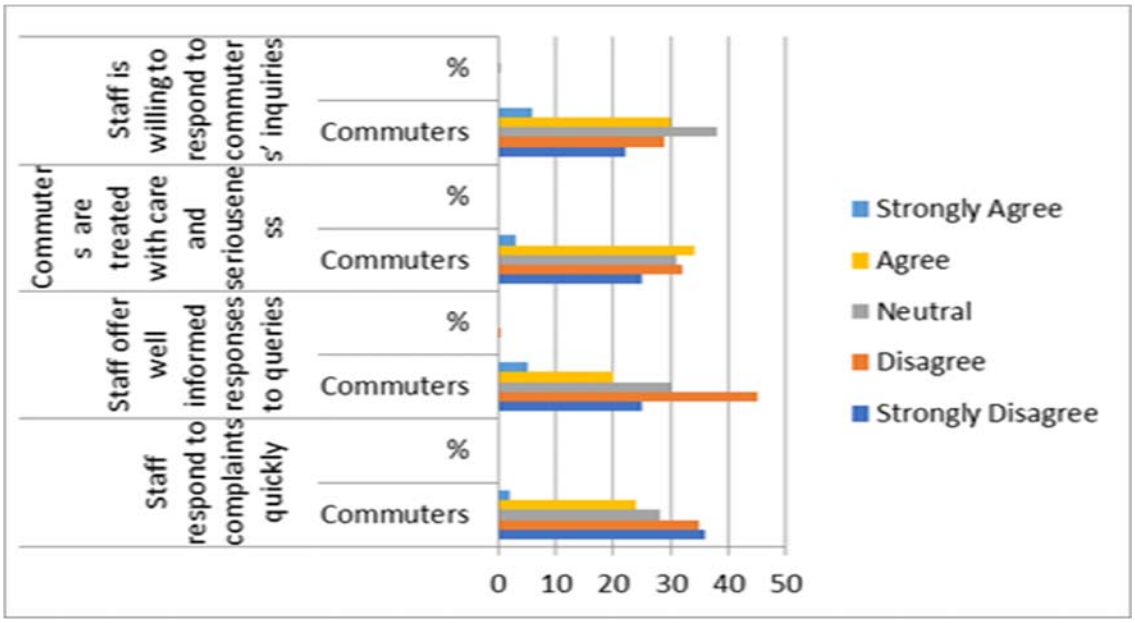

Figure 6 Responsiveness: willingness to help customers to provide speedy service

In table 11 and figure 6 out of 125 commuters, 79.2% of commuters strongly disagreed that staff responds to the complaints quickly which results in a challenge in terms of commuters satisfaction while, 20.8 % agree that the staff respond quickly to their complaints.

About 80% of commuters strongly disagrees that the staff offers well informed responses to queries, while a minimum of 20% agreed to the quick response received from Rea Vaya.

A high proportion of 70.4% strongly disagreed that commuters are treated with care and seriousness, while 29.4% agreed to be taken seriously. Therefore, 71.2% of commuters disagreed that the staff is willing to answer their questions asked about the bus service which will constitute to lower the service quality of Rea Vaya.

Table 12 Technical constraints: problems encountered by the Rea Vaya services

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
buses experience breakdowns	Commuters	15	29	25	31	25	125
	%	12.0%	23.2%	20.0%	24.8%	20.0%	100.0 %
Customer service line reachable	Commuters	19	24	46	30	6	125
	%	15.2%	19.2%	36.8%	24.0%	4.8%	100.0 %
Smart card easy to use	Commuters	5	11	25	57	27	125
	%	4.0%	8.8%	20.0%	45.6%	21.6%	100.0 %
Staff can respond to technology quickly	Commuters	17	19	40	42	7	125
	%	13.6%	15.2%	32.0%	33.6%	5.6%	100.0 %
Smart buscards are free of error	Commutes	14	18	37	44	12	125
	%	11.2%	14.4%	29.6%	35.2%	9.6%	100.0 %

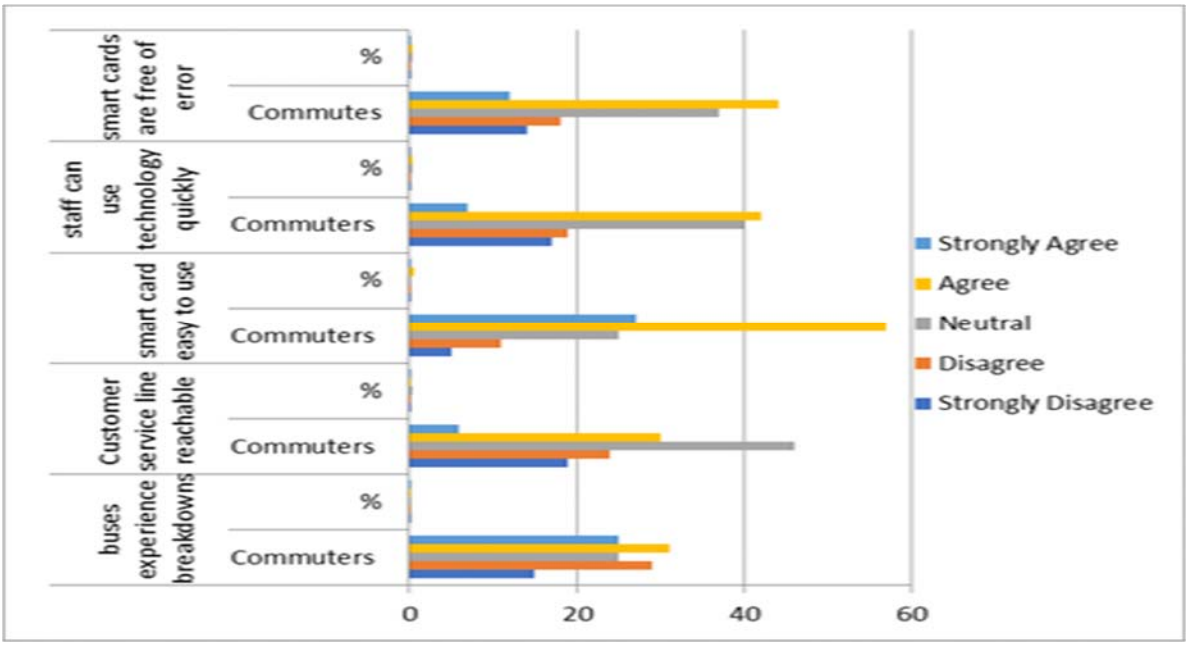

Figure 7
Technical constraints: problems encountered by the Rea Vaya services.

From table 12 and figure 7; about 55.2% of commuters disagreed that buses experience breakdowns while, 44,8% agreed that buses have breakdowns which indicates that buses are rarely maintained.

While, 71.2% of commuters disagreed that the customer service line is reachable whereas, 28.8% agreed that the customer service line is reachable. Although, a minimum of 32.8% disagreed that the smart card system is easy to use and 67.2% agreed that smart cards are easy to use.
Commuters of about 60.8% disagreed that the staff can use technology quickly and skilfully, while 39.2% of the commuters agreed to the staff being able to use the technology skilfully. And, 55.2% of commuters disagreed that cards are free from error while, 44.8% agree that smart cards are free from error.

Reliability testing

Reliability shares the consistency of a measure. A participant completing an instrument that measures motivation should have approximately the same responses every time the test is done. Although it is not likely to give an exact calculation of reliability, an estimate of reliability can be achieved using different measures. Cronbach's α is the most commonly used test to decide on the internal consistency of an instrument. In the test, the average of all correlations in every combination of split-halves is determined. Instruments with questions that have more than two responses can be used in this test. The Cronbach's α coefficient is a number between 0 and 1. The score acceptable with reliability is a score that is 0.7 or higher (Heale and Twycross, 2015).

Table 13 - Reliability testing

Construct	Cronbach	Item
Time consistency	.725	5
Reliability	.205	3
Capacity	.757	4
Accessibility	.812	4
Affordability	.814	4
Responsiveness	.848	4
Technical constraints	.645	4
	Total-0.68=0.7	

The reliability-testing table shows the different constructs, the Cronbach results and the number of items. The construct scores show an excellent indication except for the reliability construct. The reliability construct is relatively low compared to other constructs which makes the construct amount questionable.
The reliability score of the constructs amounts to 0.7, which is an acceptable score when testing reliability. The score that is acceptable with reliability is 0.7 or higher (Heale and Twycross, 2015).

The study was conducted through using previous literature where Rea Vaya's sustainability is measured through service quality. The study found that Rea Vaya at present does not meet the commuter's expectations. Disappointingly, the responses from commuters showed the level of dissatisfaction with the Rea Vaya commuting service. The level of service quality has negatively impacted the operations of Rea Vaya. Therefore, time spent waiting for the bus contributes negatively to the daily activities of commuters. The capacity of commuters travelling on Rea Vaya are affected by the bus service not having sufficient seats to accommodate them.
Rea Vaya commuters are within the average to low salary range and the reason the commuters depend on Rea Vaya is because they afford the transportation. Yet, there is a slight difference in commuters regarding affordability because it shows that the sales have been going up, and the only concern with commuters is the consistency in pricing. When prices continue to go up, the concept of Rea Vaya being affordable will be unrealistic. The commuters found that Rea Vaya is not responsive to inquiries, as they do not offer well informed information to commuters.

The staff does not give accurate response and it becomes difficult for commuters to rely and trust the service. The Rea Vaya technical constraints such as bus break downs and the customer service land line have slowed the operations process, and these service quality components measured the effect of the service quality that Rea Vaya has on commuters and it questions its sustainability in terms of commuter satisfaction and expectation.

7. Conclusion

Time consistency impacts the service quality of Rea Vaya, commuters are expecting the service to proceed timeously as promised by Rea Vaya. The time spent waiting for the bus contributes negatively to the daily activities of commuters. The capacity of commuters travelling on Rea Vaya are affected by the bus service not having sufficient space to accommodate them. It is evident from the results that Rea Vaya is unable to transport all the commuters. The results indicated that the majority of respondents using Rea Vaya are within the lower level of the salary scale. The

reason the respondents depend on Rea Vaya is because they can afford the kind of service they are receiving. Yet, there is a slight difference in respondents regarding affordability because it shows the sales have been going up, and the only concern with respondents is the consistency in pricing. When prices continue to go up, the concept of Rea Vaya being affordable will be unrealistic.

The respondents found Rea Vaya not responsive to inquiries, as they do not offer well informed information to commuters. The staff does not give an accurate response and it becomes difficult for commuters to rely or trust the service. The Rea Vaya technical constraints such as bus break down and customer service land line affect the service quality and slows down the process of meeting the commuter's expectations. In order for the BRT system to function more efficiently and effectively in the future, more private investment will be required to keep the system operational. The taxi owners and Government investment will not be enough to sustain the system. Companies such as Pick and Pay could fund the system and in return Pick'n and Pay staff be eligible to a discount from Rea Vaya. The study was conducted on a sample size of 100 participants. It provides a good indication of the commuter's opinions about the service of Rea Vaya. More research should be conducted on a much larger sample size and it should include more routes and stations.

References

Adewumi, E. and Allopi, D. 2013. Rea Vaya: South Africa's first bus rapid transit system. South African Journal of Science, 109(7-8), pp.01-03.

Aganivanshi, J. 2012. Planning Sustainability Transportation System. Future Joburg. In all cities, economy, mobility, public space. [Accessed on, https://sustainabledevelopment.un.or].

Allen, H., 2013. Africa's first full rapid bus system: The Rea Vaya bus system in Johannesburg, Republic of South Africa. Unpublished case study prepared for the Global Report of Human Settlements.

Arrive Alive, 2016. Accessed from, [www.arrivealive.co.za/Public-Transport].

Asad, F, H, A. 2013. City centres: Understanding the travel behavior of residence and the implications for sustainable travel. (Doctoral dissertation, University of Salfrod).

Askerud, C. and Wall, S., 2017. Evaluation of bus terminals using microscopic traffic simulation.

Boame, A.K., 2004. The technical efficiency of Canadian urban transit systems. Transportation Research Part E: Logistics and Transportation Review, 40(5), pp.401-416.

Bryman, A. and Bell, E. 2015. Business research methods. Oxford University Press, USA.

Cervero, R, 2013. Bus Rapid Transit (BRT): An efficient and competitive mode of public transport. Working paper-2013-01.

Cherry, T. 2011. Missing the bus: An assessment of service improvement to metro bus transfers in Bongkok, Thailand. Master's thesis. Montréal, Canada: Concordia University.

City of Johannesburg, 2013. Metro bus business plan final draft Available on www.joburg.org.za [Accessed 31 March 2017].

City of Johannesburg, 2013. Strategic Integrated Business Plan Framework Available on www.joburg.org.za [Accessed 31 March 2017].

Clarke, C. 2013. BRT: big challenges ahead. Focus on transport. EMAG issues.

Combs, T.S. and Rodríguez, D.A., 2014. Joint impacts of Bus Rapid Transit and urban form on vehicle ownership: New evidence from a quasi-longitudinal analysis in Bogotá, Colombia. Transportation Research Part A: Policy and Practice, 69, pp.272-285.

Creswell, J.W, 2013. Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.

Criden, M., 2008. Recognizing the Importance of Public Transportation for Low-Income Households, Washington, DC: National Association for State Community Services Programs.

Currie, G., 2005, 'The demand performance of bus rapid transit', Journal of Public Transportation 8, 41-53.
Currie, G., and A. Delbosc, 2011. Understanding bus rapid transit route ridership drivers: An empirical study of Australian BRT systems. Transport Policy 18(5): 755-764.

Dell'Olio, L., Ibeas, A. & Cecin, P., 2010, 'Modelling user perception of bus transit quality', Journal of Transport Policy 17, Available on http://dx.doi.org/10.1016/j.tranpol.2010.04.006. [Accessed on October 2017].

Deng, T. and Nelson, J.D., 2013. Bus Rapid Transit implementation in Beijing: An evaluation of performance and impacts. Research in Transportation Economics, 39(1), pp.108-113.

Deng, T., and J. D. Nelson. 2011. Recent developments in bus rapid transit: A review of the literature. Transport Reviews 31(1): 69–96.

Emas, R, 2015. The concept of sustainability development. Definition and defining principles. Florida international University.

ENEWS CHANNEL AFRICA, 2013. Available on www.enca.com. [Accessed on 17 March 2017]
Engelbrecht, L. and Bekker, J. 2012, A decision support model for passenger capacity design of BRT stations. Department of Industrial Engineering Stellenbosch University, South Africa.

Esson, J., Gough, K.V., Simon, D., Amankwaa, E.F., Ninot, O. and Yankson, P.W. 2016. Livelihoods in motion: Linking transport, mobility and income-generating activities. Journal of Transport Geography, 55, pp.182-188).

Foster, C. and Resnick, S., 2013. Service worker appearance and the retail service encounter: the influence of gender and age. The Service Industries Journal, 33(2), pp.236-247.
Frey, B.S. and Stutzer, A., 2010. Happiness and economics: how the economy and institutions affect human well-being. Princeton University Press.

Gauthier, A. and Weinstock, A., 2010. Africa Transforming Paratransit into BRT. Built Environment, 36(3), pp.317-327.

Gautrain, 2017. BACKGROUND TO JOHANNESBURG PARK STATION. Available on http://www.gautrain.co.za/about/route/stations/background-to-johannesburg-park-station/ [Accessed on 31 March 2017].
Global BRTData. (2016). Available at: http://brtdata.org/. Last accessed on 12 March 2017.

Grava, S. 2003. Urban transportation systems. Choice of communities.

Hair, J.F, Celsis, M.W, Oritinau, D.J, Bush, R.P.2013. Essentials of Marketing Research. 3rd edition. Mc Graw Hill International edition, New York.

Heale, R., and Twycross, A. 2015. Validity and reliability in quantitative studies.18: 66-67. Validity and reliability in quantitative research (PDF Download Available). Available from:https://www.researchgate.net/publication/280840011_Validity_and_reliability_in_quantitative_research [accessed Aug 5, 2017].

Hellopeter, 2017. Available on www.hellopeter.com [Accessed on 17 March 2017].
Hensher, D. A., and T. F. Golob. 2008. Bus rapid transit systems: A comparative assessment. Transportation 35: 501-518.

Janić, M., 2014. Advanced Transport Systems: Contribution to Sustainability. In Advanced Transport Systems (pp. 391-398). Springer London.

Jefferson, C., 1996. Improving access by public transport. Landscape and Urban Planning , 35(2-3), pp. 173-179.
Joburg: a liveable sustainable city, 2014, Johannesburg development agency. www.jda.org.za.
John, B.M., 2017. DYNAMICS OF SERVICE QUALITY IN THE INDIAN BANKING SECTOR. Indian Journal of Commerce and Management Studies, 8(1), p.59.
Kaenzig, R., Mobereola, D. and Brader, C., 2010. Africa's First Bus Rapid Transit System. Transportation Research Record: Journal of the Transportation Research Board, (2193), pp.1-8.

King, R. 2013. Ways cities benefit from Bus Rapid Transit (BRT). World Resource Institute.

Li, J, 2011. Decoupling urban transport from GHG emissions in India cities. A critical perspective. Energy policy 39(6), pp, 3503-3514.

Lindau, L.A., Hidalgo, D. and de Almeida Lobo, A., 2014. Barriers to planning and implementing Bus Rapid Transit systems. Research in Transportation Economics, 48, pp.9-15.

Litman, T., 2015. Valuing Transit Service Quality Improvements: Considering Comfort and Convenience in Transport Project Evaluation, Victoria: Victoria Transport Policy Institute.
Litman, T., 2008, 'Valuing transit service quality improvements', Journal of Public Transportation 11, 43-62.
Loke, S.P., Taiwo, A.A., Salim, H.M., Downe, A.G. and PETRONAS, U.T., 2011. Service quality and customer satisfaction in a telecommunication service provider. In International Conference on Financial Management and Economics (Vol. 11, pp. 24-29).
McCaul, C. and Ntuli, S., 2011. Negotiating the deal to enable the first Rea Vaya bus operating company: Agreements, experiences and lessons.

Nandan, S. & Geetika, C., 2010, 'Determinants of customer satisfaction on service quality: A study of railway platforms in India', Journal of Public Transportation 13, 97-112.
National Household Travel Survey, Statistics South Africa. 2013. Available from: www.ststssa.gov.za
[Accessed Aug 5, 2017].

Paiva, E, Kovolainen, A, 2015. Quantitative methods in business Research, A practical guide to social research, 2nd edition, Sage.

Pedro, M.J. and Macário, R., 2016. A review of general practice in contracting public transport services and transfer to BRT systems. Research in Transportation Economics, 59, pp.94-106.

Pinheiro, A. C, 2003. Regulatory reform in Brazilian infrastructure: Where do we stand?

Pojan, D, and, Stead, D, 2015. Sustainable urban transport in the developing world beyond megacities. Sustainability, 7(6), pp.7784-7805.

Racehorse, V.J., Zhang, G., Sussman, A., Jian, A. and Parker, T., 2014. Bus rapid transit system deployment for high quality and cost-effective transit service: a comprehensive review and comparative analysis. IET Intelligent Transport System.

Rahim, H., 2014. The social and economic effects of the Rea Vaya Bus Rapid Transit System (BRT) in the Gauteng Province (Doctoral dissertation).

Rea Vaya, 2009. Almost 16 000 commuters use Rea Vaya every day. Available on https://www.reavaya.org.za/news-archive/september-2009/262-close-to-16-000-commuters-use-rea-vaya-every-day [Accessed on: 11 May 2017].

Rea Vaya. 2016. Who are we? The City of Johannesburg's revolutionary Bus Rapid Transit. Available from: www.reavaya.org.za [Accessed 17 March 2017].

Rea Vaya. 2017. Fast Facts. Available from: www.reavaya.org.za/welcome/fast-facts
[Accessed 22 April 2017]

Sabe, Z.S. 2014. What do we mean by Structured, Semi-structured and Unstructured questionnaire? Western Sydney University
Availablefrom:https://www.researchgate.net/post/What_do_we_mean_by_Structured_Semi-structured_and_Unstructured_questionnaire [accessed May 11, 2017].

Samkange, PM, 2009. Chapter 3 research methodology. Available from www.uir.unisa.ac.za [Accessed on 22 April 2017].

Schiller, P. L, Bruun, E. C. & Kenworthy, J. R. 2010. An Introduction to Sustainable Transportation: Policy, Planning and Implementation. London: Earthscan.

Stoddart, H. 2011. A Pocket guide to sustainable development governance, Stakeholder Forum.

Stradling, S., Carreno, M., Rye, T. & Noble, A., 2007 'Passenger perceptions and the ideal urban bus journey experience', Journal of Transport Policy 14, 283-289. Avaible on http://dx.doi.org/10.1016/j.tranpol.2007.02.003. [Accessed on October 2017].

Suleman, M, Gaylard, S. T. and Snyman, C, 2015. South Africa cities green transport programme.
Thomas, D.P., 2016. Public Transportation in South Africa: Challenges and Opportunities. World Journal of Social Science Research, 3(3), p.352.
Togo, M., 2016. Adoption of Green Technologies in the Public Transport Sector: The Case of Rea Vaya BRT System, South Africa. Milestones in Green Transition and Climate Compatible Development in Eastern and Southern Africa, p.93.

TransCebu, 2016. What is BRT? ITP Word. Available on www.itpworld.net/cebu_whatisBRT.html. [Accessed on 15 March 2017].

Transportation Research Circular, 2006. Maintenance and Operations of Transport Facilities, Washington, DC: Transport Research Board of the National Academies.
Ugo, P.D., 2014. The bus rapid transit system: A service quality dimension of commuter uptake in Cape Town, South Africa. Journal of Transport and Supply Chain Management, 8(1), pp.1-10.
Vaz, E. and Venter, C.J., 2012. The effectiveness of Bus Rapid Transit as part of a poverty-reduction strategy: some early impacts in Johannesburg.

Venter, C., 2013. The lurch towards formalization: Lessons from the implementation of BRT in Johannesburg, South Africa. Research in Transportation Economics, 39(1), pp.114-120.

Vilakazi, A.M. and Govender, K.K., 2014. Exploring public bus service quality in South Africa: A structural equation modelling approach. Journal of Transport and Supply Chain Management, 8(1), pp.1-10

Walters, J., 2013. Overview of public transport policy developments in South Africa. Research in Transportation Economics, 39(1), pp.34-45.

Wood, A., 2015. Multiple temporalities of policy circulation: gradual, repetitive and delayed processes of BRT adoption in South African cities. International Journal of Urban and Regional Research, 39(3), pp.568-580.

Wu, I. and Pojani, D., 2016. Obstacles to the creation of successful bus rapid transit systems: The case of Bangkok. Research in Transportation Economics.

Zeithaml VA, A Parasuraman & A Malhotra 2001. A Conceptual Framework for Understanding e-Service Quality: Implications for Future Research and Managerial Practice. MSI Working Paper Series, No. 00- 115: 1-9.

Biographies

Omphemetse Lengana is a student at the University of Johannesburg, under the Department of Transport and Supply Chain Management

Phindile Mabaso is a student at the University of Johannesburg, under the Department of Transport and Supply Chain Management

Bhenkumuzi Mavuso is a student at the University of Johannesburg, under the Department of Transport and Supply Chain Management

Sebonkile Thaba is currently a lecturer at the University of Johannesburg under the Department of Transport and Supply Chain Management