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# An analysis of the quality of public transport in Johannesburg, South Africa using an adapted SERVQUAL model

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**Abstract**

Public transport services are generally regarded as being of low quality in many developing cities, with Johannesburg being a typical example of a city with few government funded public transportation services and relatively low levels of mobility and accessibility. The South African government's stated aims for public transport are to achieve large scale modal shift to public transport and more environmentally friendly modes of transport. Using the SERVQUAL model, this study aims to measure the service quality of the majority of public transport modes by comparing commuter's perceptions of the current service levels with their expectations to determine service gaps where interventions are required. The results reflect that safety concerns, particularly regarding protection from crime, and maintenance, particularly in as it affects the reliability of the service are concerns across most modes of transport. Although commuters regard the services as relatively affordable, this is insufficient to attract customers and reduce car ownership aspirations. Concerns related to addressing the mobility and accessibility needs of commuters in the off-peak, keeping commuters informed and training staff to be willing to assist passengers are likely to impact the willingness to remain on public transport and even attract new users. This research is of value to transport service providers in understanding the gaps in and requirements of their service provision. To policy makers it highlights the dissatisfaction in the current levels of public transport service, as well as providing some indication of areas in which future interventions can be directed.


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*Keywords:* Public transport, service quality, SERVQUAL, South Africa

## 1. Background

Transportation is important in the social and economic development of any country, but is especially critical in developing economies where mobility and accessibility are frequently constrained because of insufficient provision of

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appropriate levels of transport services. Urbanization, driven by newfound economic affluence, rural-urban migration, and limited urban planning and governance infrastructure capacity has resulted in growing urban sprawl (Loh & Brieger, 2013). As cities in developing countries grow, the provision of reasonable levels of public transport becomes ever more crucial to the functioning of the city, particularly in major cities with high population growth rates like Johannesburg (World Population Review, 2018). In Johannesburg private motor cars are the dominant form of commuter transport (Gauteng Province Roads and Transport, 2016; Luke, 2018) and, as the population growth rate is in double figures annually, the city, which is already congested (TomTom, 2017), is destined to become gridlocked. Given the rapid urban growth of the City of Johannesburg and systemic underinvestment, the city's transportation system is now characterized by congestion and associated issues such as pollution, accidents, public transport decline, environmental degradation, climate change, energy depletion, visual intrusion and lack of accessibility for the urban poor (Pojani & Stead, 2015). Urban transport problems, which are easily associated with urban sprawl conditions around the world, are exacerbated in South Africa, where the past system of apartheid and the associated Groups Areas Act (Act No. 41 of 1950), which assigned racial groups to different residential and business sections in urban areas and excluded "non-Whites" from living in the most developed areas, caused many "non-Whites" to have to commute large distances from their homes in order to be able to work (Artefacts, n.d.), essentially creating fragmented urban spaces and social exclusion that persist to this day (Kani, 2018; Thomas, 2016).

O'Neill (2010) asserted that urban transport problems severely hamper mobility and accessibility, thus impacting social and economic activities and that the poor are the worst affected. This was also recognized by Ngqaleni, deputy director-general: Intergovernmental Relations (Petterson, 2016) who stated that "The main point is to remember that public transport is essential to creating and growing competitive economies. This in turn is critical for poverty alleviation and also for environmental issues in reducing both carbon emissions and fuel consumption." The case for appropriate public transport is thus clear and was already recognized in early policy endeavors such as the White Paper on National Transport Policy (Department of Transport, 1996) which aimed at achieving an 80:20 split between public and private transport use. Subsequent policy documents and strategic interventions support this by looking to achieve a shift from private transport in the long term and providing greater mobility through transport alternatives that support minimized environmental harm (National Planning Commission, 2011); create a transport system that offers safe, affordable and accessible modal options (that) supports social inclusion (Department of Transport, 2015); and prioritize public transport, seeking to pursue greater efficiencies and social integration as well as developing, maintaining and operating an efficient transport network (Department: Roads and Transport, Gauteng Province, 2012).

Despite a consistent and comprehensive focus on public transport in national and provincial policy and strategy, Lucas (2011, p.1320) claims that "In general, there has been a very poor post-apartheid government response to the escalating mobility needs of low income travellers, who constitute the vast majority of South Africa's urban population." The National Transport Masterplan (Department of Transport, 2015) states that "Our passenger transport system is broadly inefficient and not sufficiently customer focused with poor levels of reliability, predictability, comfort and safety." Ngqaleni (Petterson, 2016) supplements this by stating that "public transport is a challenge for the majority of users, but more so for the poor". The goals of enhancing mobility and accessibility, particularly for the poor, achieving modal shifts from private to public transport and alleviating social exclusion through the transportation system therefore appear not to have been achieved. The 2013 National Household Travel Survey estimates the split to be approximately 70:30 (Statistics South Africa, 2014, p. 95). Although South Africa spends approximately 2% of the national expenditure on public transport (derived from Walters (2014) and National Treasury (2013)) and modal shift is a priority, household travel surveys (Statistics South Africa, 2014; Gauteng Province Roads and Transport, 2016) indicate that most commuting journeys are made by foot or private motor vehicle, whilst the majority of public transport trips are made by minibus taxi, which is largely operated by the private rather than public sector. Less than 5% of commuter trips in Gauteng are performed on government subsidised public transport (Gauteng Province Roads and Transport, 2016) (unless school buses are factored into the equation), clearly indicating a failure of government to supply public transport that meets commuters' daily travel needs and preferences.

The South African government's vision of realising large scale modal shifts from private to public transport and achieving the intention of the National Development Plan to provide an integrated passenger transport system and access to opportunities for all (National Planning Commission, 2011), implies that a transportation system needs to be provided that is attractive to users. Public transport in the country is however generally regarded as being of a low standard. In previous research on the state of transport in the country, an opinion poll (TOPSA) indicated over a four


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year period that the public is generally extremely dissatisfied with the quality and levels of public transport and, because of this, societal needs such as mobility and accessibility remain largely unaddressed (Heyns & Luke, 2016). This is further evidenced in the high levels of private car usage as the dominant form of commuting and low levels of public transport use; nationally 38.48% of work trips are made as the driver or passenger of a private motor vehicle, 26,5 % are made by minibus taxi (privately owned public transport) and 21.1% walk all the way (Statistics South Africa, 2014). In the Gauteng province, the figures show similar patterns, with 30.6% of all trips made by private car as a passenger or driver, rising to 31.6% if company vehicles are included. Walking all the way is the most common form of transport in the province (34%) and 21.9% use minibus taxis. The low uptake of government subsidised transport and the continued high levels of private motor vehicle use suggests that either insufficient levels of public transport is provided by government or the quality is too poor to attract users. Previous research by Luke (2018, 2016) suggests that the quality of public transport services is sufficiently low that most public transport users aim at converting to private car ownership and travel, as soon as they are able to afford it (Luke, 2016). This is supported by not only the usage figures quoted above, but also other figures highlighted in the National Household Travel Survey, which indicate that only 9% of commuters had not experienced transport problems with transport, implying that the majority (91%) had. Issues relating to bus services in Gauteng are highlighted as lack of availability, preferring taxis or private vehicles, buses not going to places where they need to, bus stops being far away from home and lack of knowledge on routes and schedules. Issues relating to trains include the lack of availability of train services, trains are too far from residential areas, preferring taxis or private cars, crime and overcrowding. Despite the frequent references to preferences for minibus taxis, these are also not touted as being a significantly more attractive mode of transport and issues relating to this form of transport tend to be associated with preferring private transport, the cost of the journey, lack of availability, reckless driving and crime. Users of public transport thus appear to want to move to private transport and the quality of public transport is such that few private transport users would willing switch to public transport. By implication, service quality in public transport requires considerable improvement if policies to achieve modal shifts to public transport are to be effective. Aside from the National And Gauteng Household Travel Surveys and, the TOPSA opinion poll, there is very little information on the quality of public transport in South Africa and quality issues are generally highlighted in news articles when quality issues are highlighted in protest action (Ntongana, 2018; Pitjeng, 2018). To adjust service offerings to the needs of the commuting public it is critical to understand current public transport requirements and the perceived failure to meet the mobility needs of the commuting public. This paper therefore aims to provide a comprehensive investigation of the perceived quality of public transport service in the City of Johannesburg. Measurement of the perceived level of service and service failures will assist service providers and policy makers to determine areas for improvement to address needs within the public transport environment and ultimately provide a service that is sufficiently high to attract private transport users to public transport and thus enable the envisaged modal shift.

## 2. Service quality in public transport

Service quality is generally considered to be the difference between customer expectations and customer perceptions of the service. Rust and Oliver (1994) asserted that the customer's perception of the quality of a service is established by comparison with their previous experiences of good quality in service encounters. Bitner and Hubert (1994) considered perceptions of service quality to be a customer's impression of an entity's overall superiority. These considerations essentially imply that measuring service quality requires a degree of relativity where the customer is comparing the current experience of the service with previous experiences of similar types of service. Expectations need not however only be formed from previous experiences, but also from other customer's experiences, for example, by word of mouth or personal selling, price or advertising campaigns where an expectation of a good service could be created (Cravens & Piercy, 2006).

A review of the available literature reveals that there a variety of approaches that can be used to measure service quality. A number of national indices have been developed that are based on perceptions and expectations (Johnson, et al., 2001; Andreassen & Lervik, 1999). Another method of determining service quality include the development of Service Quality Indexes (SQI), which are based on random utility theory and discrete choice models. SQI's are centred on choice data as opposed to the use customer judgments ratings (Hensher & Prioni, 2002; Hensher, et al., 2003; Eboli & Mazzulla, 2007). Customer Satisfaction Indexes (CSI), which measure service quality based on user judgements


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conveyed through a numeric scale (Hill, et al., 2003; Eboli & Mazzulla, 2009), have also been used.

The literature this indicates that there are a number of methods that can be employed to determine the quality of a service, however, arguably the used methodology in this regard is the SERVQUAL methodology, developed and refined by Parasuraman et al. (1985, 1988, 1991). It has been used across various industries, including banking, retailing, hospitality and tourism, hospitals, restaurants, education, local government and transport (Morton, et al., 2016; Barabino & Deiana, 2013; Awasthi, et al., 2011; Daniel & Berinyuy, 2010) to compare and measure customers' perceived service quality expectations with their perceptions of actual service experience.

Parasuraman et al.'s original SERVQUAL instrument was refined over time to being based on two sets (measuring perceptions and expectations) of 22 items, grouped into five dimensions of service quality, i.e. Reliability (considered to be the ability to perform the promised service dependably and accurately), Assurance (knowledge and courtesy on the part of employees and their ability to convey trust and confidence), Tangibility (physical facilities, equipment, and the appearance of personnel), Empathy (caring, individualised attention which organisations provides to their customers) and Responsiveness (Willingness to help customers and provide prompt service), also known as the RATER model (Parasuraman, Valarie, Zeithaml, & Berry, 1988). The SERVQUAL or service quality gap model measures the gap between customer's expectations (E) and their perceptions (P) of the actual service experienced of the five RATER dimensions, where the greatest gaps will indicate where customers experience the poorest quality of service.

Generally, most SERVQUAL research measuring service quality in the transport sector has used these RATER dimensions or an adaptation thereof (Ojo et al., 2014; Verma, et al., 2013; Barabino, et al., 2012; Muthupandian & Vijayakumar, 2012). Too & Earl (2010) however assert that, while SERVQUAL is extensively used to measure service quality across various industries, the specific contexts are different which necessitates an adjustment of SERVQUAL. They further assert that the original SERVQUAL scale should merely provide a framework that should be adapted to fit the specific service being measured. This is also supported by Parasuraman et al. (1991), who opined that the SERVQUAL instrument should be refined and revised to fit specific contexts.

Public transport service quality of considered to be particularly difficult to measure. Wisniewski & Donnelly (1999) find that, to some extent, public sector organizations have a more difficult time than their private sector counterparts, given the diversity of their 'customers'. They further assert that this just reinforces the need for public sector organizations to ensure that they provide the quality of services that match customer expectations as closely as possible. Despite the difficulties in measuring service quality in public transport, the SERVQUAL model and adaptations thereof have been used extensively to measure service quality in various transport environments around the world. Mikhaylov, Gumenuk and Makhaylova (2015) measured the service quality of public transport in the city of Kalingrad in Russia using the RATER model and found that tangibles such as cleanliness, aesthetics, driver appearance, on-board temperature and route information (i.e. the service environment) reflect the greatest gaps between perceptions and expectations. Although the study recognises bus, tram and trolleybus as forms of public transport, no distinction is made between the users of the various forms of public transport in the results. In India Muthupandian and Vijayakumar (2012) applied the RATER model to determine the perceptions and expectations of bus passengers in Tamil Nadu and found that there were no significant differences between perceptions and expectations of all service attributes in the State Road Transport Undertakings (SRTUs). Barabino, Deiana and Tilocca (2012) measure service quality amongst bus users in Cagliari, Italy and find that the greatest gaps between perceptions and expectations exist between attributes such as on-board security, bus reliability, cleanliness and frequency. Too and Earl (2009) applied the RATER model to measure public service quality in a master-planned community in Australia and found the areas where improvements are needed most, i.e. responsiveness and reliability of services. Randheer, AL-Motawa and Vijay (2011) used the RATER model adding culture amongst commuters in Hyderabad and Secunderabad, India and found that, contrary to other studies, tangibility was not found to be of particular importance, compared to responsiveness assurance, reliability, culture and empathy (in that order). Sam, Hamidu and Daniels (2018) used the RATER model to measure bus users perceptions and expectations and found that the biggest gaps existed in the reliability and responsiveness dimensions and that these thus required considerable focus to improve service quality in Kumasi, Ghana. Nutsugbodo (2013) found all five RATER dimensions contributed to the negative perceptions regarding public transport services in Accra, Ghana, of which assurance and tangibility were shown to be the most significant. These studies suggest firstly that the differences between perceptions and


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expectations differ from country to country and across modes within the country, or even within limited geographical areas, dependent on the specific services provided. To determine service quality within a particular area with the purpose of using the information to address service quality gaps, therefore requires specific investigation for the area.

Although the RATER model is commonly applied, studies such as McKnight et al's.(1986) find that the quality of transport services are influenced by five main elements, namely: reliability, extent of service, comfort, safety and affordability (RECSA). Govender (2014) used the RECSA to measure bus and minibus users' perceptions and expectations of services and found that bus passengers were more positive about the reliability, comfort, safety and affordability than taxi passengers. Heyns and Luke's (2016) annual State of Transport Opinion Polls indicate that, according to the respondents, commuter transport is not yet safe, reliable, effective or affordable. Given these findings it would be preferable to adapt the SERVQUAL instrument to include more suitable dimensions and items that addresses the specific service quality concerns of the users. Randheer, et al. (2011) stated that the traditional SERVQUAL dimensions may not always be appropriate to all situations and contexts. For this reason, they added culture to their study of customer expectations in public transport. Vilakazi and Govender (2014) applied the RECSA dimensions in an exploratory study to determine service quality perceptions of public transport users in South Africa. Khuong & Dai (2016) found this to be appropriate for measuring taxi services in Vietnam as did Horsu & Yeboah (2015) in Ghana. (Sharma, Jain, & Reddy, 2017). RECSA, which includes affordability as a dimension, is considered fitting for measuring service quality in public transport in South Africa as, in a developing world context, costs and affordability are considered to be key components of the service levels offered to customers.

When considering public transport, it is particularly important to determine service expectations and meet these, as when they are not met, customers are likely to resort to the alternative of using their own cars. As the transport policy in South Africa intends to create a transportation system that is public rather than private transport focused and aims at achieving a modal shift to facilitate this, it is crucial that public transport services are provided that provide viable alternatives to private cars. To determine the gaps in service quality (and therefore the interventions required), the study considered public transport services offered in the city of Johannesburg. There are a wide range of public transport services (offered by the private sector, or the private sector with government subsidy support, or the public sector) in the City of Johannesburg, yet widespread dissatisfaction persists with all of them. Modal shift intentions are only achievable if service quality issues are identified and addressed across all forms of public transport. This research aims to identify the most significant service quality gaps in public transport in the City of Johannesburg.

## 3. Research Methodology

The purpose of this paper is to gauge the service gap that may exist between commuters' expectations of service quality and the actual service quality offered by selected public transport operators in the Greater Johannesburg area. An adapted SERVQUAL model, applying five dimensions of service quality, i.e. reliability, extent of service, comfort, safety and affordability (or RECSA dimensions), was used to ascertain the service quality and customer satisfaction of selected commuter services. Following review and consideration of relevant literature, the research instrument was developed to incorporate 25 statements, equally distributed between the five RECSA dimensions. The structured interviewer-administered questionnaire consisted of three sections. The first section requested information on the characteristics of the respondents such as age, gender, employment status and frequency of usage; the second section assessed the respondents' service quality expectations regarding the different commuter services and the third section measured the respondents' perceptions of the service quality actually provided by the various operators. To capture the respondents' level of agreement with the expectations and perceptions statements, a five-point Likert-type scale, anchored by *strongly disagree* (1) and *strongly agree* (5), was employed.

To elicit responses, convenience sampling (or availability sampling) was used due to the ease of collection, accessibility, geographical closeness, availability at a given time and the willingness of respondents to participate in the survey (Etikan et al., 2016; Saunders et al., 2016). A limitation of convenience sampling is that it is inclined to be bias (Saunders et al., 2016) and generalisation from the research results is undermined (Zikmund et al., 2013). Trained research assistants was used to conduct the various mode specific surveys amongst waiting commuters at several transit facilities (e.g. Park Station), taxi ranks and bus stops near the researchers' premises in the Johannesburg area. The surveys were completed by 1 152 public transport commuters during two separate survey campaigns conducted in 2016 and 2017 respectively. The profile of the respondents is shown in Table 1 below. All the main public transport


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modes were considered for the purposes of the study. Bus services are provided firstly by a subsidized private company, i.e. PUTCO, as well as a city operated entity, i.e. Metrobus. Bus Rapid Transit services are provided by Rea Vaya, a city owned entity and rail services, known as Metrorail, are provided by a national state owned enterprise. The final form of commuter transport under consideration is the minibus taxi industry, which is privately owned and generally considered to be unsubsidized, although there are indirect subsidies such as exemption from paying toll fees in the greater Johannesburg area.

Table 1: Respondent Profile

| Characteristics | | Metrobus | PUTCO | Minibus | Rea Vaya | Metrorail |
|---|---|---|---|---|---|---|
| Respondents | | 300 | 100 | 204 | 200 | 348 |
| Gender | Male | 41% | 41% | 49% | 45% | 54% |
| | Female | 59% | 59% | 51% | 55% | 46% |
| Age | 18 - 20 years | 31% | 4% | 25% | 20% | 8% |
| | 21 - 30 years | 42% | 55% | 43% | 32% | 41% |
| | 31 - 40 years | 15% | 28% | 18% | 21% | 27% |
| | 41 - 50 years | 7% | 7% | 8% | 16% | 18% |
| | 51-60 years | 2% | 4% | 3% | 8% | 6% |
| | Above 60 years | 3% | 2% | 4% | 3% | 1% |
| Occupation | Scholar/student | 58% | 13% | 39% | 32% | 26% |
| | Full time employed | 33% | 82% | 39% | 35% | 50% |
| | Part time employed | 5% | 4% | 11% | 20% | 11% |
| | Unemployed | 1% | 1% | 5% | 8% | 11% |
| | Retired | 2% | | 6% | 6% | 3% |
| Frequency of travel | 1-2 times per day | 43% | 60% | 22% | 28% | 26% |
| | 3-4 times per week | 40% | 35% | 30% | 33% | 26% |
| | 1-2 times per week | 6% | 1% | 14% | 19% | 17% |
| | 1-2 times per month | 3% | 4% | 10% | 10% | 8% |
| | Seldom | 8% | | 24% | 12% | 23% |

## 4. Results

### *4.1 Overview*

Table 2 below provides an overall perspective of all the SERVQUAL RECSA elements used in this study as well as the perceptions and expectations across each element for each mode of transport. Whilst not all forms of transport were covered, the major commuting modes were tested, accounting for the majority of public transport trips in the city. The table reflects the perceptions and expectations of each element of each RECSA dimension, as well as indicating the gap score. T-tests were conducted to determine whether the gaps were statistically significant and only on one element under one mode was the gap not significant, i.e. “Waiting areas are sheltered” for Rea Vaya, indicating that respondents expectations were met in this regard.

The Kruskall-Wallis H test was used to compare the mean perception scores of three or more groups (e.g. public transport operators) (Pallant 2016). The Mann-Whitney U test was then used to identify the specific sample pairs for significant differences. The statistical results for comparing the various respondent groups are identified in Table 3.

### *4.2 Reliability*

Reliability measures the ability to perform the promised service dependably and accurately. The respondents’ perception of reliability indicates that they believe that the Rea Vaya buses are the most reliable form of transport,


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Table 2: Service Quality Scores

| | Metrobus | | | | | PUTCO | | | | | Minibus | | | | | Rea Vaya | | | | | MetroRail | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Paired T-test | | | | | Paired T-test | | | | | Paired T-test | | | | | Paired T-test | | | | | Paired T-test | |
| | (E) | (P) | (P-E) | t-value | p - value | (E) | (P) | (P-E) | t-value | p - value | (E) | (P) | (P-E) | t-value | p - value | (E) | (P) | (P-E) | t-value | p - value | (E) | (P) | (P-E) | t-value | p - value |
| **Reliability** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicles always arrive at the destination on-time | 3.97 | 2.63 | -1.31 | -13.53 | <0.001 | 3.73 | 1.84 | -1.88 | -10.97 | <0.001 | 3.64 | 2.75 | -0.90 | -8.22 | <0.001 | 4.63 | 3.05 | -1.58 | -21.41 | <0.001 | 3.90 | 1.85 | -2.05 | -24.14 | <0.001 |
| Vehicles never break down on the road | 4.05 | 2.94 | -1.07 | -11.25 | <0.001 | 3.77 | 1.89 | -1.87 | -9.40 | <0.001 | 3.39 | 2.83 | -0.56 | -5.11 | <0.001 | 4.67 | 3.04 | -1.63 | -21.62 | <0.001 | 3.89 | 2.07 | -1.82 | -22.40 | <0.001 |
| There are service timetables and other user information | 4.21 | 3.38 | -0.83 | -9.05 | <0.001 | 3.87 | 2.28 | -1.58 | -9.17 | <0.001 | 3.71 | 3.20 | -0.51 | -4.28 | <0.001 | 4.71 | 3.66 | -1.05 | -15.96 | <0.001 | 4.07 | 2.81 | -1.26 | -16.34 | <0.001 |
| Transport service firms always inform people of availability of services | 4.07 | 2.41 | -1.68 | -17.92 | <0.001 | 3.88 | 2.06 | -1.81 | -9.81 | <0.001 | 3.77 | 3.15 | -0.62 | -5.26 | <0.001 | 4.68 | 3.05 | -1.63 | -19.48 | <0.001 | 4.02 | 2.64 | -1.39 | -18.31 | <0.001 |
| Staff are always willing to help passengers | 4.15 | 2.83 | -1.26 | -13.85 | <0.001 | 3.89 | 2.29 | -1.57 | -7.84 | <0.001 | 3.65 | 3.04 | -0.61 | -5.31 | <0.001 | 4.71 | 2.58 | -2.13 | -28.08 | <0.001 | 4.04 | 2.42 | -1.62 | -21.08 | <0.001 |
| **Comfort** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicles are clean and well maintained | 4.33 | 3.62 | -0.72 | -9.35 | <0.001 | 3.80 | 1.91 | -1.89 | -9.95 | <0.001 | 3.49 | 2.59 | -0.90 | -7.22 | <0.001 | 4.66 | 3.15 | -1.51 | -21.74 | <0.001 | 3.84 | 2.25 | -1.59 | -19.97 | <0.001 |
| Vehicles have ample legroom and foot space | 4.26 | 3.42 | -0.88 | -10.46 | <0.001 | 3.76 | 2.32 | -1.42 | -7.84 | <0.001 | 3.52 | 2.59 | -0.94 | -7.95 | <0.001 | 4.54 | 3.53 | -1.01 | -13.77 | <0.001 | 4.03 | 2.82 | -1.21 | -16.51 | <0.001 |
| A smooth ride is enjoyed for the journey | 4.24 | 3.52 | -0.70 | -8.60 | <0.001 | 3.79 | 2.49 | -1.28 | -7.22 | <0.001 | 3.64 | 2.83 | -0.79 | -6.51 | <0.001 | 4.52 | 3.56 | -0.96 | -11.92 | <0.001 | 3.98 | 2.42 | -1.56 | -18.98 | <0.001 |
| Waiting areas are sheltered | 4.11 | 2.65 | -1.48 | -14.67 | <0.001 | 3.75 | 1.77 | -1.97 | -10.18 | <0.001 | 3.60 | 2.65 | -0.94 | -8.01 | <0.001 | 4.67 | 4.58 | -0.09 | -1.68 | 0.095 | 4.17 | 2.96 | -1.22 | -15.76 | <0.001 |
| Waiting areas are clean and well maintained | 4.00 | 2.80 | -1.23 | -12.72 | <0.001 | 3.74 | 1.83 | -1.91 | -9.33 | <0.001 | 3.64 | 2.79 | -0.87 | -7.48 | <0.001 | 4.61 | 4.07 | -0.54 | -7.87 | <0.001 | 4.05 | 2.61 | -1.44 | -18.07 | <0.001 |
| **Extent of Service** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Transport services on weekdays is adequate | 4.25 | 3.26 | -1.00 | -11.44 | <0.001 | 3.80 | 2.37 | -1.41 | -7.40 | <0.001 | 3.85 | 3.25 | -0.60 | -5.39 | <0.001 | 4.65 | 4.01 | -0.64 | -9.23 | <0.001 | 4.04 | 2.60 | -1.44 | -18.48 | <0.001 |
| Transport service availability on weekends / public holidays is adequate | 4.12 | 2.69 | -1.43 | -15.12 | <0.001 | 3.69 | 2.43 | -1.26 | -7.67 | <0.001 | 3.83 | 3.11 | -0.70 | -6.66 | <0.001 | 4.51 | 3.49 | -1.02 | -13.48 | <0.001 | 3.73 | 2.44 | -1.29 | -17.71 | <0.001 |
| Transport services in the evenings is adequate | 4.32 | 2.95 | -1.40 | -15.39 | <0.001 | 3.77 | 2.26 | -1.52 | -8.75 | <0.001 | 3.81 | 2.96 | -0.84 | -7.78 | <0.001 | 4.58 | 3.61 | -0.97 | -13.30 | <0.001 | 3.82 | 2.52 | -1.30 | -17.12 | <0.001 |
| Transport services are available to most areas in the city | 4.32 | 3.44 | -0.85 | -10.03 | <0.001 | 3.82 | 2.48 | -1.35 | -7.77 | <0.001 | 4.06 | 3.39 | -0.66 | -7.07 | <0.001 | 4.56 | 3.57 | -1.00 | -13.80 | <0.001 | 4.03 | 2.97 | -1.05 | -15.21 | <0.001 |
| Vehicle stops are conveniently located | 4.29 | 3.36 | -0.95 | -11.23 | <0.001 | 3.83 | 2.60 | -1.23 | -6.53 | <0.001 | 3.79 | 3.34 | -0.45 | -4.15 | <0.001 | 4.54 | 3.35 | -1.19 | -16.12 | <0.001 | 4.07 | 2.98 | -1.09 | -14.23 | <0.001 |
| **Safety** | | | | | | | | | | | | | | | | | | | | | | | | | |
| There is a low probability of accidents | 4.42 | 3.81 | -0.60 | -7.24 | <0.001 | 3.83 | 2.99 | -0.83 | -5.38 | <0.001 | 3.63 | 2.85 | -0.75 | -6.68 | <0.001 | 4.58 | 3.37 | -1.21 | -14.82 | <0.001 | 4.12 | 3.15 | -0.97 | -12.65 | <0.001 |
| Drivers are well trained and safety measures are used | 4.46 | 3.58 | -0.86 | -9.85 | <0.001 | 3.90 | 2.99 | -0.90 | -5.70 | <0.001 | 3.67 | 2.60 | -1.06 | -8.47 | <0.001 | 4.69 | 3.22 | -1.48 | -17.65 | <0.001 | 4.14 | 3.20 | -0.94 | -14.10 | <0.001 |
| There is a low possibility of personal injury due to reckless driving | 4.40 | 3.53 | -0.84 | -8.91 | <0.001 | 3.89 | 2.85 | -1.03 | -6.68 | <0.001 | 3.69 | 2.71 | -0.98 | -8.47 | <0.001 | 4.70 | 3.19 | -1.52 | -16.69 | <0.001 | 4.16 | 3.13 | -1.03 | -14.47 | <0.001 |
| There are adequate safety measures against crime on vehicles | 4.34 | 3.19 | -1.16 | -13.06 | <0.001 | 3.83 | 2.89 | -0.93 | -6.43 | <0.001 | 4.22 | 3.01 | -1.20 | -3.13 | <0.001 | 4.68 | 2.82 | -1.86 | -17.93 | <0.001 | 4.06 | 2.18 | -1.88 | -22.70 | <0.001 |
| There are adequate safety measures against crime at waiting areas | 4.20 | 2.45 | -1.76 | -17.75 | <0.001 | 3.79 | 2.18 | -1.61 | -9.71 | <0.001 | 3.90 | 3.08 | -0.81 | -7.34 | <0.001 | 4.74 | 2.50 | -2.24 | -26.49 | <0.001 | 4.09 | 2.22 | -1.87 | -21.28 | <0.001 |
| **Affordability** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fares are affordable | 4.22 | 3.31 | -0.94 | -11.59 | <0.001 | 4.02 | 3.42 | -0.60 | -5.00 | <0.001 | 3.87 | 3.44 | -0.41 | -3.37 | <0.001 | 4.69 | 4.00 | -0.69 | -10.90 | <0.001 | 4.38 | 3.99 | 0.41 | 6.80 | <0.001 |
| Fares are good value for money | 4.25 | 3.33 | -0.96 | -12.04 | <0.001 | 3.93 | 3.06 | -0.85 | -5.78 | <0.001 | 3.91 | 3.16 | -0.73 | -6.73 | <0.001 | 4.68 | 3.82 | -0.86 | -13.13 | <0.001 | 4.30 | 3.58 | -0.72 | -11.26 | <0.001 |
| I can buy weekly / monthly / season tickets | 4.34 | 4.01 | -0.36 | -4.85 | <0.001 | 3.96 | 3.48 | -0.50 | -4.17 | <0.001 | 3.84 | 3.10 | -0.72 | -6.12 | <0.001 | 4.61 | 4.16 | -0.45 | -7.52 | <0.001 | 4.31 | 4.00 | -0.31 | -4.86 | <0.001 |
| Fares are cheaper than other transport modes | 4.16 | 3.23 | -0.94 | -10.60 | <0.001 | 3.90 | 3.54 | -0.35 | -2.94 | <0.001 | 3.76 | 2.95 | -0.82 | -7.09 | <0.001 | 4.52 | 3.58 | -0.94 | -11.97 | <0.001 | 4.41 | 4.22 | -0.19 | -3.29 | <0.001 |
| Fare increases are reasonable | 4.13 | 3.18 | -1.00 | -11.34 | <0.001 | 3.90 | 3.26 | -0.65 | -4.45 | <0.001 | 3.98 | 3.13 | -0.86 | -7.80 | <0.001 | 4.68 | 3.51 | -1.17 | -13.85 | <0.001 | 4.31 | 3.83 | -0.48 | -7.07 | <0.001 |


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followed by taxis, Metrobus, MetroRail and PUTCO. This is also reflected in the results in Table 3. Rea Vaya services are the newest bus services in the city and run new equipment, thereby implying higher levels of reliability. PUTCO is generally regarded as a mass transporter of poor and marginalized users, who are also considered to be captive users. Their services are generally considered to be poor as their equipment is old and the levels of subsidies received to operate the service are also low. Their reliability perception scores are therefore expected. There is also not a significant difference between theirs and Metrorails's perceived reliability, where both are considered to be poor. Minibus taxi reliability scores are considered to be relatively high. Taxi users do not perceive significant differences in the reliability of the service as compared to Metrobus and Rea Vaya, possibly because they operate under similar conditions, with taxis often illegally ustilising Rea Vaya bus lanes. Although the industry is frequently the target of abuse, because of their safety record, users tend to favour them because of the extensive service levels they provide. Even though the industry has a record of poor maintenance and frequent breakdowns, the high reliability score is likely to have been indicated as passengers are quickly absorbed onto other vehicles when breakdowns occur.

These observations are supported by the expectations of the reliability element, where minibus taxis respondents show the lowest expectations of reliability. The highest expectations are of Rea Vaya services where the buses are considered to be new and therefore unlikely to break down. These results are reflected in Figure 1.

The largest gap scores for the reliability dimensions are PUTCO, followed by Metrorail. Rea Vaya, Metrobus and minibus taxis. The low gap scores for the minibus taxi industry reflect that the service levels are close to what is expected, however expectations for a service such as PUTCO are relatively high, given the extent and price of the service. The results also reflect that this is an element which requires considerable attention for this service provider.

Considering specific reliability elements, the results reflect that Metrobus mainly needs to focus on keeping customers informed, although on-time arrivals and staff assistance also require attention. PUTCO needs to focus on most aspects, but on-time performance, breakdowns and keeping customers informed. The main issue within the minibus taxi industry is vehicles arriving on time. The gaps are all relatively high in Rea Vaya, possibly because expectations are particularly high, given the newness of the service and the marketing of the service. The most critical element however appears to be staff willingness to assist passengers, suggesting that staff training requires the most urgent intervention in this regard. Metrorail's gap scores are also all relatively high, but appear to be so not necessarily high expectations but low perceptions. Their areas for major focus should be on-time performance and ensuring the rolling stock doesn't break down. On time performance is thus a crucial service element for all service providers.

### *4.3 Comfort*

The expectations for comfort, which considers the condition of the equipment and facilities, vary considerably across the modes. Expectation of comfort in Metrobus are high, most likely because commuters compare this service to the PUTCO service and expect more. Deductively, the expectations for the comfort elements in PUTCO are considerably lower. The lowest expectation levels for this dimension are for minibus taxis, whilst the highest is for Rea Vaya. The expectations for comfort on Metrorail are unexpectedly high, particularly given the extent to which Metrorail services are the source of public protest. The high levels of protests (Africa News Agency, 2017; Mortlock, 2018; Palm, 2018) seem however to be primarily related to on-time performance, rather than comfort, and high levels of service are perhaps required in this dimension regarding aspects such as sufficient legroom and the provision of sheltered waiting areas.

Perceptions of the service in this area are low, particularly for PUTCO and Metrorail. Areas which require attention in PUTCO are sheltered waiting areas the cleanliness and maintenance of waiting areas as well as vehicles.


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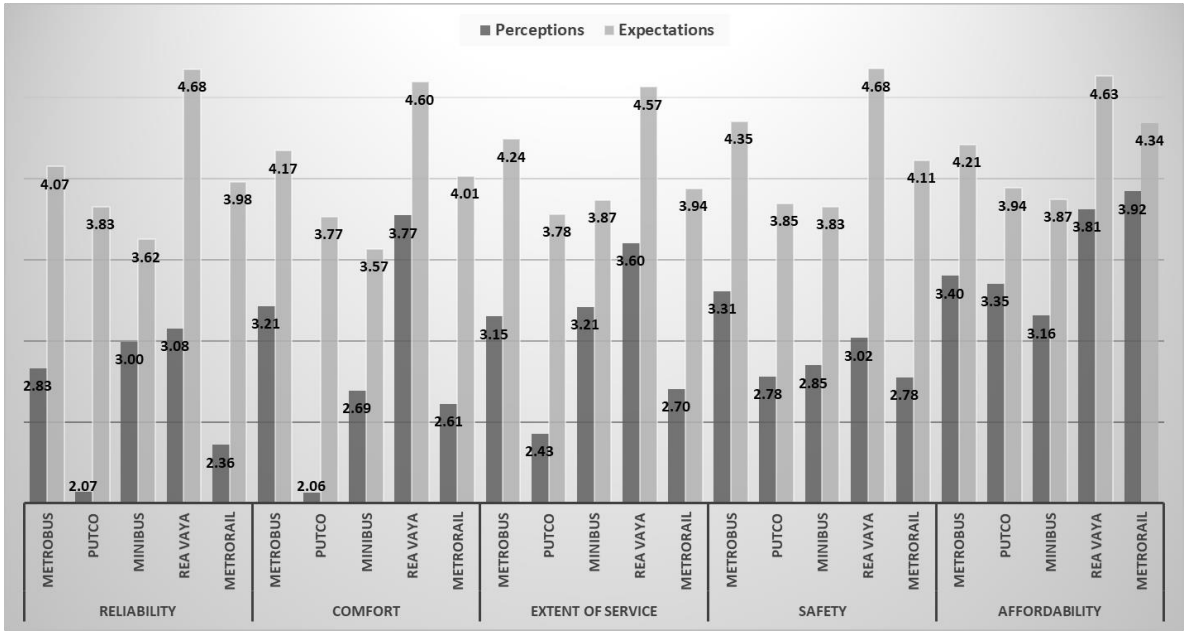


Fig 1: Public Transport Service Gap Scores


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With Rea Vaya, the perceptions of all elements of this dimension are relatively high, in particular sheltered waiting areas and maintenance and cleanliness of the waiting areas. For Minibus taxis, the perceptions are all relatively low, with the cleanliness, maintenance and space in the vehicles being key elements.
The biggest gap scores are shown reflected for PUTCO services, indicating that they are not meeting expectations on most levels, followed by Metrorail. Key focus areas for the former should be on maintenance and cleanliness of vehicles and facilities. For Metrorail, a focus is also on the cleanliness and maintenance of vehicles, but respondents also do not believe that the journey is as smooth as it should be. The lowest average gap scores are for Rea Vaya, indicating that from this perspective they are largely meeting expectations although vehicle cleanliness requires some focus. The minibus taxis also indicate generally low gap scores, primarily because users have low expectation, which are met. Given these low expectations, space constraints as well as sheltered waiting areas are still sources of considerable dissatisfaction.

*4.4 Extent of service*

The highest expectations with regards to extent of service, which considers the quantity of the services as well as the geographical and time coverage of the service, are reflected in the results from the Rea Vaya respondents, who clearly reflect high expectations across all elements. This is followed by Metrobus, Metrorail, minibus taxis and PUTCO. The latter may be a reflection of the familiarity with the service – as a long standing service in the city, commuters are very likely to be aware of the extent of the service and its constraints. Given this, commuters also indicated particularly low perception scores for this mode, reflecting that even though expectations are low, the service is still perceived to be underperforming. Although not as marked, the results for Metrorail are similar, with relatively low expectations and even lower perceived performance. For both Metrorail and PUTCO services, the primary issues of dissatisfaction appear to be with the number of services during the week, as well as on weekends and after hours. Providing services in the evenings and over weekends and public holidays are however a concern for all the modes, suggesting that even though commuters may be able travel in the week, off-peak periods are problematic and mobility appears to be severely constrained at this time.

PUTCO services appear to be the most constrained of all the modes and all elements are highlighted as having large gap scores. The respondents also indicated the most dissatisfaction with the location of bus stops and the areas that are covered by the service. Contrary to anticipations, the PUTCO expectation scores for these two elements were lower than those of Metrorail, considering that commuters are aware of the natural limitations of rail service, however perceived service levels were considerably lower in PUTCO. This is likely to be attributable to the fact that, as PUTCO is aimed at the very low cost consumer (essentially a captive user) and should at least be able to provide coverage to commonly frequented areas. It appears that the respondents did not believe that this was the case.

*4.5 Safety*

With regards to the safety dimension, which measures both the safety and the security associated with the mode, the highest expectations are from the Rea Vaya respondents, who clearly expect low levels of accidents, but also low levels of crime, the former expectation likely to be the consequence of new vehicles, but also the separation of the vehicles from others with their own lanes, and the latter because of the high levels of security personnel provided on vehicles and at waiting areas. All modes reflected high levels of expectations regarding safety; in order: Rea Vaya, Metrobus, Metrorail, PUTCO and minibus taxis.


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Table 3: Statistical differences between perceptions of service dimensions

| | Reliability | | | Comfort | | | Extent of Service | | | Safety | | | Affordability | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Kruskal-Wallis H Test** | | | | | | | | | | | | | | | |
| Significance of variance | ✓ ρ< 0.001 | | | ✓ ρ< 0.001 | | | ✓ ρ< 0.001 | | | ✓ ρ< 0.001 | | | ✓ ρ< 0.001 | | |
| Chi-Square ($\chi^2$) | $\chi^2$ (4,n=1150) = 211.937 | | | $\chi^2$ (4,n=1151) = 349.989 | | | $\chi^2$ (4,n=1146) = 238.112 | | | $\chi^2$ (4,n=1148) = 77.80 | | | $\chi^2$ (4,n=1149) = 127.354 | | |
| **Mann-Whitney U Test** | **Significance** | | **Mean Ranking** | **Significance** | | **Mean Ranking** | **Significance** | | **Mean Ranking** | **Significance** | | **Mean Ranking** | **Significance** | | **Mean Ranking** |
| MB - P | ✓ | ρ= 0.000 | MB>P | ✓ | ρ= 0.000 | MB>P | ✓ | ρ= 0.000 | MB>P | ✓ | ρ= 0.000 | MB>P | X | ρ= 1.000 | |
| MB - T | X | ρ= 0.090 | | ✓ | ρ= 0.000 | MB>T | X | ρ= 1.000 | | ✓ | ρ= 0.000 | MB>T | ✓ | ρ= 0.029 | MB>T |
| MB - RV | ✓ | ρ= 0.000 | MB<RV | ✓ | ρ= 0.000 | MB<RV | ✓ | ρ= 0.000 | MB<RV | ✓ | ρ= 0.003 | MB>RV | ✓ | ρ= 0.000 | MB<RV |
| MB - MR | ✓ | ρ= 0.000 | MB>MR | ✓ | ρ= 0.000 | MB>MR | ✓ | ρ= 0.000 | MB>MR | ✓ | ρ= 0.000 | MB>MR | ✓ | ρ= 0.000 | MB<MR |
| P - T | ✓ | ρ= 0.000 | P<T | ✓ | ρ= 0.000 | P<T | ✓ | ρ= 0.000 | P<T | X | ρ= 1.000 | | X | ρ= 0.249 | |
| P - RV | ✓ | ρ= 0.000 | P<RV | X | ρ= 1.000 | | ✓ | ρ= 0.000 | P<RV | X | ρ= 0.139 | | ✓ | ρ= 0.004 | P<RV |
| P - MR | X | ρ= 0.099 | | ✓ | ρ= 0.000 | P<MR | X | ρ= 0.160 | | X | ρ= 1.000 | | ✓ | ρ= 0.000 | P<MR |
| T - RV | X | ρ= 1.000 | | ✓ | ρ= 0.000 | T<RV | ✓ | ρ= 0.000 | T<RV | X | ρ= 0.956 | | ✓ | ρ= 0.000 | T<RV |
| T - MR | ✓ | ρ= 0.000 | T>MR | ✓ | ρ= 0.000 | T>MR | ✓ | ρ= 0.000 | T>MR | X | ρ= 0.824 | | ✓ | ρ= 0.000 | T<MR |
| RV - MR | ✓ | ρ= 0.000 | RV>MR | ✓ | ρ= 0.000 | RV>MR | ✓ | ρ= 0.000 | RV>MR | ✓ | ρ= 0.003 | RV>MR | X | ρ= 0.613 | |

*MB = Metrobus, P = PUTCO, T = Minibus Taxi, RV = Rea Vaya, MR = Metrorail*

*Significance values have been adjusted by the Bonferroni correction for multiple tests*


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Perceptions of the service reflected that the lowest perceived safety elements were recorded by Metrorail users, followed by PUTCO, minibus taxi, Rea Vaya and Metrobus. Metrorail's results are largely influenced by the findings that commuters do not feel safe on the train or in waiting areas, suggesting that considerable attention needs to be paid to policing in this mode. PUTCO results similarly showed that policing at waiting areas is critical.

This element clearly requires attention across all the modes. As reflected in Table 3, users do not perceive significant differences between many of the modes, implying that concerns regarding aspects such as safety in waiting areas and on vehicles are relatively consistent across all modes. The highest gap scores for any element of the Rea Vaya service is recorded for inadequate safety measures against crime in waiting areas. The mode also reflected high gap scores for having inadequate measures against crime on vehicles. The expectation created by additional security personnel on this mode are thus not considered by users to be effective enough. Most modes reflect similarly high gap scores for inadequate security at waiting areas, with the exception of minibus taxis. Although there is a significant gap score between perceptions and expectations, it is not as high as for the other modes, most likely because the waiting areas are not as well defined and, outside of formal ranks, commuters can flag down taxis anywhere, implying that they may have slightly more control over the safety of the area in which they choose to wait.

Overall, the gap score for safety is the highest in Rea Vaya, where the expectations for safety were high, but the scores for all elements for perceptions are relatively low, suggesting that even though Rea Vaya customers generally expect the service to be excellent, the expectations are not being met as far as safety or security is concerned. The lowest overall gap score is reflected in the responses of the minibus taxi users, most likely because of the low expectations regarding the service.

### 4.6 *Affordability*

Affordability refers to the financial burden commuters endure in paying for transportation services, principally those required to access basic products and activities (i.e. shopping, education, health services, work and social activities). The respondents' perception of affordability shows that they consider Metrorail to be the most inexpensive transport service, followed by Rea Vaya, Metrobus, PUTCO and minibus taxis. Although, Metrorail is commonly regarded as a suitable solution for moving large numbers of commuters, specifically captive and poverty-stricken users, their services quality is known to be problematic. While the minibus taxi affordability score indicate that they are perceived to be the least affordable service provider it can be reasoned that is because they provide the most comprehensive service network to commuters.

The respondents' expectations of affordability also indicate that minibus taxis respondents have the lowest expectations of affordability. The highest expectations are of Rea Vaya services where the buses are considered to be reasonably priced. The largest gap scores across the affordability dimensions are Rea Vaya, followed by Metrobus, Vaya, minibus taxis, PUTCO and Metrorail. The low gap scores for Metrorail indicate that the rail service levels supplied are close to what is expected, however expectations for a service such as Rea Vaya are moderately high, given the extent of the service.

Considering specific affordability elements, the results reflect that Metrobus primarily needs to keep fare increases reasonable and aligned with other transport modes. For Metrorail and PUTCO the main area of focus should be on providing a service where commuters feel they receive value for money. For both minibus taxis industry and Rea Vaya the main issues are that commuters are of the opinion that fares increases are not reasonable and that the fares are less competitive with other transport services.


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## 5. Conclusion

This study aimed at providing a broad perspective of the quality of public transport in the City of Johannesburg. In a city (and country) with a stated aim of achieving a modal split of 80:20 public to private transport use and a clear policy direction of moving to more environmentally friendly modes of transport, it is required that the city focus on providing public transport alternatives that are sufficiently attractive to be considered to be viable alternatives to car transport and stem the very high car ownership aspirations amongst the city's population. The current perception of public transport is sufficiently low that most public transport users aim at buying a private motor vehicle, as soon as they can afford it. Those that cannot remain captive users of the poorer forms of public transport. To change travel patterns in the city, it is therefore required that higher quality transport services be provided and, although public protests frequently highlight specific problem areas and past research has been done on selected modes or on broad travel patterns across the city including quality issues, there is no research that has been done to provide a comprehensive perspective on the expectations and perceptions of service quality in the city.

The study utilized a SERVQUAL model with RATER dimensions to determine the service quality of the modes and found that expectations were generally the highest for most elements amongst Rea Vaya users, being the users of a newly implemented form of public transport. These were also generally the lowest amongst minibus taxi users, who generally seem to not expect much from this form of transport, but use it primarily because of the extent of the service, the extent and the flexibility of the service. On the other hand, perceptions are particularly low amongst users of the PUTCO service and even though expectations are not unreasonably high, the gap scores tend to be high. PUTCO thus appears to be the service that is most disappointing to users. The captive nature of the users of this service may also imply that efforts are not made to significantly improve the service as users are generally unlikely to transition to private motor vehicle use.

PUTCO is not however the only service to reflect poor service and the results reflect that all modes need to focus on particular areas if they are to retain and grow their ridership numbers. These focus areas are reflected in Table 4 below

Table 4: Service delivery focus areas

| Metrobus | PUTCO | Minibus | Rea Vaya | Metrorail |
|---|---|---|---|---|
| Key areas of intervention Focus required on safety measures in waiting areas and, to a slightly smaller extent, on vehicles. The extent of the services also need to be expanded, particularly in the off-peak period. Metrobus needs to keep commuters informed of changes to the service. Shelters need to be provided. | Services need to be run on time and breakdowns avoided. The aesthetics of the vehicles are also problematic, suggesting that general maintenance on the vehicles require attention. Waiting areas and shelters also require higher levels of maintenance. Services need to be expanded in the off-peak. | Vehicles are cramped and uncomfortable and upgrades to larger vehicles are required. Vehicles are also unreliable, suggesting a higher maintenance requirement. Safety is the main issue in this mode, with concerns expressed regarding safety from injury due to reckless driving as well as concerns about crime, suggesting that more policing is required as well as higher levels of driver training. | On-time performance requires improvement and early indications are that vehicles break down more often than they should, given their newness. Maintenance should thus be improved. The extent of the service should be improved, both in geographical terms as well as in the quantity of services. Safety is the key concern with interventions required in terms of policing and staff training to reduce accident rates and prevent crime. Training is also highlighted as a key element regarding the willingness to assist customers. | Maintenance to improve train reliability is required. This should also address the issue of the lack of a smooth ride. Staff should be more willing to assist passengers and staff training is therefore required. Waiting areas need to be better maintained and policed and better policing is required on the train itself. The service also needs to be expanded in the off-peak. |

Common areas which are neglected are safety and associated policing and maintenance and the associated low levels of reliability. These need to be addressed across all modes of transport. Providing safe reliable services are some of the key areas highlighted in the National and Gauteng Household Travel Surveys and are key to ensuring that commuters are willing to remain on public transport services. it is however critical that more than basic issues are addressed and becoming a car competitive option requires that the service provides benefits that come close to equalling the service provided by a private motor vehicle. Some are easy to achieve, such as providing commuters


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with information regarding the service, allowing them to plan around disruptions. Others require that staff be more willing to assist commuters and don't detract from the quality of the service. Most services also require expansion in the off-peak period. This is one of the critical elements of providing a car competitive service, as commuters are currently able to access some form of service in the peak, but feel the need to acquire vehicles to accommodate their off-peak mobility needs. Expanding these types of services could impact car ownership aspirations.

To the best of our knowledge, this is the only research that provides comprehensive empirical evidence of service quality perceptions and expectations of the main modes of public transport in the City of Johannesburg. This research is of value to the transport service providers in understanding the gaps in and requirements of their service provision. It is also of value to policy makers in understanding the dissatisfaction in the current levels of public transport service, as well as providing some indication of the areas in which future interventions can be directed.

Although this research has provided new perspectives on the use of the service level dimensions, it has some limitations, such as the sample size, the inherent weaknesses associated with the SERVQUAL methodology and the limited geographic area which was investigated. These limitations also provide considerable scope for future research. It is suggested that the current research be expanded to include other major metropolitan areas in South Africa, as well as smaller towns, villages and rural areas to determine whether the results are generalizable to the population or whether other areas have different service level concerns. Another key focus area for future research is to investigate the willingness to switch modes amongst current private vehicle commuters.

## References

Africa News Agency. (2017). *Joburg-Vereeniging train service disrupted by protests*. Retrieved February 2, 2019 from IOL: https://www.iol.co.za/news/joburg-vereeniging-train-service-disrupted-by-protests-8895856

Andreassen, T. W., & Lervik, L. (1999). Perceived relative attractiveness today and tomorrow as prdictors of future repurchase intention. *Journal of Service Research, 2*, 164-172.

Artefacts. (n.d.). *Group Areas Act*. Retrieved from Artefacts: https://www.artefacts.co.za/main/Buildings/style_det.php?styleid=444

Awasthi, A., Chauhan, S. S., Omrani, H., & Panahi, A. (2011). A hybrid approach based on SERVQUAL and fuzzy TOPSIS for evaluating transportation service quality. *Computers & Industrial Engineering, 61*, 637–646.

Barabino, B., & Deiana, E. (2013). On the Attributes and Influencing Factors of End-users Quality Perceptions in Urban Transport: An Exploratory Analysis. *Procedia - Social and Behavioral Sciences, 87*, 18-30.

Barabino, B., Deiana, E., & Tilocca, P. (2012). Measuring service quality in urban bus transport: a modified SERVQUAL approach. *International journal of quality and service sciences, 4*(3), 238-252.

Bitner, M. J., & Hubbert, A. R. (1994). Chapter 3: Encounter Satisfaction versus Overall Satisfaction versus Quality: The Customer's Voice. In R. T. Rust, & R. L. Oliver, *Service Quality: New Directions in Theory and Practice* (pp. 72-94). London: Sage.

Cravens, D. W., & Piercy, N. F. (2006). *Strategic Marketing.* New York: McGraw Hill.

Daniel, C. N., & Berinyuy, L. P. (2010). *Using the SERVQUAL model to assess the service quality and customer satisfaction: An empirical study of grocery stores in Umea.* Umea School of Business.

Department of Transport. (1996). *White Paper on National Transport Policy.* Department of Transport. Pretoria: Department of Transport.

Department of Transport. (2015). *NATMAP 2050: National Transport Master Plan Synopsis Update.* Pretoria: Department of Transport.

Department: Roads and Transport, Gauteng Province. (2012). *Gauteng 25-year Integrated Transport Masterplan: 5 year transport implementation plan.* Retrieved from Gauteng Government: http://www.gauteng.gov.za/government/departments/roa/Documents/Part%20A%20-%205-Year%20Implementation%20Plan.pdf

Eboli, L., & Mazzulla, G. (2007). Service Quality attributes affecting customer satisfaction for bus transit. *Journal of Public Transportation, 10*(3), 21-34.

Eboli, L., & Mazzulla, G. (2009). A new customer satisfaction index for evaluating transit service quality. *Journal of Public Transportation, 12*(3), 21-37.

Etikan, I., Musa, S. A., & Sunu, R. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 1-4.

Gauteng Province Roads and Transport. (2016). *Gauteng Province Household Travel Survey.* Johannesburg: Gauteng Province Roads and Transport.

Govender, K. K. (2014). master-planned community in Australia. The stakeholder survey findings suggest a wide gap between community expectations of public transport services and the actual service quality provided. This was consistent across all commuter groups. In particular, t. *African Journal of Business Management*, 317-326.

Hensher, D. A., & Prioni, P. (2002). A service quality index for an area-wide contract performance regime. *Journal of Transport Economics and Policy, 36*(1), 93-113.


Peer-review under responsibility of WORLD CONFERENCE ON TRANSPORT RESEARCH SOCIETY

Hensher, D. A., Stopper, P., & Bullock, P. (2003). Service quality-developing a service quality index in the provisopn of commercial bus contracts. *Transportation Research Part A, 37*, 499-517.

Heyns, G. J., & Luke, R. (2016). South African public opinion on the state of urban transport: an appraisal of the achievement of policy objectives. Crete: Wessex Institute of Technology.

Hill, N., Brierley, G., & MacDougall, R. (2003). *How to measure customer satisfaction.* Hampshire: Gower Publishing.

Horsu, E. N., & Yeboah, S. T. (2015). Influence of service quality on customer satisfaction: A study of minicab taxi services in Cape Coast, Ghana. *International Journal of Economics, Commerce and Management, 3*(5), 1451-1464.

Johnson, M. D., Andreassen, T. W., Lervik, L., & Cha, J. (2001). The evolution and future of national customer satisfaction index models. *Journal of Economic Psychology, 22*, 217-245.

Kani, Y. (2018, May 6). *SA public transport is steeped in a history rarely told*. Retrieved from fin24: https://www.fin24.com/Opinion/sa-public-transport-is-steeped-in-a-history-rarely-told-20180506-2

Khuong, M. N., & Dai, N. Q. (2016). The Factors Affecting Customer Satisfaction and Customer Loyalty — A Study of Local Taxi Companies in Ho Chi Minh City, Vietnam. *International Journal of Innovation, Management and Technology, 7*(5).

Loh, L. C., & Brieger, W. (2013). Suburban Sprawl in the Developing World: Duplicating Past Mistakes? The Case of Kuala Lumpur, Malaysia. *International Quarterly of Community Health Education*, 199-2011.

Lucas, K. (2011). Making the connections between transport disadvantage and the social exclusion of low income populations in the Tshwane Region of South Africa. *Journal of Transport Geography, 19*(6), 1320-1344.

Luke, R. (2016). A study of car ownership perceptions and aspirations among students attending a major metropolitan university in South Africa. *Business, Marketing and Management in Today's Challenging Global Environment* (pp. 116-125). Cracow: Academy of World Business, Marketing and Management Development.

Luke, R. (2018). Car ownership perceptions and intentions amongst South African students. *Journal of Transport Geography, 66*, 135-143.

McKnight, C. E., Pagano, A. N., & Paaswell, R. E. (1986). Using quality to predict demand for special transportation. *International conference on travel behaviour (in Behavioural research for transport policy).* Utrecht: VNU Science Press.

Mikhaylov, A. S., Gumenuk, I. S., & Makhaylova, A. A. (2015). The SERVQUAL model in measuring service quality of public transportation: evidence from Russia. *Quality: access to success*, 78-83.

Mortlock, M. (2018). *Protesters torch Metrorail train in Philippi*. Retrieved February 2, 2019 from EWN: https://ewn.co.za/2018/06/25/protesters-torch-metrorail-train-in-philippi

Morton, C., Caulfield, B., & Anable, J. (2016). Customer perceptions of quality of service in public transport: Evidence for bus transit in Scotland. *Case Studies on Transport Policy, 4*(3), 199-207.

Muthupandian, K. S., & Vijayakumar, C. (2012). *Measurement of passenger service quality in public transportation: SERVQUAL analysis.* MPRA.

National Planning Commission. (2011). *National Development Plan 2030: Our future - make it work* . Retrieved November 14, 2013, from http://www.poa.gov.za/news/Documents/NPC%20National%20Development%20Plan%20Vision%202030%20-lo-res.pdf

National Treasury. (2013). *Estimates of National Expenditure 2013.* Retrieved December 21, 2017, from http://www.treasury.gov.za/documents/national%20budget/2013/ene/FullENE.pdf

Ntongana, T. (2018, August 9). *'This man knows why the trains are delayed' - commuters take a ride with Prasa regional manager*. Retrieved from News24: https://www.news24.com/SouthAfrica/News/this-man-knows-why-the-trains-are-delayed-commuters-take-a-ride-with-prasa-regional-manager-20180809

Nutsugbodo, R. Y. (2013). Tourists' perceptions of the quality of public transportation services in the Accra metropolis: a SERVQUAL approach. *African Journal of Hospitality, Tourism and Leisure* .

Ojo, T. K., Mireku, D. O., Duada, S., & Nutsogbodo, R. Y. (2014). Service quality and customer satisfaction of public transport on Cape Coast-Accra route, Ghana. *Developing Country Studies, 4*(18), 142-149.

O'Neill, P. (2010). *Urban Transport in Developing Cities.* Retrieved December 8, 2017, from https://sustainabledevelopment.un.org/content/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_ONeill.pdf

Pallant, J. 2016. *SPSS Survival manual, 6th edition.* New York: McGraw-Hill Education.

Palm, K. (2018). *CT activist group plans mass march over Metrorail's poor services*. Retrieved February 2, 2019 from EWN: https://ewn.co.za/2018/10/03/ct-activist-group-plans-mass-march-over-metrorail-s-poor-services

Parasuraman, A., Berry, A., & Zeithaml, L. L. (1991). Refinement and reassessment of the SERVQUAL scale. *Journal of Retailing, 67*(4), 420-451.

Parasuraman, A., Valarie, A., Zeithaml, V., & Berry, L. L. (1988). SERVQUAL: AMultiple-Item Scale for Measuring Consumer Perceptions Of Service Quality. *Journal of Retailing, 64*(1), 12-40.

Parasuraman, A., Zeithaml, V., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing, 49*, 41-50.

Petterson, D. (2016). *Improving public transport, improving lives*. Retrieved January 2, 2018, from http://www.infrastructurene.ws/2016/07/12/improving-public-transport-improving-lives/

Pitjeng, R. (2018, May 16). *JMPD DEPLOYS MORE OFFICERS TO GANDHI SQUARE PROTEST*. Retrieved from Eyewitness news:


Peer-review under responsibility of WORLD CONFERENCE ON TRANSPORT RESEARCH SOCIETY

https://ewn.co.za/2018/05/16/jmpd-deploys-more-officers-to-gandhi-square-protest

Pojani, D., & Stead, D. (2015). Sustainable Urban Transport in the Developing World: Beyong Megacities. *Sustainability, 7*, 7784-7805. Retrieved December 30, 2017

Randheer, K., AL-Motawa, A. A., & Vijay, P. (2011). Measuring commuters' perception on service quality using SERVQUAL in public transport. *International journal of marketing studies, 3*(1), 21-34.

Rust, R. T., & Oliver, R. L. (1994). *Service Quality. New Directions in Theory and Practice.* London: Sage.

Sam, E. F., Hamidu, O., & Daniels, S. (2018). SERVQUAL analysis of public bus transport services in Kumasi metropolis, Ghana: Core user perspectives. *Case studies on transport policy*, 25-31.

Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students.* Harlow: Pearson.

Sharma, P., Jain, J. K., & Reddy, N. S. (2017). Analysis of Service Quality Attributes for Jaipur Urban Bus Transportation. *International Journal on Emerging Technologies*, 43-48.

Statistics South Africa. (2014). *National Household Travel Survey 2013.* Pretoria, South Africa: Statistics South Africa.

Thomas, D.P.(2016). Public Transportation in South Africa: Challenges and Opportunities. W*orld Journal of Social Science Research*, 3(3), pp. 352-366.

TomTom. (2017). TomTom Traffic Index: Johannesburg. [Online] Available at: www.tomtom.com/en_gb/trafficindex/city/johannesburg [Accessed 12 December 2017].

Too, L., & Earl, G. (2010). Public transport service quality and sustainable development: a community stakeholder perspective. *Sustainable Development, 18*, 51-61.

Verma, M., Verma, A., Ajith, P., & Sindhe, S. (2013). Urban bus transport service quality and sustainable development: Understanding the gaps. *Conference proceedings of the 13th World Conference on Transport Research.* Rio de Janeiro.

Vilakazi, A & Govender, KK, (2014). Commuters' perception of public transport in South Africa. *Journal of Social Sciences*, 3(1), pp. 258-270.

Walters, J. (2014). Public transport policy implementation in South Africa: Quo Vadis? *Journal of Transport and Supply Chain Management, 8*(1).

Wisniewski, M & Donnelly, M, 1999. Measuring service quality in the public sector: the potential for SERVQUAL. T*otal Quality Management*, 7(4), pp. 357-365.

World Population Review. (2018). *Johannesburg Population 2018*. Retrieved January 19, 2018, from http://worldpopulationreview.com/world-cities/johannesburg-population/

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013). *Business research methods* (9th ed.). South-Western, Cengage Learning.