Users' Perception on Operation and Performance of Public Transport Systems in African Developing Countries: The Case of Bus Rapid Transit (BRT) in Dar es Salaam City, Tanzania

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Abstract

Public transport system has been a means of addressing transportation challenges in urban areas, such as traffic congestion, traffic jam and long travel time in cities worldwide. Transportation in Africa is unique in that it has the least developed public transport systems in the world, while also being one of the fastest urbanizing continents. Bus Rapid Transit being one of the public transport systems was introduced in Africa in 2008 as a means to provide solution on urban transportation challenges. Despite of public transport being the main means of transport in African developing countries, there have been a number of challenges that affects efficiency of performance of the system and makes its users uncomfortable. Therefore, the study aimed at exploring the setbacks or challenges associated with operation and performance of the BRT system in the African developing countries and address them. The study employed mixed methods research design that integrates both qualitative and quantitative data collection methods and analysis. The study findings reveal that, there is an improvement on the perspectives of the commuters on public transport after introduction of BRT system. However, some challenges such as long waiting time, passengers overcrowding during peak hours, as well as safety and security can slowly change the perspective of the commuters. Therefore, to address these challenges it is recommended to reduce the long waiting time and improve accessibility by introduction of passenger information displays (bus information system) and automated fare collection system; reduce travel time by introduction of bus priority signal; and improve safety and security by introduction of signage and CCTV Camera within the bus

and bus stops.

Keywords

1. Introduction

Public Transport System (PTS) is historically being associated with trains, buses, and ferries that carry people from one place to another on a fixed route at regular times. The system is not associated with other forms of shared travel such as taxis, shuttles, ride-sharing, or bike-sharing despite of the fact that these services share with PTS some common characteristics. Both are services that everyone has equal access to, and needs service provider to invest in a physical infrastructure network [1].

Since its discovery in the 1960s in Paris-France, PTS has been playing a crucial role in improving the quality of life in communities across the country by providing safe, efficient and economical services. The system also serves as a vital component for health economy [2] [3]. Public transportation has been an important part of the solution to the nation's economic, energy and environment challenges of which it helps to bring a better quality of life. According to [4], PTS is essential in enhancing daily activities taking place in urban areas as it plays an important role to the commuters to enable them move from their areas of residing to the working places. It is found to be a cheap transportation means compared to others, consumes fewer urban spaces, less energy intensive, pollutes less the air, is a safest mode, improves accessibility to working stations, and offers enhanced mobility in cities through reducing traffic congestion. In many African developing countries, PTS is the only practical means to essential services located beyond the viable walking and cycling distances [4].

Recently, African developing countries have experienced remarkable population change that signifies an increase in public transport demand. According to [5] the number of people has increased in Africa by 500 million since 1990. Towards developing the strategies of improving the people's mobility, the Bus Rapid Transit system emerged in Africa as a viable solution to urban transportation challenges.

Bus Rapid Transit (BRT) is a means of public transport that carries medium volume of passengers by rubber-tired rapid transit along the well-defined corridors to the CBD and in most cases have exclusive right-of-way [6]. Also, it refers to high quality customer-oriented transit that delivers fast, comfortable and cost-effective urban mobility [4].

The BRT System was first implemented globally in Curitiba Brazil in 1974 and its successful implementation in addressing urban transportation challenges has made it a model and inspiration for other countries in the world. Example of the

first cities in the world that adopted the BRT system includes Quito in Ecuador (1996), Los Angeles in USA (1999) and Bogota in Colombia (2000) with its influence spreading to other countries as well [4] [7]. In African context, the first BRT system was introduced in Lagos Nigeria (2008) followed by other countries like South Africa which implemented it in Johannesburg and Cape Town (2011) and Gorge (2015); along with Tanzania, Ghana and Morocco. In East Africa, Dar es Salaam City in Tanzania took the initiative to introduce the BRT in 2012 followed by Kenya in 2019 [4]. It was implemented in Tanzania and other countries as the solution to many faced urban transport challenges which were the result of existence of unreliable and low quality urban public transport services [8].

Despite the introduction of the BRT in Dar es Salaam and other cities in African developing countries, still the PTS in these cities faces transportation challenges. Therefore, this study was made to explore the transportation challenges associated with operation and performance of BRT system in African developing countries. In doing so, the main questions answered are: (a) how do commuters perceive public transport systems after introduction of the BRT systems; and (b) how the emanating challenges could be addressed.

2. Measuring Commuters' Perception on Quality of PTS Services

The need to improve the quality of PTS to meet the ever-increasing demand and expectations of passengers has been one of the main desires of urban transport planners worldwide [9]. For each individual journey, people have the choice between different travel modes, each with specific characteristics, advantages, and disadvantages. The concept of service quality has been extensively applied to PTS and it is defined as customer perception of how well a service meets or exceeds their expectations. Service quality can be measured in terms of customer perception, customer expectation, customer satisfaction and customer attitude. It covers many diverse topics, such as comfort outside and inside the vehicle, journey times, convenience of service and existence of supporting infrastructure.

Researches reveal that the quality of each of the PTS attributes is related to the importance each individual commuter places on it. Much effort has been made by various studies on PTS services; for example, a number of approaches and techniques such as customer loyalty and benchmarks have been used to define, assess, and evaluate quality of service. Their findings revealed a wide gap between commuter's expectations on PTS and the actual service quality provided [10].

Although there is much work on PTS quality, the study of this topic in Sub-Sahara African cities using a similar approach is very rare, indeed perhaps not available at all. Knowledge of how people value the quality of a PTS would benefit transport planners, policy makers, and public transit operators to stipulate strategies of service quality improvement. This would help to design service

quality interventions that meet customer expectations while eliminating subjectivity in the decision making of urban policies. The five attributes used in the study of the BRT service quality are accessibility, travel time, bus (travel) fare, safety and comfort; they were obtained from the Dar es Salaam BRT system design reports. Travel time (one way) is defined as the sum of access (walking) time to BRT stop, waiting time at BRT stop, and in-bus travel time taken to reach the CBD. Bus (travel) fare (one way) is defined as a fee charge of using the BRT.

3. Research Methodology

The study adopted mixed research design of which requires both qualitative and quantitative data collection methods. The required information of the study was categorized into primary and secondary data whereby primary information were collected through interviews, observation and photographing to cover the five variables, namely accessibility, travel time, travel fare, safety and comfort. A total of 69 respondents were interviewed of which 58 were commuters and 11 were officials. The secondary information was collected through documentary review relevant to the topic. The collected data were organized in themes by coding and then analyzed. Thematic analysis was used for analysis of the qualitative data based on the topics or major subjects that come up in the discussion; this form of analysis is recommended by [9]. The quantitative data was analyzed using quantitative analysis software which involved Excel, SPSS and QGIS and the results were organized in tables, figures and maps.

The study was conducted on BRT Phase One Route in Dar es Salaam city, Tanzania as shown in Figure 1 with a total length of 20.9 Km. Dar es Salaam BRT system comprises of six phases as shown in Table 1 and Figure 2. Phase one construction was completed in December, 2015 with 5 main terminals and 27 stations and it was fully operational in May, 2016. The phase one BRT in Dar es Salaam was designed with the capacity of carrying 400,000 commuters. Despite its designed capacity, the actual population carried is about 200,000 commuters.

Table 1. BRT System Construction Phases

BRT Phase	Road Corridor	Length (Km)	Construction Status
Phase 1	Morogoro, Kawawa North, Msimbazi Street, Kivukoni Front	20.9	Completed in 2015
Phase 2	Kilwa, Kawawa South	19.3	Construction in Final Stages
Phase 3	Uhuru Street, Nyerere, Bibi Titi and Azikiwe Street	23.6	Construction Ongoing
Phase 4	Bagamoyo and Sam Nujoma	16.1	Not yet Started
Phase 5	Mandela Road	22.8	Not yet Started
Phase 6	Bagamoyo Road	27.6	Not yet Started
Total		130.3	

Source: [11] and Fieldwork Survey, 2023.

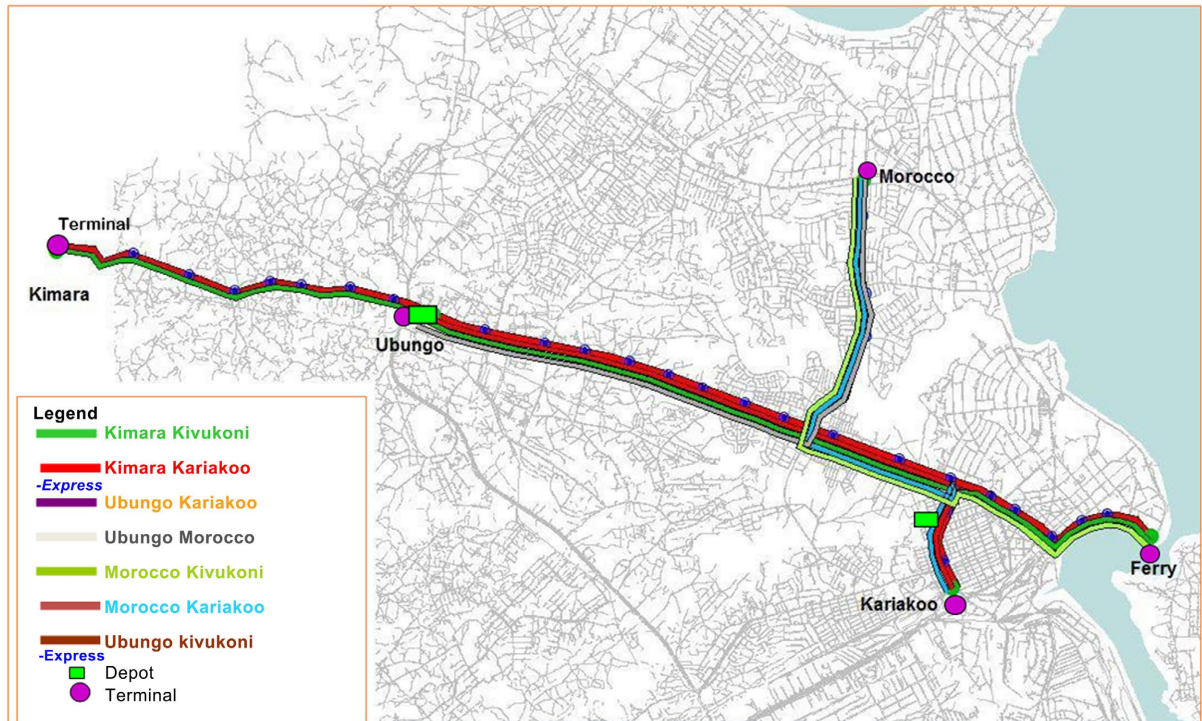**Figure 1.** BRT Phase 1 routes in Dar es Salaam City. Source: UDART, 2023.
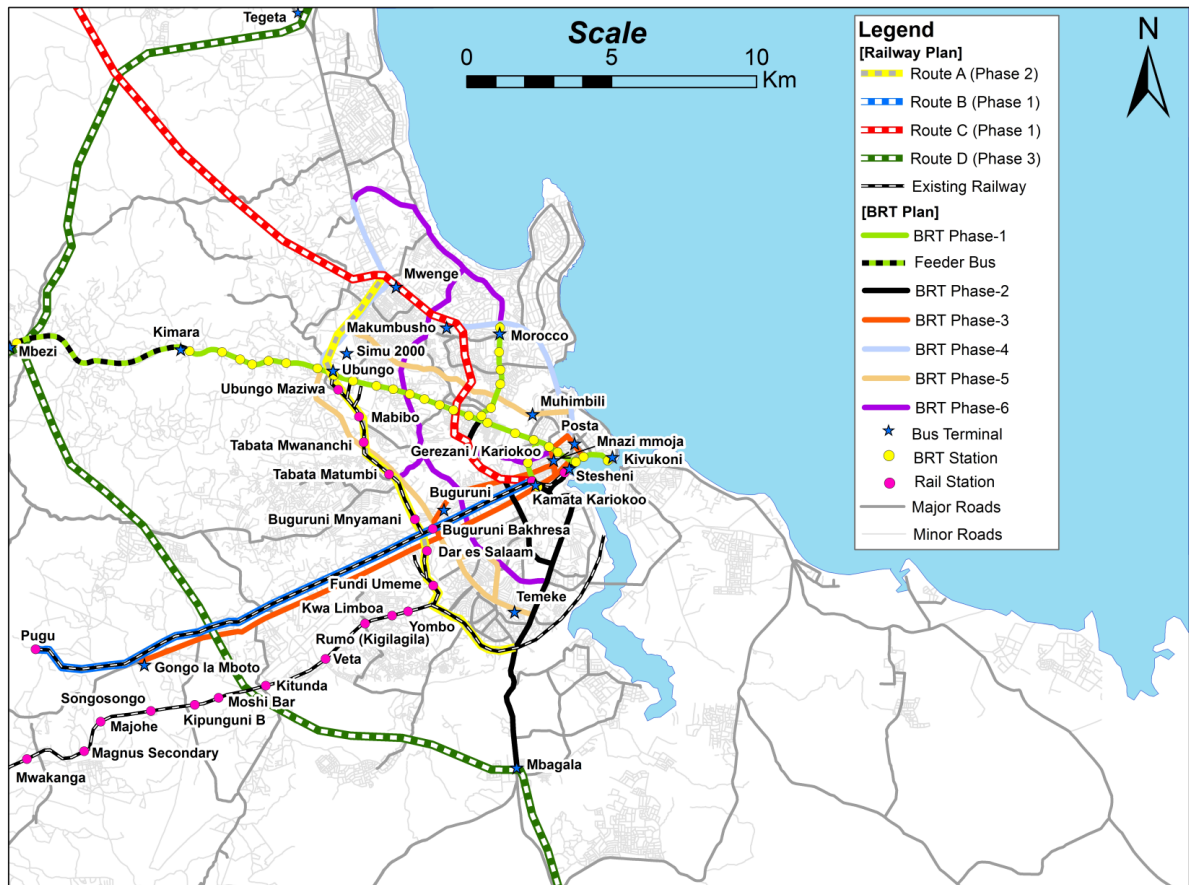

Figure 2. BRT phases in Dar es Salaam City. Source: [12].

4. Results and Discussion

The operation and performance of the BRT system is analyzed by four variables, which are; accessibility, travel time, transport costs as well as safety and comfort. These variables that were considered in the design of the BRT system were intended to address the deficiencies of local commuter buses (Daladala) of which they are characterised by lack of safety, lack of reliability, long travel times, overloading of passengers and poor sitting and standing condition [12], and [13].

4.1. Accessibility of BRT System

Access to safe and inclusive public transport is among the Sustainable Development Goals (SDGs) as the bases of improving the wellbeing of urban dwellers [14]. Also, [15] argues that accessibility of the BRT system can be improved by multiple corridors that intersect and form a network to expand travel options for passengers.

In Dar es Salaam, BRT system is well connected with road networks from different parts of the city to access the BRT stations by walking, motorcycles, Bajaj, commuter buses (locally known as daladala) and private cars. Out of all these means of transport, about 80% of people access BRT stations by walking (41%) and commuter buses (38%). Figure 3 provides a summary of means of transport that are used to access BRT stations. Contrary, [16] reported that the majority of the BRT stations are inaccessible or have poor network connection to other transport means which hinders their perfomance. The findings are different because [16] study focused on connectivity of BRT and commuter bus stations. This study focused on accessibility of BRT stations from different means of transport. However, for further improvement of the public transport, [16] recommend that "*when designing for the BRT system there should be some anticipation of future corridors which ensures that the designs will be compatible with the future developments by creating the multi-corridors connected to the BRT. This will enable different commuters from different modes of transport to access the BRT services and enable them travel to various destinations on time*".

Trip origin and destinations were also examined in the use of BRT. About 56% of the BRT trips originated from Ubungo and Kimara of which Ubungo constitute 29% and Kimara 27%. This was found to be contributed by existence of multiple routes joining the station through different modes of transport, highly developed settlements around the stations and connectivity of the stations with other urban centres. Furthermore, Kivukoni, Kimara and Gerezani contribute 72% of all BRT trip destinations. Out of these 72%, Kimara contributes 26%, Kivukoni 24% and Gerezani 22%. The high rate of Kimara BRT terminal was contributed by the residential area with high population within and around the settlement connected with BRT and availability of park and ride facilities while Kivukoni and Gerezani BRT terminals were contributed by the surrounding areas being part of the Central Business District (CBD). Table 2 shows trip origin and destination information through BRT stations.
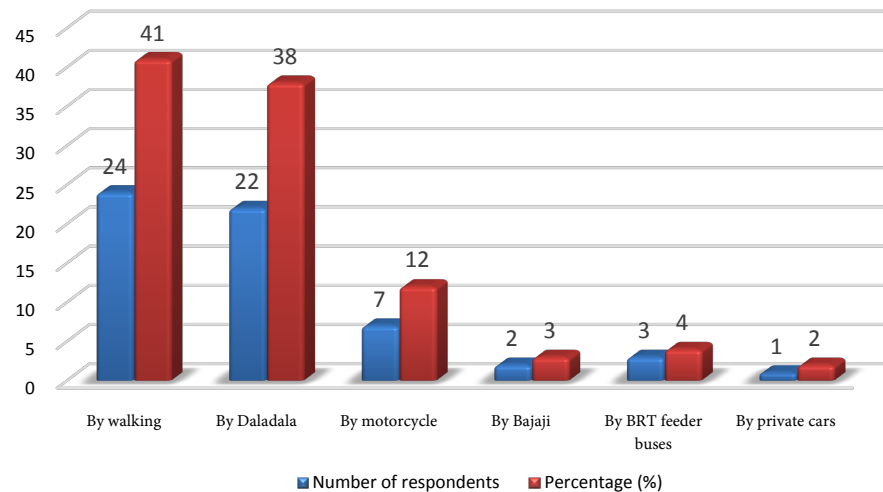
Figure 3. Means of accessing BRT system in Dar es Salaam city.

Table 2. Trip origin and trip destination to access BRT system.

Trip origin	Percentage (%)	Trip Destination	Percentage (%)
Kivukoni	14	Kivukoni	24
Kimara	27	Kimara	26
Gerezani	7	Gerezani	22
Morocco	9	Morocco	5
Ubungo	29	Ubungo	8
Urafiki	7	Urafiki	3
Mbezi	2	Mbezi	2
Shekilango	2	Shekilango	3
Manzese	2	Manzese	3
Fire	2	Fire	2
DIT	2	DIT	2
Total	**100**	**Total**	**100**

The available park and ride facilities at Kimara terminal (ULIPOPOA car parking) attracted commuters with cars to use BRT facilities since the system provides short travelling time, reduced travel cost and it is safer and more reliable. The study revealed that about 89% of the vehicles parking at the parking spaces near the BRT station are owned by the BRT users. Moreover, majority of them were found to be those from peripheral of the city centre such as Mbezi, Kibaha, Mpigi, and Kimara Suka. The parking fee is TZS. 1000 (0.4 USD) that was considered by the users to be affordable and reasonable.

4.2. Travel Time

Time of travel affects the choice of mode of transport. This study analyzed travel time by overserving three aspects: 1) walking time to the BRT stops, 2) waiting

time at the BRT stop and, 3) in-bus travelling time. About 41% of the commuters spend 5 to 45 minutes to reach the BRT stops via different means of transport. It was revealed that 14% of the BRT commuters spend less than 5 minutes to reach BRT stations, 43% spend less than 15 minutes, 17% spend 15 - 30 minutes, 24% spend 30 minutes and 2% spend 45 minutes to reach BRT stations. This implies that majority of commuters' access BRT bus stops in a short and convenient time and perceived public transport as a better means of transport. Quoting one of the interviewed commuters said that "*I use up to 10 minutes to get to the BRT bus stop since it is near the place where I live. Sometimes I opt to use motorcycle to get to the stop of which I spend less than 5 minutes*".

Commuters using BRT find it to be very reliable and convenient in time management since majority of them wait for the BRT buses in the bus stops for 5 to 15 minutes and rarely wait for more than 15 minutes during non-peak hours. One of the commuters responded that, "*The waiting time at BRT stop is improved although it differs from time to time, during off-peak hours waiting time is longer than peak hours of which more BRT buses are available*". From the analysis, 7% of the commuters were found to spend less than 5 minutes while waiting for the buses at BRT stops, 29% spend 5 minutes, 26% spend 10 minutes, 28% spend 15 minutes, and 10% spend more than 15 minutes at BRT bus stops. This implies that majority of the BRT users in Dar es Salaam spend less than 10 minutes in the BRT bus stops/terminals. The shorter the waiting time the more reliable the public transport is to its users.

Looking to the in-bus travel time, majority of the BRT users spend about 15 minutes only. The less time was found in making trip versus BRT buses compared to the commuter buses locally knows as daladala. Referring one of the respondents said that: "*Before introduction of BRT we used to spend up to 4 hours to get to our destinations, but now we use less than 1 hour in traveling with BRT to the same destination*". Another respondent said that "*BRT is very fast and convenient that enables me to make up to 6 trips in a day, travel time is short and has improved greatly*". The analysis reveals that majority of the BRT users spend less than 30 minutes on board.

Various studies such as [16] and [14] have potrayed that passenger satisfaction on public transport is linked to knowing at what time the bus will arrive to the next stop or destination. Majority of the BRT commuters in Dar es Salaam are attracted by less time consumed or spent while travelling from one point to another. Similarly, [17] argues that for BRT to truly represent a mode that is time-competitive with urban rail systems and private automobiles, exclusive dedicated right-of-way is an essential feature. However, the BRT system in Dar es Salaam sometimes faces the challenge of sharing the same right of way with other occasional vehicles which affects its travel time. This was also reported by [8] that BRT system roadways are confronted with the challenge of other traffic that contributes to delays of passengers. The BRT system is supposed to operate on an exclusive lane. Table 3 shows the walking time to BRT stops, waiting time in BRT stops, and BRT travel time.

Table 3. Walking time to BRT stops, waiting time, and in-bus travel time.

	Frequency	Percentage (%)
A. Walking Time to BRT Stop		
Below 5 minutes	8	14
5 - 15 minutes	25	43
15 - 30 minutes	10	17
30 - 45 minutes	14	24
Above 45 minutes	1	2
Total	**58**	**100**
B. Waiting Time at BRT Stop		
0 - 5 minutes	21	36
5 - 10 minutes	15	26
10 - 15 minutes	16	28
More than 15 minutes	6	10
Total	**58**	**100**
C. BRT Travelling Time		
0 - 15 minutes	3	5
15 minutes - 30 minutes	26	45
30 minutes - 1 hour	29	50
Total	**58**	**100**

4.3. Transport Cost

The cost of travel by a particular means of transport affects the choice of majority of the public transport users. Users always prefer the means of transport with the lowest charges. In respect of the BRT services in the city, commuters pay TZS. 750 (0.3 USD) compared to TZS. 500 (0.2 USD) paid for a trip in use of daladala. However, the BRT transport charges were depicted by majority of the commuters that it is moderate and affordable. On interviewing one of the commuters said that, "*The charges in using BRT services are fair and moderate despite that they are much higher than that of commuter bus services* (*daladala*). *In the BRT a person spends lesser travel time and is free from traffic challenges such as traffic jam and congestion*". The findings as shown in Figure 4 reveal that 79% of the commuters in Dar es Salaam consider that BRT charges are moderate and affordable while others see that the charged cost is cheap (2%) and expensive (19%).

Similarly, [18] and [17] argue that, BRTs could be a suitable transport option for the cities in African developing countries because of the reasonable passenger charged cost, large capacity to handle a good number of passengers, short travel time, and flexibility in changing routes and initiating additional routes to fit commuters' transport demand dynamics.
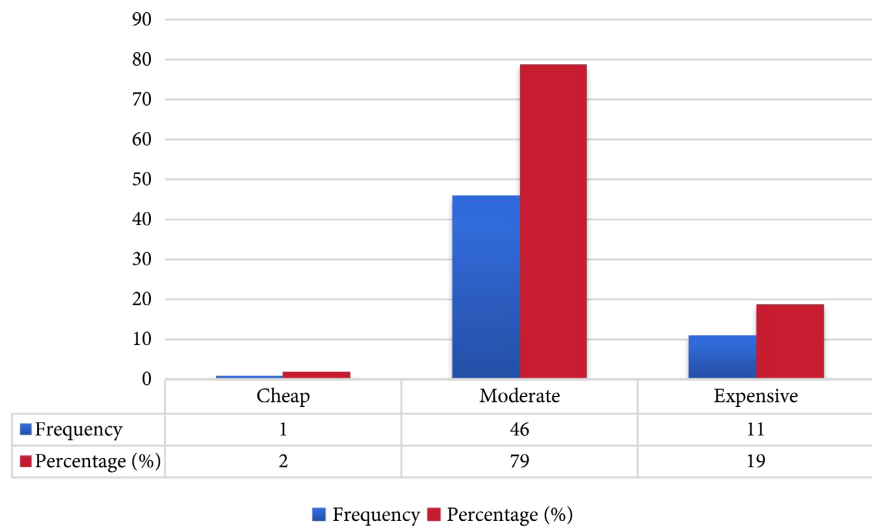
	Cheap	Moderate	Expensive
■ Frequency	1	46	11
■ Percentage (%)	2	79	19

■ Frequency ■ Percentage (%)

Figure 4. Commuters' perception on the charged BRT fare.

4.4. Commuters' Safety and Comfort While Using BRT Services

Safety and comfort are other key factors assessed in operation and performance of BRT service [16], and [18]. Safety of the service is not only including being free from accidents but also touches other aspects such as passengers' safety from theft and physical violence and vehicle safety from vandalism [17]. The study reveals that majority of the commuters feel safe and comfortable while using the BRT service. This was made clear by 80% of the total respondents while only 20% were not feeling safe and comfortable while using the BRT service, especially during the peak hours (in morning and evening hours). During peak hours some of the BRT stations and terminals are overcrowded which create a high chance for theft and inconveniences to the users such as harassment. However, in respective to this, safety and security have been improved in the BRT by using security guards at each station, placing security cameras and lights at each station, and creating posters that inform the BRT users on their responsibilities to care their properties while using the BRT service. Moreover, comparing to the other means of public transport in Dar es Salaam city, it was found that clean environment makes BRT users to be comfortable of the service.

DART has provided a large and clean spaces in the BRT stations which accommodates large number of commuters at a time. This enable commuter to stand or sit comfortably in the station while waiting for the BRT buses. The benches are provided in terminals, which are Morocco, Kivukoni, Gerezani, Ubungo and Kimara terminals. This also increases the level of comfort to the users who are using the service. The benches also help disabled people and elderly people to sit while waiting for the buses. However, the provided benches are few in number for providing more space to serve more commuters. Also, special seats are provided in the BRT buses for people with various disabilities, elders and pregnant women, to include those with babies.

In summary, quoting some of the respondents on the safety and comfort of

the BRT service had this to say: the first respondent said "*my perception on safety of public transport has improved, since BRT stops and terminals have security guards who are present to assist us on safety and security issues.*" The second respondent said "*In BRT the seats provided are clean and one can easily sit and stand comfortably without causing any disturbance to other commuters. I perceive that comfortability of commuters is improved with better and clean environment*". And the third respondent said "*Comfortability while standing in BRT buses is highly considered since a person can stand and use handles that are provided in a bus, also the standing areas are specious*".

5. Conclusions and Recommendations

5.1. Conclusions

The study aimed at discussing the performance and operation of the public transport systems in African developing countries of which BRT system in Dar es Salaam was a case study. The commuters' perception on operation and performance of the BRT system was analyzed by using four variables, which are; accessibility, travel time, transport costs and safety and comfort.

Generally, accessibility of the BRT stations, less travel time, reasonable transport cost and improved safety and conform have contributed in building the positive perspective in mind of majority of the commuters in African developing countries.

However, the study identifies the prominent challenges facing the BRT system in Dar es Salaam city which might be also facing other rapid urbanizing cities in African developing countries. These include passengers overcrowding during peak hours, long waiting time in the BRT stations as well as safety and security issues that could slowly change the positive perception of the commuters. To address these challenges, the following are the recommendations:

5.2. Recommendations

5.2.1. Introduction of Passenger Information Display

Passenger information displays (bus information system) is recommended to be introduced within the bus terminals and bus stations/stops for reduction of the waiting time and accessibility improvement of the public transport. This is intended to provide key information to passengers; such as name/number of the next bus/service for each boarding area, arrival time, departure time, route, the served stations, disruption information and advance notice of any service change or temporary station closures which can be seen by all passengers.

5.2.2. Introduction of Bus Priority Signals

Apart from the BRT bus lanes, bus priority signals are recommended to be installed in all intersections for improvement of bus movements without interruptions. This will improve efficient of the public transport according to the time schedule of the BRT busses.

5.2.3. Introduction of Automated Fare Collection System

Automated Fare Collection System is recommended to be introduced at the entrance of the bus terminals and bus stops for bus fare collection for the purpose of reduction of entrance time. This includes introduce e-ticketing system, contactless smart cards, stored value and other card services.

5.2.4. Introduction of Signage

Signage is recommended to be introduced within the BRT buses for improvement of safety and security. Signage is intended to provide education and information to the commuters within the buses through public announcement system about the boarding arrangements, seating priorities, bus destination, arrival time to the destination and the next stop during the trip.

5.2.5. Introduction of CCTV Camera within the Bus and Bus Stops

CCTV Cameras are recommended to be installed within the BRT buses as well as bus stops and terminals for improvement of safety and security. This will enable security guards posted within the bus stops and bus terminals to identify and deal with harassment and theft cases.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Ministry of Transport (MOT) (2018) Public Transport 2045. A Working Paper on Urban Transport in Shared Mobilityn Era. Ministry of Transport (MOT), Wellington.

[2] Costa, Á. and Fernandes, R. (2011) Urban Public Transport in Europe: Technology Diffusion and Market Organisation. *Transportation Research Part A*: *Policy and Practice*, **46**, 269-284. https://doi.org/10.1016/j.tra.2011.09.002

[3] Neff, J. and Dickens, M. (2013) Public Transportation Fact Book. American Public Transportation Association, Washington, D.C.

[4] Wright, L. (2002) Sustainable Transport: A Sourcebook for Policy-Makers in Developing Cities Module 3b: Bus Rapid Transit. Deutshe Gesellschaft fur Technische Zusammenarbeit (GTZ), Eschborn.

[5] OECD, UN-ECA and AfDB (2022) Africa's Urbanisation Dynamics 2022: The Economic Power of Africa's Cities. West African Studies, OECD Publishing/United Nations, Paris, 205 p. https://doi.org/10.1787/3834ed5b-en

[6] Mchome, E.E. (2021) Improved Business Model for Commuter Bus Transport in Urban Areas Using Electronic Ticketing and Cashless Payment Machines: The Case of Public Transport in Dar es Salaam City. *Journal of the Building and Land Development (JBLD)*, **22**, 59-70.

[7] Wright, L. and Hook, W. (2007) Bus Rapid Transit Planning Guide. Institute for Transportation and Development Policy, New York.

[8] African Development Bank Group (ADB) (2015) Environmental and Social Impact Assessment Report. African Development Group, Abidjan.

[9] Kombo, D.K. and Tromp, D.L. (2006) Proposal and Thesis Writing: An Introduction. Paulines Publications, Nairobi.

[10] Nkurunziza, A., Zuidgeest, M., Brussel, M. and Maarseveen, M.V. (2012) Modelling Commuter Preferences for the Proposed Bus Rapid Transit in Dar es Salaam. *Journal of Public Transportation*, **15**, 95-116. https://doi.org/10.5038/2375-0901.15.2.5

[11] JICA (Japan International Cooperation Agency) (2018) Dar es Salaam Transport Policy and System Development Master Plan. Eight-Japan Engineering Consultants Inc., Dar es Salaam.

[12] JICA (Japan International Cooperation Agency) (2008) Dar es Salaam Transport Policy and System Development Master Plan. Pacific Consultants International Construction Project Consultants, Dar es Salaam.

[13] Kanyama, A., Kanyama, A.C., Linden, A.L. and Lupala, J.M. (2004) Public Transport in Dar es Salaam, Tanzania-Institutional Challenges and Opportunities for a Sustainable Transpotation System. Institutionen för miljöstrategiska studier, Stockholm.

[14] Jones, S., Adanu, E., Adams, C. and Ambunda, R. (2022) Safe Inclusive Public Transport in Africa: Challenges and Opportunities Identified in Ghana and Namibia. In: Acheampong, R.A., Lucas, K., Poku-Boansi, M. and Uzondu, C., Eds., *Transport and Mobility Futures in Africa: The Urban*, Sprinker, Cham, Washington, D.C, 217-233. https://doi.org/10.1007/978-3-031-17327-1_14

[15] Bhatti, M. (2021) Bus Rapid Transit (BRT) System and Design Features. Linkedln.

[16] Hardi, A.Z. and Murad, A.A. (2023) Spatial Analysis of Accessibility for Public Transportation: A Case in Kakarta, Indonesia. *Journal of Computer Science*, **19**, 1190-1202. https://doi.org/10.3844/jcssp.2023.1190.1202

[17] Cervero, R. (2013) Bus Rapid Transit (BRT): An Efficient and Competitive Mode of Public Transport. Scientific Adivasory Group (SAG), Berkeley.

[18] ERIA (2013) An Overview of Bus Rapid Transits in the World. In: Kutani, I., Ed., *Improving Energy Efficiency in the Transport Sector through Smart Development*, ERIA Research Project Report 2013-27, Kutani, 5-25.