

PUBLIC TRANSPORT SERVICE MODAL CHOICE, AFFORDABILITY AND PERCEPTIONS IN AN UNPALATABLE ECONOMIC ENVIRONMENT: THE CASE OF AN URBAN CORRIDOR IN HARARE (ZIMBABWE)

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ABSTRACT

Public transport plays an important role in fulfilling the travel needs of people in cities of the developing world. For most cities, notwithstanding the availability of different modes, which include conventional buses, midi and minibuses and paratransit systems, the public transport system is increasingly becoming inadequate, inefficient, unreliable and unaffordable. The choice on the public transport mode to use is therefore depended on both quality and affordability. With increases in public transport fares, the spectrum of choice has expanded to include non-motorized means of transport such as cycling and walking. The paper examines modal choice, affordability and perceptions of commuters in a low-income high-density residential corridor in Harare (Zimbabwe) within the context of a difficult macro-economic environment. Residents are spending more than half of their earnings on public transport and responding to the situation by devising coping strategies.

1. INTRODUCTION AND BACKGROUND

Public transport plays a very critical role in the socio-economic development of any nation. It enhances the people's livelihood frameworks by facilitating mobility and accessibility to services. As such transport is very instrumental in poverty alleviation through the breaking of socio-economic and spatial isolation. This is critical, particularly in the developing world, where rates of urbanization are unsustainably high.

Over 50% of the world population is projected to reside permanently in urban areas by 2025. (World Development Report: 2000). In Zimbabwe, about 34% of the national population permanently resides in towns and cities. The rural folk also directly and indirectly depend on rural-urban linkages for their survival. (CSO: 2002, Madyangove 2006). The current high urbanization rates have come with a price tag, in the form of an insatiable demand for services. In Zimbabwe, the public transport system is struggling to cope with the current excess demand for the service.

For the past few years, the country has been confronted by a plethora of macro-economic challenges. The hyper-inflationary conditions, crippling unemployment and industrial flight, through complex causal chains, have resulted in a harsh socio-economic environment. Average dependency ratios of up to 1:15 have become very common (CSO: 2002). This is against the backdrop of the HIV and AIDS scourge that has continuously bedeviled the nation. (Zimbabwe Human Development Report: 2003). Over 70% of the economically active and employed people, fall within the low to medium income segment. (CSO: 2002). As such they cannot afford to buy their own vehicles, and largely depend on public

transport. However due to the current challenges facing the sector, commuters are forced to make use of other rudimentary modes. (Mbara: 2004).

The current unpalatable macro-economic environment has not spared any sector. The continuous depreciation of the Zimbabwean dollar (Z\$) against other major currencies has made public transport provision nearly impossible. For instance, while in October 2005, the United States dollar (USD) traded at Z\$100 (revalued) on the parallel market, by the end of January 2007, the Z\$ had depreciated by over 200%. This effectively mopped the economy of foreign currency reserves, thus making the importation of vehicles, spares and fuel impossible. The public transport sector, which requires an average annual vehicle replacement rate of about 400 buses, has been severely crippled (Confederation of Zimbabwe Commuter Omnibus Operators (COZCOS): 2006).

The commuters have therefore continued to endure the poorly performing public transport system. This paper examines commuters' perceptions of the urban public transport system in terms of affordability and modal choice. It analyses the trends in copying mechanisms employed by the commuters in Harare, by focusing on the Mabvuku-City Center corridor. The corridor was chosen because of the prevalence of various modes including the commuter train.

2. CONCEPTUAL FRAMEWORK

The status of public transport can best be explained by concept of affordability, as it applies to different groups of people. Mitric et al (2005) noted that modal choice decisions among different income groups are influenced by different factors. Among the low-income groups, fares charged are the main decision making variable. For the high-income groups, modal choice decisions center on service quality (waiting time, travel time, comfort, etc). In the Zimbabwean case, Mbara and Maunder (1996) concluded that deregulation of public transport initially resulted in a marked fare rise. However, even low income passengers (ZUPCO) services. This mainly had to do with service quality.

Mitric et al (ibid) further noted that operators' concern is more with the elasticity of demand¹ for their service. Passenger responses to fare adjustments influence the overall ridership and thus the revenue generated. Thus, the perceptions of passengers' about the service determine their elasticity of demand and the stability of revenue generated if fares are to be adjusted. However, in most developing countries, where the demand for public transport is generally inelastic due to inadequate services and limited available alternatives, the low-income groups face a desperate situation. The situation becomes even more critical where commuting distances are relatively long.

The affordability patterns of the low-income groups are very critical in the overall sustainability of urban public transport. For instance, if a fare increase results in the loss of poor passengers in an environment where there are limited alternatives, the chain reactions would be grave. This implies a curtailment of access to jobs, services and social interaction (Rwebangira 2000). Such socio-economic exclusion triggers poverty. Authors like Chambers et.al (1992) and Ellis (2000) have acknowledged the role played by social exclusion in trapping people in poverty vicious cycles². The Integrated forum for Rural Transport and Development (IFRTD) (1992) noted that isolation results in "*poverty of ideas, poverty of health, poverty of opportunities, poverty of income and even poverty of hope for a better future*".

A number of studies were carried out worldwide to determine the relationships between affordability of urban public transport systems and resultant modal choice. In October

2004, the World Bank funded surveys in Mumbai, to assess the low-income groups' residential-work trip patterns, overall travel patterns and modal choices as well as attitudes towards particular aspects of urban public transport (quality and reliability). It was found that the poorest groups spent about 15% of their disposable incomes on public transport and that their modal choice was limited to public transport only. The highest income groups spent less than 10% of their income on different modes of transport. While they were flexible in terms of their modal choice, the majority favoured private transport and devoted more than 50% of travel expenditure to it. (Mitric et al: 2005)

In Brazilian cities of Sao Paulo and Belo Horizonte, studies by the World Bank in 2003 and 2004 respectively, established that poorer households had critically low mobility and poor access to public transport. This was due to long distances and trip times, inadequate supply of public transport in peripheral areas and lack of an integrated fare system. The poorest households had AIs exceeding 40%. In Sao Paulo unconstrained speculation by property developers made it impossible for the poor to live closer to the city center. This not only increased commuting distances and overall transport cost, but also reduced available alternative modes, thereby restricting low-income groups' mobility to levels below 30% of that for the highest income groups. In Belo Horizonte, there was a direct relationship between adequacy and accessibility of the service among the poor. The worst accessibility indicators (AIs)³ and restricted modal choices were observed in highly populated, low income areas with poor accessibility due to physical barriers such as tunnels, motorways, etc. (Mitric et al: 2005).

Mitric (ibid) noted that in another similar study in the Chinese city of Wuhan, modal split was such that walking was the dominant mode followed by public transport and cycling. This was attributed to city morphology, which was largely compact such that employment, education, health care and other service facilities were located within walking distance of residential units. However the system has since changed, making public transport services indispensable. Fares vary by route depending largely on route length (which has a bearing on the number of modal options) and quality and comfort of the vehicles. There were no route transfer ticketing facilities, thereby forcing passengers to pay twice or thrice for a single home-to-work journey. Transit fares were actually cited as the main factor influencing modal choice. As a coping strategy households forgo better employment opportunities in further away locations and limited themselves to jobs within walking or cycling distances from their residential places. Average AI for the poor was estimated at between 30-40%.

The following section explains the situation in Zimbabwe basing on findings of a study carried out along the Mabvuku-city centre corridor in Harare.

3. STUDY METHODOLOGY

Data and information for the study was collected through household questionnaire surveys, traffic counts on the corridor, discussions and observations at rail and bus termini, unstructured interviews with railway and public transport operators. Due to lack of resources, only 50 households were interviewed and traffic counts were conducted during the morning peak period only between 05:30 hours and 09:30 hours. The data collected through the questionnaire comprised of household structure, income, monthly expenditure on transport, vehicle ownership, modal split and trip purpose. In addition there were also open ended questions that sought to obtain information on mode preference, transport problems faced and coping strategies that people were devising in order to cope with the situation.

Traffic counts were carried out on the corridor from Mabvuku residential area to the industrial area (Msasa) and city centre. Apart from the total vehicular flow, estimates of passengers carried were also made.

4. RESULTS

4.1 Introduction

Mabvuku is a high density residential area located some 17 kilometers on the eastern side of the Central Business District (CBD) of Harare. The residential area was established initially to accommodate domestic workers for high-income residential areas to the north of the CBD. Over the years the suburb has become a home to industrial and commercial workers for the city.

4.2 Livelihood activities

The main livelihood activities that generate travel demand are formal employment, informal trading and self-employment jobs as shown in Figure 1.

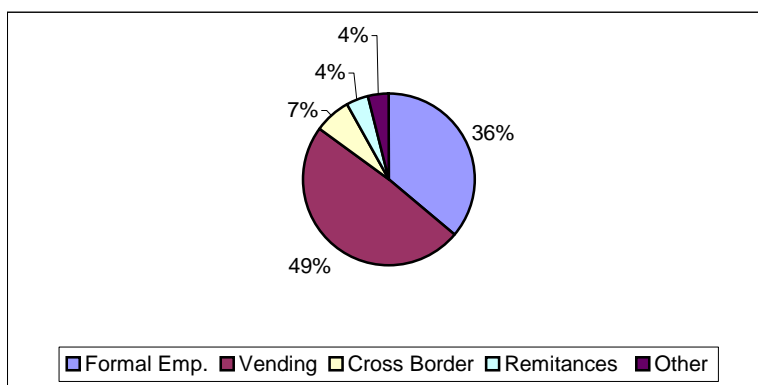


Figure 1: Major livelihood activities in Mabvuku

The household survey established that 36% and 49% of the households gained their incomes from formal and informal employment respectively, and thus these activities generated frequent trips between the residential area, industrial area and the city center. Other income generation activities that also generated trips albeit on a smaller scale included urban agriculture and cross border trading.

4.3 Trip purpose

In respect of trip purpose, the main ones are education (35%), work (29%) for both formal and informal) shopping (14%) and visiting friends and relatives (10%) as evidenced by Figure 2 below.

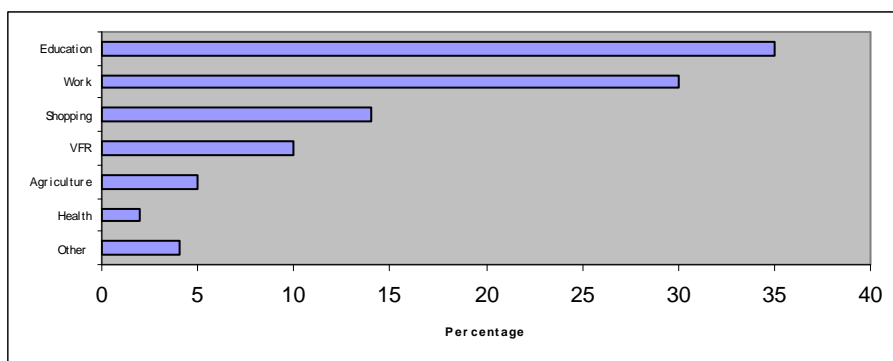


Figure 2: Trip purpose for Mabvuku residents

From the travel diary results, the principal destinations for people were local surroundings (45%) where trips are invariably undertaken on foot, city center (24%) and industrial area (5%).

4.4 Public transport provision

Public transport consists of conventional buses, commuter train, midi- and mini-buses. The latter two are collectively known as commuter omnibuses. In addition, company vehicles and other privately owned cars, pick ups and lorries also carry passengers for a reward, the former clearly being an act of abuse. The use of pick ups and lorries compromises safety and comfort. The commuter train service was introduced in July 2001 in order to alleviate transport problems experienced by urban commuters. The train services are making use of the existing railway lines, which in some cases are not ideally located. In the case of Mabvuku, the commuter railway station is very far from the people who are supposed to use the commuter train.

4.5 Vehicle ownership

From the 50 households interviewed, vehicle ownership was generally low, with only 4 households owning at least a bicycle and 5 owning a car. However, as highlighted in a subsequent section, bicycle ownership was found to be fairly high from the traffic surveys conducted during the peak hour.

5. MODAL SPLIT

Modal split was determined in three ways, namely:

- Trips made by household members of Mabvuku in respect of the last 24 hours (household questionnaire)
- Ascertaining household members modal preference (household questionnaire)
- Passenger counts in the various modes in the Mabvuku-city centre corridor (Peak hour only).

The results from the 50 household surveys undertaken (Table 1) revealed that walking is the predominant mode used by members of the household in Mabvuku.

Table 1: Modes used the previous 24 hours

Mode	Total Time(mins)	Fare (Z\$)	Use (%)	Preference (%)
Walking	240	-	51	-
Conventional bus	70	1500	15	38
Commuter Omnibus	50	2000	22	48
Train	100	400	2	8
Car	30	-	5	6
Bicycle	96	-	4	-
Hitchhiking	45	2000	1	-

Modal use results augur well with trip purpose results where education is the main trip purpose, which invariably is undertaken on foot. Conventional buses and commuter omnibuses account for 15% and 22% respectively with train, car and bicycle having low percentage modal choices. Interestingly, walking has the highest travel time, but has the highest usage.

In response to the question on modal preference, only 4 modes were cited. The majority households (48%) prefer commuter omnibuses with 38% preferring conventional buses. Interestingly, the two non-motorized means of transport, namely, walking and cycling were

not mentioned at all indicative of the fact that residents do not regard them as modes of transport or that their use is not out of choice but due to extenuating circumstances.

Commuter omnibuses were preferred for their speed while conventional buses were regarded as cheaper and safer when compared to the former. This is in contrast to Mitric's suggestion that for the low income groups, fares are the key determining factor of modal choice. Those who cited commuter trains as the preferred mode regarded them as the cheapest public transport mode though not adequate and accessible.

While household questionnaire surveys covered all trips made by members of the household, passenger ridership surveys were confined to those passengers traveling from Mabvuku to the city centre. Table 2 illustrates the total number of vehicles and passengers observed during a workday peak hour.

Table 2: Peak passenger ridership on the Mabvuku-City corridor

Mode	No. of vehicles	Percentage vehicles	Passengers	Percentage passengers
M/Cycle	4	0.19	4	0.04
Bicycle	1549	73.45	1549	14.34
Pedestrian	-	-	147	1.36
Commuter Omnibus	162	7.68	3362	31.12
Conventional Bus	34	1.61	2822	26.13
Car	201	9.53	661	6.12
Pick up	157	7.44	1117	10.34
Train	2	0.09	1139	10.55
Total	2109	100.00	10801	100.00

With a share of 31%, commuter omnibuses have the largest share of the passenger ridership market during the peak period. Notwithstanding the small number of conventional buses (34), their large capacity has resulted in sizeable peak period market share of 26%. These ridership figures are consistent with the preference of households shown in Table 2 above.

Of significance is the number of bicycles observed on the corridor. Bicycles constitute the highest number of vehicles (73%) recorded during the peak our but their market share of 14% is a reflection of the limited capacity (Table 2). Clearly, there has been a significant shift towards cycling, which principally is a result of the high cost of using motorized public transport modes. In 1966, bicycle share of the passenger market in Harare was only 3% (Mbara 2004). The 147 pedestrians that were walking to the industrial area (6 kilometers) and city center (17 kilometers), is indicative of the hard economic times that people are experiencing and the resultant unaffordable public transport services.

6. TRAVEL COSTS

Most behavioral models concerned with choice, attempt to explain passenger choice on the basis of some quantifiable factors. Such an approach would try to explain how passengers trade off each factor against the other factors in making travel decisions. To this end, the generalized costs of each mode have been computed for the Mabvuku – City centre trip in order to assist in explaining the benefits of using a particular mode of transport when compared to the other. Four factors were examined in relation to their effects in influencing passenger choice of travel mode. These factors are walking time, waiting time, in-vehicle traveling time and passenger fare. Table 3 summarizes the costs associated with each mode.

Table 3: Travel costs for each mode

	Conventional bus	Commuter omnibus	Train	Bicycle	Walk
Fare paid (Z\$)	1 500	2000	400	0	0
Walking time (min)	5	5	50	0	240
Waiting time (min)	20	20	15	0	0
In-vehicle time (min)	45	25	35	96	0
Modal split (%)	15	22	2	4	51
Total Time	70	50	100	96	240

Commuter omnibuses have the lowest total travel time costs but the highest fare. Passengers opting for commuter omnibuses are therefore trading money for time. Cycling (96 minutes) and walking (240) have the highest travel time costs. With a significant number of commuters walking and using bicycles, this clearly shows the difficult choices that people in low-income high-density areas have to take. The Affordability Index (AI) calculated from the household survey, indicated that households are spending approximately 53% of their hard earned income on transport. The people interviewed lamented the high cost of fares, which at time fluctuated without notice. As one respondent puts it:

“Public transport fares are too high and unaffordable. Commuter omnibuses increase fares without giving us notice. There is need for Government to gazette the fares and strictly control what commuter omnibuses charge”

In addition to the high fares charged, commuters also complained vehemently about the generally unreliable public transport system and the rude and unfriendly behaviour of commuter omnibus drivers and conductors. An irate household member had this to say:

“We are being short changed by commuter omnibus crew. They are very rude and the high fare we pay is not commensurate with the service”

7. COPING STRATEGIES

The high cost of travel has forced people to devise coping strategies. The results of the household survey have shown that coping strategies that the people have devised include the following:

- Relocating some members of the household to rural areas where no daily transport costs incurred;
- Drastically cutting social journeys and traveling strictly for essential trips;
- Giving up formal employment all together and resorting to self employment that does not necessitate the need to travel;
- Acquiring a bicycle;
- Failure to report for work in order to save costs to buy food;
- Forming travel clubs and take turns to visit the CBD for shopping; and
- Relocating children to attend nearby schools.

8. DISCUSSIONS AND CONCLUSION

Urban public transport in Zimbabwe is largely unaffordable, with average affordability indices exceeding 50%. This has largely been blamed on the current harsh macro-economic environment, which has made the provision of the service almost impossible. Commuters have however been forced to bear the brunt as they sadly and helplessly

watch their hard earned incomes only covering transport expenditure. Their perception of the transport service is largely negative

Under this desperate environment, urban commuters have adopted a number of coping strategies to try and cushion themselves. Some have also been forced to make sacrificial modal choice decisions, most of which are influenced by many heterogeneous factors.

Such a situation is not sustainable. A holistic approach, starting at national level, becomes very critical. Firstly, there is need for the state and its partners to work hard to correct the negative international image of the country so as to boost investor confidence. This is important for the economy to come off its knees. Further, there is need to re-foster partnerships between the various sectors of the economy. Efforts of such partnerships should be directed at inter alia reducing transport costs, creation of a public transport development scheme administered through commercial banks and the Reserve Bank of Zimbabwe, investment in cheaper and high capacity modes as well as research and development. Town planners should also desist from the traditional outward urban sprawl approaches and focus more on land use integration. All these efforts should be guided by the aim of creating a safe, adequate, reliable and affordable public transport system.

9. REFERENCES

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END NOTES

¹Price Elasticity of demand (PEoD) is the responsiveness of consumers to changes in the price of a given product.

It is calculated as: $PEoD = (\% \text{ Change in Quantity Demanded}) / (\% \text{ Change in Price})$.

²Vicious cycle of poverty is a concept used to explain how poor people's conditions are worsened through the interlocking of many factors in complex ways. An example is how restricted mobility and accessibility leads to low productivity which leads to low income, low income leads to low savings, and low savings leads to low investment and low investment to low productivity.

³Accessibility indicator (AI) is the expenditure by a household on a given good or service, expressed as a percentage of its total income. The World Bank recommends that in developing countries household public transport AI should not exceed 10%.