

**DETERMINANTS OF THE SUPPLY OF URBAN PUBLIC TRANSPORT
SERVICES IN HARARE, ZIMBABWE**

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By

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ABSTRACT

The level of supply of public transport increases proportionately with population size. However, increases in population growth and urbanization have led to several transport problems, including meeting the supply of transport services. The rationale behind the supply model as used in the study is generally found in economic theory, where vehicle operators/owners choose among alternative opportunities before investing in urban transport service industry. Despite the importance of the transport business sector to the Zimbabwean economy, the continued undersupply in the sector is alarming. The main objective of the study is to identify the factors affecting the supply of urban transport in Harare, Zimbabwe. The research seeks to find the reasons of the high mismatch of demand and supply in the urban public transport sector. These situations are related to finance, demand forecasting, management, high operational overheads, unviable fares, marketing, capitalization at start up and business planning. It also established that many entrepreneurs have high operational overheads as a result of inefficiency due to vehicle old age and high statutory safety requirements on vehicle fitness, which is forcing many large investors to opt to sell their passenger vehicles and venture into haulage trucks instead.

By the end of the research we should be able to list the factors affecting investment in this sector in their order of importance such that coming up with solutions to those most important factors may just unlock a lot of investment into this sector This research established the notion that under investment in the transport sector are caused by lack of funding and non viable fares even though occupancy is very good. These factors will serve as a basis of modeling the supply situation in the study area. In addition, the study will outline some policy directions, which need to be considered in order to sustain the supply of urban transport services.

CHAPTER 1: SITUATION ANALYSIS

1.1 Introduction

This chapter introduces the study by providing a historical background on urban public transport provision in the country and the efforts that have been put in place to improve the situation. It also gives the objective of the study . It must be realised that the transport problems are not generic and clearly would not require simplistic solutions.

The demand for urban public transport in Zimbabwe, like in many cities of the developing world, continues to increase with urbanisation. For instance, a third of the world population lived in urban areas in 1975 and by 2000, the population living in urban areas had increased to approximately fifty percent and it is estimated that by 2025, two thirds of the world population would be living in urban areas (World Development Report 2000). While the urbanisation process is partly coming to a halt in the industrialised countries, growth of cities in the developing countries is in full swing and far from over. Most of the rapid urbanization changes are taking place in cities of the developing world particularly Africa where urbanisation growth rates for Kenya, Tanzania and Zimbabwe were 7.7%, 6.6% and 5.9% respectively (Ibid).

It is clear from the above backdrop that the demand for public transport will continue to increase as population increases. Zimbabwe is no exception. The problem in Zimbabwe has been compounded by some macro-economic fundamentals, which have characterised the Zimbabwean economy over the last few years. The inflation and interest rates were extremely high leading to the abolishment of the local currency and subsequent dollarization of the economy. Foreign currency reserves were depleted making importation of vehicles and fuel very difficult.

1.2 Situation analysis

Prior to the attainment of independence in 1980, there was United Transport Group which operated stage carriage services in the urban areas of Zimbabwe. In Harare, United Transport Group operates as the Harare United Omnibus Company. Services were operated under a franchise agreement (between the local authority and the bus company, which gave the operating company an exclusive right to operate services within a specified franchise area. The agreement guaranteed the operator a certain level of profitability. In the case of Harare, a

20% return on capital employed was guaranteed and in the event that the company failed to achieve this level of profitability, the difference was paid by the local authority as a subsidy. During this period, long waiting and commuting times characterised the public transport system.

After the attainment of independence, the Government of Zimbabwe pursued a policy targeted at redressing the socio-economic imbalances that had characterised the Zimbabwean economy prior to independence. Urban transport was regarded as one such key economic sector as evidenced by a number of important decisions taken by the Government. These included;

- ❖ The determination of fares which became the direct responsibility of the Government and no longer that of the local authority.
- ❖ The legalisation of the informal sector private transporters popularly known as “emergency taxi” in order to augment the conventional transport services. Emergency taxis provided a shared service on set routes and had a legal capacity of 7 passengers although 9 was the norm
- ❖ The acquisition by government of a majority shareholding (51%) in the Zimbabwe United Passenger Company (ZUPCO), a successor of the former Harare United Omnibus Company, a holding company that had been formed to facilitate government participation.

Government’s participation in ZUPCO was meant to influence policy in particular the acquisition of new buses to replace the old-aged vehicles as well as for expansion purposes. A few buses were bought but the bus acquisition programme came too late as it failed to keep abreast with demand. It was also noted that ZUPCO’s problems at the time were further compounded by several years of financial stagnation as the company could not regularly adjust fares to keep abreast with increases in operational costs.

In 1990, the country embarked on an Economic Structural Adjustment Programme (ESAP). The thrust of ESAP was geared towards the liberalization of the economy by removing certain controls and regulations inhibiting competition. It is against the backdrop of the need to liberalise the economy that urban transport in Zimbabwe was deregulated in August 1993.

Regulation in the sector therefore loosened as authorities allowed small time players to come in to fill the gap. Operator’s licences for operating a commuter omnibus became easier to get

and these have even been granted for long distance journey or inter-city travels. The operator would choose the preferred routes for their vehicles and the operator may choose to have one dedicated route or multiple routes for the different vehicles.

The Ministry of Transport Communication and Infrastructure Development is the authority that issues the Operator's Licences and Route Permits. One would need the following to get the operator's licence:

- ❖ Commercial number plates
- ❖ Garage report
- ❖ Certificate of Fitness issued by the VID(Vehicle Inspection Department)
- ❖ Motor vehicle insurance
- ❖ Passenger liability insurance
- ❖ Application fee of \$50.

The whole process can take 3 days and the operator's licence is renewable after 4 years. The Route Permit application fee is \$75 and is renewable annually.

The deregulation had some impacts which include inter alia:

- ❖ Unprecedented increase in the number of privately operated public transport vehicles the majority being minibuses. This in turn has increased capacity in a substantial way
- ❖ An expansion of the urban public transport network as new services were introduced in some local authorities that were not serviced by public transport prior to deregulation and,
- ❖ Improvement in the quality of service as evidenced by a considerable reduction in average passenger waiting times

Notwithstanding the above positive impacts, there were also negative aspects, which were directly attributed to deregulation. The growth in the number of small public vehicles adversely affected the environment. The newly introduced commuter omnibus, took over a number of streets, which they used as loading points. Noise mainly caused by rank marshals touting for passengers is one of the problems associated with omnibus loading points. Secondly, the newly introduced commuter omnibus with a completely different modus

operandi threatened the survival of ZUPCO, an established stage carriage bus operator. Thus, over the years, the service provided by ZUPCO declined. For instance, prior to deregulation, ZUPCO had a fleet of approximately 1200 buses for its urban operations. By 1997, the fleet had depleted by 45%. During the same period, there was a corresponding decrease in routes operated by ZUPCO in the urban areas from 426 to 270.

On the whole, the positive effects of deregulation outweighed the negative aspects. Even public transport users acknowledged changes in the quality citing significant positive improvements resulting from deregulation.

As from the time of deregulation, public transport services are provided by both the Government and the private sector, which operates a mix of buses, minibuses ('Kombi'), and taxis. Kombi is defined as an efficient and inexpensive, minibus used mostly, for short distance travel. The roads were awash with buses from Tenda Bus Company, Kukura Kurerwa, Shu-Shine, B & C, Mucheche, Mverechena, Mhunga, Musanhi, Power Coach, Tauya, Mazarura, Chawasarira, Suffer Continue, Ajay Motorways, Mhukahuru; Mhiripiri, Chigubhu, Country Boy, Hwange Special Express and the Zimbabwe United Passenger Company (ZUPCO), just to name but a few. These buses were found in every corner of the country.

Most of the black entrepreneurs of the 90s lost their 'sparkle' during the economic meltdown resulting in many of them venturing into the trucking business which has proved more lucrative.

The main challenge that has faced operators in the country has been similar to the ones facing all other sectors of the economy. Firstly, the time operators flourished was when the economy was liquid and financial institutions had capacity to finance the purchase of new vehicles. In the period since 2000, a lot of operators failed to renew their fleet or at least maintain the existing fleet sufficiently due to hyper-inflation. So those operators who failed to adequately grasp the changes and initiate processes to counter these challenges went out of business. In addition to economic meltdown, many of them collapsed due to poor management and lack of a clear succession plan, with examples shown in a table in Chapter 2. The likes of Chawasarira have established themselves well in Mozambique. Tombs Motorways is one of the few bus companies that survived the economic meltdown. The company has one of the well maintained fleets on the road in the Midlands.

Today, the country's road network is dominated by luxury coaches such as Pioneer Coaches. Pioneer is the biggest transport and logistics group listed on the domestic bourse with strategic business units, which include Pioneer Clan Freight, Pioneer Clan Botswana, Pioneer Coaches, Mavambo Coaches, Pioneer Transport, Pioneer Logistics and Skynet Worldwide Express.

Pioneer Coaches, is the most recognisable company in the Pioneer Corporation Africa stable through its "Yebo Yellow" buses. It runs 41 semi-luxuries and luxury coaches and offers both scheduled routes locally and regionally, in addition to private hire, according to the firm's website. By 1993, ZUPCO was operating a fleet of 1 200 buses on 426 routes, providing world class service to urban and long-distance passengers. But that was ZUPCO then. By January 2011, only 60 buses were operational. The company is currently saddled with debts and a depleted fleet. Most of the State owned buses (ZUPCO) have been grounded and few are in operation due to mechanical and electrical faults, unavailability of spare parts, and engine problems.

Also, the fares charged during the economic meltdown were not in line with the costs of running a passenger transport business. This resulted in overnight successes becoming overnight failures as the costs of running buses/coaches continue to increase as fares continue nose-diving. The supply of urban transport is also affected by local bus assembly companies such as Deven, Sub Sahara Buses and AVM Africa that are failing to structure financial packages, like finance leases to meet the demand for new buses. This is due to lack of long term capital which is needed for retooling and financing packages for clients such as lease hire or hire purchase. However, most operators plying cross-border routes renewed their fleet and have started to enjoy uninterrupted service.

The period 2000 to 2009 was a really difficult period in the history of the economy. Hyper inflation, economic contraction, high unemployment and foreign currency scarcity characterised the period.

Hyperinflation rapidly eroded the value of the Zimbabwe dollar to become one of the least valued currency units in the world, undergoing three redenominations, removing a total of 25 zeros from the currency from August 2006 to February 2009. Such was the severity of

economic meltdown in Zimbabwe that saw high face value paper denominations including a \$100 trillion banknote.

Table 1 Zimbabwean inflation rates since independence (official up to Jul. 2008, estimates thereafter)

Date	Rate	Date	Rate	Date	Rate	Date	Rate
1980	7%	1986	15%	1992	40%	1998	48%
1981	14%	1987	10%	1993	20%	1999	56.9%
1982	15%	1988	7.3%	1994	25%	2000	55.22%
1983	19%	1989	14%	1995	28%	2001	112.1%
1984	10%	1990	17%	1996	16%	2002	198.93%
1985	10%	1991	48%	1997	20%	2003	598.75%
						2004	132.75%
						2005	585.84%
						2006	1,281.11%
						2007	66,212.3%
						2008 Jul.	231,150,888.87%
						2008 Aug.	471,000,000,000%
						2008 Sep.	3,840,000,000,000,000%
						2008 Mid-Nov.	89,700,000,000,000,000,000%

Source: http://en.wikipedia.org/wiki/Zimbabwean_dollar#Inflation

According to Central Statistical Office statistics, annual inflation rate rose to 231 million percent in July 2008. The month-on-month rate rose to 2,600.2%. By December 2008, annual inflation was estimated at 650 million googol percent (6.5×10^{108} percent), equivalent to a *daily* inflation rate of 96%.

This table shows a condensed history of the foreign exchange rate of the Zimbabwean Dollars to one US Dollar:

Table 2 Condensed history of the foreign exchange rate of the Zimbabwean Dollars to one US Dollar

Nov 2008	1 200 000
Mid Dec 2008	60 000 000
End Dec 2008	2 000 000 000
Mid Jan 2009	1 000 000 000 000
2 February 2009	300 000 000 000 000

Source: http://en.wikipedia.org/wiki/Zimbabwean_dollar#Inflation

The table above is the cash rate of the third dollar history. Despite attempts to control inflation by legislation, and three redenominations (in 2006, 2008 and 2009), use of the Zimbabwean dollar as an official currency was effectively abandoned on 12 April 2009. This was a result of the Reserve Bank of Zimbabwe legalizing use of foreign currencies for transactions in January 2009. Currencies such as the South African rand, Botswana pula, pound sterling, euro, and the United States dollar are now used for all transactions in Zimbabwe

From about the end of 1999, public transport services in urban areas of Zimbabwe had been on a declining trend. Most of the public transport vehicles that were acquired at the time deregulation had reached their economic life and needed to be replaced. However, the recapitalisation programme was affected by macro-economic challenges of hyper inflation and an unpalatable economic environment. Erratic fuel supplies also compounded the problem.

S.Sikonye, (2012) et al, postulated that the major players in the commuter transport are now family business (SMEs), established the notion that business failures in the transport sector are caused by failure to adequately plan for succession. They also established that some family members may not be willing to take the same business model, also failure to identify a potential successor prior to the death of the founder results in the discontinuance of the business. The key to succession dilemma is to identify and train the possible suitor early.

Table 3 Companies that experienced succession challenges

Name of company	Owner/fou	Year	No.	of	No. of buses	No. of buses	No.	of
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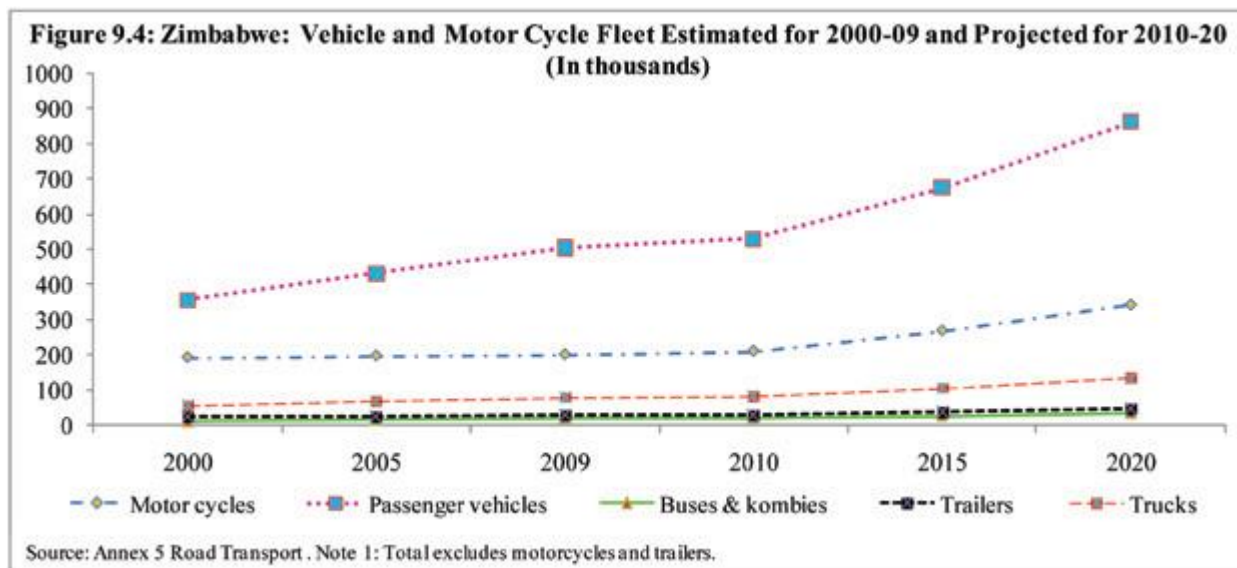
	nder	of death of founder	buses at the time of death	after year one	after two years	buses in 2009
Manica Bus services	Mr. Moven Mahachi	2001	12	10	8	1
Matemba Bus services	Mr. Matemba	2000	9	8	6	2
Mushandira (Samaz)	Mr. Solomon Tavengwa	2004	10	7	4	1
Masamvu Bus services	Mr. Masamvu	1998	6	5	5	2
Mwoyomuchena bus services	Mr Mabodza	1995	16	16	13	0
Shoe shine	Mr. P Hall	1988	62	60	55	0

Source: Ministry of Transport records section

From the table of list of some examples above, Sikonye et al, painted the picture that most SMEs, who had taken advantage of the deregulation of the transport sector, were crashing as the first generation owners become incapable or deceased, as succession planning failure takes its toll.

The graph below shows the volume of vehicles and projections to 2020

Figure 1 Volume of vehicles and projections to 2020



The graph above shows that the busses and kombis category is lagging behind. This has shown under investment in this sector. The unreliable nature of public transport services has resulted in the gradual

increase in cars, which further congest the roads in the cities and worsen air pollution, noise, and safety problems with the effects borne by the citizens.

The transport industry would need close to US\$500 million to meet the country's public transport needs. An estimated 500 reliable buses are required, depending on their specifications. The parastatal, ZUPCO, has surrendered the monopoly it used to enjoy prior to the deregulation of the public transport sector to private operators. And to get ZUPCO back on its wheels; an estimated US\$60 million is required in fresh capital. Like most bus operators, the ZUPCO empire has crumbled

While a good transport system is required to support the livelihood activities of the growing urban population, the macro-economic fundamentals cited above have had an adverse effect on the provision of public transport. Excessively long waiting times as well as long walking distances characterise the current urban public transport situation. Thus, the peak periods are once again characterised by very long queues of passengers and excessively long waiting times. This is more acute in Harare, the capital city.

There is a serious problem of capacity to cope with demand particularly during the peak periods. The situation has compelled people to walk for long distances and travel in all sorts of vehicles including trucks and pick-ups, a practice which compromised the safety of travellers.

1.3 Study objective

This study seeks to identify the factors that influence the supply of urban transport services in Zimbabwe. The main objective of the study is to identify and listing the factors affecting the supply of urban transport services in Zimbabwe.

1.4 Statement of the problem

Urban mass transportation is one of the key priority areas for urban planners because transportation is a very important input for the distribution of goods and services in urban areas and also contributes to economic growth. It has therefore been noted that there is limited knowledge of the factors that affect the supply of urban transport in Zimbabwe. Due to lack of information, investors and policy makers have not been well informed on the most significant or important factors to emphasise on when supplying the urban transport. it was

also noted that several studies are descriptive and qualitative in nature which is noted as a gap, therefore the need for this study which is quantitative in nature.

1.5 Significance of the study

Urban mass transportation is one of the key priority areas for urban planners because transportation is a very important input for the distribution of goods and services in urban areas. In addition, transportation facilitates the developments of every society and is crucial to sustainable development, especially if investments in the sector are well targeted and planned. On that note this study will add value in that it highlights the significant factors that affect the supply of urban transport and help in the planning purpose for both the policy makers and the private investors which are usually SMEs. An increase in the supply of urban transport services provides the platform for urban transport services in most cities. Indeed transport plays an instrumental, catalytic and lubrication role in development/society. Provided transport is good, areas become easily accessible and people mobile.

Transport is a derived demand in that it is demanded to satisfy or facilitate another activity such as production. Having good access, connectivity and appropriate transport mode are important considerations. Transport should be affordable to avoid eroding people's incomes. Having a good transport network and systems can alleviate poverty.

1.6 Organisation of the study

The report is divided into 4 chapters. This introductory chapter (Chapter 1) puts the study into context by giving a background of the country and the transport situation. The second chapter (Chapter 2) is literature review. Chapter 3 will focus on methodology and research design. Chapter 4 will focus on the research and data analysis finally rounding off the study by summarizing the study findings, drawing conclusions and the main recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter gives the literature that is related to the subject matter which is divided into theoretical and empirical review.

2.2 Theoretical Review

Urban transport is the movement of people and goods within urban areas using the technologies such as buses and trains. The basic purpose of public transport has been to provide mobility to people without access to private cars. Nowadays, public transport is adopted for many purposes, such as providing mass mobility, managing traffic jams and creating development opportunities (New Zealand Transport Agency, 2010). These have increasingly made public transport a crucial component of a sustainable and functional city.

According to State of Western Australia, (2011), public transport plays a vital role in creating competitive economies, liveable and inclusive communities within the city. Additionally, numerous authors have also articulated that public transportation is one of the potential ways of mitigating air pollution, reducing energy consumption, improving mass mobility and alleviating traffic congestion (Chen, 2005; Grotenhuis, Weigmans and Rietveld, 2007; Yao, 2007)

In spite of above incentives, the benefits of public transport will be realized by having an adequate public transport system, which provide good service everywhere in the city at all times (Gwilliam, 2002). An adequate public transport should provide service for travellers with different needs, ranging from peak-period access to the central business district to all-day access to local shops, recreational areas, residential areas and community centres in order to achieve environmental and social objectives. It should also be to provide attractive service frequencies and operating hours to a wide range of destinations. It is obvious that such public transport system can contribute evidently to urban economic performance, social cohesion and sustainable environment outcomes (Dodson, Mees, Stone & Burke, 2011; New Zealand Transport Agency, 2010)

For a noteworthy concern, if the distances to access a service are too great at either the trip origin or destination, then the public transport is unlikely to be utilized as a mode of travel

(Murray et al, 1998). Yet , the temporal side of public transport is crucial, considering that the service within walking distances is not considered available if wait times beyond a certain threshold level are required (Bhat et al, 2006; Polzin,Pendyala & Navari,2002). Similarly, if the service is insufficient to satisfy the demand, then utilization of the services is also unlikely.

An innovative approach is needed to meet urban mobility challenges especially in Sub-Saharan Africa cities (Diaz Olvera, Plat, & Pochet, 2008; The World Bank, 2011b). Most of these cities are overburdened by a high population growth, inadequate transport and extreme poverty. The rapid population growth and urbanization, coupled with increasing economic activities and opportunities in the cities, result in rapid growing travel demand, both for private as well as public transport.

To accommodate this rapid growth in the demand for private transport requires very extensive road capacity, which would induce more greenhouse gas emissions. Alternatively, public transport is required for mass mobility; it makes better use of the urban space, reduces the reliance on more polluting modes of transport, and is likely to be an affordable means of transport for most residents in these cities.

The provision of adequate and appropriate public transport services is one of the most important components for well-being of growing and expanding urban areas (Murray, Davis, Stimson, & Ferreira, 1998). Experience has shown that, public transport has a great significance in reducing traffic congestion, offering alternative means of travel and contributing greatly to the quality of urban life (Vuchic, 2005). Public transport is a public service, and should provide service levels that comply with public demand (Soehodho & Nahry, 2006). With a growing population and rapid urbanization, public transport systems need to be updated as well. A lag between growing public transport demand and services capacity results in an increase of travel costs, congestion and unreliable services, thereby creating economic loss and environmental degradation. Therefore, it is of substantial value that approaches for monitoring, assessing and modelling public transport system performance are developed, in order to ensure a provision of better services.

Many researchers, such as Vuchic (2005) and Sperling (1995; 1997), have studied the roles and adverse effects of transportation on cities. To this end, Blonk (1979) has stated that

transport is a catalytic force, both as an agent vital for economic growth and as an agent for economic decline where economic resources and conditions, as well as human endeavour, are insufficient. In this vein, efficient transportation should be seen as a factor that unifies the entire economy, which facilitates development. Kwakye, Turner, and Grieco (1994) have also noted that a well functioning transport system helps to maximize the economic growth or progress of cities.

The level of supply of public transport increases proportionately with population size (Maunder, Fouracre, and Jacobs, 1987). Increased population growth and increased urbanization have led to several transport problems, including meeting the supply of transport services. According to Pucher, Korattyswaropam, Mittal, and Ittyerah (2005), the supply of transport services has lagged far behind demand. This is because public finances, in general, are so limited that funding for transport improvement is woefully inadequate, hence the need to rope in the private sector. It is usually thought that smaller cities rely more heavily on intermediate public transport, but this is not substantiated by field data (Maunder, Fouracre, and Jacobs, 1987). According to them, intermediate public transport accounts for at least 30 percent of supply in most cities and, in some, it may account for as much as 60 to 70 percent of public transport provision.

Transport management in the metropolises is already facing considerable problems owing to non-sustainable transport structures, high local levels of air pollution, noise, traffic jams even outside the peak traffic times as well as decreasing safety levels for non-motorised road-users. In some cities, the external costs of transport have been estimated at more than 10 percent of the urban gross domestic product (e.g. Bangkok); this share is spent year for year on municipal welfare measures.

In most cases, parastatals in the transport sector are usually inefficient, with loans accumulating every year and interest payments become an ever increasing financial burden. But there is little documented evidence about the costs and profitability of private operators of standard size buses, although private operators seem more cost effective than the parastatals (Maunder, Fouracre, and Jacobs, 1987).

Although many cities in developing countries are different, many of the problems encountered by transport users and operators are similar (Maunder, Fouracre, and Jacobs, 1987).

When low fare structures are imposed by Governments, the heavy investment required coping with the demand and long trips contribute to the heavy losses being incurred despite the high level of demand generated at peak periods, in some of the low income areas. According to the Zimbabwe Cross Border Bus Operators Association (CBOA), in this industry, profitability is mainly determined by the reduction in operating costs, consistency of service delivery (availability of vehicles on chosen routes), durability of vehicles - vehicles with a longer lifespan provide constant income, while vehicles with enhanced safety standards reduce the occurrence of mechanical accidents thereby reducing claims against the operators as well as down time.

According to Michael Poku-Boansi and Kwasi Kwafu Adarkwa (2011) city form may influence the type of mode that can be employed. Dense compact cities with limited road networks may have high intermediate public transport content because it is physically impossible to operate buses efficiently. In the circumstances, public transport users may incur high public transport unit costs, although their absolute demand for public transport may be low. According to Vuchic (2005), the dynamic growth and changes in cities require that their transportation systems be further developed and modified in order to influence its growth.

Good quality transport services are seen by passengers to mean affordable fares, reliable, good frequency of transport services, short travel time, and improved safety (Poku-Boansi, 2008). This implies that vehicle operators need to provide services which meet these needs in an economically, efficient manner. These call for the proper management of operating cost, revenue, and having the required vehicle fleet. According to Markus (2006), service quality considers the requirement of passengers who ask for a short travel time, short walking distances, frequent and reliable services, decent comfort, and appropriate fares.

Urban mass transport continues to be a high priority social obligation of governments throughout the world and, in some jurisdictions, it is the prime responsibility of national governments, while in other localities, it is a state or local government responsibility (Hensher, 2002). Mass transport in developing countries is essential for the urban poor who have to rely on walking, cycling, and road-based public transport to meet most of their travel needs. Mainly buses provide urban mass transport and competition guarantees the efficient supply of mass transport services. The supply of urban transport services, therefore, helps in realizing this potential presented by mass transit services to cities development.

Public transport services are provided, in most cities, either by the private sector, public sector, or both. However, Amos (2004) argued that transport services that are privately owned and operated are widespread throughout developed and developing countries, but the government's provision of the services to the public has been found to be disappointing in many countries.

Cities across the globe face many pressing economic, social and environmental challenges. Efficient public transport networks are integral features of modern urban transport systems. Public transport networks can contribute markedly to urban economic performance, social cohesion and sustainable environmental outcomes.

The problem of public transport network planning is accentuated in dispersed urban settings where the density of land-uses such as homes and workplaces is relatively low. For some decades planning practitioners have held the view that the density of land-uses is a key factor in determining the viability of public transport (Breheny 1995). A more recent body of research suggests that density is less critical to public transport demand (Mindali et al. 2004; Newman 2006; Mees 2009) compared to, for example, the quality of public transport operations and that suburban public transport can offer a viable alternative to private motor cars even in highly dispersed cities (Mees 2000; Mees 2010)

The crucial challenge in supplying high quality suburban transport relates to the overall strategic and tactical planning of networks to ensure a fast seamless interconnected trip that is optimised to provide a competitive travel experience to the main suburban mode, the private motor car (Mees 2000; Newman 2006; Mees 2010). This challenge is arguably greater in the most dispersed car dependent suburban contexts, such as those found in North American and Australasian cities.

In general, the larger the city size, the higher the percentage of urban people served by public transport. In India: 30 percent of travelers in cities with population between 1 and 2 million, 42 percent for cities with populations between 2 and 5 million, and 63 percent for cities with populations over 5 million, are served by public transport (Sreedharan 2003). Thus, the especially rapid growth of large cities suggests a further rise in future demands for public transport in India. Transport demand in most of the Indian cities has increased substantially

due to an increase in population as a result of both natural birth rates and migration from rural areas and smaller towns.

Rapid urbanization in the city has resulted in unplanned settlements, urban sprawls and increasing urban poverty. Subsequently, more than 80% of the population of Kigali lives in informal neighbourhoods (Kigali City, 2011a; The World Bank, 2011a). The capacities of the available buses for public transportation are becoming more and more inadequate in providing the required services on the face of growing demand, while public transportation is the mainstay of most commuters. Due to limited extent of the public transport routes, newly developed parts of the city are deprived of public transport service, and people have to walk long distance to access bus stops.

On suburban rail lines in Mumbai, peak-hour trains must carry more than twice their maximum design capacity, leading to inhuman traveling conditions, with so-called “super dense crush loads” of 14 to 16 standing passengers per square meter of floor space (Varshneya, Jain, and Sahai 2002; Ministry of Railways 2002). Mass transport is scarce, overcrowded, unreliable, and involves long walking periods. Suburban trains and stations seem hopelessly overcrowded and desperately need expanded capacity. Considering the population growth in most Indian cities, the urban transport infrastructure thus needs to be increased manifold over the next few years, if the gap in the demand and supply has to be eliminated.

2.3 Empirical Review

On the supply side we find that technical efficiency and determinants of production cost structure have been the main foci of study. Less common are works on the determinants of transport supply systems. To this extent, Bruckner and Selod (2006) recently advanced the construction of a political economy model where transport system (supply) is endogenously determined. Nonetheless, no empirical strategy is used to test their hypothesis. De Borger and Wouters (1998) also simulate a model on supply decisions based on the influence of prices and traffic flows in Belgium, but further research on these determinants is needed. Others like Fernandez,Cea and deGrange (2005) and Fernandez ,de Grange and Malbran (2008) have also recently made efforts to link demand responsiveness to supply design.

Daniel Albalade and Germa Bel, 2009, researched aimed to determine factors explaining urban transport systems in 45 European cities. Supply and demand were separately and jointly determined using OLS and SUR estimation models, using data obtained from the Mobility in Cities Database (MCD) provided by the International Association of Public Transport (UITP) for 2001. The supply for urban transport was supposed to rely on the recovery rate of the service by the producer (income over costs), by the fleet of vehicles (capital) and other city characteristics like economic activity or density. They used the variables such as GDP, Urban population density, fares, average operating cost, fleet, average speed of public transport vehicles in operation, average time spent by private vehicle trip, motorization as number of private vehicles per thousand population, and parking. They estimated their equations using the Heteroskedasticity-Robust Ordinary Least Squares estimator (OLS) and afterwards implemented a SUR model (Seemingly Unrelated Regression, also called joint least squares or Zellner estimation). From their research, they found that the supply side of transport system is positively affected by Gross Domestic Product which captures income and economic activity, the number of total vehicles supplies and being a political capital. On the contrary, a negative effect of supply is exerted by the operational costs of the service. The other variables, including the average price of a passenger-km and urban density, do not present statistically significant coefficients.

Regarding the demand equation, they found that the coefficients associated with GDP, the fleet of vehicles provided, being a political capital and the average time spent in private transport trips, are all positively correlated with passenger-km per capita. On the contrary, the average price of public transport and the number of parking spaces in the CBD have a negative effect on public transport demand.

Michael Poku-Boasi and Kwasi Kwafu Adarkwa (2011) did an analysis of the supply of urban public transport services in Kumasi, Ghana. The research was modelled around the supply model, generally found in economic theory, where vehicle operators/owners choose among alternative opportunities before investing in the urban transport service industry. They carried surveys and collected data including hours worked per day, the number of trips made per day, travel times from an origin to destination, the travel speed, the number of passengers conveyed per trip and vehicle capacity. The study identified the cost of vehicles, cost of providing urban transport services, the demand level and the number of vehicles available as key factors, which affected the supply of urban transport services in Kumasi. From the study,

profits had a significant effect on the supply model and is anticipated that the higher profit margin may manifest in increased investment levels resulting in increase in number of vehicles and vice versa. Based on their significance probability criterion, four variables, cost of vehicles, overheads, profit level and demand level, were selected as key to the supply of urban transport. From the model results, it was realised that the cost of vehicle is the main independent variable, contributing almost 47.7 percent of the entire coefficient of determination (R^2) of the model. This implied that, for investors, the cost of vehicle is the most important factor to consider before investing their resources in the urban transport services industry. Demand contributed 17.1 percent, overheads or cost of providing urban transport services contributed 16.5 percent and the profit level contributed about 2.2 percent. The coefficient of multiple determination (R^2) of the model was 0.835, implying that about 84 percent of the variability in the supply of urban transport services could be explained by the four independent variables. This means that, in modelling the supply of urban transport services in the Kumasi Metro Area, variables such as demand level, the profit level, overheads and the cost of the vehicle should be considered since they contribute substantially to the overall supply of urban public transport services.

2.3 Conclusion

Urban transportation is the major challenges in both developed and developing countries since it interlinks with most (if not all) sectors of the urban setting. According to a World Bank study, the challenges of urban transport have been associated with globalization, urbanization, fiscal decentralization and economic transition. The growth of the population and density of the buildings in the cities only add further to the difficulties of traffic and plague to endless congestion, grave air pollution, alarming accident rates and lengthy travel time to work (Drakakis-Smith, 2003). Urban population growth plays a very important role in evaluating the supply and demand of transport.

The research on the determinants of supply of urban public transport has become interesting and lucrative areas for development particularly in developing countries evidenced by the numerous publications on the phenomenon. Differences arise on methodological issues such as model specification, definition of variables, functional form, regression technique, the data source and form and the sample selection criterion. Commonly used and significant variables include GDP, demand level, profit level, operating overheads, city characteristics, capital

employed, fares, motorization, population density, and parking spaces. The literature reviewed in this chapter therefore give way to a suitable and convenient specification of the model in the following chapter.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The ideas in the previous chapter provide the conceptual framework for the specification of the model presented in this chapter. Since models are simplifications to the theoretical derivations they are used to capture the policy and institutional decision-making process specific to the Zimbabwean economy. This is necessary because the degree of applying economic theory in model building differ due to the intended use of the model and data availability.

This chapter explores the theoretical underpinnings of the model paying particular attention to the derivation of the whole model. The chapter also gives a detailed description of the area of study, highlighting their specification in the model and description of variables constituting the model.

3.2 Description of the data

The primary data source for this study of determinants of supply of urban transport is a socio-economic survey of transport users and suppliers views in Harare where a single questionnaire is administered to the respondent. The area of study and reasons for the choice of this area was based on the factors discussed in the following section.

3.3 Questionnaire and sampling method

The survey collects information on data on vehicle operations, such as travel time, fares charged, revenue, and number of trips made in a day, among others. The survey was necessitated by the lack of such data. A pilot study was carried out. The survey was carried out with a small sample of 10 respondents. This enabled me to field test a questionnaire. After the pilot survey the questionnaire was readjusted to suit the environment from the assessment.

The survey was targeted at 50 respondents randomly selected; a questionnaire was developed and structured in a manner that could bring forth all the necessary information from the respondent in a precise way. A simple random sampling which was used is a sampling

method where a group of subjects (a sample) for study is selected from a large group (a population). Each individual was chosen entirely by chance and each member of population had an equal chance of being included in the sample. Every possible sample of a given size had the same chance of selection, that is, each member of the population was equally likely to be chosen at any stage in the sampling process. Other advantages of this sampling method are that it is easy to calculate the probability of a given person being chosen and the likelihood of bias are also reduced.

3.4 Study area

In my endeavor to collect data, it is usually far too expensive and too time consuming to collect information from every member of the population; hence data was collected from a sample. But to be of any use, a sample must represent the whole of the population we are interested in and not biased in any way. Although information about our sample is of immediate interest, the point of collecting it is usually to deduce information about the entire population that is, making inferences, hence the need for the sample to be truly representative of the population.

Armed with these basic principles of sampling all towns in Zimbabwe were listed. Harare had many characteristics that pointed to it as the ideal city for my research and the results likely to be representative of urban Zimbabwe. It is the Capital city of Zimbabwe and has the biggest urban population. It has lots of smaller towns and townships surrounding it. Most of these people came to Harare in search of employment and other socio-economic opportunities. As a result, it has lots of commuting residents going to work, schools, hospital and even shopping. The city has the young and the aged. Harare is well net-worked by roads intra and inter-city. Harare is the capital hub for economic activities; hence the highest number of commuter omnibuses is in this town. Harare generally has the highest concentration of transport operators.

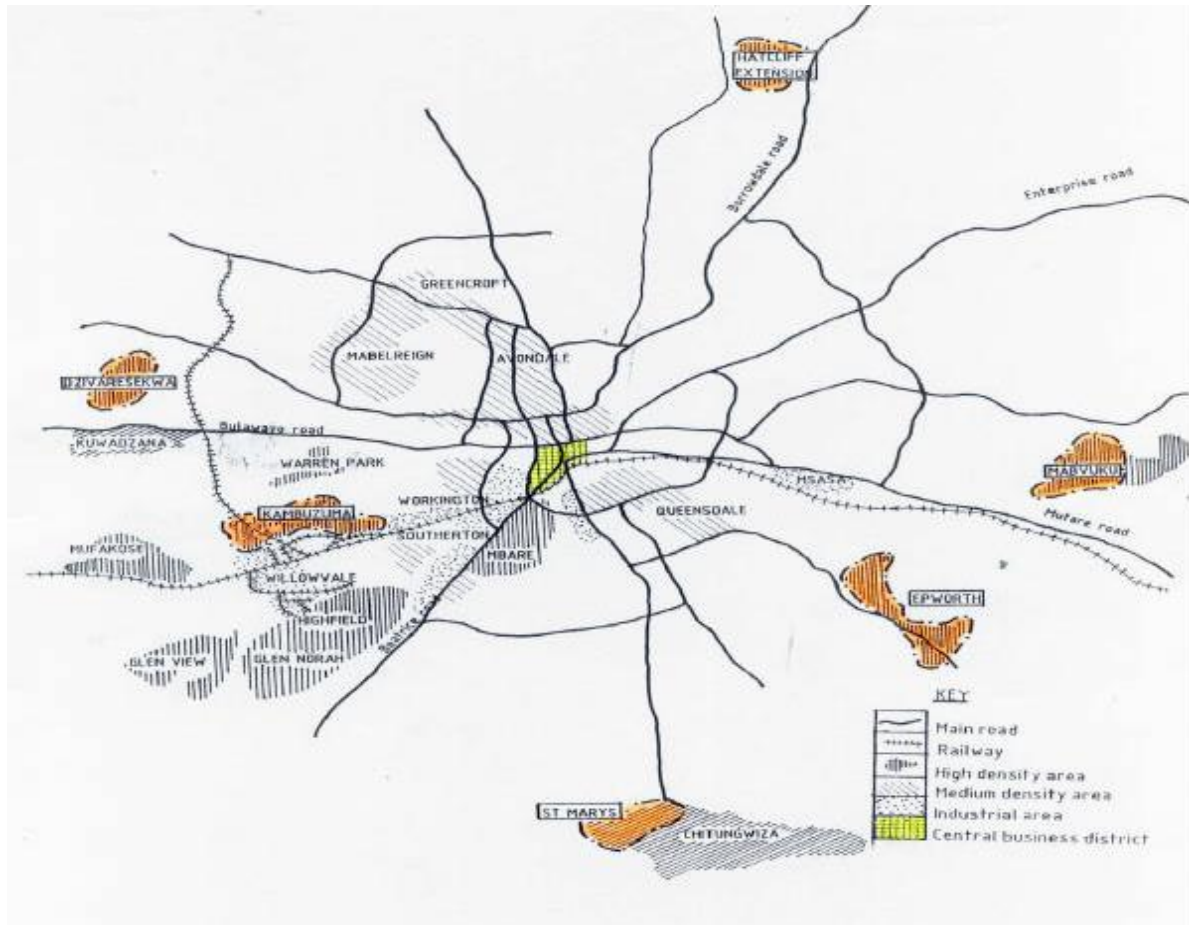
The people there are generally easy to approach and interview hence makes my data collection easy. Most of the residents, young and old, are very proficient in English and Shona hence communication is simplified. Now with all these positives towards Harare , the capital city became the preferred study area.

Therefore, because of its socio-economic importance Harare was chosen as the study area for the data would be sufficient, competent and of substantial matter to be used in this research to deduce information that would be truly representative of urban Zimbabwe.

The study was undertaken in Harare, Zimbabwe. Six sites in Greater Harare were chosen for the study. These are Hatcliffe, Mabvuku, Epworth, St Mary's, Kambuzuma and Dzivarasekwa. All six sites are from high-density Areas. In respect of distance from the CBD, this ranges from 10 kilometres (Kambuzuma) to 25 kilometres (St Mary's). In general the sites are considerable distance from the CBD. These zones were delineated on the basis of homogeneous social and economic characteristics, such as income, housing quality, the general culture of the people, and the level of economic activities generated in the area.

The study focused on population, traffic patterns, and socio-economic characteristics within each of the traffic zones. Vehicle operators in the selected communities in each of these zones were interviewed to obtain data on vehicle operations, such as travel time, fares charged, revenue, and number of trips made in a day, among others.

Figure 2 Location of Study Sites



Data for this study was gathered from 50 transport operators operating within the study area. The selection of the vehicles was done using the various bus terminals in the city along the routes and the main bus terminal at the central business district (CBD) as the link.

Data gathered include the hours worked per day, the number of trips made per day, the travel time from an origin to a destination, the travel speed from an origin to a destination, the number of passengers conveyed per trip, and vehicle capacity. The analysis of the data gathered was done using the E-Views which provided the basis for the development of the supply model.

3.5 The model specification

The research is modelled around the supply model. This model is expected to be used in estimating the supply level of urban transport services in the study area as well as helping to

determine the key variables and their contributions to the supply of urban transport services. The rationale behind the supply model used in the study is generally found in economic theory in which vehicle operators and owners choose, among alternative opportunities, in order to invest in the urban transport service industry. In so doing, service providers aim at maximizing their utility; that is, to provide a service that will offer them with the best return on their investment. The supply function, therefore, reflects the behaviour of service providers or vehicle owners whose interest and preference dictate the functional form of the relationship. Several factors affect the supply of urban public transport services. These factors include the cost of providing the service, profit levels, price of the vehicle used, fares and the number of passengers (demand) to be served by public transport service. These factors provided the basis for the subsequent modelling of the supply function.

On one hand, our supply equation can be considered as a production function of urban transport expressed in the following form:

$$\textit{Supply} = f(\textit{Demand}, \textit{operational costs}, \textit{capital}, \textit{vehicles available}, \textit{fares},) \quad (1)$$

Therefore, supply for urban transport is supposed to rely on the recovery rate of the service by the producer (income over costs), by the fleet of vehicles (capital), and other city characteristics like economic activity or density. On the other hand, the aggregate demand for transport services can be assumed to depend on the attributes of the service affecting the generalized cost of transport (monetary cost, time cost,...), but also on the properties of the alternative modes and city characteristics as well.

In this case demand is affected by the price of the service for the user, the time spent in the journey (walking time, waiting time, and in-vehicle time, and also taking into account the journey time in the alternative mode) and city characteristics. For this reason we will consider not only urban public transport variables, but also variables describing private transport and city characteristics that can capture these time dimensions.

3.5.1 Definition of Dependent Variable

For this study, supply is equated to the number of vehicular trips per year. The reason for using this is that the actual vehicles operating within the study area is what is available for

passengers to use when making trips. The **number of vehicular trips available** refers to the total number of vehicles providing urban public transport services within the study area and serves as **a proxy for supply**. This is because the number of vehicles available to provide urban transport service affects the supply of urban public transport services. Where the total number of vehicles increases, the supply of transport services also increases and vice versa. In Zimbabwe, the inadequate number of vehicles has resulted in long queues at the various bus terminals, especially during the peak periods (morning and evening rush hours).

3.5.2 Defining the Independent Variables

Profitability is usually the ultimate aim of investors that influence the supply of transport services and is usually the return on investments transport owners or operators make after deducting their cost from the revenue. The level of profit operators make is one important decision criterion that is considered before investing in the urban transport service industry. It is anticipated that higher profit margins may manifest in increased investment levels resulting in an increase in number of vehicles and vice versa.

The availability of capital is in short supply and this has influenced the quality of the vehicles purchased. Generally, higher vehicle prices discourage the number of potential investors, who may be willing or have the resources to invest in the industry by purchasing vehicles. From the field visits, vehicle prices ranged from \$5000 to about \$15 000, depending on the age and condition of the vehicle. These vehicles are second hand and are imported into the country by individuals and dealers.

Another predictor variable is the **demand for the service (travellers)**. The level of demand for public transport services refers to the number of passengers that use urban public transport services within a particular traffic zone. The demand for the service is affected by service quality. Speed and 'in vehicle' time in relation to average time spent by private vehicle trip, as a substitute commodity. Motorization, which is a number of private cars per thousand populations, has an effect. More private vehicles tend to lower incentives to use public transport. It is generally expected that the higher the demand for public transport service, the more likely an increase in the supply of transport services.

Urban population density (*POPNDENS*): This variable captures city characteristics and urban form. It is well known and widely recognized that mobility and mode choice is affected by city form (Nijkamp and Rienstra, 1996). In general, dense cities are associated with a high use of public transport (Newman and Kenworthy, 1989). Therefore, the choice between public and private transport systems is influenced by urban form. For this reason dense cities are expected to have large transport systems since supply becomes profitable (or less expensive) by taking advantage of scale and density economies.

Fare /Price: Average price charged to urban transport users. Prices are no longer regulated by public authorities and are now driven by market (demand) forces. Good prices would mean more users of the public transport system and it would also very closely related to suppliers' profitability hence likely to have a positive effect on supply. Prices always affect individual demand decisions, and for this reason we will expect strong impacts on transport aggregate demand and supply.

Average daily trips/Operating Costs (*OCOST*): Average operating cost of one public transport place-km. This variable reflects the operating cost of providing each place-km. For this reason we expect a negative relationship between the operational cost and transport supply. The more expensive the place –km is, the lower the number of place-kms offered by suppliers.

Distance (*DIST*): The majority of the public transport are 15 seater minibuses. These are not so economic on longer distances at the same fare. It becomes uneconomical and unprofitable to ply longer routes. Bigger capacity buses would be appropriate and economical on such longer routes.

We also take into account the other determinants represented by the random **error term (ϵ)**. It is, in effect, a symbol of our inability to model all the movements of the variables.

3.6 Conclusion

We gathered data from the surveys carried within the study area. Many factors such as capital (cost of vehicles), operating costs (the cost of providing urban transport services), the demand level, fares, profits , and the number of vehicles available, were highlighted as key factors on the supply of urban transport services in Harare.

In the next chapter, these identified factors affecting urban transportation supply will be subjected to analysis. We will test and solve any possible problem of multicollinearity, which occurs when two or more predictors in the model are correlated or highly linearly related. The stepwise multiple regression technique will be used in the analysis of the factors affecting the supply of urban transport services in the study area. The criterion for selecting or dropping an independent variable from the final model will be based on significant probability. Independent variables with significant probability of less than or equal to 0.05 will be entered, while those with significance probability greater than 0.05 will be dropped (Garson, 2006). The regression method will be used to estimate the supply model and interpretations from a statistical point of view.

CHAPTER 4: RESEARCH AND DATA ANALYSIS

4.1 Introduction

In this part of the study the data collected in the previous chapter is fitted into the model. In this section we also present the tests that were done on the data and then the results of the estimation and their interpretation. The results are interpreted statistically and in economic terms.

4.2 Interpretation of results

The probability values (PV), which are automatically churned out by most computer packages in regression analysis, have made the interpretation of results faster and a lot easier.

Following this quick test, the conclusion is that some coefficients of the explanatory variables from the regression analysis are statistically significant at 10 percent level of significance. The R-squared is 99 percent which means that about 99 percent of the variation in urban transport supply is explained by the variation of the included explanatory variables. Therefore some of the variables used in the model are significant in explaining the behaviour of urban transport investors in Zimbabwe.

4.3 The Supply Model and Interpretation

This model is expected to be used in estimating the supply level of urban transport services in the study area as well as helping to determine the key variables and their contributions to the supply of urban transport services. The multiple stepwise regression method was used in estimating the supply model. The criterion for selecting or dropping an independent variable from the final model was based on significant probability. Independent variables with significant probability of less than or equal to 0.05 were entered, while those with significance probability greater than 0.05 were dropped. From my analysis, daily takings and travel time were insignificant as they had PV greater than 0.05.

Based on the criterion, four variables, average trips (cost of providing urban transport service), distance to be travelled, fare and travelers (Demand), were selected as being key to the supply of urban transport services. These independent variables were selected because of their significant probability of 0.000, 0.0284, 0.0012 and 0.000, respectively.

Table 4 : Summary of Regression Analysis for Supply of Urban Transport Services

Included observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	77.68500	2.702024	28.75067	0.0000
AV_DAILY_TAKINGS	0.017307	0.027614	0.626742	0.5341
AV_DAILY_TRIPS01	-5.254542	0.164185	-32.00371	0.0000
DISTANCE	-0.039663	0.017486	-2.268264	0.0284
FARE	-3.406541	0.980662	-3.473717	0.0012
TRAVEL_TIME01	-0.007194	0.031219	-0.230440	0.8188
TRAVELLERS	0.004101	7.74E-05	52.96980	0.0000
R-squared	0.988768	Mean dependent var		70.66000
Adjusted R-squared	0.987201	S.D. dependent var		12.31493
S.E. of regression	1.393213	Akaike info criterion		3.630280
Sum squared resid	83.46488	Schwarz criterion		3.897963
Log likelihood	-83.75700	F-statistic		630.9110
Durbin-Watson stat	1.474016	Prob(F-statistic)		0.000000

From Table 4 above, the final output for the supply model obtained from the regression analysis is given as:

$$\text{Supply} = 77.685 - 5.25 \times \text{TRIP} - 0.03966 \times \text{DIST} - 3.4065 \times \text{FAR} + 0.004101 \times \text{TRV} \dots \dots \dots (2)$$

- Where
- TRIP= Daily trips which is also a proxy for operating overheads;
 - DIST= Distance
 - FAR= Fare
 - TRV= Travelers which is also a proxy for demand

From the equation, it can be seen that the cost of providing urban transport services, distances to be travelled, fare and demand for urban transport service determine the level of supply of urban public transport services. This means that, in modelling the supply of urban transport

services in Harare these variables should be considered since they contribute substantially to the overall supply of urban public transport services.

Fares have an impact on demand. The increase in fares would reduce demand as the travelers are still struggling to make ends meet, hence a slight fare increase would result in them opting to walk instead of boarding buses. Hence a reduction in fares may stimulate demand for the services. Therefore, the current fares are too low and rendering it uneconomical for long distances. The fares on their own are not too bad, but because the majority of the buses on the roads are too old and have reached the end of their economic lives, now have high fuel consumption and need regular maintenance, then operators find themselves in a difficult position, at the same time any increases of the fares would risk losing the demand.

Since most of the vehicles being currently used are 18 seaters, as trips and operating overheads increase the supply is negatively affected as this has a major impact on the profitability of this business. Bigger capacity vehicles can be able to operate at these prices and remain profitable through economies of scale. Newer and economically viable buses would be the way to go, but funding for such acquisitions is not available at the moment. Banks are not assisting as most of these SMEs and family businesses are seen as risky. Above all, the banks themselves do not have capacity to extent loans and support these entrepreneurs. Government intervention on the funding side might be a welcome idea in this sector.

As distances increase, at the same fare, the transport supply becomes less. This is mainly exacerbated by the fact that the operators are using smaller buses and they do not enjoy economies of scale which would make it possible for them to still operate on longer routes and remain profitable. These old vehicles with high fuel consumption make it uneconomic to ply longer routes.

As more travelers demand these services, more operators will bring in more vehicles. This also implies that investors consider the availability of market opportunities for their products, for example, transport services before investing in the industry. Therefore, the more these services are demanded the more the transport operators will supply the service.

The results of this research are very consistent with a similar research done in Kumasi, Ghana. Michael Poku-Boansi and Kwasi Kwafu Adarkwa found out that demand for the

services, profit level, cost of vehicles and cost of providing service were the main factors influencing the transport investors. The slight difference is that in Ghana the fares are state influenced hence had no impact on their model. Unlike in Zimbabwe, the fares are open market determined, but given the state of the economy, fares have a major impact as any slight increment would force people to walk.

4.4 Limitation of the research

The research was conducted using a small number of respondents. Due to the limited size of the sample, the research may have an inherent bias. It would be great if a similar research could be done with a bigger sample size in future.

From this research, insightful information was received, but it may be very difficult to generalize the findings given the size of the sample might not be true representative of the country as a whole, for now.

4.5 Issues for future research

In the course of the research, it was noted that private ownership of cars in Harare has increased significantly in the past one and a half years. In future it would be great to try and find out the cause of this. It would be nice to statistically analyse this phenomenon to deduce whether this is a direct response to poor public transport, that the public now feels it is more convenient to own a car than rely on public transport, or the change might be because of an increase in the middle class, hence affordability. But generally the economy is quite poor. This phenomenon needs to be analysed and explained.

4.6 Policy implications

The analysis and development of the supply model brings to light some very important issues, which require attention in the urban transport service industry in Harare. These issues have been discussed as follows:

i. Investment in larger capacity modes

The availability of an insatiable demand for public transport in our urban areas provides a ready market and a business opportunity for both existing as well as potential operators. The

challenge is to provide an adequate capacity to cope with this unprecedented demand. There is need to change the investment approach which has focused on small vehicles as larger vehicles would be needed. Apart from their carrying capacities, larger vehicles have an added advantage in that they are an efficient user of road space. Thus, such vehicles would also go a long way in minimizing congestion in the principal urban areas, particularly Harare.

The Government has seen the need to encourage operators to invest in bigger buses by a deliberate policy to phase out small public transport vehicles. For instance, importers of public transport vehicles with a capacity of more than 22 passengers will be exempted from paying duty.

The introduction of the commuter rail system is an appropriate intervention but the challenge is to provide the requisite infrastructure and facilities to enhance safety and comfort of users. There is need to provide platforms to ease boarding and lighting both inside the trains and at stations in order to improve security.

ii. Creating an enabling environment

It is the responsibility of the Government to determine the framework within which the principal decisions pertaining to transport are made. Therefore, the government has the challenge to create an enabling environment and to provide a clear policy framework for the provision and operation of public transport. Such a policy needs, inter alia, to articulate the objectives of urban transport in relation to investment in the sector, provision of an efficient, reliable and affordable transport system particularly for the poor, minimizing transport resource costs making more effective use of existing facilities and minimizing the impact of transport on the environment.

Hitherto, the country has had no national transport policy. Thus, there is no policy to guide investment in the sector as well as strategies required for the improvement of public transport. Efforts to come up with the National Transport Policy have been taken by the relevant Ministry and it is imperative that these efforts come to fruition soon. The initiative dates back to 1992 and the process has been very slow.

iii. Reducing transport costs

It is the local authorities' responsibility to provide infrastructure and services to residents in urban areas. In doing so, the challenge is to reduce transport costs for both the operator and the individual traveler. The location of physical infrastructure such as houses, industries, commercial centres have implications on transport costs. Therefore there is need to integrate transport and land use. Local authorities have a vital role to play in order to reduce the distance travelled by commuters. Implementation of appropriate land use planning policies that integrate residential and employment places will significantly reduce transport costs and improve livelihood aspirations for the poor. Hitherto, local authorities have paid lip services to this important land-use integration as decisions for new housing areas tend to be principally guided by availability of land and not integration with other land uses.

iv. Influencing Modal Split Patterns

Public transport and walking are the prevalent means of transport used in many cities of the sub-Saharan Africa countries. The same applies to Zimbabwean major cities as shown by Table 3, which illustrate the modal split patterns of selected cities in developing countries.

Table 5 Percentage modal split of selected cities (1999)

City	Public Transport	Private Transport	Walking	Cycling
Harare	40	15	42	3
Dar-es-Salaam	44	6	46	3
Eldoret	24	10	54	12
Morogoro	12	4	67	17
Nairobi	45	7	46	1
Amsterdam	20	30	25	25
Delft	13	34	16	37
Munster	10	37	22	32
Stockholm	35	30	20	10
Zurich	35	30	25	10

Source: - *VeloMondial Conference, Amsterdam, June 2000*

University of Zimbabwe/Transport Research Laboratory

*Rebangira, T. Cycling in African cities, Status and Prospects in Low Cost
Mobility in African cities, Proceedings of the Expert Group Meeting held
in Delft, The Netherlands, 21-23 June 2000*

In Harare, the percentage number of people walking is much more than the figures shown above (2000 survey) as many people are resorting to walking as a coping strategy. Of interest is the low share of cycling in Harare and other cities with the exception of Eldoret (Kenya) and Morogoro (Tanzania), which are both small cities that benefited from the assistance of the World Bank and Sub-Saharan Africa Transport Programme. Interestingly, there are cities in the industrialized world where people have easy access to both public and private motorized transport, which exhibit higher shares of bicycle use. For instance, the bicycle modal shares of the cities of Amsterdam, Delft (The Netherlands), Munster (Germany) and Stockholm (Sweden) were 25%, 37%, 32% and 10% respectively.

The important role of non-motorized transport in meeting the travel and transport needs of the urban poor is increasingly becoming acceptable but has not been recognized in most African cities. Cycling as a non-motorized means of transport does not require massive urban infrastructure as required by motorized modes. It is generally regarded as a *benign* mode, which is friendly to the environment and remains an option to be seriously considered in our urban areas in Zimbabwe. The challenge is therefore to create an enabling environment and encourage the use of bicycles.

One problem that is constraining the use of bicycles in Zimbabwe urban areas is the environment that is unfriendly to the user. A friendly environment for the bicycle user is one, which provides facilities such as cycle lanes and properly secured parking for bicycles. The lack of these facilities has created a general perception among users that cycling is risky, and prone to accidents than motorized transport. Secondly, it is generally felt that the prices of bicycles are too high and outside the reach of the intended beneficiaries. This is an area where bicycle ownership costs can be reduced by the removal of duties. In short, the following are the specific challenges that need to be addressed:

- ❖ Creating awareness on the benefits of using non-motorized transport. This is a grey area as there is no local authority in the country that consciously addresses non motorized issues in the planning process.

- ❖ Consideration for the complete removal of duties on bicycles. The cost can be significantly reduced if duties are scrapped.
- ❖ Provision of appropriate infrastructure to enable bicycle users to cycle in a safe environment.

Most of our cities in Zimbabwe are located on flat terrain, which is conducive for cycling

v. Knowledge of the industry

In Zimbabwe, there is an enormous challenge to know what is happening in the urban public transport industry. This is an area, which requires accurate data as any strategies and decisions to address and cope with the situation has to be based on factual information. For instance, basic information on the levels of public transport demand, size of fleet operating in each urban area, passengers carried on each day, percentage of disposable income spent on public transport is not known. There is therefore need to continuously conduct research whose results would assist policy makers and transport managers to make informed decisions.

4.7 Conclusion

Urban mass transportation is one of the key priority areas for urban planners because transportation is a very important input for the distribution of goods and services in urban areas. Transportation facilitates the developments of every society and is crucial to sustainable development, especially if investments in the sector are well targeted and planned. Findings of this paper have highlighted the factors influencing the supply of urban transport services. Four main factors have been identified as influencing the supply level in the study area. These variables include the distance to be travelled, the cost of providing urban transport services (trips), the demand level, and the fares. These findings have provided some useful policy direction such as, encouraging the use of large capacity buses in urban transport service industry, creating an enabling environment, reducing transport costs through integrated land use, influencing the modal split and knowledge of the industry through making more data available.

Public transport in Zimbabwe is characterized by inefficiency and unreliability. Partly, this is a result of the macro –economic fundamentals, which have increased operational costs. The unpalatable macro- economic environment needs to improve in order to attract investment in the transport sector.

There is need to develop a sustainable urban public transport system in Zimbabwe. A policy framework is required and transparent and symbiotic partnerships between central, local governments, private sector and civic societies have to exist. These stakeholders have to share a common goal of developing a sustainable urban public transport system.

The current challenges include, inter alia, the need to reduce costs, encouraging and development of cheaper modes, integration of land use, positively influencing modal choice in favour of cheaper and benign modes, investing in bigger modes as well as supporting research and development. The bottom line is that these options have to be funded. While a transport user is looking for a cheaper service, replacement and expansion of public transport vehicles would require financial resources. There is need for the user to accept the '*user pays principle*' and at the same time the user need to get value for money. In the meantime, the user has devised coping strategies which include, inter alia, walking and relocating to residential areas which would either eliminate or minimize transport costs

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