



The KENYA INSTITUTE for PUBLIC
POLICY RESEARCH and ANALYSIS

Policy Brief

Improving public policy making for economic growth and poverty reduction

Organising Urban Road Public Transport in Nairobi City

In Kenya, and particularly in Nairobi, the urban public transport system is plagued with problems such as a huge unmet demand during peak hours, high fares, high road traffic accident rates, captive travelling and vehicular pollution, all operating against a hazy urban transport policy backdrop. Despite the pervasive images of an 'urban transport crisis', opportunities, replete with challenges, exist for innovative and strategic choices to sort out the current problem. A performing urban transport system is an important factor in improving the business climate for the private sector, as well as poverty eradication efforts.

The prevailing transport system in Nairobi has been largely shaped by population pressure and urban structure. The current profile of urbanization has in turn been shaped by influences of geographical, historical and contemporary forces. There has not been proper urban planning. Many of the current transport problems in Nairobi can be attributed to the high population growth rate, low vehicle capacities, high energy costs, poor utilization of infrastructural facilities, location of high density residential areas, lack of road and vehicle infrastructure development and maintenance, poor road safety, and lack of organised public transport, among others. Presently, the city of Nairobi is operating without a development plan, as the 1973's City Growth Strategy expired in the year 2000.

Experiences in the Transport Sector

After independence, growth of public transport services was mainly as a result of demand by middle and low-income population. The emergence of the informal public transport service, the *matatu*, was as a result of the demand unmet by the formal public transport, either due to lack of capacity to handle the trips or due to high cost of travel. This resulted in predominance of *matatus* as public transport providers. The implication is that if there is no strategic and deliberate reform targeting public transport system in general and *matatu* transport in particular, the services to the

bigger proportion of the city population will continue to deteriorate.

Research has established that the organization of the public transport system has been adversely affected by lack of proper coordination between the various stakeholders. For example, *matatus* provide a high percentage of the public transport but their overall coordination is poor. The Matatu Welfare Association, and the Matatu Owners Association, coordinate interests of their respective stakeholders. The recent reforms in *matatu* transport were introduced by the Ministry of Transport but the Police (Traffic Department) plays a crucial role in the enforcement. The Transport Licensing Board (TLB), which registers public transport vehicles is housed at the Kenya Revenue Authority (KRA). There are far too many bodies regulating the transport industry, and this has caused confusion and duplication of roles. Lack of

This policy brief is based on KIPPRA Special Report No. 5 of 2005 on Urban Public Transport Patterns in Kenya: A Case Study of Nairobi City. The study focused on how the development pattern in Nairobi and its environs has affected the growth and intensity of traffic and other transport parameters.

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Urban land use patterns

Although the city displays a strong monocentric form due to concentration of employment in the Central Business District (CBD), other urban forms can also be discerned, such as polycentric, sector and linear. However, the trend of both land use and transport planning within the Nairobi City Council has not been conscious about this view. Land use changes have continued to move ahead of transport planning and implementation, besides lack of linkage between planning and transportation. This is evident from a spot analysis of land use change within the Council from 2000-2003, using instruments like subdivisions, change of use, building plans and amalgamations, which have increased densities without considering the macro impacts on the circulation system. The two-way land use transport interaction in relation to urban form implies that long-term urban transport problems can only be tackled through close working relationship between land use planning and transportation planning.

Modal split and capacity

About 49% of residents use non-motorised means of transport as their main means of mobility. This includes walking and cycling. Private transport, mainly the private car, is used by only 9% of the residents while 42% percent of residents mainly use public transport. The poor and the marginalized in society are not well catered for in urban transport. An organised transport system must include effective public transport. In terms of capacity, it has been found that only 4 out of the 49 arms making up the transport corridors in Nairobi can effectively handle the existing traffic volumes. In other words, 91.8% of the arms are operating above their design capacities and

therefore over-stretching their capacity. This has undermined the quality of service provided.

Nairobi is not doing well in some ridership areas compared to some other African cities such as Abidjan, South African and North African cities. For example, in Abidjan, there is a mass transit system but not everybody uses it to transit to employment, commercial, education or other centres of activity. Walking is one of the major modes of commuting in Abidjan, representing 24% of the trips made. This is far better than Nairobi where 49% are walking. 11% use private cars compared to 9% in Nairobi. African cities show a similar trend in modal split.

Supply of transport services

Nairobi has approximately 1,214.5 kilometres of roads, which constitute 5.3% of Nairobi's land area, of which 972 kilometres are paved roads and 178 kilometres are earth and gravel roads. The classified road network is 265 kilometres, whose construction and maintenance falls under the Ministry of Roads and Public Works. The poor drainage conditions and absence of drainage on some roads contributes to the quick deterioration of the road network during the wet seasons. This renders the roads impassable and interferes with pedestrian and motorized transport movement due to water logging. The poor conditions of the roads impact on the efficiency of traffic flow, leading to cost increases due to frequent breakages and reduced speeds.

Parking

Provision of parking within the city is done by Nairobi City Council, Central Government, and private organizations or enterprises and parastatals. The types of parking spaces available are: private residential parking, private non-residential parking, on street parking and public residential parking and off street parking. Kenya Railways and the Council supply public transport termini. The number of business employment opportunities in the Central Business District ought to determine the parking spaces and development conditions. Revenues collected from private parking accrues to the providers while a percentage of it is paid to the Council through licensing of parking, whereas the public off-

street and on-street parking has differential charges of Ksh 1,300 per month and Ksh 70 per day, respectively. Loading and off-loading on service lanes are paid for at Ksh 60,000 per annum. Parking space is inadequate and parking fee is too little, and this does not discourage movements to the Central Business District, thus resulting into congestion.

Termini and bus stops

There are two types of termini within the Nairobi City Council area: internal and external, both for road and railway systems. The major external terminus for road public transport along Landhies Road is located away from the main railway terminus, which now has both internal and external public transport termini for matatus. In addition, other external termini are found scattered along some bus stop areas and on the right of way due to the inadequacy of the available planned termini and due to the fast growing upcountry public transport demand. Kenya Bus Services has extended the use of its termini from internal to external while the lower part of the termini serves both internal and external public transport. Therefore, the existing traffic movement within the City is that of conflict among pedestrians, cyclists, handcarts, vehicular movement and trading activities along the roads. The organization of termini facilities in Nairobi is inappropriate and has led to loss of economic opportunities that would have resulted from agglomeration economies through complementary location of the railway and road termini facilities.

Financing of road infrastructure

At present, the urban transport system is both financially and environmentally unsustainable. It is financially unsustainable because it perpetuates land uses that lead to demand for long distance travels, and is poorly funded. In addition, it is environmentally unsustainable because it encourages dependence on use of private vehicles. It is also socially unsustainable because it perpetuates exclusion by limiting transport choices for the vulnerable groups in society.

Consequences of this Disorganization

Accessibility

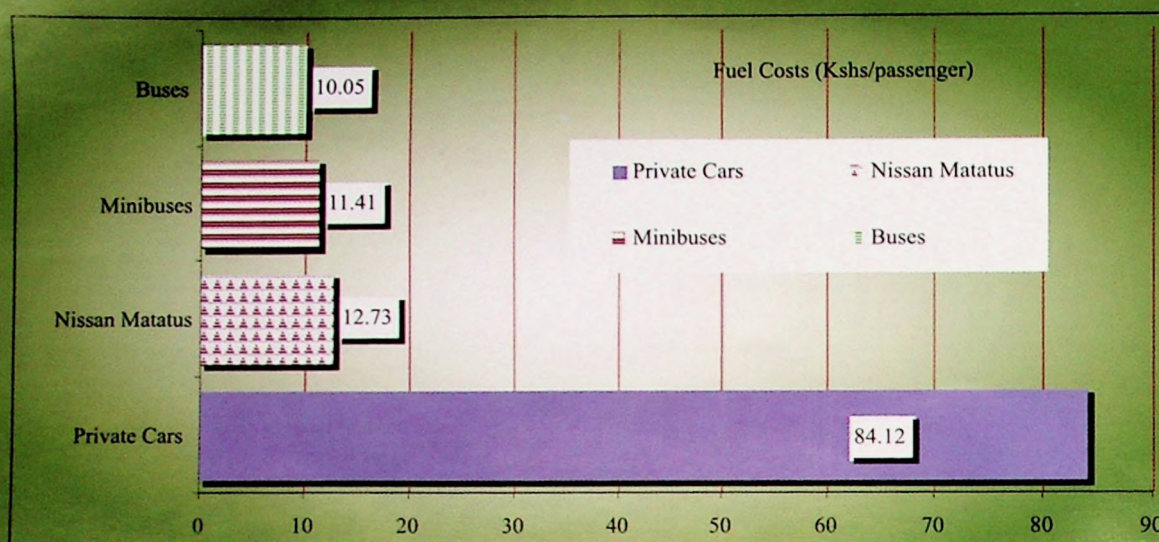
In Nairobi, 73.3% of households have access to public transport stages within 15 minutes of from their residences. More than 63.1% of the population in Nairobi spends more than 10% of their household expenditure on transportation. Further, in the higher income areas such as Langata, Karen, Kilimani and Highridge, the absolute amount spent on transportation is much higher than the average expenditure. However, a significant majority spend less than 15% of their total household expenditure on transport. On the other hand, the lower income areas such as Viwandani/Mukuru and Dandora/Kariobangi South exhibit a lower mean monthly expenditure on transport, the overall mean being Ksh 4,781. However, in these areas, over 65% of households spend more than 10% of their overall household expenditure on transport. This clearly portrays an expensive urban transport system for the majority of households in Nairobi.

Transport safety and security

The main causes of accidents in Nairobi are drivers and riders of motor cycles, pedestrians, and passengers. The order in which they rank varies annually from year to year.

Accidents occur during the day, but a significantly equal number of accidents occur at night. Although the number of vehicles is lower at night, the relative incidence of accidents is higher than during the day. This is probably due to drunkenness of drivers and pedestrians, poor lighting, lack of installation of safety signs on our roads and speeding. Therefore, road safety interventions aimed at

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reducing the number of accidents at night would be useful. The number of reported cases of injuries, fatalities, seriously injured and even the number of crashes reported has gone down.

The rate of insecurity in our urban public transport is very high. Kenya Bus Service (BusTrack) is perceived as the safest mode followed by the Metro shuttle/Citi Hoppa and Double M. The disorganized transport system has brought about cartels, which informally controlling the *matatu* industry, and are seen as harbouring criminal leading to insecurity in the city.

Urban travel times

Effective transport planning focuses on ensuring rapid mobility of persons between their various activity points. Therefore, a good transport system is one which achieves rapid movement of persons, not vehicles. On average, residents of Nairobi spend 78 minutes travelling, and wait for 12.4 minutes, adding up to approximately 90 minutes spent travelling each day. This works out to approximately 90.4 minutes spent by each person aged 12 and above travelling to and from their activity points. The transport system is thus inefficient in terms of time saving.

Energy efficiency

The energy efficiency of the urban transport system is assessed on the basis of the amount of fuel consumed by the motor vehicles in the city to move passengers. This is especially

important when we consider ridership data, which shows that 64.1% of the vehicles on the road (private cars) carry only 23% of the passengers.

Data clearly shows that it is almost eight times more expensive to move a passenger using a private car as opposed to using a bus (see chart). Ridership data shows that although the private car constitutes a larger percentage of the total vehicle population, it moves only a small proportion of the commuter volume. Given the actual cost of accidents and the savings that would accrue from a shift towards higher occupancy vehicles, it is clear that the operation of the urban transport system imposes significant costs to households and businesses operating in Nairobi.

Observational evidence also shows that the bus fleet operating within the city is more than 20 years old and is therefore an inefficient one in terms of fuel utilisation.

Economic costs of poor operation of traffic intersections

A review of 16 key intersections, namely: Langata, Bunyala, Haile Selassie, GPO, University Way, Museum Hill, Westlands, Globe, Racecourse, City Stadium, Donholm, Kariobangi, Dagoretti Corner, Karen, Bomas, and Roysambu based on the traffic counts shows that their inefficient operation costs the economy significantly. It is estimated that the costs of the inefficient operation of the intersections amounted to approximately 4.91% and 19.93% of the annual recurrent and

development expenditures, respectively, and 1.79% of Kenya's GDP.

Impact of Urban Public Transport

Poor urban transport reduces the profitability of firms through imposition of high transport costs and lost worker productive time. It further reduces incomes of both firms and households through high expenditure on transport by workers and firms. The resultant environmental pollution from poorly performing automobiles and congestion increases household health expenditure. It reduces disposable income and therefore the capacity of the market to use business products and services. Basically, therefore, a poorly functioning urban transportation system increases transaction costs and reduces the market size and capacity for businesses to expand. The results of the Urban Public Transport Survey 2004 show that the share of organized public transport in the modal split has been declining rapidly from 36% in 1994 to 17% in 2000 to 3.5% in 2004. The share of non-motorized transport is approximately 49%. It also shows that public transport in Nairobi moves 78% of the passengers, but they account for only 36% of the total traffic volume in the city and therefore it is highly inefficient.

"Atomized" ownership structure

In Nairobi, private provision of transport service is characterized by an extremely atomized ownership structure. This means that there are many small owners of public transport vehicles as opposed to few owners of organised public transport. This ownership structure is an obstacle to exploiting potential economies of density in a network. It breeds diseconomies of size, generates negative practices such as owners giving operating crew very demanding minimum targets, leads to speeding and use of unqualified drivers, and tempts the crew to work for long working hours and pick/ drop passengers at undesignated stops.

Principle-agent problem

In the current competitive urban transport service industry within the city, the number of passengers using a particular public service vehicle will be partly a function of the effort the driver makes to seek potential passengers on the road, stop to pick them (informal bus stop) and in general try to beat other buses for clients.

The natural private solution for this moral hazard is for the owner to design a contract for the driver, which aligns the latter's incentives to his objectives.

The new regulations have reinforced the solution by public transport operators of paying their operating crew on a fixed or percentage basis and providing them with targets. The ensuing competition generates externalities that preclude development of a rational and integrated transport system. While the system operating may be rational from the operators perspective, from a social angle there is need to break the linkage of operating crew payment from the daily collections by the crew. The future for regulation in this area is to break the linkage between pay for the operating crew and the profits paid.

Optimization of network configuration

When the current reforms were reintroduced to limit overloading, limit speeds, removal of route cartels and route-specific operations, the first immediate effect was to reduce transport supply in relation to demand and a rise in the fare. This created an incentive for the rational economic man to enter the urban transport service industry due to surplus revenues being earned. No effort was made to optimize the network configuration or to introduce some sort of tariff integration for public transport operators. At the moment, too many routes overlap, with little coverage of the routes that go beyond the city center. This implies lack of integration, except for the Kenya Bus Company. These features generate aggregate economic inefficiencies, and excessive number of low occupancy vehicles in the system compared to an optimized network. Secondly, few operators earn revenues from ticket collection. When this is subjected to the "atomised ownership structure" in the public transport industry, it generates strong incentives for head to head competition in the public transport industry. Besides the difficulty this creates for an orderly bus stop design, vehicles stop anywhere, generating more frequent stop and goes,

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The government should consider introducing the Bus Rapid Transport (BRT) and have dedicated bus lanes for such modes of transport as this would reduce traffic jams and introduce comfort in public transport as is being done in Dar es Salaam, Tanzania.

increasing travel times and therefore further undermining the economic efficiency of the transport system as whole. This threatens to reduce the gains made in road safety and may take us back to the savage cycle of public transport.

Market failure in the urban transport industry

Market failure in urban transport is not only related to the results of environmental and congestion externalities but the network characteristics of the transport service industry, the peculiarities of demand journeys, and the specific organizational structure chosen for the delivery of the service. Major governance issues can also result in many other forms of market failures. Failures related to economic and network characteristics of the industry may justify a regulatory intervention even in the absence of more traditional congestion and environmental problems. Some of the economic problems in the current set up of the urban transport service are viewed at three levels: the aggregate network level, the individual matatus or bus, and problems related to the relationship between owners and drivers.

Inefficient entry and tariff regulation

At the level of individual routes in the city, there are some other reasons why the current free market in urban transport may not provide efficient quantity and quality of service. Lack of regulation may result in under-provision of the socially efficient level of service in the sector. Increasing service frequency has been going on within the urban transport industry after the introduction of the new regulations on various routes. However, there is an added social benefit in increasing service frequency. The private equilibrium, where the number of public transport service vehicles is determined by extra private cost and the extra revenue obtained by the marginal bus, will be socially inefficient.

In Nairobi, private costs vary due to different vehicle sizes. In a free market, private equilibrium will not supply the correct quantity of services and cannot appropriate the extra surplus by charging higher tariffs created by increased frequencies. This is explained by the fact that most of the benefits of waiting time also accrue to other passengers that do not have definite clients due to competition for the market. The final outcome is excessive entry on routes, reducing all individual's demand, and leading to operating on a high point on their average cost curve. Therefore, the urban transport system in Nairobi exhibits excessive waiting times, since there is no incentive for the provider to increase frequencies to reduce waiting times, given the atomized ownership structure.

Policy Recommendations

To be able to improve access to transport by all, especially the poor, as well as promote choice, and flexibility within the transport system, we recommend that the Government implement the following:

- (i) Undertake long term planning for Nairobi and its metro region to take into account the growth rate in population and changing needs: by full implementing the Integrated Public Transport Policy Recommendations submitted to the Minister for Transport in 2004. The public road passenger transport system in Kenya should be based on regulated competition and strict law enforcement. Services should be fully competitive with the granting of service provision and operation being based solely on compliance with safety and traffic regulations. Infrastructure needed to support efficient public transport operations should be developed to reduce the amount of time spent on the road by commuters. Therefore, a Nairobi Metropolitan Growth Strategy incorporating urban public transport is essential. It needs to be supported by an institution at the metropolitan level to manage urban transport requirements.
- (ii) Develop a mass rapid transit system by consolidating the existing system into

three to four companies focusing on high capacity buses. For example, the government should consider introducing the Bus Rapid Transport (BRT) and have dedicated bus lanes for such modes of transport as this would reduce traffic jams and introduce comfort in public transport as is being done in Dar es Salaam, Tanzania. This can be facilitated through tax incentives/concessions for such investors and encouragement of Public Private Partnerships (PPP) in the provision of urban transport.

- (iii) Focus on infrastructure development and management to include development of missing links within the road-based network and integrating rail-based system into the urban transport network. In addition, it would focus on development of dedicated routes for public transport. The aim should be to optimise the network to reduce congestion, pollution and other externalities.
- (iv) The City Council, and Government should improve traffic management. This entails judicious development of parking spaces, revision of parking fees to discourage congestion, improvement of the traffic

signalling system, and integration of land use planning decisions as key components. They should, for example, encourage multi storey parking bays to ease congestion at the Central Business District. Proposals to beautify the Nairobi River from Museum Hill roundabout to Ngara and construct parking bays while at the same time protecting the environment could ease congestion. In addition, the government should encourage or even make it mandatory for construction of new storey buildings to have underground parking.

- (v) Develop non-motorised transport as a means of transport within Nairobi. Non-motorised transport should not be seen only as a means of travel for the low-income population. This is the lesson learnt from Latin American and European countries that have successfully integrated non-motorised transport into their urban transport systems. This should be achieved by designation of a city-wide integrated system of secure bicycle lanes, parking bays and pathways on suitable routes for this mode of transport.

About KIPPRA Policy Briefs

KIPPRA Policy Briefs are aimed at a wide dissemination of the Institute's policy research findings. The findings are expected to stimulate discussion and also build capacity in the public policy making process in Kenya.

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