PUBLIC TRANSPORT PROBLEMS IN NAIROBI: A STUDY OF THE MANAGEMENT AND OPERATIONS OF KENYA BUS SERVICES (K.B.S.) LIMITED.

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A THESIS

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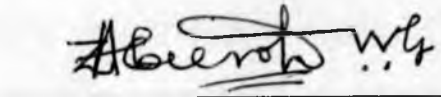
DECLARATION

This thesis is my original work and has not been presented for a degree in any other University



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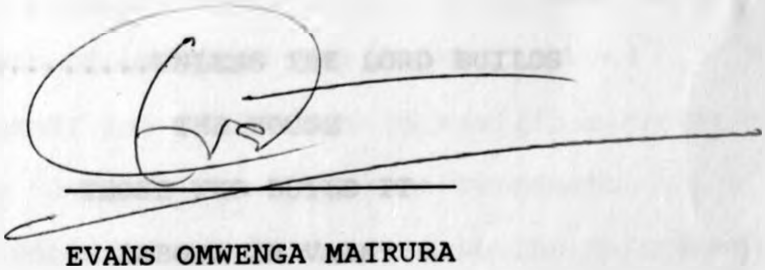

EVANS OMWENGA MAIRURA

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DEDICATION

TO

THE MASTER PLANNER

".....UNLESS THE LORD BUILDS

THE HOUSE

THOSE WHO BUILD IT

LABOUR IN VAIN"

(The Holy Bible, R.S.V, Psalms 127:1)

ABSTRACT

Public transportation is an essential service and is a very necessary input in the development process of a nation. For a third world capital city like Nairobi, public transport in the role it plays because majority of the population do not own private automobiles. Unfortunately, Public transportation is facing various problems resulting in the inefficiency of the system and deterioration of the services.

The main causes of urban public transport problems in Nairobi include: inadequacy and lack of proper maintenance of the transport infrastructural facilities; concentration of a lot of economic activities, employment, and other activities within the central area and Industrial area of the city resulting in volumes of people and goods movements that become difficult to accomodate efficiently; inadequate supply of public transport services to meet the high ad increasing demand; low efficiency in traffic management and operations of the modes of public transport.

The main focus of this thesis is on the management and operations of K.B.S. However, it first presents a background by giving an overview of the public

transport system in Nairobi in an attempt to examine the public transport user problems. The study then climaxes by examining the problems of management and operations of K.B.S. In doing so, the study considers a number of aspects of the Company's Management and operations of public transport. These aspects are discussed before summarising the problems revealed by the study.

In order to appreciate the discussions and analyses in this study, a number of aspects and characteristics of the study area have also been covered. Coverage of the study area (in the thesis) forms a fitting background for the study.

In an attempt to offer solutions to the public transport problems of management and operations of K.B.S. in particular, a number of policy recommendations are spelt out. The recommendations are based on the findings and conclusions from the study and their policy implications.

In conclusion, the study stresses that to solve public transport problems of the city, cooperation and coordinated effort is required, not only among those in the Government and those who manage and operate public transport services, but also from the public. In fact, even the implementation of the proposed policy recommendations needs a lot of cooperation and

involvement of every body (in the community) in one way or another, although the weights of roles they play may vary. This is, therefore, a road to an effective and efficient public transport system for the city of Nairobi.

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Abiero - Gariy, Z.C

TABLE OF CONTENTS

LIST OF MAPS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

CHAPTER 1

1.0 INTRODUCTION

Nairobi is the capital city of Kenya. It is the most complex urban set up in the country, and this is an indicator for complexity and importance of its transport system, particularly the public transport system. The beginning of its growth and development as an important urban settlement can be traced back to the time of the construction of the first (Mombasa - Kisumu) railway line during the colonial days.

The railway construction started in Mombasa in the year 1886 and reached Nairobi in 1899, in the event of which the latter was made the headquarters for the Railways Company due to its suitability for a depot situated roughly halfway between Mombasa and the final destination at Port Florence (Kisumu). By the year 1906, the original railways depot and camp had mushroomed to a town of 11,000 people living and working in five district areas within 1.5 Mile radius of Government Offices.[1]

The population of Nairobi has continued to expand at a high rate. The population of the city according to the 1948 census was 109,000[2] while the population according to the last (1979) census was 842,608[3]. The Nairobi City Commission, City Planning Department, gives the population projection to the year 1990 and 2000 (in the document "Development Plan 1984-88") as

1,394,900 and 2,272,100 respectively.[4]

The City of Nairobi has also continued to grow spatially with large areal expansion. The 1927 city boundary which was enclosing about 30 square miles was extended in 1963 to cover an area of approximately 266 square miles.[5] Areal expansion of an urban centre has a lot of implication on its transportation system.

The fact that Nairobi is the capital city is probably the cause for high "expectation" for the provision of job opportunities for various classes of people of various fields of skills and professions (including the unskilled labour force.) This "expectation" is among the top factors which cause the attraction of a lot of people to the city. The expected decent urban life, attractive services offered, and even the prestige of being associated with the urban manner of life style are also factors to consider as contributing to population expansion of the city.

The current exceptional rates of urban growth are unlikely to diminish in the near future and may well accelerate.[6] The city has become the most important centre of employment and services; and it is important to note that the distribution of land uses is such that the employment centres are mainly concentrated at the central part of the city. Both business and service centres are located at the central area of the city where major administrative centres are located. The

residential areas are outwards (off the central area) around the city.

Nairobi for both employment and services not only serve people within its boundary but also beyond, particularly those bordering districts like Kiambu, Kajiado and Machakos. There is, therefore, high demand for services, including transportation services. With scarce resources it may not be easy to adequately provide these services, hence the likelihood of problems arising whose solutions can only be obtained through deliberate efforts.

1.1 STATEMENT OF THE PROBLEM

Transportation is one of the very essential and important services needed by any community. It enables man to carry out his activities at different sites (or locations) and to supply his needs from widely scattered resources; and, in turn he is able to develop his own skills and market his products. Transport, therefore plays a crucial role in the economic life of the community and is essential if what is now regarded as an acceptable standard of living is to be maintained. For a city of the status of Nairobi, it is imperative, therefore, that the issues related to transport be adequately addressed.

From the introduction (in section 1.0), it is clear that there is a high pressure on the transport system of the city, and hence the emergence of transport problems. As the city continues to grow and

workers live further away from their places of work, a more proportional expansion of public transport facilities is required - bearing in mind that most of the residents do not own cars. These facilities also need proper management and maintenance if our limited resources are to be utilized with the aim of meeting our needs.

Due to the city's increasing demand for public Transport, there has been considerable yearly increase in the number of various public road transport operators, and even an inter-city railway travel (commuter train) has been introduced by the Government in some areas. There has also been a considerable increase in car ownership and in the number of Private/Company vehicles.

However, despite the high rate of increase of road transport operators (private and public), the peak or 'rush' hours or periods have proved that the available public means of transportation is not yet adequate. At the same time, the operators being commercial undertakers would like to maximize profits to the best of their ability. This has resulted in competition among the operators. Competition among the operators would be beneficial to the commuters (passengers) if they had a choice (which is only available when the public transport means is adequate). However, due to inadequacy of the available public transport means, the competition has apparently resulted in search for more

money without regard to the welfare of the commuters (passengers) and the public in general. This issue hinges strongly on the management of the public transport agencies, how they exercise control and plan their public transport operations.

It is a common scene (particularly during peak hours) to see people rushing and even stepping on others so that they get into a bus or matatu. The weaker are trampled upon and left helpless. Some people travel from outside of buses as they move, a practice that has resulted in serious accidents in some cases.

The major problems faced by Nairobi's public transport include those of congestion, accidents, poor roads, inadequate terminal facilities and abuse of traffic rules/or regulations. Congestion, which is mainly witnessed in the form of frequent traffic jams, are not merely inconveniences, but are expensive events which threaten the very substance and fibre of tenable and rewarding urban life.[7] It wastes the time of those entangled, it causes physical and mental wear and tear, and reduces activity at work place. It also makes the delivery of goods and services much slower and more difficult, increasing labour costs and adding to physical wear of vehicles.[8] Congestion forces some people to make some trips on foot (particularly relatively short trips).

The abuse of traffic rules and the use of

unroadworthy vehicles has caused alot of concern not only to the Government but also to the public. Overloading is so common that passengers are sometimes 'packed' like luggage. Overspeeding in built up areas, coupled with careless and irresponsible acts by operators have resulted in serious motor accidents.

Essentially any urban transportation problem results in lack of mobility, or mobility purchased at a very high social or economic cost. In Nairobi, the current situation is alarming and needs immediate attention. This view is supported by the studies that have been carried out on transportation in Nairobi like: Metropolitan Growth Strategy (1973); Nairobi Bus-lanes and Bus-ways feasibility study (1977); Nairobi Urban Transport Project (1979) the Matatu mode of Public Transport in Metropolitan Nairobi (1982) and the Urban Transport Needs of Nairobi (1986).

However, it must be pointed out that problems of public transport in Nairobi are complex and this calls for a more imaginative and innovative response. K.B.S Ltd., Matatus and other modes of public transport have played a role in alleviating the public transport demands, but so far there is a general lack of information and knowledge about their dynamics and problems. Little is known about their managerial and operational problems which are likely to translate into passenger problems and into problems for other road users which are open and visible to the general public.

For example, how could someone explain the cause for overspeeding and overloading? One explanation could possibly be that since during off-peak hours some vehicles operate at less than their capacity, their management systems accept overloading and overspeeding so that they avoid losses by spreading the systems overheads over more trips and greater number of passengers; thus, what is lost during off-peak hours is gained at peak hours. One other possible explanation is that since there is not much choice for commuters they accept to take even those vehicles that are already full; and the management may allow this to happen in fear that if they keep turning away commuters they may lose customers.

Consider conflicts among operators (K.B.S, Nyayo buses, Matatus etc.) The management system is geared towards making profits. If this goal is not pursued with due consideration of the welfare and interest of the commuters as has been the case in Nairobi in most cases, the passengers (commuters) and indeed the general public and other road users are the victims of numerous nasty circumstances.

The issue of staff training and rewarding is very important and plays an important role in determining the efficiency, overall effectiveness and demand of public transport. Thus, any management that may find problems with training and rewarding staff will in

essence not provide good services. Criteria for rewarding staff, however, is a very crucial issue. Some criteria may ultimately yield transport problems rather than solving them.

Some problems and difficulties in management and operations of public transport may not be the making of those is the management, but others are due to their own faults. Whichever way, these problems impair the efficiency of public transport.

It should be noted that due to public transport obligations (or objectives it has to satisfy), and the fact that ultimate control rests with a local political governing authority, it means that conventional profit objectives cannot be employed. When management states its objectives in terms of volume and penetration of different categories of passenger segments, it must do so within specified financial parameters.[9] Any problems resulting from the failure of the management to do this should be shouldered by the management.

K.B.S Ltd., being the largest single public transport company providing services in Nairobi (with market share of about 55%), is facing the said management and operational problems. The understanding of these problems and dynamics of the company will obviously go along way in improving public transportation in Nairobi.

It should be stated at this point that any policy recommendations which do not adequately take into

account and address management and operational problems of public transport, may well not give any solution to the general public transport problems. It is with this conviction that this thesis research paper studies the management and operational problems of K.B.S Ltd. Indiscipline among K.B.S conductors and drivers shown by their rude attitudes towards the public; the irregularity of services which are meant to be "scheduled regular services" ; the high rate of breakdown of buses, and the long time buses take to be towed away from sites of breakdown are just but a few problems facing K.B.S and impairing the quality of its services.

The city's transport system is indeed in need of policy recommendations that will give a solution to public transport problems. The recommendations presented in this report will go a long way in meeting this need.

1.2 JUSTIFICATION FOR THE RESEARCH

Planning is future oriented; that is, it is oriented towards finding a solution to a felt problem and /or a problem anticipated in future so that man may have a more comfortable and better life in future. With the trend of increase in population and the areal expansion of the city, the accompanying public transport problems are expected to rise considerably. Thus, unless something is done now, the problems will be unbearable and more costly to rectify in future.

This will not only cause harm to the city dwellers and the economy, but it will also mar the name of the city.

Consider the loss incurred when an employee is late for work for only one hour per day for a whole month (due to traffic jam)! What about the loss incurred by the country or a family when a life is lost in an accident? These are only but a few of the losses caused by the public transport problems, not to mention the difficult times faced by the police force in trying to ensure that inconveniences are not caused to the public, and that law and order is maintained.

Considering what is stated in section 1.1, the losses caused by transport problems and the repercussions which follow, the author is convinced that this study report is not only important but also essential.

It is true that there is a need to overhaul the system of public transport in Nairobi so as to cope with ever increasing demands; but this could only be done with a clear understanding of the wide range of problems faced by the system . This clearly includes the problems faced in management and operations of the modes of transport. This study report is important because of the absence of previous up to date studies on this topic.

The decision to consider only the K.B.S Ltd., in this study (and not other modes) was due to limitation in time and finances. Also, for a fairly proper

understanding and treatment of the subject, the scope should not be too wide. K.B.S was therefore chosen because, in addition to being the longest serving commuter transport service, it has other advantages. K.B.S has a formal management and operates the largest fleet of buses. The company also commands the greatest percentage share of the public transport market in Nairobi (of about 55%). These characteristics ensure that the recommendations and proposals given in the light of this study are applicable to other modes as well. However, it should be noted that an overview of the other modes of public transport in Nairobi has been covered.

1.3 OBJECTIVES OF THE STUDY

The objectives of the thesis research study were:

1. to examine the problems faced by the K.B.S Ltd in the management and operations of public transport;
2. to examine the problems of urban public transport experienced by the commuters; and
3. to come up with proposals and recommendations for the improvement of the services provided by K.B.S Ltd. in particular, and for the improvement of the city's public transport system in the light of 1 and 2. The implementation of such policy recommendations would offer effective and efficient public transport system.

1.4 SCOPE AND LIMITATIONS

This thesis research report essentially covers a study of the problems of management and operations of K.B.S in the provision of public transport services in the city of Nairobi. It also considers other closely related issues. An overview of the public transport system of the city is covered. This has helped in identifying the public transport user problems.

Spatially, the study covers the entire Nairobi city plus (peri-urban) areas in which K.B.S provides transport services. However, the focus is mainly on the intra-urban public transport services.

The report is divided into five chapters. Chapter one introduces the thesis research study and explains the research methodology used. It also contains a review of the existing literature on the study subject.

Chapter two covers the historical, geographical and socio-economic aspects of the area which are pertinent in the study of the transport system of the city. These aspects form a background against which the study analysis and findings can be appreciated.

Chapter three is an overview of the public transport system in Nairobi. The analysis of the system and its elements has resulted in identification of the public transport user problems.

Chapter four is an analysis and synthesis of the information on various elements pertinent in the management and operations of K.B.S. It summarises the

problems of management and operations of K.B.S and then states the conclusions based on the findings.

Chapter five spells out the policy implications of the findings of the study. It then gives the policy recommendations and states the areas that require further research work.

The study, however, had a number limitations. The sponsor failed to honour the obligations of the scholarship agreement at the right time. This resulted in temporary confusion and shortages in both finances and time. The persistent financial shortage during the research made the progress abit slow (but sure).

Another problem came up during the actual field survey work. To the author's surprise and unexpectation, many respondents (particularly the K.B.S Management, the defunct Matatu Vehicle Owners Association officials and matatu operators) seemed to treat the information required from them for the study as "sensitive". Thus, it was not quite possible to get the full information within the originally planned time. This made the research process slow, tedious and cumbersome. However, the information that was finally obtained was quite adequate for this thesis report; thus, this limitation has not made this thesis research report any less useful and complete.

1.5 STUDY ASSUMPTIONS

The main study assumptions are:

1. With the present trend in urbanization, the

issue of transportation is going to be even more crucial and traffic is going to continue to increase with time because transportation will continue to play a dominant role in the total urban system.

2. There is a strong functional relationship between transportation (and its network) and land use density; areas of high land use density have more transportation demand and availability.

1.6 LITERATURE REVIEW

The provision of mobility and equality of access to employment, health, educational and cultural opportunities is the most cited benefit of public transport.[10] However, quite a number of factors have interfered with this benefit, hence the emergence of public transport problems.

Urbanization in the third world countries has been accompanied by various problems due to a number of factors. Attention has been drawn not only to the extent and magnitude of urbanization in newly developing countries, but also to the percentage of population involved.[11] Facilities and services required for urban living include drinking water, sewers, transportation, markets and housing among others. Third world cities have faced problems in providing these facilities and services.

Breese (1966) in specific reference to the

problems of provision of urban public transport states that:

> "providing mass transportation facilities in the cities of developing countries is an extremely costly and complex problem partly because the movement of the people is complicated due to the wide variety of vehicles available for this purpose; and partly because of the poor equipment ordinarily provided for mass transportation system".[12]

The view that population growth in general and high rate of urban population expansion in particular, has worsened the problems in third world cities (in regard to provision of facilities and services) is also expressed in an urbanization sector Working Paper by the World Bank (1972). It states that:

> "Problems of urban poverty and unemployment, of inadequacy of housing and urban infrastructure has been recorded throughout the history. What distinguishes the current urban problems of developing countries is their scale and intensity. The severity of the problems reflects primarily the rapidity of overall growth and acute shortage of resources to equip the additions to urban population.[13]

The paper projects that the population and area of many cities will triple within 20 years, necessitating heavy investment in roads, other transport infrastructure and equipment for mass transit for majority of the population who cannot afford private automobiles. The paper notes, however, that private automobile use is rising rapidly. The resultant congestion, it argues, greatly complicates the provision of mass transit. A strong case exists in bringing automobile user charges more into line with

the high marginal costs of providing for additional vehicles in congested urban areas, and for other steps to limit growth in numbers.

The World Bank's view on limiting the numbers of private automobiles (car ownership) is supported by a study on Nairobi City by Nairobi Urban Study Group (1973) in recommending that a policy of restraint on the ownership and use of private cars in Nairobi area should be adopted in association with measures to encourage the use of public transport.[14]

The Sector Working Paper (World Bank, 1972) further states that:

> "While transportation facilities play a large part in determining urban growth patterns, transportation requirements can be greatly reduced by appropriate siting of employment and residence. Strong interrelations also exist between different transport modes necessitating their consideration in the context of the urban transportation system as a whole".[15]

This argument is in line with the definition for urban transport and its planning as given by Cooper (1971) which states:

> "Urban transportation is the total public and private means for the movement of people, goods and services on land, air, and water to, within, and through the urban region. Urban transportation planning, then, is a continuous process for developing in advance a course of action for achieving urban goals by providing adequate quality and quantity of each mode by coordinating the balance between the modes and by permitting flexibility for innovation. Transport planning can be effectively carried out only as part of comprehensive planning; similarly, single mode (like road transportation) planning must be part of the total transportation planning".[16]

In explaining the importance of resources and more innovative methods in solving urban transport problems, World Bank (1972) states that:

> "Apart from the fact that the despondency surrounding the task of ameliorating urban conditions in developing countries arises from the speed of urban growth and shortage of resources, human as well as financial, there are other contributing factors which, though also apparent in the developed countries, operate with much greater force and are less amenable to solution due to the shortage of resources. For instance, experience has shown that the provision of more and better urban highways provides no more than temporary alleviation and does not solve traffic congestion. Investment in transport facilities accordingly can appear of dubious permanent value."[17]

Concerning urban structure and land use in relation to transportation, the same paper by World Bank (1972) argues that"

> ".... For larger cities, general urban speeds based on concentrated employment in a single central district is clearly uneconomical in resource use. An urban pattern with several nuclei of relatively high densities connected by major arteries and with considerable low density development preserved between them can offer considerable advantages. The existing urban pattern, particularly housing and employment, greatly determines transportation needs."[18]

Hutchinson's view is that urban transportation planners must be concerned with both economic efficiency and distributional efficiency of investment alternatives. He states that the goal of economic efficiency is development in terms of the maximization of aggregate accessibility and maximization of aggregate environmental quality.[19] Cresswell (1979) points out, however, that the relationship between

towns and their public transport is "rarely pure and never simple". Indeed it seems that there are at least five basic ingredients in the relationship. These basic ingredients are land use, highways, public transport and the pedestrian.[20]

Urban transportation studies on third world countries have been done by World Bank. A sector policy paper by World Bank (1975) identifies problems in third world countries as congestion; failure to expand transport networks proportionately to the urban growth; the poor state of bus systems; and the spontaneous development of intermediate personal transport services to alleviate the deficiencies of the existing modes of public transport. The paper recommends that ways of solving these problems should include a more rational use of transport facilities; improvement in the efficiency of transport undertakings and their coordination, and a considerable reduction in transport requirements in urban physical patterns. These recommendations call for improvement in management and operations of public transport; hence closely hinges on the theme of this thesis research : a study of the problems of management and operation of K.B.S Ltd (in provision of public transport services.)

The paper on Urban Transportation policies by World Bank (1986) notes that:

> ".... Solving urban transportation problems has become one of the chief tasks confronting governments in developing countries ..... primarily because of the importance of

> efficient transport to urban productivity and to national development."[21]

This report (World Bank, 1986) states the priorities for future World Bank lending to developing countries and emphasizes that such countries should consider the policy options such as strengthening the existing transport institutions; using low-cost measures such as traffic management and road improvements and improving public transport, particularly buses and mini buses; improving road networks with an emphasis on the needs of commercial traffic and public transport (especially those serving the poor neighborhoods); and giving preference to capital - intensive projects such as major improvements in existing road networks and transport systems that produce high rates of return. These policy options have a direct bearing on the improvement of urban transportation through minimization (if not elimination) of the problems of management and operations.

Nairobi, being a city in a third world country, faces transport problems most of which are similar to those above. The Urban Transport Management Seminar (Nov/Dec. 1987) held at Kenya Institute of Administration (Nairobi) is apparently in agreement with the view of the World Bank. The seminar considered the following as those "areas which need serious attention".[22]

1. Problem of provision of urban transport

infrastructure. These problems could be identified at the levels of PLANNING, DESIGNING, FINANCING AND IMPLEMENTING of urban infrastructural projects.

2. Problems of provision of urban public transport. These problems include the SUPPLY, DEMAND, DISTRIBUTION and QUALITY of the service.

3. Traffic management and safety aspects. The problems of traffic flow ..... were identified as a cause of DELAYS, FRUSTRATIONS and ACCIDENTS.

4. The contribution of the transport sector to the national development.

All these areas, particularly the second area (above) identified by the seminar hinges directly on the thesis research whose report is given in this paper. The seminar calls for research and understanding of the problems of management and operations of public transport with a view of finding a solution.

It should be noted that studies on third world cities only offer general attempt in understanding the problems and prospects of urban transportation problems. They are not specific on Nairobi.

In Nairobi, not much comprehensive work has been done on the problems of productivity and efficiency of the public urban transportation system. Yet, public

transit has been perceived by many planners as an essential service and continuing responsibility for all metropolitan centres. According to River and Associates (1970), this is so because it is in these centres where highway congestion, parking problems, air pollution, among others, are prevalent.[23] They argue that improved urban transportation service would divert travellers from private automobiles to public transit reducing congestion, parking problems, air pollution etc., which are evident in cities of industrialized societies.

The studies that have been carried out so far (on Nairobi) include Nairobi Metropolitan Growth Strategy (1973), Nairobi Buslanes and Busways Feasibility Study (1977), situma (1977), Nairobi Urban Transport Project (1979); the Matatu Mode of Public Transport in Metropolitan Nairobi (1982) and Transurb Consult Study (1986).

Nairobi Metropolitan Growth Strategy as a study has included transportation as one of the subjects among many other subjects it studied. Its main argument is on promotion of cheap public transport through restraint on private car ownership and reduction in fares coupled with promoting rational traffic management in the city. Staggering working hours and provision of roads are some of the recommendations of the study.

Nairobi Buslanes and Busways Feasibility Study

(1977) focuses on the improvement of the road network of the city with particular emphasis on creation of bus priority routes. The study reflects an intention to reduce investment costs of new infrastructure.

The Matatu Public Transport of Nairobi by Situma (1977) focuses on the Matatu industry. The study reports on the numbers of matatus and their trips and states their operational problems. In fact, this study is a report presented by the Nairobi City Commission (Engineers department) to the World Bank.

Nairobi Urban Transport Project (1979) is a study comprising a series of components. It mainly focuses on creation and improvement of infrastructures and discusses the policy matters and monitoring procedures in doing so.

The Matatu mode of Public Transport (1982) by Mazingira Institute is a study which argues for the promotion of matatu mode of public transport. In doing so it discusses issues such as matatu licensing,matatu vehicle design, access to capital by matatu operators and matatu terminals. The main policy recommendations of the study are on these mentioned issues.

Transurb Consultants Study (1986) covers the assessment of future urban public transport needs of the city of Nairobi. It then proposes and evaluates the various options of transport supplies.

From the above summary of the urban transport

studies on Nairobi, a number of things can be noted. These studies consider the general public transport problems and the transport network system. Some of them consider only the matatu mode of public transport and the role it plays. In some cases, these studies have presented only one side of the story of public transport problems. No attempts have been made to study the problems of management and operations of the public transport modes (in general) and of K.B.S in particular. It is this gap that this thesis research report fills.

To improve the public transport system to become effective and efficient, the management and operational problems of the existing modes of transport must be looked into because such problems do exist. This is supported by a report by World Bank (1975) when it states that:

> "standards of management and efficiency of publicly run transport undertakings in developing countries vary greatly but are generally poor.[24]"

The report (World Bank, 1975) makes an attempt to specify the goal of management bodies of public transportation and what it takes to achieve this by stating that:

> "..... Purposeful action over considerable periods is involved in achieving efficiency of individual transport undertaking, in ensuring a more appropriate balance between different forms of public transport, and in developing methods of coordination that result in an economical integrated transport system in which different elements complement each other".[25]

On coordination and regulation of public transport operations in third world countries the report states that:

> "..... Perhaps less obvious, yet no less serious are the failures of coordination between transport operators and the public works department or other road building agencies".[26]

It argues that dangers in overregulation of urban transport services by regulatory agencies are indeed evident; and, intermediate personal transport services tend to suffer particularly from inflexible regulations.

On the role of management on the improvement of transportation network, Hovell (1975) states that:

> "..... Because land use fundamentally inter-relates with the kind of transport system which is operable, management will be required to provide expertise and judgement as an aid to formulating the broader land use and car access policies of the relevant political authorities".[27]

World Bank (1975) states why it is important to address the problems of management and operations by giving summary on "Management improvement and coordination as follows":

> "Improvement in efficiency of transport undertakings and their coordination are heavily dependent on better management. Standards of public transport service in terms of speed, comfort and fares need to be tailored more closely to income levels. The poorer the travellers, the greater the importance of the level of fares relative to time and comfort. But enforcement of low fares by regulatory authorities is not, by itself, generally conducive to efficiency. The consequent lack of financial resources, often indeed results in obsolete vehicles and inadequate maintenance, leading to high rates of breakdown and poor service. A more direct attack on costs and standards is required.

> So is action to remedy inefficient regulating methods which, combined with management weaknesses in municipal bus companies, are reflected in the failure to develop new routes.[28]

Faulks (1962), on organizational structure of public transport service mode says that:

> "..... an organisational structure must be drawn up in such a way that the undertaking is able to conduct its affairs with maximum efficiency and the arrangements which are made are influenced by size ..... as the system expands so does its administration.[29]

On the responsibility of management Faulks argues that

> "management has a threefold responsibility - to its shareholders, to its customers and its staff. Legislation has not made it easy to satisfy the legitimate demands of the first two categories but parliament has certainly not been lacking in taking steps to ensure that the third group is adequately protected".[30]

Concerning regulations and rules governing public transport services in Kenya, the Government has been keen to see that there is a legal way of ensuring improved overall public transport services and road safety and driving standards. To this end, the Traffic Act was amended in 1986. The Traffic Amendment Act of 1986 had the following objectives:

- to reduce overloading
- to reduce driving hours
- to ensure better safety by more vigorous police vehicle inspection.

While it is accepted that the provisions of the Traffic Act are capable of improving the public

transport system, the objectives can only be realized if the problems of management and operations of the modes of public transport are understood well. The cooperation of the management of the existing modes of public transport are vital in the implementation of the requirements of the Traffic Amendment Act.

In concluding the above review of the existing literature, it should be stated here that in addressing the problems of management and operations of public transport modes in Nairobi, Kenya Bus Services Limited was chosen as a case study. However, the findings, should help fill the gap which hitherto remained unfilled not only for the case of K.B.S.s but for other modes as well.

1.7 RESEARCH METHODOLOGY

1.7.1 Introduction

The procedure followed in carrying out this research study was in four main stages. The first was concerned with library work. The author scanned through the existing literature on the subject. This was followed by a general reconnaissance of the study area (with particular attention to the modes of transport distribution). The next step consisted of preparation of various study requirements and field work tools. This was followed by the actual field survey in which both primary and secondary data was collected. The data was processed to enable this report to be written.

1.7.2 Data Sources and Collection Techniques

A number of survey methods were used in collection data from various sources.

(i) **Discussions and interviews.**

These techniques were used to obtain information from a number of officers. The respondents were mostly those involved in the administration, policy making and management of the city's transport system and the modes of public transport. They included K.B.S. Management officers, Government officers from the Ministry of Transport and Communications, Department of Physical Planning, and Nairobi City Commission; and the Traffic Police Inspector for Nairobi area. The defunct M.V.O.A officials were interviewed. This was one of the main methods of collecting primary data.

(ii) **Interviews using questionnaires**

Questionnaires with some closed-ended and some open-ended pre-coded questions were administered to various groups of people. The sampling technique used for this purpose is explained later in section 1.7.3. A sample of the questionnaires used for this purpose are given in appendix 4.

The respondents in this case were the commuters and K.B.S. staff (drivers, conductors and inspectors). Whenever it was felt that there was lack of clarity of the answers, probing was done to obtain further details.

This was another method through which primary data

was obtained.

(iii) Observation and photography

These are also important methods of survey used in primary data collection. They helped in covering the wide area under study. The additional information obtained through these methods helped in proving certain pieces of information and thus support the facts discussed.

(iv) Documentary data collection

This was done by extracting secondary information from various sources including the existing literature from the library. Documented information (or data) were provided by Ministry of Transport and Communications; Kenya Railways Corporation; and Communications; Kenya Railways Corporation; The Nairobi City Commission; Traffic Police files; and the defunct Matatu Vehicle Owners Association (M.V.O.A). K.B.S. management provided quite a lot of documented data.

1.7.3 Sampling Techniques

The sampling method was used to obtain a sample of population to which the questionnaires would be administered. This is because the target population (within the research area) is so large that it was not possible to interview all of its members.

The sampling technique which was used in this research is stratified simple random sampling method (that is, simple random sampling of different strata). This was done as follows:-

Questionnaires were randomly administered to passengers served by different routes. The routes covered were Jogoo road, Juja road, Uthiru/Kabete route and Kileleshwa/Westlands route. The aim was to get a combination of relatively busy and less busy routes, and also for the three main socio-economic classes of commuters comprising of the low, medium and high income groups. A total of 16 questionnaires were spoilt, and therefore 104 well filled or answered questionnaires were used for the study.

Questionnaires were administered to 45 employees of K.B.S. The staff interviewed were drivers, conductors and inspectors. A total of 15 questionnaires were spoilt leaving 30 questionnaires for the study purposes.

1.7.4 Data Processing : Analysis and Presentation

Both qualitative and simple quantitative analyses of data were applied in this study. The presentation has been done in a manner considered suitable for each situation under consideration. This has been done in a manner which enhances clarity and better understanding of each issue discussed.

In handling quantitative data, ordinal scale of measurement has been used. Tables have been drawn and frequencies and averages have assigned to elements considered as has been considered appropriate in each case. The interpretation has been done through cross tabulation. Also, graphs have been drawn for the

cases considered appropriate.

Qualitative analysis has been employed in handling most qualitative data. The discussion and interview information have been analysed and synthesized inorder to make the conclusions drawn in this study.

The method of presentation used in the study is predominantly descriptive in format. However,maps, plates (photographs), tables and figures have also been used to support the facts discussed.

1.7.5 Shortcomings of the Methodology

In stratified simple random sampling method used, it is assumed that those who were interviewed are a true representation of the various strata considered. The method, therefore, assumes that their opinions, feelings and experiences reflect the correct opinions, feelings and experiences of the population represented. This assumption may not always be absolutely true.

1.8 DEFINITION OF OPERATIONAL TERMS

1.8.1 Public Transport

Public transport/mass transit may be defined as that organized means of travel which is intended for the general public use for travelling from one location to another for various activities and for which fare is paid. That is, public transport is the conveyance of people in a vehicle en mass on their trips from one point to another. The vehicles which are used for conveyances are termed Public Service Vehicles (P.S.Vs) and they make money by taking fares (as opposed to

private vehicles carrying fewer people in most cases, most of whom are relatives, friends etc, and without paid fare). Those who use P.S.V.s may be referred to as patrons or passengers.

1.8.2 COMMUTERS

These are the people who travel regularly between two points of interest (for example, between work place and residential place). Such people usually need to be at one of the points of interest at certain times of the day and at the other point at another time of the day (for example being at the work place in the morning and at the residential place in the evening).

1.8.3 Manambas and Makangas

Manambas are touts who act as agents for matatu operators and help in lobbying customers.

Makangas are those whose job (in public transport services)is to on and off load the bags and luggage belonging to commuters.

1.8.4 Kenya Bus Service (K.B.S) Limited

K.B.S Ltd., is a public limited liability company incorporated under the Company's Act of the Laws of Kenya. It is the dominant public transport means in Nairobi. 75% of its shares are held by United Transport Overseas (U.T.O) Ltd., a public limited liability company incorporated in United Kingdom (U.K); and 25% of the shares are held by the Nairobi City Commission (N.C.C).

1.8.5 **Matatus**

These are vehicles used for mass transport of persons and goods. Their official carrying capacity ranges from 8 to 25 persons according to the Traffic Amendment Act, 1984. They are operated under private states by private owners and small fleet owners (for small scale transportation).

1.8.6 **Transport Modes**

This term refers to the various types or means of movement.

1.8.7 **Operation of Public Transport Service**

This refers to the organisation of the mode of transport (e.g buses) and the crew and how they operate to meet riders' requirements. Here we are interested in the day-to-day working of the traffic department and related operational problems.

1.8.9. **Management**

Management refers to the organisation of the resources available (which may include people, money, and other assets such as land, equipments and others) for the achievement of certain objectives; and usually, setting the objectives is also included. It is the duty of Management to take policy directions from its governing body (which may be a government department, shareholders, etc., according to the form of ownership) whilst at the same time working in accordance with the statutes. Whatever they may be. To discharge its responsibilities and achieve its objective (which in

the transport world include safe arrival), management must give directions to and negotiate with its staff through defined channels of communication.[31]

1.8.10 Nyayo Bus Services Corporation (N.B.S)

This is a mode of public road transport in Nairobi. It initially started as a Government public transport services in 1986, It came under management of state corporation in 1988 under the umbrella of National Youth Service (N.Y.S).

1.8.11 The Central Business District (C.B.D)

This refers to the central area of Nairobi where most employment and other land uses are concentrated. It is the most active area in terms of commercial, service, administrative and other activities of urban concern.

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CHAPTER 2

2.0 THE STUDY AREA: NAIROBI CITY

Nairobi, the Capital city of Kenya, was granted city status in 1950 (after being incorporated as a township in 1900). The name of the city is derived from the Masai term "Enkare Nairobi" which means "the place of cold water". The importance of Nairobi goes beyond Africa - it is known worldwide. A number of African and World bodies, for example, United Nations Environmental Programme (UNEP), have their headquarters in Nairobi.

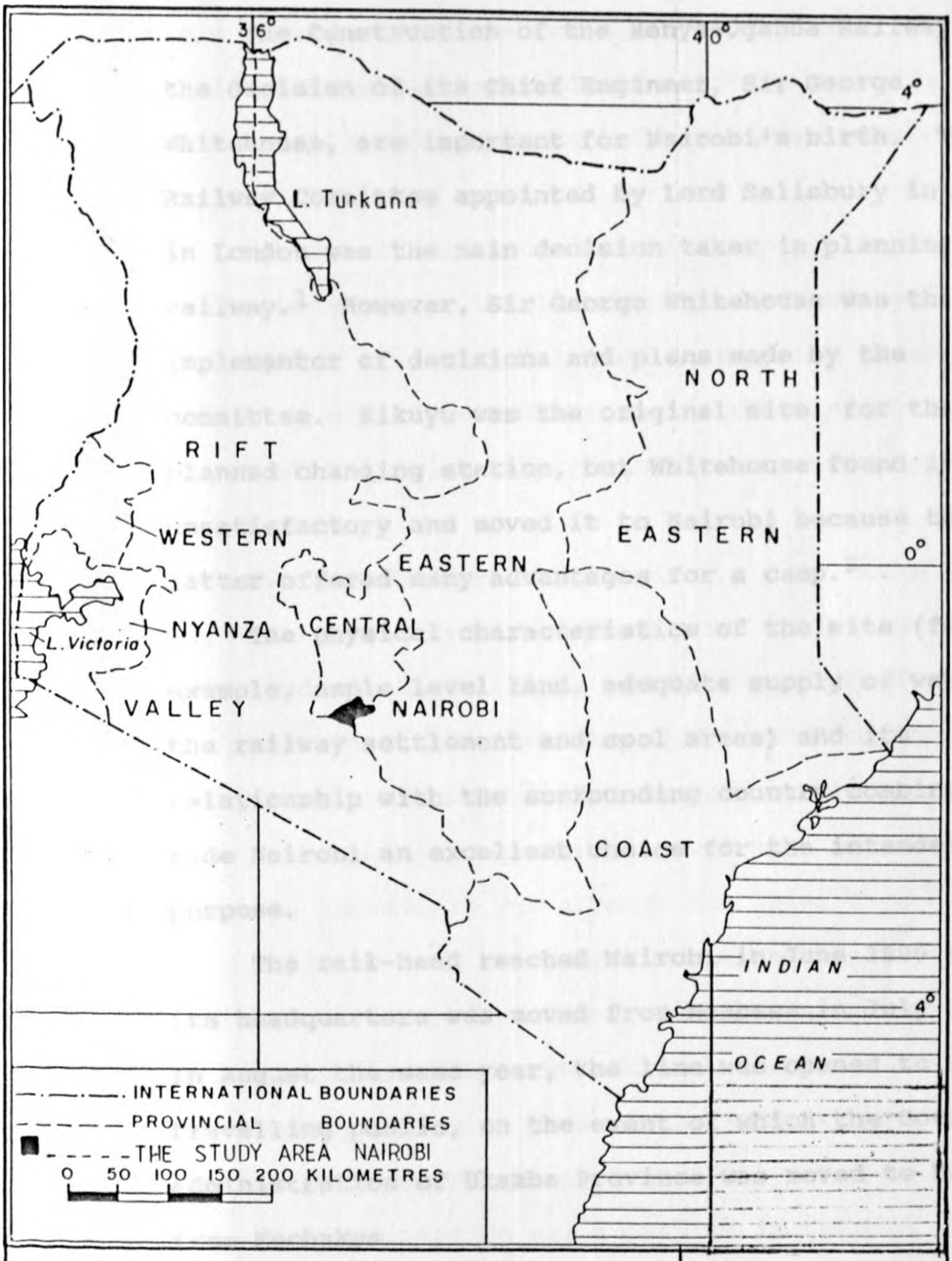
2.1 THE LOCATION OF NAIROBI

The location of Nairobi in the national context is shown in Map 1. It is located to the Southern part of the Equator (which divides Kenya into approximately two halves).

In latitudes, the city lies approximately between 1^{o} 09' South and 1^{o} 29' South, and in longitudes it lies approximately between 36^{o} 39' East and 37^{o} 07' East.

The city is bounded by three districts. To the south-western side lies Kajiado district (in Rift Valley Province); to the south-eastern side lies Machakos district (in Eastern Province), while to the north lies Kiambu district (in Central Province).

It is worth noting that while the southern plains are not agriculturally potential areas (except for pastoral purposes), the northern side of the city is fertile for agricultural practices.



MAP 1: NAIROBI'S LOCATION IN NATIONAL CONTEXT IN KENYA

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2.2 HISTORICAL DEVELOPMENT OF NAIROBI

The Construction of the Kenya-Uganda Railway and the decision of its Chief Engineer, Sir George Whitehouse, are important for Nairobi's birth. The Railway Committee appointed by Lord Salisbury in 1895 in London was the main decision taker in planning the railway.[1] However, Sir George Whitehouse was the implementor of decisions and plans made by the committee. Kikuyu was the original site for the planned changing station, but Whitehouse found it unsatisfactory and moved it to Nairobi because the latter offered many advantages for a camp.[2]

The physical characteristics of the site (for example, ample level land, adequate supply of water for the railway settlement and cool areas) and its relationship with the surrounding country combined that made Nairobi an excellent choice for the intended purpose.

The rail-head reached Nairobi in June 1899 while its headquarters was moved from Mombasa in July 1899. In August the same year, the line was opened to the travelling public, on the event of which the Government administration of Ukamba Province was moved to Nairobi from Machakos.

By the end of 1899, Nairobi was assuming the functions it was to perform as future capital city. A number of roads were already in existence. Commercial developments including a hotel, general store, soda

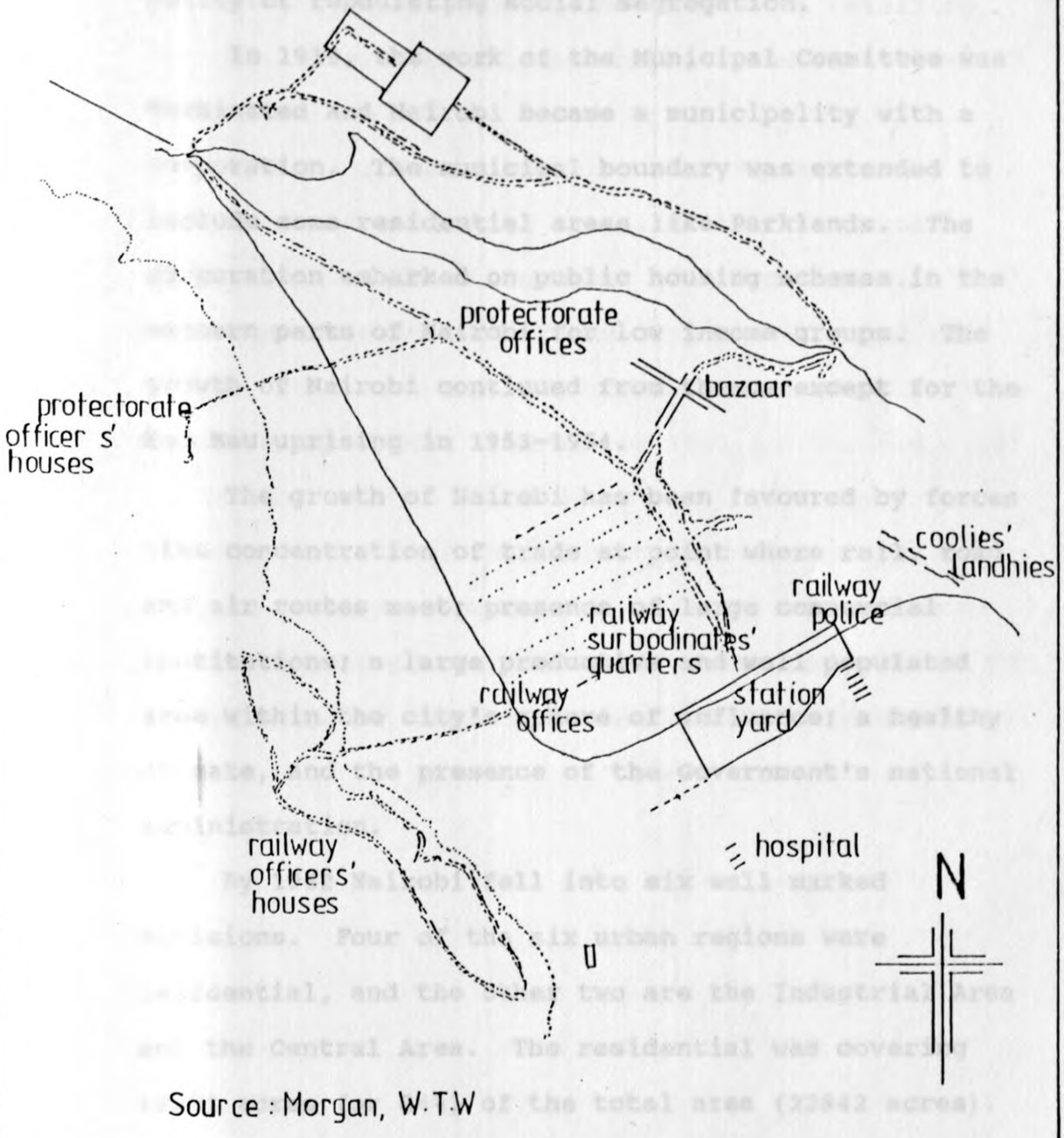
water factory, post office and other trading concerns were already in existence. In fact, by 1900, a small indian bazaar had appeared and military barracks had been established. Residential areas were widely dispersed.

On 16th April 1900, Nairobi Municipal Regulations were published and the township was defined as "that area within a radius of 1.5 miles from the present office of H.M. Sub-Commissioner in Ukambani". This was the first Nairobi boundary (which was arbitrary).[3] (See Map 2).

The suitability of Nairobi as a site for a large settlement was questioned during the following years. Low standards of buildings and living, lack of proper drainage and ill-drained clay soils, and inadequate water supply all contributed to poor conditions and slum. The shifting of the city was not, however, possible because it was already too late.

Definite land use patterns had appeared by 1906, not through imposed planning, but by chance and choice of inhabitants. The same pattern of zones underlies the present Nairobi. Much of the road network in the central area was established by 1909.

Land speculation was a problem in Nairobi due to lack of land use control.



Source : Morgan, W.T.W

MAP 2 : NAIROBI 1901

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The war came, and after it the adoption of a new policy of repudiating social segregation.

In 1919, the work of the Municipal Committee was terminated and Nairobi became a municipality with a corporation. The municipal boundary was extended to include some residential areas like Parklands. The corporation embarked on public housing schemes in the eastern parts of Nairobi for low income groups. The growth of Nairobi continued from thence except for the Mau Mau uprising in 1953-1954.

The growth of Nairobi has been favoured by forces like concentration of trade at point where rail, road and air routes meet; presence of large commercial institutions; a large productive and well populated area within the city's sphere of influence; a healthy climate, and the presence of the Government's national administration.

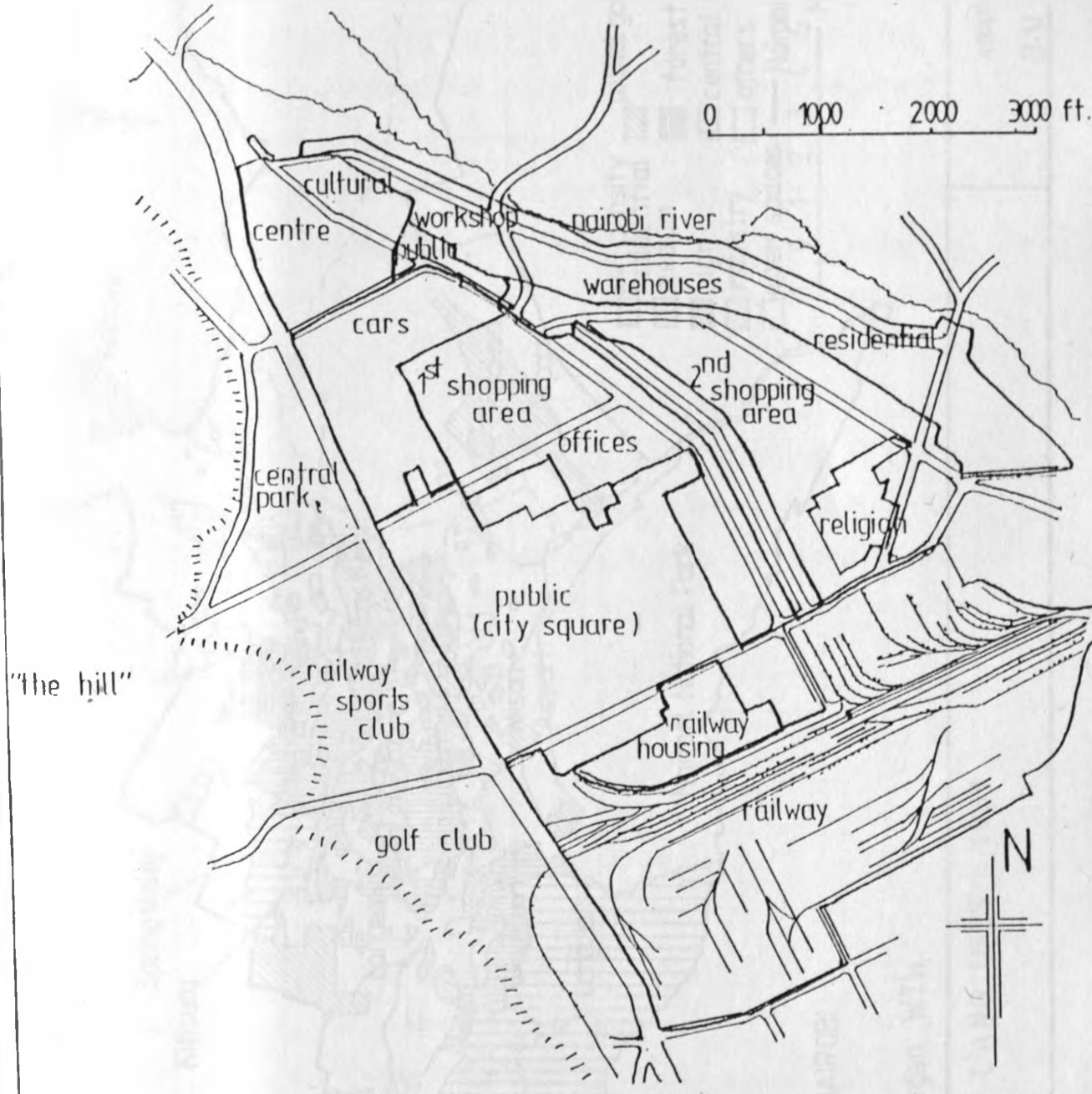
By 1962 Nairobi fell into six well marked divisions. Four of the six urban regions were residential, and the other two are the Industrial Area and the Central Area. The residential was covering 19271 acres (or 84%) of the total area (22842 acres). The residential areas were upper Nairobi, Nairobi South, Eastlands, and Parklands - Eastleigh.

The Industrial area contained 91% of the area devoted to industry, 86% of which were for warehouses.

The Central area is where the town began. The principal functions of this area are rather grouped

together in distinct quarters as shown in Map 3, and include the railway, religious buildings, retailing, offices, entertainment, workshops, cultural centre and residential.

The functions of any city find their spatial expression in the use of land and their temporal expressions in the occupations of its citizens. Although the functions of the city have changed very little, they have expanded and developed greatly. The relative employment figures for 1963 for the old city of Nairobi and the whole Kenya are 113400 and 535100 respectively. [4] This shows that Nairobi employed 21% of Kenya's total employment. It gives an indication of the importance of the city since those early days. The distribution of those land uses are shown in map 4.



Source: Morgan, W. T. W

MAP 3: NAIROBI CENTRAL AREA 1920

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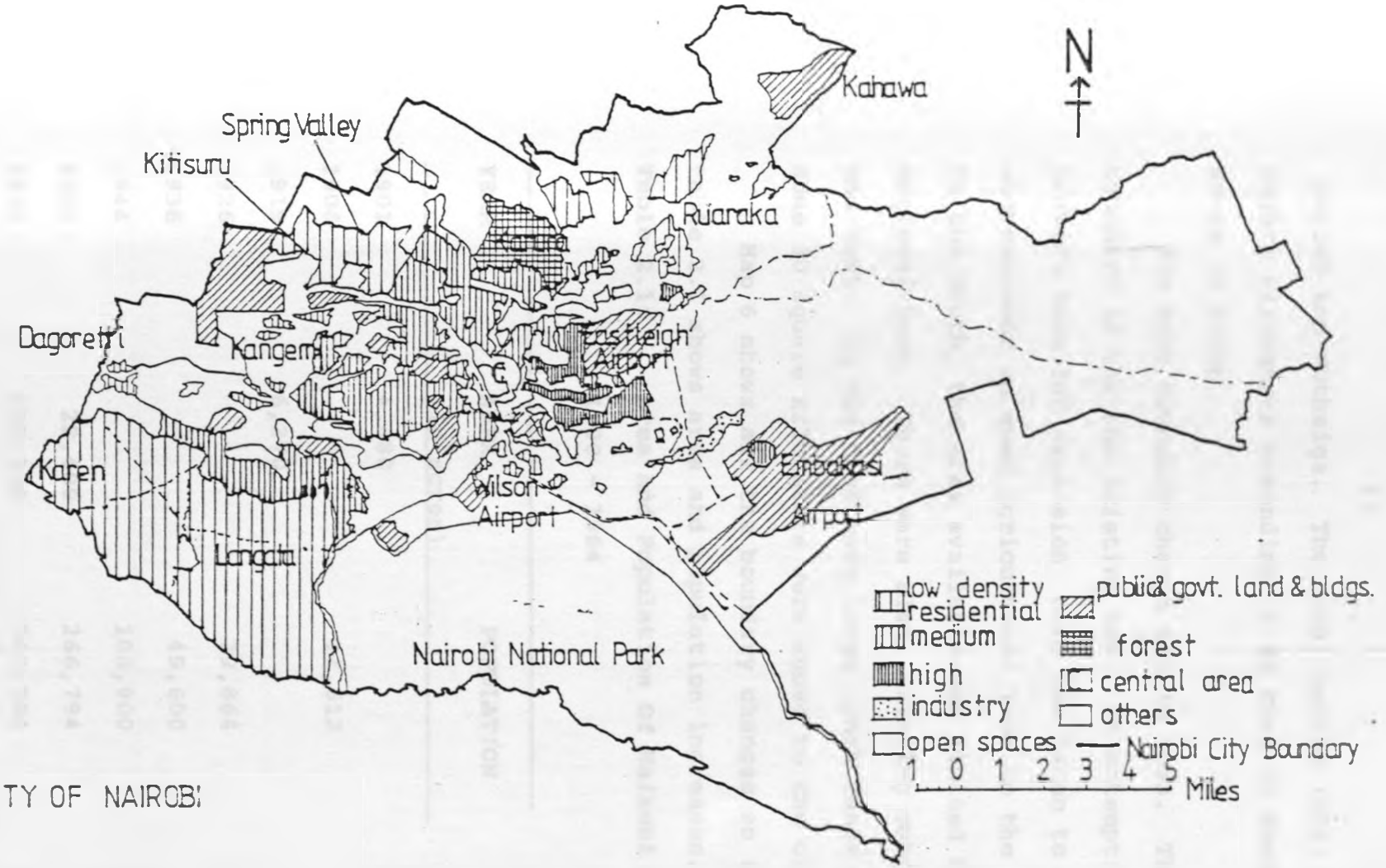


CITY OF NAIROBI

Source: Morgan, W.T.W

MAP 4: LAND USES 1963

ABIERO-GARIY Z.C.

D.U.R.P. 1989

Valley and Muthaiga. The area, before 1963, was 80 square kilometers extending 10 km East to West and 8 km North to South.

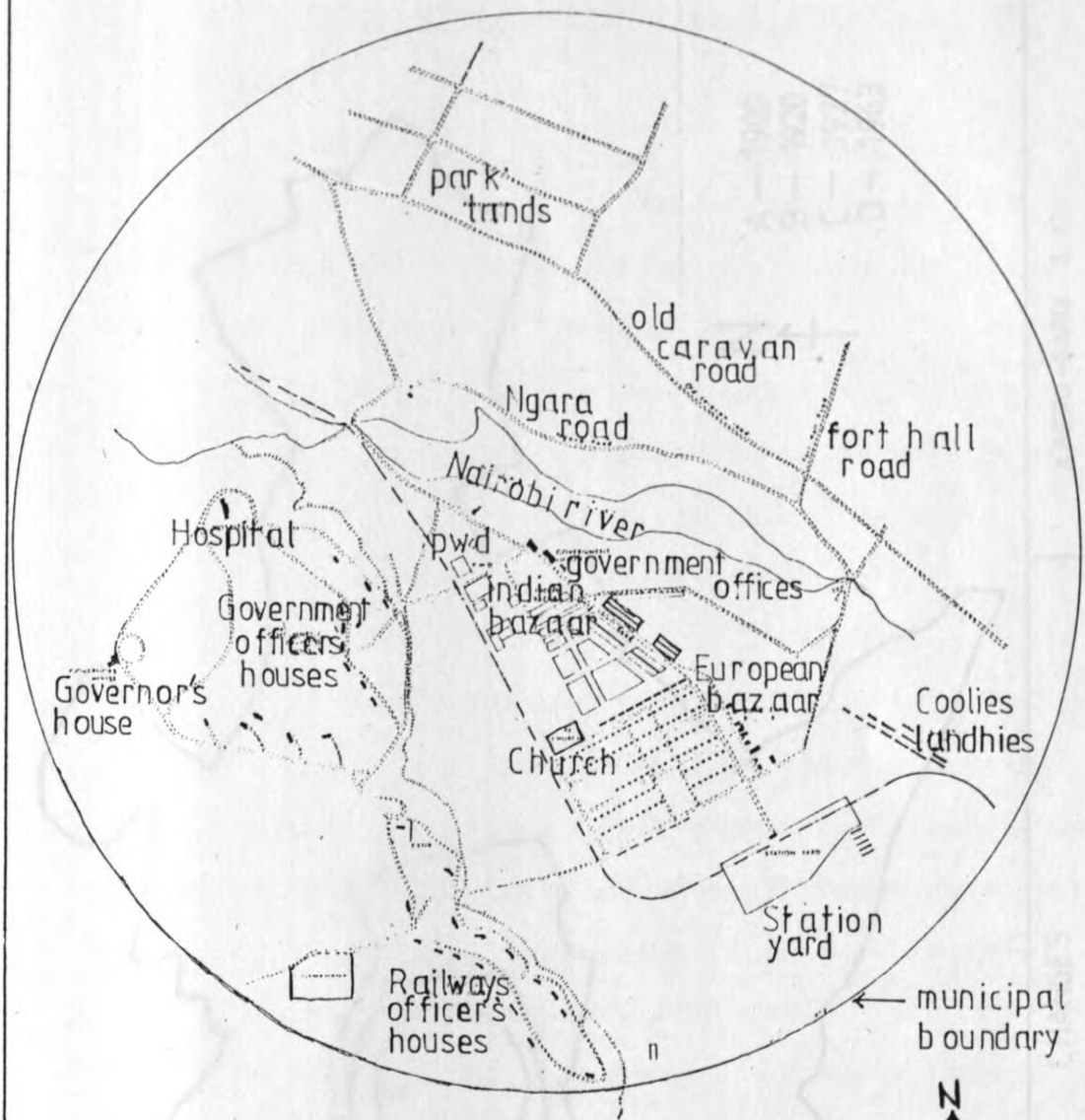
The next boundary change was in 1963. The boundary is the one existing now. In attempting to provide room for expansion, care was taken to avoid encroachment on good agricultural land to the North. To the South, the area available was limited by Nairobi National Park. There were also, existing suburbs to the West. To the East were large ranch lands and here some 30 square kilometers were added to the city.

Map 6 shows all the boundary changes so far, while table 2.1 shows area and population increases.

Table 2.1: Area And Population Of Nairobi Between 1900 - 1964

YEAR	AREA (in acres)	POPULATION
1901	4,480	
1906		11,512
1919	6,270	
1926		29,864
1936		49,600
1944		108,900
1962	22,400	266,794
1963	170,364	342,764

Source: Morgan W.T.W., 1967



Source: Morgan, W.T.W

MAP 5 : CENTRAL NAIROBI 1905 AND THE FIRST MUNICIPAL BOUNDARY

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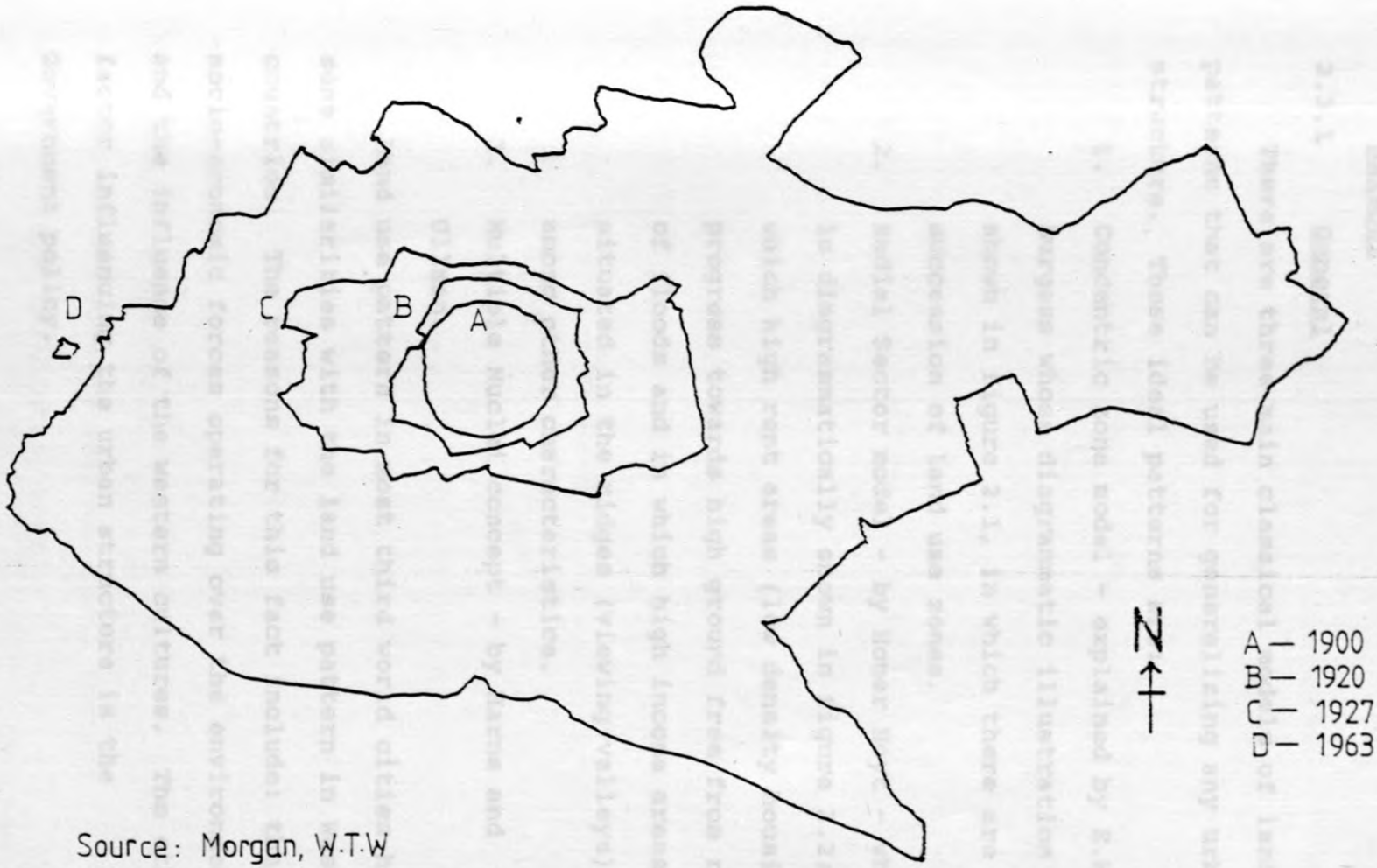

Source: Morgan, W.T.W

MAP 6 : NAIROBI'S BOUNDARY CHANGES

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2.3 SPATIAL/LAND-USE PATTERN (URBAN STRUCTURE) OF NAIROBI

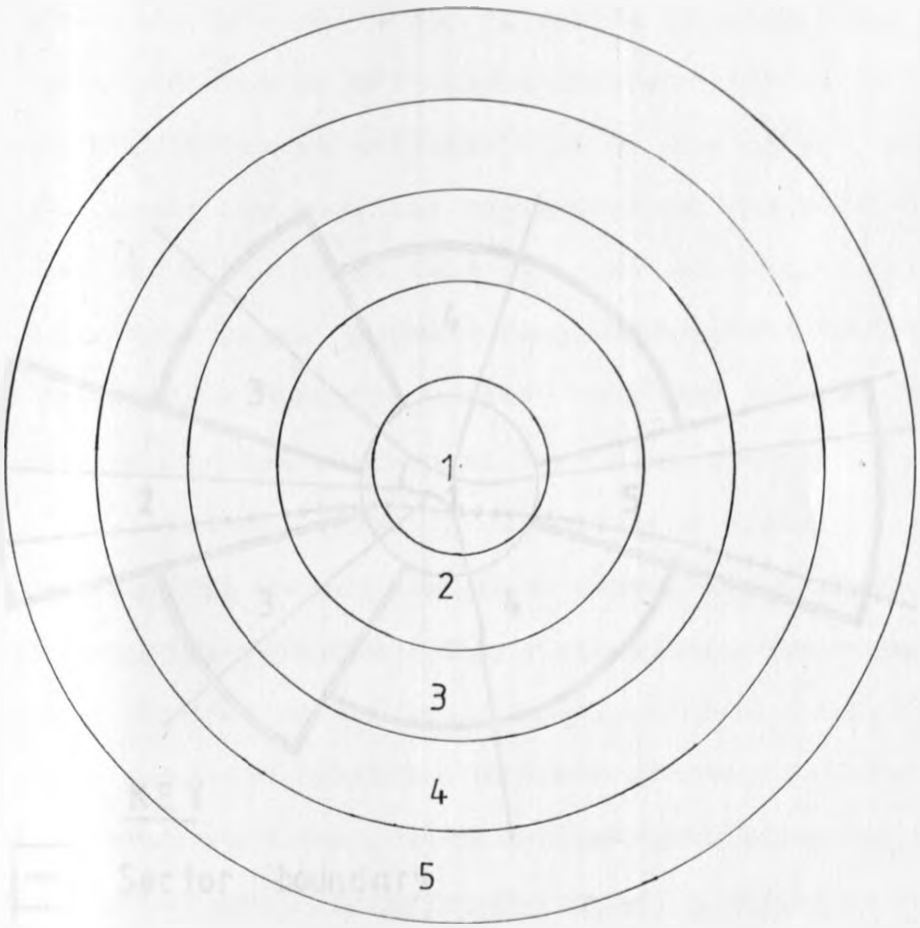
2.3.1 General

There are three main classical models of land use patterns that can be used for generalizing any urban structure. These ideal patterns are:

1. Concentric zone model - explained by E.W. Burgess whose diagrammatic illustration is shown in figure 2.1, in which there are succession of land use zones.
2. Radial Sector model - by Homer Hoyt - which is diagrammatically shown in figure 2.2; in which high rent areas (low density housing) progress towards high ground free from risks of floods and in which high income areas are situated in the ridges (viewing valleys), among other characteristics.
3. Multiple Nuclei concept - by Harns and Ullman.

Land use pattern in most third world cities have some similarities with the land use pattern in Western countries. The reasons for this fact include: the socio-economic forces operating over the environments and the influence of the western cultures. The other factor influencing the urban structure is the Government policy.

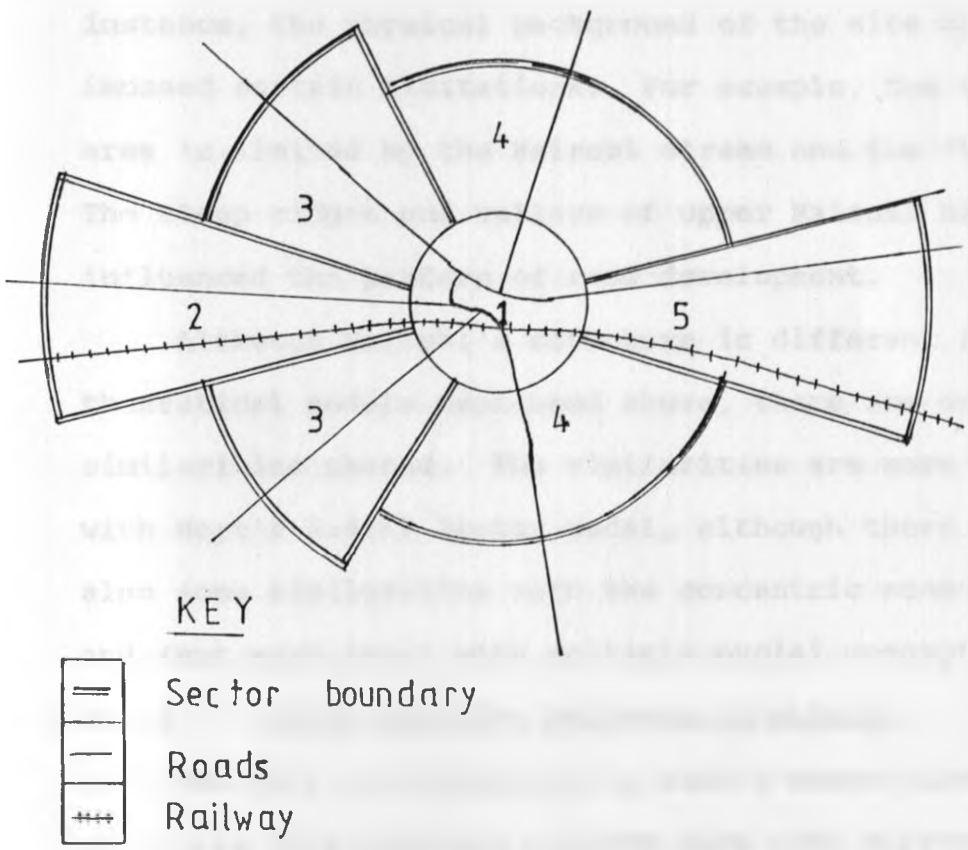
Figure 2.1 Concentric Zone Model land use pattern. (after E.W. Burgess, 1922).



KEY

1. CBD
2. Zone of transition
3. Low income housing zone and small factors
4. High class residential zone.
5. The commuter zone.

Figure 2.2: Radial Sector Model of urban use pattern (after Hoyt, 1939)



1. CBD
2. High income, low density residential area
3. Medium income residential area
4. Low income, high density residential area.
5. Manufacturing and warehousing zone.

Nairobi's layout is a result of a number of factors. The colonial Government policy was influenced by racial segregation. Nairobi was somewhat planned with specific areas meant to be used exclusively by the European colonialists. Nairobi's physical and socio-economic factors are unique and have strong influence on the structure and character of the city. For instance, the physical background of the site has imposed certain limitations. For example, the central area is limited by the Nairobi stream and the 'Hill". The steep ridges and valleys of upper Nairobi have influenced the pattern of road development.

Although Nairobi's structure is different from the theoretical models mentioned above, there are some similarities shared. The similarities are more evident with Hoyt's Radial Sector model, although there are also some similarities with the concentric zone model and (but much less) with multiple nuclei concept.

2.3.2 Urban Land-Use Patterns in Nairobi

The City is developing in such a manner that parts of it are like separate regions each with different functions, distinguished by the type of the people who live there, how they live and what they do, as well as by the appearance of the area. Four of the six major regions are residential and other land uses, while the other two are the central Business District (CBD) and the industrial area.

Upper Nairobi, consists of the higher ground to

the west and north lying over 1700 metres high in altitude. It is the area of low residential density farther from the city centre and of medium residential density as you approach the city centre. Much of the area consists of ridges. Separated by deeply cut wooded valleys which gives a pleasing aspect to these parts and the fertile red soils encouraging garden development. The valleys are difficult to cross and roads tend to follow the line of the ridges towards the city centre making tortuous any journey across the area. The first European residential area was on the Hill where the railway and government built houses for their Senior Staff. This area (part of which is called Upper Hill) is a residential area with buildings bearings European influence. Government buildings at 'Community Hill' are also located in the area.

Muthaiga, on a ridge between Gitathurue and Mathare streams, is regarded as one of the best residential districts and consists of large houses whose occupants include heads of diplomatic missions and of large business firms. The less attractive flat plateau to the west has been developed as housing estates.

Parklands - Eastleigh area is mainly a residential area whose prosperity roughly ranges from the poorest in Eastleigh in the east to the richest in Parklands in the west.

Nairobi South, though not attractive due to being

flat and on black cotton soil, has modern buildings and is convenient for employment in the industrial area.

Eastlands, the flat site on black cotton soil, is not very attractive and amenity must be planned for rather than allowed to occur naturally. Eastlands is mainly for residential and other land uses. Income and rents are low and density of population is high. There is actual physical growth of the city to eastlands. It consists of estates and site and service schemes such as Umoja, Kayole, Dandora, Buru Buru, Makadara, Jericho, Kariokor, Pumwani, Savanna and Doonholm. The land in these areas is poorly drained and unsuitable for constructions and development, and residential development has thus created great problems of servicing and providing amenities.

Next to Eastlands residential areas is the idustrial area (on black cotton soil), extending south from the quarters of the railway. This is the area for heavy and manufacturing industries.

The central area of the city is where the town began. The area is defined on the western side by a barrier consisting of the highway and the open spaces o for Railway Sports Club and the Uhuru Park. It has severe competition for land for various uses and houses a number of government and private offices. The area is attractive to a wide range of functions. Offices of government and commercial and financial firms has

clustered together to be more mutually accessible. As the route centre of Nairobi it is the most convenient place to be reached by shoppers or employees from many parts of the city and vice versa. Due to the limited size and the high cost of the plots in the central area it has given rise to high rise buildings within the city centre, and a cluster of shops and office buildings within this limited area.

Map 7 depicts the current land-use pattern within the city boundaries. The most intensively developed area surrounding the CBD, and having a radius of roughly 8km (6.2 miles) corresponds to old city boundary (laid out in 1928). Employment areas are mainly centralized within the central area and Industrial area. According to the third Nairobi Water Supply Project Study, the following table gives the breakdown of land uses in Nairobi in 1985.[5]

Table 2.2 Nairobi's Land Use Breakdown in 1985

TYPE OF LAND USE	AREA (Hectares)	DISTRIBUTION (%)
Residential	21760	31.8
- high income	11000	16.1
- medium income	4070	5.9
- low income	4500	6.6
- poor settlements and shanty areas	2190	3.2
Commercial	270	0.4
Industrial	2410	3.5
Institutional	7480	11.0
Recreational	15330	22.4
Agricultural	21150	30.9
	68400	100.0

Source: Third Nairobi Water Supply Project.

From the above table it can be observed that spatially the predominant functions are residential and agricultural (agriculture being practiced in Eastern Part of the City). However, it should be realized that since 1985, there must have been some changes which resulting in reduction in agricultural land area and increase in residential land area. (The actual figures showing this were not available from any sources. However, the coming up of new residential areas like Kayole, and Komorock are enough evidence to this fact).

2.3.3 LAND USES BY DISTRICTS

Map 8 shows the different districts to which Nairobi has been divided. A summary of the land uses for each district are briefly explained below. The basis of the analysis is the land use map prepared by City Planning Department of Nairobi City Commission.

District 1

This district consists of the Central Business District (CBD) of Nairobi where most offices, governmental institutions and commercial/shopping facilities are located. A medium density residential area with some public buildings (on Nairobi Hill) are located to the west of the district. Nairobi hospital covers an area lying partly in district 1 and district 10 while some of the facilities of Nairobi University are on districts 1 and 3.

Within this region are found the Central Park, Uhuru Park and the Railway Golf Course which are

located between the C.B.D and the residential area.

District 2

This district is mainly for residential and institutional urban land uses. Its central area is occupied by various educational institutions, while the remaining part is mainly residential.

District 3

This district is mainly residential with lower densities in Parklands and higher densities in Westlands. There are also some schools located in this district; and also, Westlands commercial centre is located in this district.

District 4

The district is entirely residential with a medium density land occupation. It is occupied by scattered residential housing for predominantly high income households.

District 5

This is a medium density residential district for high income households. Two areas are occupied by schools (mainly Kenya High School and Nairobi School) spreading over large surfaces.

District 6

This is a primarily residential district with medium density and relatively scattered habitat. The East is occupied by green area (Muthaiga Golf Club).

District 7

The north-western part of this district is

occupied by the Mathari Mental Hospital and an institutional area (amongst others sports facilities and the Police Traffic Operations Headquarters).

The rest of the district is residential with significant geographical disparities: from the north-east towards the south-west of the district, a medium density population area is followed by a planned high-density area, an existing low income, high density area and finally squatter settlements (shanty area) in the Mathare Valley.

District 8

This is mainly residential area. Its central part is occupied by medium to high density, relatively low income residential area. In the eastern side of the district, along the Outering Ring Road, new estates (mainly Buru-Buru) are developing with medium density occupation and higher average incomes than in the rest of the district. Others includes Doonholm, Greenfield etc.

District 9

This district is entirely occupied by the industrial area with significant possibilities of higher occupation density in the west. The area also consists of an extension towards the south within district 10.

The residential area in this district is limited to a small area in the south west. Employment is estimated to be around 50,000 at the present time.[6]

District 10

District 10 is made up of an area extending from the International Airport in the East to the Ngong Road Forest in the West and consists of different land uses. The different land use found in the district include the following:

- Public Institutions: International Airport and Welcome Research Institute are located here. An area situated infront of Wilson Airport is also earmarked for future Institutional use.
- Industry: The industrial area in district 9 extends up to Mombasa Road (Where Firestone Tyre Factory is located). Extensions are planned to be made towards the west and the south east.
- Hospitals: Nairobi Hospital is located such that part of it is in district 10 and part of it in district 1.
- Forest and Recreational Areas: The south part of the district is occupied by facilities of Wilson Airport on the border of Nairobi National Park. Near Ngong Road, in the North, is located the Nairobi Golf Club.
- Residential: The district is occupied by, on one hand, by medium density residential areas (Nairobi South, Nairobi West, Otiende, Ngei etc.) and, on the other hand, by a shanty area (Kibera) situated on both sides of the railway and extending to district 11. More development of residential

areas is between Langata Road and Kibera (shanty area) and in the Eastern part (Villa Franca and Doonholm Estate).

District 11:

In this district, two medium density residential areas are found in the North and South. Kibera shanty area also extends from district 10 to this district. Also, an institutional area is located along the Ngong Road Forest.

District 12:

This district is predominantly residential with relatively low land occupation density (which is rising since the extension of water distribution network to this place). The district is also occupied by Karen Country Club and educational institutions.

District 13

Land use in this district is two fold: agricultural and residential, with an institutional and school area in the East bordering the Karura Forest. Coffee estates are in this district.

District 14

This is mainly a residential district with low land occupation density and whose residents' average income ranges from medium to low. The density is increasing and some areas have higher habitat density (e.g. Kangemi, South of Waiyaki Way). An industrial area is planned in the south-west of the district near the border with district 12. Large areas are for

educational institutional: Lenana School and the Veterinarian Clinic, as well as Government Farm and its annexes.

District 16

The area is mainly occupied by an industrial area with a shanty area in the south which is an extension of the one along Nairobi river (in district 18).

District 17

This district is occupied by the following land uses;

- Agriculture
- Public Institutions: Kamiti Prison in the North and Military institutions in the South.
- Education: Kenyatta University Campus and other schools.
- Industry: an industrial area is planned along district 20B in the south.
- Residential: Between industrial zone and the city boundary there is a residential area medium to high occupation density. Most of the other areas are low occupation density areas (whose density is increasing).

District 18

One of the functions is agriculture for which land is reserved to Eastern part. However, this region is gradually becoming residential and agricultural area becoming smaller. Land uses in the district include:

- Industry: Two industrial zones (Dandora and

Kasarani) are being developed near roads and residential areas (to decentralize industrial activities).

- Residential: To the south there are medium density areas like Doonholm Estate (and others), while in the north-west along the Outering Road, there are high density habitat areas as well as large shanty area along Nairobi River. To the East are developing residential zones of medium density, for low to medium income population. Institutional land use also occupies the area e.g. Kayole Estate area.

District 19

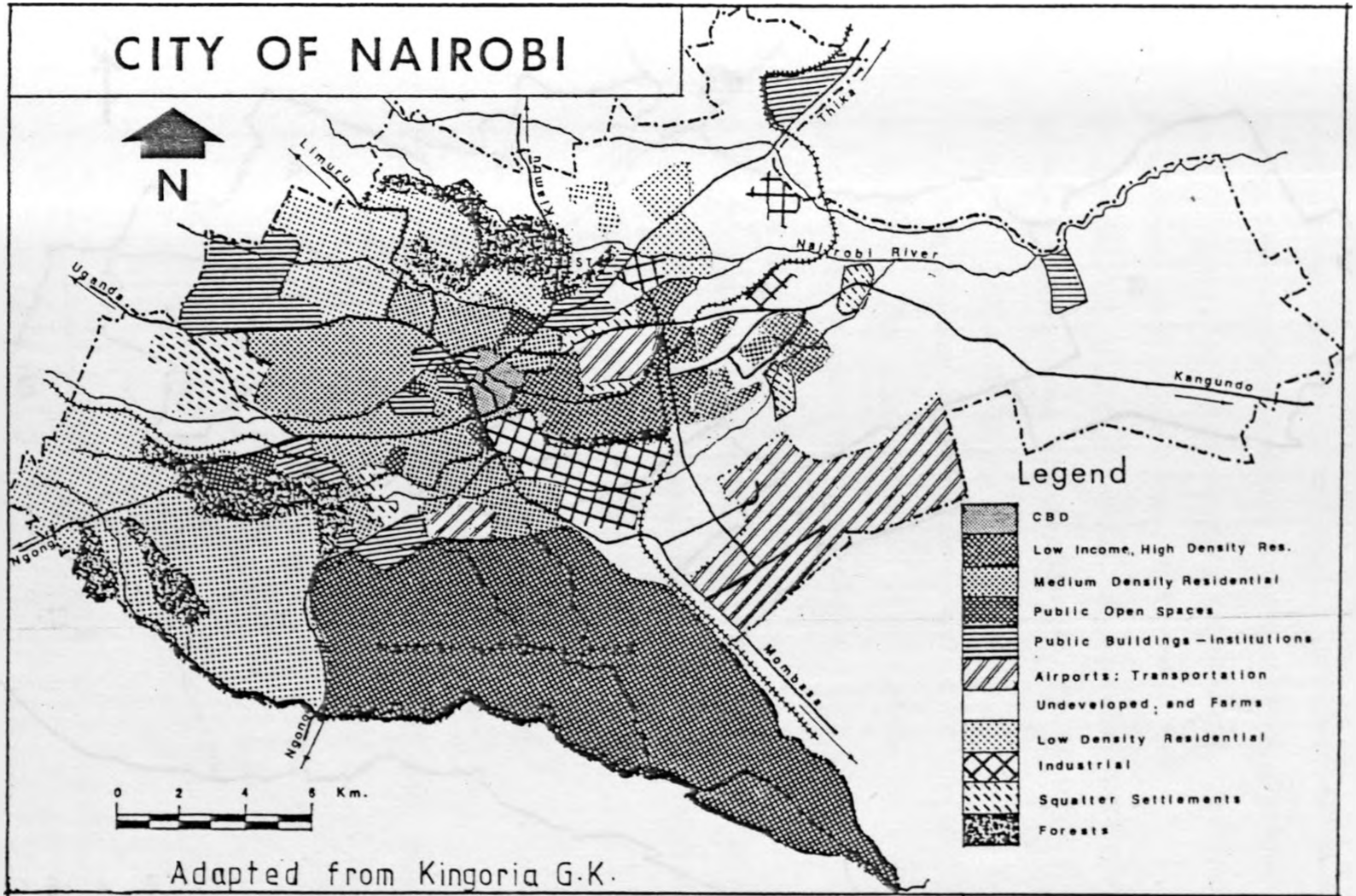
The district is mainly agricultural. However, there are many land development projects (to the south) going on and others planned. Many of the projects are residential.

District 20:

The districts marked "20" are made up of varying land uses like airports, forests, national and other parks, etc. These areas do not have resident population.

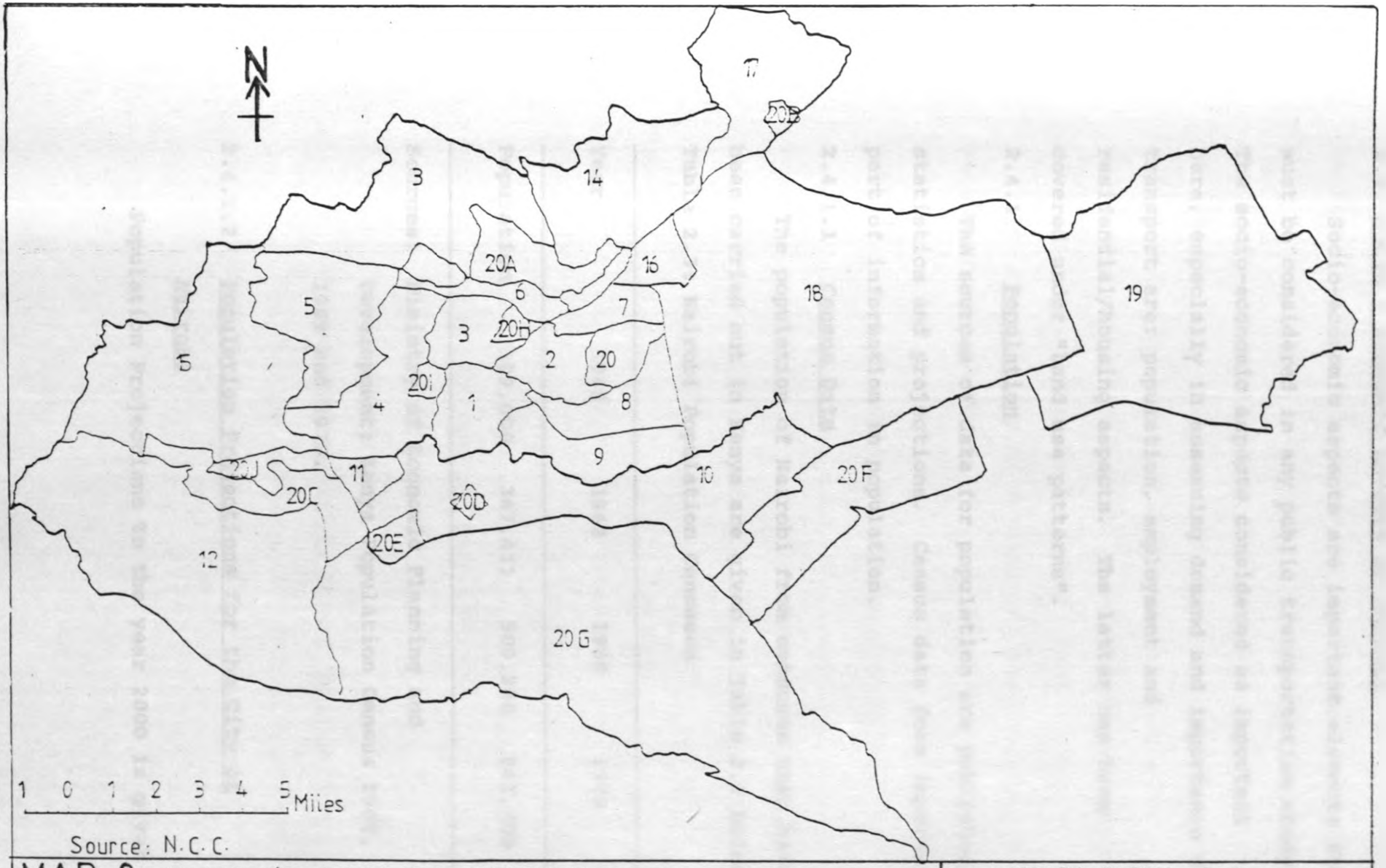
In conclusion, it should be noted that the land use pattern of Nairobi is such that the employment areas are mainly concentrated in the CBD and industrial area. This has an effect on transport. Those who commute to work travel towards the same direction in the morning and they travel from the same place in the

evening after work. This implies that unless the Public transport services are adequate, this big population will have to struggle for transport.



MAP 7 : LAND USES

ABIERO-GARIY Z.C.
D.U.R.P 1989



MAP 8: NAIROBI'S LAND USE DISTRICTS

ABIERO-GARIY Z.C.
D.U.R.P. 1989

2.4 SOCIO - ECONOMIC ASPECTS OF NAIROBI

Socio-economic aspects are important elements that must be considered in any public transportation study. The socio-economic aspects considered as important here, especially in assessing demand and importance of transport are: population, employment and residential/housing aspects. The latter has been covered under "Land use patterns".

2.4.1 Population

The sources of data for population are published statistics and projections. Census data form important part of information in population.

2.4.1.1 Census Data

The population of Nairobi from censuses that have been carried out in Kenya are given in Table 2.3 below.

Table 2.3: Nairobi Population Censuses

Year	1948	1962	1969	1979
Population	109,000	347,431	509,286	842,608

Sources: Ministry of Economic Planning and Development; Kenya Population Census 1962, 1969 and 1979.

2.4.1.2 Population Projections for the City of Nairobi

Population Projections to the year 2000 is given

in table 2.4 below. The projections have been obtained by the City Planning Department; the rates are: + 5% from 1984 to 1985, + 4.5% from 1990 to 2000. The hypothesis of a decreasing annual growth rate from 1984 to 2000 is based on the results expected from the policies implemented by the Government aimed at decreasing population growth in principal urban areas (like Nairobi, Mombasa and Kisumu), that is, the District Focus Policy of development encouragement of secondary urban centres.

Table 2.4: Nairobi's Population Projections

Year	Population
1884	1,109,900
1985	1,165,900
1990	1,469,800
2000	2,282,600

Source: TRANSURB CONSULT, 1986, PP. 16

2.4.1.3 School Population

1. Primary and Secondary School Populations

The Primary and Secondary School enrolment for the years 1982 to 1985 are given in table 2.5.

Table 2.5 Primary and Secondary School Enrolment 1982-86.

Year	1982	1983	1984	1985	1986
Primary School Enrolment	105,549	107,706	110,902	123,573	127507
Secondary School Enrolment		38,500	31,700	27,500	31,000

Source: Republic of Kenya; Statistical Abstract 1987 (C.B.S, Ministry of Planning and National Development) Pages 187 and 188.

It should be noted that the enrolment in Primary Schools had an abrupt jump between 1984 and 1985 due to the implementation of the new 8.4.4 education system in which pupils take 8 years instead of 7 as had been the case previously. The jump is approximately 12% in 1985 as compared to 1984. Projections for primary and secondary schools enrolment for the years 1990 and 2000 are given in the table 2.6.

Table 2.6: Primary and Secondary School Enrolment Projections.

Year	1990	2000
Primary School Enrolment Projections	166,000	242,000
Secondary School Enrolment Projections	54,000	85,000

Source: TRANSURB CONSULTS, Pages 35 and 36.

Higher Education

The institutions considered here are those whose enrolment figures could be obtained; viz University of Nairobi, Kenyatta University and Kenya Polytechnic. Table 2.7 give enrolment figures.

Table 2.7: Enrolment for Institutions of Higher Education in Nairobi.

Year	University of Nairobi	Kenya Poly.	Kenyatta University	Total
1980/81	-	-	2,461	-
1981/82	-	2,745	2,341	-
1982/83	-	3,713	-	-
1983/84	6,875	4,001	2,348	13,224
1984/85	6,682	3,240	2,372	12,294
1985/86	6,411	3,614	2,625	12,650
1986/87	6,760	4,014	3,017	13,791

Source: Republic of Kenya; Statistical Abstract 1987 pages 190 and 192.

Higher Education Enrolment Projections are given in table 2.8.

Table 2.8: Higher Education Enrolment Projections

Year	1988/89	1989/90	1999/2000
Univesity of Nairobi	7,500	7,900	9,600
Kenyatta University	2,900	3,200	5,200
Kenya Polytechnic	5,800	6,400	10,400
Total	16,200	17,500	25,200

Source: TRANSURB CONSULT; Page 39.

2.4.1.4 Population Distribution by Districts

Figure shows the divisions of the city into districts determined by the City Planning Department of the Nairobi City Commission. The distribution of population according to the districts (for the years 1985, 1990 and 2000) were determined by interpolation. To take account of margin conditions, the interpolations were corrected on the basis of expected land use densities. The estimates (corrected interpolations) are given in table 2.9 (in thousands) note that the districts are shown under map 8.

Table 2.9 Population Projection (estimates) by Districts (in thousands of people).

Districts	1985	1990	2000
1	52	54	56
2	125	130	135
3	45	48	52
4	55	58	63
5	25	40	46
6	12	14	15
7	105	110	118
8	170	185	200
9	10	10	10
10	90	116	178
11	63	73	85
12	16	36	102
13	10	25	50
14	50	70	95
15	134	198	388
16	23	25	30
17	30	46	90
18	150	232	490
19	0	0	0
20	0	0	0
Total	1165	1470	2283

Source: TRANSURB CONSULTS, 1986, PP 19.

2.4.1.5 Population Outside the City Boundary

It was mentioned earlier that Nairobi city does not provide services for its population only, but also

for the residents from the neighbouring districts. It is therefore important to have an indication of the number of this population that also depend on Nairobi's transport system and other services. In fact, some of the areas outside the present city boundaries must be considered as part of the Nairobi catchment area.

The towns/areas in the surrounding districts served by Nairobi's transport system include Ngong, Athi River, Ongata Rongai, Kikuyu, Limuru, Githunguri, Kiambu, Ruiru and Thika, as well as the areas bordering the city's present boundaries, mainly along Thika road in the East and "Western Shamba area" in the West. However, it was difficult to establish the population projects for these areas as very little information is available for this particular catchment areas.

The third Nairobi Water Supply Study Project (page 74) and TRANSURB consult estimated the population for the areas shown in table 2.10 below.

Table 2.10: Population Outside the City Boundaries.

Area/Year	1995	2000	2010
Area			
Western Shamba	75,000	131,000	400,000
Ruiru	160,000	267,000	750,000

Source: TRANSURB CONSULT, 1986, pg. 21

2.4.2 Employment

It had been mentioned earlier that Nairobi City is

considered, (and indeed it is, as will be seen later in this section) as a major focus for employment in Kenya. Employment figures give an indication of the number of number of people involved in Journey-to-work travels are important in transportation studies. Table 2.11 gives employment statistics available for Nairobi between 1977 and 1986 covering both wage employment and informal sector (self-employed and unpaid family workers)

Table 2.11 Employment Statistics for Nairobi

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Wage Employment	-	244431	260822	274209	284534	291327	309815	315701	327215	3368
Informal Sector (Self-employment)	38854	42918	48003	48630	48705	-	-	-	-	-
Total	-	287349	308825	322839	333239	340854	365260	-	-	-

Sources: Republic of Kenya, Statistical Abstract 1987; (C.B.S, Ministry of Economic Planning and National Development) page 230-231, and Republic of Kenya, Employment and Earnings in the Sector 1975-1983, page 38.

Figures 2.3 and 2.4 show the trends of employment in Nairobi.

Figure 2.3: Trends of Wage employment in Nairobi

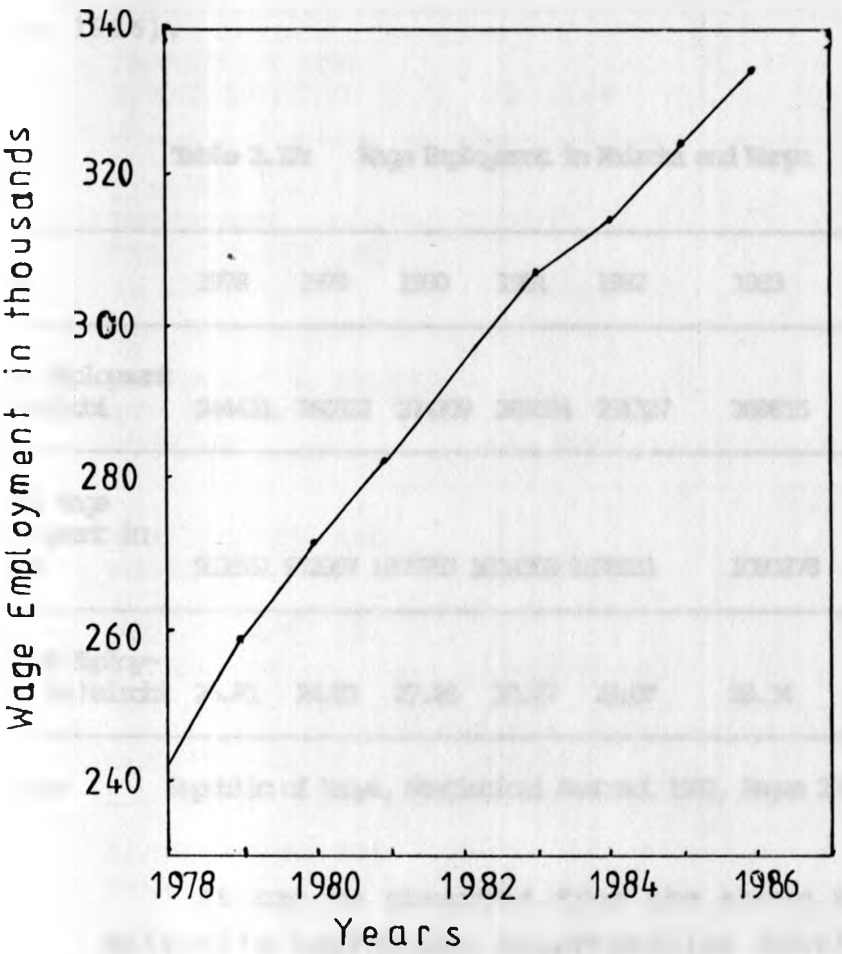


Figure 2.4: Trends of Informal sector employment in Nairobi

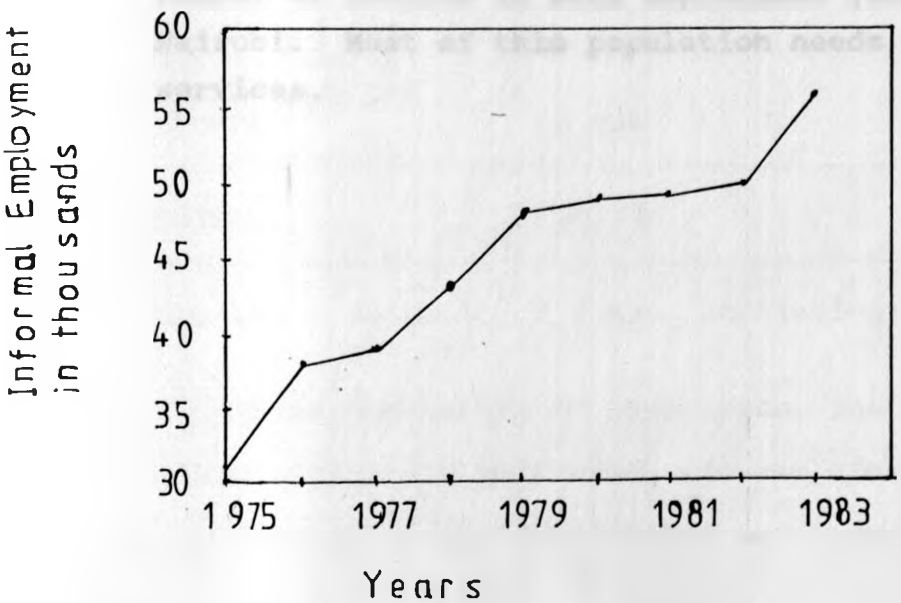


Table 2.12 gives the wage employment figures for Nairobi and Kenya, and calculates the wage employment in Nairobi as a percentage of the total wage employment in Kenya (for the years 1978 to 1986).

Table 2.12: Wage Employment in Nairobi and Kenya

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986
Wage Employment in Nairobi	244431	260822	274209	289534	291327	309815	315701	327215	336820
Total Wage Employment in Kenya	911561	972307	1005753	1024309	1038031	1093278	1114655	1174366	1220492
% WAGE Employment in Nairobi	26.81	26.83	27.26	28.27	28.07	28.34	28.32	27.86	27.60

Source: Republic of Kenya, Statistical Abstract 1987, Pages 230 and 231.

It can be observed from the above table that Nairobi's employment opportunities continue to grow with that of the rest of the republic; and quite a number of Kenyans in wage employment (about 28%) are in Nairobi. Most of this population needs transport services.

Table 2.13: Nairobi's Wage Employment by Industry in 1986

INDUSTRY	EMPLOYMENT	% EMPLOYMENT
TRANSPORT AND COMMUNICATION	23,887	7.1
FINANCE AND INSURANCE, REAL ESTATE AND B. SERVICES	38,111	11.3
COMMUNITY'S SOCIAL AND PERSONAL SERVICES	116,866	34.7
AGRICULTURE AND FORESTRY	13,794	4.1
MINING AND QUARRYING	2,108	0.6
MANUFACTURING	63,394	18.8
ELECTRICITY AND WATER	7,853	2.3
CONSTRUCTION	28,499	8.5
WHOLESALE AND RETAIL TRADE, RESTAURANT AND HOTELS	42,308	12.6
TOTAL	336,820	100.0

Source: Republic of Kenya, Statistical Abstract 1987 pp. 235.

From the nature of industries, the above table gives indication that most wage employment industries are located in the City centre and Industrial area.

This concentration of employment opportunities in particular location makes public transportation problems more serious.

Employment Projections

Table 2.14 gives summary of employment projections for Nairobi to years 1990 and 2000. It also shows the ratio between employment and population in Nairobi.

Table 2.14 Nairobi's Employment Projections and Ratio Between Employment and Population

Year	1983	1990	2000
Gross Domestic Product (GDP) at factor cost (K#Million)	1800.76	2424.86	3765.73
Wage Employment Kenya	1093278	1356500	1946600
Ratio: Wage Employment (W.E) Nairobi/W.E Kenya	28.34%	30.77%	33.85%
Wage Employment Nairobi	309815	417400	658900
Employment in the Informal Sector	60200	84900	115900
Total Employment in Nairobi	370015	502300	774800
Population (Nairobi)	1047951	1469800	2282600
Ratio: Employment/ Population (Nairobi)	53.3%	34.2%	33.9%

Source: Transurb - Consult Report.

With the trend of increase of employment in Nairobi, public transport demand is going to increase and this calls for not only more supply of transport services but also calls for improvement in the management of the services, traffic management and cooperation among all those concerned with transport provision at all levels. This is because as the city grows and transportation demand increases, it is not the supply only that is important but also the ways and means of solving problems associated with the increased supply of public transport services.

Conclusion

The aspects considered in this foregoing chapter helps in getting a view of the study area and appreciating the aspects of transportation considered in the study. The areas covered are pertinent in any transportation study. They form a background against which the findings can be clearly appreciated.

ENDNOTES FOR CHAPTER II

1. GREAT BRITAIN, Colonial Office; The Uganda Railway, Vol.1, Origin of Scheme, London: Colonial Office 537/2 pp.8

2. DIARIES OF SIR GEORGE WHITEHOUSE Oxford: Rhode House, MSS Afri, S.1046 (3) 1897 PP. 3

3. MORGAN W.T.W. Nairobi: City and Region Oxford University Press, Ely House, London Made and Printed in E. Africa, Nairobi; 1967 pp.102

4. Ibid pp.112

5. THIRD NAIROBI WATER SUPPLY PROJECT Nairobi, Kenya, 1985. pp.59

6. TRANSURB CONSULT ; Urban transport needs in Nairobi, 1986. pp.59

CHAPTER 3

3.0 PUBLIC TRANSPORT IN NAIROBI

Public transport or mass transport system refers to the system of transportation in which passengers are ferried en mass in a vehicle as they make their trips, and they pay (fare) for the services. Thus, public transport systems provide the most efficient means of moving large numbers of people especially in dense urban areas.[1]

It is important to understand the history of Nairobi (in chapter 2) in order to understand the evolution of public transport system in Nairobi City. Colonialism and the political legacy of colonial communication patterns have had both negative and positive major effects upon the modern public transportation policies and much of the development of post-independence transportation systems.[2] Nairobi's land use development and pattern portrays a classic example of this colonial settlement, the configuration of Nairobi was essentially tripartite in character with Europeans, Indians and Africans occupying different residential zones. The residential areas of the Europeans was well served by transport facilities hence it was relatively trouble free in terms of movement problems. The residential areas of Africans which were left to develop towards the East accommodated the vast majority of the city's population and were characterised by poor transport access to both the

city's transport network and within the area itself.[3]

3.1 HISTORICAL DEVELOPMENT OF NAIROBI'S PUBLIC TRANSPORT SYSTEM.

It had been mentioned earlier that the development of Nairobi as an urban centre and ultimately as the capital city of Kenya had a marked start by the arrival of the Kenya-Uganda Railhead at the site in June 1899. For the first time, the railway line was opened to the travelling public in August 1899. However, even after the line was completed in 1901, the railway was mainly for inter urban transport services. This is because Nairobi was still quite small in size and the population was too low to warrant use of commuter (or intra urban) railway services. Thus for a long time there did not exist any commuter rail (suburban) services in Nairobi. It is clear however, that the distant railway services (i.e. from Mombasa, through Voi, Athi River to Nairobi and then through Kikuyu, Limuru and Nakuru to other places) continued to be increasingly important to Nairobi as the latter continued to grow both in population and size.

The extensions of Kenya - Uganda railway and subsequent cooperation between Kenya, Uganda and Tanzania gave birth to East African Railway Corporation which operated one railway system covering Kenya, Uganda and Tanzania. However, the corporation collapsed in 1977 and separate railway systems were created for each country. For Kenya, the Kenya

Railways Corporation (K.R.C) came into being on 20th January 1978 through an Act of Parliament. Even then K.R.C did not start commuter services for Nairobi. It should be noted however, that those who were living in suburban areas close to railway stations were using the long distance services whenever it was possible for them, although the stiff competition from modes of road transport and the time scheduling of train arrivals and departures did not allow the development of demand of this service to an appreciable extent.

On 5th August 1986, railway commuter (suburban) service was introduced following a Government directive. This was during the commuter crisis which followed a three-day stoppage of K.B.S operations to peri-urban areas of Nairobi. K.B.S had withdrawn 60 of its buses following a directive by Government that they cease carrying standing passengers on peri-urban routes. This rail commuter service was to complement the services that were being rendered by the existing modes of road transport (K.B.S, country buses, matatus, etc.). To implement and accommodate the commuter service, time scheduling of arrivals and departures were adjusted accordingly to suit commuters work schedules.

At the implementation of the rail commuter service it was visualized that its potential market was reaching as far as Limuru on the main line west of Nairobi, and to Thika on the Nanyuki branch line. Two

commuter trains were incorporated in a special time-table: a west-bound service starting from Makadara to Limuru and back; and, a north-bound service starting from Nairobi station to Thika (stopping at stations and at "Halt" points introduced by K.R.C). However, experience revealed later that passenger traffic beyond Dagoretti on to Limuru and beyond Kahawa on to Thika was negligible, mainly due to the awkward hours of arrivals and departures. Also, demands for the service during weekends was extremely low. In view of this situation, the services were re-scheduled as from November 1986 so as to terminate at Dagorretti and Kahawa respectively; and also, the weekend services were discontinued.

Initially the railway commuter service began with seven coaches and a mere 49 passengers on the inaugural journey. The corporation has since then more than doubled the coaches. Today, the service operates two trains with 16 coaches per day in two sections: Nairobi station/Makadara/Kahawa; and Makadara/Nairobi station/Dagorretti, in which the former route runs 9 coaches, while the latter runs 7 coaches.

In so far as road transport is concerned, the pattern of roads and urban form during the 1920s was dominated by a major trunk road from the CBD out of the city to the hinterland and to the Industrial area. During the colonial period (particularly the early days of the period) there was general low demand of public

services . One reason for this is that there was relatively trouble-free movement of people. Although there was rise in population growth of Africans, there was not much journey to work movements from their zone of residents (in Eastlands) to other parts of the city because most of their sustenance revolved around activities within the residential areas. Thus, most of their movement was done either on foot or bicycles (even to the central area).

It should be also noted that as early as those days the European residents (whose residential zone was well served with transportation facilities and well linked to major parts of the city and to the overall road network) had a high private vehicular ownership. There is evidence indicating that by 1928 Nairobi was the most motor-ridden town in the world proportionately to its white population.[4]

Kenya Bus Services (K.B.S) started to operate a road commuter service in Nairobi in 1934 with only 13 buses on 12 routes. The city population then was 50,000. By 1954, the same number of buses were just enough to serve the existing populations public transport demand. Most residential areas like Pangani, Muthurwa, Pumwani, were within a walking distance to the central area, hence walking was predominant mode of commuting for quite a number of residents.

However, as the city continued to expand and the

number of well to do Africans increased, the need for public transport services continued to increase. The level of motorization within the African residential zones slowly increased as traders were hiring and buying vans to use mainly for transporting foodstuffs from the rural areas to feed the growing population. The result of this was the emergence of informal motorised public transport services within the areas, which became very common as the native areas grew and travel demand increase. These "Matatus" as they later came to be known, emerged in the 1950s and were mainly used in transporting the residents of African neighborhoods to and from the nearby rural villages. Although the matatus continued to increase they were not officially known and recognised,and were outside the interest of the colonialists.

As the time for independence came close and after independence there was general deterioration in the state of infrastructural facilities in the city including transportation facilities. This is due to the fact that whatever had been invested by colonialists was running down (and required re-investment in maintenance and repairs); also, there was decline in economic resources and increased urban population growth. The result was a marked deterioration of the city's transport network and services. It became a task of Kenyan leaders (after independence) to improve the situation.

Meanwhile, as the demand for public transport was increasing over the years, (due to population growth and urban sprawl), the K.B.S responded by both extending the routes and increasing its fleet. By 1964, K.B.S was operating 106 buses carrying about 69,000 passengers daily (as per K.B.S records).

In 1966, the K.B.S signed franchise agreement with the then Nairobi City Council (now Nairobi City Commission - NCC) at which time the latter acquired 25% of the shares of the company. Thus K.B.S was granted an exclusive francise to run passenger transport within the city by the Kenya Government.

It should be noted that post-independence period saw a further increase in car ownership at a growth rate of about 6.8% per annum during the period 1960-70. Thus by 1970, 28% of commuters in the city were using private automobiles. However, the use of public transport was not very widespread (as quite a number of residents were walking to their areas of work).[5] It is estimated that by 1970 the percentage use of public transport was 32%.[6] World Bank (1975) estimates that by 1970 the number of buses per 1000 of the population in Nairobi was 1.5. In 1973, the matatus received official recognition by the Government and began to operate services within the city and other parts of the Nation. The word "matatu" is derived from the local term "mang'otore matatu" which means "thirty cents", the standard fare they charged during those days when

they started operating. The Matatus, after recognition, began to compete with buses on the profitable routes.

In 1986, Nyayo Bus Service Corporation (N.B.S) started as a Government Commuter Service in Nairobi aimed at supplementing the already overstretched Kenya Bus Services and other modes of Public transport. Initially, the President of the Republic launched the service with only six buses on 17th October 1986, but the number of buses quickly rose to 16. The fleet of the buses was increased to 38 in 1987. In less than two and ahalf years since its inception, the fleet has now grown to 142 (being the present fleet number, by March 1989) of which 46 are serving the rural districts. In 1988, the Government Bus Services came under the management of a state corporation. Nyayo Bus Service Corporation was constituted and gazetted on 22nd July 1988, stipulating that it would be run under the umbrella of the National Youth Service (N.Y.S).

Law relating to transportation has been part and parcel of the public transportation historical development. The Traffic Act was amended in 1984 and 1986. In both cases the aim was to improve transportation in general and public transport services in particular.

In conclusion, it should be appreciated that the nature and role of the city's public transport system, has apparently been shaped by certain forces including

history of the city, urban structures and population pressures.

3.2 PUBLIC TRANSPORT DEMAND

3.2.1 General

From the preceding chapter (chapter2) it is clear that Nairobi has experienced (and will continue to experience) tremendous growth in development, spatially and in population. With this kind of situation there has been (and will continue to be) an increased demand for transport in general and public transport in particular. Demand for Public transport services is directly related with population growth and employment opportunities (socio-economic activities). The factor that may, however, reduce demand for public transport is private car/automobile ownership.

Modal Split

Generally, in Nairobi, there are a number of means (or modes) of movement from one place to another, for the purpose of carrying out activities from one location to another. These modes of travel are: public transport, private cars (automobiles), other private vehicles (including company and other employer's vehicles), and walking (for pedestrians), bicycles and motorcycles. A study conducted by Mazingira Institute in 1981 on "the Matatu mode of public transport" using stratified sampling according to income groups (and interviewing 325) established modal split for the main modes of transport as given in table 3.1 below. The

results in the table gives the most recent survey on modal split in Nairobi, using a large sample.

Table 3.1: Modal Split

Mode	%
1. Walking	24
2. Public Transport	50
3. Private Car	22
4. Other Private Vehicles	04
Total	100

Source: S. Kapila et al. "Matatu Mode of Public Transport" Mazingira Institute, 1982. Page 5.

3.2.2 Overall Public Transport Demand in Nairobi

Overall Public Transport Demand refers to the total demand of public transport services in the whole of Nairobi, including the peri-urban areas. The Urban Transport Management Seminar held in November to December at Kenya Institute of Administration (K.I.A, Nairobi) estimated the figure for public transport demand in Nairobi. The estimate was based on the modal split established by Mazingira Institute (given section 3.2.1), and also, on the figures from K.B.S which shows that K.B.S buses ferry 1.3 million passengers per month and holds 56% of market share. They gave the total monthly demand (as per 1987) as 28.8 million. Table 3.2 gives the overall public transport demand in Nairobi in 1985, and projections for the years 1990 and 2000.

Table 3.2: Public Transport Demand in Nairobi.

Year	Passenger Journeys (Trips) Per Day.
1985	676,000
1990	873,000
2000	1,393,000

Source: Transurb - Consult Report, 1986, Pages 47 and 48.

3.2.3 Public Transport Demand on Main Urban Roads

The main urban roads in Nairobi include Waiyaki Way, Ngong Road, Thika Road, Juja Road, and Jogoo Road. These are the roads that serve the main high demand areas.

Table 3.3 provides and estimate for population served by these main roads for the years 1985 - 2000; and table 3.4 gives estimates for public transport traffic on the roads.

Table 3.3: Population Served by the Main Urban Roads of Nairobi

Road	Served Population(inhabitants)		
	1985	1990	2000
Waiyaki Way	631,000	815,000	1,295,000
Ngong Road	542,000	718,000	1,244,000
Ngong Road Corridor	970,000	1,202,000	1,825,000
Langata Road	781,000	946,000	1,374,000
Thika Road	637,000	797,000	1,207,000
Juja Road	844,000	1,059,000	1,611,000
Jogoo Road	794,000	1,014,000	1,568,000

Source: Transurb - Consult, 1986, page 54.

Table 3.4: Estimate of Daily Public Transport Traffic on the Main Roads of Nairobi.

Road	Public Transport Traffic (demands)		
	1985	1990	2000
Waiyaki Way	21,665	28,600	46,800
Ngong Road	23,724	32,100	57,300
Ngong Road Corridor	49,601	62,900	98,100
Langata Road	8,945	11,900	16,600
Thika Road	25,004	32,000	49,900
Juja Road	39,651	50,900	79,500
Jogoo Road	51,077	66,800	106,100

Source: Transurb - Consult, 1986, pp.55

The above main roads (routes) serve areas of high public transport demand. They serve major residential areas and a number of lower class roads join them before they lead to the city centre. Most of these roads, if not all, serve high population density, residential areas, and they either lead to the city from peri-urban areas or are joined by roads leading towards the city from peri-urban areas.

3.2.4 Reasons for Travel

Demand is an indicator of how much people would like to/or how much people are travelling from one location to another. The movement from one place to the other enables individuals to carry out certain activities which are important in one way or another to that individual.

Survey carried out in Nairobi by the author using a stratified sample of 120 commuters (in which 103 responded) gave the main reasons for travel as shown in table 3.5. The percentages for the number of times a

reason was mentioned are entered in the table.

Table 3.5: Main Reasons for Travel in Nairobi

WEEK DAYS		WEEK ENDS	
Reason	%	Reason	%
Work	82	Church	15
School	15	Visits (within&without	
Other reasons		Recreational	33
(including		Shopping	13
personal		Private business and	
reasons)	03	other reasons	04

Source: Author's Survey, 1988.

From the above table it can be observed that reasons for travel in Nairobi can be summarised into five main reasons, viz. going to work, going to school, going to church, going for recreational activities and going for private business (and personal reasons). One of the problems facing the city is the centralization of activities in the central area - which, by 1975, was estimated to employ 180,000 people or 86% of commuters. And today, a large percentage of low income public transport users live further away from the city centre, mainly due to the introduction of the low-income housing programmes like site-and-service schemes; and also due to the availability of low rental housing in such places. To the eastern part of Nairobi, such low income settlements have emerged in places like Kariobangi, Dandora and Umoja. Also, the city has expanded to include peri-urban zones like Kawangware,

Riruta, Kangemi and Kabete townships towards the west - where cheaper rental houses are available. Towards the northern part of the city new neighborhoods have emerged in Ruaraka and Kasarani areas, which are still expanding with increasing population of Nairobi. New residential estates (like Ngei, Langata, Otiende, Dam etc.) are coming up in the southern district. All these are an indication of a tremendous increase in public transport demand. The people in residing in these places will want to go about carrying out their activities in different places.

In conclusion to this section it is worth noting that one of the elements of a solution to public transport problems is meeting the demand. This element remains a challenge to Nairobi's transport system. The demand is already quite high and promises to increase as can be observed from demand projections. The fact that the public demand for transport has not been met is manifested (even before determining the supply) in the daily stampede and jostling which characterises most of the public transport terminals and bus stops. It should also be realized that with increase in public transport demand there is an increase in the degree of challenge for the management of public transport, traffic management and provision of infrastructural requirements that make operations smooth and efficient.

3.3 MODES AND SUPPLY OF PUBLIC TRANSPORT IN NAIROBI

The modes of public transport in Nairobi are

classified into road and railway public transport. The road public transport services are provided by Kenya Bus Services (K.B.S), Matatus, Nyayo Bus Services Corporation (N.B.S) and country buses.

3.3.1 Matatus

Researches carried out in Nairobi on public transport show that matatus are the second in command of the city's public transport market (after K.B.S). Matatus were authorised by a presidential degree to operate paid transport of passengers without license in 1973. At present and according to Traffic Amendment Act 1984 to have a public service vehicle (P.S.V) license to be authorized to carry passengers against payment, matatus are acknowledged as public transport as such.

Matatus are operated under a private status by private owner-operators and small fleet owners. They employ the services of manambas and makangas who help in lobbying for passengers and in loading and off-loading luggages. It was found out from the survey that most of these employed to work in matatus are not paid on monthly basis, but are paid daily (and sometimes weekly). The reason for this method of payment was given during the research that it is not easy to know when the vehicle breaks down, and incase this happens the employee may not get his salary for the month. For a long time only men were operating matatus, but now even women have joined the business as

can be seen in the newspaper cutting shown on plate 3.1.

Matatus are managed by their individual owners. In past, matatu owners had formed owners associations. Two parent such organisations were Matatu Association of Kenya (M.A.K) and Matatu Vehicles Owners Association (M.V.O.A). These were formed to restore order and discipline within matatu operations and, also to represent owners and operators to the authorities as a united body. The wide range of activities they were carrying included organising seminars for operators. They drew a code of conduct which all members had to adhere to. It is, however, surprising that quite a number of the rules in their "General Rules of Operators" were very often flouted, yet without bringing culprits to book. The M.V.O.A and other matatu associations and the Kenya Bus Owners Association (KBOA) were banned by the Government on 2nd December 1988 for their inefficiency and exploitation of matatu owners and operators (Sunday Standard, 4th December 1988, page 1). These organisations cannot be considered to have achieved success in their effort to streamline matatu operations.

Matatus operate urban, inter-urban and rural routes. They operate urban lines (and peri-urban lines) using the same route numbers as K.B.S. buses. However, in most cases, if not absolutely, the matatus use the short route system of operation, that is, they

make trips to the city centre or other destinations (like Industrial area) and move back to their origins (through the same routes) unlike K.B.S buses which make trips to the city, proceed to other destinations and then pass through the city again on their way back to their origins (long route system of operation). The matatu operations are demand responsive. They only operate on those K.B.S route lines that have high public transport demand and where they compete well. They are not tied by any social-obligation to serve unprofitable areas.

The types of matatus operated in Nairobi are of two main types. The small matatus have a carrying capacity of 8 people while the minibuses have carrying capacity of 25 people. Plate 3.2 shows the photograph of an old (or original) type of matatus which are still operating in Nairobi, while plate 3.3 and 3.4 shows some of the modern matatus (small matatu and minibus respectively) in Nairobi today. A survey on matatus conducted by K.B.S between September 1982 and January 1986 gives the information on table 3.6 which shows the trend of matatus and country buses since September 1982.

Table 3.6 Trends of Matatus and Country Buses

Survey Dates	Total Vehicles including long distance Vehicles	Vehicles Within city boundaries
September 1982	-	1,667
March 1983	2,048	1,862
July 1983	2,294	-
Jan/Feb 1984	2,533	1,572
May 1984	2,497	1,582
July 1984	2,801	1,572
December 1984	1,990	1,171
May/June 1985	2,257	1,341
October 1985	2,107	1,248
January 1986	1,856	1,301

Source: K.B.S.

plate 3.1: A woman in matatu operation business.

(Source: Nation Newspapers).

plate 3.2 Old (original) type of Matatus used in Nairobi.

plate 3.3 Small Modern Matatu (Nissan) Used ub Nairobi today.

plate 3.4: Large Modern Matatu (Mini-bus) used in Nairobi today.

The Urban Transport Management Seminar estimated (in 1987) that there are 1500 - 2000 matatus in Nairobi.[7] Table 3.7 gives matatu fleets and passengers for some years between 1971 and 1987.

Table 3.7: Matatu Fleets and Passengers (1971-1987)

Year	Fleet Size	Growth rate %	Average daily passengers	Fleet per 1000
1971	217		38,000	5.7
1973	375	36.4	47,000	8.0
1974	538	43.5	63,000	8.5
1975	700	30.1	74,000	9.4
1976	969	38.4	101,000	9.6
1977	1320	36.2	140,000	9.4
1978	1434	8.6	164,000	8.7
1979	1567	9.3	195,000	8.0
1981	1704	4.2	263,000	6.5
1987	1500	-	211,000	7.1

Source: Aduwo and Obudho (1988), A paper presented to the First International Conference on Urban and Spatial Planning of Nairobi (Dec. 1988) pp. 21.

Matatus are the one mode of public transport that has posed a big threat to K.B.S operations. Table 3.8 gives a demonstration of the stiff competition between KBS and matatus by giving Market shares for the two modes.

Table 3.8: Matatu Verses K.B.S Market Shares (1973-1985)

Year	Market Share	
	Matatu	K.B.S
1973	0.16	0.84
1974	0.21	0.79
1975	0.24	0.76
1976	0.34	0.69
1977	0.38	0.62
1978	0.40	0.60
1979	0.42	0.58
1985	0.45	0.55

Source: Aduwo and Obudho (1988) op. cit. page 22 and Transurb Consults, 1986, pg. 47

The Matatus - K.B.S competition is based on factors such as:

- length of the journey
- time taken (and speed) in a journey
- vehicle frequency
- availability of seats in vehicles
- price of the journey
- safety
- comfort

This competition may have a positive consequence for the commuters in that it tends to result in an economically efficient service and competitive fares to users of public transport. The question that circles in the mind is how effective the competition in Nairobi city is (as will be discussed later).

Matatu plays an important role, however, in complementing the services rendered by the KBS and

other existing modes. Without matatus peak hour public transport will be in a mess as had been experienced when the matatu operators boycotted provision of services. Although they play an important role in public transport system in Nairobi, Matatus have been recognized as a problem, not only to the transport system but also to the management of the city's traffic and transport system, and, even to themselves. Their manner of operation can be described as unruly, haphazard and hazardous. Their disregard for traffic regulations, misuse of roads, lower standards of vehicle maintenance and careless driving were observed by 100% of the commuters interviewed as the causes of fatal accidents. The other negative aspects observed by commuters (during the survey) include: operation by poorly behaved, aggressive, drugged (who are also suggested to be young) drivers, conductors and "manambas"; the operators have no social concern and hike fares (since they do not have any standard fares) at those times when they are the only option remaining (for example, during the recent 1988 KBS crew boycott, during night services etc.); and loud music and smoking in these small vehicles. Country buses also play a role, though not much, in the provision of public transport in Nairobi. They are concerned with inter-urban public transport. By 1987 there were 90 country buses serving Nairobi (according to survey by KBS).

3.3.2 Kenya Bus Service Limited (K.B.S)

KBS is the largest public transport supplying body in Nairobi. Managed by a limited company, it ferries about 13 million passengers a month with a fleet of about 300 buses. The market share of KBS is averagely about 55%, although there are local variations in different routes. KBS is not only serving the Nairobi intra-urban transport system, but also operates the peri-urban services. Their intra and peri-urban services are scheduled and well distributed in all routes. They are not concerned with making profits only but also with the social obligation to provide public transport even to the non-profit making routes. The capacity of the buses vary slightly but is averagely 48 passengers. The buses are licensed to carry about another 50 passengers standing. KBS operate on more than 60 routes within the city and peri-urban areas. Much about this mode of public transport (which is the case of the study) is covered in chapter 4.

3.3.3 Nyayo Bus Services Corporation

From the historical background of public transport it was made clear that this is a very recently introduced mode of road public transport in Nairobi. However, its role in provision of public transport in this city is already appreciable, and it is posing a great challenge to the modes that were existing before.

NBS is managed by a state corporation under the

umbrella of National Youth Service. Presently the deputy director of National Youth Service (NYS) is the one in charge of NBS, and running the corporation. The Government venture in NBS has received support from Kenya's friendly countries like the Netherlands, Belgium and Italy which donated the buses as a grant in aid to the Government. The NBS buses have continued to increase in number as seen from table 3.9 which also gives projections for target aimed at by the corporation.

Table 3.9: Trend of Increase of NBS Buses

Year	Number	Additional Information
1986	16	6 buses were launched, and the number rose to 16
1987	38	
1988	124	
1989	142	The number is per early 1989; 96 buses in Nairobi while the other 46 buses serving some rural districts.
1990	260	These are expected number of buses set by NBS as target
1992	360	

Source: NBS files.

NBS has made a mark in the city's public transport, not only because the buses are being run in a disciplined manner and increased commuter service capacity, but also because they offer alternative transport which many believe has started and will provide checks and balances in the commuter services in the city. NBS buses operate on the same routes as KBS buses. However, although they are expanding the number of service routes, they started only by serving the

heavy commuter routes.

NBS do not operate full time as KBS but operate mainly at 5.00 a.m to 9.30 a.m in the morning and from 3.00 p.m to 9.00 p.m in the evening. According to the management, full time operation has not been possible due to lack of adequate human and physical facilities. However, when adequate and effective support facilities will be available (by September 1989), most if not all the buses will be put on the road for the required 18 hours. Supply of transport services by NBS by the end of 1988 is estimated at 50,000 passenger journeys per day (source: NBS files). NBS currently employs 580 workers in all aspects of the running of the corporation.

In so far as discipline of the operating crew is concerned, NBS is having some of the most disciplined public transport service crew in the city. The disciplinary code of conduct for NBS stipulates that stern action is taken against any officer misbehaving or violating the laid down rules and regulations. For example, any officer who reports on duty drunk is dismissed on the spot. Never the less, during the survey, it was revealed (and some complaints have started reaching the corporation) that the NBS drivers and conductors were becoming lax in their discipline and often accepted or encouraged bribes in fare collection. Though only a few, some people complained of having been harassed and threatened to be taken to

police cells by conductors while using the NBS buses. The corporation, however, has instituted what it calls "very sophisticated methods" to catch the offenders. Already six such people have been netted and dismissed.

Future Plans by NBS

The corporation has already obtained more than Ksh. 600 million from the Government to put up a self-contained complex at its headquarters in Ruaraka, Nairobi. A modern office administration block with 114 offices has already been completed within the complex. A modern health centre is already in operation, and some 580 staff quarters are nearing completion. A workshop (big indeed) is in its final stages. A parking yard capable of taking all the 360 buses with a capacity to fuel and wash eight buses at a go is also receiving final touches. There is also a twin warehouse which will hold spare parts worth more than 10% of the total value of the 360 buses in operation. The complex (shown on plate 3.5 from paper cutting) will be completed in July 1989 and will be fully operational in September 1989, when more buses will be added to the fleet. When the complex becomes fully operational, an additional 300 workers will be recruited. The corporation has projected work force establishment of 1116 people. Those respondents interviewed during the survey frequently mentioned that services by NBS should be expanded. The reason for this desire is that they provide good services in terms

of lower fare charges, disciplined staff, orderly operation and very good attitude towards the sick and the old. However, the majority lamented that NBS buses are too few in many routes - hence resulting in very low frequency, a major factor considered in transport in Nairobi. Plate 3.6 shows the photograph of an NBS bus.

Profitability of NBS Services

For some reasons, probably because NBS were given as a grant, it seems that the NBS overheads are quite low. This in effect has meant that they can charge lower fares than other modes of public transport and still make profit. This is an advantage to the commuters. According to the management of NBS, the buses made Ksh. 15 Million profit between October 1986 and January 1989 giving an average profit of Ksh. 500,000 a month over that period.

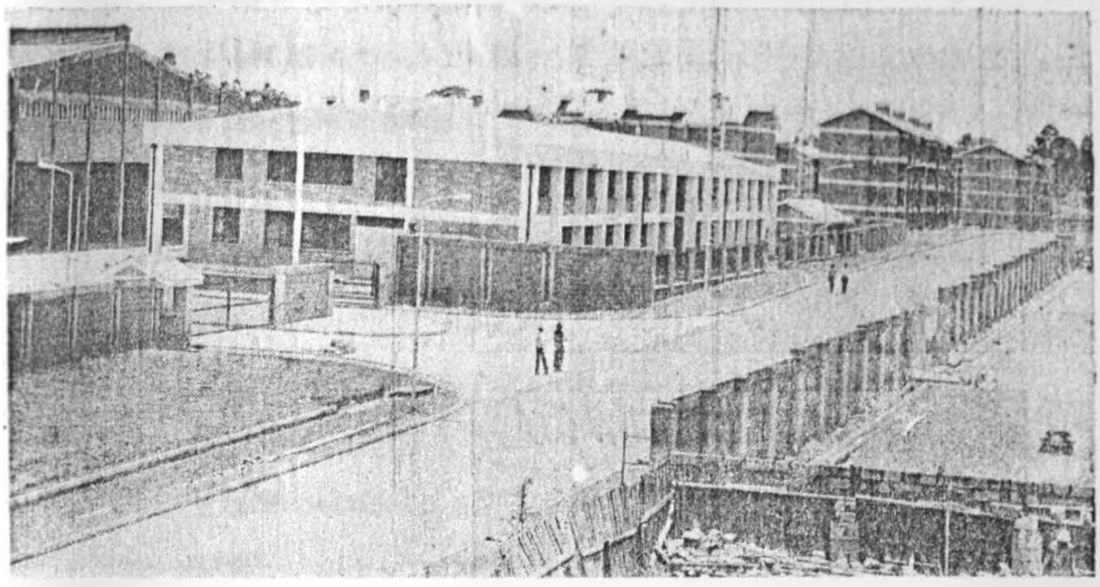


plate 3.5 Nyayo Bus Services Corporation (NBS) complex (Source: Standard Newspapers).

plate 3.6 An NBS bus

3.3.4 Kenya Railways Services

Kenya Railway Corporation operates two commuter trains on the routes terminating at Dagorretti and Kahawa respectively. The time schedules are as follows:

Departures		Arrivals	
1. Outward (evenings)			
Makadara	6.04 p.m	Dagoretti	7.20 p.m.
Nairobi	5.30 p.m.	Kahawa	6.27 p.m.
Inward (mornings)			
Dagoretti	6.40 p.m.	Makadara	7.46 p.m.
Kahawa	6.30 p.m.	Nairobi	7.30 p.m.

Source: K.R.C files.

The trains ply between Makadara, Nairobi station, Laini saba, Kibera, Satellite, Lenana and Dagoretti on one route; and Nairobi station, Makadara, Umoja, Dandora, Njiru, Githurai and Kahawa on the other route. The Kahawa route runs nine coaches while Dagoretti runs seven coaches. Public transport supply to the commuters by K.R. commuter services for the year 1987 is contained in the corporation's annual report for 1986/87 as 2,800 passenger journeys per day. Plate 3.7 shows the present level of utilization of the rail commuter services. The rate of increase of passengers using train as a mode of transport is increasing tremendously (considering that the service started with only 49 passengers per day in 1986).

Problems Facing the Commuter Rail Services

The commuter rail service is a heavy loss maker whose future depends on the availability of financial and other resources. For the commuter service to continue it requires a subsidy of about Sh. 1 Million per month. The corporation is also losing much money on the commuter service through mismanagement and unscrupulous conductors and commuters (particularly those that board and alight at the "halts" in between the termini) who alight without paying the fares. Other passengers do pay but the money never reaches K.R. corporation because the same conductors are unfaithful. The ticketing system is such that it is not shown where one boards the train to enable the ticket examiners to detect frauds.

Public Opinion

It is felt that commuter rail services is cheaper, more convenient and very punctual (regular). The arrival and departure times are religiously observed making it easy to plan one's day. KBS and Matatus avoid estates that may have very rough and muddy roads like Njiru. The residents in this estate enjoy the services of the train. Also, according to some commuters the train is more comfortable and cleaner than what they call 'unroadworthy matatus'. The train is much safer and travels through a less polluted environment. The train services has special fare of sh.1 for students. However, the Makadara-

Dagoretti route which operates from 6.40 a.m. and from 6.00 p.m has the commuters complaining that the evening service starts too late (one hour after leaving work at 5.00 p.m). Others indicate that they don't like using the train services because it takes a long time on the way (due to low speeds); although it is very punctual.

Fully-packed and seemingly overflowing, the commuter train leaves Makadara Halt for Kahawa.

plate 3.7 A commuter train in Nairobi: the level of utilization is high.
(Source: Nation Newspapers).

3.3.5 Market Shares of the Main Public Transport Modes in Nairobi.

Table 3.10 gives an estimate of the passenger journeys per day for the different modes of public transport for the year 1987, and calculates the market shares for the modes in the said year.

Table 3.10 Public Transport Market Shares in 1987 (Nairobi)

Modes	KBS	MATATUS	NBS	KRC	TOTAL
Passenger trips/day	389062	311000*	50000	2800	752862
Market Share	51.7%	41.3%	6.6%	0.4%	100%

* approximations from KBS and Matatu data.

Source: KBS, NBS, KR, and approximations by the author.

3.3.6 Public Transport Supply in Nairobi

Table 3.10 in section 3.3.5 gives an estimate of the public transport supply by the year 1987. The figure is close to the estimate calculated by U.T.M.S, 1987 (Urban Transport Management Seminar held in November/December 1987) which gave a figure of the supply as 23.2 million passenger journeys per month. This gives about 748,000 passenger journeys per day. Table 3.11 gives public transport fleet size by 1987. It is assumed that by 1987 the population of Nairobi and its environs that was being served by Nairobi based public transport is 1.6 Million.

Table 3.11 Public Transport Fleet Size and Number of Vehicles in Regular Use.

SECTOR	FLEET SIZE	BUS CAPACITY EQUIVALENT	NO.OF BUSES PER 1000 POPULATION	NO. OF LICENSED CAPACITY PER 1000 POPULATION
KBS	264	264	0.17	17
Small Matatu	900	144	0.09	8
Mini Bus	600	222	0.14	9
Country Bus	900	80	0.05	3
G.K Bus	40	40	0.02	3
2 Trains	15 coaches	11	0.06	0.7
Total		761	0.48	41

Source: KBS presentation to the U.T.M.S, 1987.

Although more recent figures on transport supply was not possible to obtain (except for KBS which keeps proper records), the above data on public transport supply indicates how inadequate the level of supply is when compared to the demand. It should be noted that the supply for 1987 given on table 3.10 includes those passenger trips made in very uncomfortable conditions (during peak hours) while standing in the available vehicles. However, an average of 0.48 buses per 1000 population is 20% higher than the average of 0.4 for a wide range of third world cities.

3.3.7 Modal Choices

Modal choice refers to the voluntary selection of the mode of public transport based on one's own esteemed qualities of transport. As to whether commuters/passengers in Nairobi make voluntary choices of modes of transport remains to be answered. Table 3.12 gives the survey data showing the actual

frequency of use of the modes of transport in Nairobi. (102 respondents gave response to the question requiring them to state the mode they frequently use).

Table 3.12 Actual Frequency of Use of Different Modes of Public Transport.

Sex/Mode	KBS	Matatus	NBS	Others*	Total
Male	33	36	1	5	75
% Male	44%	48%	1%	7%	100%
Female	8	15	2	2	27
% Female	30%	56%	7%	7%	100%
Total	41	51	3	7	102
% Total	40%	50%	3%	7%	100%

* Others refer to modes such as commuter train, private company buses, walking etc.
Source: Field Survey by the author (1988/89).

The table shows that most people use matatus more frequently than any other mode. Most of those who use matatu said that one important reason for using them is because they are more frequent than any other mode. Most women use matatus more frequently than any other mode, particularly during the evening peak hours because they don't like pushing and rushing for seats and spaces in KBS. This kind of situation is not existent when one takes a matatu or NBS bus from town to the estates because the commuters have to queue for these two modes of transport. NBS, however, has the lowest frequency at different terminals and bus stops because they are still few in number.

<u>Qualities in Modal Choices</u>

In so far as qualities considered in modal choices are concerned, 98 respondents interviewed gave

responses displayed in table 3.13 which shows the frequency of listing the qualities at the top (for most considered quality) and at the bottom (for least considered quality). On the basis of the qualities so considered as being very important by the interviewed commuters, the latter made choices of the modes they would use in Nairobi (all things being equal), voluntarily. Their frequency of choices of modes (for the main modes of public transport) are shown in table 3.14.

Table 3.13 Prioritization of qualities in Making Modal Choices

Quality/Factor	Top Priority Frequency %	Bottom Priority Frequency %
Fore/Cost	10%	23%
Safety	30%	11%
Comfort	10%	11%
Regularity	14%	5%
Frequency	18%	4%
Speed (fast)	18%	39%
Others		
- Alight anywhere	*	2%
- Music	*	3%
- Length of route	*	2%

* quality was never considered as having any importance that could take top priority. They were all taking bottom priority.

Source: Field Survey by the author (1988/89)

Table 3.14 Frequency For Modal Choices Based on Qualities (for the main public transport modes in Nairobi)

Mode	KBS	NBS	Matatus
% Frequency	62%	3%	35%

Source: Field Survey by the author (1988/89)

The main qualities of KBS were given as:

- they are fairly comfortable.
- Commuters do not have to change vehicles very frequently (at the city centre) when travelling a long distance.
- Fairly regular
- Stop at safe and convenient points (i.e at bus stops)
- They are reliable, and incase of any breakdown or accident, passengers can use another KBS bus.
- The buses have more and sufficient space for standing (even for tall people).
- Their operations are orderly.
- Generally cheaper than Matatus (in some routes) and their fares are fixed. They don't exploit passengers by taking advantage of certain circumstances (e.g. when travelling at night.)
- Their safety standards are high. However, KBS buses are slow and are easily caught up in traffic jams.

The qualities of NBS were given as:

- They charge low fares, hence cheaper
- have most disciplined staff
- obedience to traffic rules and regulations
- high standards of safety and orderly operation.

However, NBS are few and thus have low frequency.

The qualities of matatus given as determining their choice are their high frequency and manouvrability through jam which makes it a faster

means of travel. Otherwise, the blame on this mode of transport is so much that most commuters said that they use it because of the prevailing unbearable conditions of public transport.

Conclusion

The conclusion from the foregoing discussion is that most travellers (or commuters) in Nairobi do not make voluntary choices of the modes of transport they use. Infact, this study reveals that they choose the mode of public transport that is more frequent and may offer comfort in form of sitting place. This kind of situation unfairly puts matatus in a better position because they are most frequent, flexible and have high manouvrability power through traffic jam, (as shown in table 3.12), yet they do not offer many highly desirable qualities (expressed by the passengers interviewed,(as shown in table 3.13 and 3.14). Public transport operation competition taking place in such a situation where there is limited choice to make is not always beneficial to the travellers.

3.4 ROAD AND RAIL NETWORK FOR NAIROBI'S PUBLIC TRANSPORT.

3.4.1 Road Network

The road network of Nairobi City consist mostly of tarmac roads. The types of roads comprising this network range from the highest class of urban highway through arterial street (primary distributor) and collector street (secondary distributor) to local

street (access street). Also, in terms of sizes, the roads range from multi-lane double carriageway (one way traffic) to single carriageway (two way traffic) roads.

A number of junctions are signalized (mainly within and close to the central area of the city). Map 9 shows the main roads in the central area of the city. Table 3.15 gives the number of lanes for the main roads leading to the central area.

Table 3.15 Number of Lanes for Main Roads Leading to Central Area

Main Roads	Number of Lanes
Mombasa Road	2 X 2
Langata Road	2
Haile Sellasie Avenue	2 X 2
Kenyatta Avenue	3 X 2
Chiromo Road/Uhuru Highway	3 X 3
Limuru Road	2
Muranga Road	2
Park Road	2
Ring Road Ngara	2
Landhies Road	2 X 2
Jogoo Road	2 X 2

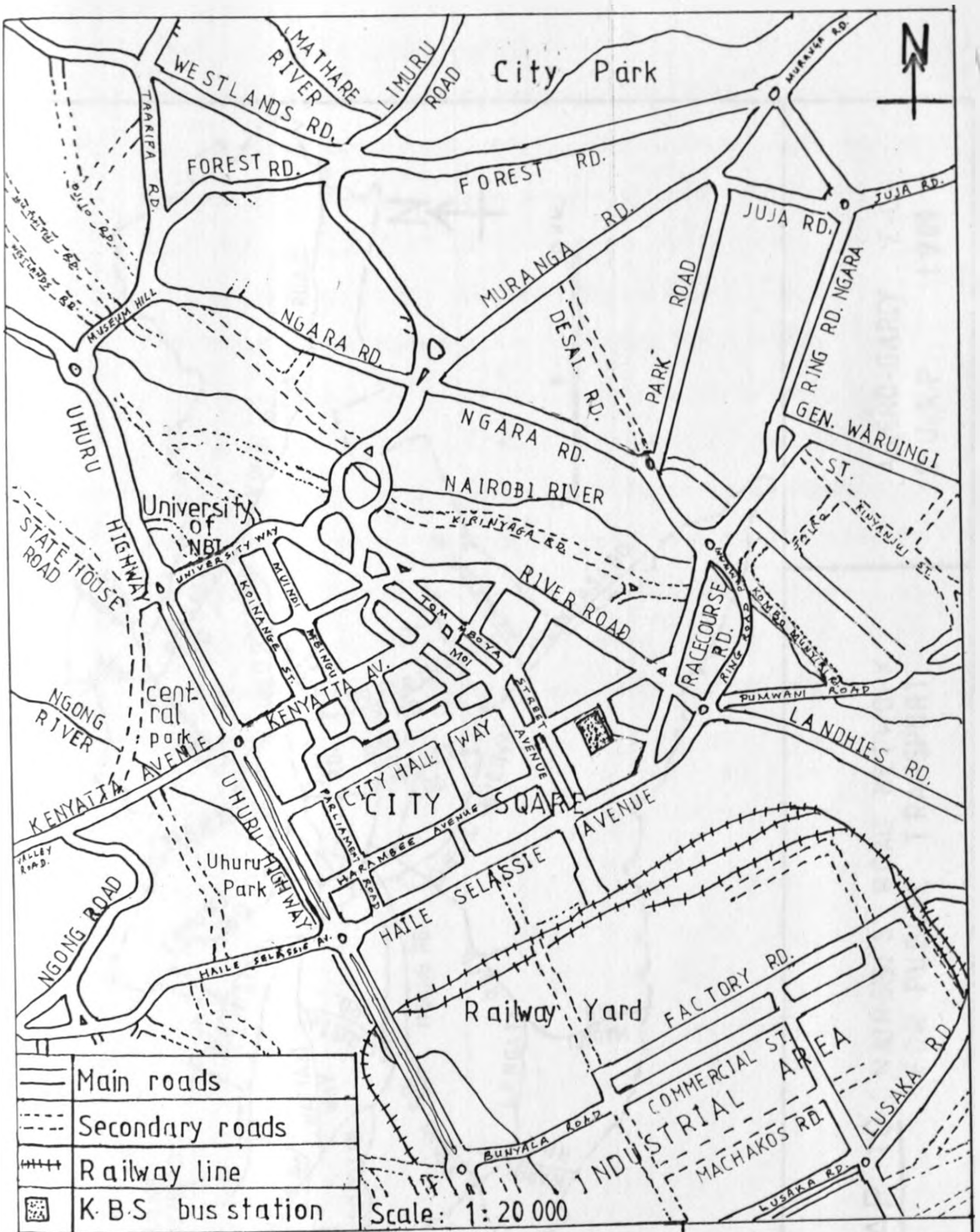
Source: Transport Unit, City Engineer's Department, Nairobi City Commission.

Map 10 shows the main roads comprising the public transport road network. Looking at the road network, it is observed that most roads going from one part of the city to the other are passing through the central area. There are no by-passes (except some few like Outering road which was not perfectly completed to serve as a by-pass). In one way it can be seen that due to the poor terrain in some parts of Nairobi, the

connectivity of different parts of the city through the road network is consequently poor. On the other hand, it can be seen in the light of demand for transport (hence for roads) leading from every part of the city to the central area where most activities and employment opportunities are located. In 1979, 67% of traffic made through and by-passable movement to the central area (Nairobi Urban Transport Project, 1979, page 14).

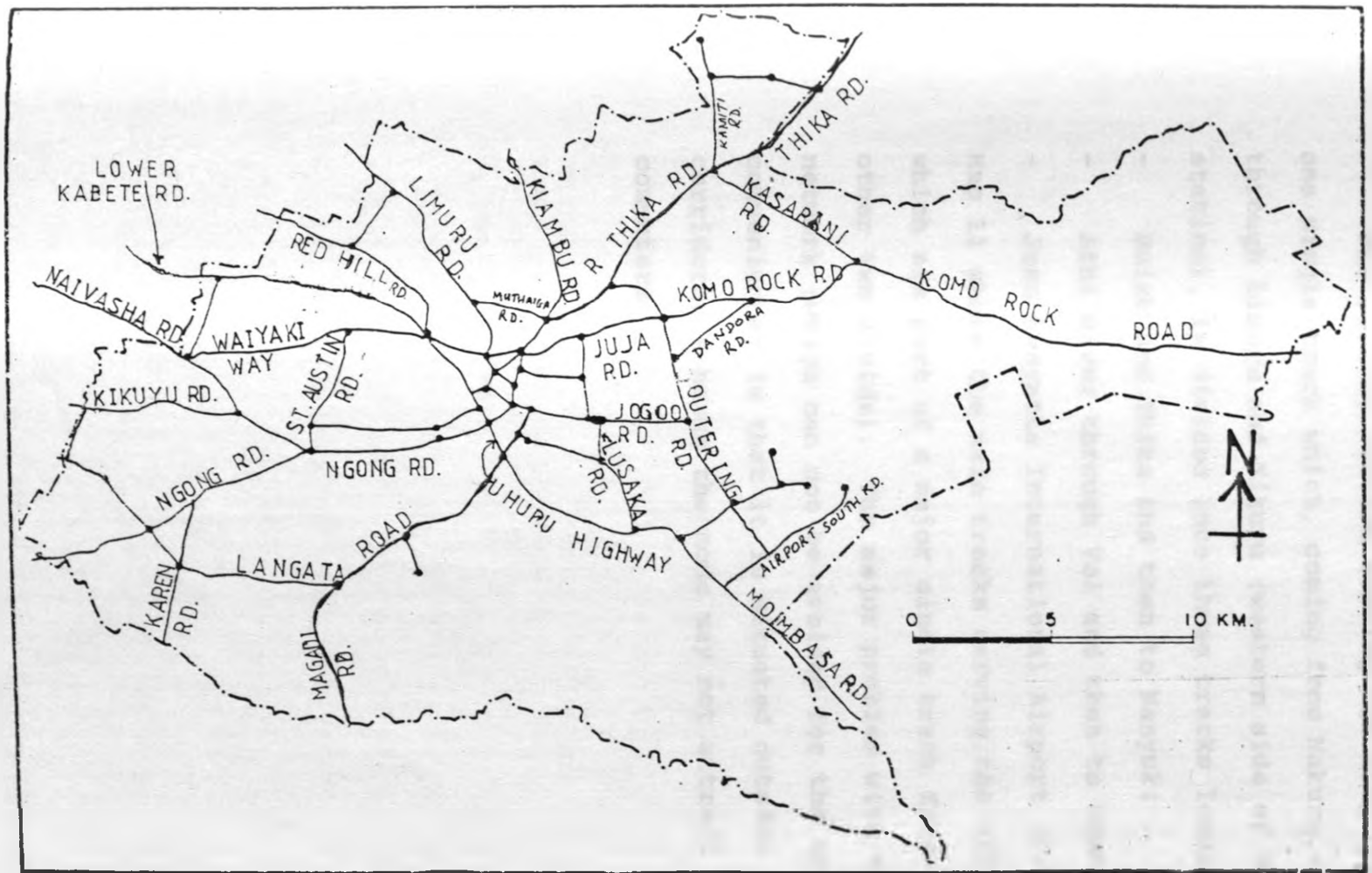
The problems within the road network can be summarised to include:

- the congestion phenomenon
- parking problem in central area
- lack of adequate by-passes to avoid passing through the central area
- small spaces left for bus stops (not adequate to accommodate vehicles)
- lack of proper maintenance of some roads
- floods and poor drainage
- bottlenecks at certain junctions
- lack of separate lanes to serve cyclists and other slow moving traffic such as handcarts.



MAP 9 : ROAD NETWORK IN THE CENTRAL AREA OF NAIROBI CITY

ABIERO-GARIY Z.C.
D.U.R.P. 1989



MAP 10 : NAIROBI'S ROAD NETWORK FOR PUBLIC TRANSPORT

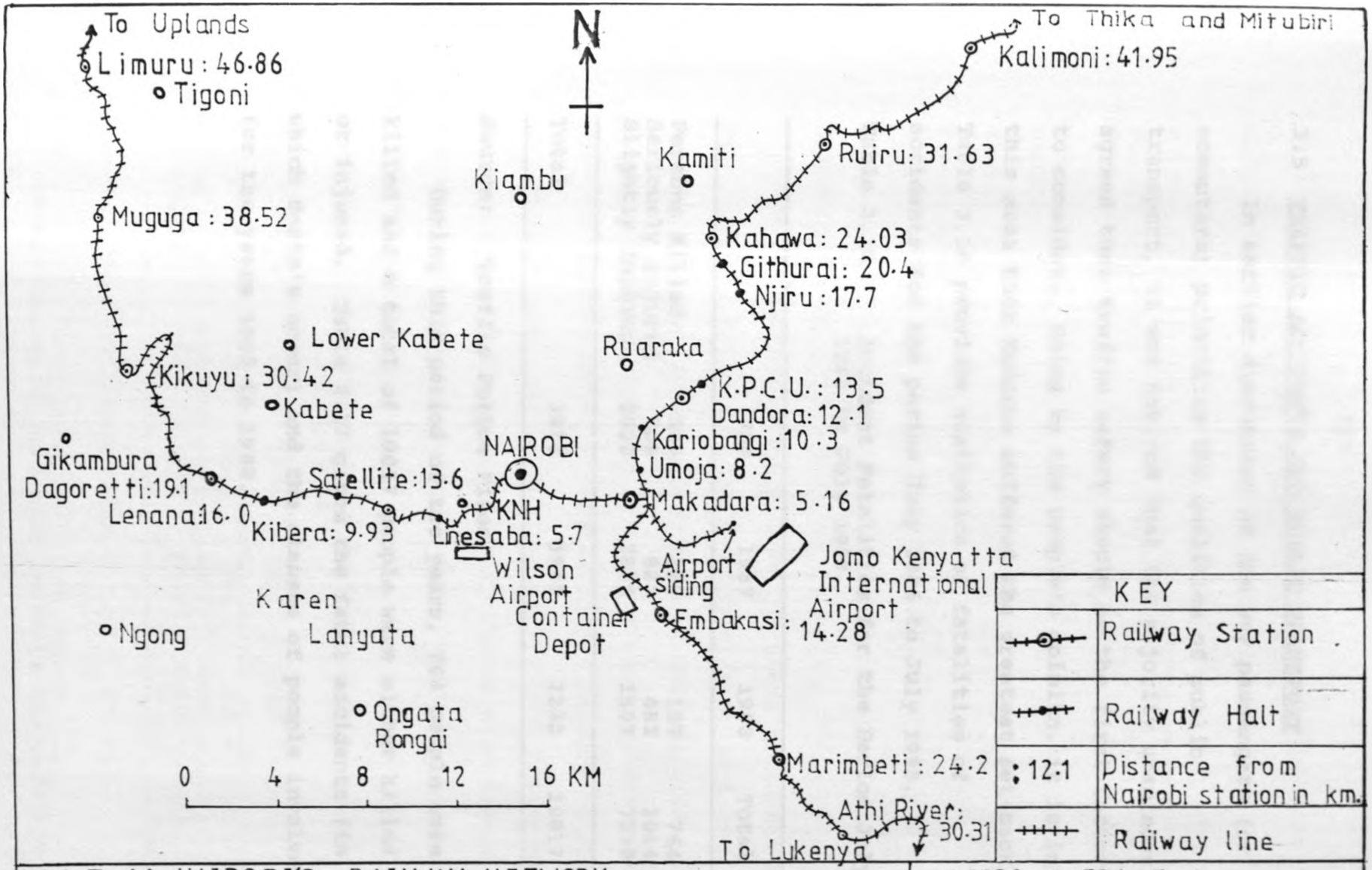
ABIERO-GARIY Z.C.
D.U.R.P. 1989

3.4.2 Railway Network

The railway network serving the city consist of one single track which, coming from Nakuru and passing through Limuru and Kikuyu (western side of Nairobi station), is divided into three tracks leading to:

- Ruiru and Thika and then to Nanyuki
- Athi River through Voi and then to Mombasa
- Jomo Kenyatta International Airport (J-K.I.A).

Map 11 shows the main tracks serving the city (all of which are part of a major single track from which the other two divide). The major problem with the railway network (which can not be avoided for the sake of convenience) is that it is situated outside the demand corridors; - hence the mode may not attract many commuters.



MAP 11: NAIROBI'S RAILWAY NETWORK : COMMUTER TRAIN ROUTE

ABIERO-GARIY Z.C.
D.U.R.P. 1989

3.5 TRAFFIC ACCIDENTS AND PUBLIC TRANSPORT

In earlier discussion of the way passengers (or commuters) prioritize the qualities of public transport, it was noticed that the majority unanimously agreed that traffic safety should be the first factor to consider. Going by the people's opinion, it is in this area that Matatus suffered the greatest set-back. Table 3.16 provides statistics of fatalities of accidents for the period July 1986 to July 1988.

Table 3.16 Accident Fatalities for the Period July 1986 to July 1988.

	1986	1987	1988	Total
Persons Killed	309	298	157	764
Seriously Injured	709	823	482	2014
Slightly Injured	2820	2826	1593	7239
Total	3838	3947	2232	10017

Source: Traffic Police Files

During this period of two years, 764 people were killed and a total of 10017 people were either killed or injured. Table 2.17 gives the fatal accidents (in which death's occur) and the classes of people involved for the years 1985 to 1988.

Table 3.17 **Fatal Accidents and Persons Involved (1985 - 1988) in Nairobi.**

	1985	1986	1987	1988	Total
No. of accidents	252	286	268	262	1068
deaths	264	309	298	274	1145
breakdown of persons.					
adults	218	268	268	246	1000
drivers	24	30	16	16	86
Passengers	47	57	65	42	211
Pedestrians	172	213	187	204	776
Children	33	41	30	28	132

Source: Traffic Police Files

Over this period there were 267 fatal accidents a year giving a total of 1068 fatal accidents in four years. This resulted in 1145 persons killed, giving an average of 286.25 persons dying from road accidents per year during the period. A total of 211 passengers died in the four years giving an average of 52.75 passengers deaths per year during the period. Table 3.18 provides the statistics of accidents by type for the years 1985-1989 in Nairobi.

Table 3.18: Accidents by type (in Nairobi) for the years 1985-88

Type/Nature	1985	1986	1987	1988	Total
Fatal	252	286	268	262	1068
Injury	2759	3225	3052	3008	12044
Non-Injury	1864	2075	2438	2048	8425

Source: Traffic Police Files.

These figures of accidents indicate the morbidity and mortality rates for Nairobi; and this clearly

points out the need for concerted effort by the community at large to tackle the great health hazard of road traffic accidents in the city.

3.6 PUBLIC TRANSPORT USER PROBLEMS IN NAIROBI: A SUMMARY.

Public transport problems faced by commuters or passengers in Nairobi are many and have different effects of varying magnitudes on different people as was realized during the study. Some factors which may determine gravity of public transport problems include socio-economic status, area of residence, place of work, income, time for reporting to work, period of the year, sex and others. Some of the main public transport user problems are discussed here under.

Delays and Unreliability of Public Transport

These problems result in lateness for appointment, work, school and other scheduled engagements one may be involved in. The consequences of delays are felt not only by commuters (or passengers) but also by those who are related in one way to those entangled and hit by the delay like employers, teachers parents, public transport managements etc.

The main cause for delay is traffic congestion witnessed in the form of frequent traffic jams. This has lowered the qualities of public transport by causing unreliability in the sense that maintenance of regularity is now not possible; and one is not able to predetermine journey duration. Infrequency of vehicles

is predominant causing heavy overcrowding and long waits at the bus terminals and bus stops. The main causes of traffic congestion were found to come from both planning, designing and maintenance of the transport infrastructures, and from human's practices in the city. The causes include:

- Insufficient (direct) linkage between different land use zones (for example, the industrial area, the central zones and the low-income residential areas.
- Lack of adequate space for bus stops to accommodate the stopping vehicles which leads to vehicles standing on the lanes and causing obstruction.
- Roads not adapted to traffic intensity; for example, some roads are smaller than traffic volumes they serve; and also, there is no progressive increase in road capacity on radial routes as the central area is approached.
- Cross-roads and junctions not well adapted to traffic cause bottlenecks.
- Parking obstructions.
- Lack of separate ways for the slow-moving traffic like bicycles and handcarts.
- Lack of discipline of drivers who neglect laws of the land and rules of the Highway Code that represents the custom and courtesies which are accepted as best behaviour on the road.

- Lack of satisfactory circulation in and around the central area.
- Occurrence of accidents, delays in action by traffic policemen, and delays in removal of broken down vehicles from the road.

These are some of the few causes identified during the study; some of them are shown on the plates 3.8 to 3.11.

Overcrowding in Vehicles, Stampede and Jostling Vehicles and Inadequacy of Transport Supply

These are very expensive problems, (particularly for the sick, the weak, women and the old) which plague the city's public transport. They make commuters tired, dirty, sick and also cause miscarriage in expectant mothers. There is lack of comfort resulting.

These problems are expression of (and are caused by) inadequacy of the supply of public transport, particularly at peak hours. School children and the working population leave for their homes in the evening during the peak hour. Inadequate supply of public transport in Nairobi is also expressed in the comparison of demand figures with supply figures (discussed above) which indicate that the former is much higher than the latter.

Accidents:

This is one of the worst problems facing the city's public transport system. The magnitude of

accidents rate is disappointing and causing social and emotional anguish. Overspeeding, reckless driving, use of unroadworthy vehicles (which are not properly maintained and repaired) are some of the high ranking causes of accidents. These can be traced back to competition among operators (particularly the kind practiced by Matatus), which, as had been mentioned earlier, is not to the advantage of the public transport users. Some accidents are, however, blamed on lack of knowledge and behaviour on the part of pedestrians and passengers. Road defects are also a cause of accidents.

Table 3.19 Traffic Injury and Main Causes (19886)

Drivers	Pedal Cyclists	Pedes-trians	Passen-gers	Animals	Obstruc-tion	Vehicle Defects	Road Defects
1325	55	1114	263	8	2	18	6

Source: Traffic Police Files.

It was suggested that the high rate of cause of accidents by drivers in Nairobi is due to overspeeding, disregard for traffic rules and driving for too many hours before taking a rest.

<u>Unfriendly, Inhuman (and sometimes arrogant) Behaviour of Operators</u>

This kind of problem is more dominant with matatus, although it is experienced (at a lower scale) in other public transport in Nairobi. In matatus the problem constitutes of harassment of passengers, use of

dirty language, smoking, playing loud music and dishonesty in giving back change and charging fares. In other modes it constitutes mainly failing to stop at certain bus stops (while people want to alight). The main cause of the problem in Matatus is due to disorderly and informal way of management and operations. There is no accounting for whatever happens so that one shoulders the responsibility.

High Fares

This is a problem mainly to the low-earning class that stay further away from the city centre and/or their places of employment. The rate of increase of fare is quite high, but people do not have any options. It was discovered that matatus hike fares at night in various routes, particularly when K.B.S buses have stopped operating. For example, Buruburu route for which Sh. 3.50 is charged as normal fare, they charge a staggering Sh. 6 to sh. 10. This is direct exploitation caused by greed for money, and dishonesty.

Other Problems

Dirty and unmaintained vehicles on the roads are a scare to the commuters. This problem is an indication of negligence on the side of managers or owners and operators of these vehicles.

Thieves and pickpockets are a menace to the commuters. This is caused by overcrowding at the bus-stops, and bus terminals and, also in the vehicles.

The above are only the main problems facing public

transport users in the city. There are, however, many others like worn out seats in the vehicles, abrupt breaking by drivers, acute shortage of vehicles in some routes, etc.

Conclusion

A study of the public transport in Nairobi as discussed above has revealed that public transport system in the city is in serious problem. The nature of the user problems shows that to solve these problems, a concerted effort and coordinated community action is a priority.

The problems discussed above squarely points fingers at the managers and owners of the public transport services, the traffic management department, NCC and other bodies concerned with provision and management of public transport in Nairobi. KBS plays a major role in this respect, and thus need more study attention.

plate 3.8 small lay-bys provided: inadequacy of bus stop facilities.

Plate 3.9: A junction bottleneck

plate 3.10 Parking obstruction

Plate 3.11 A hand cart sharing the same road lanes with motor vehicles.

plate 3.12 A rush for buses

Plate 3.13 A risk taking crossing the road: a common feature in Nairobi.

ENDNOTES FOR CHAPTER 3

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CHAPTER 4

4.0 KENYA BUS SERVICES LTD (KBS) IN PUBLIC TRANSPORT IN NAIROBI: MANAGEMENT AND OPERATIONS.

This chapter, after looking at the historical development of K.B.S., considers the various aspects of management and operations of the Company. A synthesis of every aspect considered is given based on the research findings of the field survey conducted by the author.

In discussing the management and operations of K.B.S., it is difficult to have a distinct boundary for identification of what aspects to be covered under management and what aspects are to be covered under operations. The reason for this difficulty is that, in public transportation study, certain aspects arise in both management and operations. In any case, operations of a transport firm is part of the overall management of the firm. Infact, in reference to management, the study focusses on operational management of the public transport resources (buses and staff); that is, how these resources are organised to meet the public transport demand.

4.1 HISTORICAL DEVELOPMENT OF K.B.S.

Quite abit about historical development of K.B.S. is covered in section 3.1 of the previous chapter. However, there are some few facts in the development

that are covered in this section.

It had been mentioned earlier that K.B.S. operations started in 1934 with a fleet of 13 buses. At that time, Nairobi had a population of 50,000 as compared to the estimate of approximately 1.3 million now.[1] Most of the operation was on the short routes; and the first routes were operated along Ngong Road one Kilometre around Golf Course, along Chiromo Road, Rhapta Road and half a Kilometre up Waiyaki Way.

As Nairobi continued to develop, population, commerce and industry continued to expand. As a result, the demand for public transport grew because this growing population had to be served with new and extended routes on the periphery of the city. To meet this demand, therefore, K.B.S. fleet was increased and the engineering facilities were developed at the Eastleigh Depot.

A fact worth noting in its development is that K.B.S. was first incorporated as a private company (when it first started) with an authorized capital of Sh.20,000. It was however converted to a public company in June 1950 jointly owned by the United Transport International (U.T.I) of London (a giant British Company managing and operating several companies over the world) with 75% shares and N.C.C. having 25%.

The franchise K.B.S. signed with N.C.C. in 1966 was to enable K.B.S. to operate a comprehensive

commuter network so that less remunerative routes could be supported by revenues from elsewhere in the network. Despite problems with the franchise agreement of late, the company has been able to maintain a broad level of service consistent with its franchise obligations.

Expansion has not been limited to the city only but has included towns adjacent to the city as well. As pressure on housing within the city increased, some people moved out to the suburban areas in search of cheaper housing; also, the number of those working in the city and commuting from home increased. Consequently, demand for public transport increased. The country bus services which were available were insufficient and requests were made to K.B.S. to operate regular services to these centres.

The first peri-urban service to be introduced in February 1982 was to Kiambu. Subsequently the Transport Licensing Board granted further licenses to other towns in Machakos and Kajiado districts. These were introduced gradually and now make up an integral part of the current network. The Company now operates scheduled services on over 60 routes in Nairobi and the surrounding peri-urban areas, and its scale of operation is clear from the following 1987 (December) figures below.

Staff	2450
Passengers per month (000's)	13000
Kilometres per month (000's)	2700

Source: K.B.S., 1987

The plates 4.1 and 4.2 show the kind of K.B.S. buses that were earlier operated in Nairobi.

Throughout the company's development, the K.B.S. has benefitted from the support and expertise of its parent company, the United Transport International (U.T.I), whose experience in passenger and freight transport is worldwide.

The double-deckers which the company operated until they were phased out in the late 60s.

Plate 4.1: A type of Double-decker bus operated by the Company until they were phased out in the late 1960s.

A look at an era gone by: The very first buses that the company operated in the city.

Plate 4.2 An example of the very first buses that the Company operated in the city.
(Source: Nation Newspapers; 7th Dec. 1987)

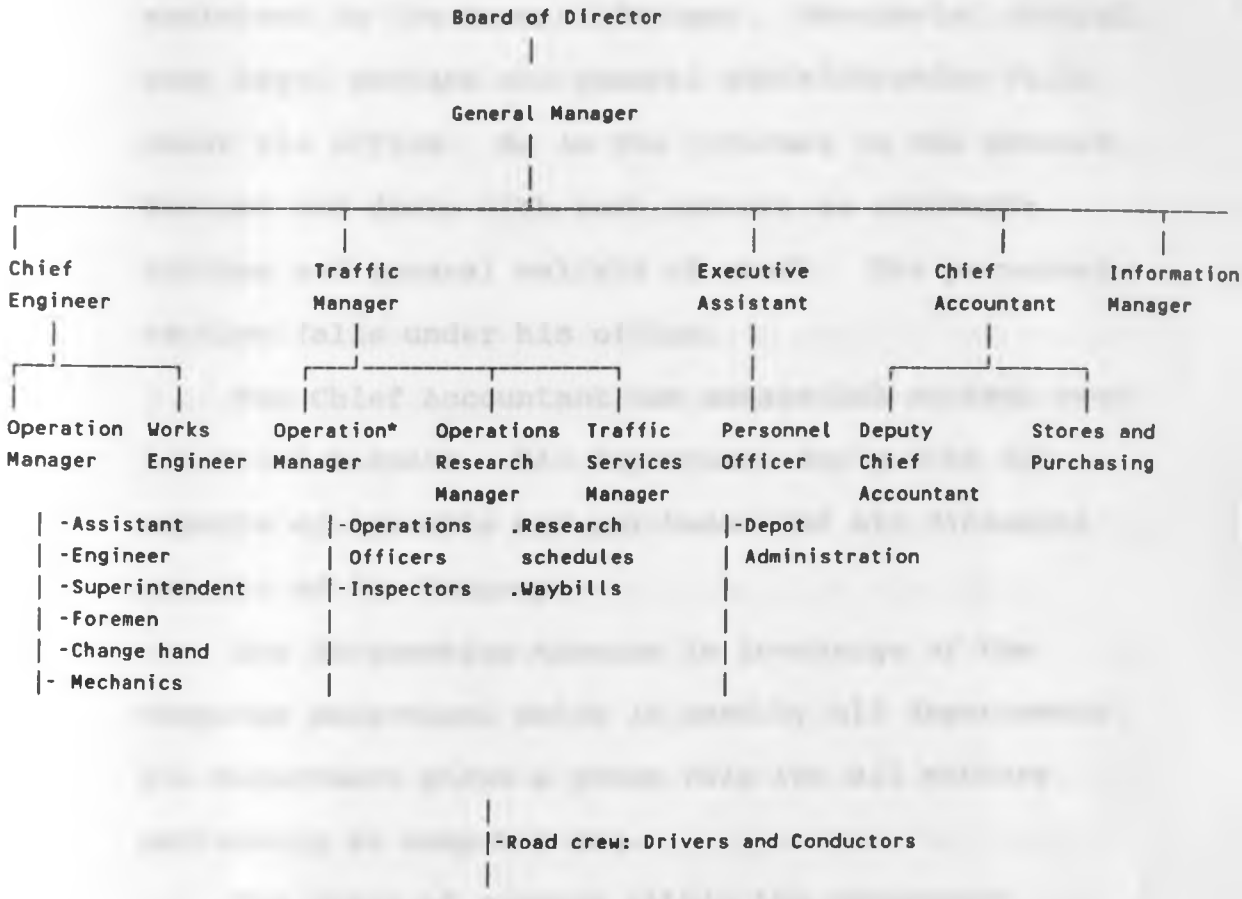
Plate 4.3: A modern K.B.S. bus

4.2 K.B.S. MANAGEMENT

4.2.1 Organizational Structure of K.B.S. Management

Besides provision of public transport services, K.B.S. operates as any other profit-making commercial enterprise. To accomplish its objectives, therefore, such an organization must have an organizational structure that utilises the resources of the undertaking in a manner that ensures provision of efficient, safe and high quality public transport services and yet not running at a loss. Although there must be control, such a structure should facilitate delegation of authority and allocation of duties as this becomes necessary in large organizations. The top management should be able to delegate some of its functions down the line through a laid down chain of responsibility provided by the structure.

Figure 4.1 provides a diagramatic representation of the organizational structure of K.B.S. management. In the structure, there are five responsible officers, each of whom heads a department and reports directly to the General Manager. These are: The Chief Engineer, the Traffic Manager, the Executive Assistant, the Chief Accountant and the Information Manager.
All these five departmental heads are below the General Manager who is the overall head of the Company.



* Operation Manager falls under two departments as a direct link between them. This is to facilita smooth day to day operations.

Fig. 4.1 Organisational Structure of K.B.S. Management
Source: K.B.S.

The chief Engineer is in charge of Engineering Department which is concerned with maintenance and repairs of buses, including purchases and storage of spare parts of buses and other items related with engineering.

The Traffic Manager heads the Traffic Department which deals with production and sales of public transport services.

The executive Assistant is the administrative

assistant to the General Manager. Managerial control over legal matters and general administration falls under his office. He is the informer to the General Manager and deals with such matters as accidents, strikes and general welfare of staff. The personnel section falls under his office.

The Chief Accountant has managerial control over financial matters. His department deals with all aspects of accounts and purchases and all financial aspects of the Company.

The Information Manager is in-charge of the Computer Department which is used by all departments. His department plays a group role for all matters pertaining to computer use.

The chain of command within the management structure is not too long to cause delay through bureaucracy when decisions are to be taken. Rather a chain of responsibility is laid down through which the top management can delegate some of its functions. Moreover, the K.B.S. operating unit is compact and the administrative centre is centrally located within the K.B.S. operated road network with all departments located at the only depot in Eastleigh. The supervisory staff that monitors the operation is linked to the depot through radio communication.

It should, however, be noted that if the existing chain of command is not wisely operated, it may be found that delays in handling of certain issues can

occur. Thus, flexibility must be permitted within the structure that will not only facilitate prompt decisions but will also allow the discussion of certain issues at levels that will give a fair and better hearing.

One issue to consider in this area is the medium through which suggestions from the staff considered as junior (the crew), could be given fair consideration. The crew complained of neglect of the suggestions they give, yet they are the people who know the actual problems of operation on road.

The other problem is concerned with the mistreatment of the crew by the inspectors. The bus crew does not have a channel provided by the company for handling such matters in amicable or other manner. Instead, the inspectors are given a better hearing in their cases with the crew members. This is a weakness within the system that provides a loophole for senior staff to look down upon the junior staff whose jobs are very important in, and directly related to provision of public transport services.

4.2.2 STAFF/PERSONNEL MATTERS

For any undertaking to be successful, its organization must facilitate the utilization of its available resources to produce maximum efficiency and economy. In a public transport service undertaking, like K.B.S., the personnel and machines (or equipments) are the resources through which transport service is

supplied to the travelling public. These two must be properly utilized if efficient public transport service is to be rendered; but the utilization and handling of matters of the former determines the efficient utilization of the latter.

4.2.2.1 Employment and Personnel

Most K.B.S. employees, if not all are employed on permanent terms with a well defined scheme of service. For any post or vacancy, candidates are interviewed and those that qualify in terms of both practical experience and academic standard (as may be determined for different posts and vacancies from time to time) are offered jobs. Training on the specific work or job to be performed by a fresh employee is given (depending on the kind of job and the experience the fresh employee has already attained).

Traffic Management and Engineering departments are very important in any public transport service, as they are directly related to the supply of the service and thus directly determines the quality of the services rendered. Drivers and conductors, among other employees in these departments, directly supply the services to the public and hence their conditions and terms of employment are important.

For anyone to be employed as a driver by K.B.S., he has to meet the following conditions:

- Be in possession of a valid driving licence for classes A,B,C and E which he should have held for

at least three years. At least two years experience in heavy commercial services is preferred.

- Be in possession of a reference letter from his last employer.
- Have a certificate of good conduct (from police).
- Be between 26 and 45 years of age. The average retirement age is 55 with 60 as maximum and 45 as minimum.
- Be at least 5'4" tall.
- Be medically fit. His eye sight must be medically proven good.
- Be able to read and write, although there is no condition specifying the quality of formal education.
- Be able to pass the test given by K.B.S. Those with P.S.V. licenses are preferred.

During the field survey conducted by the author, it was found that out of the eleven drivers interviewed, the ages of 3 drivers (27%) were ranging from 25-34 years, 7 drivers (64%) were ranging from 35-44 and 1 driver (9%) was in the range of 45-54. The drivers interviewed were all married. Table 4.1 gives statistics for the educational level of the drivers and those that have other kinds of training.

Table 4.1 Drivers' educational level and other training

	Below class 7	Class 7 or 8	Form 1-3	Form 4+
No. with another training	2	0	1	0
No. without another training	1	4	3	0

Source: Author's field survey, 1988/89.

Most drivers, therefore, are not having training in other fields apart from driving, hence less chances of leaving for elsewhere, except to a better transportation company or firm. Since they are married and aged above 25 years, they should be responsible people and committed to their work.

The ages of those employed as conductors must be in the range of 24-45 years. Previously, those whose educational level were class seven and above were employed; but now only those who attained at least a pass at form four are employed as conductors. Field survey showed that of the 14 conductors interviewed, 10 (17%) were aged between 25-34 while 4 (29%) were in the range of 35-44 years of age. All conductors interviewed were married.

Table 4.2 Conductors' Educational Level and other training

Conductors	Form 1-3	Form 4	Above Form 4
No. with another training	1	4	0
No. without another training	2	7	0

Source:Field survey by the author, 1988/89.

Inspectors are recruited mainly from among the conductors and drivers (as promotional post). They must have at least a form four certificate. Fresh form six graduates have also been recruited as inspectors but they take longer to know how to work well because they lack experience in working with the public, though they prove better afterwards. During the survey, five inspectors were interviewed, one of which was between 25-34 years while the other four were between 35-44 years old. All of them were of form four level of education, three of whom had no other kinds of training.

The minimum age of clerical officers is 18 years. They are normally recruited from within the company and training in accounts is a priority. They may also be recruited from without.

The engineering department has various kinds of personnel, skilled and semi-skilled. These include the Chief Engineer, Engineers, Foremen, Store Keepers and

Clerks, Engineering Clerks, Motor Vehicle Mechanics, Fuel Pump Mechanics, Auto Electricians, Body Builders, Panel Beaters, Welders, Spring Repairers, Radiator Mechanics, Painters, Sign Writers, Turners, Apprentices, Greasers, Oilers, Storemen, Tyre Fitters, Bus Cleaners, Forklift Drivers, etc. The skilled-manpower employed include those trained from technical schools, those who have obtained Government Trade Test certificates of grades one to three, and university graduate engineers. A few semi-skilled personnel (spanner boys) are also employed.

Supervisors or charge hands, foremen etc, are promoted from skilled mechanics with Government trade test grades 1, 2 or 3. Assistant Engineers and Engineers do vehicle maintenance; and the department is headed by the Chief Engineer.

Table 4.3 gives the number of staff of K.B.S. for the years 1979-1988, as per the end of each year. The personnel is divided into three major functional divisions.

Table 4.3 K.B.S. Staff for the years 1979 - 1988

YEAR	MAINTENANCE ENGINEERING	TRAFFIC OPERATING	ADMINISTRATION & MANAGEMENT	TOTAL
1979	432	1592	102	2126
1980	439	1605	154	2198
1981	447	1692	150	2289
1982	500	1673	122	2295
1983	512	1744	122	2378
1984	530	1678	114	2223
1985	546	1810	113	2469
1986	536	1816	111	2463
1987	558	1738	201	2497
1988	538	1759	184	2481

Source: K.B.S. files.

The table above shows fluctuations in the number of staff. The question is; what could be causing the fluctuations? During the field survey by the author, a total of 30 operating staff (i.e. the drivers, conductors and inspectors) were interviewed. The responses regarding the future of their work with the K.B.S. are interesting. 24 respondents (80%) said they would continue working with K.B.S., 4 respondents (13%) said that they were not willing to continue working and would stop working with K.B.S. soon, while 2 respondents (7%) were not decided. More interestingly, 16 respondents (67%) of the 24 who are willing to continue working with K.B.S. said they are going to do so because they don't have any alternatives, and only 8 respondents (30%) were willing to continue because they like working with K.B.S.

There has also been lack of adequate number of

operating crew (particularly the drivers) for K.B.S. They have also had some of their drivers moving to other transport firms (like N.B.S.). All these facts point to one direction: dissatisfaction and some sort of frustrations these employees are facing; and so they are moving to places with better working conditions and prospects.

The operating crew said that since they don't have K.B.S. workers association, there is no proper forum whereby workers can express their opinion and cases of frustrations, since the existing fora (Trade Union's branch and meeting held with the top management) are not sufficient because there is no full freedom to air views. Yet, the views expressed during the meetings between the workers and the management are rarely taken seriously because there is lack of follow up from the workers' side - a problem that would be solved by workers' association officials or workers' committee.

4.2.2.2 Training

The importance of first-class training schemes and facilities has been fully recognised by K.B.S. and a comprehensive programme of courses for the staff is provided. Implicit in the company's goals for road safety and customer service is a dedication to improving the quality of training in all areas of operations including top management. They recognize that training is the "life-blood" of a bus company.

K.B.S. programme for training covers all levels of

staff - technical, operational, management and accounting. They have programmes which provide contacts for the management and other personnel with personnel from other successful bus companies and corporations so as to gain exchange information of new development and improvements in the field of public transport.

The K.B.S. Central Training School provides facilities and programmes for training drivers, conductors, inspectors, mechanics, etc. Conductors and Inspectors may be fresh (untrained) or they may have had experience in working at such positions before. Whichever the case may be, they have to undergo training upon the appointment. The same is the case with drivers, mechanics, apprentices, etc.

Upon being selected by the company, each driver undergoes a four week rigorous inductions training course where a lot of emphasis is placed on the road training and road safety. The operating crew has to be aware of the routes, fares, handling of passengers etc. Drivers are also trained with Institute of Advanced Motoring for perfection in their work. As part of its on-going training programme, the K.B.S. runs remedial courses for all its drivers. These courses are mandatory for all drivers once a year and also aimed at those drivers who are picked out of the company's inspectorate for refresher courses to iron out some of their on-the-road weaknesses.

K.B.S. has an in-plant training scheme called Modular Training Scheme (MTS) for the supervisory personnel in all its departments to enhance efficiency and better working standards, safety in the workshops and safety on the roads.

K.B.S. has been training people in the Traffic Department and a number of them have obtained diplomas in Road Transport and become members of the Royal Society of Arts (R.S.A). Some of them have passed the Chartered Institute of Transport (C.I.T) examinations and are members of the institute. All supervisory and management staff in K.B.S. are encouraged to become members of the C.I.T. (which is considered a high qualification by Transport Industry employers). The employees (at managerial level) also attend Management Development Courses at Kenya Institute of Administration (K.I.A).

In Engineering Department, many workers have sat and passed London City and Guilds Examinations, Motor Vehicle Mechanics Examinations and Institute of Motor Industry Certificate Examination. The department has qualified personnel.

With the above training programmes, it is expected that the services given by K.B.S. would be the best not only in Kenya, but also compared to those transport companies in other third world cities. This is, however, not the case. K.B.S. is even complaining of a number of their trained personnel leaving for other

companies. It also complains of stiff competition from other public transport modes in the city of Nairobi. The opinion of the author is that with this kind of training K.B.S. can attract sufficient market. For this to happen, their services must be seriously improved. The company must therefore offer attractive terms and conditions of employment and other possible incentives (rationally given) so as to keep their well trained personnel. The complaints from the operating crew pointed to lack of concern, appreciation and trust by the K.B.S. management for the crew. The main areas they complained about include, salary, fringe benefits and services, treatment by senior staff, help when involved in an accident, accusations (which were described as inconsiderate and baseless), and leave of absence (when sick or when one has a problem). It is worth noting here that this situation, if not put under proper control, is capable of creating poor working atmosphere. To some extent, this is the case with K.B.S.

4.2.2.3 Fringe Benefits and Services

Fringe benefits and services are staff welfare provisions which are meant to keep the staff in a state of well-being and includes all steps taken by the management which serve to relieve the employee of worry and strain, safeguard his health, cultivate his interests and make his working life generally more congenial. They boost the working morale of the staff

and thus increase their productivity and efficiency at work.

The operating staff benefit from the following provisions:

Health Services: The company has a health clinic for its employees, and also, refer their sick employees to other hospitals and meets the expenses involved. However, the family members of the employees do not benefit from the services.

Cooperative Society Services: Huruma Cooperative Society helps the employees in saving regularly, borrowing wisely (at minimal interest charge of 1% per month) which includes borrowing for urgent financial matters (emergencies), educating the members on how to manage their finances and also pay dividends to the members.

Transport from work to the house is given through K.B.S. buses. The complaint in this area is that those who finish work late in the night take too long to get transport since the operating buses are quite few at such a time. However, there are transport arrangements to take home and bring to the depot those who are involved in the late night shifts and early morning shifts respectively.

Bonus Scheme for the operational staff (bus crew) is such that the bonus for each person is paid at the end of the month. However, incase an employee commits an offence considered to be capital by the company,

there is likelihood of missing a whole month cumulated bonus. The daily bonus given to conductors and drivers when paid together with salary at the end of the month, it is used on expenses other than daily up-keep of the crew. What this means is that the crew works on empty stomach during the other days of the month, since the company does not give any provisions for lunch. It would therefore be more reasonable and more beneficial to the crew (and for the sake of the quality of services) to give the daily operational bonus wages at the end of each day.

House Allowance: The crew is given Sh.600/= (before tax) for house allowance. Field survey showed that most of them reside in the low income residential areas in Eastlands (although there are some who reside in other low income residential areas like Kawangware, Dagoreti, etc.) where it is possible to get cheap housing services. Many of those interviewed complained that this house allowance is too little to afford any decent house in Nairobi now.

Overtime: The normal working duration is 45 hours a week. Any work done in excess of 45 hours is paid as overtime at a higher rate (1.5 times) the normal payment rate. Public holidays are also paid as overtime.

Leave: There are three kinds of leave. Annual leave ranges from 28 to 32 days per year depending on the number of years one has worked with K.B.S. When

going for annual leave, an employee is given fare to and from his rural home covering his wife and at most four children. Incase the employee does not use specific buses belonging to the company in agreement with K.B.S., they are paid cash money later upon production of receipts (tickets) for travelling. The transport allowance ranges from Sh.365 to Sh.405. The other kinds of leave are sick leave, unpaid leave and special leave.

There were complaints that there are some cases that deserve special leave (paid-off) yet management never gives considerations. Examples given included cases in which one's family member is sick or dead. The management does not accept arrangements for reduction of the days of annual leave to compensate for the number of days an employee was on genuine permission. Instead of giving them chance to compensate, their salaries for the month in question is reduced to reflect the number of days he actually worked. Even though it is very difficult to determine those who deservingly need special leave, particularly during pay days (usually at the end of months), the company should establish a system of handling the issue so that genuine and truthful employees don't suffer because of the unfaithful employees.

Other Benefits include provision of uniforms; free travel in K.B.S. buses while off-duty; and handling police cases which come up while on duty, and

giving up to sh.500 for bond to release those arrested by police while not on duty (to be refunded later to the company).

One other important means of motivating the staff is through company magazine (publication written by the staff for the staff) to stimulate interest in the undertaking. Chance should be given in the magazine for the staff to express their opinions, criticisms on the management, etc. so that their thoughts are known in order that solutions may be sought before the effects are felt. The taking-off of the K.B.S. news letter (called Bus News) has not been very successful to help the management in this direction.

4.2.2.4 Incentive Wage System: Bonus Awards

K.B.S. apply the Incentive Wage System in which bonus awards are given to employees for purpose of motivating them and improving quality of service rendered. The company has formulated a procedure under which drivers, conductors and inspectors are entitled to bonus wage. There are some kinds of bonus that may cover other employees also. The bonus wage to the operating staff is geared towards improving discipline, care for customers, and the task performance of the staff resulting in better quality of services, greater revenue collection and better handling of buses. The main classes of the incentive wage system are:

- Ordinary bonus,

- Driver of the year award,
- The top ten award,
- The team spirit award.

The bonus system is effected in the following way:

(1) <u>The bonus scheme for drivers</u>

(i) <u>Safe Driving Award</u>

This is awarded to drivers with clean records in a month, without accident or overspeeding. Tachographs (which records speed, time, distance operated, time when the bus is idle and in motion) are fixed in buses and charts are removed in the evenings. A driver with a clean record is entitled to sh.30/= per shift paid at the end of every month. To earn the bonus, drivers are required to have clean records for each day in a whole month. Incase a driver commits any offence, the offence is rated and given weight. The weights are of types 1 to 4 carry the following penalties:

Type 1 - lose a whole month's bonus,

Type 2 - lose a day's bonus,

Type 3 - lose half a day's bonus,

Type 4 - lose a quarter day,s bonus.

(ii) <u>Driver of the year Award</u>

This is a special driving award given once a year to the driver with the cleanest record in the company for a whole year. Such a driver is obtained from amongst the best drivers after a draw is made and is awarded the bonus. The cash bonus given is sh.15,000, sh.10,000 and sh.5,000 for the first , second and third

drivers respectively.

2. The Bonus Scheme for Conductors

(i) The Ordinary Bonus

For any shift assigned to a conductor, he gets a bonus if he works in accordance to regulations and commits no offence. There are two ways of determining the amount to be awarded as ordinary bonus to conductors as follows:

a) For those conductors whose shifts of the day fall on routes which are termed "predictable" by K.B.S., (and on days considered "predictable"), they are assigned a given minimum target fare collection per shift. Collections made in excess of the target serve as a basis for bonus payment. The conductor receives 50% of the fare collection made in excess of the set target. This is normally done for high demand routes whose fluctuations are not high - hence termed "predictable".

b) For those conductors whose shifts of the day fall on routes considered "unpredictable" by K.B.S., the cash bonus given to them is 2% of the total fare collections made.

The first way of giving bonus to conductors (fixing a target fare collection) has alot of disadvantage as the author has realized. It will make the crew struggle to get as much collection as possible above the set target even if it means using a vehicle

having some mechanical problems. It brings a lot of competition and overspeeding as well as rushing up people who are alighting. The result of all these, as was observed by the author in some routes, is deterioration in the quality of services. The use of buses which already have mechanical problems results in creating more problems in the bus, hence higher costs of maintenance and repair which raises the cost of operation. The opinion of the author is that the use of fixed percentage of the fare collection in giving bonus will minimise these problems since the crew will at least be assured of getting some money.

It should be noted, however, that the risk of losing the bonus (incase any offence is detected by K.B.S. management) is same as in the case of drivers (already explained).

3. Bonus Schemes Covering both Conductors and Drivers

(i) The Top Ten Award

This is a special incentive award for drivers and conductors who qualify for the highest bonus awards (for their daily operations). All drivers and conductors who qualify for ordinary bonus awards are entered for the draw and the best 10 drivers and 10 conductors are picked for the award. Those awarded are given 25% over and above the bonus earned each month. The top ten award is given monthly.

(ii) The Team Spirit Award

This is a bonus given to a conductor and a driver to enhance their team work spirit and cooperation while working in a bus. It is meant to encourage the crew to report together in time for their shift, to care for customers, cooperation between the driver and conductor in terms of the driver giving more time to the conductor to collect fares, and minimization of carelessness (like in driving) which may result in less revenue collection. Factors considered in awarding the bonus include: the conductor and driver working together for at least 22 days in any one month and issuing optimum number of tickets (depending on the route length). It should be noted, however, that the award is not affected by other mistakes already taken care of by the other bonus wages discussed above.

The opinion of the author is that if the crew is allowed to work together for too long, they may become so used to one another and collude with one another. This may have bad effects and the award may after all not have any meaning. For example, they may enter into funny financial deals (to deprive the company of money), and may develop some unsuitable operation techniques for their own benefits.

4. Inspectors' Bonus Wages

The K.B.S. operation is divided into three basic areas or zones. Within each area there are inspectors. The inspectors in each area are awarded bonus depending

on the performance of the buses operating within their areas. Aspects considered include revenue return and efficiency in ferrying passengers and good handling of patrons (measured in terms of minimum complaints) because these factors reflect the quality of supervisory work of inspectors.

5. Special Bonus Scheme Covering Drivers, Conductors, Mechanics etc.

(i) Public Holidays: All drivers, conductors and mechanics who work on public holidays are regarded as working on overtime basis and are entitled to overtime payment for all hours worked. The rate of payment is 1.5 times the normal hourly wage rate. The basis of this is that any work beyond 45 hours a week is entitled to overtime payment. When preparing rota for crew to work on public holidays, care is taken to ensure that all drivers, conductors and mechanics have equal chances of working during public holidays.

(ii) 20 Years of Service: In this case, every employee of the company from top management to bottom scale, in recognition of long service, is entitled to cash award after working with K.B.S. for 20 years.

The awards/bonus wages explained about above are instrumental in improving the morale of the operating staff and if the weaknesses observed in each case are removed, the objectives will be achieved. If the conditions for getting the awards are too stringent, many of the staff will give up trying to work harder to

get the awards. During the survey it was found out that some of the operating staff interviewed have the opinion that certain bonus wages are too difficult to be won. If the majority of the employees harbour this belief, the aims of giving the awards will as well not be realized.

4.3 OPERATIONS OF K.B.S.

4.3.1 K.B.S. Route Network and Route Assignment

4.3.1.1 The K.B.S. Route Network

At present K.B.S. operates city, peak and peri-urban services. The company operates regular scheduled services on 90 routes covering a total length of network of 1,867.6 km.

Map 12 shows and map the K.B.S. route network. K.B.S. covers 2.7 million km per month in their operations. Table 4.4 gives the evolution of the number of kilometres covered by K.B.S. operations for some years between 1966 and 1987.

Table 4.4 Distance covered by K.B.S. operations (1966 - 1987)

Year	Distance in millions of km.
1966	8.2
1973	19.0
1974	21.2
1975	22.5
1985	30.8
1987	32.4

Source: K.B.S.

K.B.S. maintains a Long Route System of operation. This is a system in which buses make long trips picking people from different traffic generation areas and dropping at their destinations and continues for a while before making back trip. For example, in Nairobi, most K.B.S buses operate from the residential areas through the town centre and to other residential areas before making back trip to the original residential area through the town centre again. The opinion of the author is that the Long Route System has important operational advantages and, therefore, gives K.B.S. advantage over the other modes of public road transport in Nairobi. (like matatus and most N.B.S. buses) which maintain Short Route System. The long route system is capable of meeting travel desires with minimum of interchanges, minimum inconveniences of changing modes and minimum fares charged for trips.

However, K.B.S. network is determined by the existing road network which has low capacity and consists of most (if not all roads) approaching the central area with very few by-passes linking the other land uses like residential areas without necessarily approaching the Central Business District (C.B.D.). Another problem with the K.B.S. route network is that most of them intersect at CBD and thus increases congestion in the area and reduces the operational speed, frequency and regularity and hence bears a negative influence on the efficiency and effectiveness

of K.B.S. operations.

The K.B.S. current route numbers and their origins and destinations are given in appendix 1.

K.B.S. has only one depot in Nairobi city situated at Eastleigh on General Waruingi Street.

4.3.1.2 **Assignment/Allocation of Buses to Routes**

The criteria for assigning buses to routes include the following:

(i) **Demand**:

The research management section organizes for collection of data which is then analysed to determine the actual and latent demand for public transport services; and decisions on the number of buses to assign to a particular route are based on such research findings.

(ii) **Franchise:**

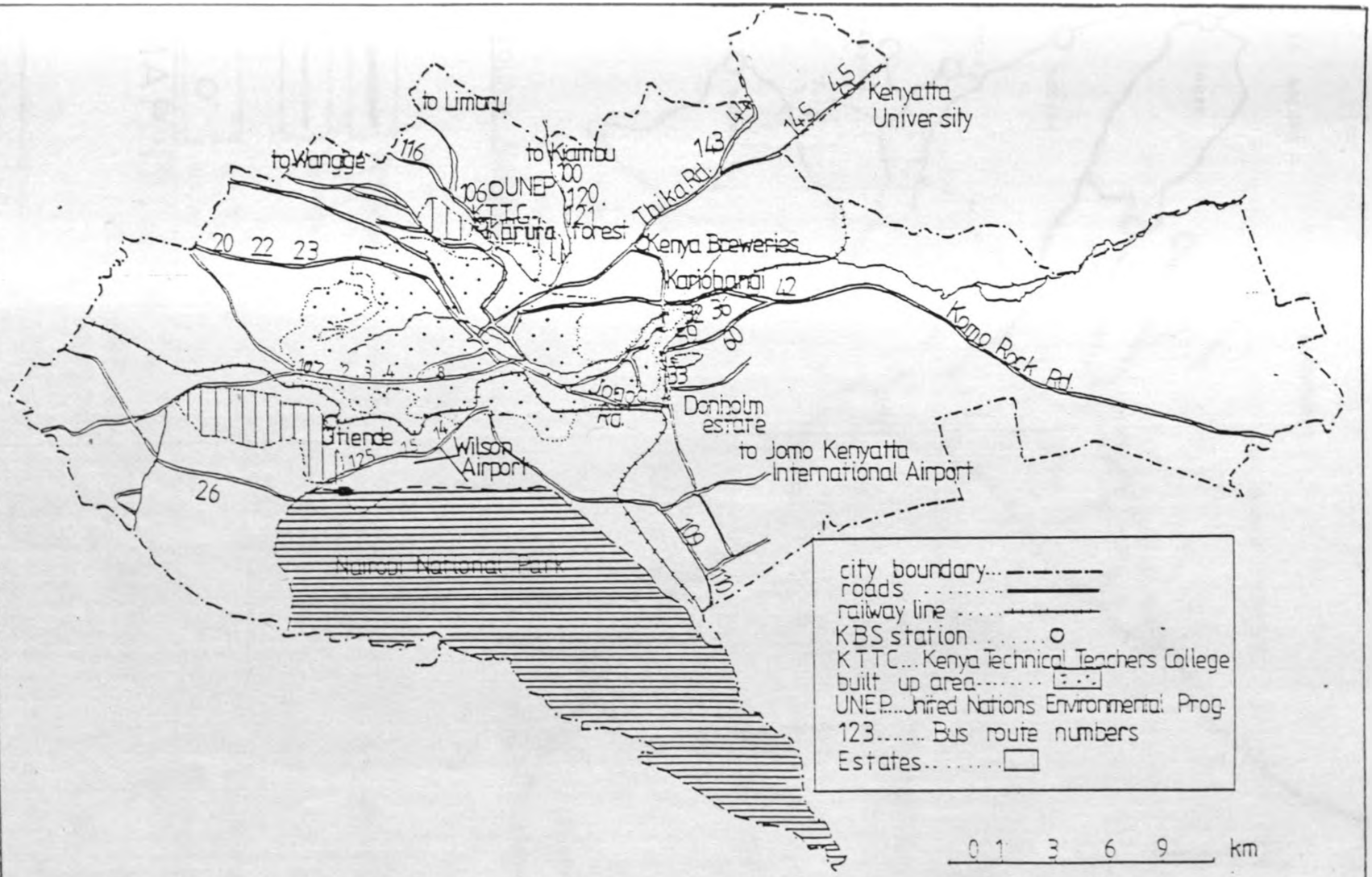
K.B.S. signed a franchise with the Government and hence has social obligation to serve all routes (even new ones like Kayole) within the city even if the routes do not have adequate demand. However, the level of service given to any route depends on the demand for the services.

(iii) **Request by the Commuters**:

K.B.S. responds to requests by commuters to either introduce a service or to increase the level. However, research is carried out to find out what level of service should be supplied to them.

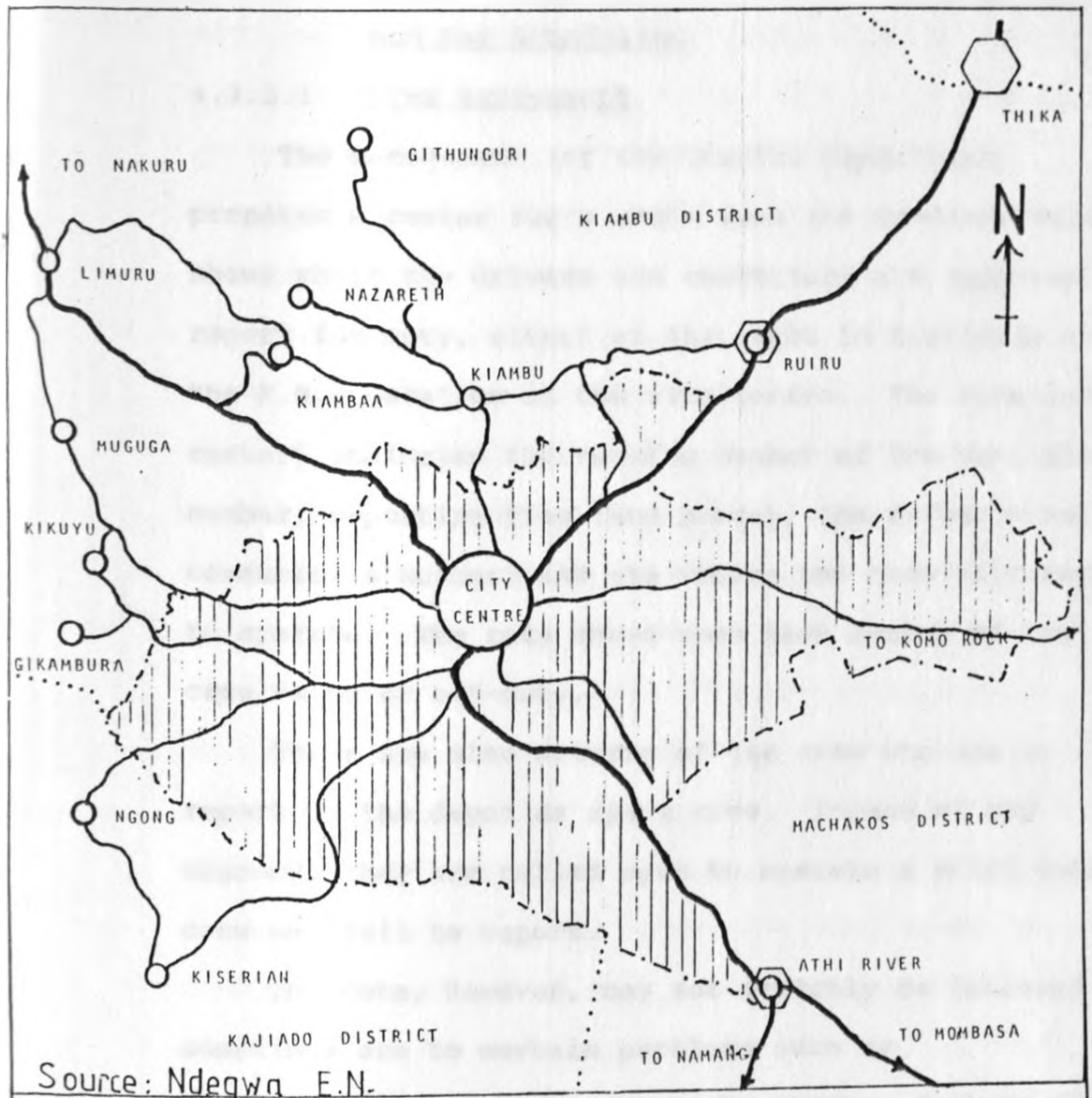
The problems identified in this area during the

research survey is that the terms and conditions of the franchise under which K.B.S. serves the city is not strictly adhered to by the N.C.C. What this means is that the routes served by K.B.S. at a loss cannot be compensated for due to the competition K.B.S. is facing. The very likely thing to happen is that K.B.S. is going to withdraw from loss making routes and this will be a blow to the commuters in such land use areas.



MAP 12 : K·B·S ROUTE NETWORK FOR NAIROBI CITY

ABIERO-GARIY Z·C·
D·U·R·P· 1989



Source: Ndegwa F.N.

LEGEND

INTERNATIONAL RD.

BUS ROUTE

CENTRES OUTSIDE CITY BOUNDARY SERVED BY CITY BUSES

CITY BOUNDARY

DISTRICT BOUNDARY

MAP 13: K.B.S. ROUTE NETWORK FOR NAIROBI CITY AND ITS PERI-URBAN AREA

ABIERO-GARIY Z.C.

D.U.R.P 1989

4.3.2 Crew Assignment, Supervisory Staff Allocation and Bus Scheduling

4.3.2.1 Crew Assignment

The management (of the Traffic Department) prepares a roster for a whole week (on Sundays) which shows where the drivers and conductors are supposed to report for duty, either at the depot in Eastleigh or at the K.B.S. station at the city centre. The rota (or roster) indicates the running number of the bus, shift number, reporting time (and place), the driver's and conductor's number; and the routes the crew will have to operate. The rota shows when each member of the crew is on or off-duty.

There are also members of the crew who are to report to the depot as spare crew. Incase of any urgency, they are called upon to operate a shift whose crew may fail to report.

The rota, however, may not strictly be followed sometimes due to certain problems such as unavailability of buses due to breakdown, failure of some crew members to report on duty and lateness of some crew members. These factors may cause changes in shifts which in turn interferes with the pre-arranged system of providing services (per schedules) and cause inconveniences to the commuters and resulting in low revenue return for the company. Frequency and regularity of buses are therefore interfered with seriously in this way.

Another problem identified in this area is that many members of crew (drivers and conductors) were complaining that some shifts are too long for proper operation of a bus service in a busy place like Nairobi. The survey revealed that although normal duration for a shift is 7.5 hours (i.e. 45 hours a week), the actual duration of shifts ranges from 5 hours to 10 hours. Worse still, some of these shifts start from early in the morning and go over mid-day. Now, since the company does not make specific provision for lunch, many of the crew members continue working in these long, shifts on empty stomach. The author's contention is that with the attention and concentration required to drive in this busy city, even the best training and high quality incentives may not absolutely prevent drivers from causing accidents in such conditions of work. No wonder some commuters interviewed complained that some K.B.S. conductors are easily worked up and that some drivers are at times negligent.

The rota preparation is done is such a manner that members of the crew work in different service routes and buses, so that they have a taste of all routes. This avoids specialization on routes and buses by members of the crew. Specialization on routes may be a source of loss of revenue (to the company) resulting from collusion of the crew with the passengers they deal with everyday. Again, if a driver specializes in

driving only one kind of bus, he will not be able to do well with other kinds incase a situation calls upon him to do so.

4.3.2.2 Supervisory Staff Allocation

The supervisory staff (inspectors) supervise the operating crew and control the traffic flow on the routes. The Chief Inspector is assisted by a team of inspectors and ticket examiners of varying grades whose duty is to ensure that the conductors and drivers do adhere to the regulations and rules of operation. It was mentioned earlier that for inspection and supervisory purposes, Nairobi is divided into three areas of operation. By making regular surprise checks, inspectors are supposed to control the flow of traffic in their zones of operation in order to eliminate loss of trips. They also ensure that the drivers keep a high standard of care to facilitate road safety for the bus, passengers and other road users. They also ensure that the conductor collects all fares and issue tickets and does not harass passengers.

During the survey, the author learnt that some inspectors are so rude to the crew that they publicly harass the crew in the face of passengers. The result of this is that the passengers underrate the crew and think them failures in life and so mocks them, belittle them, abuse them, etc. This gives the crew very hard time. One wonders whether this is the kind of way inspectors are trained to behave. In cases where the

crew negatively responds to counteract the mistreatment and harassment by inspectors, the latter reports them heaping false accusations upon them. The Chief Inspector and the top management should do something before this situation goes out of hand.

The other problem in this area is in night inspection and supervision. There are some areas that have security problems and so inspectors cannot stay in such areas. The result of this is that the crew misbehaves at times to the extent that they don't pick commuters from all bus stops and also, they don't stop for those alighting at the right bus stops.

4.3.2.3 Bus Scheduling

It was mentioned earlier that K.B.S. operates scheduled bus services. This is meant to improve the frequency and regularity of the services at different locations in the city.

The management prepares a running card in which, among other things, the points along the route to be served by the bus, and the times at which the bus is expected to be at those points are recorded. The operating crew are supposed to strictly obey the schedules within the running card. An example of such a card is shown in appendix 2. If followed, running card improves reliability of bus services. Reliability implies punctuality and regularity which ensures timely departure from and arrival at terminals of bus services, and also ensures passing through intermediate

bus stops at the right times.

The problem facing the company in bus scheduling and regularity is that there are several factors, some of which are external and beyond K.B.S. control, which easily affect and therefore upset the schedules and regularity of services. These factors include the crew strictly adhering to the time schedules the running card, satisfactory condition of the operating buses and absence of delays and traffic jams en route.

The reliability of K.B.S. is indicated by the waiting of passengers at the bus stops. Surveys carried out by the K.B.S. show that the average waiting time in residential areas during the morning peak is 8 minutes and 7 minutes at the city centre in the evening.[2] While this appears to be a fairly short waiting time, it was observed by author during the field survey that on some routes, it is much longer. For some routes, a bus may appear after 45 minutes or more. It was also observed that in the CBD area that the buses were not in schedule or not properly spaced. It is not uncommon to see two or three buses of the same route number plying in quick succession in one and the same direction and route at certain times. This results in longer waiting time for the next commuters, lesser utilization of the buses and hence lower revenue return. Maintaining proper spacing of bus timings and schedules is thus very important.

It was realized during the survey that buses which

become so late and out of schedule are re-scheduled. If this becomes rampant it reduces the quality of services since the reliability is completely disturbed.

A problem observed by the author is that during the time of changing the staff (operating crew) at the K.B.S. bus station (usually between 12 noon and 2.00 p.m.), the passengers are left in the bus waiting for the next crew for a long duration (which may range from 10 - 30 minutes or even more). This inconveniences the passengers who may be in a hurry to reach certain places. This may be happening due to either the out-going crew arriving late or taking their time leisurely. Whichever the reason, this area needs improvement.

K.B.S. sets time of starting and ending the bus services. For now, earliest shift starts at 4.22 a.m. (with service/bus route number 28) while the latest shift ends at 12.20 a.m. (with bus route number 41). The buses which used to operate throughout the night were stopped due to problem of supervision at such times of the night. This puts the residents of Nairobi who do not own cars in a tricky spot in that when one is sick, it would be very difficult to help the situation; and even if one arrives in the city late at night it is not possible to travel to his residential place.

4.3.3 Fare Policy, System of Ticketing, and Money Transactions

The fare policy of K.B.S. company is that every zone of operation shall be self-supporting. If one route in a zone is run at a loss, the other part of the zone should compensate for the loss.

K.B.S. charges a graduated fare system which is principally dependant on the distances travelled, so that fares increase in proportion to distance travelled. In working out the fares, the city is divided into concentric zones with increasing distances from the city centre. The zones are identified by certain fare stages. Within any one zone, all those people alighting at different bus stops are charged the same amount for fare.

In charging fares, however, there are some few concessions for certain areas based on social factors. For example, students are charged low fares (fixed at sh.1/=), the disabled are also treated like students, low income residential areas tend to be charged lower fares, and those going to Kenyatta National Hospital are charged low fares. Current fare zones are shown in appendix 3.

All passengers travelling pay their fares in the bus and are issued with tickets upon the payment. Ticket machines are used to facilitate quick issue of tickets. In most cases, there is only one conductor collecting fares and inspectors regularly enter the

buses to check the tickets.

During the field survey, some problems were observed. During peak hours the buses are overcrowded with passengers and it is impossible for one conductor to collect fares from everyone. Sometimes, passengers travelling short distances jump out when they see the conductor approaching. This results in lower revenue return for the company. The problem of giving "change" to alighting passengers is predominant. The company should therefore look for a better system of issuing tickets which will not result in restricting the productivity of bus fleet and running staff, and causing delay and frustration to the travellers. One method open to them is giving conductors some money for "change" and also, utilizing two conductors per bus.

The other problem facing K.B.S. in this area is the attack of the crew by thugs and gangsters during night shifts. The attackers cause harm to them and snatch the day's collections. This is a problem beyond the management's control as such, but the author believes that with special arrangements with the Government the problem can be solved.

4.3.4 K.B.S CREW DISCIPLINE AND COMMITMENT

The discipline and commitment of the crew (drivers and conductors) is very important. This is because their productivity can be measured in economic (physical and monetary) terms.

4.3.4.1 Crew Disciplinary Method/System

There is a Disciplinary Committee through which disciplinary actions are taken against the crew in cases of indiscipline.

The system is such that incase of any misconduct, the immediate supervisor (inspector) reports the misconduct in a complaint form. The misconduct may also be realized from "way-bill" which is recorded during the operation. Formal complaint is then served to the employee involved. The employee may then be called to appear before the Disciplinary Committee.

Punishment varies depending on the nature and gravity of the offence. The punishment vary from verbal warning to up to several days suspension or even dismissal. However, there are some kinds of misconduct which only require counselling, while others are punished through non-payment of bonus to the offender. In cases of serious offences where the offenders are taken to the Disciplinary Committee, provision is made for a right of appeal and to representation by the shop-steward (who is the Trade Union leader of K.B.S. Trade Union branch).

In the area of disciplinary system, the crew complained of witch-hunting by the inspectors. It would, therefore, be important for the company to find out a more rational way of establishing the offences committed by the crew before taking any drastic measures.

4.3.4.2 Crew Commitment and Discipline

The commitment and discipline of the crew was measured by the author by looking at K.B.S. records on the crew staff position which shows the crew strength (total number of crew members), the number on duty, the number absent, etc. The records on the run out position of K.B.S. buses were also looked at.

Table 4.5 gives the averages of cases of crew staff position for the year 1988 while Table 4.6 provides the 1988 K.B.S. run out position of morning shifts.

For morning shifts, a driver or a conductor who reports for duty after 6.30 a.m. (so that their shift does not start by 7.00 a.m.) is regarded as absent and are not allocated any work. There are also those who just decide to be absent. The punishment for such crew members is that they miss a whole day's wage. They many also receive warnings or may be suspended and may lose the bonus wages. Those who report late as at 6.30 a.m. or before they are allocated duty but have to explain in the complaint sheets why they report late. Depending on how satisfactory the reasons are, the punishment could range from warning to losing part of the day's wage, and sometimes even part or whole of the bonus wage.

The tables 4.5 and 4.6 show that for the year 1988, only 77.8% of the drivers and 82.0% of the conductors worked in their shifts as scheduled. It is

even more shocking to note (from table 4.6) that 57 shifts (21.8%) were not despatched daily for the year 1988. It was learnt from the management that the absenteeism and excuses to be off-duty is very prevalent during pay days. What this means is that averagely, 62 shifts per day (in 1988) were not run as scheduled. Consequently frequency of buses are reduced, regularity distorted and hence reliability drastically reduced. This in turn interrupt duty and trip schedules and seriously reduce the qualities of transport service rendered by K.B.S. However, the effect is not only on the commuters but also on the company. The daily collections are reduced and their market share value is reduced since the quality of service makes it less attractive to customers who then opt for other modes of travelling.

The other aspect in mind is the increase in operation costs. It is more expensive to pay for overtime. However, since the management has to hire the crew off-duty, it has to meet the extra costs.

It can be concluded that the punctuality and discipline of the K.B.S. crew is low and this reflect their lack of commitment to duty assigned to them.

Table 4.5: K.B.S. crew staff position for the year 1988

	Drivers (1988 daily averages)		Conductors (1988 daily averages)	
Strength	714	100%	738	100%
On duty	556	77.8%	605	82.0%
Annual leave	53	7.4%	54	7.3%
Unpaid leave	3	0.4%	6	0.8%
Sick	21	2.9%	27	3.7%
Absent	11	1.5%	9	1.2%
Private hire	17	2.4%	-	-
Suspended	2	0.3%	-	-
Training	16	2.2%	14	1.9%
Other duties	35	4.9%	23	3.1%

Source: K.B.S. and the author's calculations.

Table 4.6 K.B.S run out position for 1988 morning shifts (daily number of buses)

Month	Buses Scheduled	Despatched on time	Despatched late* No.	%	Not despatched** No.	%
January	263	194	58	22.1	11	4.2
February	263	203	55	20.9	5	1.9
March	263	175	75	28.5	13	4.9
April	263	181	78	29.7	4	1.5
May	263	189	69	26.2	5	1.9
June	263	208	51	19.4	4	1.5
July	260	203	56	21.5	1	0.4
August	262	213	48	18.3	1	0.4
September	261	206	54	20.7	1	0.4
October	262	205	49	18.7	8	3.1
November	261	205	53	20.3	3	1.1
December	254	218	36	14.2	0	0.0
1988 means	262	200	57	21.8	5	1.9

* Despatched late as at 0700 hrs.
** Not despatched as at 0800 hrs.

Source: K.B.S. and author's calculations.

4.3.5 DEPOT FACILITIES AND THE ENGINEERING DEPARTMENT

4.3.5.1 Depot Facilities

K.B.S. has one depot located on General Waruingu Street in Eastleigh.

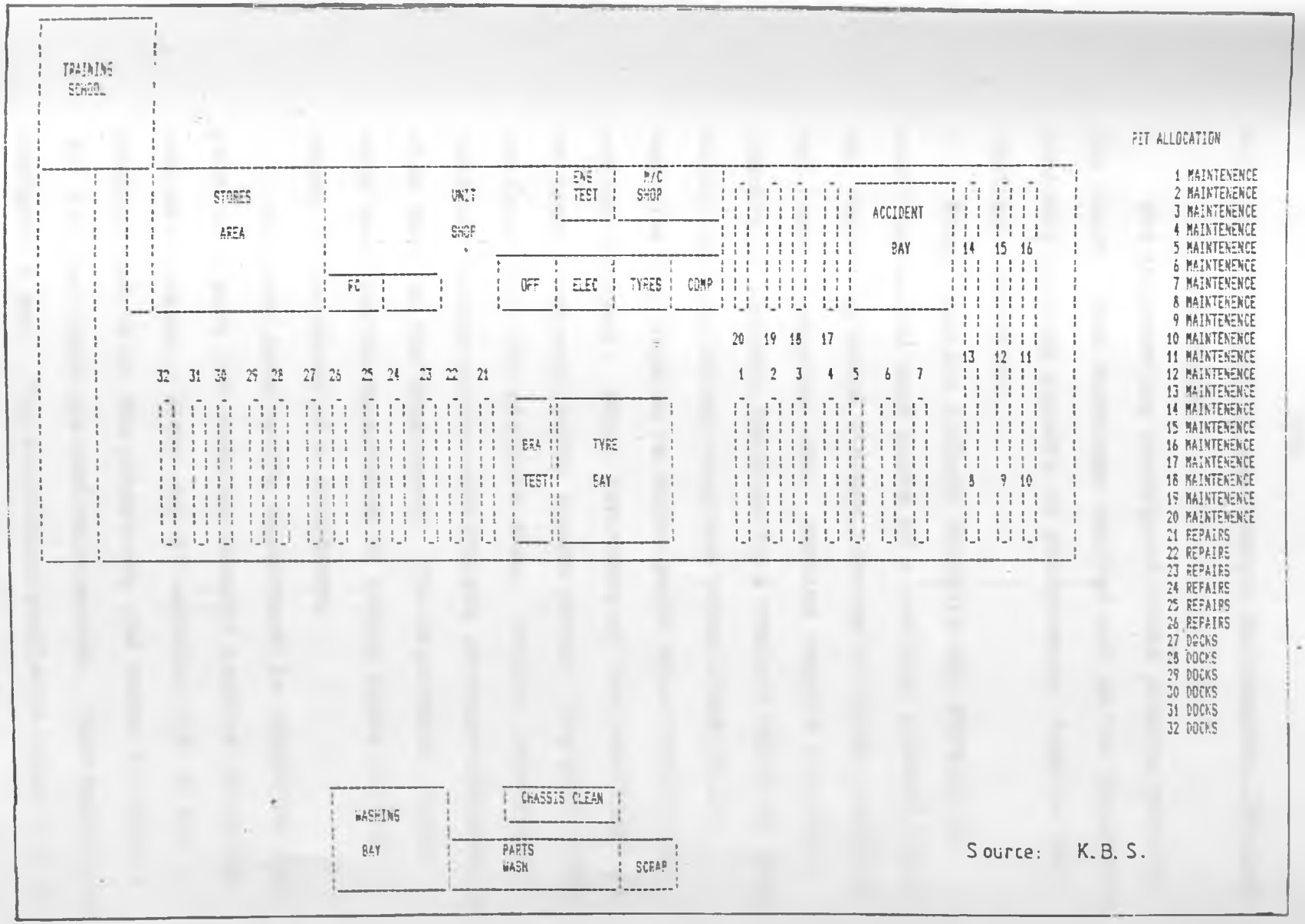
The total area of the depot is approximately 23957 square meters. Structures and buildings in the depot cover an area of about 5914 square meters. This leaves a balance of 18043 square meters for parking and movement. This includes space for access to pits, access to fuelling and washing place, roadway to gates, etc.

Considering the size of fleet owned by K.B.S. and the various functions of the depot, this area of 18043 square meters is too small, particularly if K.B.S. is to continue expanding its fleet. It makes servicing and proper keeping of records difficult to have a large in one depot.

Figure 4.2 gives a layout of the depot and shows the schematic layout of the engineering workshop, giving the various components.

By September 1988, the depot had 302 buses with the workshop having staff of 550 personnel.

Figure 4.2 K.B.S. Depot Layout



Source: K.B.S.

4.3.5.1 Engineering Department: Maintenance, Repairs and Towing

The Engineering Department forms a major part of the depot. The functions carried out in the department includes various aspects of maintenance, repairs and vehicle inspection.

Minor repairs include carrying out repairs on small broken or bent parts of a vehicle, general check up, repairing brake linings, charge of tyres, carrying out running repairs, etc. Running repairs are minor repairs on defects incurred by a vehicle while on road. Major repairs include complete rehabilitation of vehicles and repairs on major parts of a vehicle like engine overhaul. Other functions of the department is to keep store unit parts (spare parts) like gear boxes, engines, etc. and maintain them. Police inspection of vehicles before giving certificate of roadworthiness is also done at the department. The department liaise with the Traffic Department in towing buses to the depot in the event of a breakdown.

The work done by the department is scheduled such that in a week 150 vehicles undergo regular check-ups and maintenance. Every day 30 vehicles (15 in the morning and 15 in the afternoon) are taken for half a day regular check-ups and maintenance. Each vehicle is assigned 8 men. The facilities available cater for 15 vehicles being worked on at the same time.

After experiments and experience, the Engineering

Department has set up schedules for check-ups and maintenance for every vehicle as follows:

- After every two weeks, a vehicle undergoes half a day check-up and maintenance.
- After 10 weeks, a vehicle undergoes a full day check-up.
- After 1 year, a vehicle undergoes three days check-up and maintenance.
- After 5 years, a vehicle undergoes a complete overhaul.

Thus, with or without mechanical defect, it is mandatory that after every two weeks (10 days), each bus must be taken to the workshop for a general mechanical check-up and maintenance. This preventive maintenance programme is based on years of experience.

Engines are built or undergo overhaul after 17 months, and about 15 engines are worked on per month.

The work in workshop is split at 70% and 30% for scheduled and unscheduled work respectively. Scheduled work refers to maintenance, check-ups and repairs pre-arranged to take place on specific days and times; while, unscheduled work refers to working on running repairs, minor repairs and on breakdowns which had not been pre-planned.

The department is responsible for deciding the types of vehicles and equipments that are bought by the company. The buses owned by the company as per January 1989 are of the following models and makes:

Leyland Guy Victory:	Manual	- 5 buses
	Pneumocyclic	- 97 buses
	Mark II	- 163 buses
ERF Trailblazer		- 11 buses
ZF (a modification of leyland)		- 8 buses
Nissan		- 1 bus
Isuzu		- 2 buses
	Total	- 287 buses

Those vehicles (leyland victory, ZF and ERF trailblazer) are compatible in terms of service requirements and have been specifically adapted (through technical skill and experience) for the local road conditions in Nairobi. Their engines are designed to minimise fuel consumption which is an essential factor in a running a profitable transport services as well as minimising the overall need for foreign exchange. In Nairobi, many bus engines use 45 - 50 litres of fuel per 100 km. K.B.S bus engines, however, uses about 34 litres of fuel per 100 km, which makes them about 25% more economical in the use of (diesel) fuel. The assembling and body building of the buses are carried out locally.

It should be noted that similarity of vehicles (in terms of model and specifications) is important because it enhances continuity. For example, reclamation of spare parts from the old vehicles to repair new ones becomes possible. It is the policy of K.B.S. that newly bought equipments (like spare parts), must be of the same specifications as the old

equipments.

Table 4.7 gives the monthly averages of the engineering performance indicators calculated from 12 months (from September 1987 to August 1988).

Table 4.7 Monthly average of engineering performance indicators (September 1987 - August 1988)

Performance indicators	1987/88 means
Fleet size (operating)	301
Fuel litres /100 km	34.65
Oil litres/100 km	0.50
Tyre km.	72705
Available buses: Morning peak	255
Available buses: Evening peak	250
Defect per day	182
Lost km %	755
Engine failed	2
Engine stop	11
Engine life (months)	15.93
Gear box life (years)	3.81
Vehicles off road (waiting repair)	11
Gear box built	60

Source: K.B.S. and author's calculations.

From the above table it can be observed that average number of vehicles available at morning and evening peaks (for the period considered) are averagely 46 (15%) and 51 (17%) respectively less than the fleet that is supposed to be in operation. Again, 7.55% of the total number of kilometres to be covered in a day is lost. About 11 vehicles are out of the road and are awaiting repairs. This is not a very good engineering performance record. What all these imply is that quite a number of shifts are interrupted and hence a reduction in the quality of public transport supply.

This not only bears a bad financial and market competition implications for K.B.S., but also amounts alot of inconveniences for the travelling public. However, with the kind of training and engineering personnel K.B.S. has, one wonders why such a situation should exist.

It was learnt during the field survey that Nairobi is a tougher area of operation of public transport for K.B.S. than towns like Mombasa. Experience has shown that diesel engines are easily defected by high altitudes. Coupled with high demand for public transport services at peak hours (resulting in overcrowding and overloading) and a fast pace of life in Nairobi, a lot of vehicle defects occur. During and after the rains, there are a lot of defects affecting, among others, brakes, tyres, gear boxes and the electrical system. Resources required to repair such defects on a large fleet results in high operating costs which may be difficult to meet.

The study revealed that although K.B.S. is turning local, only 40% of the purchases of its equipments is done locally, while 60% of the equipments are imported. This has an implication on foreign exchange position of the country. These equipments imported are not cheaply available in the country. Central Bank's restrictions on foreign exchange and the company's low financial position (resulting from competition, high cost of operations, etc.) has resulted in lack of spare parts.

Quite a number of buses are lying in the depot without spare parts.

Table 4.8 provides the number and other aspects of K.B.S. breakdowns for the months from April 1987 to March 1988.

Table 4.8 K.B.S. Breakdowns (BD)

	MECHANICAL BD	ELECTRICAL BD	PUNCTURE	OTHER	NON ENGINEERING BD	TOTAL BD	KM/BD	LOST KM	% LO KM
April 1987	319	234	108	81	17	759	3656	117337	4.2
May 1987	341	303	96	52	24	816	3357	156405	5.7
June 1987	306	292	113	85	15	811	3118	162518	6.4
July	373	291	119	84	4	871	3475	245548	8.1
Aug	364	237	114	70	5	790	3110	135789	5.5
Sept	415	198	119	63	6	801	2946	234965	9.9
Oct	545	168	156	54	7	930	3241	250789	8.3
Nov	289	187	104	42	16	638	3810	199432	8.2
Dec	390	237	114	84	5	830	2865	218962	9.2
Jan 1988	477	273	92	96	0	938	3200	224634	7.4
Feb 1988	451	190	98	70	1	810	3063	-	0.0
March 1988	623	290	146	92	-	1151	0	-	-
Cumulative Total	4893	2900	1379	873	100	10145	2878	1946379	6.6
Daily Mean						28		6360.7	

Source: K.B.S.

In the event of a breakdown, a driver is instructed to park the bus safely and report the matter to the headquarters for appropriate action. This is because if a driver continues to operate a defective vehicle, the lives of the passengers are in danger, and more defects may occur in the bus.

The problem of breakdowns is persistent in K.B.S. The table above shows that (for the period considered)

on average 28 buses break down daily. These breakdowns are attributed to minor mechanical, electrical and other problems.

An issue at point concerning the vehicles that breakdown is that it takes a long time for them to be removed from the road and towed to the depot. This has been a major cause of traffic jams on the road (especially in the city centre). Since drivers are supposed to guard the vehicles until they are removed, they are made to stay at the breakdown sites for a long time. During the research, many drivers complained about this issue adding that they are not paid overtime even if they stay at such places beyond their shift period.

Delays in towing the buses that break down is caused by both delay in getting information and of reaction of the engineering department. The recovery crew which includes five large recovery vehicles for towing and four pick-ups are not enough to deal with the problem. The main weakness lies with the engineering department which is slow to react to break downs. The management (particularly the department of engineering) should take action to reduce breakdowns and react faster in the event of a breakdown so that inconveniences to passengers and other road users (whose ways are obstructed and time wasted in jams) is minimised. This action will also reduce mileage loss by K.B.S. which results in low revenue returns and high

operating costs.

Another issue at point here is that when drivers report minor defects to be looked into, their reports are ignored. The management (engineering department) does not take action on these because of two reasons. One, there are other major repairs that must be done before the minor ones are done. Secondly, when all buses are parked in the depot, it is very difficult to single out the various vehicles with minor defects since the space is very small; that is, the small size of the depot affects work of servicing and repairing vehicles at night. It should be noted that this kind of situation leads to drivers not reporting any minor defects. This is detrimental both to the life of the bus and of the passenger boarding it. During the survey, a number of drivers complained of inappropriate ways of carrying out some engineering repairs in the bus. Two main cases mentioned are concerned with the driver's seat and steering wheels. The drivers' seats are fixed, yet drivers are not of the same height. This problem leads to drivers being uncomfortable during the shifts. Some steering wheels are so tight while others are so loose that it is very difficult to control the buses (since turning distances of buses are very long). These disorders make the drivers tired very quickly. This may result in loss of concentration while driving.

In conclusion, therefore, it is important to state

that while K.B.S. is trying its best, repair and maintenance is a persistent problem.

Plate 4.4: A K.B.S. broken down vehicle being towed to the depot.

4.3.6 K.B.S. ACCIDENTS

K.B.S. is committed to improving safety measures inorder to reduce the number of accidents involving their vehicles. K.B.S. vehicles have been involved in a number of accidents, although they are considered the safest in Nairobi (by the public).

Table 4.9 provides the K.B.S. accident record for the year 1988.

Table 4.9 K.B.S. Accident Record.

	Blame Worthy	Non-Blame Worthy	Under investigation	Fatals*	Total
Jan	39	59	48	2	146
Feb	22	61	39	2	122
March	41	75	55	0	171
April	55	69	73	1	197
May	39	50	39	1	128
June	27	57	49	2	133
July	45	111	51	2	207
August	30	70	31	1	131
Sept.	29	79	33	1	141
Oct.	31	98	49	2	178
Nov.	31	58	34	2	123
Dec.	27	76	26	1	129
Total	416	863	527	17	1809
Mean	35	72	44	1.5	150

*Fatals only include those dying on the spot.

Source: K.B.S.

From the table above, it can be observed that K.B.S. buses are involved in accidents in which, averagely, 35 are caused by drivers, 72 are caused by a

third party and 44 are under investigation every month. At least one of the monthly accidents is fatal. Bearing in mind the consequences of accidents, any accident must be treated with exception. The opinion of the author is that it is meaningless saying that K.B.S. causes "only a few" number of accidents because where life can be lost or a person can be injured must be treated with seriousness.

The various main causes of accidents in Nairobi include: constant increase in number of vehicles and the congestion problem, inexperience of new drivers (up to about 1 year), carelessness and lack of knowledge on the part of passengers and other road users, carelessness and lack of concentration on the part of some drivers, and vehicle defects. Some of the factors that may lead to loss of concentration on the part of drivers were discussed earlier. These include too long shifts, working in empty stomach, uncomfortable driving conditions and frustrations a driver may be experiencing.

When a K.B.S. driver is involved in an accident, or accused of careless driving, the case is examined carefully. If it is proved that the driver is at fault, he faces disciplinary action which may include even dismissal. Drivers are also disciplined by sending them back for refresher courses.

Apart from disciplinary measures and the remedial courses which are now mandatory for all drivers once a

year, K.B.S. has launched a road safety campaign aimed both at its own staff and the general public consisting of the following:

- Lectures on road safety to school children.
- publicity on K.B.S. buses with a view to: queuing for buses; avoiding overloading; using the company's official bus stops, and avoiding the rush hour. Posters shown in figures 4.3 to 4.6 relay these messages.

  Queuing, among these other instructions, has been very difficult to implement by K.B.S. because there are no separate bus stops for different routes, and the multi-route bus stops which are there are so small that it is not possible to form separate queues for different bus-routes.
- The other messages to customers are: using only the rear door when boarding the bus; avoiding standing on door steps as it is both illegal and dangerous; never force the doors open when the bus is in motion, and never jump from a moving bus.
- Holding senior management seminars and other road safety seminars in which K.B.S. staff and those from other organisations like National Road Safety Council, Automobile Association and Traffic Police Participate

According to K.B.S. records, these programmes and schemes have reduced the accident rate by one-third of the previous levels. However, there is need to

intensify campaign and action to further minimise, if not to eliminate, traffic accidents. The Government's recent intervention in handling accident cases in court is obviously a step forward. The introduction of a requirement that whoever causes an accident must appear in person in court and be given quicker hearing and more severe sentencing if found guilty will make the would-be offenders more careful than before and encourage policemen in handling traffic accident matters.

It was observed by the author that due to accidents so many members of the K.B.S. crew (particularly drivers) appear in court. On 13th January 1989, 12 drivers were to appear in court. This interrupts a number of shifts and hence the supply of public transport services to the public is interrupted.

In conclusion it should be noted that although K.B.S. drivers are considered the best by the public in Kenya, K.B.S. has not succeeded in sufficiently minimising (if not eliminating) traffic accidents. Coordinated effort in this area is thus required to save this situation.

Figure 4.3: K.B.S. educational poster.

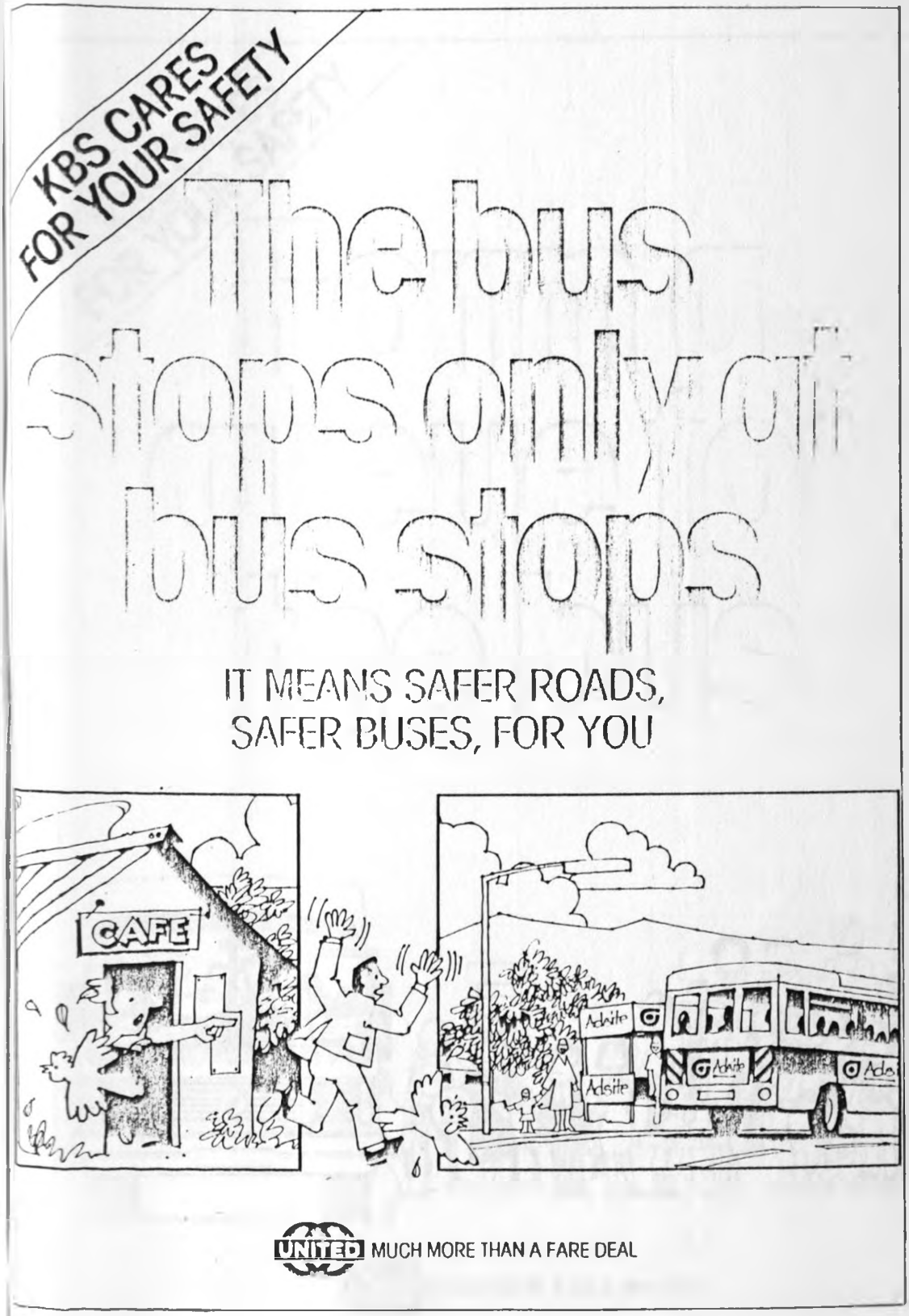


Figure 4.4: K.B.S. educational poster.

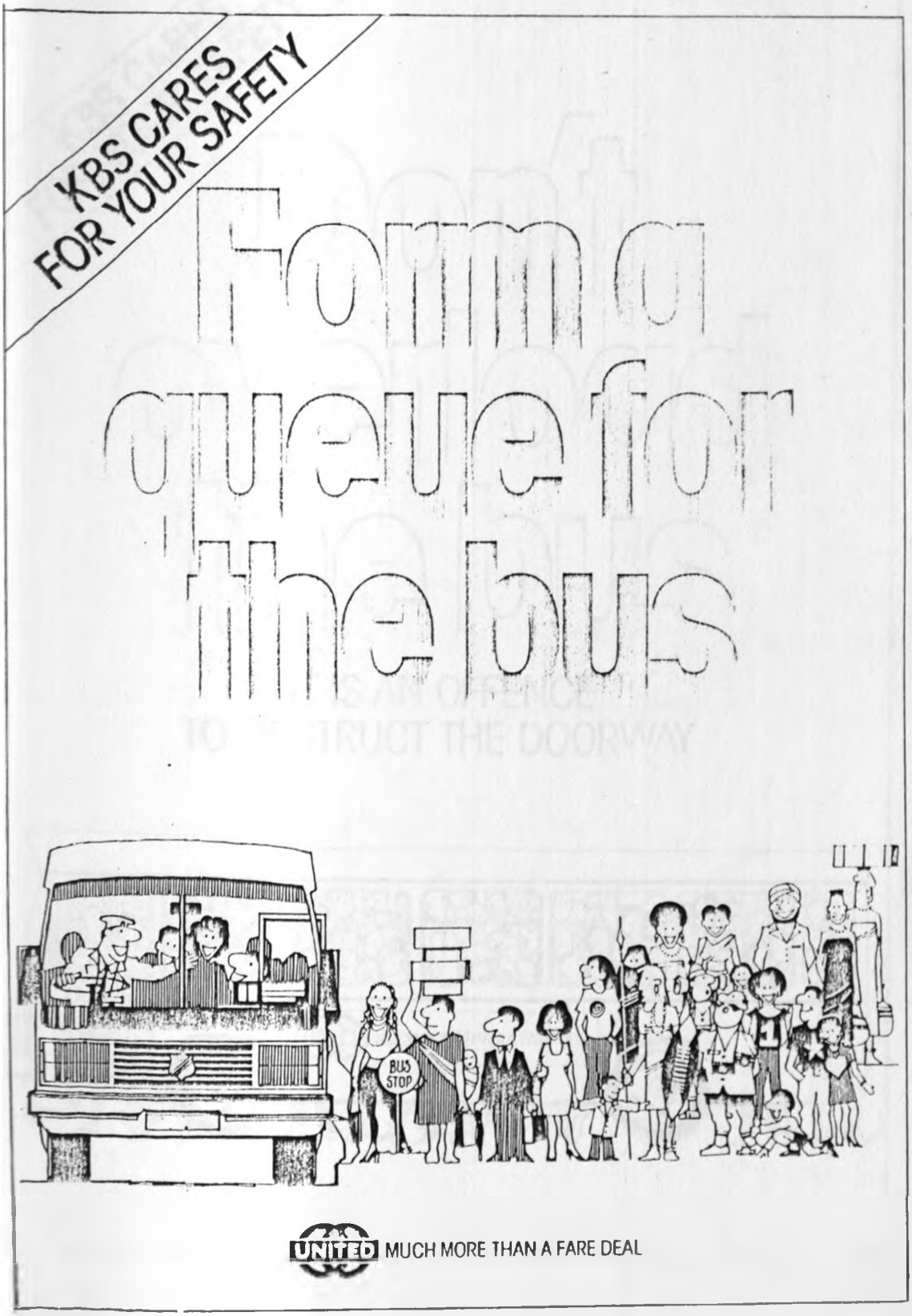


Figure 4.5 K.B.S. educational poster

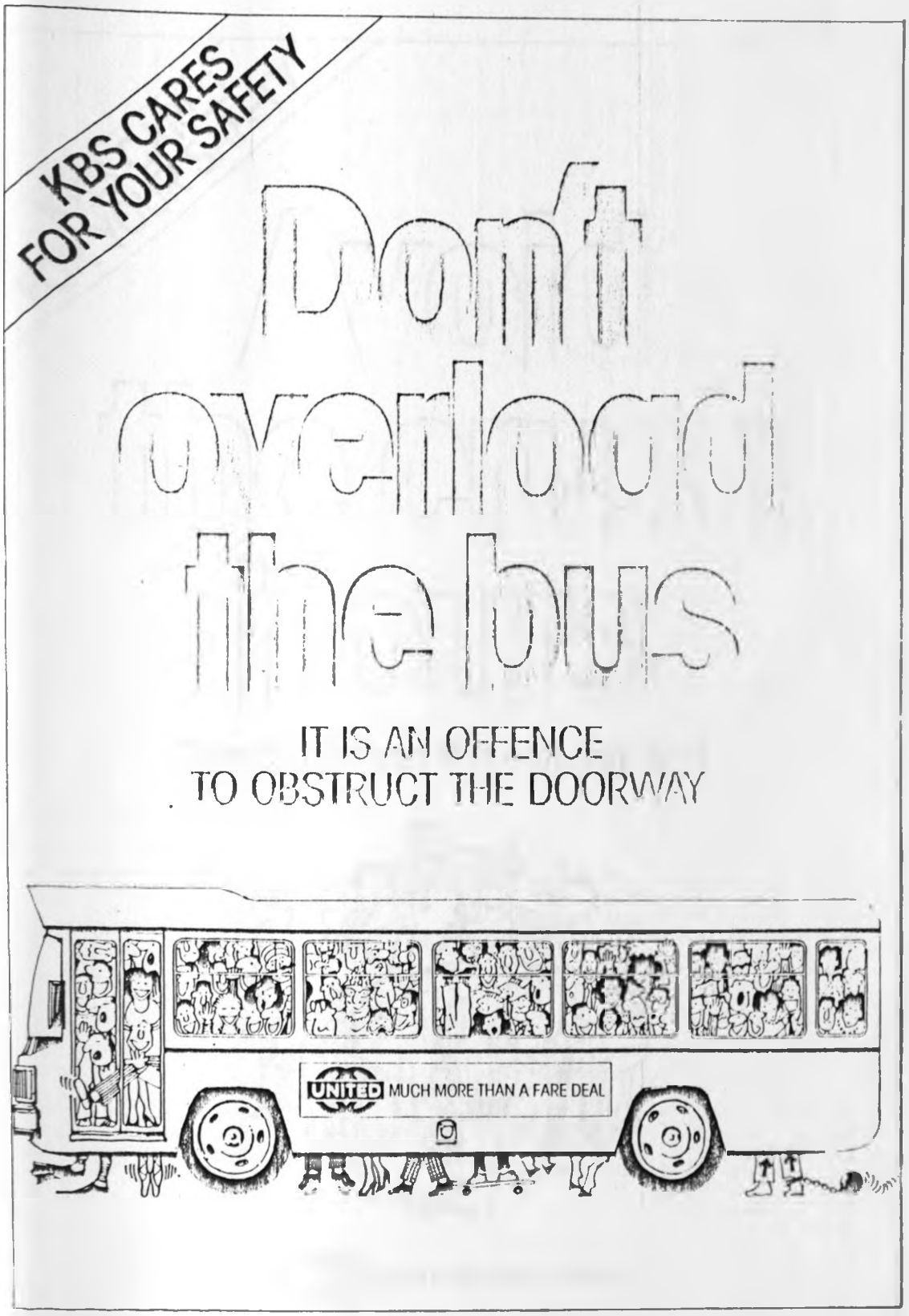
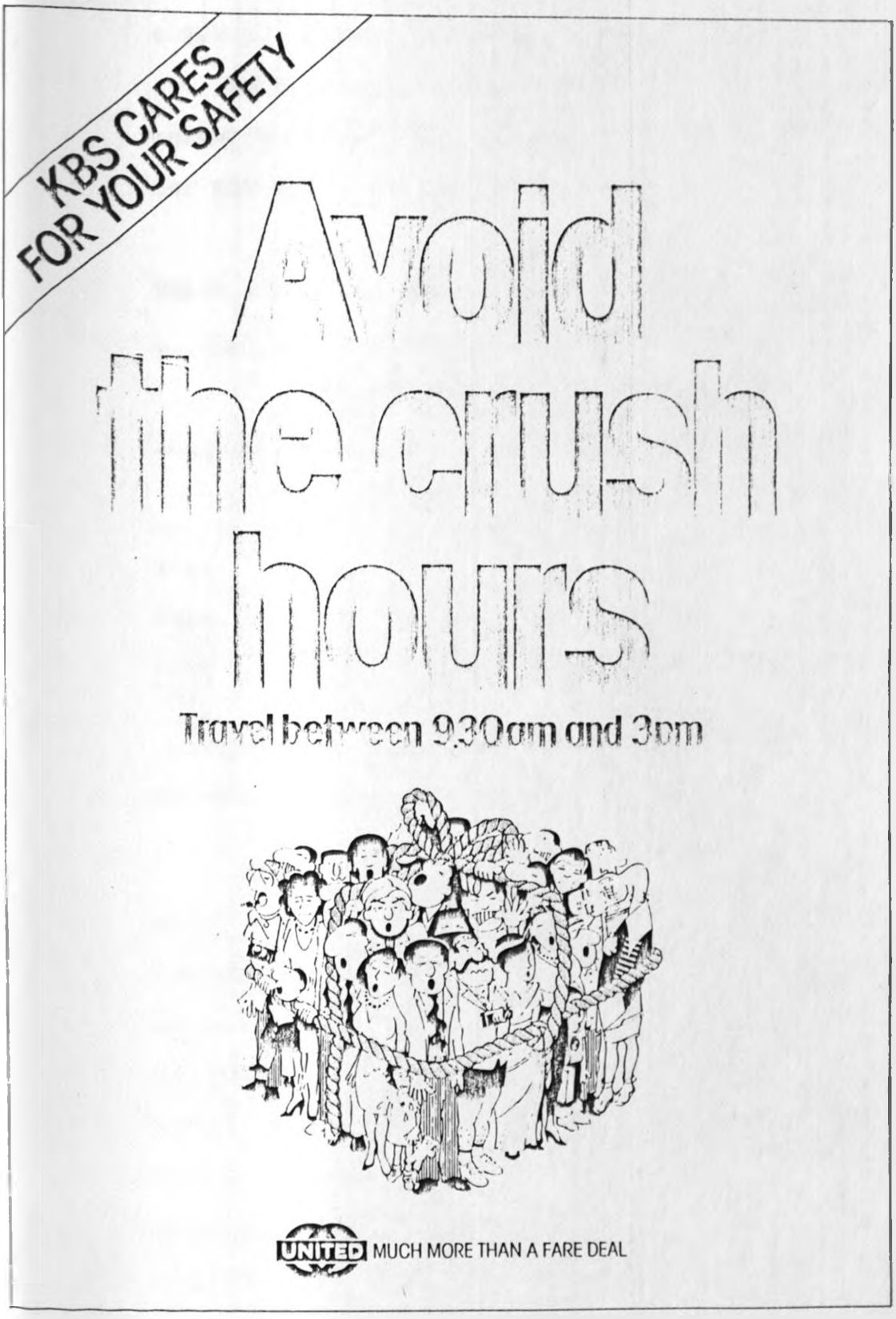


Figure 4.6 K.B.S. educational poster



4.3.7 OPERATING CHARACTERISTICS OF K.B.S.

4.3.7.1 Fleet, Passengers and Competition

Table 4.10 provides the trend of growth of K.B.S. operation in terms of number of buses and passengers for the years 1983 to 1988.

Table 4.10 Average daily fleet and passengers

	Average daily Fleet		Average daily passengers	
	No.	% Growth	No.	% Growth
1983	253		369868	
1984	245	- 3.2	345143	-6.7
1985	253	3.3	372471	7.9
1986	259	2.4	397606	6.7
1987	257	-0.8	389062	-2.1
1988	258	0.4	353678	-9.1

Source: K.B.S. and author's calculations.

From the above table it can be observed that the daily average number of operating fleet and daily average number of served passengers fluctuate over the period (1983 - 1988). From the calculated percentage increases, it can also be observed that the increase in fleet number does not follow the increases in the number of passengers. Moreover, since the annual population growth rate of Nairobi is about 5%.[3], it is expected that number of passengers served should increase with the increase in number of buses operated.

Besides blaming the fluctuation in the fleet number on high operation costs and maintenance problems, the fluctuation and decrease in the number of passengers is blamed on the stiff competition K.B.S. is facing from matatus and the newly introduced N.B.S. For instance, between 1987 - 1988, the K.B.S. fleet increased by 0.4% while the number of passengers decreased by 9.1%. This was the first year of operation of N.B.S. which was introduced in 1987. The competition against K.B.S. by N.B.S. and matatus have been based on fare and "new conditions" of N.B.S. on one hand, and the high frequency of matatus on the other hand.

There is a difference in the nature of operations of these modes. While both N.B.S. and matatus offer demand responsive services, K.B.S. operate under franchise agreement and thus offer regular scheduled services throughout the day and in all routes irrespective of the much revenue returns from the routes. This makes the competition very unfair for K.B.S. The competition is worsened by the fact that the fares of N.B.S. (which has low operating costs due to less overheads) is lower and the fares of matatus are more or less at the same level with those of K.B.S. The commuters, therefore, tend to shift to these other two modes of public road transport.

In response to this competition, K.B.S is trying forward complaints to the Government with which it assigned a franchise agreement. It is also trying to

improve the level of services, e.g. better customer-care and introduction of K.B.S. Blue Bird Services. The opinion of the author is that these are good steps which can improve the general public transport system when the competition is fair and free. However, their recent withdrawal of services from less profitable routes like numbers 118, 119, 114 and 100 may not be seen as a very good gesture and spirit; but what alternative do they have?

Tables 4.11 and 4.12 show the weekly and daily distribution of passengers respectively, for some selected months of 1988.

Table 4.11 Weekly distribution of passengers

Month	Week starting	No. of passengers*	Weekly mean	Comment
June 1988	5/6/88	2805425		June is one of the good months of 1988.
	12/6/88	2686229		
	19/6/88	2632462		
	26/6/88	2850784	2743725	
October 1988	2/10/88	2315430		October is one of the poor months.
	9/10/88	2489245		
	16/10/88	2346441		
	23/10/88	2408722	2389960	

* Free ridership of 5% is excluded.

Source: K.B.S.

Table 4.12 Daily distribution of passengers

Month Year	Day Date	No. of* Passengers	Daily Mean	Comment
July 1988	3	439697		This week
	4	441377		is a
	5	424740		school
	6	415979		term week.
	7	401021		July was
	8	400817		one of
the				
	9	400351	419140	best
				months.
November 1988	20	358126		This is a
	21	337923		school
	22	326718		holiday
	27	339704		low week.
	24	334919		
	25	343200		
	26	354564	342165	
November 1988	27	345262		This is a
	28	353562		school
	29	362888		high week.
	30	379897		
December 1988	1	358956		
	2	400504		
	3	388810	369983	

* free ridership of 5% is excluded.

Source: K.B.S.

From the two tables above, it can be deduced that there is variation in demand of public transport depending on time. Within any year, there is a variation in the number of passengers served from month to month due to variation in demand. Within a month, there is also a variation from week to week. Even within a week, there is a variation from day to day. Also, within any one day, there is a variation in

public transport demand from one hour to the other. This latter case gives the so called peak and off-peak hours. Recalling once again that K.B.S. operates regular scheduled services (with a small difference of about 5 buses to cater for peak hours only), it is clear that it is facing a problem in its operations. During very high demand times (peak hours), the buses are overcrowded and overloaded causing harm to both the buses and the quality of services. During low the demand periods (off-peak hours), however, the buses run half-full or even less resulting in great losses due to high operation costs with less revenue collection.

In conclusion, it should be noted here that K.B.S. regular scheduled services is facing the problems of stiff competition (from other demand responsive modes), over-utilization of buses (at peak periods) and under-utilization of buses (at off-peak periods). The average capacity of vehicles which, when exceeded then it is said to be over-utilized (overcrowded or overloaded) are:

New vehicles:	Seated passengers	- 49
	Standing passengers	- 56
Old vehicles:	Seated passengers	- 47
	Standing passengers	- 53
Average:	Seated passengers	- 48
	Standing passengers	- 50

These are the licensed capacity of the buses.

4.3.7.2 Average Fare and Revenue Collected

Table 4.13 provides the average number of passengers and average fare per passenger for the years 1983 to 1988 for Nairobi urban area (excluding peri-urban passengers).

Table 4.13 Average fare and revenue collected (for urban passengers only)

Year	Number of Passengers*	Average* Fare (sh.)	Approx. Total Revenue (Kf)	% increase
1983	110562893	1.66	9176720	
1984	102995699	1.82	9372609	2.1
1985	110976669	1.91	10598272	13.1
1986	120075330	2.14	12848060	21.2
1987	119233702	2.24	13354175	3.9
1988	118358928	2.50	14770208	10.6

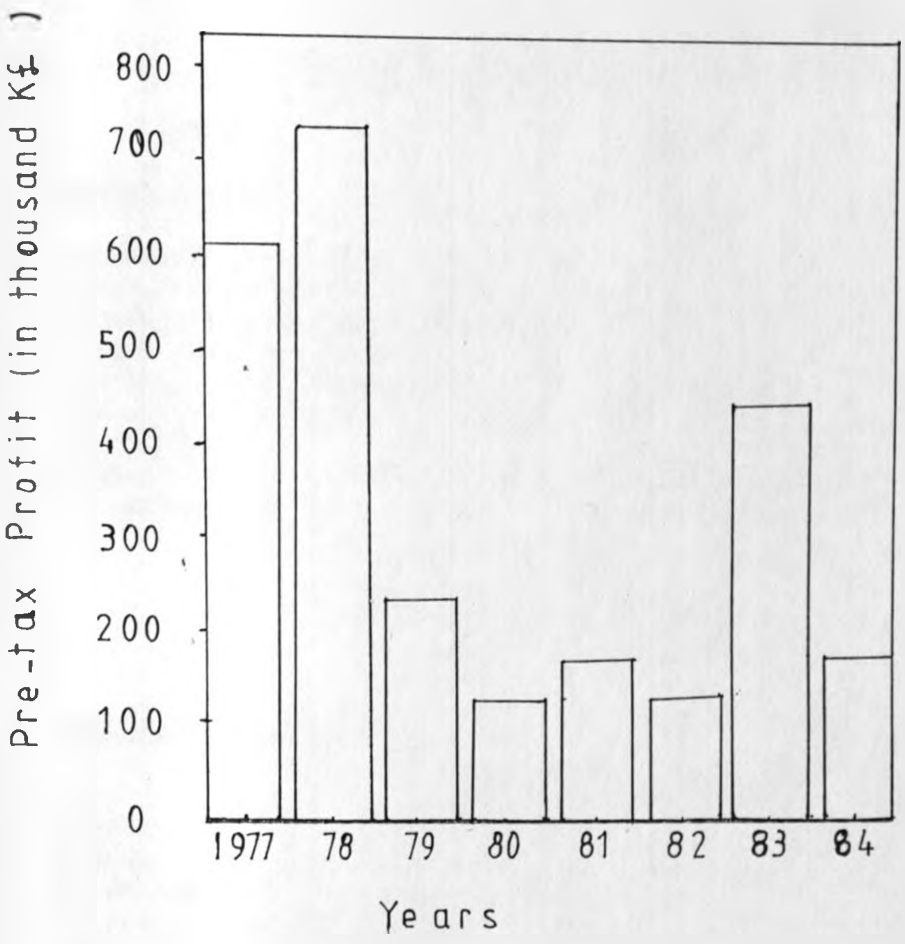
* Numbers refer to urban passengers only.

Source: K.B.S. and calculations by the author.

The above table shows that there have been increase of revenue collected (over the years 1983 - 1988). However, the collected revenue increases at fluctuating rates.

The bar graph in figure 4.7 shows the pre-tax profit from 1977 to 1984.

Figure 4.7 K.B.S. pre-tax profit for the years 1977 - 1984.



Source: Transurb Consults, 1986, page 87.

The above graph shows decrease in pre-tax profit made by K.B.S. over the years 1977 - 1984. With such a kind of trend it becomes difficult to expand the services.

4.3.7.3 Operating Costs

To show the approximate magnitude of operating costs, the 1985 K.B.S. fixed and variable costs are given below:

K.B.S. AND VARIABLE COSTS 1985

ITEM	UNIT	
FIXED COSTS		
Vehicle insurance	K£	331 835
Vehicle licenses	K£	75 644
Vehicle operations (other)	K£	105 666
Depot and traffic	K£	813 094
Vehicle maintenance	K£	1 011 922
Administration	K£	2 068 609
Depreciation	K£	858 641
Crews	K£	2 237 625
Directors fees	K£	8 000
TOTAL Kenya pounds		7 511 036

VARIABLE COSTS		YEARLY AVERAGE
Fuel	cents per km (cpk)	196.9
Tyres	cpk	54.3
Tubes	cpk	15.4
Stationary	cpk	3.0
Maintenance materials	cpk	144.4
Maintenance (others)	cpk	10.2
TOTAL		424.3

Source: Transurb Consults, 1986, page 92

When the 1985 fixed annual costs of K£7,511,036 is divided to the fleet of 293 buses, it gives annual

fixed costs per bus of Kf25,635. The annual variable costs is 42'4.3 cents per kimometre for 293 buses.

The figures point to one important thing: the high operating costs. There is constant increase in prices of inputs in terms cost of buses, oil and fuel, spare parts and repairs, insurance, customs duties , tyres, lubricants, uniforms, salaries, training, etc, arising from global inflation and economic recession, which has hit the third world even harder.

The drop in profits shown in figure 4.7 can be attributed to the rising costs of inputs and other operational problems discussed earlier. The challenge to K.B.S. is to implement strategies and approaches which would reduce the operating costs.

4.4. PERFORMANCE OF K.B.S. : ANALYSIS

This analysis is based on World Bank Standards. The specifications for key indicators of performance of bus services are given by World Bank as in table 4.14

Table 4.14 Key Indicators of performance of bus services and K.B.S performance.

Indicator	Specification	K.B.S* case
1. Passengers carried per bus per day (crush capacity of 120)	1500-1800	1627
2. Kilometres per bus per per day	230-260	380
3. Staff employed per bus		
- administrative	0.3-0.4	0.6
- maintenance	0.5-1.5	1.8
- total	3-8	8.3
4. Dead mileage as % of total mileage	0.6-1.0	7.48
5. Accidents per 100,000 bus kms	1.5-3	4.9
6. Breakdowns as % of buses in operation		
7. Availability: buses in service as % of total fleet	80-90	85.6
8. Fuel consumption: litres per bus per 100 kms	30-50	34.4

* Calculations shown on the below.

Source: World Bank Policy Study; Urban Transport, 1986, pp.48 and calculations by the author.

Below is the analysis of the performance of K.B.S. in January 1988.

1. Total Passengers carried in January = 12864836
   Mean number of passengers per day = 414995
   Mean number of buses operating/day = 255
   Therefore, passengers carried per bus per day = 1627.

2. Total kilometres covered in January = 3001951
   Average number of kilometres per day = 96837
   Mean number of buses operating/day = 225
   Thus, kilometres per bus per day = 380

3.	Maintenance Engineering Staff	=	538
	Traffic Operating Staff	=	1759
	Administration and Management	=	184
	Total Staff (K.B.S.)	=	2481
	Number of K.B.S. buses	=	298
i)	administrative staff per bus	=	0.6
ii)	maintenance staff per bus	=	1.8
iii)	total staff per bus	=	8.3
4.	Total mileage	=	3001051
	Dead mileage	=	224634
	Dead mileage as % total mileage	=	7.48%
5.	Accidents per 100,000 bus km	=	4.9
6.	Breakdowns in the month	=	938
	Breakdowns per day	=	30
	Buses in operation	=	225
	Breakdown as % buses in operation	=	11.9%
7.	Buses in service as % total fleet	=	$\frac{225 \times 100}{298}$
		=	85.6%
8.	Fuel consumption: litres per bus per 100 km	=	34.4

The World Bank specifications are for reasonably well-managed bus companies in developing countries; and take into account varying conditions that may prevail.

From the analysis, K.B.S. fall short of satisfying quite a number of the requirements of the specifications, (table 4.14) K.B.S. buses cover too

many kilometres per day. This is due to the fluctuation in demand at peak and at off-peak periods. Again due to stiff competition, the buses have to cover extra mileages to make ends meet.

Concerning the staff, it seems that there is over employment in the administrative and maintenance departments. Yet there are fewer personnel in the operating staff section.

The problems of breakdowns, accidents and hence lost mileage had been discussed before. The specifications show that these are serious problem areas for K.B.S.

However, K.B.S. Engineering Department has done well in adapting bus engines to suit Nairobi's road conditions and minimise fuel consumptions. The fleet utilization (or availability) of 85.6% is by any standards a high efficiency ratio.

Using scoring system based on the eight indicators shown in table 4.14, the management and operations of K.B.S. is only about 38% efficient.

4.5 THE PROBLEMS OF MANAGEMENT AND OPERATIONS OF K.B.S.: A SUMMARY

The foregoing sections have examined the management and operations of K.B.S. and explained the various problems faced by K.B.S. in various areas. Below are now given the summary of those problems. The problems are divided into two main classes: The external problems and internal problems. External problems are due to

forces from without while internal problems are from within. However, one common thing with both classes of problems is they impair the quality of public transport service provided by K.B.S. and make the going very difficult for the company.

4.5.1 INTERNAL PROBLEMS

The internal problems revealed by the research are given below.

1. Indiscipline among the bus crew:

This is shown in their coming late to work; delays during change over from morning shifts to evening shifts; failing to allow passengers to alight at their respective bus stops; and rudeness to passengers. They become worked up very easily. Apart from attributing these to their own indiscipline as individuals, they can also be attributed to the frustrations they face in the working situation like operating buses with defects, encountering rude passengers, etc. There is a general feeling that the work they do is so much that after a day's work, one may be too tired to handle the next day's work properly.

2. Absenteeism of the bus crew on scheduled shifts leads to delayed shifts which interfere with the reliability of the scheduled services. It also forces the company to hire off-duty personnel and thus incurring extra costs in overtime payment.

3. Lack of commitment of the operating staff to work was revealed in this study. Many members of the operating staff said that they work for K.B.S. because they do not have alternatives elsewhere. Also, the operating employees' turn over is not very low. They are easily attracted to other transport companies and corporations with better terms and conditions of service. Thus, the lack of commitment may be attributed to low wages and minimal benefits and inadequate realization of the potentials of the incentive (bonus) wage system. The staff's feeling is that some bonus wages are too difficult to win.

There is no adequate forum for employees to air their views and exchange experiences and thus feel they belong to the company. A workers' magazine and more fora to air their views and come together with those in the higher management positions is desirable. There is need for the operating staff to have a feeling of belonging and being part and parcel of belonging.

4. Poor relationship between the bus crew and the inspectors is another problem. This is caused by the latter's occasional rudeness and harassment of the former. This leads to demotivation of the bus crew. Moreover, the crew do not have adequate channel for defending themselves.

5. Unproportional employment of staff leading to inadequate operating staff and overemployment in other departments. The ultimate result of this is high

operation costs yet low quality of services, because the ratio of staff employment per bus is high but the operating staff members are insufficient. Inadequacy in operating staff necessitates long shifts for the drivers and conductors. In a busy town like Nairobi, it is very dangerous to have a crew operate for a long period in a shift. It may lead to lack of concentration in work which may cause accidents (on the side of drivers) and loss of revenue through incomplete collection of fares (on the side of conductors). Infact, during peak hours, the only one conductor deployed per bus is rarely able to collect all fares. Ultimately, this leads to inefficiency in the system.

6. Maintenance and repair problems reflected in poor engineering performance records shown by persistent breakdowns, poor conditions of some buses (which may be lacking windows, doors, seats, etc.) and the lack of maintaining the cleanliness of the bus. The delay in giving attention to and towing the breakdown vehicles cause a lot of inconveniences to the passengers and other road users. The maintenance and repair problems are being worsened by the poor conditions of the roads and peak hour overloading and overcrowding.

7. Persistent accidents:

Although K.B.S. drivers are considered to be well trained and best drivers in Nairobi, the accidents involving K.B.S. are persistent. Infact, according to World Bank Standards (discussed in section 4.4), the

K.B.S. accident rate is high. The accident rate indicates the standard of driving and maintenance but is also greatly influenced by traffic conditions in Nairobi. Apart from causing very serious inconveniences to the passengers and reducing the quality of public transport services, they stop operations for a time leading to loss of revenue. The crew involved in an accident have to appear in court causing further loss to the company due to lack of enough crew. It should be noted, however, that K.B.S. is not to blame for all accidents they are involved in except for about 25% of them (see table 4.9)

8. Difficulty in using only one depot.

The only depot K.B.S. has is not wide enough to accommodate all activities required for the existing fleet. The result is that servicing, minor running repairs (to be done after the shifts in the night) and proper record maintenance is not easy.

4.5.2 EXTERNAL PROBLEMS

1. Inadequacies within the K.B.S. route network. The network's problems include the following:

- Most, if not all, of the routes intersect at the CBD which is normally congested with traffic; and therefore increases congestion and reduces the operational speed, frequency and regularity leading to deterioration in the reliability of K.B.S. services. It should be noted that K.B.S. road network follows the Nairobi's road network

which is influenced by the structure of the city and the location of land uses which are centralised at the City centre and Industrial area (see chapter 2).

- Small and inadequate bus stops facilities leading to obstruction by other vehicles and hence delays at such bus stops. This has also prevented a successful implementation of the "Queuing System" of boarding K.B.S. buses. Both lay-bys and passengers waiting facilities are inadequate.
- Small sized roads are existing in some places within the network.
- Junction bootlenecks lead to accidents and delays, hence interferes with the regularity of the shift schedules.
- Roads with small turning distances makes it difficult for K.B.S. buses (with long turning distances) to operate smoothly.

2. <u>Fluctuation in public transport services demand</u> in the different routes served and during peak and off-peak hours. This problem leads to creation of surplus capacity (which indicates fleet under utilization); it also creates peak overload (and overcrowding) resulting in passenger discomfort, revenue leakage and excess wear and tear of the vehicle. The combining effect resulting is high operation costs with low revenue returns.

3. Lack of spare parts to facilitate quick repair of vehicles incase of malfunctions and breakdowns. Since most of the spare parts have to be imported, the high costs of spare parts and the bid to save foreign exchange have made the situation worse. K.B.S. is slowly turning local in terms of purchases of the spare parts and other equipments available, but it still has to import some other equipments and spare parts.

4. High operating costs, especially as a result of increase in cost of labour, spare parts and fuel; difficult conditions of operation (on poor road conditions, congested roads, peak hour overloads, etc.) and stiff competition from other operators.

5. Unfair competition from other operators:

The franchise granted to K.B.S. was to enable it to operate a comprehensive network such that high revenue on highly patronized routes would off set low revenue on routes with lower patronage. K.B.S. therefore, operates scheduled services. However, matatus and N.B.S. which more or less operate demand responsive services have relatively lower fixed and operating costs. Therefore, with the current obligations of K.B.S. and the strict control of fares, K.B.S. has over stretched its resources such that the company cannot generate sufficient cash flows for further expansion and improvement of public transport supply. It is like the franchise operator is being pushed further out. It should be noted that N.B.S.

fares are generally lower than any other operators, while matatus have high manoeuvrability and frequency (yet they are low capital cost investments) giving them advantage over K.B.S. Again, being demand responsive, they are normally operating at full capacity. There is need to open a fair competition or other measures be taken to care for K.B.S. franchise obligations.

6. Insecurity in some routes (during night shift operations) has led to a number of crews being attacked by thugs who usually rob them of the fare collections after beating the up.

7. Inconveniences from other road users like matatus and other road users like pedestrians and car drivers. The biggest challenge is to cope up with the careless matatu drivers who intentionally and un-intentionally cause obstruction to the K.B.S. buses. Many matatu operators do not obey traffic rules; and go to the extent of even hiting K.B.S. buses and throwing objects at the drivers of the latter. There is need for more effective and positive enforcement of the law, particularly Traffic Amendment Act 1986.

8. Revenue loss: Handling passengers during peak hours when the buses are overcrowded is difficult. This makes it difficult for conductors to collect fares from every passenger (since there is only one conductor deployed in a bus). Also, there are passengers who prove to be very difficult to deal with and thus involve the crew in squabbles and quarrels. Some of

the passengers jump out of the buses as conductors approach them for fare.

In analysing the performance of K.B.S. based on World Bank criteria (section 4.4), it was found that the performance in its management and operations has deteriorated. Based on these criteria, K.B.S. is only 38% efficient in its management and operations.

4.6 INFLUENCE OF DISTRIBUTION OF LAND USES

In chapter 2 section 2.3, Nairobi's land use pattern has been discussed in detail. Considering the nature of many of the public transport problems (discussed in section 3.6) and the problems of management and operations of K.B.S. (as analysed in this chapter), it is clear that centralization of land uses (which employ majority of the population of Nairobi) in the Central Area and Industrial Area of the city has negative effects on the public transport system. Employment areas need to be well distributed all over the city. This kind of land use planning would help re-distribute the existing demand so that the available public transport infrastructure and services will be efficiently used.

There is need for more rational thoughts in planning the newly developing land uses. Any more concentration of employment areas in or close to the central areas will further worsen the efficiency of public transport.

4.7 CONCLUSIONS

From what has been discussed in this chapter, the following are important conclusions:

1. K.B.S. is facing management and operational problems which need immediate attention so that the public transport situation in Nairobi can be improved, and also to save this giant (K.B.S.) that has served the city for such a long time since 1934.

2. The problems facing K.B.S. Public Transport Service Company are not all having their sources or causes from the management *per se*, but rather there are problems whose origin are from without the K.B.S. management. Most of the external problems (from without K.B.S. management) affect the whole transport system in the city, but some have greater impact on the K.B.S. operations.

3. The problems facing K.B.S. have led to decline in the quality of services being rendered by K.B.S. and hence loss of a good proportion of the market to other modes of public transport. The result of these problems has been that the company has often complained of running at a loss in its operations as a result of which deterioration in its services continue. This may form a vicious circle whose final effect is pushing K.B.S. out of the market completely.

4. The determination of K.B.S. company to continue operating amidst these problems, shown by deploying over 85% of their total fleet on Nairobi roads every

day, shows that a concerted effort in searching for solutions to the above problems will yet again be a very positive step in improving the public transport system in Nairobi as a whole. The cooperation of the Government is definitely inevitable.

ENDNOTES FOR CHAPTER 4

1. K.B.S. Operations Research Section, A paper presented to the Urban Transport Management Seminar Nov/Dec 1987, at Nairobi. pp.2

2. Ibid pp.7

3. NAIROBI CITY COMMISSION, Planning Department, Development Plan 1984 - 1988, pp.2

CHAPTER 5

5.0 POLICY IMPLICATIONS AND RECOMMENDATIONS. CONCLUSION AND FURTHER RESEARCH AREAS

The findings of this research study on public transport problems are summarised at the ends of chapters 3 and 4 (in sections 3.6 and 4.5), the former being the general public transport user problems and the latter being the problems of management and operations of K.B.S. Based on the study findings the policy implications have been derived. The policy recommendations given by the author are based on the findings and in line with objectives of the research study.

5.1 POLICY IMPLICATIONS OF THE FINDINGS

Below are the explained implications of the findings of the study.

5.1.1. Need For More Public Transport Services

Although the policy of the Government in decentralising activities to the districts through the District Focus Strategy is likely to reduce the rural-urban migration (particularly to Nairobi in this case) and hence reduce the rate of increase of its population, the demand for public transport services is still going to increase according to the findings in this study (see chapter 3). This research revealed that there is insufficient supply of public transport

services at present, particularly during the peak periods. This implies that the situation is going to be worse with time. There is need to find out ways and means of increasing public transport supply. Along with this increased supply, fair competition should be enhanced to reduce monopoly.

5.1.2 Need for Rational Use and Expansion of Public Transport Facilities

The study revealed that there is increase in the number of vehicles operating in the city (consider increase in the number of N.B.S. buses and matatus and the increase rates of car ownership discussed in chapter 3). The study also revealed that there are bottlenecks within the city's road system and that improper usage of the inadequate infrastructural facilities existing heightens the problems of transport. The results are high frequency of accidents and congestion (noticed in the form of traffic jams, particularly at the city centre or as roads approach the city centre). Also, the urban redevelopment in the CBD of Nairobi resulting in taller buildings (with more floors and hence more activities in these buildings) is creating more demand for transport in general and public transport in particular directed to the CBD. The cars to the CBD definitely need more parking space. All these facts point to one direction, need for more

rational utilization and expansion of transportation infrastructural facilities. This includes encouraging those modes which do need to enter the CBD and discouraging unnecessary use of the CBD by vehicles.

5.1.3 Need to Encourage Streamlined Operations of the Public Service Transport Modes (which are not streamlined yet)

The growth of matatu operations has been quite fast and may continue to be so (see chapter 3). Their growth has been accompanied with a gigantic problem of the city's traffic and transport system as has been revealed by the research. Their enormous growth has not been matched by a corresponding improvement in their regulation and control so as to streamline their operations to ensure safety within the system and convenience to other road users like N.B.S., K.B.S., car drivers, pedestrians, etc. As their growth continues, more problems are going to come up with greater mess to the transport system. This situation need to be controlled now or else it will be too difficult to remedy in future; hence the need to streamline their operations now.

5.1.4 Need for New Management and Operational Improvements in K.B.S.

The K.B.S. problems of management and operations have been revealed by this research. The situation is

such that, unless these problems are handled in time, they will continue to impair the performance of K.B.S. and continue to deteriorate the quality of its services and may finally force the company out of the market. If this happens, the problem of public transport will be very grave in the city as was clearly indicated recently when K.B.S. failed to operate its buses due to its workers going on strike. There is only one alternative, therefore, in saving the situation for city residents: implementing management and operational improvements.

5.1.5 Need to Re-direct Further Development to Other Places Outside the Central Area and Industrial Area.

The congestion characterised by frequent traffic jams in these two places is an indication that any further development in the areas will make the situation worse. There is need to direct any further development elsewhere.

5.2 POLICY RECOMMENDATIONS FOR THE IMPROVEMENT AND PROMOTION OF NAIROBI'S PUBLIC TRANSPORT IN GENERAL. AND FOR THE IMPROVEMENT OF MANAGEMENT AND OPERATIONS OF K.B.S. IN PARTICULAR

The policy recommendations given here under are based on both the findings and implications of the findings of the research study. In working out the

recommendations and action areas, the alternative solutions worked out on the basis of the findings on existing situation have been considered. Also, the implementability of each policy proposal has been considered by taking into account the capability of the agencies in terms of finance and other resources.

The recommendations are in two parts. The first part constitutes those proposals geared towards the improvement of public transport in general, and including K.B.S; while the second part only deals with the proposals to improve the management and operations of K.B.S.

The recommendations in both sections have been arranged in order of priority.

5.2.1 ENHANCEMENT OF TRAFFIC MANAGEMENT, REGULATION AND SAFETY MEASURES

The main and most important objective of public transport planning is to ensure a satisfactory circulation system within the transportation network. The achievement of this objective for Nairobi requires carrying out both certain management measures and structural changes within the network. Traffic management schemes and regulations are short term measures which are capable of improving the transport network and facilitating efficient and safe flow of buses like K.B.S., N.B.S. and other vehicles as well.

The following are the proposed traffic management, regulation and safety measures.

1. Provision of Segregated Right of Way:

Construction of pedestrian walkways, foot bridges and tracks for handcarts and bicycles should be done. This will solve the problem of obstruction of public service vehicles and other vehicles caused by slow moving traffic. This will also reduce the rate of accidents involving vehicles and pedestrians. The problems of slow moving traffic is actually prevalent as the roads approach the central area of the city.

Introduction of separate bus-ways and bus-lanes as a way of granting priority to public service vehicles should be done. Authorization for Nairobi City Commission to exclude private vehicles from areas and streets they choose to designate for exclusive mass transit use should be legally granted. This will reduce congestion for public service vehicles and also reduce the number of conflict points. Therefore, a part from reducing traffic delays, it will also ensure better road safety. The area most affected is the central area of the city.

Separation of bus stops and terminals for different modes of public transport services for different modes of public transport is important. Matatus should be granted their own bus stops and

terminals while K.B.S. and N.B.S. also be separated to have their different terminals. This will reduce overcrowding at bus stops and terminals as well as reduce conflicts. It will also reduce congestion at the small sized lay-bys caused by one vehicle obstructing another.

2. Restraint on unnecessary Traffic:

Matatus use short route system in which they travel from their origins to the city centre and back. The future allocations of terminals for matatus should be at the fringe or near the fringe of the central area (but convenient for the commuters to walk to) so as to avoid and minimize the congestion and traffic jams at the centre. This should apply to all vehicles operating on the short route system.

Re-routing of vehicles which do not need to go to the central area of the city should be done where necessary. In the long run, it should be ensured that there will be roads to help deviate unnecessary traffic from the city centre (see recommendations in section 5.2.2.). Control over the movement of heavy commercial vehicles through the central area, particularly during peak hours and other specific times of the day, should be strictly exercised.

3. Parking Control and Regulation:

One way of reducing traffic congestion is to eliminate or control parking at the side of the road because parked vehicles cause congestion simply by occupying road space that could be used by moving vehicles, hence reducing capacity of the roads. The practice of parking on the road or at the road side is very common in the city. This should be prohibited immediately, particularly on the approach roads to the city centre.

Free car parking in the central area should be abolished. It leads to obstruction of the roads within the central area, thus preventing the badly needed free circulation of traffic.

Parking regulations and strict endorsement of the same be introduced on the approach roads to the central area and industrial area. There should be stiffer penalties on those who park at un-official parking places.

Nairobi City Commission (N.C.C.) should introduce a policy to encourage short term parking only. To do this they have to control all on-street central area parking by metres; and increase parking fees and penalties.

N.C.C. should encourage the provision of parking spaces by all buildings coming up near the central area. Provision should also be made for the protection

of possible future sites for multi-storey car parks within and on the periphery of the central area.

4. Removal of Bottlenecks From the Road Network System to Ensure Smooth Operation of Public Transport Services and Smooth Flow of Other Traffic.

Traffic signal control system for central and industrial areas and their approaches should be implemented. However, only those junctions that have been researched and proved to be capable of doing better with traffic lights should be implemented. The recent installation of traffic lights at junctions within the central area without proper research has led to more bottlenecks than before in terms of traffic jam, although with minimization of accidents (see section 5.4 on areas proposed for further research).

Junction improvement works should be implemented to reduce bottlenecks at junctions. These include widening and other structural changes to improve capacity and minimise conflicts.

The small roads and lay-bys need expansion. Where land is available or where it is possible to acquire land by N.C.C., road widening and/or dualling should be undertaken. The small lay-bys which have contributed so much to vehicles obstructing others and

non-implementation of the queuing system of boarding vehicles, should be expanded.

N.C.C. need to carry out continuous road maintenance. Poor conditions of roads have caused quick wear and tear of vehicles. This increases operation costs of supplying transport services.

5. Legislation to Control Pedestrians and Other Slow Moving Traffic

Some legislation should be used to control pedestrians, cyclists and hand cart drivers to improve travel conditions and provide safe environment for them. Such legislation need strict and proper enforcement.

6. Public Education about the necessity to respects their traffic regulations and recognise their importance should be more strongly promoted. The use of propaganda machinery would increase the road users' knowledge, induce more positive attitude towards road safety measures and ultimately change the road users' behaviour so that they would not put themselves and others at risks of road accidents.

7. Manpower Expansion and Training for the Purpose of Carrying out Traffic Management Measures

The success of the above proposed traffic management measures depends on the sufficiency of the staff to carry them out. The same staff should be well

trained in matters pertaining to handling traffic management data and cases. Also, the cooperation between the Government, N.C.C., Traffic Police, and the public is essential in the implementation and realization of the benefits of the above policy proposals.

The delay of police in clearing vehicles involved in accidents is an indication of inadequate traffic police staff to handle cases. The result of the delay is congestion and jam along the roads and in the city centre. The number of traffic police in the city should be increased to cope with the increasing traffic management problems.

During the research study it was clear that the methods of handling traffic management data (like accident records) is such that it is difficult to use the data for proper planning. Traffic police should be given proper training (to the extent of the use of computers) in the management of traffic data so that transportation planning of the city of Nairobi may be based on clear, correct, relevant and accurate data.

The N.C.C. police concerned with traffic management in the city should not only be expanded, but should undergo training programmes to improve their efficiency in handling their work.

The implementation of the above policy recommendations coupled with the implementation of the Government's recent directive on quick appearance and stiffer penalties on traffic regulation flouters, there will be much better traffic situation and smooth circulation of traffic within the city's transport system. This will improve the operational efficiency of the public service vehicles in general and also that of the K.B.S. in particular.

5.2.2 RESTRAINT OF FURTHER EMPLOYMENT IN CENTRAL AREA AND INDUSTRIAL AREA

Growth of employment in Central and Industrial Area should be restrained and be channelled to outlaying areas. This will reduce traffic congestion in the two areas.

5.2.3 ENHANCEMENT OF THE COMMUTER TRAIN SERVICES

There are a number of advantages of using the train services for public transport. The present network lines pass through major high density residential areas like Dandora, Umoja, Ruaraka residential zone, Kibera, Dagoretti etc. Again, the lines pass close to the industrial area where quite a number of land uses and employment are centralized. Another advantage is that the corridor along which the railway line is laid is outside the heavily congested corridors and it does not pass through the city

centre. The latter advantage could have some shortcomings like inability to create strong market competition for other modes. However, from the market share it holds (discussed in chapter 3), it is clear that the commuter train services is popular.

While the recommendation of the long term planned Light Railway Transit System (L.R.T.) by Transurb Consults[1] is acceptable, the improvement of the present commuter train services is paramount. To this end, two important steps are proposed here. The Government should enter into an agreement with the Kenya Railways Corporation for compensation to minimize the heavy losses the service is incurring at present (see chapter three section 3.3.4). Also, the management of its operations and fare collection system should be streamlined to iron out the unscrupulous ways through which the corporation is losing large sums of fare collections. The latter step will reduce the losses incurred, and hence reduce the compensation required from the Government.

It should be noted that although the commuter train engines are smaller and designed for such a service, the present railway network lies outside the high demand corridor. The reason for this is that the railway network was not originally designed for the purpose of commuter trains. However, as it had been

mentioned earlier, there are quite a number of commuters to whom this service is convenient. Therefore, while waiting for the implementation of the long term planned Light Railway Transit (L.R.T.) system, this improvement of the existing commuter railway services will tremendously improve the public transport system by increasing the supply of the services, yet not increasing congestion in the CBD and on roads.

5.2.4 STAGGERING WORKING AND SCHOOL HOURS

Administrative or legal action should be taken to stagger working and school hours. This will spread peak public transport service demand and reduce current peak pressure on the existing public transport facilities. This will improve the profitability of the public service vehicles, particularly K.B.S. which operates scheduled regular services.

5.2.5 ESTABLISHMENT OF AN OVERALL PUBLIC TRANSPORT ADMINISTRATIVE BODY FOR NAIROBI CITY

The Government should establish an overall public transport administrative body for the city to manage and oversee the affairs of public transport services. The body will help in taking undivided responsibility and effort in streamlining the operations of the existing modes of public transport. More researches on the day to day complexities of public transport is

required. Such a body would promote this kind of research. The scheduling of buses (particularly N.B.S. and K.B.S.) is currently done in a manner which does not reflect their complementarity, but a 'dirty' competition which does not help the commuters. When this body proposed is formed, it will help in coordinating the operations of the existing modes of public transport to suit the needs of the commuters.

A formal incorporation of matatus into the city's public transport system can only be done by streamlining their operations. This exercise obviously needs a more organised body with committed members and concerted effort. This body proposed will form an arm of the Government with the responsibility of doing this. This body could either fall under the Ministry of Transport and Communication or under the Nairobi City Commission; but, it should only be responsible for administration of public transport system of the city.

5.2.6 FORMAL INCORPORATION OF MATATUS INTO THE CITY'S TRANSPORT SYSTEM BY STREAMLINING THEIR OPERATIONS

Matatu mode of public transport is here to stay. This conclusion is drawn from the trend of operation of the mode and the increase in its share of the city's public transport market, (chapter 3, section 3.3.1).

The challenge now is to streamline its operations for the benefit of the public, and hence formally incorporate it into the city's transport system.

From the study of K.B.S. management and operations, it has been found that management of operations by a central body has a number of advantages which can help transform and streamline the operations of matatus. The two very important aspects that are capable of streamlining and transforming the operations of matatus are making their operating crew to be accountable and to take responsibilities of whatever takes place during their operations on the road. The central body, apart from having disciplinary measures, will ensure that whatever monies are collected and used, the same will be accounted for to the last coin. This will ensure that money collected by their crew is not used on unapproved expenses. The claim that policemen take bribe (which is an abuse to the police body) will be eliminated. (The author calls police bribery "a claim" by matatu men because it was alleged only by matatu men from MVOA. However, if it is true, then it is the matatu men who lure the police into this act. The author's proposal on formation of a central management body is hinged on finding a solution to this alleged problem).

The reason for this step is that matatus have proved to be a nuisance to the public transport system, (see chapter 4 section 4.5.2 and chapter 5 section 5.1.3).

The recommendation is that the Government, through its machinery, should facilitate the formation of Public Transport Co-operative System for the incorporation of all matatu operators in the city. The matatus should form a number of separate cooperatives set up on the principles of self-labour, self-financing and self-management; but with a central operations management body. R.W. Faulks describes the cooperative system as follows:[2]

> "A candidate for membership of one of these cooperatives must possess a bus driver's licence and be capable of assuming the responsibilities of a public servant. Provided that he complies with these requirements and is otherwise suitable, the applicant will be accepted ....." If he proves himself satisfactory, membership of the cooperative then becomes possible which is acquired by a certain financial investment necessary for the expansion of the concern. The result is that each member holds an equal share in the undertaking, but what is more important, each undertakes the same obligations and enjoys the same rights and remunerations - be he a driver, garage hand or manager _ in keeping with status of equal partnership in the common venture. They all bear equal responsibilities for the maintenance and operation of the public service".

Concerning the management and disciplinary matters of the cooperative transport undertaking, Faulks states that[3]

> "Management is in the form of a council freely elected by the members from amongst the annual

> general meeting and those chosen for administrative, control and supervisory duties remain in office for a year or longer as may be determined. Those responsible for the administration of discipline are similarly elected from the members by the members and the code of conduct and award of punishment is very similar to the other systems....."

This system is widely used in Isreal (without any investment of the Government, financially or otherwise) to provide public transport services. With the cordial relationship between the Kenya Government and the Isreal (following the renewal of diplomatic ties between the two countries last year, 1988), the implementation of this policy recommendation should constitute an arrangement by the Government to have some pioneers-to-be of this system and some Governement officials go to Israel to fully understand the working of this co-operative system.

A few changes could be introduced into what has been explained by Faulks (above). For example, it may not have to be a financial investment as such, but the beginning could be marked by valuation of the existing matatus. To have equal shares, each member may be asked to add cash investment so that all shares are considered equal for all members. The cash investment could then be the liquid capital for the cooperative.

In due course, and in the long run, the Government could allow the existing cooperatives to register as companies. By then, they will be able to employ full

time employees who are not necessarily members of the cooperatives. Such companies will operate in the same way as K.B.S. company whose operations and management has been explained in chapter 4.

5.2.7 CONSTRUCTIONS TO IMPROVE THE ROAD NETWORK

Improvement of the road networks through constructions are long term plans. This is because of the huge sums of money involved in the process of implementing such constructions.

The missing link of the Outering Road with Industrial Area should be constructed to direct traffic from the sides of Ruaraka - Kahawa zone and the rest of Eastlands to Industrial Area without passing through the city centre and avoiding the approach roads to the city centre.

The creation of two by-passes as recommended by Nairobi Urban Transport Project in 1979 should be implemented.[4] A northern by-pass is to be created by extending the University Way and an eastern by-pass should be constructed connecting Ngara Road and Quarry Road to Lusaka Road at its junction with Jogoo Road.

A third by-pass should be created to run from Industrial Area to Kibera zone. Feasibility research on this is left for further work.

The creation of these by-passes will be beneficial to the city's transport network including both private

traffic and public transport. This is because (as it was discussed earlier in chapter 3 section 3.4.1) most roads serving the city's transportation system converge to the city centre causing congestion and traffic jams and making traffic management very difficult there.

5.3 POLICY RECOMMENDATIONS FOR THE K.B.S MANAGEMENT AND OPERATIONAL IMPROVEMENTS

Some of the problems faced by K.B.S. can be solved by the implementation of the policy recommendations given in section 5.2 of this chapter. Following now are the recommendations geared to solving management and operational problems faced by K.B.S. Some of the measures are to be taken by K.B.S. while others are to be taken by the Government or by both in some cases.

The recommendations in order of priority are given below:

5.3.1 DISCIPLINARY MEASURES

The disciplinary measures taken by K.B.S. and introduction of various incentive wages to instill discipline is commended. It has been revealed, however, that there is indiscipline among the crew and inspectors.

The present disciplinary measures of deducting employees' salaries and forfeiting bonus wages should be extended to the inspectors who flout supervisory regulations and cause problems for the crew.

Furthermore, these measures should be taken just as a warning to the culprits for a number of times. Those that do not possible to respond positively to these disciplinary measures should be suspended and ultimately dismissed. The inconvenience caused to the public and the management by crews coming late or being absent is much more than just the salary or bonus if it is a repeated habit.

However, a system of scrutinizing all cases involving inspectors on one hand and drivers and conductors on the other hand should be established to avoid what the crew feels is a frustration and mistreatment by the conductors coupled with unfair hearing and judgement by the management.

The management should also set up a body of some few supervisors to oversee the work of inspectors. These supervisors should carry out their duties through surprise and unexpected boarding of buses to catch the inspectors who mistreat the crew. Incase proved guilty by the disciplinary committee, such inspectors should be demoted or sacked depending on the magnitude of the fault.

The implementation of these proposals will not only improve discipline of the operating staff, but will also improve the relationship between the crew and the inspectors.

5.3.2 IMPROVEMENT ON THE SCHEMES OF SERVICE AND INCENTIVE WAGE (BONUS) SYSTEM

The improvement on schemes of service and bonus system will create a high morale of working. With the good salary and other benefits, when one is dismissed from work or suspended or even denied one day's salary, the feeling of great loss on his side will be felt.

To win the commitment of the crew, the schemes of service should be revised with a view of improving the salaries and fringe benefits given. This will make K.B.S. keep most, if not all of their well trained employees; and will increase the productivity in the field of work. There is actually no sense in K.B.S. keeping so many employees (whose productivity are only indirectly realized) while leaving the crew (whose productivity can be measured directly in monetary and physical terms) to suffer and feel being exploited. It is better to keep fewer employees but keep them well.

The main areas in fringe services and benefits that need attention are the house allowance and hospital or health services. The low house allowance given make these people stay in very uncomfortable housing conditions and this is likely to be reflected in their productivity. House allowance should therefore be revised from time to time depending on the housing situation in Nairobi. K.B.S. should start

a housing scheme for their employees as a long term project. This will not only improve the living standards of the employees (particularly the crew) but will also reduce the incidences of lateness and absenteeism. It will also reduce the cost incurred in transporting the crew at night (back home). It will also save on paying house allowance in the long run.

It was revealed that health services given to the operating staff does not cover their family members (wife and children). This policy should be repealed so that the health services are extended to their family members as well.

On giving permission to be off-duty, which may also be considered a fringe benefit, K.B.S. has faced a lot of problems with the unfaithful employees who want to visit their homes every now and then. Due to this problem, many faithful employees have also suffered. K.B.S. should establish a system of determining those who have genuine excuses to be off-duty. These genuine cases should be given paid leave of absence. If this is not possible, then a system of compensation for the days one is absent should be established. For example, an employee who is absent for some days will have his annual leave reduced by the same number of days he was off-duty. Imagine a fellow who has gone home for a funeral or to give attention to a sick family member

coming back to Nairobi and just getting less salary after spending so much on solving the problem which took him home. This is not an easy issue to stomach, and is likely to lead to reduced productivity of the crew at work.

One of the ways of knowing the truth on the excuses for leave of absence from work is by asking the employee to produce the various documents "that can be trusted" as a proof. Different excuses for permission will determine the relevant documents for proof that should be produced by the employees concerned.

On incentive wages (bonus), K.B.S. should give the daily bonus at the end of the shift. The money is likely to help the crew for buying lunch and other items (at home) on a daily basis. However, the daily bonus should be given only to those who have performed their job in accordance to the requirements demanded by conditions of award of the bonus.

K.B.S. should also be flexible in giving the awards by considering only the conditions stipulated for such awards. For example, the present practice that an employee can lose the whole aggregated daily bonus he has earned for a whole month because of defaulting in an area on one day, should be revised. With flexibility and therefore possibility of getting the bonus, everybody will try his best to be

disciplined, committed to work and to work harder with a hope. However, if the conditions become so stringent, many employees will have no hope of getting bonus any one time, and therefore such bonus will not act as an incentive to making them work harder and better.

5.3.3 **INTENSIFICATION AND EXPANSION OF TRAINING PROGRAMMES**

Quite a number of training programmes are already established by K.B.S. company. Within the programmes are included traffic safety programms incorporating the participation of the public (see chapter 4 section 4.2.2.2).

The company should however, expand and intensity the training programmes. The main objectives of training should be to:

- enable employees to perform the duties well and to give them a chance to rise in their position and attain higher standards of living. This means that K.B.S. should attach certain salary increases and other benefits to some training opportunities they offer;
- educate workers to realize, understand and fully appreciate their role and contribution to the economy and building of the nation;

- enhance the job supervisory skills and promote good and cordial relationship between employees of different categories and levels;
- enhance the understanding of the operating staff in so far as the behaviour of, and dealing with the public is concerned.

To achieve these objectives, the company should intensify training of all the operating staff particularly for the inspectors. Administrative and supervisory courses that have been offered to the inspectors have so far proved insufficient. With the current stiff competition within the public transport service market, various employees can only help the company by performing their job perfectly and diligently and cooperating with the other employees to work as a team.

The study revealed that conductors have very few training programmes save for the training to help them know how to collect fares and at a high speed. K.B.S. should extend other training programmes to encompass the conductors. Training in public relations and social work and diplomacy will improve their understanding of the behaviour of the public. This will create stamina in them to be able to withstand the pressures of work coming as a result of poor public behaviour. It will also help them know how to conduct

themselves while serving the public and how to respond to various situations. With open and fair market competition, this will enable K.B.S. to increase and command more of the public transport market share.

5.3.4 **K.B.S TO REVOKE FRANCHISE OBLIGATION WHICH HAS BEEN BREACHED BY N.C.C.**

Since there is no strict adherance (on the side of N.C.C) to franchise agreement signed between K.B.S. and Nairobi City Commission (then called Nairobi City Council) in 1966, there is no need for K.B.S. to continue operating under the obligations of the franchise. The reason for this is that the current competition will be very unfair for K.B.S. There is no way provided for K.B.S. to compensate for the losses incurred in less paying routes which are operated due to social obligations.

K.B.S. should operate economical routes as the management may determine (through its researches) from time to time. This will open a fair market competition for all modes. That is, all modes will be under the same umbrella of regulations, rules and obligations set by the Government. Thus, the market share commanded by any mode will now depend on the quality of services they offer so as to attract patrons.

Although K.B.S. should revoke the franchise agreement and its obligations, it should continue to

run scheduled regular services. The latter is a very unique and good way of operation that is convenient for commuters.

5.3.5 EMPLOYMENT OF MORE OPERATING STAFF AND REDUCTION OF WORKING HOURS

The study revealed that although K.B.S. has a huge staff relative to the size of the fleet, the number of the operating staff is small. For this reason, drivers and conductors have to work on very long shifts; and, only one conductor is deployed in a bus even during peak hours. This results in accidents (though most of them are minor) and revenue leakage during operations.

K.B.S. should employ more operating staff so as to shorten the length of the shifts and also to deploy at least two conductors per bus during the peak periods.

K.B.S. should, however, reduce the number of employees in other sections (particularly from management and general work) so as to reduce the number of staff per bus employed by the company. This will reduce the operating costs of the company and improve their financial position. It will make the company cater for the fewer employees (remaining) in better way.

5.3.6 IMPROVEMENT OF MAINTENANCE, REPAIR AND SERVICE OF THE BUSES

The policy of K.B.S. in so far as maintenance, repair and servicing of vehicles is concerned is commendable. However, improvement is necessary because the standard of performance is not high enough.

The company should rationalize the deployment of the mobile inspection and radio communication so that the long delays before towing away vehicles to the depot is minimised. More towing vehicles should be added to the present number to facilitate quick attendance to the breakdown vehicles.

The company should ensure that the few vehicles on the road are in good condition. The repairs of the minor breakages like in windows, doors and seats should be done. The buses should be clean to attract passengers and improve the services.

The neglect of minor defects reported by drivers is a cause of more and major defects which may finally make a vehicle to breakdown or cause an accident. More serious attention should be given to these reported cases.

The comfortability of the driver on wheels improves his concentration in driving and makes him less tired even after a long period of driving. The fixing of seats and steering wheels should be done in a manner that suits driving. The seats should be made

movable and the steering wheel should be adequately sensitive but not too tight.

K.B.S. should, through its Engineering Department, find out reasons why there are many breakdowns despite the regular services and maintenance.

5.3.7 **ENHANCEMENT OF SECURITY FOR THE STAFF DURING NIGHT OPERATIONS**

K.B.S. should deliberate on tangible methods of enhancing security for the operating staff (during the night shifts).

It is beyond any reasonable shadow of doubt that if special arrangements are made with Commissioner of Police through the right channels, the security problem will be solved.

The buses which operate at night should be provided wit at least one armed policeman to fight off the thugs that may attack and rob both the conductors and passengers. The plain clothes policemen will perform this work better. The reason for this is that the thugs would not know where they are seated and who they are. This has the effect of keeping the thugs at bay even when the policemen are not there in the bus.

K.B.S. company should streamline the operation of inspectors at night. They should be made to travel in the buses and make surprise changes to different buses within their zones of operation. This will enhance

security situation for them, unlike waiting and timing buses at the bus stops. It will also ensure that members of the crew do not misbehave to the passengers during the night shifts.

3.5.8 **OPEN NEW DEPOT OR SUB-DEPOT**

The study revealed that the existing K.B.S. depot in Eastleigh is too small to cater for the present requirements of the fleet size owned. K.B.S. should, therefore, open a new depot or sub-depot to facilitate easier and better maintenance, servicing and general record keeping of the buses.

5.3.9 **EXPANDING THE WORKSHOP FOR MANUFACTURING AND RECLAMATION OF SPARE PARTS**

The present standardization of vehicles owned by K.B.S. ensures that spare parts can be reclaimed for use in other vehicles.

The K.B.S. company should intensify their relationship with U.T.I. (United Transport International which has often given aid for its improvement) so that the present workshop can be expanded and another workshop be built within the next depot (proposed in section 5.3.5). Facilities for manufacturing and reclamation of spare parts should be a priority.

The spare parts that are being manufactured by companies in Nairobi, and therefore can be manufactured

by K.B.S. include cylinder liners, gear and gear boxes, brake drums, rubber wheel cups, bolts and studs, workshop tools, etc. The spare parts that can be reclaimed from scrap metal include batteries, armatures, carburetors, alternators, gear boxes, differential starters, dynamous, etc. To some extent, K.B.S. Engineering Department manufactures and reclaims spare parts. However, there is need to intensify and expand this effort to save on foreign exchange and to reduce the operating costs of K.B.S. It will also, to some extent, solve the problem of lack of spare parts.

K.B.S. parent company - U.T.I - has a wide experience in public transport services all over the world. Its cooperation is very important towards this end of solving the problem of spare parts. The management should try its best to win the favour of U.T.I. through better management and operational techniques and total commitment to the course of the company.

5.3.10 **INTRODUCTION OF THE COMPANY WORKERS' MAGAZINE**

The company should introduce a worker's magazine. This magazine will be helpful in the sense that workers will be able to express their views, experiences and criticisms. These are very important expressions that could help the company make very important and better decisions. It should be noted that there is alot of

freedom in expressing views through the papers than fora being provided by K.B.S. currently.

The magazine is also important in promoting certain activities of the company. This could help in boosting the morale of the employees.

5.4 CONCLUSION OF THE STUDY AND FURTHER RESEARCH AREAS

5.4.1 CONCLUSION OF THE STUDY

The various sections covered in the research study shows and reveals that the problems faced by K.B.S. in its management and operations impair not only the public transport services rendered by K.B.S. but also the general public transport system in the city. The sources and origins of these problems are wide and varied. The problems have resulted from expansion of the city both in area and population, hence increase in public transport demand at higher rate; the centralised location of land uses (particularly employment centres in Central Area and Industrial Area); the structure and physical characteristics of Nairobi which have influenced the transport network (roads and railway) system; the imperfections within the road network and traffic management problems; the nature of operations of the various modes of public transport creating certain problems; the behaviour, conduct and knowledge of other road users in the city; the behaviour and conduct of some of the public members; the unfair

competition in the transport market due to certain policies; and certain imperfections in operational management of K.B.S. company.

It should, therefore, be noted that the public transport problems affecting K.B.S. are not only internal but also external by origin.

The above policy recommendations are geared to finding solutions to the management and operational problems of K.B.S. in particular, and also to the public transport problems in general. The implementation of the above policy proposals is therefore important.

The implementation of the given policy recommendations require cooperation and coordinated effort of various agencies concerned. K.B.S. is obviously at the centre in implementing the recommendations. The involvement and full participation of Nairobi City Commission and the Traffic Police Department are inevitable. The other agencies whose participation are inevitable include: Kenya Railways Corporation and Government Ministries like Ministry of Public Works, Ministry of Local Government and Physical Planning and other Government arms and sectors like Attorney General's Office, police, etc. The cooperation and participation of matatus and N.B.S. are very much required, particularly

in streamlining the public transport services in the city. The public should also be involved in some of the programmes of improving the transport system.

Public transport problems are a cause of concern to all people within the city's community. They are a universal affair for all, and therefore, need the participation and involvement of all members of the community in one way or another. This is reflected in the various recommendations given above.

5.4.2 AREAS THAT NEED FURTHER RESEARCH

To further improve the city's overall transport system and effectively implement the above proposed policies, the following are the proposals for areas that need further research:

1. Traffic Lighting System for Junctions

Different junctions have been proved to require different improvements in the clearing bottlenecks thereof. The lighting of the various junctions in the city need proper research prior to implementation. This need has been stressed by the recent heavier bottlenecks created by the move of N.C.C. to install traffic lights at junctions (and round-abouts) without conclusive evidence that they are necessary and would prove more useful.

2. Analysis of Patterns of Pedestrian Movements in the city

This will be important in knowing the heavy pedestrian corridors which need pedestrian facilities. It will also reveal areas which may be kept out of use of pedestrians.

3. Direction of New Development and Employment Areas

Research should be made to clearly indicate the outlying areas to which developments and employment areas should be directed. This should be done to minimise travelling distances and maximize the capacity to move in all areas and zones.

4. Route Location for the Third By-pass (proposed in section 5.2.7)

The very suitable corridor through which the by-pass should pass should be determined through research.

5. Sizes of, and Other Vital Aspects and Strategies for the Matatu Cooperatives (proposed in section 5.2.6)

Research should be conducted to determine the suitable sizes of the proposed matatu cooperatives. The research should be able to spell out the possible methods the Government can use to facilitate the formation of the cooperatives. The strategies for possible constraints should be spelt out by the research.

ENDNOTES FOR CHAPTER 5

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APPENDIX 1:

K.B.S. ROUTE NUMBER AND DEFINITION OF ROUTE

ROUTE NUMBER	"	DEFINITION ROUTE
1	"	CITY-NGOG RD-KAREN-DAGORETTI MARKET
2	"	CITY-KAWANGWARE-DAGORETI MARKET
2A	"	CITY DAGORETTI MARKET VIA HAILE SELASSIE AVE.
2B	"	WAITHAKA-NGONG RD. -CITY
3	"	EASTLEIGH SEC. 3 -CITY-KINOO
4	"	SECTION 3-WARUINGI ST. -CITY-RIRUTA SATELLITE
4B	"	CITY-RIRUTA SATELLITE
5	"	CITY-JAMHURI ESTATE
6	"	EASTLEIGH SEC.1 -CITY
7	"	JERICHO-CITY-KEYATTA HOSP.
7A	"	KNH-NGUMO-CITY-JERICHO
8	"	JERUSALEM-SECTION 3-CITY-KIBERA
8B	"	JERICHO-CITY-KIBERA
9	"	EASTLEIGH SEC.1 -CITY
14	"	KARIOBANGI-JUJA RD. -CITY-GILL HSE-OTIENDE
14B	"	KARIOBANGI-JUJA RD. -GILL HSE SOUTHLANDS OTIENDE
14C	"	CITY-CHIEF'S CAMP NUMBER TEN
15	"	KARIOBANGI-JUJA RD. -CITY-GPO-SOUTHLANDS(OTIENDE)
17	"	CITY-PUMWANI-NJIRU-KASARANI
17A	"	CITY PUMWANI-NJIRU-RUAI
17J	"	KAYOLE-JOGOO RD-CITY-K.N HOSPITAL
17K	"	KAYOLE-JUJA RD-CITY -K.N. HOSPITAL
20	"	KABETE-CITY-PUMWANI-HARAMBEE
21	"	NDUBUINI-CITY-HARAMBEE
22	"	KABETE-CITY-HARAMBEE ESTATE
22C	"	CITY-HARAMBEE ESTATE
23	"	OUTERING EST.-CITY-KANGEMI
26	"	KARIOBANGI-STADIUM-CITY-RIRUTA
27	"	KARIOBANGI-THIKA RD-K.N.H -RIRUTA
28	"	KARIOBANGI-GOKOMBA-CITY-KIBERA
28C	"	KARIOBANGI-PUMWANI-BUS STN.
30	"	MATHARE NORTH-PUMWANI-CITY-KNH-KAWANGWARE
31	"	SOUTH B -NGUMO
32	"	DANDORA-CITY-KENYATTA HOSP.
32C	"	CITY-DANDORA
33	"	EMBAKASI-CITY-NGUMO-NAIROBI SOUTH 'B'
34	"	J.K.I. AIRPORT-CITY-OTIENDE
36	"	DANDORA-BURUBURU-CITY-NGUMO
37	"	NDANDORA-JOGOO RD. CITY-NGUMO
41	"	DANDORA-PUMWANI-CITY-NGUMO
42	"	DANDORA-JUJA RD-CITY-KIBERA
44	"	CITY-THIKA RD. D-KAMITI
44A	"	KAMITI-CITY-COMMUNITY
45	"	MANDARAKA-CITY-KENYATTA UNIVERSITY
45B	"	KENYATTA UNIVERSITY-CITY-COMMUNITY
45C	"	CITY-THIKA RD-GITHURAI
46	"	HURUMA-CITY-KAWANGWARE

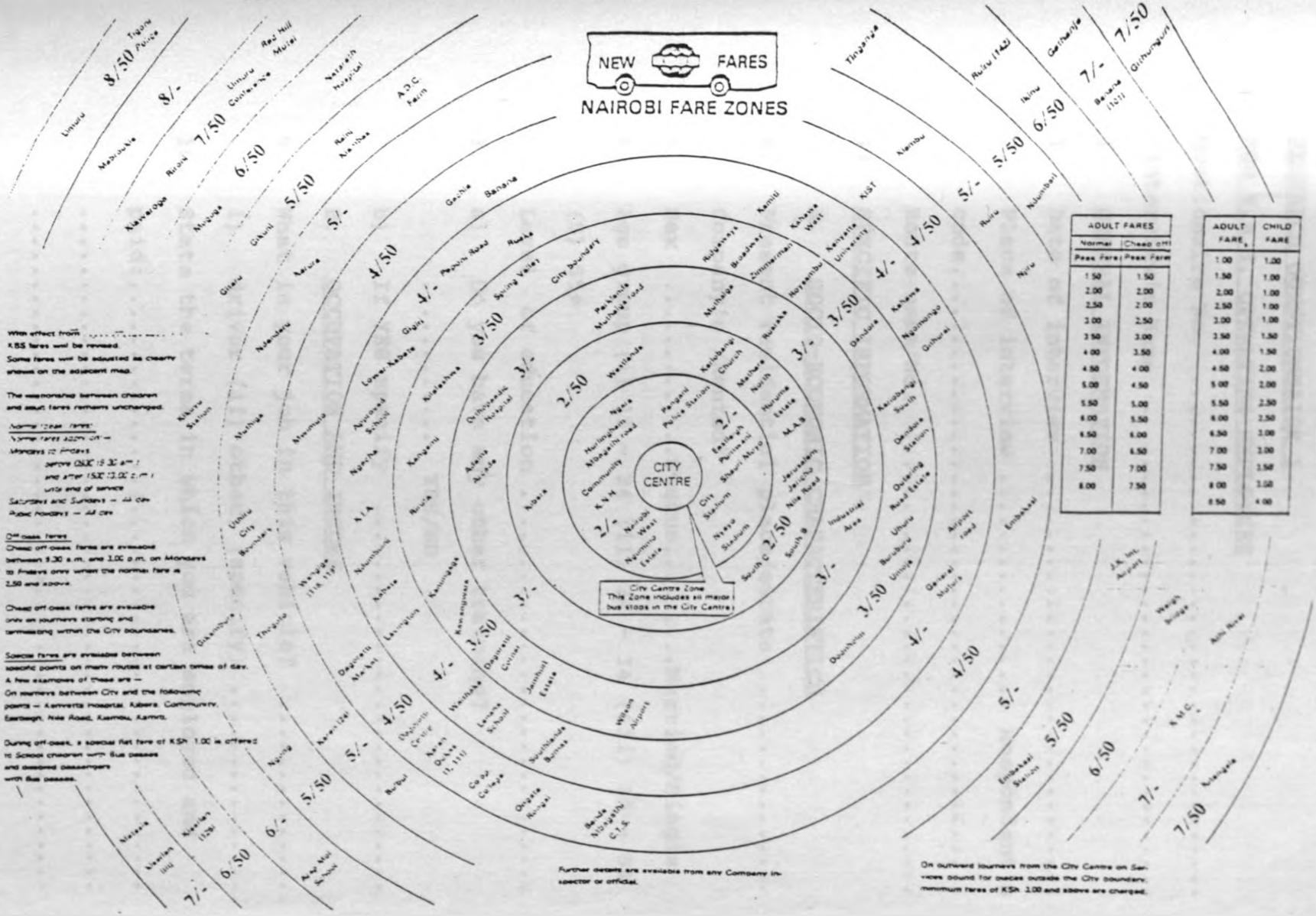
ROUTE NUMBER	" DEFINITION OF ROUTE
48	"HURUMA-CITY-LAVINGTON
56	"KARIOBANGI SOUTH-CITY-KAWANGWARE
57	"KIBERA-HAILE SELASSIE AVE. -CITY-BURUBURU
58	"KIBERA-CITY-BURUBURU
59	"UMOJA-CITY-KENYATTA HOSP.
60	"UMOJA-JOGOO RD. -CITY-KIBERA
79	"GILL HSE.-INDUSTRIAL AREA
86	"CITY-RACES
87	"CITY-JAMHURI PARK/KASARANI COMPLEX
102	"BUS STN.-KIKUYU STATION
104	"BUS STN. -GITARU-WANGIGE
107	"BUS STN. NDENDERU-WANGIGE
108	"BUS STN. -KIHARA-WANGIGE
109	"BUS STN.-KMC (ATHI RIVER)
111	"BUS STN.-NGONG
112	"BUS STN. -GIKAMBURA
115	"BUS STN. -RIRONI-LIMURU
116	"BUS STN. -TIGONI-LIMURU
117	"BUS STN. -NAZARETH-LIMURU
118	"WANGIGE-CITY-JERICHO
119	"BUS STN.-MWIMUTO-WANGIGE-GIKUNI
120	"BUS STN.-GITHUNGURI
125	"BUS STN. -ONGATA RONGAI
126	"BUS STN.-ONGATA RONGAI-KISERIAN-NGONG
135	"BUS STN.-NGONG RD.-RIRONI-LIMURU
142	"BUS STN.-KAMITI-RUIRU
145	"BUS STN. THIKA RD.-RUIRU

APPENDIX 2: AN EXAMPLE OF A K.B.S. RUNNING CARD.

K.B.S. LTD. VEHICLE RUNNING CARD	STANDARD KILOMETRES			DATE	BUS TYPE	DAYS USED	RUNNING NO.
	SHIFT NO.	689	690	TOTAL	START 26th June, 1988	G 2	SUNDAYS AND SATURDAYS	3207
	KILOMETRES	161.6	154.8	316.4			

SHIFT NO.	689					689	690			690
	am	am	am	am	am	pm	pm	pm	pm	pm
DEPOT DEPART	6.16									
DANDORA TERMINUS			7.39		11.39		3.39		7.39	
Dandora Phase 1V			7.41		11.41		3.41		7.41	
City Hall Way			8.17		12.17		4.17		8.17	
E.A.C.R.H.Q.			8.25		12.25		4.25		8.25	
KIBERA (AYANY ESTATE)			8.41		12.41		4.41		8.41	
KIBERA (AYANY ESTATE)			8.44		12.44		4.44		8.44	
E.A.C.R.H.Q.			9.00		1.00		5.00		9.00	
Ambassadeur Hotel			9.08		1.08		5.08		9.08	
M. A. B. Gates			9.26		1.26		5.26		9.26	
DANDORA TERMINUS			9.44		1.44		5.44		9.44	9.44
DANDORA TERMINUS				9.49		1.49		5.49		
Dandora Phase 1				9.54		1.54		5.54		
M. A. B. Gates				10.07		2.07		6.07		
BUS STATION				..		2.24		..		
City Hall Way	6.26	6.26		10.25		2.25		6.25		
E.A.C.R.H.Q.		6.33		10.33		2.33		6.33		
KENYATTA N. HOSPITAL		6.38		10.38		2.38		6.38		
KENYATTA N. HOSPITAL		6.43		10.43		2.43		6.43		
E.A.C.R.H.Q.		6.48		10.48		2.48		6.48		
Ambassadeur Hotel		6.56		10.46		2.56		6.56		
M. A. B. Gates		7.14		11.14		3.14		7.14		
Dandora Phase 1		7.25		11.25		3.25		7.25		
Dandora Phase 1V		7.31		11.31		3.31		7.31		
DANDORA TERMINUS		7.33		11.33		3.33		7.33		
DEPOT ARRIVE										9.59
SERVICE NO.	32X	32	42	32	42	32	42	32	42	42X
KILOMETRES	3.8	22.5	42.8	36.3	42.8	36.7	42.8	36.3	42.8	10.0

APPENDIX 3: K.B.S. FARES AND FARE ZONES AS PER DECEMBER 1988.



ADULT FARES	
Normal Peak Fare	Cheap off Peak Fare
1.50	1.50
2.00	2.00
2.50	2.00
3.00	2.50
3.50	3.00
4.00	3.50
4.50	4.00
5.00	4.50
5.50	5.00
6.00	5.50
6.50	6.00
7.00	6.50
7.50	7.00
8.00	7.50

ADULT FARE	CHILD FARE
1.00	1.00
1.50	1.00
2.00	1.00
2.50	1.00
3.00	1.00
3.50	1.50
4.00	1.50
4.50	2.00
5.00	2.00
5.50	2.50
6.00	2.50
6.50	3.00
7.00	3.00
7.50	3.50
8.00	3.50
8.50	4.00

With effect from ... K.B.S. fares will be revised.
Some fares will be adjusted as clearly shown on the adjacent map.

The relationship between children and adult fares remains unchanged.

Normal (Peak) fares
Normal fares apply on —
Mondays to Fridays
before 0930 (9.30 a.m.)
and after 1500 (3.00 p.m.)
until end of service
Saturdays and Sundays — All day
Public holidays — All day

Off-peak fares
Cheap off-peak fares are available between 9.30 a.m. and 3.00 p.m. on Mondays to Fridays only where the normal fare is 2.50 and above.

Cheap off-peak fares are available only on journeys starting and terminating within the City boundaries.

Special fares are available between specific points on main routes at certain times of day. A few examples of these are —
On journeys between City and the following points — Kenyatta Hospital, Kabete Community, Eastleigh, Hale Road, Kasarani, Karen.

During off-peak, a special flat fare of KSh 1.00 is offered to School children with Bus passes and assisted passengers with Bus passes.

APPENDIX 4:

RESEARCH QUESTIONNAIRE 1

FOR K.B.S. OPERATING EMPLOYEES

Quetionaire No. .....

-Interview's Name .....

I GENERAL INFORMATION

1. Date of interview .....
2. Place of interview ..... Respondent's code.....
3. Route name/No. .....

11 SPECIFIC INFORMATION

A. SOCIO-ECONOMIC CHARACTERISTICS

4. Present residential place/estate ..... Company's /Rented?
5. Sex .....Status.....Married/Single
6. Age group (i) 15 - 24 (ii) 24 - 34 (iii) 35 - 54 (5) 55+
7. Level of education .....
8. a) Do you have any other training?
   ..... YES/NO
   b) If YES specify .....

B. OCCUPATION AND INCOME

9. What is your job in this vehicle? .....
   i) driver (ii) other, (specify) .....
10. State the terms in which you are employed and paid:.....
    .....
    .....

11. a) Do you work in the same route every day?

YES/NO .....

b) If NO state/specify how you carry out your operations:.....

.....

.....

12. a) Do you have in-service training sessions?....

YES/NO

b) If YES,specify:.....

13. a) Are you rewarded for any exemplary sessions?

..... YES/NO

b) If YES, specify: .....

"how" .....

.....

c) In what other ways is the management trying to encourage you (motivate you) to work hard and enjoy your job?

.....

14. In what ways does the management take care of your welfare? Fill the table below:

Item	Availability & Comment
1. Health	.....
2. Co-operative	.....
Society	.....
3. Transport home/	.....
house	.....
4. Bonus	.....
5. Housing/house	.....
allowance	.....
6. Overtime	.....
7. Leave allowance	.....
8. Leave (holiday)	.....
9. Others (state)	.....
10.	.....

15. For how many years have worked with this company?

.....

C. **OPERATION AND SERVICE PATTERN**

16. State the following:

a) Average number of trips you make per day.....

b) Your main route points and the mean number of passengers/tickets as you enter and as you leave the said points (in the table below):

Route Points	No. of tickets/pass. on arrival		No. of tickets/pass.on depart	
	Normal times	Peak hours	Normal time	Peak hours
i)	.....	.....	.....	.....
ii)	.....	.....	.....	.....
iii)	.....	.....	.....	.....
iv)	.....	.....	.....	.....

c) Maximum fares charged (on the route) per passenger to town centre.

i) during normal hours

leg 1 ..... leg 2 .....

ii) during peak hours:

leg 1..... leg 2 .....

17. a) Are there any time "dead lines" set for you by the management to be at particular points at certain specified times?

.....(YES/NO)

b) If 'YES', what happens if you don't meet the "dead lines"?

.....

.....

c) If 'NO' why do your vehicles sometimes move very fast; and sometimes they are driven even over traffic islands?

18. Does the bus/vehicle comply with any formal regulations strictly? (specify)

.....

19. a) Is the bus legally restricted to designated traffic routes and service zones so that there are particular number of buses on any particular route?

..... (YES/NO)

B) If 'YES' state how the designated routes/zones are chosen (i.e. criteria in choosing them)

.....

.....

.....

20. State the number of hours (duration) of daily operations:

.....

21. Are there any shifts? ..... (YES/NO)

22. a) Are there any differences in payments of salary for working on Saturdays, Sundays and public holidays

(YES/NO).....

B) If 'YES' or 'NO', explain (specify).....

.....

.....

D. <u>OBSERVATIONS AND EXPERIENCES IN OPERATION</u>

23. a) What do you consider as some of the problems which you K.B.S. operators (employees) face (in your operations)?

1. .....

2. .....

3. .....

4. .....

5. .....

b) Suggest possible solutions to the above problems:

1. .....

2. .....

3. .....

4. .....

5. .....

24. What changes would you like to see introduced into the transportation system in Nairobi?

.....

.....

.....

25. a) Do you intend to continue working for K.B.S. for more than six years from now?

.....(YES/NO)

B) Give reasons for your answer .....

.....

.....

26. What is your opinion concerning the following in so far as transportation operations and the associated problems are concerned?

i) Passengers/public .....

.....

ii) Police .....

.....

iii) Management .....

.....

iv) Matatus .....

.....

v) Other road users (drivers/pedestrians) .....

.....

.....

.....

27. Any additional comment: .....

.....

.....

.....

.....

RESEARCH QUESTIONNAIRE II

FOR COMMUTERS AND/OR PASSENGERS

Questionnaire No. .....

Interviewer's name .....

I. GENERAL INFORMATION

3. Residence of the respondent.....

4. If employed, place of work .....

5. Sex.....

II TRAVEL PATTERNS

6. a) Where do you most frequently travel to:

i) During week days?.....

to.....

ii) During weekends? .....

to .....

b) Give reasons for your trips: in

i) .....

ii) .....

7. Which mode/kind of transport do you frequently use?

i) K.B.S. .....(vi) N.Y.S. Buses .....

ii) Matatus .....(viii) Commuter railway.....

.....

iii) Walking .....(viiii) Private car.....

iv) Bicycle .....(ix) Company car.....

v) Motorbike .....(x) Taxi.....

8. a) State the approximate number of times a week that you use the following modes from your residential place and to your residential place.

Mode	Freq. from res. Place	Freq. to res. place
i) K.B.S.....	.....	.....
ii) Nyayo buses.....		.....
iii) Matatus		.....

b) Give reason for the trend of frequencies stated above (if any):-

.....

.....

.....

9. a) Rank the following factors (qualities) in the order in which you use them to make the choice your preferred mode of transport.

Factor/quality	Rank
1. Fare/cost	.....
2. Safety	.....
3. Comfort	.....
4. Regularity	.....
5. Frequency	.....
6. Speed	.....
7. Others (specify)	.....

b) In the light of the above factors in (a) which public transport mode offer better services (Matatus or K.B.S.)?

.....

10. a) What problems do you associate with matatus and what do you think are the causes of these problems?

Problems	Causes
1.	.....
2.	.....
3.	.....
4.	.....
5.	.....
6.	.....
7.	.....

b) Suggest possible solutions .....

.....

.....

11. a) What problems do you associate with K.B.S. and what are the possible causes of these problems?

Problems	Causes
1.	.....
2.	.....
3.	.....
4.	.....
5.	.....
6.	.....
7.	.....

b) Suggest possible solutions:- .....

.....

.....

12. a) Generally, what problems do you face as a commuter and what do you think are the causes?

Problems	Causes
1.	.....
2.	.....
3.	.....
4.	.....
5.	.....
6.	.....

b) Suggest possible solutions: .....

.....

.....

13. State the changes you would like to see introduced into the present public transport system to improve it:

.....

.....

.....

14. What is your opinion concerning the following in so far as the transportation problems for commuters are concerned?

i) Police .....

.....

ii) K.B.S. Management .....

.....

iii) Matatus .....

.....

iv) The other road user (e.g. cars, pedestrians, etc.)

.....

.....

15. Any additional comments: .....

.....