

**THE CHALLENGES OF MOBILITY WITHIN NIGERIA’S EMERGING  
MEGACITIES**

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(being text of the Keynote Address delivered at the maiden annual National Conference on Public Transportation organized by the Lagos Metropolitan Area Authority (LAMATA) on the theme: “*Integrated Transport System in Nigeria’s Emerging Megacities: Issues, Challenges and Options*” and taking place at the Lagos Sheraton Hotel and Towers, Ikeja on May 6-8, 2008.)

All protocols observed

Let me start by expressing sincere appreciation to the Lagos Metropolitan Area Transport Authority (LAMATA) for the special invitation to deliver the keynote address at this first in the series of Annual National Conferences on Public Transportation, which it has decided to initiate. I note that the idea behind the series of conferences, as stated in my letter of invitation is “to provide a quintessential forum for international experts and stakeholders in public transportation, drawn from the private, public and non-governmental sectors, to brainstorm annually on germane contemporary and emergent issues confronting the sector with a view to proffering time-tested solutions towards achieving effectiveness and standardization in public transport delivery”. For this maiden Conference, therefore, the central theme is “Integrated Transport System in Nigeria’s Emerging Megacities: Issues, Challenges and Options”. I believe, however, that it is important to situate the issue of integrated transport system within the wider context of general mobility within megacities. Consequently, the title of my keynote address is “The Challenges of Mobility within Nigeria’s Emerging Megacities.”.

Mobility, or enhanced mobility involving the increasingly rapid movements of people and goods from one point to the other is a feature of only modern times. It has, indeed, been accelerated with the evolving globalisation of the world. It is this process of globalisation which is behind the remarkable escalation of urban growth in all parts of the world as a result of the exponential rise in rural-urban migration. And it is impossible in any

discussion of mobility within cities not to appreciate its continued importance. In this maiden lecture, therefore, I have organized my presentation into three parts. First, I examine the forces leading to the global emergence of mega cities especially in developing countries; second, I consider the challenges this poses for mobility within these emerging mega cities since ease of movement and circulation is a major determinant of the quality of life and the general liveability of cities. Third, I raise the issue of how, for such enhanced liveability; integrated transport system has become imperative for efficient and effective mobility within mega cities. I conclude by noting that the idea of integrating transport systems in Nigeria's emerging mega cities is very much in its infancy even in a maturing mega city like Lagos and that the motivation behind this Conference is to challenge stakeholders and transport experts to begin to brainstorm on how transport systems integration could be promoted in all of Nigeria's emerging mega cities.

### **The Global Emergence of Megacities**

First, then is to discuss the emergence of megacities globally and in Nigeria in particular. According to the United Nations, the term "megacity" refers to a continuous urbanized area with population of at least 10 million people. The Nigerian National Population Census of 2001 has not presented its results in a manner in which cities and megacities and their population can be easily identified. This is one of the tragedies of the 1976 Local Government Reform in Nigeria that sought to establish a single-tier local government system based essentially on a demographic criterion of between 160,000 and 800,000 (Adamolekun & Rowland, 1979) . As a result, large cities were simply carved up into a number of local governments whilst small to medium-sized cities were lumped together to form one local government. The result was a certain ambiguity in the database for fully appreciating the enormity of the urban transformation taking place in the country.

Yet, not being isolated from the globalisation process, much of this urban growth was being channelled increasingly to the large metropolitan centres in the country, some of which are now in the process of evolving into megacities. The globalisation process which is driving their development derives in part from the tremendous impact advances in information technology are having on global relationship and in part from the global extension of the capitalist mode of production or the free market economy

with its tremendous wealth-creating potentialities. The information technological revolution began as an accompanying innovation to the railway and steamship transport development of the 19<sup>th</sup> century. It accelerated in the 20<sup>th</sup> century with further significant developments in transport technology (for instance, the jet engine) as well as such other fundamental innovations as the computer and the copying machine in the productive sector as well as the transistor radio, the television, audio and video recording and so on in the consumer sector. The present century is already seeing the effective convergence of all of these technologies in the Global System for Mobile Communication (the GSM), the Global Positioning System (the GPS), satellite imaginaries and other remote-sensing equipments.

The global extension of these various information technological innovations spawned other revolutions especially in the organizational and operational spheres. The organizational revolution saw the emergence of big trans-national corporations which have been able to amass enormous wealth within and beyond individual nation-states such that their role in the economy of their countries as well as of other countries have, in many cases, become decisive. Such trans-national corporations have fuelled the process of privatisation and private sector intervention in areas such as energy and infrastructural development and social services provisioning which used to be the preserve of governments in many countries. Their impact is starting to be felt in Nigeria with the increasing public-private partnership in infrastructural and other developments in the nation's economy.

The operational revolution, on its part, has entailed a major shift from a fordist-type process of production to an increasingly flexible strategy. Instead of a huge factory producing all components and end-products in one, single factory in the classic method of vehicle production by Henry Ford in the early 20<sup>th</sup> century, components can now be produced in different locations and countries and assembled at the market site. This revolution has been greatly aided not only by innovations in information technology but also by the increased mobility of human beings and particularly of financial resources. Enormous financial resources can now be moved from one end of the world to another in a matter of minutes. This could make or mar the economic fortunes of countries and affect the lives and employment opportunities of large number of people. Much of these capital resources is usually foreign in origin, with a significant proportion owned by trans-national corporations. Nation-states have thus been put in a position that

they (but particularly their major cities and megacities) must vigorously compete to attract such foreign investment to greatly enhance the rate of growth of their economies. Such competitiveness reinforces the necessity for nation-states and their major cities to satisfy minimum conditions not only of infrastructural and social services development but, more importantly, of economic and political stability. And this is why the Lagos Megacity, for instance, is under international pressure to improve on its transportation, sanitation and security situation.

All of these developments have resulted in making urban centres increasingly more exciting as “bright-lights” and have fuelled unprecedented volume of rural-urban migration. This is why the proportion of urban to rural population in both developed and developing countries has been changing rapidly with the prognosis that by 2015 for the first time in human history the urban population will be greater than the rural. For Nigeria, the expectation is that by that time the urban population would be at least 43 per cent of the total and most of these will be concentrated in the nation’s large cities.

Not all large cities, however, are megacities. The prefix “mega” before the word “city” comes from the Greek word “*megas*” meaning great or mighty. It is applied to any element that is large, great or powerful. In measurement terms, it refers to an element that is at least a million times more than the standard unit of reckoning. When applied to cities, therefore, it is easy to appreciate that it does not simply mean a big or large city but one that is inordinately big or large for its times. Rome was the first real megacity in world history, its population reaching at its peak as much as 1.5 million (slaves included). Its huge size was such as to compel “its administrators to devise complex systems of international food supplies, to grapple successfully with long distance delivery of water and with complex systems of waste disposal, even to formulate rules of urban traffic management” (Hall, 1997). All of which cast long shadows to problems of modern-day megacities such as Lagos.

Although it is claimed that Constantinople equaled ancient Rome during the middle ages and that Beijing did in the early modern period, it was not until just after 1800 that London became indisputably the greatest city that had ever existed in the world. Its population passed the one million mark by 1811 and had more than doubled by 1851. It had again doubled by 1901 when it reach over 4.5 million. By 1925, however, London had been

overtaken by New York as the largest city in the world and the primer city of the burgeoning capitalism of the times (Jackson, 1984: 321)

Since the 1950s, however, most of the remarkable growth in the size of cities has been taking place in developing countries. This was a period that witnessed the decolonization movement all over the world and therefore the removal of restrictions on internal movements of people in former colonial territories such as Nigeria. It was also a period that saw much emphasis on socio-economic development. This was promoted actively by the United Nations in a series of development decades starting from the 1960s. Development in this context was interpreted as the struggle against ignorance, disease and poverty in the new nations being established in Africa, Asia and Latin America following the end of colonialism. Everywhere, the programmes for the struggle concentrated on education, health-care and industrialization. Education and healthcare together, whilst in part reducing the sway of ignorance and diseases and, therefore, the rate of mortality in the populations resulted in enhancing life expectancy and accelerating the rate of growth of the population. The growth of population in Nigeria, for instance, escalated from 31.6 million in 1952 to over 140 million in 2001, a more than fourfold increase within 50 years.

Industrialization was, however, a more difficult strategy to promote. As a result, without adequate attention paid to agricultural and rural development, the growth in population simply resulted in increasing rural poverty. Out-migration from rural to urban areas especially to the capital cities became a feature of most developing countries including Nigeria. This, combined with the fact that most educational and health-care facilities were disproportionately concentrated in urban centres, resulted in a high rate of natural increase in their population. Together, these trends in the urban population of many developing countries led to many of their cities growing so rapidly as to enter the category of megacities and to displace a number of others in developed countries.

Thus, up to 1950, there were only 8 cities in the world with population of 5 million and more (Montgomery et al., 2004: 85) At that time, New York, London and Tokyo were the world's major megacities with population of 12.3 million, 8.7 million and 6.9 million respectively. Today, on the basis of the 10 million population definition of the United Nations, there are some 28 megacities in the world, 21 of them being in developing countries. Megacities in the developed world include such places as New York and Los

Angeles in the United States, Paris, Moscow and Istanbul in Europe, and Tokyo and Osaka in Japan. Of the 21 megacities in developing countries, Asia boasts of 14, Latin America of 5 whilst Africa at present lays claim to two megacities namely Cairo and Lagos but the prognosis is that the number will increase in the very near future.

In Nigeria, although metropolitan Lagos is undeniably the only megacity, a few other urban centres are already showing indications of growth towards metropolitan, if not megacity status. The creation of states in the period since 1967 re-directed rural-urban migration streams to many of the new State capitals. Especially where such capitals have some rudimentary capacity to absorb modern industrial and commercial establishments, their rate of growth in the last three decades have been phenomenal. Thus, cities like Kano, Port Harcourt, Warri, Ibadan, Ilorin, Kaduna, Aba and even Abuja are already showing trends towards emerging as potential megacities. Indeed, it is estimated that in year 2000, some 17 Nigerian cities already have population of more than one million people, a good number getting closer to three million and above. Most of the population agglomerating in these centres are, however, relatively poor, seeking employment largely in the informal sector of the urban economy. They have also tended to house themselves in informal housing with inadequate infrastructural provision at the semi-periphery of emerging megacities.

The uncontrolled urbanization that this development gave rise to with poor layout of streets and inchoate road infrastructure determines much of the fabric within which mobility takes place in many Nigerian emerging metropolitan centres. Moreover, unlike in the average large city where most of the economic activities are concentrated in one major central business district on which general mobility is focused, these emerging megacities tend to be multi-centred with a more complex system of mobility. It is the complexity of these movements along with the complexity of the land-use pattern that are already constituting serious challenges for mobility within emerging megacities in Nigeria.

### **The Challenges of Mobility in Nigeria's Emerging Megacities**

One of the major functions of the spatial structure of any human settlement is to facilitate the mobility and circulation of people and goods within the settlement. For an emerging megacity, such mobility ranges from the movement of an individual on foot to the daily hordes of commuters

entering and leaving the megacity from distant points. It comprehends two-wheeled bicycles and motorcycles, automobiles, buses, trucks and railroads on land, underground trains, boats and ships on water as well as helicopters and airplanes overhead. It traverses series of routes for a variety of purposes notably work, shopping, entertainment, education, relaxation, affairs of state, law enforcement, health-care delivery and transport of raw materials and manufactured products. The mixture of the demand for mobility for these various purposes and the diverse vehicles or modes to serve them compounds the equation for the transport system in any city. This system embraces walkways, bicycle paths, service lanes, estate streets, major roads, highways, freeways, rights-of-way for rail lines, waterways and airway routes. In most cities, a large part of the elements of this mobility system, however, would have been inherited from the pre-machine era of urban development especially in the city centre.

Thus, although most major cities in the world developed before the widespread use of automobiles and were thus “pedestrian cities” with narrow streets, high densities of residences and a great mix of commercial and industrial activities, everywhere there has been an explosive growth in the number of road vehicles. There is thus in many cities of developing countries a major challenge of adjusting the new system of mobility to the archaic layout of their cities (Gallion & Eisner, 1983: 254). The convenience of ownership and the concentration of job opportunities in particular locations have encouraged the massive reliance on private automobiles for mobility within most cities. Indeed, this reliance has now been built into much of the evolving urban landscape that it is very difficult to change. Thus, in reviewing the challenges of mobility in Nigeria’s emerging megacities, the situation in the Lagos Megacity provides an advanced template of the evolving circumstances in most of them.

According to Afolabi (2008), a survey carried out by the Lagos State Ministry of Transport revealed that of 800,000 vehicles plying the roads of the Lagos megacity, some 740,000 are private. Indeed, during the oil boom period in the early 1970s, commuters who earned over N600 per month normally owned their own private means of transport, thus reducing the demand for public transport. However, the period of economic hardship that followed the adoption of the structural adjustment programme in the 1980s turned many marginal car owners into public transport users. The position changed again with the return to civil rule and the adjustment in average personal earnings of workers. This led again to a rapid rise in the

importation of used cars from different countries of the developed world. Consequently, for a developing country like Nigeria where per capita income is sometime as low as a dollar per day and where, as a result, only the wealthiest 10 – 20 per cent of the population are likely to own a private car in their life time, the domination of public space by their motor vehicles directly translates to the domination of the public space by the ultra rich in megacities.

Private ownership also characterizes the provision of numerous mass transit vehicles used as public transport. These are known in Lagos variously as *molue*, *danfo* or *kabu-kabu*. They comprise of 48-seater buses or 16-seater minibuses, or 5-seater taxis usually painted yellow with black strips. Most of these are imported already used and quickly become old and rickety with tendencies to smoke or breakdown frequently. These privately-owned vehicles constitute today the most significant, though largely unregulated, means of public transport in most parts of the Lagos Megacity. They are followed in importance by the use of motor-cycles called *okada*, which carry one or two passengers from the suburbs to the main transport interchanges or terminals.

Estimates of transport demand in metropolitan Lagos in the 1990s ranged from 7 to 10 million passenger-trips daily. Of these, over 95 per cent are undertaken by road, primarily by car, bus and taxi. Some 80-85 per cent are made by forms of privately-provisioned public transport. There is no accurate statistics of the total fleet of such public transport vehicles operating within the megacity although the figure was said to have been as high as 165,000 in 1984 and to have declined to around 100,000 by 1988. It is not inconceivable that the return to less harsh economic conditions since the return to civil rule and the ease of importation especially of used vehicles would have seen more than a doubling of these figures.

The history of publicly-owned mass transport service within the Lagos Metropolitan Area has been a very chequered one. With the take-over of the former Zarpas Bus Service by the Lagos State Transport Corporation (LSTC) in the 1970s, total annual passengers carried by the Corporation fluctuated from 90 million in 1978 to 53 million in 1983, 76 million in 1989 and less than 60 million in 1992 (The Guardian, 1994). Consequent upon the riots following on the initiation of the structural adjustment programme in 1989, the Federal Government introduced the Mass Transit Scheme. Under the scheme, buses were distributed to states, including Lagos, to assist in both intra-urban and interstate transportation. The Lagos State

Government itself in 1991, bought some 90 buses and leased these to private operators to help ease the acute transportation problem. Other bus operations were sponsored by local governments within the metropolitan areas but the capacity they provided hardly equaled more than half of that provided by the LSTC. However, given the general inefficiency and corruption with which the LSTC operated, resulting in frequent breakdown of its buses, the Corporation was dissolved in 1993 and its staff laid off.

With the abrupt termination by the military in 1984 of the metroline project initiated by the civilian government of Alhaji Lateef Jakande (1979-1983), the role of the rail in moderating mobility within the megacity was truncated. However, the Nigeria Railway Corporation, which already had a commuter service between Agege and Apapa, also introduced mass transit rail passenger services in 1988 as part of the anti-SAP measures of government. It later went on to commission a commuter line from Iju to Ebute Metta in 1994 which was the first such effort since 1965. It is claimed that this service added some 10,000 passenger per day to the commuter passenger capacity which had stood at fewer than one million passengers per year over more than a decade. However, like with the fate of the Nigerian Railway Corporation itself, rail mass transit services within the megacity has been at best epileptic in its delivery.

In spite of the fact that metropolitan Lagos comprises of a number of islands connected to the mainland by a system of lagoons, it has not been possible to establish an effective mobility system based on water boats. For many passengers crossing by a ferry boat from the commercial centre on the Marina to the port at Apapa could have been a matter of less than half an hour travel at peak traffic period compared to the over two hours it takes to do so by road. An attempt made to inaugurate a ferry service in the period 1979 to 1983 did not last much longer owing to the perennial problem of corruption and a lack of an effective maintenance system. Furthermore, the Federal Inland Waterways Department which has responsibility for managing the lagoon system has been indifferent to the need to dredge the lagoons and make them a veritable channels of mobility within the megacity.

Thus, from the situation in Lagos, it is patent that four challenges confront mobility within Nigeria's emerging megacities. The first is the inadequacy in the public transport system. Lagos is perhaps not the only city where the public sector had tried to operate a mass transit bus system and had had to discontinue after the failure of sustainable management. Ibadan, Kano and Kaduna, for instance, have had similar experiences due to corruption and

poor management of the public bus service. But Lagos Megacity has the advantage that it can deploy both rail and water transport services to promote effective and efficient mobility within its borders. This, however, will require cooperation with various agencies of the Federal Government which should not prove an insurmountable challenge.

The second major challenge is the perennial problems of traffic congestion. This is the product of many causes. On the one hand there is the physical structure of many parts of the megacity. Apart from the expressway and the major trunk roads, the road network in many parts of the megacity are poorly articulated, reducing the traffic route options available to motorists except to crowd on to the major road arteries. This is further aggravated by the lack of coordination between federal, state and local council road networks which results in the existence of sharp breaks in road quality and maintenance standard. On the other hand, there is the failure of the Lagos State Government to integrate the development of government layouts with those of private developers. This has also produced ineffective integration of road networks within the megacity. The relative narrowness of most roads as well as the inherent physical characteristics of many areas, especially the swampy terrain and drainage obstructions especially during the rainy season create conditions forcing movement of vehicles to pile up and cause serious traffic congestion.

Frequent break down of the imported used vehicles and accidents on the roads are other causes of traffic congestion. Various strategies have been deployed to reduce traffic congestion within the megacity. These include the widening of roads, the construction of fly-overs, clover interchanges, bridges, ring roads and expressways. They also include attempts to restrict access to the city centre on alternate days of vehicles with odd and even registration numbers as well as the conversion of hitherto two-way to one-way roads. In spite of all of these strategies, traffic congestion remains a major feature of mobility within megacities especially during the peak periods.

A third challenge is environmental and relates to the increasing incidence of air and noise pollution emanating from the traffic situation. The most ambient air pollution in megacities comes from the combustion of fossil fuels in all motorized vehicles. The use of fossil fuels tends to increase with the growth of the urban economy unless measures are taken to promote efficient fuel use and the use of the least polluting fuels such as unleaded fuel for motor vehicles. More commonly, however, motor vehicle emission

tends to generate photochemical pollutants, lead and carbon monoxide. High ambient level of lead is increasing in most Nigerian megacities because of the high concentration of imported used vehicles, which cannot use lead-free petrol, and the indecision of government to compel a turn-over to vehicles that can. High concentration of carbon monoxide occurs along busy roads or in central areas of city. It is suspected that the mix and concentrations of air pollutants are already high enough in the Nigerian megacities to cause illnesses in more susceptible individuals and premature deaths among the elderly especially those with respiratory problems. Furthermore, the poor state of monitoring ambient air conditions in these cities has made it difficult to initiate appropriate measures to deal with this particular range of challenges.

The fourth challenge concerns the level of safety on roads within megacities. Efficient flow of traffic is often interrupted by accidents especially in areas where the street design is of the grid-iron pattern. Studies in the United States disclose that the accident rate in such areas can be eight times as great as in neighbourhoods whose road systems have limited access to major traffic arteries (Gallion & Eisner, 1983: 270). Consequently, it is argued that not only is safety greatly improved by reducing street intersections but also that economy in time and money is effected. Similarly, safety and efficient flow of traffic is enhanced by improvements in lighting and directional signs both of which are poorly deployed on streets in Nigeria's emerging megacities. Lighting for night travel has made great progress in technological and cost terms such that highways in megacities have become ribbons of lighted pavement requiring no headlights on vehicles for adequate vision and safety.

The scale of letters and placement of signs which indicate directions, places and distances have also become important factors in the design of traffic ways for smooth and safe mobility. The indigence of local governments has made lighting of streets hardly recognized as a normal feature of urban life whilst poor maintenance has reduced the effectiveness of directional signs. This is particularly noticeable in respect of such signs as zebra crossings. At such crossings, it is unusual to find any special lighting to assist pedestrian or steady and flashing beacons to caution motorists. In fact, many zebra crossings are obstructed due to on street parking whilst motorists often race across such crossings, making roads in most of the emerging megacities some of the most dangerous for pedestrians.

## **The Imperative of Integrated Transport Systems**

The challenges indicated above go to underscore the imperative for an integrated transport system for Nigeria's emerging megacities. What this means in reality is, of course, integrated transportation management systems (ITMS). ITMS is a process of enhancing mobility by making the use of existing facilities more effective through systematic articulating, monitoring, evaluating, prioritizing and implementing the operational management systems of different modes of transportation within megacities. The objective is to initiate opportunities to improve the effectiveness and efficiency of transportation services by innovative ideas and practices through the proper application of technology and operational procedures. Effectiveness of transportation services is defined by consumer needs in the sense that the services are safe, convenient, economical and reliable whilst efficiency entails meeting these collective needs of consumers at a cost that is acceptable to users, taxpayers and the environment.

The necessity for integration is the fact that generally within most cities the transportation system is fragmented due to multiple modes, multiple agencies, multiple jurisdictions and multiple disciplines being responsible for various aspects. The resulting specialization, whilst improving the efficiency of the various modal components, tends to be detrimental to overall mobility. To facilitate the attainment of the goals of integration and of effective and efficient mobility, emphasis must thus be placed on promoting the greater use of mass transit modes within megacities especially of high capacity buses, rail and water and a lower emphasis on the private cars.

Integrated Transport Management System can be conceptualized in terms of four dimensions: physical, logistical, tariff and contractual. The physical components of the system entails the management of highways, pavements, bridges, jetties, public transportation facilities and equipment for the different modes – road, rail and water, intermodal transportation facilities and systems as well as traffic congestion and highway safety. Clearly, this physical dimension of ITMS requires that transport planning should be more broad based and should include considerations such as those of land use, intermodal connectivity, methods for enhancing transit service and other needs of consumers.

The implementation of the physical dimension of an ITMS thus implies the need for an ITMS System Architecture. Such system architecture provides a

framework that describes how the various sub-systems (e.g. traffic signal sub-system, expressway traffic management system, traveler information sub-system, etc.) should interact and work together to achieve total systems goals. System architecture is developed through a system engineering process. System engineering is the process that turns operational needs into system performance parameters, assures compatibility of all the technical components, and delivers a satisfactory product on time and on budget. This structured approach to the physical dimension of an Integrated Transport Management System ensures that the end product is truly a system, not a loosely coupled group of modes. For the Lagos megacity, for instance, such system architecture will help to identify where on the transportation system new bridges, fly-overs, new terminals or one-way streets may need to be established.

The logistical dimension of ITMS involves the availability of comprehensive system information of all the modes and the operators as well as the reliability of connections between them provided in real time. It requires that the delivery of transportation services is made transparent to the users and is done in an efficient manner that is also responsive to their needs. Consequently, transit between modes cannot be treated as a separate mode but as a full and pivotal element in the operation of the integrated transportation system. This dimension thus includes those of institutional relationships necessary to support the mission of the transparent delivery of transportation service across modes. It includes the full consideration of pedestrians and bicycles in system operation with full appreciation of the importance of these self-powered modes as a part of the system, not as a nuisance to be considered after all other issues. The logistical dimension also ensures the multidisciplinary but integrated responses of police, fire, ambulance and wrecker services to major incidents as part of the system. By the same token and because users do not expect official city limits or city departments to be reasons for systems operating inefficiently, this dimension also entails dealing with the multiple jurisdictions in the system.

For all of these reasons, the logistical dimension has spawned many tools for managing integrated transport services in developed countries (Urbanik II, 1995). Such tools include, apart from the traditional Transportation Systems Management (TSM), the Congestion Management System (CMS), the Travel Demand Management (TDM), the Transportation Control Measures (TCMs) and the Intelligent Transportation Systems (ITS), among others. The TSM is a class of management strategies carried out to improve the

management of the supply and use of existing transportation facilities. It is designed to increase effective capacity of the existing system without major capital investment in new facilities. TSM strategies tend to be low cost, to require minimum right-of-way, and to be rapidly implementable compared to new construction. The CMS is a system to monitor and analyze the magnitude of congestion on a multi-modal transportation system in order to plan and implement appropriate action to enhance transportation system performance. It thus includes methods to monitor and evaluate performance, identify alternative actions, and evaluate the effectiveness of implemented action. The TDM is a class of management strategies carried out to reduce effective travel demand by modifying trip-making behaviour. The purpose is to achieve efficient use of transportation facilities by reducing drive-alone auto-trips (single-occupant vehicles, SOVs), and to minimize costs of roadway expansion for such SOVs.

The tariff dimension of ITMS entails the design and supply of packages of services with an integrated price that promote their adoption by customers thereby reducing transaction costs for them. A key ingredient for more successful mobility within megacities is an adequate pricing and financing policy for the integrated transport system. Price of mobility services must be seen not only as an instrument for cost recovery but also for driving consumers' behaviour (Viegas, 1999). It should attempt to contribute to the control of external costs produced by the system. This can only be achieved by the combined use of market-based incentives together with control regulations. The former should persuade users to adapt their behaviour towards policy aims whilst the latter are mostly meant to restrain practices leading to the growth of external costs.

Nonetheless, the effective mode of payment for mobility services in an integrated transport service remains one of the critical issues for determination. The experience of the city of Curitiba in Brazil is instructive in this regard (Parasram, 2005). It was found that one of the factors that generated delays in the system was the hold-up in the mode of passenger payment. Over the years, there had been many forms of payment implemented. A new system to avoid delays was then created in which the city eliminated transfer payments and substituted them with transfer tokens made by paper. After 7 months of implementation, the city discovered major forgery of these paper transfers. It then tried to install a two-fare payment system, separating the express fares from the feeder fares (fares for the outlying buses connecting to those going to the city centre). This system

was repealed after one and half-years because it favoured the rich who resided closer to the centre and paid only one fare over the poorer population who resided on the periphery of the city and would have to pay two passages to arrive in the centre.

Realizing the social imbalance imposed by this fare mode, the city dropped the feeder fare. Eventually, the city adopted a one-fare payment system. Given the fact that the city was divided into zones with privately-owned bus companies having the franchise to cater to particular zone, the one-fare payment system implied that passenger could pay one company at a terminal located in a particular zone and ride the system without paying the other bus companies. In 1987, the city addressed this particular issue by distributing transportation revenue based on the number of kilometers traveled by vehicle type for any given company. With each company given a number of route kilometers and a timetable, each company competes with the schedule not with other companies (Rabinovitch and Hoehn, 1995). It is, of course, noteworthy that in highly developed megacities such as London, a one-fare payment system across modes is related to zones defined from a centre as well as to particular time of the day when the trip is generated.

The contractual dimension of ITMS relates to the formal commitment of all parties for the conjunction of efforts and the allocation of responsibilities between authorities and operators and between operators of different modes for the quality of the service provided including system integration initiatives. In most megacities, the transportation system is managed and operated by many different agencies and multiple jurisdictions. These agencies represent various modes and functions. Therefore, to better manage and operate the system requires coordination of the many agencies and jurisdictions. Implementing such coordination is difficult because of the multiple and sometimes conflicting objectives of the different agencies and jurisdictions. These differences of perspectives and willingness to participate are mediated through various contractual instruments. The main elements in such contractual integration relate to the scope of competencies of the primary authority and the responsibilities of the different agents regarding initiatives towards system integration. The existence of an authority that co-ordinates all mobility aspects facilitates better inter-relations with other decision-making bodies concerning land-use and urban environment. But it is recognized that communications and partnerships among agencies and jurisdictions are as or more important to the management of the transportation system than technical sophistication and

refinements of tools. Hence, in actual practice, ITMS is expected to become a reality through incremental improvements in the existing process of building institutional bridges between diverse agencies, modes, jurisdictions and disciplines with individual missions.

## **Conclusion**

Let me conclude by emphasizing three issues, which should have become patent from the presentation so far. First, it must be clear that efficient and effective mobility is critical for sustainable development of megacities in terms of the economic, environmental and safety considerations. Second, it should be evident that integrating the transportation system is perhaps the single, most important ways of achieving such efficiency and effectiveness in mobility within megacities. Third, neither the emerging megacities in Nigeria nor even the already emergent megacity like Lagos have started to seriously address the challenges of integrating their transportation system. The reasons for this are, of course, not far to seek. Perhaps the most obvious is dealing with the wide-ranging contractual dimension of integration.

The decision by the Lagos State Government to establish the Lagos Metropolitan Transportation Authority (LAMATA) is perhaps the first step in initiating the process of integration. Even here, however, there is a jurisdictional weakness since the span of LAMATA does not cover the whole of the megacity, a significant part of which is in Ogun State and, as already indicated, consumers of transportation services do not recognize such artificial boundaries to mobility within the megacity. Equally commendable in respect of this contractual dimension is the initiation of the process of organizing existing private-sector vendors of mass transit such as the National Union of Road Transport Workers (NURTW) to participate as a franchisee on some of the emerging bus routes within the megacity. Activities in this direction are going on to bring in more private-sector operators into the integrated transportation system. There is also the beginning of developing the physical dimension of an integrated transportation system as reflected in the provision of limited access bus rapid transit routes along major expressways as well as providing some of the buses to ply these routes.

The articulation of the over-all system architecture for integrated transportation is still a challenge not only for the Lagos Megacity but also most of the emerging megacities in Nigeria. Equally awaiting greater

attentions are issues, challenges and opportunities in the logistical, tariff and contractual dimensions of integrated transportation system in these megacities. None of the problems involved can be resolved easily or on a one-shot basis. This is the overriding reason for initiating this Conference, which is expected to be an annual Conference on Public Transportation. Looking at the caliber of participants at this first in the series, I have no doubt that much of the issues, options and challenges of integrated transportation system in our emerging megacities will be seriously confronted. I wish the Conference useful deliberations and thank you all for your attention.

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