of these new technologies in the mining process of bitumen in Nigeria would open a bigger gateway of income, thereby having a ripple effect on other sectors of the economy.

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ECONOMIC PROBLEMS OF PUBLIC TRANSPORT IN MEXICO – A REVIEW

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Introduction. This article discusses current economic problems faced by the public transportation system in Mexico. It is no surprise to anyone that public transportation is undergoing a crisis: unregulated and private operators, an ageing fleet of vehicles, lack of government investment and incentives, high emissions of greenhouse gasses, inadequate infrastructure and long commuting times are some examples of the current challenges encountered in the pursuit of a sustainable and efficient public transport.

Current situation of public transport in Mexico

Public transportation is inseparable from the function and development of nowaday's cities, as it has become an important mean of regulating the urban development model, but the lack of investment into the modernization and efficient functioning of urban public transportation has led into an increase in the numberof private motor vehicles, with very clear negative results on the economy, society and environment: an increase in accidents, traffic congestion, longer commuting time, an increase in greenhouse gases emissions, lower quality of life, among others. For decades, cities have being planned and developed with the private motor vehicle in mind, diminishing the role of urban public transportation, its related infrastructure and its inherent benefits.

As noted by Joseph and Bourn [1], transport problems can harm local economies and businesses in a number of ways. Both congestion and local traffic problems can increase business costs, impede or even block new developments and put off customers and clients. A local economy cannot expand without spare capacity in local transport networks. Local firms may experience a shortage of labour due to poor access by transport, and for the unemployed, transport issues can be a key barrier to getting into the labour market.

The problems being faced by the public transport system of Mexico nowadays are the following, as identified by Lopez [2]:

Decreasing travel speeds and increasing travel times – It was estimated that the current operating speed for public transport in Mexico City was of around 12-15 km/hr, with an expected operating speed of 25-30 km/hr. For Monterrey, current operating speedvalues are 12-15 km/hr, and 25 km/hr of expected operating speed.

Low levels of comfort and safety – In general, the quality of public transport is low. Accurate information about the public transport system is unknown to both the passengers and the transport authorities. There is generally a lack of safety for the passengers, as in some cities buses operate with the doors open, board/descent of passengers takes place in prohibited and/or dangerous areas. Additionally, the drivers speed up above authorized operational speeds, and may even be using their mobiles while driving the unit. Also, some seats may be in poor condition, not allowing for for its use or endangering the users.

Vehicle fleet age – The average fleet age is around 10 years, while the legally authorized age is of no more than 9 years. But, there have been cases of fleets that exceed 20 years.

Poor state of insfrastructure – The dedicated infrastructure to public transport is mostly, in poor state. This can include: (1) poor condition of the bus stops; (2) no enforcement to respect the bus stops; (3) infrastructure built in places where is not safe for the passengers, as in some cases they have to step out into the avenue to see if the public transport is nearby. In most cities, both private and public transport share roads, with the latter being slowed down by the congestion caused by the private vehicles, and the former in turn slowed down by the frequent stops of buses. This greatly affects commuting time. Funding usually is destined for automobile infrastructure rather than public transport.

Fares not properly defined by legal bodies – Fare levels are rarely determined through technical studies, and are mostly politically determined. This results in the fares not taking into account the service quality, and all that comes with it, such as the operating costs and maintenance of the transport system. This mostly impedes a fleet modernization and generation of surpluses that would grow the sector.

No government subside – While the service is in fact, subsidized, this comes mostly from the private transport operators and not from the government bodies.

Low capability to plan, construct and regulate public transport by institutions –This is even more limited by the fact that it is usually short-termed planned, due to political cargos duration and affected by the current political party, which further reduces the possibility of continuity in already existing programs, if any.

Austerity - The current austerity measures taken by the Mexican Federal Government have the goal of saving funds in the short run, but on the longer term, they are more likely to become a drag on economic growth, as it is implied on the report made by PTEG [3].

Monterrey urban transport in numbers. The city is an integrated labor market and it is visible on a metropolitan scale: Out of 11 million daily trips, 45.7% of trips are by car, 21% by public transport and 19% on foot, as shown by the ITESM [4].

The greater density of jobs in the central area and the emergence of new centralities in the periphery directly affects urban mobility. The problem is that although the city has sub centers, the highest density of employment continues to be in the central zone; and if there is no adequate transportation infrastructure to these new centralities, the labor market is fragmented and the city loses competitiveness. This has social and environmental impacts related to the longer time and higher costs it takes to travel from home to work.

Problems of urban transportation of Monterrey[4][5]:

- The average travel time in public transport is 62 minutes, the second highest value in the country behind Mexico City, with 66 minutes.
- More than 39% of passengers spend more than 2 hours travelling in public transport daily. It was found by Marchetti [6] that the average time spent by a person, is about one hour. Beyond that time, people perceive time spent traveling as wasted.
- The average waiting time is 20 min, but more than 40% of passengers wait for more than 20 minutes, third highest in Mexico. For comparison, in Mexico City the average waiting time is 11 minutes and only 11% of passengers wait for more than 20 minutes.
- The average distance travelled (one-way), is 9.4 km. 52% of passengers travel for more than 12 km in one-way.
- In average, 53% of passengers has to transfer at least two times during a one-way travel, highest percentage in Mexico, above Mexico City and Guadalajara, with 50% and 49%, respectively.
- 44% of passengers walk more than 1 km to arrive to their destinations.
- In three years, inversion for maintenance of state-owned transportation was reduced from 2,2 million dollars to less than a million dollars.
- In 6 years, the number of buses in service went from over five thousand to less than three thousand units.

It’s planned that the state government will invest over five thousand million dollars during a period of six years to build and modernize infrastructure, renew fleet and push for a smart mobility. This includes three new Metro lines in addition to the existing three; as well as a new railway line. It is expected that the government will acquire 1,600 new buses, with an investment of over 300 million dollars, which will include 1490 low-emission units and 110 electric ones [7].

Conclusions

Problems ranging from outdated fleets, long commuting times, oversaturation, current state of dedicated public transport infrastructure, and long

waiting times are part of every passenger's day. If this issues are to be solved, an extensive technical study is required taking into account several factors, such as the urban agglomeration, workplaces location, available infrastructure, fares, average operating and maintenance costs, subsides; and an extensive cooperation is mandatory from all bodies, from government, to private operators, as well as the most important factor – the user.

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