



**ROADS AND HIGHWAYS IN EGYPT
REFORM FOR ENHANCING EFFICIENCY**

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Abstract

The transport sector in Egypt is characterized by strong public intervention in the design, building and operation of networks and services. Additionally, being a strategic sector, it is marked by significant political interference, aiming to either absorb excess workers or to maintain a low pricing policy. Such policies led to a considerable deficit and shortage of resources in this sector. It is no surprise, therefore, that financing new projects and improving efficiency headed a list of problematic issues on the government agenda. In order to solve these problems many reforms need to be implemented. In this context, the study focuses on ways to develop performance and eliminate obstacles facing private sector participation in rehabilitation and maintenance of infrastructure in order to reduce the cost burden on the public sector. It illustrates the experience of a number of developing countries in reducing road transport costs and improving the service as well as the different possibilities to enhance the sector's efficiency either by reforming public sector performance, strengthening private sector involvement or adopting public-private participation in road investment.

ملخص

يتسم قطاع النقل في مصر بالتدخل القوي من جانب القطاع العام في تصميم وبناء وتشغيل الشبكات والخدمات. فضلا عن ذلك، كونه ذا أهمية إستراتيجية، يتسم هذا القطاع أيضا بتدخل سياسي كبير يستهدف إما استيعاب العمالة الزائدة أو الإبقاء على سياسة الأسعار المنخفضة. وأدت هذه السياسات إلى حدوث عجز كبير ونقص في موارد القطاع. وعليه، فمن الطبيعي أن يتصدر تمويل المشروعات الجديدة وتحسين الكفاءة قائمة المشكلات المدرجة على جدول أعمال الحكومة. ولأجل حل هذه المشكلات لابد من تنفيذ الكثير من الإصلاحات. وفي هذا السياق، تركز الدراسة على سبل تطوير الأداء وإزالة العقبات التي تحول دون مشاركة القطاع الخاص في إصلاح وصيانة البنية التحتية، وذلك بغية تقليل أعباء التكلفة التي يتحملها القطاع العام. كما تعرض تجربة عدد من البلدان النامية في مجال خفض تكاليف النقل البري وتحسين الخدمة، بالإضافة إلى السبل المختلفة لتعزيز كفاءة القطاع سواء من خلال تطوير أداء القطاع العام، أو تعزيز مشاركة القطاع الخاص، أو تبني نهج المشاركة بين القطاعين العام والخاص في مجال الاستثمار في شبكات الطرق.

“Transportation is one of the tools that civilized societies need to bring in order out of chaos. It reaches every phase and facet of our existence. The more complex life becomes, the more indispensable are the elements of transportation systems.”

(U.S. Senate, Committee on Interstate and Foreign Commerce, 1960 quoted in Coyle, Bardi and Cavinato (1990))

1. INTRODUCTION

Traditionally, the provision of means of transport was the monopoly of governments either in providing transport services or building adequate infrastructure including airports, ports, railways and roads. These projects have always put financial pressures on governments to maintain service quality and monitor safety to protect users. Such intervention resulted in financial deficits, which eventually forced governments to consider private financing. The 1990s witnessed a major change in terms of restructuring transport policies and increasing the role of private operators and investors in transport infrastructure.

Unlike in other countries, the Egyptian transport network could benefit from the strategic location of Egypt, where it could play a role in expansion of trade, and also in bringing together production zones and distribution points. Thus, modernization of the transport sector will not only allow trade and business to flourish but also will strengthen the country's presence internationally and increase its competitiveness. This implies a rising annual share of budgetary resources directed to different modes of transport (air, maritime and land). The significant need to expand projects and maintain existing ones resulted in a continued burden on Egypt's public finances. To remedy this situation, the government has started investing more in the roads and highways sector and restructuring the railway and maritime sectors. It has also allowed the private sector to participate through several BOT and BOOT projects in both maritime and road sectors.¹ The road sector is considered the backbone of an economy and the most important mode for carrying both goods and passengers. Nevertheless, the road network has become a major problem affecting trade, industry, tourism and population in general due to the financial, structural and institutional obstacles facing the sector.

¹ BOT stands for build, operate and transfer, while BOOT stands for build, own, operate and transfer.

This study focuses on roads and highways, and aims at illustrating the challenges and opportunities facing the Government of Egypt (GOE) in this respect. Specifically, the study will attempt to answer the following questions: i) What is the current status of the sector? ii) What are the constraints confronting the sector, and what needs to be done to enhance the sector's performance? iii) What lessons can be learned from international experience to face these problems? iv) What actions and policies are required to enhance the efficiency of the road sector?

Following the introduction in Section 1, the current situation of roads and highways, and the size and structure of the sector are discussed in Section 2. Section 3 analyzes the challenges and the main impediments facing the sector. Section 4 introduces alternative scenarios to improve roads management by reviewing the successful experiences of Malaysia, Indonesia and Turkey in adopting new strategies to enhance efficiency. Finally, Section 5 concludes by suggesting and drawing solutions and policy recommendations.

2. THE CURRENT SITUATION IN THE ROADS AND HIGHWAYS SECTOR

2.1. Economic Importance

As a major contributor to trade and an essential means of transport, Egypt's road sector is responsible for 97 percent of freight movements, most of which are private, and for more than 55 percent of domestic passenger movements (4.1 million vehicles in 2006/07 with 60 million passengers/daily).²

2.1.1. Share in GDP

In 2007/08, transportation and warehousing contributed to the economy by only 4.1 percent of GDP on average, and represented 12.9 percent on average of total production services during the same period (transportation and warehousing, telecommunications, Suez Canal, trade, financial services, insurance and tourism) (MOF 2009). Evidence shows that the transport sector in Egypt still needs to expand the network, improve its adequacy, reduce costs and increase its capacity in order to achieve better performance. Recently published figures show that the share of the roads and highways sector in GDP was around 0.3 percent in 2004, with

² An adequate road network is divided into freeways, urban streets and related civil engineering work (bridges and tunnels). The other modes of transport, including the 3,500 km of inland waterways (i.e., Nile River, Lake Nasser, Alexandria-Cairo Waterway, and smaller canals in the Delta), carry very little freight traffic; Egypt's railway network, comprising about 5,000 km of standard gauge (rail gauge), carries around 45 percent of passenger transport with less than 3 percent of freight traffic (IDSC 2007).

new construction expenditure contributing the major part (0.25 percent) and maintenance no more than 0.05 percent (World Bank 2007d).

2.1.2. Road network

Constructing, maintaining and operating the national road network are assigned to a semi-autonomous authority established by Presidential decree in 1968, namely, the General Authority of Roads, Bridges, and Land Transport (GARBLT) one of the affiliated authorities to the Ministry of Transport (MOT) among others: the Egypt National Railways (ENR) and the River Transport Authority (RTA).³ The road network in Egypt consists of more than 62,000 kilometers of paved and unpaved roads, with the MOT portfolio covering around the third. The network is also divided into three main types: arterial and primary roads comprising freeways and fast roads, which are under the jurisdiction of GARBLT; secondary and regional roads fall under the jurisdiction of municipalities; and urban roads under the new communities (Table 1).

Table 1. Classification of Roads in 2007/08

Road category	Length (km)	Paved (%)	Administration
Arterial roads	22,000	100	MOT (GARBLT)
Secondary roads	37,600	64	Governorates
Urban roads	2,400	100	New communities
<i>Total</i>	62,000	78	-

Source: GARBLT (2008).

Among the approximately mentioned 22,000 kilometers of paved roadways under GARBLT supervision, 4,277 km are dual carriageway with at least two lanes in each direction but with no application of freeway standards; the remainder of the network is single carriageway. Most of the dual carriageways are characterized by: no surface intersections;⁴ shoulders on both sides of the road; allow U-turn maneuvers with complete access control to and out of the road that are used by cars, pedestrians and animals from nearby towns and villages; and no emergency lanes. The only available freeways with motorway standard specifications include the 110 km road linking Cairo to Ain Sukhna; the 28 km bypass close to Tanta along the “Agricultural” road; and several kilometers close to Alexandria along the

³ The waterways transport networks and infrastructure fall under the responsibility of the Ministry of Transport (MOT) and the Ministry of Irrigation and Water Resources (MOIWR), which is responsible for maintaining navigational canals, construction of waterway locks and regulating the level of water in the navigation canals.

⁴ This is when the path of two roads or a road and a railway intersects, thus requiring some sort of traffic control (e.g., a traffic light and a railway crossing gate).

North Coast road. The remaining 37,600 km of paved and unpaved roads fall under the responsibility of the governorates, where investments should be allocated to improving road sections with high traffic accident rates, rehabilitation and maintenance to improve accessibility.⁵

According to a 2007 report by the World Bank, 20 percent of the roads are in good condition but suffer from low service quality and are at risk of premature failure unless there is a substantial increase in maintenance activities (World Bank 2007a). The report also stressed that the sector is saddled with infrastructural inefficiencies, old institutional structures, high logistics costs and unrealistic fares and interference of multiple authorities. These negatively impact the movement of trade, competitiveness of Egyptian manufacturing and road safety.

2.1.3. Employment

The transport sector, worldwide, does not employ more than 8-10 percent of the total work force, and this percentage is declining with the increasing capital intensity in the industry. In Egypt, it is not considered a large employer (private and public). Figures from the Ministry of State for Economic Development (MOED) indicate that in 2006/07 employment in the transportation and warehousing sector has reached approximately 812,000, representing 4 percent of total employment with an average annual growth rate of 4.5 percent, where 72 percent are private employees (MOED 2008b). According to GARBLT, the number of its workers in 2008 was around 6,500 public employees representing only 3 percent of total public employees in the transport sector distributed among the headquarters in Cairo and the 12 related districts, each covering one or several governorates, as well as toll and weigh stations. The employee structure is composed of 370 high-level professionals (managers/engineers), administrative staff (1,770 legal, finance, procurement and budget employees, etc.), while the rest (4360) are operators, technicians and unskilled workers representing 6 percent, 27 percent and 67 percent respectively of total employment in GARBLT—around 25-30 employees per 100 km of roads. In Europe, Africa and Australasia,

⁵ In 2007/08, many achievements were witnessed in the field of roads and bridges, the most important of which were: upgrading the main road and highway networks with a total length of 1223 km; constructing 382 km of roads and 454 km of double-line roads; constructing 5 bridges crossing the Nile and 9 new upper bridges; paving 1020 km of local roads, and entrances of cities, villages and slum areas; constructing 46 pedestrian bridges connecting centers and villages; and replacing, renewing and completing 37 pedestrian bridges.

the number of employees per 100 km ranges from 2-3 reflecting more efficiency, with white-collar staff smaller by 3 percent, and intermediate and administrative employees, and the skilled and unskilled staff representing 15 percent and 82 percent respectively of the total (Michon 2007).

2.1.4. Investment

Government investment spending on transportation, warehousing and communications has increased significantly, almost doubling from LE 22.8 billion in 2005/06 to LE 40.1 billion in 2007/08 representing 20.1 percent of total investment (CBE 2008; MOF 2009). The GARBLT budget for investment projects is financed through government funds;⁶ other sources, such as toll roads, fines levied on overloaded trucks, advertising revenues; share of the fees from permits issued for various commercial activities within the road's right of way (ROW) (e.g., gas stations and service stations); fuel surcharge (a share of fuel sales price collected for GARBLT by the General Authority of Petroleum Products). Currently, the law specifies that amount to be at LE 0.15 / liter of gasoline.

The GARBLT budget for maintaining the existing highway network has also increased. It jumped from LE 200 million in 2005/06 to LE 800 million in 2007/08 and again to LE 1.2 billion in 2008/09. The LE 1.2 billion are financed as follows: LE 220 million from the state budget (Ministry of Finance), the rest is collected from tolls and fines levied on overloaded trucks, and from fuel surcharges, which are respectively 65 percent and 35 percent of the amount (GARBLT 2008).

2.2. Characteristics and Performance Indicators of the Roads and Highways Sector

To evaluate roads and highways, various indicators are measured. These indicators include the number of registered vehicles, passenger/kilometer travelled, vehicle operating costs, fuel costs, value of time, and axle loads. Although they are not easy parameters to monitor—being a combination of different series of measures at different levels—they could be used to stimulate action toward further improvement.

⁶ The Ministry of Economic Development (MOED) finances construction of new/capital projects and the Ministry of Finance (MOF) finances maintenance works. The GARBLT's own sources of funds are limited and contribute very little to the development and maintenance of the roadway network.

2.2.1. Number of vehicles per inhabitants

During the last 5 years (from 2002/03 to 2006/07), the average number of vehicles in Egypt increased rapidly, recording about 18 percent during the period where the indicator of vehicle per inhabitants has recorded 27.7 vehicles per 1000 inhabitants. This reflects the development of car demand⁷ although it is still considered lower than other countries in the MENA region where in 2005 the average ranged between 46.9 and 41.8 per 1000 inhabitants (JICA 2006).

2.2.2. Passenger/kilometer travelled

The road network in Egypt is characterized by chronic congestion, caused by aging vehicle fleets and a traffic volume rising at a faster pace than the road network expansions. All this has put a heavy load on roads and was reflected on a high density of traffic, measured by the number of passengers transported and distance traveled. According to passenger/kilometer parameter, this traffic density has risen about 2.5 percent in one year, from 142,026/kilometer in 2006/07 to 145,576/kilometer in 2007/08 over 80 percent of paved roads (MOED 2008a). Although these figures are relatively low compared to many countries in the MENA region with a much higher passenger/kilometer per paved road, their road networks appear less congested. This is due to the location of density along the Delta, and the North Coast line, where population and economic activities are largely concentrated.

2.2.3. Vehicle operating costs (mileage based costs)

Vehicle operating costs (VOC) are those expenses directly associated with the transportation of freight and exclude fixed and non-transportation costs: customs, management costs, depreciation, vehicle capital costs, interest costs and social costs (related to accidents and environmental costs). Usually, VOC are divided into four main categories: vehicle condition (engine age, tires, fuel, lubricants and maintenance costs); spare parts; road expenses (loading, handling fees and toll rates, which differ according to vehicle type and overloading fines); and crew salaries and incentives as shown in Table 2. In recent years, VOC for private truck owners in Egypt have significantly increased because of aged fleet, weak productivity, poor maintenance, low purchase of new trucks and spare parts due to the rising prices of imports. Most of the fleet has also the disadvantage of poor service provided to the customer. For

⁷ Car sales have increased by 154 percent during the period 2002-2006. In 2006/07, the number of registered vehicles was about 4.1 million with private cars accounting for 48.4 percent, trucks 19.1 percent, taxis 8 percent, buses 2 percent, motorcycles 17 percent, public vehicles 3.2 percent, and others 2.3 percent (IDSC 2007).

example, tires are used until totally worn out, which causes slow driving speeds and delays due to breakdowns.

Table 2 compares the detailed current VOC and the estimated costs in normal conditions in Egypt, assuming that fuel and lubricant prices will increase by 40 percent, and tires, spare parts, road expenses and labor wages by 20 percent (MOT 2005). The current VOC for a heavy truck in Egypt (25 ton payload, the most prevalent type for transport of containers) is LE 5.58/vehicle-kilometer. This cost is lower than in other countries in MENA and Africa⁸ and could be raised to LE 6.89/vehicle-kilometer to encourage transporters to provide better service and keep their trucks well maintained. This improved service will have a positive impact on the economy by reducing the annual number of fatalities caused by traffic accidents, which have increased in recent years to reach several thousands (approximately 8000 according to the Ministry of Interior (MOI)).⁹ It will also enhance the efficiency of road transportation (freight and timing of delivery).

Table 2. Estimation of Standard Operating Cost Components of a Heavy Articulated Truck with 25 Ton Payload in Egypt (Current Prices in LE)

Component	Current expenses	Estimated (normal conditions)	% of VOC of the total cost
Tires	1.41	1.62	10.1
Maintenance costs	0.28	0.34	2
Fuel	1.20	1.68	8.6
Lubricants	0.20	0.28	1.5
Spare parts	1.35	1.62	6.9
Road expenses	0.13	0.14	0.9
Crew salaries	1.01	1.21	7.2
Total VOC, LE/kilometer	5.58	6.89	37.2

Source: MOT (2005).

⁸ Lebanon, Jordan, Ghana and South Africa have recorded an average VOC of LE 6.45/vehicle-kilometer (DEPRA 1999).

⁹ Worldwide, between 750,000 and 880,000 people are killed and between 23-34 million are injured in road accidents each year. About 85 percent of these road accidents take place in developing and transition countries, with almost half of all estimated deaths occurring in the Asia-Pacific region. In industrialized countries, only about 15-20 percent of fatalities involve pedestrians, non-motorized vehicles and motorcycles. In developing and transition countries, the figure is closer to 50 percent and is as high as 70 percent in Asia. In developing and transition countries, road accident rates per 10,000 vehicles tend to be 10 to 20 times higher than in industrialized countries and cost between 1.0-1.5 percent of GNP (World Bank 2009).

2.2.4. Fuel

Fuel consumption is related to many variables: size, type and load of the vehicle, roughness of the road, speed and price. There is a positive relation between fuel consumption and the latter variables with the exception of price. Studies have proven that slow driving increases fuel consumption when it is lower than optimal speed (MOT 2005). In Egypt, the price of gasoline is relatively low and is below international prices because it is heavily subsidized by the government. This encourages frequent usage of roads and implies more fuel consumption, resulting in congestion and waste of subsidy. However, prices have significantly increased since May 2008,¹⁰ with the exception of 80-octane gasoline, which remained unchanged because of its large use by trucks and its impact on prices of goods. This resulted in a noticeable increase in the number of car users who shifted to that grade. The increase in demand is evidenced by the long lines of cars queuing outside gas stations selling this grade of gasoline.

2.2.5. Value of time

Inadequate road conditions increase social costs due to congestion and delays caused by breakdown of aged vehicles and other elements, which seriously increase travel time with long-term economic costs. According to a recent survey conducted in 2007 by the Japanese International Cooperation Agency (JICA) on a sample of 526 road users in Cairo¹¹ where 50 percent of the sample are road users with monthly incomes ranging between LE 500 and LE 1000 and an average daily wage of LE 30, the average time of trip in Cairo is considered very high. The study concluded that time spent in transportation in Cairo absorbs around half of daily earnings, which increases social costs borne by workers. The results were based on an assumption that a minimum average time of a round trip to go to work is 2 hours daily and comparing it with the average value of time calculated at LE 7.3 per hour according to

¹⁰ LE 1.10 / liter of diesel (LE 0.3 / liter in 2006); LE 1.75 / liter of grade 90 octane gasoline (LE 1.0 / liter in 2006); LE 1.85 / liter of grade 92 octane gasoline (in 2006); LE 2.75 / liter of grade 95 octane gasoline (in 2006); LE 0.90 / liter of grade 80 octane gasoline (in 2006).

¹¹ It is found that 70 percent of the trips were related to business; 93 percent of road users were male; and 15 percent have an education limited to primary school. With respect to income level, approximately 42 percent refused to answer income-related questions, with the remaining 58 percent having the following monthly income: 10 percent is below LE 500; 50 percent is between LE 500 and LE 1,000; 26 percent is between LE 1,000 and LE 2,000; and 13 percent is more than LE 2,000. Finally, 40 percent of road users pay a monthly electricity bill of less than LE 40, and 70 percent do not pay for parking. Among the 30 percent who pay more than LE 40 for electricity, the average parking bill is LE 70 per month.

different purposes of trips¹² (GARBLT 2008).

2.2.6. Axle loads

Overloaded trucks are considered a major cause of damaging roads, highways and bridges. To reduce operating costs, firms and truck drivers are usually willing to pay the imposed fines on overloaded trucks, which to them is more profitable than complying with the rules of the road and the legal loading measures.

The fine on overloaded trucks is LE 20 per ton of extra load, and is currently being reviewed, although there is no intention yet to increase it. GARBLT issues authorizations for the suitability of trucks to be used on its network. It examines the width, height, and axle loads and imposes fines in case of non-compliance. Axle loads in Egypt range between 7 tons for the front axle, 10 tons for single axle and 15 tons for double axle. However, penalty is unrelated to distance traveled although truckers' marginal revenue is proportionate to the distance moved, which is much larger than the fine imposed. Moreover, fines are far too low to deter truckers from carrying excessive loads and if the overload does not exceed 40 percent of the allowable weight, trucks continue with the load after paying the fine. Inadequate attention to the enforcement of legal load limits results in deterioration of pavements and reduced performance and life span of the road. In other words, a road with a life time of 12 years can be ruined in 6 years only with moderate overloading (DEPRA 1999).

Therefore, roads and highways carry high volumes of traffic due to weak law enforcement on heavy trucks and cheap fuel, with limited road maintenance due to the shortage of finance.

2.3. Legal, Institutional and Regulatory Frameworks

The road network in Egypt is characterized by interference of multiple authorities, with the MOT operating a complex structure of the network. The Ministry of Local Development (MOLD) is responsible for secondary roads, while the responsibility of the Ministry of Housing, Utilities and Urban Development (MOHUUD)—previously the Ministry of Housing, Utilities and Urban Communities (MOHUUC)—is limited to new cities, industrial and trade zones, and internal roads of new communities and their access. The Ministry of Defense (MOD) is also involved as a concessionaire in large projects of strategic importance

¹² Going home: LE 4.8 per hour; going to work: LE 7.2 per hour; business meetings: LE 8.9 per hour; personal meetings: LE 3.0 per hour; and leisure: LE 3.5 per hour.

(e.g., some toll roads and bridges).

2.3.1. Laws affecting MOT structure

The road sector is one of the sectors that are not subject to many laws regulating operation and investments. Below is a review of the main laws.

Public Roads Law no. 84/1968

Freeways, express highways and main roads are determined, built, modified, and managed by GARBLT. These roads are financed by the GOE. Regional roads are managed by different governorates, which bear all related costs. GARBLT is responsible for ensuring road safety and road maintenance measures.

Public Roads Law no. 146/1984

Toll system is to be implemented on some public roads to upgrade service and maintenance.

Building of Roads Law no. 229/1996

Public concessions to be granted to local and foreign investors to build, manage, maintain and collect traffic charges of freeways, express highways and main roads.

GARBLT Law no. 334/2004

GARBLT plays the role of the sector regulator and was established per presidential decree no. 2717/1966 to provide internal organization and more efficient management. With this new law GARBLT's role expanded not only to issue licenses, but also to set tariffs, develop roads and bridges, organize and upgrade passenger and freight transport.

Goods Transport on Public Roads Law no. 64/1970

This law regulates transport of goods, with the MOT responsible for organizing goods and material transport and for supervising its implementation in coordination with the Minister of Interior, the Minister of Local Development and governors. This law allows the MOT to set the license fees of each type of vehicle (trucks, trailers or special cargo vehicles)

Operating Public Transport Concession Law no. 55/1975

The minister of transport sets the requirements for operating vehicles or companies for public transport service on public roads and the specifications required for vehicles.

Investment Law no. 8/1997

The law has enabled private sector agents to participate more in transport and allowed their full engagement without restrictions.

2.3.2. Institutional and regulatory structure

As the regulatory body, GARBLT manages arterial roads (22,000 km of the total existing road network) and controls field operations, construction supervision, maintenance and quality assurance (see section 2.1). Recently, GARBLT started to increase the role of private consultants in road design, and in such cases its role is confined to mainly issuing licenses and setting tariffs (Ghoneim 2007).

Despite the above reform, the sector still suffers several financial, institutional and regulatory impediments. Also, there are still outdated laws regulating the system and do not allow flexibility in improving performance, especially access to suitable financing sources to meet the required investment needs. In what follows, Section 3 will highlight sector-specific constraints and discuss issues related to enhancing competition and commercial behavior to improve the road transport sector.

3. PROBLEMS AND CONSTRAINTS

This section deals with the various financial, institutional and legal constraints facing the sector.

3.1. Financial Constraints

Traditionally, road expansions and maintenance were financed by the government. Since modifying its role in 2002/03 and increasing its scope of responsibility in 2004, GARBLT started financing part of its budget through internal resources from toll rates and fines on overloading. Over the last five years, GARBLT has not only undertaken the responsibility of maintenance to increase the life span of roads and reduce overall management cost of the network but also funded the projected road expansion, which created a pressure on its financial resources.

According to the World Bank (2007b), over one-fourth of the network is beyond repair and a complete rebuild/rehabilitation is required. For the next five years, the GOE has to

provide around LE 4.5 billion for maintaining roads¹³ and undertaking road projects; only LE 200 million is allocated from the state budget to maintenance. An annual road maintenance budget of LE 1.1 billion; LE 1.2 billion for maintaining the existing highway network; and an annual expenditure on new roads investments of LE 2.2 billion (\$400 million) are required to bring the road service and transport costs to acceptable levels.

As the regulator, GARBLT has not yet succeeded to allocate enough resources for maintenance due to legislative constraints. Comparing the structure of road expenditure in Egypt with that of other middle-income countries, we find that the share of maintenance is relatively low and unbalanced with around 80 percent of the sector’s budget directed to new projects. According to GARBLT, the share of implemented investment on construction and maintenance has declined between 2001 and 2004 from about 0.77 percent to 0.3 percent of GDP, where construction expenditure accounted for 0.25 percent of GDP in 2004, while road maintenance represented 0.05 percent of GDP. Countries at similar stages of economic development spend an average of 0.35 percent and 0.34 percent of GDP on new construction and road maintenance, respectively (Table 3).

Table 3. Construction and Maintenance Expenditure in the Road Sector in Selected Middle-Income Countries

Country	GDP per capita (\$)	New construction expenditure/GDP (%)	Maintenance expenditure/GDP (%)
Belarus (2002)	1,411	0.47	N.A.
Ecuador (2002)	1,353	0.50	0.23
Ukraine (2002)	737	0.16	0.45
Egypt (2004)	1,600	0.25	0.05

Source: World Bank (2007b).

In Table 3, we can observe the small contribution of new construction and road maintenance in GDP of many emerging economies. This is mainly due to the huge capital investments required for infrastructure projects, which do not always attract the private sector because of its integrated technology-driven approaches and the weakness of the return on investment (ROI). To encourage private investment in road operation and maintenance, governments must define strategies that allow the private sector to benefit from revenue sharing opportunities in the form of concession rights or opportunities to develop land adjacent to the roadway. An assessment of the road transport performance, emphasizing

¹³ There are three types of maintenance/repair: routine, preventive and emergency.

environmental concerns, especially for trucking and bus services, will be discussed in the following sub-sections.

3.2. Institutional Constraints

The presence of multiple entities that are assigned similar responsibilities is considered one of the major impediments facing the transport sector. Restructuring the road sector is therefore a crucial step, involving a new perception of the role of the sector by all stakeholders, including decision makers, the public, as well as employees in the sector.

3.2.1. The public sector

Economic literature has always considered the transport sector—like all network industries—as a natural monopoly with the ability to set prices above cost to reap yield above normal profit. It exhibits two main characteristics: 1) scale economies; and 2) tight regulations of entering and exiting the market, because of huge investments (sunk costs). Therefore, government intervention has become mandatory to prevent market failure and ensure the production of services at the lowest possible cost. Consequently, various problems have occurred with the increasing level of capital needed to finance expansion of infrastructure, and to maintain existing facilities. This phase was accompanied with significant transformation in provision of network industries, especially with advances achieved in technology and economic thinking, which led to introducing the concept of unbundling¹⁴ in the transport sector (Perrot and Chatelus 2000; Ragab 2005).

In Egypt, road construction and maintenance is still dominated by the public sector. The following complicated structure can be observed: *The General Nile Company* (GNC) with its four affiliates¹⁵ under the authority of the Ministry of Investment (MOI) and controlled by a holding company dependent on the MOT; *Arab Contractors* a quasi-private management with a government majority ownership, and is considered the largest contracting company in

¹⁴ Unbundling is where the notion of a single provider has changed and the process of production can separate between operations from infrastructure to facilitate the introduction of competition. It also can divide activities to ease pricing goods and services. In practice, unbundling can be vertical, when the infrastructure (road construction and road operations) and activities (e.g., maintenance, toll station operations) are separated; or horizontal, when the separation is between activities (e.g., toll collection/operations, road maintenance and emergency services), thus offering more opportunities for competition in the sector (Gomez-Ibanez and de Rus 2006; Perrot and Chatelus 2000). Such changes involve more government responsibilities in designing pro-competition reform policies and regulations (Armstrong and Sappington 2006).

¹⁵ GNC for Roads and Bridges; GNC for Desert Roads; GNC for Road Construction; and the GNC for Paving and Construction.

Egypt; The MOHUUD has four large public road construction companies under its jurisdiction; the *National Services Company* under the armed forces; and the public road paving unit in each governorate.

It is not clear what degree of financial and managerial autonomy corporations enjoy in relation to their parent ministries as they tender for works and operate on commercial principles. The management of public sector corporations is totally dependent on government spending as the Nile companies claim to execute 90 percent of all road works through contracts with GARBLT. There are few private road contractors, but almost all of them are small and incapable financially of undertaking larger contracts.

3.2.2. Impediments to multimodal transportation

Freight transport can be inefficient and provides a poor service when truckers are reluctant to upgrade or replace their vehicles and trailers and enjoy the benefits of subsidized fuel. The five largest freight companies are state-owned and belong to the Holding Company for Maritime and Land Transport (HCMLT), in addition to 25 associations of transporters with an aging fleet. These associations suffer from high import duties on vehicles; low profit margins; and lack of enforcement of service standards regulations, which do not allow them to work commercially and seek profit.

Road passenger transport (city and intercity buses and coaches) is similarly constrained by old fleets, unsafe equipment and poor service. Intercity bus services are provided by four public companies, whose market shares have gradually declined over the years to 7 percent of passenger transport, and have recently increased fares to match costs; five private companies, which have only 10 percent share of the governorates' market; and an informal sub-sector of privately owned minibuses, which is increasing and dominates (83 percent) the market in spite of poor service, unsafe equipment and erratic operation.

3.2.3. Unfair competition

The domination of state-owned road construction companies limits competition in the sector and reduces quality. Although projects are tendered by GARBLT under a transparent bidding process, contracts awarded to state-owned corporations are approximately 6-8 times higher than those awarded to private contractors. This is due to the low cost of construction and rehabilitation of paved roads offered by state-owned companies in Egypt. For example, the cost of new construction of a 10-meter wide road with 18 cm of asphalt concrete ranges

between LE 500 million and LE 750 million, considered 50 percent of the cost in neighboring countries such as Sudan, Jordan and Ethiopia (GARBLT 2008). The artificially depressed costs can be explained by low staff salaries and hiring smaller private contractors regardless of their product quality.

3.2.4. Lack of inter-sectoral coordination and limited institutional capacity

GARBLT and the four public sector companies depending financially on MOT are responsible for road construction. Also, the MOHUUD has four large quasi-public road construction enterprises under its jurisdiction, in addition to the *National Services Company* under the Armed Forces, and a public road-paving unit in each governorate. These companies are responsible for large-scale road construction and maintenance projects, while small-scale jobs are handled by local contractors under the supervision of the Ministry of Local Development (MOLD). Finally, monitoring is the responsibility of the Ministry of Interior and traffic laws are generally perceived to be weakly enforced. The current policy of having multiple entities responsible for construction is ineffective and implies possible conflicts and overlaps. Considerable institutional review and restructuring are critically needed to consolidate responsibilities under one ministry.

3.3. Legal and Legislative Constraints

The laws regulating the sector are both few and outdated; they neither cover pricing nor reflect the cost of maintenance and rehabilitation. Although laws and regulations do not prevent the private sector from engaging in road transport activities (its participation has been allowed by Law 8 of 1997), private sector's engagement is still very limited. This could be attributed to the multiple entities responsible for the sector, making it difficult to formulate a unified national road transport master plan.

The following section will put forth reform scenarios to achieve internal reorganization of the sector; relax government control; introduce modern management techniques and operating practices; implement a modernization investment program; and promote private sector participation in road and highway activities.

4. ALTERNATIVE POLICIES TO ENHANCE SECTORAL EFFICIENCY

To enhance performance, two major requirements are needed: substantial financing; and institutional restructuring and reform management. There are three alternatives to fulfill these objectives. *First*, increasing government expenditure and allocated budget; second, complete private ownership; and third, private-public partnership (PPP) in construction and maintenance, which could lead to some labor and cost savings. This section will present the first two options and then elaborate on public-private partnerships (PPP) as a means of service provision, drawing on international experience.

4.1. Increasing Government Financing

The government has to increase financing to the roads sector to support the rapid pace of economic development, to reduce the rate of traffic accidents, and to cut air and noise pollution due to the growing number of vehicles. Traditionally, road projects in many developing economies relied heavily on government subsidies, and fuel and property taxes as an effective funding system. This encouraged motorization and eventually led to new types of problems, such as traffic congestion, environmental damage and road safety problems. To reduce these growing problems, new techniques were introduced, such as sector restructuring; eliminating fuel subsidies; and adopting toll road and fuel-tax systems to finance the highway network. Many of these measures were not easy to adopt and were implemented gradually due to their social and political effects especially when dealing with reducing the fuel subsidy or increasing any tariffs because of their direct impacts on citizens' disposable income and other different sectors in the economy.

4.2. Private Sector Engagement

The experience of many countries has confirmed that private sector cooperation with the government has been effective in infrastructure provision, such as operating toll stations and/or managing truck weighing facilities. Moreover, many emerging economies such as Hungary, Mexico, Argentina, Chile, China and Korea (World Bank 2008a) have succeeded in attracting private investments to toll roads. However, the results were not always positive and some projects failed in Hungary and Mexico in the 1990s due to insufficient traffic on the roads, and high tolls relative to the value of services rendered. As an example, a new road is unlikely to be financially viable without a flow exceeding 10,000 vehicles per day, unless the government offers an additional subsidy to the concessionaire. In contrast, the rehabilitation of a road,

particularly where there are no competing corridors, can be viable where the flow is just 6,000 vehicles per day. These experiences stand as lessons to be learnt for other countries.

Many countries have increasingly turned to public-private partnerships (PPP) for construction, maintenance and management of road services. Experiences of these countries have confirmed the efficiency of private provision of infrastructure and operation of some roads under the regulation and governance of the public sector where concession regulations were revised to provide benefits to private investors.

4.3. Public-Private Partnerships (PPP) in the Roads and Highways Sector

PPP could be a model for providing infrastructure and/or services to solve the political, social, economic and technical constraints. This requires a strong regulatory framework to avoid conflict of interests between operators and policymakers. An independent regulator helps control the quality of service, enforces laws and regulations, promotes stability and reduces risk. It has a significant impact on performance and results.

To monitor deregulation, regulators should measure the efficiency gained from potential or effective competition, and ensure that benefits are shared equitably between operators and users. Regulators have to implement comparative efficiency evaluations to measure competitors' performance according to their objectives, reduce the entry barriers and adopt explicit assistance to competitors by unleashing the full force of competition rather than favoring certain competitors.

Measures of efficiency include technical efficiency (TE); scale efficiency (SE); and allocative efficiency (AE). TE is the firm's ability to achieve maximum output given its set of inputs. SE is the degree to which the firm is optimizing the size of its operations; and AE is the firm's ability to select the correct combination of input quantities so as to ensure that the input price ratios equal the ratios of the corresponding marginal products. Regulators usually compare firms facing the same operating environment at one point in time to select the best according to total factor productivity (TFP) (ratio of output over input), which could differ because of TE, SE or AE differences. It may also vary over time because of changes in the above-mentioned efficiency (Leibenstein 1966).

Regulated firms usually use two different approaches to set prices: i) *Rate of Return Regulation* to cover non-capital costs plus a fair rate of return on capital usually used in the US. ii) *Price Cap Regulation* specifies the maximum rate at which regulated prices may

change after adjusting for inflation. In the UK and many other countries, a specific period of 4-5 years is usually required to revise the price. Prices in the latter approach are set to increase at a rate equal to the rate of increase in the consumer price index (CPI) minus the so-called productivity designated as X.¹⁶ The value of X is generally based on the regulator's assessment of the potential for productivity growth of the firm, which depends on the extent the regulated firm can improve its productivity faster than the rest of the economy. Reasonable estimates of aggregate productivity gains depend on information asymmetries between monitoring agencies (regulators) and regulated firms and the biggest problem a regulator may face is how to obtain enough data of sufficient quality to be able to conduct a good analysis to measure TFP using allocative efficiency. The lack of information could deprive the regulator from setting the value of X correctly (Ragab 2003).

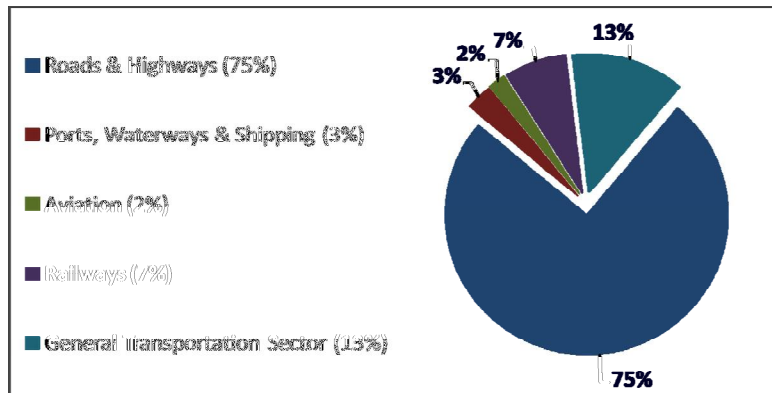
Worldwide, the most popular form of PPP in the road sector was applied on toll roads. The 1990s witnessed notable growth in road projects with the support and technical advisory services of the World Bank. Many countries have increasingly turned to the private sector for construction, maintenance and management of road services.

During 1996-2007, the World Bank proposed a '*Sustainable Transport Strategy*', allocating \$42 billion for over 530 transport projects (operations and components) in more than 100 countries. Total transport lending declined between FY1999 and FY2001 due to the decrease in the number of road projects in developing countries from 56 to 12, and investment commitments from \$10 billion to \$1.8 as a result of the economic crisis in the late 1990s. It has increased again to \$5 billion in FY2007, representing around 75 percent of transport lending to active projects as shown in Figure 1 (Silva 2000).

This strategy was followed by a new transport business strategy for 2008-2012 named "*Safe, Clean, and Affordable Transport for Development*" placing special emphasis on road safety. The new strategy aims to enhance mobility and inclusion, establish governance, and provide services that are economically, financially, environmentally and socially sustainable (World Bank 2008b).

¹⁶ It is often called CPI-X regulation, where the formula implies that consumers will face a nominal price decrease if inflation is lower than the X assessed for the period. If it is set too low, the firm is earning excessive profits because the tariff ends up being significantly higher than actual costs. If it is too high the firm may find itself financially in trouble because tariff may no longer cover its real costs. Reasonable estimates of aggregate productivity gains depend on information at the sectoral level.

Figure 1. Transport Portfolio of Active Projects at End of FY2007



Source: World Bank (2008b; 2009).

Latin America and the Caribbean have accounted for the largest investment share of 47 percent of total toll road project lending, including management or lease contracts, concessions, greenfields and divestitures (privatization of existing toll roads). In Eastern Europe, projects were limited and were mostly urban expressways, and were granted to the concessionaire by the government due to insufficient project-generated revenues.¹⁷ In Asia, most PPP toll projects were in the form of BOT.

4.3.1. Types of private sector involvement in roads and highways

When it comes to roads and highways, the service (operations) is usually rendered to the end user, while the public authority supplies the needed infrastructure. In other words, two distinct activities are associated with this sector: infrastructure and operations. Technological change has altered the nature of the supply side and pushed policymakers to believe in a new role for the private sector as a provider and a financier of infrastructure or services provided.

In this context, many reform policies have been adopted to allow more room for private ownership in the form of PPPs. As a type of deregulation, this form opens the market to competition and implies an institutional change and new regulatory frameworks. However, successful policies are not only implemented by removing all legal restrictions on entry, but also other barriers facing potential entrants such as incumbent control of key inputs that

¹⁷ In early 1990s, Hungary initiated its ambitious highway development program. Revenues were not sufficient to cover construction costs due to low traffic (one third lower than forecasted), very little use by trucks and high toll compared to the value of services provided. As a result, an operating subsidy was granted to the concessionaire by the Hungarian government and the project was restructured, and commercial loans were converted to sovereign debt but shareholders suffered substantial losses (World Bank 2007b; Gazal 2000).

entrants require for profitable operation and reaction of incumbent suppliers. An important social barrier is when customers refuse to participate and reject the service due to increased costs (Armstrong and Sappington 2006). In this case, a public authority has to choose between two alternative types of competition: *Competition in the market* and *competition for the market*.

Competition in the market is established when there is free market exit and entry and where demand and supply determine prices and quality. *Competition for the market* is realized through bidding concessions to force potential entrants to compete to become the single provider. This type of competition implies that a strong regulatory body should control concessions by designing contracts in a way that passes on many of the efficiency gains to the users (Estache and de Rus 2000). It allows for the creation of an open and transparent market, which serves to lower transaction costs; shift the role of the state from asset ownership and operation to sector policy and regulation pursuing social and environmental objectives (from a player to a referee) (Müller-Jentsch 2001).

PPP ranges from a relatively short-term management contract with no capital expenditure (e.g., operation services management contracts and medium-term lease contracts); to operation and maintenance concessions (e.g., build, operate and transfer (BOT) concessions,¹⁸ including a range of provisions for the construction and financing of the entire operation); and strictly private long-term investment in the sector (e.g., divestiture and full privatization).

The rationale for introducing competition and PPP to road infrastructure projects originates from the desire of the public authority to discontinue financing road and highway construction and maintenance due to chronic budgetary constraints. It delegates the responsibility to private agents and seeks for a significant contribution capacity from users, by accepting using the road and paying fees for this usage. Hence, the success of PPP depends on the existence of an independent body (an administrative regulatory system) capable of designing the appropriate contracts. This requires a capacity-building process in the scope of an institutional framework adequate to react to unforeseen events (Fayard and Bonnin 2000).

¹⁸ These concessions could also be build, own, operate and transfer (BOOT), or rehabilitate, operate and transfer (ROT).

4.3.2. PPPs in roads: advantages and challenges of the toll road model

Well-designed PPP schemes in a transparent and competitive procurement process produce economic benefits that enable emerging economies to solve affordability problems when attempting to develop advanced road networks (Piron 2000, in Perrot and Chatelus, eds.).

This is evidenced by:

- *Reduction of public spending*: insufficient traditional funding to finance the scale of expansion of road investments;
- *Minimizing the overall time and long-term costs*;
- *Acceleration in collecting the financing*: new instruments are introduced to expedite the return on investments, thus creating a leverage effect;
- *Efficiency of facilities provided to the users*: better service delivery;
- *Creation of innovative use of assets*: new technologies adapted in toll collections¹⁹ to provide better control over the toll collection process;

However, a number of challenges could face the PPP toll road model, limit its benefits and delay achieving its objectives, the most important include the following (World Bank 2007c):

- *Overestimation of traffic flows*: forecasting of traffic levels was not based on a robust analysis;
- *Insufficiency of economic activity*: weak traffic due to declining economic growth, trade and level of income;
- *Inequality of wealth concentration in some urban cities*, which reduces the ability of project sponsors to charge rates that would enable cost-recovery;
- *Absence of a well structured legal and institutional framework*: which prevents real competition;

¹⁹ The implementation of electronic toll collection (ETC) systems using credit accounts and prepaid cards—dispensed in fuel and service stations—have proven to decrease excessive queuing and backlog traffic at toll stations.

- *Lack of transparency in the bidding process* could minimize good and fair opportunities and open the door for corruption;
- *Social problems and public resistance* emerged from the increase of toll levels affecting transportation costs for employees;
- *Environmental risks* related to the noise and pollution resulting from the mounting traffic flows; and
- *Political instability*, when governments decide to nationalize or reduce private ownership of assets.

4.3.3. Country experiences in PPP toll roads

Roads carrying high volumes of traffic (generally over 10,000 to 15,000 vehicles per day) are increasingly being tolled to generate additional revenues. Some are operated as free-standing toll roads, while others are operated as an integrated toll road network with high volume roads cross-subsidizing the lower volume ones. These roads may be managed by the national road agency, a public toll road authority, by a private concessionaire, or may be owned and managed by a private concessionaire. They rarely account for more than 1-2 percent of the overall road network in the country, but may account for up to 20 percent of the national road network. In order to adopt these new types in involving private sector, we have to learn from country experiences, so as not to repeat the same mistakes. Malaysia and Indonesia are good models of Asian toll road experiences. Turkey has also succeeded in dealing with road improvement and traffic safety and reducing the number of road accidents and fatalities. The above-mentioned case studies could highlight challenges, which the development of PPP projects in Egypt might encounter. These countries were chosen due to their similarity in specific aspects such as the need for a transport infrastructure with broader geographic coverage and good inter-modal connectivity; the requirement of high quality and sufficient capacity to accommodate traffic flows; the rapid growth in urban transport demand and in motorization where almost 60 percent of the population live in cities; the activities are dominated by the capital city and the surrounding roads; and the increasing difficulty in transport problems with a high degree of traffic congestion, which reduces mobility and deteriorates air quality (see appendix for more details).

4.3.4. Lessons learned

The experience of the three countries in different types of PPP projects has proven that some institutional and financial reforms have to be made in order to achieve successful and sustainable projects when adopting such type of private participation. Institutionally, strengthen local government involvement in road projects during the preparation phase and in the program assessment and set up a central agency to manage these projects on behalf of local governments to monitor projects and to ensure that all roads are regularly maintained. This implies building technical capacity and developing skills for both project staff and government employees to be able to improve the progress reporting system, and design and revise other alternative solutions in different geographical regions if some problems occur. The regulator or central agency has to empower independent consultants to carry out their responsibilities for the supervision of the technical aspects of works, and link contractors directly to outputs to ensure high quality of work. Financially, they have to create government incentives to help develop sustainable planning and to combat corruption; estimate cost according to up-to-date feasibility studies with detailed designs during project preparation and supervision on the bank side to ensure adequate resources; and adopt a suitable duration for loans according to the need of the project to ensure effective implementation. In addition, the government has to raise public awareness regarding the new form of investment to ensure social approval and support.

5. POLICY RECOMMENDATIONS IN ROADS AND HIGHWAYS IN EGYPT

In light of the constraints facing the roads and highways sector in Egypt, as well as the lessons learnt from international experience, the following policy recommendations represent the main reforms needed to enhance the sector's efficiency.

5.1. Proper Financing of the Roads and Highways Sector

In general, current policies in Egypt lower vehicle operating and road transport costs for users due to the highly subsidized fuel and the partly compensated regular maintenance and upkeep of the road network.²⁰ This unsustainable situation has, among others, the effect of: (i) distorting truck transport costs to appear more competitive than other modes of transport (e.g.,

²⁰ The LE 220 million from the state budget as mentioned before (see Section 2.1).

rail and river); (ii) distorting the economics of alternative investments; and, (iii) increasing congestion and pollution. Even without including the government's direct expenditures on subsidizing fuel—estimated to be at least LE 5 billion per year—the cost to the healthcare system of road accidents and the environmental costs of emissions from road traffic are immense.

The overall financing of the road and highway sector should remain at around 1.2 percent of GDP in order to bring Egypt in line with other emerging countries that maintain their roads more effectively. This is needed to preserve the existing road network and ensure its functional efficiency. Insufficient funding for road maintenance activities negatively affects the quality of service and vehicle operating costs and results in higher costs of reconstruction in the longer run. Current toll levels in Egypt are not sustainable, and are not distance-related as cars pay a flat rate at each toll station irrespective of the length of the tolled section of the road.²¹ Although tolls are fixed per trip to an average between LE 2 and LE 4 for a private car, the average toll level is well below those in other developing countries. Toll rates in Egypt are considered very low compared to other countries despite the increase in highway revenues due to the upward readjustment of the toll rates in 2006 in some highways (Cairo – Alexandria Desert road and Cairo – Ain Sukhna Desert road), and increasing fine collection from overloaded trucks, as a result of stronger law enforcement and better coordination between GARBLT and the Ministry of Interior in spotting overloaded trucks. Toll rates in Egypt are 10–16 times lower than those applied in Indonesia and Malaysia respectively, as shown in Table 4 below.

Thus, there are various means of securing necessary additional funds, such as:

- Gradually raising the revenues of the responsible entity (GARBLT) from fuel surcharge to double the current level (from LE 0.015 to 0.03 per liter), applied to both diesel fuel sale as well as gasoline. This would generate about LE 65 million from diesel sales and LE 40 million from private cars annually.
- Increasing toll rates by 10 percent per year over 5 years to generate LE 200 million per year as of the sixth year. That is assuming traffic increases by 5 percent per year.

²¹ Currently, there are seven tolled highways in Egypt, in addition to the Mubarak Peace Bridge over the Suez Canal. These are: Cairo – Alexandria Desert road; Cairo – Ismailia Desert road; Ismailia – Port Said Desert road; Wadi Natroun – El Alamein bypass road; Cairo – Belbeis Desert road; Cairo – Ain Sukhna Desert road; Tanta bypass along the Agricultural road.

- Raising the annual license fees charged by the Ministry of Interior on the trucking industry over 5 years to provide an additional LE 200 million per year at the end of the period.
- Increasing the fines on overloaded trucks and establishing a progressive penalty for each ton of excessive load on each axle and enforce law to stop continuing the trip with the overload even after paying the fine.

Table 4. Comparison of Toll Rates (Average per Vehicle-Km*)

Country	Toll rate (US cents/km)**	Toll rate (\$/11600 km)	GNI/capita (\$/annum, 2005, Atlas Method)	Ratio of toll rate/GNP per capita (%)
Indonesia	2.5	39.7	1280	3.1
Philippines	5.0	80.4	1300	6.2
Thailand	5.9	94.6	2750	3.4
Brazil	7.3	116.3	3460	3.4
Argentina	9.5	152.5	4470	3.4
South Africa	10.1	162.4	4960	3.3
Malaysia	5.4	86.0	4960	1.7
Mexico	16.7	267.5	7310	3.7
France	13.1	210.2	34810	0.6
Japan	22.7	363.0	38980	0.9
USA	13.1	210.2	43740	0.5
Egypt	0.3	4.8	1250	0.38

Source: World Bank (2007c).

* Average for all categories of vehicles.

** Inflated at the rate of 3 percent per annum from 1999 rates.

5.2. Involvement of the Private Sector

The private sector should be allowed to participate in maintenance management contracts. Thus, it can evolve to handle operation and maintenance (O&M) concessions of tolled highways. This will result in:

- Improving the road infrastructure in the face of budgetary constraints;
- Advancing road services through efficiency gains;
- Accelerating delivery of projects.

5.2.1. Requirements for such involvement from previous experience

- A strong political will and a stable macro-economic environment will help improve the country's sovereign credit rating to attract FDI in infrastructure projects;

- The willingness of the public sector to provide substantial public sector contribution (in some cases, up to 40-60 percent of the total project cost);
- Sufficient traffic volume to make a PPP arrangement viable for the private sector;
- A sound economic and financial appraisal of the project;
- Contractual arrangements, which satisfactorily address all risks; and
- A transparent and competitive procurement process.

5.2.2. *Various forms of involvement*

The build, operate and transfer (BOT) model often fails to attract investors due to uncertainty about future income and significant political risks. In Egypt, the unenforced legal framework for PPPs, very low toll levels, uncertainty about the corridor development rights offered to the concessionaire, and country risk perceived by financial markets have contributed to that failure. The fact that the proposed concessions in Egypt were partly land development concessions as well as toll road concessions increased the risk for investors due to the time lag between investments made and income generated from area developments. A way forward for GARBLT to increase private-sector participation would be through pilot operating and management (O&M) contracts of existing tolled highways. These would require limited upfront upgrading works and involve low risk while not requiring changes to the regulatory framework. Under such arrangements, the private sector would operate and maintain an existing corridor in return for the right to charge tolls. If toll revenues are high enough, a portion of the income could be forwarded to GARBLT.

To initiate such a pilot O&M contract, it would be prudent to conduct detailed legal, technical and financial feasibility studies in order to:

- determine required revisions of the legal framework and other policy aspects that would encourage private sector participation in the road sector;
- structure the risks distributed between public and private partners;
- assess the potential interest of private operators based on the technical and financial parameters of the operation; and
- prepare bidding documents and search for an operator based on contractual terms validated by market testing/previous experience and references.

5.3. Improved Legal Framework

An improved legal framework entails:

- **Well-established laws and regulations** that promote PPPs in road infrastructure. *These are essential for* attracting private capital flows, compared to issuing executive decrees on a project-by-project basis.
- **Creating a regulatory agency especially for PPP—with specific obligations**—whose main responsibility is to promote efficiency.

5.4. Improved Institutional Organization

- **Streamline responsibilities for the various roads:** For the national road network, the responsibility of planning, budgeting, and construction of national road infrastructure including arterial accesses to new communities should be vested in the MOT only, which should be empowered as the sole authority with regard to road transport sector. On the other hand, local rural and urban roads should be the responsibility of governorates. This division of responsibility may require a reclassification of the road network to accord with the different jurisdictions and managing institutions.
- **Promote competition:** This can take place by transforming the General Nile Companies (GNCs) into managerially independent, market-based economic entities operating on a commercial basis in preparation for full privatization. This will help strengthen the capacity of domestic construction industry and foster the development of commercially viable large contractors who will eventually be able to compete for work in international markets.
- **Develop inter-city road service:** Encourage private operators to invest in modern trucking fleets, which are well maintained and capable of providing high quality inter-city passenger road transport services.
- **Revise enforcement arrangements and effective fines to deter overloading in road haulage:** by monitoring and controlling truckers, and tightening penalties for non-compliance.
- **Adopt a comprehensive road safety program involving all relevant ministries and agencies:** Egypt should develop a national road safety strategy to reduce road accidents and casualties on the highway network. It should encompass a realistic action plan with strategic

objectives, and monitoring and evaluation arrangements. *A lead agency should be identified to coordinate and guide road safety efforts including* identifying complementary interventions by all agencies, specifying equipment and other resources needed, developing safety standards, fostering public awareness, improving driver skills, and promoting vehicle safety inspections and speed controls, among others.

5.5. Technical Improvements and Risk Mitigation

- **Improve efficiency of road maintenance** by limiting contract duration and conducting more rigorous on-site supervision.
- **Introduce performance-based maintenance management** to ensure that funds for maintenance are results-oriented.
- **Hire independent quality control** to identify penalties to face shortage of outputs.
- **Identify clear contingency plans** to cover any increasing costs during project life.
- **Apply technical inspections on the project parameters** to minimize the possibility of mistakes as a result of traffic forecast inaccuracies.

All of the above creates benefits to the sector. For new investments, a greenfield BOT is not likely to attract the interest of private investors, unless GARBLT finances a very large percentage of investment. However, bundling the management of some existing highways with potential capacity with the operations that generate adequate income into a single concession is an alternative approach worth considering. Increasing toll rates up to the financial optimum for the concessionaire would reduce the need for GARBLT's financial support, but great care should be applied before setting toll levels. The government should take into consideration the affordability of tolls for all categories of users.

In conclusion, a master plan and an efficient regulatory framework imply the need for considerable institutional review to consolidate responsibilities for the roadway sector. The creation of one authority that works towards reducing the challenges facing the sector and improving the quality of road network with sufficient coverage and appropriate standards is essential to achieve Egypt's objectives of high and sustainable economic growth, alleviation of poverty and reduction of income disparities. Enhancing the image of Egyptian transport requires institutional reforms, improving accessibility, upgrading road conditions, reducing the rising number of accidents, and putting new traffic legislations into effect. This will

provide a well-functioning road network, which plays a central role in increasing trade, accelerating growth, enhancing employment creation and meeting social needs. In other words, it is not wealth which makes good roads possible but rather good roads which make wealth possible. As Adam Smith (1937) said “*Good roads, canals and navigable rivers, by diminishing the expense of carriage, put the remote parts of the country more nearly upon a level with those in the neighbourhood of the town. They are upon that account the greatest of all improvements.*”

APPENDIX

ROAD PROJECTS IN DIFFERENT COUNTRIES

I. MALAYSIA: Highway Rehabilitation Projects (1996) with a total cost of \$242 million (World Bank 1996a)

This project is a part of **Malaysia-Road Asset Management Project** (with a total cost of \$450 million: IBRD \$300 million and Government \$150 million) (World Bank 1999).

Objectives

1. Road maintenance capability and operations to decrease congestion and transport costs.
2. Programming and providing training to staff in the areas of highway planning, design, supervision/project management, safety, and operation and management to enhance efficiency and timeliness of maintenance operations.
3. Coordination of highway planning and the existing network of national highways to increase traffic safety along the federal road network, which carries the majority of traffic volumes.
4. Truck-weight control to reduce damage to the roads and maintain road safety.

Description

The proposed project would comprise the following components:

5. Rehabilitation and strengthening of 562 km of road;
6. Improvement of 42 hazardous road sections and highway maintenance operations;
7. Computerization of road design and construction of 35 weigh stations;
8. Replacement of 67 bridges and construction of 27 pedestrian bridges; and
9. Institutional assistance by provision of consulting services for design and works supervision and of technical assistance to strengthen government capability to plan, coordinate and supervise road projects and to evaluate their environmental impact.

Impediments

- Cost overruns and delays;
- Cost estimates of major civil works components were not based on solid and up-to-date data;
- Maintenance improvement program was not sufficiently monitored by the Bank or the borrowers.

II. INDONESIA: Eastern Indonesia Region Transport Project (December 2006), with a total cost of \$262 million (World Bank 2006b)

Objectives

1. Improve the condition of national and other strategic arterial roads;
2. Support sustainable decentralization of planning and management responsibilities;
3. Improve the use of scarce financial and natural resources through increased efficiency, quality, and transparency in award of works.

Description

1. Road network preservation;
2. Accident in black spots;
3. Implementation of technical support and road sector support.

Impediments

1. Responsibility of the sector is not clear due to many institutions implementing road arrangements;
2. Road safety activities remain a challenge;
3. Involvement from all ministries not just the transport ministry;
4. Failure of institutional reform;
5. Lack of independent consultancy to carry out supervision of the technical aspect of works.

INDONESIA: Sumatra Region Roads Project (June 2006) with a total cost of \$370 million (World Bank 2006b)

Objectives

1. To improve transport efficiency and accessibility within the 4 provinces;
2. Strengthen integrated planning and management of transport infrastructure in the region within the Government of Indonesia's decentralized framework;
3. Develop and preserve the road networks in the project region to environmentally sustainable and economically efficient levels;
4. Improve resource use and service delivery through gains in policy implementation;
5. Expand geographical coverage of the project to include all of Sumatra.

Description

The proposed project would comprise 3 main components:

1. Support and develop strategic transport planning capacity, and improve planning management within the government-decentralized framework;

2. Improvement of the national, provincial and kabupaten (district) road networks and regional network development;
3. Improvement of resource use and service delivery, by enhancing quality and technical efficiency of design and construction processes.

Impediments

1. Lack of culture, technical capacity and public awareness;
2. Shortage of government incentives to help develop a sustainable planning, programming and maintenance culture at the local level;
3. Weak government involvement during preparation and assessment;
4. Alternative transport planning paradigms for the different provinces are not considered;
5. Corruption in related sectors;
6. Construction supervisors are not independent;
7. Consultants' contracts are linked to physical presence more than to the outputs and outcomes;
8. Inadequate simplified design approach. Shortage of non-bank financed (NBF) categories in progress reports;
9. Loans are not well extended to ensure effective implementation of an institutional component.

III. TURKEY: Road Improvement and Traffic Safety Project (1996), with a total cost of \$389 million (World Bank 1996b)

Objectives

1. Rehabilitation and strengthening of paved highways to protect past investments. Improvement of traffic safety in state and provincial roads;
2. Reduction of transport costs;
3. Enhancing management and computerization systems to improve operational efficiency of KGM (General Directorate of Highways);
4. Improvement of environmental factors in project selection and design;
5. Repairing the damaged Istanbul-Ankara expressway, a vital link in Turkey's road network.

Description

1. Increase civil works in the road sections identified as accident black spots;
2. Provision of road safety materials for improved traffic management;
3. Provision of equipment for the Turkish Traffic Police (TTP) and improve their accident database to other users through the creation of an accident data bank;
4. Improve the emergency response of the University Hospital at Gazi University (GU) by providing medical equipment;

5. Emphasize the importance of road safety through educational awareness campaigns in selected schools;
6. Provision of technical assistance and training to the staff.

Impediments

1. Planning and control capacity were limited;
2. Delays due to disagreement over bidding documents;
3. Cost overruns;
4. Lack of KGM funds and adding extra works to the contracts;
5. Lack of public awareness;
6. Other factors outside government control affected the implementation and outcomes in 1999: Marmara earthquake, generally depressed economic conditions and regional military conflicts.

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