DIAGNOSIS OF EXISTING TRANSPORTATION SYSTEMS IN PALESTINE UNDER THE CURRENT POLITICAL CONDITIONS

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ABSTRACT

This study diagnoses the transportation infrastructure in Palestine. This includes roads, air, sea, freight, and public transport, as well as the institutional structure. This assessment should help formulate future developmental strategies and identify assistance needs.

There have been considerable recent positive developments such as rehabilitating roads, constructing transport facilities, and establishing national institutions. Other developments were negative due to the great losses in infrastructure assets especially during the years of Intifada and the resultant incursions, which caused severe damage to transport facilities, restrictions on movement of people and goods, and weakening of Palestinian institutions.

Land transportation infrastructure is the predominant type of transportation. It is estimated that about 50 percent of roads are under poor pavement conditions. Operation at Gaza International Airport was banned after the beginning of Intifada in 2000, and Israel damaged part of the airport in 2001. There have been efforts to construct a Palestine seaport in Gaza in 1999. Such efforts were stopped and Israel damaged some of its constructed parts.

The public transport consists of buses, shared-taxis, and taxis. There is excess supply of shared-taxis, while the reliance on buses is limited. Freight transport is provided by land and by trucks and trailers. Other types are provided through Israeli borders. Therefore, the service is subject to Israeli control.

Several ministries are involved in the transport sector. There is no official mandate or clear responsibilities identifying roles and duties. Therefore, roles overlap and some duties are not carried out by any party.

1. INTRODUCTION

Under the current political conditions, the Palestinian territories comprises of the West Bank (WB) and Gaza Strip (GS) with a total population of 3.6 millions, distributed as 2.3 millions in the WB and 1.3 millions in GS. The total area of the Palestinian territories is about 6225 km^2; 5860 km^2 in the WB and 365 km^2 in GS.

There have been considerable developments on the ground after the establishment of the Palestinian National Authority (PNA) on parts of the WB and GS in 1994. Positive developments include rehabilitating roads, constructing transport facilities, and establishing institutions. Negative developments were due to the great losses in the infrastructure assets especially during the past four years of Intifadah and the resultant incursions which caused severe damage to the transport facilities, considerable restrictions on movement of people and goods, and had weakened the institutions.

This assessment will help formulate strategies for future assistance and intervention to respond to the needs of this sector. Such assessment would lead to identifying developmental objectives and sectoral priorities. The transportation sector includes roads, air, sea, freight, and public transport; as well as the institutional arrangements.

The transportation sector contribution to the gross domestic product (GDP) of the Palestinian territories is limited, as it accounted for 4.2% of the GDP in 2000. This is despite the observed trend of gradual increase of the share of the transport sector in the GDP, as the share was 3.4% in 1995, and 3.9% in 1997, and 5.8% of the GDP in 1998 [(1)]. Although the GDP of the Palestinian territories has been slightly improving, transportation infrastructure investment is still low compared to other developing countries [(2)].

The transport sector employed about 9.4% of total persons employed in the service sector in the Palestinian territories in 2002, which was the lowest employing sector among the services sectors [(3)]. The number of persons engaged in the transport sector dropped by 40% in year 2002 compared to year 2000. The share of the employed persons in the transport sector was estimated at 4% of the total labor force in 1995, but this percentage was slightly decreasing over the years.

The existing conditions for each component of the transport sector (road, air, sea, public, and freight transport, as well as the institutional structures) are briefly presented hereafter.

2. ROADS AND HIGHWAYS

The road network in the Palestinian territories had developed during the past decades to a system that is only partially capable of satisfying the accessibility and mobility needs of the Palestinian society. Roads specifically serving the Palestinian communities suffered from neglect. After the establishment of the PNA, considerable effort was invested to implement road projects. The vast majority of such projects were oriented towards rehabilitating parts of the existing road network and not to opening new roads.

Road transport is currently the only transport system, which provides opportunities for the movement of people and goods within the Palestinian territories and with the outside

world. Because of the political constraints over the years, the road transport was not given the opportunity to develop to a level which would enable it to perform its economically required function, and to provide the appropriate and effective transport services and facilities, which are essential for the development of the Palestinian economy. According to the interim peace accords and arrangements, the Palestinians are entitled to develop and maintain roads in specific areas of WB and GS. Since the start of the Intifadah in September 2000, the Israeli authorities imposed measures related to movement restrictions, which greatly constrained the role of the road network.

The current paved road network in the Palestinian territories comprises of 2869 km. About 2248 km of these roads are in the WB, including 207 km of roads within Jerusalem Governorate, and about 621 km are in GS. The main roads form about 21% of the total road network, the regional roads form about 30%, while local roads form 49%. Table 1 shows the lengths of the existing road network by road class and region. In addition to these paved roads, there are unpaved agricultural roads. There are also other roads that have been constructed for the intended use by the Israelis, which are bypass and settlement roads with a total length of 1018 km, mostly located in the WB [(4)].

Table 1: Road network lengths in the West Bank and Gaza Strip (in kilometers)

Region	Main	Regional	Local	Sub-Total	Bypass	Settlement	Sub-Total
West Bank	489	634	1125	**2248**	345	621	**966**
Gaza Strip	128	218	275	**621**	-	52	**52**
Palestinian Territories	**617**	**852**	**1400**	**2869**	**345**	**673**	**1018**

The Palestinian territories have limited access to all-season paved roads compared to other countries in the region in terms of density of the paved roads (km per 1000 population). The road density in the Palestinian territories in 2003 was 0.79 km/1000 population, distributed as 0.98 km/1000 population in the WB and 0.47 km/1000 population in GS. This illustrates that the road network in GS is less capable of satisfying population travel demand than in the WB. Based on the World Road Statistics 1998 Report [(5)], the road density in Israel was 2.62, in Jordan 1.52, and in Egypt 1.06 km/1000 population (see Figure 1). Therefore, the current road density in the Palestinian territories is worse than those of neighboring countries calculated even few years ago. In the developed countries, this value is considerably higher.

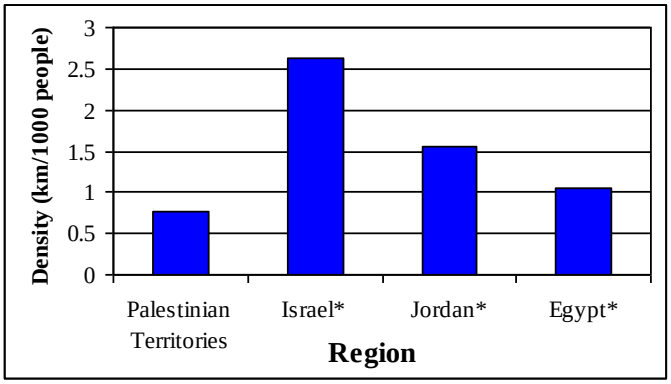

Figure 1: Road density in km/1000 population

* Source: International Road Federation, World Road Statistics 1998 Report

Surveys of road conditions in 1989 showed that about half the road network was in good conditions, and the second half was in fair to poor conditions [6]. In 1996 (conditions before the Intifadah), the percentage of good-condition roads decreased to 15% and the percentage of poor roads increased from 40 to 56%. The remaining 29% was in fair condition [7]. This shows the deteriorated conditions of the existing old road network and its neglect.

During the period between 1996 and 2000, there have been several road rehabilitation projects in the WB and GS. Therefore, road pavement conditions improved. However, the needs of the road transport are greater than what has been invested in this sector. Therefore, the number of road rehabilitation projects was hardly sufficient to bring up the network to the desired level. The estimated cost of eliminating road maintenance backlog was about $105 millions, and the estimated needed annual road maintenance cost was $48 millions [7]. The total amount spent on this sector was far less than needed.

Since the start of the Intifadah, road conditions deteriorated because of damages caused by the Israeli military and due to lack of road maintenance. Most road works in rural areas require permission from the Israeli side, which was rarely granted. In 2003, road pavement condition was estimated by MPWH as 50% poor, 26% fair, and 24% good [4].

Figure 2 shows road conditions over the years. Despite road deterioration and damage resulted from Israeli actions, the overall picture indicates that road conditions in 2003 are slightly better than those in 1996. This was the result of intensive rehabilitation activities by the PNA and rehabilitation and construction of bypass roads by the Israeli authorities.

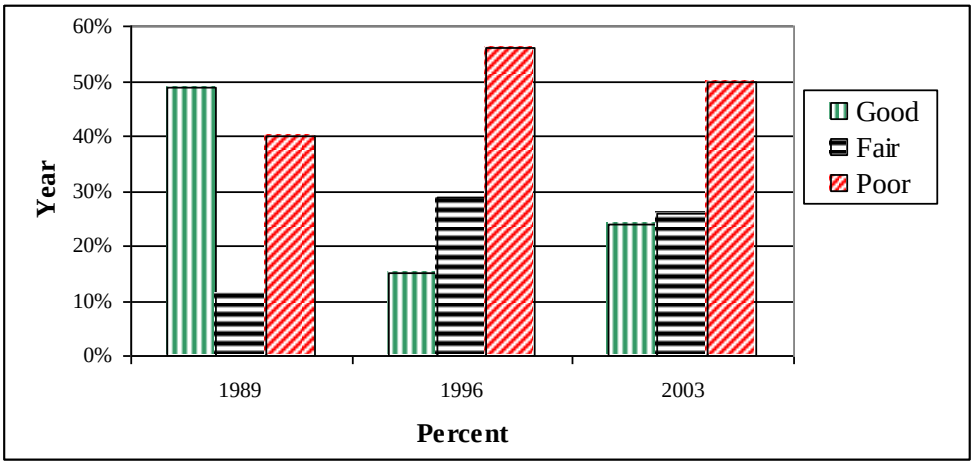

Fig. 2: Pavement conditions of the Palestinian road network (1989-2003)

The total number of licensed vehicles in the Palestinian territories in 1999 was about 137,000 vehicles. Approximately 99,000 vehicles were private cars. About 65% of the total licensed vehicles were in the WB, and the remaining 35% were in GS. The number of licensed vehicles in the Palestinian territories dropped to 124,000 (60% in WB and 40% in GS) in the year 2000. The drop in licensed vehicles occurred in the WB (-16%) while in GS, it slightly increased (2%). The percentage of privately owned vehicles in the Palestinian territories was approximately 73%. The total number of licensed vehicles in the Palestinian territories further decreased in 2001 (115,000 vehicles). The decrease was in

the WB, while number of vehicles continued to increase in GS at an approximate annual rate of 2% [4].

The percentage of officially registered vehicles out of total operating vehicles had declined in the WB since the beginning of the Intifadah. A sharp decline in vehicle registration occurred in year 2002 where Israel invaded almost all WB cities. There was an absence of the various PNA bodies, and therefore many vehicle owners did not renew vehicle's registration. In year 2003, there was partial presence of PNA in WB cities. This resulted in a slight increase in vehicle registration. The first two months of year 2004 experienced an increase in vehicle registration because the MOT offered 50% reduction in registration fees as a way to encourage vehicle registration [4]. Table 2 shows the percentage of registered vehicles by type, and Figure 3 shows private vehicle ownerships.

Table 2: Percentage of registered vehicles in the West Bank

Vehicle Type	Year 2000	Year 2001	Year 2002	Year 2003
Taxis	92%	86%	55%	60%
Buses	68%	65%	43%	44%
Private Cars	55%	43%	25%	26%
Commercial Vehicles	59%	56%	42%	48%

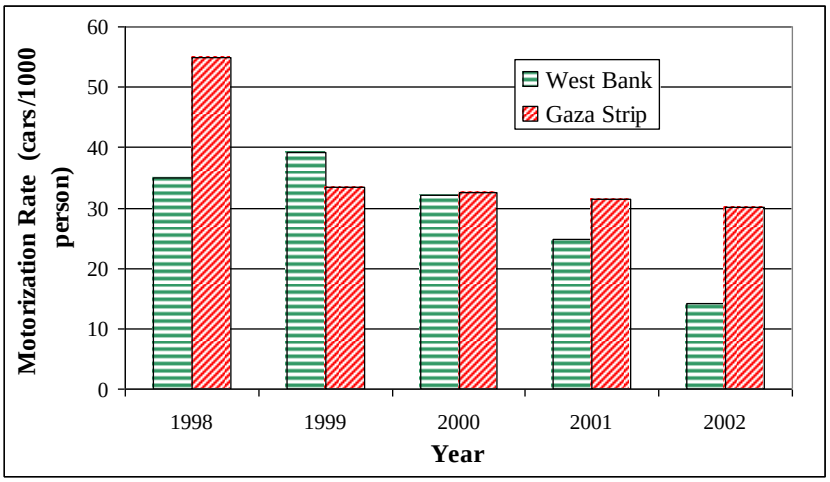

Fig. 3: Private vehicle ownership in the Palestinian territories (1998-2002)

After October 2000, Israel closed and destroyed many roads of the WB and GS. The movement of heavy military vehicles and tanks caused damage to rapidly propagate to most of the roads, especially within the urban areas. Damage estimates to roads according to the MPWH has reached about $118.6 million, of which $66.5 million as direct damage and $52.1 million as indirect damage [4].

The most serious issues facing road transport now are road closures and travel restrictions. This has severely restricted mobility. Until now, no private or public transport vehicles are allowed to travel across many of the road blocks erected surrounding many communities unless they have permits from the Israeli authorities, which are rarely granted.

In a survey conducted by the Palestinian Central Bureau of Statistics in 2001, traveled distances in the WB post Intifadah have increased by 14 to 111% compared to the pre-Intifadah conditions, with variation depending on the governorate, while increased by a lower rate in GS. The average travel time has also increased by 58 to 325% in the WB. Palestinians have to use narrow dirt roads that are inadequate for travel. Dirt roads made up 10 to 47% of the travel distances in the WB, and reached up to 20% in GS [8] (see Table 3). However, the Israeli movement restrictive measures have intensified after year 2001.

Table 3: Impact of Israeli measures on the transport sector

Transport Indicator	**% of Change After the Intifadah Compared with Pre-Intifadah***	
	West Bank	**Gaza Strip**
Travel Distance	14 – 111	0-50
Travel Time	58 – 325	0 – 180
Travel on Dirt Roads	10 – 47	0 – 20
Maintenance Cost	25 – 270	2 – 23
Daily Trips	- (10 – 58)	- (0 – 40)
Travel Cost	32 – 114	25

* % Change varies from one governorate to another

2. AIRPORT AND CIVIL AVIATION

Building of Gaza International Airport (GIA) was completed by the end of 1998. The airport was designed according to International Civil Aviation Organization (ICAO) airport standards. The Palestinian Civil Aviation Authority (CAA) was created to administer and operate the airport. The Palestinian Airlines (PAL) started its operations in 1997. However, the PAL started regular flights from GIA since 1999. The PAL is run by the Palestinian Civil Aviation Authority, and has a total of three planes [4].

The total number of passengers in GIA during 1999 reached about 60 thousand (9% of airport capacity) [4]. The low capacity utilization was because only third of the Palestinians living in the WB and GS had access to the airport, and due to the Israeli restrictions on the use of the airport. However, the demand is expected to increase rapidly if the Palestinians living in the WB can travel freely to the GS.

The travel demand on PAL significantly grew reaching 41 thousands passengers during 1999, compared with about 15 thousands in 1998 when PAL was operating from Al-Areesh in Egypt. During the period when the airport was operational in 2000, PAL passengers were increased by about 74% compared with the respective period of the preceding year [4]. Figure 4 shows the development of the number of PAL passengers, from 1998 to 2002. However, the 1998, 2001, and 2002 figures represent PAL passengers departing and arriving from and to Al-Areesh Airport.

Shortly after the start of the Intifadah, Israel banned the Palestinians to operate the airport. Starting late 2001, the Israeli authorities damaged parts of the airport. The airport requires

extensive rehabilitation before operations can be resumed. The total requirement for repairs of the GIA was estimated at $22.0 million [4].

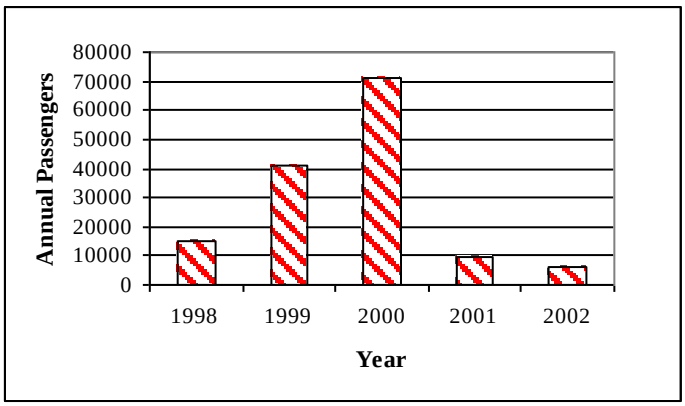

Fig. 4: The development of the number of PAL passengers from 1998 to 2002

3. SEAPORT AND MARITIME TRANSPORTATION

Since 1967, the international trade serving the Palestinians areas was done through the seaports of Haifa and Ashdod with restrictions. The Israeli security checks on exported Palestinian products resulted in considerable delays and losses. With the establishment of the PNA, a decision was made to build Gaza Seaport near Gaza City.

The construction of the seaport was delayed due to the Israeli obstacles and opposition to constructing the seaport, which were related to security and custom inspection. The agreed arrangements included establishing procedures for checking, operation, management, and security in the seaport through a joint Sea Port Protocol [4].

The plans for the seaport include the construction of three wharfs, a breakwater, excavation and leveling works, and the necessary facilities and infrastructure. The depth of water will reach for this stage 10 m, so that 15-25 thousand ton ships can be served.

The Palestinian Seaports Authority (SA) was created in 1999 under the umbrella of the Ministry of Transport (MOT). SA has developed a number of plans and developmental programs, an organizational structure, and had prepared the first draft law to regulate aspects of sea transportation.

The construction of the seaport started in July 2000 and was scheduled to be completed in 25 months. Construction was stopped after the start of the Intifadah. The cost of the first stage was estimated at about $68.5 million. By the end of 2002, the Israeli authorities completely damaged all the seaport facilities being constructed and the installations on the construction site. International contractors withdrew from construction and donors froze the implementation of the project. The value of direct structural damages and installations was estimated at $1.56 million. However, indirect damages reached $11.02 million [4].

4. PUBLIC TRANSPORT

Public transport in the Palestinian territories consists of buses, shared-taxis, and taxis. In addition, there is an illegal operation of private and shared-taxis. Public transport services are regulated by the MOT. However, due to the absence of PNA power on the ground because of the continuous Israeli military existence in WB cities, there has been weak control of public transport. This has affected the implementation of regulations related to public transport.

Mass transport is provided by medium-sized and full-sized buses. This is mainly supplemented by shared-taxis, which operate on long distance routes and on short haul services within the larger cities and from cities to surrounding villages. Public transport services are currently provided by private companies, with little or no support from the government. Intra-city buses currently play a relatively minor role in the provision of public transport, which causes an increase in the number of shared-taxis and taxis.

In 1999, the total number of registered bus companies in the WB was about 100 with a total fleet of about 700 vehicles. In 2000, the number of companies decreased to 84 with 648 buses. However, the 2003 number of registered bus companies in the WB was 95 with a total fleet of 690 buses, while in GS there were 2 companies and 70 buses [(8)]. There was also an increase in the number of non-licensed vehicles in the WB due to the absence of enforcement by the PNA because of Israeli invasions. There was also a decline in public transportation services due to the continuous road closures.

Several bus companies in the WB complained (even before the Intifadah) that their operations are not profitable. There are competitions by the registered public shared-taxis on the same route, unfair competition by illegal taxis and buses, and the poor management operation of some companies. The MOT believes that the main reason for financial losses for some companies is their poor management operations [(4)]. The financial conditions of these bus companies have considerably deteriorated since the start of the Intifadah.

The reliance on inter-city bus services is limited due to travel restrictions by Israeli; therefore, the majority of these services in the WB are provided by shared-taxis, which can easily use alternate routes. Shared-taxis are the most widely used public transport on most routes. They duplicate the services provided by buses. Issuing new licenses for shared-taxis is restricted. Urban and inter-city shared-taxi services may deviate from routes and/or fixed schedule, and may pick up and drop off passengers at other than regular stops.

The conditions of public transport vehicles have deteriorated in the last few years. Road conditions have significantly deteriorated in the WB because of Israeli invasions and destruction of roads, which affected the conditions of public transport vehicles serving the cities. The economic hardship resulted from the closure and curfews limited the ability to maintain vehicles to the same standards. There is excess capacity in shared-taxis and taxis in the industry. The number of taxis increased significantly in the past several years because the PNA resumed granting permits after years of strict Israeli control.

The number of licensed taxis in the WB was 6090 in year 2000, 5542 in year 2001, and 4804 in year 2002. The main reason for this drop is the increasing number of operating

taxis that did not renew their licenses and the general decrease in public transport services for the aforementioned reasons. However, the total number of private and shared-taxis was 5916 vehicles in the WB in year 2003 [8]. This increase can be attributed to the reduced permit fees and the partial presence of the Palestinian traffic police.

The MOT established formulas for estimating the total number of permits to issue and fares for each type of public transport. The number of permits was mainly based on population and their distribution. The MOT indicated that the number of permits and fares were reasonably controlled until the beginning of the Intifadah [4].

The MOT established fares for each public transport route. This fare was calculated based on a cost plus a profit for each route. The cost per kilometer was calculated for each public transport type based on fuel (diesel) consumption, vehicle registration fees, insurance, vehicle deterioration and maintenance, and driver's wage. Actual fares for public transport were lower than fares set by MOT on several public transport lines. Buses and shared-taxis on certain routes used to offer discount prices for special groups, such as students.

There was a serious problem of illegal public transport services in the late 1990s. The MOT estimated that there were about 10,000 illegal vehicles [4]. The MOT conducted extensive enforcement efforts to control this issue. These efforts lead to almost eliminating this problem until the end of 2000, when the Intifadah erupted. However, after year 2000, this problem became worse because of the absence of PNA enforcing bodies.

Surveys of the legal transport sector indicated that about 23 percent of enterprises working in this sector closed their operations in year 2001. The productivity level of the transport sector was $30.4 millions in 1995, which dropped to $13.2 in 2001 [3]. It is expected that these numbers decreased in the following years.

Public transport vehicle registration in the WB dropped considerably [4] (see Table 2), for the aforementioned reasons. However, by year 2003, the percentages started to increase because of the partial presence of the PNA bodies in the WB.

The total losses in the transport sector reached about $2.0 billions by the end of 2003 [4]. A survey conducted in 2001 showed that travel distance of students to their universities, which is mostly done using public transportation, increased by 61%, travel time increased by 121%, and travel cost increased by 110% [10]. However, realities on the ground after year 2001 are much worse.

5. FREIGHT TRANSPORT

Freight transport in the Palestinian territories is road-based. It is fully privatized; owned and operated by individuals or companies. Freight routes are not fixed or regulated. There is no enforcement of maximum weights. A very high percentage of vehicles are old. By 1998, there were 22000 and 8000 trucks registered in the Palestinian territories [2]. In 2001, the number of licensed freight vehicles was 23215. In addition, there were approximately 900 vehicles operating in a non-legal freight transport. In 2002, the number of licensed vehicles dropped in the WB; however, increased in GS [8].

The number of enterprises working in freight transport in the Palestinian territories was 33 in year 2000 and 35 in year 2002 [8]. Records of the Ministry of National Economy showed that there were only 14 officially registered freight transport companies in the Palestinian territories in 2003 [4]. Several companies went out of business or froze their operations mainly because of the travel restrictions imposed by the Israelis. In addition, there are several small companies that are not registered.

The number of operating vehicles in freight transport increased drastically (25%) during the period of 1995-1998 (post the establishment of the PNA), where there was a good demand for transporting goods [2]. In years 2000 and 2001, the number of licensed freight transport slightly increased (by 4%). However, this number sharply declined in year 2002 in the WB (see Table 2), while it increased at a normal rate in GS [11].

Palestinian trade is through borders controlled by Israel. International trade with Israel, Jordan, and Egypt is through land border crossings. Palestinian international trade is currently through Israeli airports and seaports. Trade commodities through the Israeli airport and seaports must use the Palestinian-Israeli land crossings first. Almost 99% of the Palestinian imports are through land.

The current political conditions resulted in loss or severe decline in services of the freight transport. Surveys have shown a decline in the number of people working in the transport sector by 40%, especially employees of the freight transport. Production in this sector dropped by 70% in 2002 compared to year 2000 [3]. Travel restrictions resulted in damages to a large quantity of Palestinian products, especially agricultural and food products. The cost of transporting goods also increased because products have to be unloaded and loaded again at several stations. Demand for freight transport decreased because imports from Israel decreased. Freight vehicles depreciation rate has also increased. The total estimated losses in the freight transport between October 2000 and September 2002 was $1 billion [4]. The impact of political conditions on freight transport is summarized in Table 4.

Table 4: Impact of Israeli measures on freight transport

Measure	**Region**	**%Increase**
Traveled Distance	From Firm to Israeli Border	35
	Rafah	16
	Damiah Bridge	47
Travel Time	To Local Market	208
	To Border With Israel	123
	Rafah	473
	Damiah Bridge	84
Time Spent On Borders	Rafah	242
	Damiah Bridge	778
	Borders With Israel	245
Transport Cost	At Borders With Israel	69
Goods Damage	Imported Through Rafah	18
	Imported Through Haifa Port	16

6. INSTITUTIONAL STRUCTURE

Since the formation of the Palestinian cabinet in 1994, six ministries have been sharing responsibilities in the various fields of the transport sector. These include the Ministry of Transport (MOT), Ministry of Public Works (MPW), Ministry of Planning and International Cooperation (MOPIC), Ministry of Local Government (MLG) under which the municipalities and village councils operate, Ministry of Agriculture (MOA), and Ministry of Finance (MOF).

A survey with ministry officials was performed to evaluate their responsibilities in the transport sector in terms of planning, financing, budgeting, new construction, rehabilitation/maintenance, tendering/supervision, and administration [(7)]. The results showed that their degrees of involvement vary considerably and intersect in many instances. There is a clear work overlap between several of these agencies, and this has resulted in duplicating efforts and some duties were not carried out by any party. However, at specific other cases, there is integration in the role and responsibility of these agencies and institutions. The survey concluded that there is a need to clearly define their roles and responsibilities in the transport sector.

7. CONCLUSIONS

Based on the presented diagnosis, it can be concluded that the current components of the Palestinian transport systems are underdeveloped and insufficient to meet current needs and future developments.

The most serious issue facing the transport sector is road closures and travel restrictions. This had resulted in limiting mobility and accessibility, increasing travel time and cost, restricting the transportation of imports and exports. There is also considerable damage to various components of the transport sector as a result of Israeli military actions, which has to be repaired or replaced. Considerable segments of the national and urban roads; public and private transport vehicles; facilities and equipment within the GIA; and facilities and installations of the seaport have been damaged to various degrees. There is also still no linkage or free passage between the West Bank with Gaza Strip. There are political constraints which retard the development of a sound and efficient transportation system in most rural areas. There is also the weak control of the PNA on the ground, the reliance on Israel; and the issue of bypass and settlement roads.

Development activities in the transportation system have not been following a national transportation master plan, which has led to projects that are not coordinated or not in harmony with the prioritized national needs within the transport sector.

Funding is a limiting factor. Most funds came from international donors and were spent to finance rehabilitation and upgrading of roads, and very little was devoted for road development and construction of new roads. The allocated funds by the PNA for the transport sector are very limited and are mostly directed towards maintenance of roads.

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