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Presidency of the Council of Ministers

Safeguarding a public asset: The future of the Rene Mo'awad Airport

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Executive summary

This report is prepared at the request and under the supervision of Dr. Sateh El-Arnaout (Chief Technical Advisor at the Presidency of the Council of Ministers). It comes in response to a growing interest in the revival of aviation services at Rene Mo'awad Airport in Quley'at, North of Lebanon. The report argues that, at present, the revival of aviation services for goods and passengers at RMA is not a viable policy option from a transport point of view. However, safeguarding this important public asset remains a priority for the Government until the need for a new or a second airport for Lebanon arises.

A vast literature discusses the developmental impacts of airports on their regional economies. Policy-makers and politicians alike boast the positive effects of these mega-infrastructure facilities on economic development and growth. However, these claims warrant a careful look. The direct connection between airports and economic development is not conclusive, and experience has shown that the argument of *"build it and they will come"* does not always lead to desirable outcomes. Unless airports are built in response to increasing demand in transport aviation, it is unlikely that they would contribute to regional and national economic development. In fact, airports plugged in remote rural areas, in the hope of initiating economic growth, were heavily subsidized to attract airlines in their start-up phases, and eventually ended shutting down. The experiences of some regional airports in Germany illustrate a similar outcome.

When built to fill a real demand gap in aviation transport, airports impact regional economies in three ways. First, airports are direct employers, with an average of 100 employees for 100,000 passenger throughput. Second, they are catalysts for other on-site activities which may or may not be aviation related businesses, for example industrial parks. Finally, airports have a regional multiplier effect. In numerous ways, they affect regional economies for example, by providing indirect jobs, and linking with local industries and suppliers. However, measuring the multiplier effect of airports is an extremely difficult task. As such, beyond the creation of on-site direct employment and ancillary activities, the real developmental impacts of an airport on its regional economy can only be gauged "a posteriori".

Therefore, deciding whether investing in the revival of aviation services at RMA has developmental impacts on the regional economy of the northern governorate would require comparing the developmental impacts of this investment to those of investing in other sectors of the economy of northern Lebanon, for example: education or health. Such an exercise is beyond the scope of this report. Instead, the analysis aims at assessing the need for the revival of aviation services at RMA from a transport point of view only. It draws on international experiences of primary and secondary airports, the history of the aviation industry in Lebanon as well as the socio-economic status of the northern governorate, to propose three scenarios pertaining to the future of RMA: a passenger only airport, a cargo only airport, and a safeguarded public asset.

The first option is a passenger-only airport. RMA and RHIA catchment areas overlap, and as such travelers choice becomes a choice in a multi-airport region. This choice is a function of travel access time, frequency of flights and airfare. A very conservative estimate of USD \$24,530,000 (1997 prices) is needed before scheduled passenger flights can be operated from RMA. This conservative estimate excludes the cost of on site infrastructure (such as apron and maintenance workshops rehabilitation, instrument landing system, airfield lighting, access road rehabilitation, and new parking spaces), all operating costs, and costs of relocating of the military base, in addition to the various subsidies which may need to be offered to airlines, at least at the airport's start-up phase. These investment costs translate

ultimately into higher passenger charges, and therefore higher airfares. Therefore, as long as RHIA is not congested, it will offer better quality, cheaper and more frequent flights, at a relatively shorter travel access time. With MEA's monopoly ending in 2011, followed by subsequent deregulation of the Lebanese aviation industry, the breadth of services offered at competitive prices at RHIA will increase even more, offering air travel at minimum generalized costs to producers and consumers alike. This analysis shows that a passenger only airport is not a sustainable option for the revival of RMA, and should thus be disregarded.

The second option is a cargo only airport. Cargo volumes processed through a cargo airport are either domestic or transit. For domestic traffic, an analysis of Lebanon's export and import profiles shows that Lebanon is the end market for the vast majority of imported products. Exports from northern Lebanon are restricted to perishable goods. The bulk of imported and exported products are transported through land and sea with air freight constituting only 1% and 2% of Lebanese imports and exports respectively. Therefore, domestic air cargo is negligible and may be accommodated through RHIA alone. For transit traffic, uplift capacity is the most important determinant. International experiences have shown that air cargo traffic relies on scheduled, frequent passenger services in hub-and-spoke as well as in point-to-point traffic. If an airport suffers from a lack of scheduled uplift capacity, and the volume of transported cargo relies almost entirely on charter flights, the airport will be not recognized as a cargo airport by either forwarders or shippers. Therefore, in the absence of scheduled passenger flights at RMA and a sufficient passenger flow to sustain the use of wide body aircrafts serving multiple destinations (such as Dubai Airport and Emirates Airlines for example), demand for RMA is not enough to sustain air cargo operations.

The third option is a safeguarded public asset. The report calls for a strategy to safeguard RMA by expropriating land in its vicinity. The absorption rate of land located east and west of RMA ranges between USD \$25 and USD \$40 per square meter for east and west of RMA. Previous studies suggested the absorption of 3,000,000 square meters for a total value of USD \$75 - \$120 million. Such government investment will be partly earmarked for use as "Industrial Estates" (IEs). The development of IEs responds to growing demands by Lebanese industrialists and investors yearning for serviced lands to accommodate the growth of their industries. This third option would not only have positive welfare effects on the region's economy, but it would help to preserve the RMA. It is only a matter of 15 to 20 years until the need for a new or a second airport in Lebanon arises.

Objectives and scope

This report is prepared at the request and under the supervision of Dr. Sateh El-Arnaout (Chief Technical Advisor at the Presidency of the Council of Ministers). It comes in response to a growing interest in the revival of aviation services at Rene Mo'awad Airport in Ouley'at, North of Lebanon. Acclaimed for its developmental impact, this project is considered an opportunity to create jobs and initiate economic growth in a lagging region of Lebanon. It is also featured in the 2009 Ministerial Declaration. This report examines closely the validity of these claims arguing that the revival of aviation services for goods and passengers at RMA is a "not a viable" policy option from a transport point of view, and hence its developmental impact is questionable.

Drawing on the vast literature of airports as mega-infrastructure geared at economic development, the report discusses the relationship between economic development and the presence of an airport in a given region, as well as the conditions under which this relationship is likely to materialize. In addition, the report takes into account the specificities of the aviation industry in Lebanon and the region, and places the airport within its local and national context, to propose and assess three scenarios pertaining to the future of RMA: a passenger only airport, a cargo only airport, and a safeguarded public asset.

Logical framework

Interest in reviving aviation services for passengers and goods at RMA comes at a time when the Lebanese economy has been experiencing real growth rates ranging between 7.5% and 9% from 2007 to 2010. The economy is expected to register a lower but sustainable rate averaging 4% between 2011 and 2015¹. This growth has been generating a sustained 20% yearly increase in passenger traffic at RHIA since 2007² catering for leisure, business passengers and cargo transport. It is characteristic of the Lebanese aviation industry which was severely affected by the political turmoil during 2005 to 2007, and has since successfully recovered. The growth rate of the aviation industry is expected to reach an average of 7% between 2010 and 2029³.

This report argues that, unless airports are built in response to increasing demand in aviation transport, it is unlikely that they would contribute to regional and national economic development. International experiences have shown also that airports plugged in remote rural areas, in the hope of initiating economic growth, were heavily subsidized to attract airlines in their start-up phases, and subsequently ended up shutting down⁴. Drawing on these experiences, the analysis in this report separates between **a business model** that makes investment in the revival of the airport worthwhile from an economic point of view, and **strategic objectives** such as initiating economic development and providing job opportunities in a lagging Lebanese region⁵. As such, this report demonstrates that the developmental impact of investing in the revival of aviation services at RMA is a function of its ability to satisfy an effective demand for aviation transport.

To do that, the report assesses first, whether investing in RMA responds to demand for aviation transport and second, whether it results in lower generalized cost of travel to airport users, and suppliers⁶ and third, whether any developmental effects may be derived from this

¹ IMF Country Report No. 10/306, 2010

² Airport statistics courtesy of TMA

³ Boeing Market Outlook 2010-2029

⁴ Behnen 2004

⁵ Jorge, De Rus, 2004

⁶ "Generalized cost is ... overall cost of making a trip including all time 'costs' as well as monetary costs. In many cases this will also involve a number of non-transportation costs that are influenced by the quality of transportation provided. For example, more frequent air services from an airport reduce the likelihood that a traveler will have to bear the financial and time costs of an overnight stay. High frequency of services also

investment. Although a literature on the growth impact of airports is provided, a full-fledged assessment of the development impact of reviving aviation services at RMA is outside the scope of this report. In fact, understanding the long-term development implications of this project on the regional economy of the northern governorate would require comparing the welfare returns of investing in RMA to those of investing in sectors such as education or health⁷. Therefore, the aim is to infer from international experiences and available information whether the revival of RMA is a viable policy option from a transport point of view.

The analysis is based on: (1) a review of the literature on the economics of transport infrastructure, specifically airports, (2) an overview of the aviation industry in Lebanon, (3) the state of the Rafic Hariri International Airport (RHIA) in terms of capacity constraints and level of services offered, and (4) interviews with transportation experts, and business leaders in the aviation industry.

The report is organized around five sections. Section I summarizes key lessons learnt from international experiences pertaining to the economic impacts of airport development, Section II provides a brief overview of RMA and its context, the north Lebanon governorate; Section III provides an overview of the aviation industry in Lebanon as reflected at the RHIA, Section IV provides three scenarios pertaining to the future of RMA, an analysis of each the options in terms of the demand market, and an evaluation based on social benefit it brings. Section V concludes with summarizing recommendations.

Learning from international experiences

“Economic development literature often cites hub airports as mechanisms for helping metropolitan areas grow”⁸. Numerous articles have celebrated the impact of airports on job creation, the relocation of international firms to the airport-city, and a clear spill-over effect to the surrounding region. However, when studying the impact of airports on economic development, decision makers are faced with a chicken and egg relationship: are airports a function of, or a cause of economic development? In other words, does a metropolitan area’s vibrant economy create the need for an air transport hub, or does an air transport hub trigger a vibrant local economy? In fact, the direction of causation is not entirely clear. With “a growing recognition that a ‘predict and provide’ policy for air transport infrastructure is simply not sustainable in political, economic and environmental terms”⁹; the argument of “build it and they will come” has led to undesirable outcomes.

When built to satisfy a demand for aviation transport, airports are catalysts to regional economic growth. They impact regional economies in three ways. First, they are direct employers. For every 100,000 passengers, 100 to 110 direct jobs are generated and are distributed as follows “airport operators 20; authorities 10; airlines 40; other: 40”¹⁰. Second, they are catalysts for other on-site activities which may or may not be aviation related businesses, for example industrial parks. Finally, airports have a regional multiplier effect. They affect regional economies for example, by providing indirect jobs, and linking with local industries and suppliers. However, it “is exceptionally difficult to measure the degree of embeddedness of an airport in its local economy and [...] smaller regional airports are much less capable of stimulating additional indirect jobs in their regions”¹¹. Reflecting back on RMA, the difficulty of measuring the multiplier effect of regional airports supports our

means there the ‘down’ time that is wasted as participants wait for attendees at a meeting are reduced.”
(Button 2002, 181)

⁷ Jorge, De Rus, 2004

⁸ K. Green, 2007

⁹ Graham, Guyer, 2000

¹⁰ Behnen 2004

¹¹ Graham, Guyer 2000

questioning of the developmental impacts of the project. In fact, the link between economic growth and the presence of airports is not as straightforward.

Empirical studies exploring the multiplier effect of airports have shown that the economic impact of an airport depends on the metropolitan area's commercial activity (income)¹². Strand (1999) uses the examples of two Norwegian regional airports to demonstrate this point. One of the airports, "located on the west coast of Norway has grown at a rate higher than the national average because of a growth in dynamic local businesses, the employees of which have a high propensity to use air travel".¹³ Consequently, this was translated into equally frequent flights to domestic, as well as European destinations. In contrast, traffic at an isolated regional airport north of the country "has remained constant over a long period, simply because no potential exists to grow the market"¹⁴. This result necessitates probing into the economic characteristics of the northern governorate, where RMA is located. Since the governorate is among the poorest of the country,¹⁵ reviving an airport in a region where demand for air transport is very low -if non-existent- is counter-intuitive.

Also related to the multiplier effects of airports is their ability to act as transport links, allowing for market expansion, which in turn creates the economies of scale needed to trigger economic development.¹⁶ In addition, in a globalized economy, the economic sectors that are most likely to support future economic growth are the same ones that depend heavily upon aviation. Consequently, the presence of an airport becomes one of many location factors of international businesses. Increasingly connected cities house businesses and enterprises whose day to day operations requires face-to-face interaction with clients. In that respect, studies have shown that "a 10% increase in passenger enplanements in a metro area leads approximately to a 1% increase in employment in service-related industries"¹⁷. However, airline traffic has no effect on manufacturing and other goods-related employment, suggesting that air travel is less important for such firms than for service-related businesses"¹⁸. This raises important questions about the type of enterprises which potentially benefit from, as well as create demand for the presence of RMA in northern Lebanon, and consequently about the appropriate investment climate required to foster this economy.

In summary, the literature has shown that it is questionable whether an airport in a disadvantaged region could be successful"¹⁹. In all cases, the presence of an airport did not generate international business, but was critical where there was sufficient business"²⁰. "In Germany, only the small airports in regions with well-developed economic structure [...] have prospered. In most cases, small airports are not economically viable... regional authorities have to compensate for their losses permanently"²¹. In that respect, examining the extent to which the northern governorate is equipped, in terms of human capital as well as physical infrastructure, to support industries which form the demand pool for aviation services proves crucial in understanding the economic viability of RMA.

Aside from their positive outcomes, airports are also sources of strong negative externalities, such as noise, and pollution"²². Airport development puts additional pressure "on land use planning [...] coefficients of exploitation, [and] urban sprawl"²³. Therefore, the revival of RMA should be planned in a way to ensure that the positive externalities created by the airport

¹² Benell et al, 1993

¹³ Quoted in Graham 1999

¹⁴ *ibid*

¹⁵ CNRS, 2005

¹⁶ Daley, 2009

¹⁷ Brueckner, 2002

¹⁸ *ibid*

¹⁹ Quoted in Behnen 2004

²⁰ LS, Interview with John Arnold, August 2010

²¹ Behnen 2004

²² Green 2007

²³ Stevens, Freestone, 2010

outweigh the negative ones. Figure 1 shows the airport and surrounding settlements. For example, with people relocating closer to the airport due to the availability of job opportunities, the small settlements of Khirbe, Tall Kerri and Mass'oudieh currently surrounding the airport might witness a sudden increase in their population and in real estate development. As such, the surrounding agricultural areas, which are not equipped with adequate infrastructure to sustain rapid urbanization, will suffer negative consequences. This calls the attention to carry-out an an environmental impact study focusing on the short and long term effects of the airport on its surroundings, and the necessity of developing a regional master plan which accounts for this future development.



Figure 1: Map of RMA with surrounding settlement, Source: SDW, 2005

The reviewed studies serve the purpose of giving a nuanced perspective on the relationship between economic development and air transport. As argued by Daley, many assumptions about the economic benefits of air transport prevalent in the media and some literature about airports should be dismantled, including the following statements:

- benefits are delivered across the whole national and regional economy, they are delivered across all economic sectors,
- they are spatially uniformly distributed, they are temporally uniformly distributed (or even increasing over time),
- they are neutral in terms of dependency between regions or nations,
- they are an enduring and secure basis for investment and social development.

Instead it should be clearly understood that in many cases:

- economic benefits of air transport were concentrated in core regions of national economies that are already intensively developed with transport infrastructure, which is not the case in Akkar,
- air transport benefits do not accrue across the whole of a national economy; indeed, specific, targeted government interventions are sometimes necessary to correct for regional imbalances in demand for, and supply of air transport, such as government subsidies to airlines, and government investment in productive industries to foster economies of scale calling for the presence of an airport
- economic benefits are not delivered uniformly across economic sectors; many businesses do not require air transport services, nor do they benefit from inbound or outbound passenger movements, yet they may nonetheless incur costs due to airport-related congestion.

The empirical literature also focuses on the conversion of military bases into other commercial uses upon their closure²⁴. This literature indicates that successful conversion of military bases to civilian airports hinges upon using the location of the military base for a designated type of air service, "which may mean no air service at all..."²⁵ if necessary

²⁴ Bagaeen, 2006 and Cidell, 2003, and Behnen, 2004

²⁵ Cidell, 2003

conditions such as a sufficient demand levels are not present. “An extreme example is the former Soviet airbase at Cochstedt in Germany, which has already been closed, **in spite of federal state and local authority investment to the tune of €45 million**. Here, the “job-machine” failed, and other airports are likely to go the same way”²⁶.

The conversions of 118 military bases into commercial uses in the U.S., were categorized in five types: non-aviation, commercial, cargo, general aviation (GA), and aeroplex – an airfield connected to an industrial park-. Summarizing the findings, the author concludes:

“Commercial traffic has shown itself to be attracted almost entirely to airports **that are replacing existing facilities**, whether in a city or rural area ... airfields located in uncongested rural areas have not attracted much cargo traffic because of their lack of connectivity on the ground. GA airports are best suited for places that can relieve traffic at large, congested airports, or in rural locations. Finally, aeroplexes, as a combination of aviation and non-aviation uses, work well in either rural locations that would otherwise not see much air traffic, or in large metropolitan areas that want to split off some functions from the main airport.”

These empirical findings have important implications for RMA. They will be subsequently discussed in relation to the demand for each of the project options provided in the report.

The Rene Mou’awad Airport (RMA) within its context



Figure 2: Locating RMA on the map of Lebanon

Location & site conditions

As detailed by the Parsons & Brinckerhoff report²⁷, RMA is located in Quley'at in the Akkar Mohafaza of north Lebanon, approximately 7 kilometers south the Lebanese-Syria border, and 25 kilometers north of the city of Tripoli. Its total surface area is 2.544.000sqm, vs. 2,942,000sqm for RHIA. For RMA, the prevailing wind is from the south-west, both its runway orientation and meteorological conditions are more favorable than RHIA to aircraft landing and take-off²⁸.

²⁶ Behnen 2004

²⁷ Parsons & Brinckerhoff, n.d.

²⁸ S.A., interview with Director of the Civil Aviation Authority, April 2010

The Airport was originally developed by the Iraq Petroleum Company (IPC), with a 2000m runway. During the construction of the current military base in the 1960's, the runway was extended to the existing 3000m length (compared to two runways in an open V configuration with a total length for the main runway at 4.536m at RHIA). Other ancillary facilities were also constructed such as: the security office at the entrance of the airport, the radar station, the meteorological office, the air traffic control, the military administration, the military reception, the hangar, the ammunition dump, the fuel farm, the maintenance workshops and stores, and the fire station. Currently, the airport serves as a military base for the Lebanese army, and was last used for passenger aviation in 1992.

The last study about RMA completed in 1997 assesses the physical conditions of the airport. It attests that military facilities were in good condition and more than adequate for the prevalent military needs. The runway/taxiway is in need of rehabilitation, and requires replacement if to be used for civil aviation²⁹. The below SWOT analysis summarizes important aspects of RMA, and informs the project options proposed later in the report.

Table 1: SWOT analysis of RMA

Strengths	Weaknesses
<ul style="list-style-type: none"> • Located on the coast in an easily accessible area with negligible urbanization, & acceptable noise contours • Cheap land absorption rates • Cheap labor costs 	<ul style="list-style-type: none"> • Runway & facilities in need for rehabilitation to become functional • Compensating the military if it is to be used for passenger aviation • Weak connectivity with the city and the rest of the Lebanese territory
Opportunities	Threats
<ul style="list-style-type: none"> • Located in an area which allows for expansion • Located on the Syrian border benefiting from a cross-national catchment area • Part of a multi-modal transport platform: highway network, railway link, expanded Tripoli Port 	<ul style="list-style-type: none"> • Competition with RHIA if no market new market niche is targeted • "Bad" logistical conditions and custom management at Abboudieh border crossing • Located in a lagging region in need of further investment & away from heavily serviced urban center

Socio-economic profile of the northern governorate & implications for RMA

RMA is located in the northern governorate which has suffered from underinvestment in its infrastructure as well as human capital since the end of the civil war. According to the National Survey of Household Living Conditions of 2004 & 2007, the northern governorate is characterized by the following residents' profile in terms of demographics, education, employment & labor force:

Demographics:

- Home to 20.3% of the Lebanese population
- 44.0% of its residents have not reached the age of 18, making it the youngest region of the country in terms of inhabitants
- 42.4% of its residents are under the poverty line, 7.3% of which are under absolute poverty level. Both of these indicators are below national averages of 29.7% and 4.4% respectively

The literature showed that the economic impact of an airport depends on the metropolitan area's commercial activity (income). Reflecting on the poverty line of the governorate, it is

²⁹ SA interview with the Lebanese Army, March 2010

questionable to what extent the revival of aviation services at RMA is likely to trigger positive spill-over effects to the regional economy.

Employment & labor force:

- Encompasses 17.5% of the Lebanese working force
- Includes 10.8% of the Lebanese unemployed labor force
- 43.7% of males in the age group 15-24 are employed, compared to 8.4% of females in the same age group
- 76.9% of the labour force is employed by the private sector and 22,7% by the public sector
- Skilled workers aged 15 and above constitute 23.1% of the labour force, followed by 17% unskilled workers, and 11% general and corporate managers.
- 39.3% of the labour force aged 15 and above is employed in the services sector, followed by 19.7% in trade, and 17% in agriculture.

International experiences have shown that small airports are not likely to generate a sufficient number of job opportunities. As such RMA's revival is likely to contribute very little to overall job creation in the northern governorate.

Education:

- 33.5% of the student body enrolled in private educational institutions, and 60.5% in public ones
- School enrollment rate in the governorate drops from 99.1% for the age group 5-9, to 61.4% for the age group 15-19 to reach 4.8% for the age group 25-29
- 45% of the residents have therefore not exceeded the level of elementary education, and university students make up less than 9% of the total governorate's population
- More than 60% of the labour force is specialized in professions that do not necessitate an advanced university degree

In summary, investing in mega-infrastructure such as airports as a stand-alone intervention does not guarantee local economic development. As extensively documented by international experiences and the literature, the economic benefits of airport development are not straight-forward. Rather, they are context-specific, and dependent on the economic performance of the region where they are located.

The aviation industry in Lebanon as reflected by the RHIA

The aviation industry in Lebanon compared to the Middle East

The aviation industry has been a lucrative sector for the Lebanese economy. Discussions with the Civil Aviation Authority (CVA) testified to the health of this sector, which remained unaffected by the financial crisis hitting the operations of many regional & international airports. Figure 5 shows passenger traffic by type at RHIA from 2002 until 2009, and figure 6 shows the trend in total passenger traffic for the same period. If we were to remove both years 2005 & 2006 –crisis years in Lebanon- passenger traffic at RHIA would have registered a sustained 20% yearly increase in passenger traffic for the past 8 years. As mentioned earlier, this growth rate is twice the international average and is expected to drop to an average of 7% between 2010 and 2029, according to the Boeing Market Outlook, 2010-2029.

The same report asserts that the Middle East region is the only region in the world where air traffic increased during 2009, reaching an overall growth rate of 11.2%. Reasons behind this continuous growth vary and include: the region's oil wealth, demographics, and changing technologies. Per capita GDP growth is, empirically, a robust determinant of air travel in the region, with the Gulf leading the increase in passenger as well as freight traffic. Favorable demographics also account for the future growth of the industry. In fact, half of the region's population is under the age of 25; this youthful portion is likely to constitute the next consumer of air travel. Finally, changing technologies; "new-generation long-range airplanes can reach any point in the world from the Middle East, making the region an ideal

connecting point between Europe, Africa, India, and Asia. Gulf airlines using "sixth freedom" agreements, which allow carriage of revenue passengers between two foreign countries with a stop at an airport in the home country, are an attractive, low-cost alternative to nonstop flights offered by European and Asian carriers"³⁰.

	Africa	Latin America	Middle East	Europe	North America	Asia Pacific
Asia Pacific	8.7%	6.3%	7.5%	5.6%	4.8%	7.1%
North America	7.3%	5.3%	7.2%	4.8%	2.8%	
Europe	4.6%	4.6%	6.0%	4.1%		
Middle East	6.9%	-	6.0%			
Latin America	5.5%	7.1%				
Africa	5.7%					

Figure 4: Annual Airline traffic growth by world region

It is worthwhile noting that while the region as a whole has registered, and will continue, to register a 7% growth of passenger traffic per annum until 2029, the node of this growth is the Gulf rather than the Levant. "Over the next three decades, \$48 billion is committed to airport projects to significantly increase the number of passengers able to visit Dubai, Doha, Jeddah, Abu Dhabi, Cairo, Bahrain, Kuwait, and Muscat. In addition, the third greatest demand for new aircraft, by market value, will emanate from the United Arab Emirates, preceded by China and the U.S. respectively."³¹ One of the reasons why the Gulf region is the node for the upcoming three decade boom in the aviation industry is its catering for rapidly growing markets, especially the Southeast Asian market. Middle East carriers have gained significant market share, with a 64 percent capacity share between the Middle East and South Asia, a 68 percent share to Europe, a 77 percent share to Southeast Asia, and an 80 percent share to Africa. Figures 3 and 4 show annual traffic growth, and airline traffic growth rates by world region.

Expansion & planning activity levels at RHIA

In summer 2008, the congestion at RHIA warned of reaching current airport capacity estimated at 6 million passengers. This situation attracted policy-makers –and public opinions– attention to the salient issue of airport congestion. Capacity expansion to accommodate a growing number of passengers at RHIA was accounted for in the master plan for RHIA devised by Dar Al Handasah with Perkins & Will and Ricondo & Associate Inc in 1993³².

³⁰ Boeing Market Outlook 2010-2029, World Regions, Middle East

³¹ Ibid

³² Reference is made to the same study throughout this section

Figure 5: Passenger traffic by type at RHIA 2002-2009- Source: airport statistics

Figure 6: Trend in total passenger traffic at RHIA from 2002-2009- Source: Airport Statistics

The master plan's scope is to identify and define an airport facility expansion plan which balances passenger terminal- in other words the number of passengers which may be accommodated by RHIA-, airport and airline support services, with airfield capacity. The first task of the master plan involved identifying the preferred airfield expansion alternative, i.e. the shape, orientation and spacing of the runway which would, according to the plan: (1)

provide more airfield capacity to extend the life of the airport into the long term future, (2) achieve environmental (noise) goals, and (3) entail a relatively low capital cost.

A total of seven (7) airfield configuration alternatives have been identified, and filtered according to several criteria related to the expansion plans. Alternative 5, the Open-Vee concept ranked highest in terms of optimum airfield capacity provided for the optimum implementation cost. Unless the airport is relocated, the current capacity of the airfield in combination with the maximum number of passengers which may be processed by the airport support facilities – such as gates, terminal building, costumes, etc.- determines ultimate demand levels. By ultimate is meant “the maximum demand level which can be accommodated with a reasonable level of service given the defined capacity of the airfield”³³.

Although the master plan document points out to the difficulty of making predictions, forecasts of aviation activity offer some insight. Four planning activity levels were identified. Total numbers of annual passengers were calculated using aircraft operations and fleet mix. Cargo and mail forecasts were developed assuming that the 1974 levels of freight activity will be recovered by 1997, and that the growth thereafter will be consistent with the International Civil Aviation Authority expectations of freight for the region .Table 2 shows the projected activity planning levels.

As can be readily inferred from Table 2, RHIA is close to reaching its first planning activity level. Should there be no exogenous shocks to the Lebanese economy (e.g. a world fuel crisis, a war, etc...); level 4 is to be attained in 2031, 20 years from today. As per the 1993 master plan, the current airport may be expanded in terms of terminal building, aircraft gates, ground access system, and other airport & airline support facilities catering for each of the above planning levels, without adding a new runway.

Table 2: Yearly planning activity levels- Source: BIA master plan

	Level 1	Level 2	Level 3	Level 4
Year	2002	2012	2021	2031
Aircraft Operations	55,400	77,940	97,800	120,900
Passengers	6 million	9 million	12 million	16 million
Freight (tonnes)	140,400	214,500	288,600	362,700
Mail (tonnes)	3,745	6,425	9,100	11,780

In other words, if the 6 million planning level is reached, the airport may expand to accommodate up to 16 million passengers, thus filling almost all of the available current airport surface space. Technological advances in the past seventeen years render this estimate somewhat conservative. Transportation specialists asserted that RHIA’s capacity under current technological advances and shorter time intervals between inbound and outbound flights would reach up to 25 million passengers³⁴.

The annual capacity of 25 million passengers per year has to be reached before building any new runway is even considered. However, taking into account the dense urban fabric surrounding the airport, and the close to politically and financially impossible option of expropriating land around RHIA, a new runway configuration can only be built on reclaimed land in the sea. Excessively prohibitive costs rule this option out. If we are to assume that the new runway built in deeper sea level will require three times the amount of rubble required for the current half of the Open- Vee³⁵ , and that building the current

³³ P3-1

³⁴ LS, Interview with John Arnold, August 2010

³⁵ Approximation provided by Abdul Halim Jabr, architect, & planner, member of the 1993 master plan team

runway cost around USD 100 million³⁶ in 1993, then a new runway in the sea would cost USD 300 million in 1993 prices. This figure could substantially increase if adequate support facilities are to connect this runway to the rest of the airport.

SWOT analysis of RHIA

Beyond capacity constraints, table 3 is a SWOT analysis which summarizes the general status of RHIA. This analysis will be used to ensure that the proposed project options for the revival of RMA are complimentary with the activities and services at RHIA.

Table 3: SWOT analysis of RHIA- Source: authors' compilation

Strengths	Weaknesses
<ul style="list-style-type: none"> • Located 20 minutes away from Beirut's downtown • Has witnessed a sustained 20% increase in passenger traffic for the past 3 years 	<ul style="list-style-type: none"> • Ill-equipped to cater for cargo-transport • Access roads to it constantly congested
Opportunities	Threats
<ul style="list-style-type: none"> • Non-exploited transit passenger niche • Non-developed cargo services 	<ul style="list-style-type: none"> • Expected to hit capacity constraints in summer 2010 • Need investment in airport & airline support facilities to expand • Prohibitive expansion costs beyond 25 million passengers in 2031

Three scenarios pertaining to the future of RMA

Three scenarios pertaining to the future of RMA are proposed: a passenger airport, a cargo airport, and a safe-guarded public asset. For both the passenger airport and the cargo airport options, an overview of the local and regional market is provided, followed by an assessment of the demand level, an analysis in terms of costs of provision, and an evaluation based on the social benefit generated. The third option is a safeguarded public asset. It introduces the idea of public asset management, provides an overview of the market for industrial estates, analyses costs of provision, the option of financing through Public Private Partnerships (PPPs), and derived social benefits.

Option 1: A passenger airport

Overview of the passenger market locally and regionally

RHIA has one of the lowest volumes of passenger traffic in the region, despite an increasing number of tourists. Passenger traffic registered a 20% increase between 2008 & 2009, driven mainly by the number of incoming tourists reaching 1.8 million in 2009. Arab tourists accounted for 42.5% of the total, followed by 24.5%, from Europe, 14.3% from Asia 12.6% from America, and the rest from Oceania and Africa. This 20% is characteristic of a booming sector in a developing economy. A more sustainable growth rate is 8% per annum in the medium term, and 5% per annum in the longer term³⁷.

Despite the increase in overall passenger traffic, RHIA still serves as a point-to-point airport with a shrinking transit traffic share as shown in figure 7. After an initial increase between 2002 and 2004, the number of transit passengers dropped from 134,758 in 2004 to 32,600 in 2009. Two reasons explain this drop in transit traffic. First, political instability since the number of transit passengers has been on the wane since 2005, second strategic restructuring of MEA's business plan. Planning first to operate as a hub-and-spoke airline between Europe and the Middle East, the flag carrier increased the frequency of its flights in both directions, and enlarged its network. However, it became over-stretched and its small

³⁶ BIA master plan Table VIII-I: Costs by planning activity level

³⁷ Projections are based on an interview with John Arnold, and Boeing Market Outlook 2010

fleet could not be sustained over that large of a network. As such, MEA ended up losing its point-to-point customers such as Gulf nationals because of either too early or too late schedules in anticipation of a connecting flight. Today, MEA focuses mostly on origin-destination routes, and transit passengers are complementary.

Figure 7: Transit Passenger traffic at RHIA 2002-2009- Source: Airport Statistics

Jordan is currently expanding Queen Alia International Airport. Construction work is expected to be completed by 2011. As a result, the airport will be able handle about 9 million passengers. Cairo has also completed the expansion of its airport expected to handle 22 million passengers annually. Ataturk airport is facing severe capacity constraints. As such, traffic is diverted to Sabiha Gökçen International Airport, a secondary airport located on the Asian side of Istanbul, 55 km away from the Ataturk Airport. Sabiha Airport is surrounded with industrial and residential zones, and has a catchment area of 20 million people. Syria's aviation industry is witnessing similarly high growth rates. In 2008, an estimated 5 million passengers used Damascus International Airport. Work is also under way to improve the Damascus International Airport, including a US\$59 million upgrade of passenger facilities including a new state-of-the-art terminal expected to be completed in 2010, while an extensive renovation of the Deir El Zor Airport in the east of Syria was completed in early 2008. Aleppo International Airport is also another regional competitor with a capacity for 1.5 million passengers per year.

Figure 8: Passenger traffic and capacity millions of tones in selected airports regionally- Source: airport websites

Figure 8 illustrates current volumes and planned capacity at selected regional airports. Three points are worthwhile noting. First, expansion projects are either completed or underway in each of the international airports Queen Alia, Cairo Airport, and Damascus. In the case of Ataturk International Airport, traffic has been diverted to a secondary airport which is expected to handle 25 million passengers, thus adding up to a total capacity of 50 million passengers. Therefore, the absorptive capacity of competing regional airports is rapidly increasing. Second, RHIA may be expanded to accommodate at least up to 10 million additional passengers. Third, if aviation services at RMA are to be revived, the airport will face many challenges in facing mounting regional competition by established airports which offer better quality and more competitively prices services.

Demand market for additional passenger capacity in Lebanon

Estimating demand for RMA is a difficult task given the lack of reliable traffic statistics. Available mathematical models are more suited to forecasting traffic growth on operational airports rather than predicting demand at an airport with poor or no traffic history. In addition, it is not within the scope of this study to accurately forecast demand levels for RMA. Rather, this section applies theoretical models of airport travel forecasts to the case of RMA, in an attempt to understand who would be the potential airport users, and whether the demand level determined by these users justifies investment in airport infrastructure.

The neo-classical economic approach to forecast traffic demand is known as simple gravity models, where “air traffic between two points is proportional to the products of their populations and inversely proportional to the distance between them”³⁸. “The pattern and growth of demand on any route can be understood only by reference to the economic and demographic characteristics of the markets at either end of the route, and to the supply features of the air services provided of which price is the most important.”³⁹ Table 4 summarizes factors affecting airport travel forecast as defined by three different gravity models.

Table 4: Factors affecting demand at airports in three selected models- Source: Hoffmann, Jürjado and Ojala 2006

Author	Factors
Jorge Calderón (1997)	Income levels Number of inhabitants (and share of people with university degree) Distance to destination Competing airports in nearby cities Frequency of departures Load factors Aircraft size or technology (jet versus prop) Airfare
Graham (1999)	Population and its growth Access travel time Frequency of service to a particular destination Cost – the fare paid Aircraft size or technology Number of inhabitants in the spheres of influence of the departure and arrival cities
Strand (1999)	Average income in the same areas Average air fare Fastest surface transport alternative fare (except private car) Air travel time between city centers (not airports) Corresponding travel time for the fastest surface alternative

³⁸ Graham 1999, 286

³⁹ Graham 1999

The above three models stress the importance of the hinterland or catchment area of an airport as the main defining characteristic of airport demand. Many criticisms were made to these simple gravity models. Three at least are worth mentioning:

First, the definition (and estimation) of an airport's catchment area is not clear. "In general, a catchment area in a commercial sense can be defined as the area where regular customers originate from."⁴⁰The breadth of a catchment area varies between one and two hours driving distance from a given destination to the airport. Any city contained within the geographical boundary defined by this commuting distance could potentially be served by this airport. However, characteristics such as number of inhabitants, age brackets, population growth rates, average income of the respective catchment areas at both ends of a certain route are also important, and need to be calculated, in addition to accounting for the presence of other regional airports with an overlapping catchment area.

Second, these models tend to stress demand-side rather than supply-side factors. The literature points out to "at least seven supply-side factors which impact airport demand forecasts"⁴¹ of which five are relevant to our case (1) the creation of hub-and-spoke systems which have redefined the concept of catchment areas, whereby hub airports serve hinterlands which extend way beyond the catchment areas they are located in, (2) the importance of frequency of service as a major determinant for airport usage, (3) the complex structure of air fares as reflected by Frequent Flyer Programs and other loyalty packages for customer, (4) strategic airline alliances, whereby forecasts are not only a function of the airlines serving the airports, but also the alliance which may feed customers into its routes form multiple hub airports worldwide, (5) market entry by low-cost carriers, which are increasingly using hub airports rather than smaller regional airports because of generous incentive schemes offered at larger airports⁴².

Third, these models fail to properly account for the role of airlines in airport demand forecast. Since the industry's deregulation in the late seventies, airlines have played a major role in airport development.

When applied to the case of RMA, these models point out to the following. First, without providing accurate measures of RMA's catchment area, we know that the wealthiest 1.5 million Lebanese citizens live in metropolitan Beirut. The remaining 2 million are spread across the Lebanese territory with the governorate of Akkar and North Lebanese being the poorest of the country. Therefore, real demand in RMA's catchment area is low because the income level of this area's dwellers. Second, defining a catchment area in Lebanon is a complex exercise which rests on a different set of social and political assumptions. Most of metropolitan Beirut's inhabitants are not originally from the areas they live in, and might for example have houses in the northern governorate and Akkar. Third, demand levels at RMA will depend in the destinations served from the airport, and whether these destinations are more frequently and cheaply serviced through RHIA. Finally, the catchment area of RHIA and that of RMA overlap. As such air travelers have to choose between RMA and RHIA.

As detailed in the literature⁴³, air travelers' choice in multiple airport regions is defined by: (1) access travel time; (2) frequency of service to a particular destination; and (3) cost defined as the price of airfare. In terms of access travel time, RHIA is a maximum of two hours drive from any point in the country. As such, theoretically, any point within the Lebanese territory lies within RHIA's catchment area. Commuting from Tripoli to RMA is of course cheaper in terms of time and cost than commuting from Tripoli to RHIA, but the monetary and time costs saved to access the airport would probably be offset by the number of destinations serviced by RMA (at least in its start-up phase, and surely the frequency of flights offered to various destinations). Established airports always enjoy a higher flight frequency than

⁴⁰ Hoffmann, Jürjido and Ojala 2006

⁴¹ Graham 1999

⁴² Behen 2004

⁴³ See Ishii, Sunyoung, Van Dender 2009, Loo 2008, and Graham 1999

newcomers. Number and frequency of destinations, as well as access time would ultimately be reflected in the fare paid at each airport. Before turning into the determinants of air fares and other airport related costs, and after the application of the theoretical models to the case of RMA, we can safely say that RHIA is better positioned to satisfy air travelers' demand in Lebanon. As long as the airport is operating below capacity, traffic will not be diverted to other destination airports since it would be cheaper to fly through, and offer services at RHIA.

Costs of provision and derived social benefits:

This section outlines the investments needed before RMA can be used for scheduled passenger flights. Like the previous section, it does not give accurate estimates of the size of the investment, but rather analyses the cost implications of making RMA operational.

Investments in airports of any size are usually divided into 5 categories: land development, airside facilities, landside facilities, support facilities and operating expenses. Table 5 provides an overview of these costs, with rough estimates of each cost category when available. The landside, airside and support facility estimates were obtained from the Parsons Brinckerhoff Quleaat and Rayak Airports Technical Memorandum Two: Conditions and Options Report (1998); all estimates are based on the least costly alternative 3, which proposes reuse of most military facilities for civil aviation, and are in 1998 prices. The operating costs were obtained from the Project Feasibility Study of the Navi Mumbai International Airport prepared by The Louis Berger Group Inc (2010), these estimates are based on international benchmarks in the airport industry. The land reclamation cost is based on estimates provided in the Tripoli Transportation Master Plan by Solh Design Workshop (2005).

The total amount of USD \$24,530,000 shown in table 5 is of course greatly underestimated. Apart from all unavailable costs estimates and the fact that all estimates are based on 1997 prices, missing from this table are:

- (1) costs of relocating the military base from RMA should the airport be used for civil aviation
- (2) costs of off-site infrastructure to improve the airport's access time
- (3) subsidies which would be offered to airlines in the start-up phases on the project.

The literature indicates that in the start-up phases of regional airports, airports offer airlines (especially low-cost airlines) subsidies up to USD \$130,000 per destination per year, in addition to other incentives such as lower airport landing and handling fees⁴⁴.

Regardless of the exact size of investment necessary for the development of RMA, "the key issue is how investment costs affect passenger charges and thereby air ticket prices, as too high prices may reduce the passenger demand considerably, especially in the price sensitive market segments such as tourists and private persons"⁴⁵ which arguably account for the bulk of potential RMA users. Therefore, at small airports in their start-up phases, governments and municipal authorities have to almost always subsidize air travel both for air travelers and airlines, thereby failing to derive the expected social benefit from investment in airport infrastructure; that of bringing down the generalized cost of travel for both consumers and producers.

As long as RHIA is not congested, and offers better quality, cheaper and more frequent flights, at a relatively shorter travel access time, air travelers' choice would be restricted to RHIA. With MEA's ending monopoly in 2011, and subsequent deregulation of the Lebanese aviation industry, the breadth of services offered at competitive prices will increase even more at RHIA, thus satisfying the condition of offering air travel at minimum generalized cost to producers and consumers alike. This analysis shows that a passenger only airport is not a sustainable option for the revival of RMA, and should thus be disregarded.

⁴⁴ See Behnen 2004, J. Gardiner et al 2005, Hoffmann, Jürriado and Ojala, 2006.

⁴⁵ Hoffmann, Jürriado and Ojala 2006, 115.

Table 5: Available estimates of cost of provision of a passenger only airport- Source: compiled by authors from Parsons Brinckhof, Louis Berger Group, 2010, & Hoffmann et. al 2006

Cost category	Description	Estimate (if available)
Land Development	Reclamation cost for airport expansion is at an average of USD \$10/sq.m. for the surrounding 500,000sqm land to the north east of the terminal	5,000,000
	Drainage	1,570,000
Airsides facilities	Runway: rehabilitation and reuse of current facility	1,845,000
	Instrument Landing System	n/a
	Airfield Lighting	n/a
	Taxiway: rehabilitation and reuse of current facility	1,160,000
	Apron: rehabilitation and reuse of current facility	250,000
	Perimeter Fence: new fence	n/a
Landside facilities	Perimeter Road: rehabilitation	n/a
	Airport access roads: rehabilitation	n/a
	Parking spaces: new facility	n/a
	Terminal building including check-in areas, security screening and border checkpoints, waiting lounges, baggage claim area, public spaces, concession spaces, administration offices (estimate is based on the conversion of the current military reception and officers club to a small passenger terminal)	420,000
Support facilities	Fuel farm: new facility	2,000,000
	Power plant: new facility	500,000
	Rescue and fire fighting: rehabilitation and reuse of current facility	2,500,000
	Meteorological office: rehabilitation and reuse of current facility	226,000
	Traffic control tower: rehabilitation and reuse of current facility	1,300,000
	Maintenance workshops: rehabilitation and reuse of current facility	n/a
	Equipment	6,200,000
Operating	Utilities	1,559,000
	Repairs and maintenance of pavements	0.6% of asset value per year
	Repairs and maintenance of structures and buildings	1.2% of asset value per year
	Repairs and maintenance of equipments	7.50% of asset value per year
	Personel (managers, engineers/professionals, supervisors, technicians/assistants, workers/secretaries)	30% of passenger volume
	Insurance premium	0.23% of terminal asset value per year
Total	Based on available estimates in 1998 prices	24,530,000.00

Option 2: A cargo hub

Overview of the cargo market locally and regionally

The total annual cargo volume handed at RHIA currently stands at 85,000 Tons. This represents 5% and 30% of the cargo handled by Dubai Airport, and Cairo airport respectively (figure 9).

Figure 9: Cargo handled by selected airports regionally and internationally in 2009 Source: Airport websites

Figure 10: Cargo Volume handled at the BIA 2000-2009- Source: Central Administration for Statistics/Lebanon Civil Aviation Authority

The cargo volume at RHIA was stagnant between 2001 and 2007. However, a 26% growth rate was witnessed over the past 3 years as shown in figure 10. Cargo handled at RHIA caters mostly for imported products (70% of the total cargo volume) destined to the local market. Transit traffic is almost inexistent.

Cargo handling was severely disrupted during the war, and little effort was exerted to recapture the pre-war market share especially by the flag carrier. Discussions with MEA as well as the Civil Aviation Authority confirmed that RHIA is not on the world map of cargo destinations, and cargo services constitute a side business for MEA. In addition, the airport lacks a sufficient amount of storage areas including for example cold storage areas for perishable goods. Other support facilities which enable the processing of cargo such as

inspection, triage, etc... are also absent. Dedicated cargo airlines operating at the airport carry only 1% of the total imports and exports and the majority of goods travel as belly-hold cargo. CargoLux is the only dedicated cargo airline currently operating in the airport, and TMA plans to re-launch its cargo operations in the near future⁴⁶. Transportation experts⁴⁷ indicate that lack of business interest is the only impediment to offering quality cargo services at RHIA, rather than logistical constraints.

Queen Alia airport has also negligible transit cargo traffic but this might change with the Jordanian Government's plan to turn the airport into a hub by 2011. As for Ataturk airport, there is no clear data on the percentage of cargo traffic that is destined for transit; however cargo traffic has been increasing at double digit rate for the last few years. The Asian market including Hong-Kong, Lahore and Singapore, is a main cargo destination and is serviced by the ACT Airline.

Dubai airport on the other hand is a key cargo hub for international markets. Transshipment in Dubai airport accounts for approximately 50% of the total cargo volume. The airport has been playing an important role, catering to the increasing demand for foodstuff, high technology equipment and luxury products in Gulf countries. In addition, it reaches an "outlying ring" of huge markets including East African countries, Iran and the Indian sub-continent. The airport's success is due in large part to the national flag carrier Emirates Airlines. With its recent ordering of 58 of the 555-seater Airbus A380, Emirates Airlines is the largest buyer of aircrafts in the Middle East, and is planning to double its all wide body fleet in 2012. With these new acquisitions, Emirates Airlines will be the world's largest long-haul carrier⁴⁸. Its fleet of wide-body long-haul carriers is also the core of its belly-hold cargo business with a capacity of 10 tons per carrier. A mix of domestically originating cargo –most of which is assembled in the cargo village- is combined with transit demand to cover underserved destinations with frequent flights thereby minimizing total transit time and costs.

Demand market for additional cargo capacity in Lebanon

Similarly to the analysis for the passenger option, this paragraph does not give accurate estimates of RMA's market share as a cargo hub. Rather, it makes logical assumptions and infers from available information and the regional context the potential demand for RMA should it be transformed into a cargo hub.

Inbound and outbound air cargo traffic can be divided into the following segments⁴⁹:

- Scheduled domestic
- Scheduled international
- Charter domestic
- Charter international
- International integrator
- Domestic integrator (non-existent)
- International RFS
- Domestic RFS

Scheduled cargo is belly-hold cargo, and as such is inseparable from scheduled passenger services. Belly-hold cargo may be transported in narrow body aircrafts with capacity up to 3 tons or wide-body aircraft with capacity up to 10 tons. Charter cargo is carried in air freighters with capacity ranging between 50 to 100 tones. International integrators are companies such as FedEx, DHL, TNT, etc... which offer out of one hand all the services provided by forwards, transportation companies, custom brokers and airlines. "A Road Feeder Service (RFS) is a truck which substitutes a flight. This transportation mode is especially popular in Europe, where the RFS is organized by an airline, while the operation is

⁴⁶ LS, Interview with Mazen Bisat, April 2010

⁴⁷ Interview with John Arnold, August 2010

⁴⁸ Vespermann et al.2009, 389

⁴⁹ Lufthansa Consulting 2009, 10

done by forwarding or trucking companies. The RFS operates under a real flight number, is defined by origin and destination and certain “on” and “off-block” times. Even the Airway Bills (AWB) show the “truck flight number” and the exact origin and destination.”⁵⁰ Whatever cargo category they fall into, goods typically shipped by air can be classified into 6 categories as shown in table 6.

Table 6: Types of goods shipped by air- Source: Authors’ compilation

High value products	Cyclical/seasonal & fast selling products	High product obsolescence	Critical products	Time sensitive commodities	Perishable products
Jewelry luxury automobiles race horses	toys, fashion clothing, electronics, ICT, light engineering,	products that constantly lose value in the distribution channels such as cellular, laptops, software	Just-in-time shipments, pharmaceutic als , medical equipment & supplies, emergency parts	magazines, news papers, express & courier (mail)	perishable food, fresh food, frozen food, floral stock (bulbs, tubers, cuttings etc), live trees & plants, herbs & organic products, dairy products semi- processed vegetables, sweets, chocolates, meat products, seafood, etc...

RMA projected cargo traffic volume is either domestic or transit. Domestically, Lebanon currently exports 22,800 tons of cargo by air for a total value of US\$1,460 million making only 2% of total Lebanese exports. Most of Lebanon’s goods are exported by land (60%) through Abboudieh and Masnaa border crossings, followed by 38% by sea. Destination markets for air cargo are Europe, and some Arab countries. Products exported by air, currently though RHIA, are shown in figure 11. As for Lebanon’s import profile, 93% is imported by sea, 6% by land, and only 1% by air. These numbers show that the local market is the end destination of most of our imports, with very little products transshipped/redistributed to regional markets.

Figure 11: Products typically exported by air

Agriculture is the key economic activity in the North and employs 30% of the population. The North is the 2nd largest producer of agricultural goods in the Caza of Akkar. Its products make up to 29% of Lebanon’s total production. Production and export data, at the Caza level, are not available; therefore, an overview of the agricultural production and exports are provided at the Mohafaza level. Figure 12 shows the types of agricultural goods produced in North Lebanon.

⁵⁰ Lufthansa Consulting 2009, 18

44% of IDAL's exports are generated from North Lebanon. Destination markets are Syria (28%), Saudi Arabia (24%), Kuwait (23%), United Arab Emirates (8%) and Egypt (4%). Exports to Europe accounted only for 2% of total exports. These figures include exports by sea and air. More detailed figures are not available. Figure 13 shows the type of exported products.

Figure 12: Types of agricultural goods produced in North Lebanon

Figure 13: Products exported from North Lebanon by sea & air

The agriculture sector in Akkar thus forms the main source of perishable goods for the air cargo traffic. Added to the fact that these products are still noncompetitive on the international market due to the lack of modern technologies and the poor quality of the final products, statistics by the International Air Transport Association (IATA) have shown that perishable goods constitute a negligible percentage of air cargo traffic worldwide. With technological advances, containers with controlled environments (nutrients, gases and temperature) are now used to transport perishable product by sea and land rather than air, which is but far the most expensive mode of transportation. The above analysis of the local production, import and export profiles shows that domestic air cargo is negligible and currently produced volume may be accommodated through RHIA.

For transit goods, uplift capacity is the most important determinant. Preliminary feasibility studies for air cargo hubs⁵¹ have shown that air cargo traffic relies on scheduled, frequent passenger services in hub-and-spoke as well as in point-to-point traffic. As such, if an airport suffers from a lack of scheduled uplift capacity and the volume of transported cargo relies almost entirely on charter flights, the airport will be not recognized as a cargo airport by either forwarders or shippers. Therefore, in the absence of a passenger airport with scheduled passenger flights and a sufficient passenger flow to sustain the use of wide body aircrafts serving multiple destinations (such as Dubai Airport and Emirates Airlines for example), demand for RMA is not enough to sustain air cargo operations.

In addition to the above analysis, international experiences and literature on all cargo airports points out to several challenges regarding this option.

First, attracting sufficient cargo volume to sustain the operations of an all-cargo airport is difficult to achieve in most countries. A good indicator for potential traffic volume which may be attracted to a cargo airport is throughput.

“Throughput is the total traffic volume at an airport. This is an important determinant in explaining the transshipment location choice in two ways. First, traffic volume increases with the market size in an airport’s catchment area, and thereby more flights to meet the demand. Secondly, the throughput size can be used as a proxy for the size of hinterland demand thus serves as a good indicator of the attractiveness of the adjacent city or region as a global or regional transport and logistics hub. This is referred to as agglomeration effect in economic geography literature such as Fujita and Mori (1996), Krugman (1993), and Mori and Nishikimi (2002).⁵²”

Although we have not calculated a throughput for RMA, we expect this throughput to be small because of the size of the local market, and because regional markets are serviced by their own airports currently expanding into cargo hubs, e.g. Cario airport, Ataturk airport and Queen Alia International Airport.

Second, as mentioned by the same author,

“Air cargo business is inherently competitive. This is because most cargo, except for emergency cargo, is indifferent to the routings from its origin to its destination. A shipper is not concerned whether a shipment goes from New York to Kuala Lumpur via Tokyo, Shanghai, or Hong Kong as a transshipment point, provided that the shipment arrives at Kuala Lumpur within the expected time. Thus, in most cases, a freight forwarder would choose among numerous routings and carriers to move their cargo to the final destination. Therefore, there is more competition among airports for transshipment cargo than for passengers.”

As such, even if a sufficient traffic volume is attracted, competing in terms of services and prices with other regional hubs will be challenging especially if there are no economies of scale to price competitively.

Third, Cidell, 2003 notes that the all-cargo airport is usually:

“meant to supplement a metropolitan area’s existing airport(s) with one that handles only cargo flights, or that creates a new cargo “hub” in a region that did not previously have one. More airports of this type have been proposed than have been established successfully, whether due to lack of ground transportation connections or lack of interest on the part of freight companies. All of the cargo conversions that have actually taken place have been within large metropolitan areas but outside the central city, largely serving to relieve congestion at existing major commercial airports.”

⁵¹ Lufthansa Consulting, 2009

⁵² Ohashi et al. 2005

If we assume the Lebanese coast to be one metropolitan area, than an all-cargo airport would be meant to relieve pressure off RHIA. Since RHIA is not yet congested neither in terms of passenger capacity nor in terms of cargo services this option becomes obsolete.

Cost of provision and derived social benefits

Not only is the demand level for a cargo airport in Qulay'at negligible, but also the necessary investment to make such a facility operational in our case, outweighs by far the benefit derived from having it. In fact, other than the rough estimates necessary to operate scheduled passenger flights from RMA, the following investments are necessary on the micro and macro-levels⁵³.

On the micro-level:

- First, developing air cargo related facilities. At present RMA lacks specific cargo handling and storage facilities. The ability to handle cargo is non-existent and services should be conceived and built in line with international handling practices. The establishment of a modern, efficient air cargo terminal to accommodate general and special cargo (e.g. perishables, valuable cargo) with supporting facilities (e.g. for forwarders and logistical service providers) would be a major step for RMA to become an operational air cargo hub. Other facilities such as a cargo village are also necessary in the long term.
- Second, marketing and air service development initiatives should be implemented to increase uplift capacity at RMA. A mix of cargo dedicated charter flights with scheduled passenger flights are required in the long run to sustain cargo operations. These development initiatives are in the form of subsidies to airlines.

On the macro-level:

- First embedding the airport in a multimodal logistical platform to enhance the connectivity of the airport with its destinations markets in necessary. This multimodal platform includes: Tripoli Port, the highway network and the potential railway link.
- Second a business stimulus package should be designed and provided to encourage local production, be it light manufacturing or agro-food industries. Incentives in the form of forgone taxes, access to credit facilities, etc... should be offered to local entrepreneurs to induce business development. Potentially, companies would also be attracted to set up shops in the vicinity of the airport and may thus generate air cargo.

As has become clear from the above analysis such investments are not justified by the potential demand. In the absence of scheduled passenger flights and the possibility of handling belly-hold cargo, and in the presence of excessively high costs, cargo services will be need to be heavily subsidized to become commercially viable. In the absence of government subsidies – and most probably despite their presence- turning RMA into a cargo hub is not a viable option.

Option 3: A safeguarded public asset

Public asset management

This option argues for the safeguarding the RMA as an important public asset, that could become operational twenty years from today, when RHIA becomes congested and the costs of its expansion prohibitive. RMA could become the country's main or second airport, fulfilling a crucial role in the country's aviation policy. So how can the Lebanese Government safeguard this asset?

A first step is to expropriate lands in the vicinity of the airport, in anticipation to its future expansion. According to the pre-feasibility study for the Tripoli Special Economic Zone⁵⁴, the

⁵³ For a detailed description of these requirements refer to Lufthansa Consulting, 2009

⁵⁴ Sibley International, forthcoming

land absorption rate in the vicinity of RMA, covering up an area with a total of 3,000,000 square meters, ranges between USD \$25 and USD \$40 per square meter.

According to the same study, a total amount ranging between USD \$75 and \$120 million is necessary to expropriate the equivalent of 3,000,000 square meters of land east and west of RMA. This government investment will not be frozen awaiting the reactivation of aviation services at RMA. Instead, we propose to use part of this strategically located site (proximity to RMA and Syrian border) as “Industrial Estates” (IEs), or a future Special Economic Zone thus ensuring a return on government investment.

Overview of the market for industrial estates (IEs)

“An Industrial Estate (IE) is a self-contained geographical area with high quality infrastructure facilities, which house businesses of an industrial nature. An industrial estate is administered or managed by a single authority that has a defined jurisdiction with respect to tenant companies. The authority makes provisions for operation and management; enforcing restrictions on tenants and planning with respect to lot sizes, access and utilities. The IEs offer industrial [...] areas with developed plots pre-built factories, power, telecom, water, sanitation and other civic amenities such as hospital, sewerage and drainage facilities, security etc. The main targets of Industrial Estates are the high value adding small and medium scale industries, which do not have the wherewithal to invest in developing their own basic infrastructure facilities, but have the capacity to pay for the services provided to them.”⁵⁵

Not only are IEs a means to safeguard RMA airport, but also respond to a dire need among northern entrepreneurs for affordable serviced lands. Interviews and personal communications with entrepreneurs⁵⁶ uncovered their difficulties in expanding within cities such as Tripoli, facing increasing land values due to competing residential uses. Not only are cities too expensive to accommodate industries, but poor infrastructure constantly brings up the costs of production. Entrepreneurs complain about exorbitant electricity prices, which they have to supplement with personal generators to run entire factories. When available, facilities such as broadband internet, suitable sewage and drainage systems are built at the entrepreneur’s own expenses usually in areas outside congested cities. While some entrepreneur’s economies of scale allow them to relocate to better serviced facilities built at their own costs, many cannot afford such investments on their own, but are willing to pay for the provision of these services.

Although we are unable to evaluate the costs of serviced land per square meter, we understand that the cost implications of IEs on the government are crucial to the viability of the project. To this end, we draw on regional experiences of IEs, specifically in Jordan and Egypt.

Costs of provision, Public Private Partnerships (PPPs), and derived social benefits:

In Jordan, some IEs are under the government’s full authority, while others are built, managed and operated under Public Private Partnership (PPP) agreements⁵⁷. A coordinating body known as the “Jordan Industrial Estates Cooperation” purchases lands, build on purchased lots, organizes land use planning and zoning, performs all management and maintenance inside the zone, puts together all policies and regulations related to sale and lease of land, as well as negotiates sales and lease agreement with interested investors. The PBI Aqaba Industrial Estate LLP (PBI Aqaba)⁵⁸ is an example of IE planned, financed, developed and marketed by Parsons Brinckerhoff International (PBI), a US-based civil engineering company, and SUTA Construction, a Turkish land development company. The estate will be and operated by the same companies for a 30 years concession period. The sale price of undeveloped land is USD \$40,000 per denum (USD \$40 per square meter), while the rental price is USD \$5,000 per denum (USD \$5 per square meter) per year.

⁵⁵ PriceWaterHouse Coopers

⁵⁶ Salman, 2009

⁵⁷ Jordan Industrial Estates Cooperation, 1999

⁵⁸ Aqaba International Industrial Estate

Buildings sell for \$250 per square meter, including cost of land, and the building rental price \$25 per meter square per year, for a standard building including cost of land.

In Egypt, donors are pushing the government to enter into PPP agreements with the private sector if its aims at building sustainable IEs⁵⁹. Not only will partnerships with the private sector eliminate problems of inefficiency in allocating scarce resources –such as prime serviced industrial lands- but it would also relieve the national treasury. Several PPP models are provided with a varying mix of public-private involvement across a wide spectrum. Figure 14 illustrates these possibilities. Whatever public-private mix is aimed for the establishment of IEs, the Lebanese case warrants a warning. Given that IEs have never been built in Lebanon, and as such the risks and uncertainties of investment still unknown, attracting private developers is likely only if the government provides some guarantees. For example, if a developer invests in the hope for 10% returns on his investment in the first year, and ends up achieving only 6%, the government would commit to subsidize the project by covering the remaining 4%, at least in the project’s start-up phase⁶⁰.

While most zones managed under PPP agreements tend to range between 40 and 80 hectares (400,000 to 800,000 square meters), “this would be insufficient reason to declare an “optimum” size for a PPP transaction”. Too small of a size might not be sustain the required economies of scale, and too big of a size might create negative externalities that deter private investors. Ultimately, investors’ interests in developing a site are a function of its location, and most importantly demand for it. When investing in a site, private developers will also pay attention to expansion potential, to accommodate future growth.

Although the pre-feasibility study does not give estimates for the rental and sales price of both undeveloped and undeveloped lands, it indicates that “investors cite access to high quality land as among the most challenging constraints on their growth” and are willing to “pay market prices for industrial land in the right location and infrastructure to meet their needs.” As mentioned earlier, the same remarks resonated among Lebanese industrialists and entrepreneurs.

The model proposed in this pre-feasibility study for the establishment of an Industrial Zone in Alexandria is identical to that of the Tripoli Special Economic Zone (TSEZ) and enjoys the support of multiple international donors for both planning and implementation phases. The aim of these zones is of course to attract foreign investors with a handsome package of subsidies in the form of tax breaks and free imports. The model according to which IEs are proposed to function here is different.

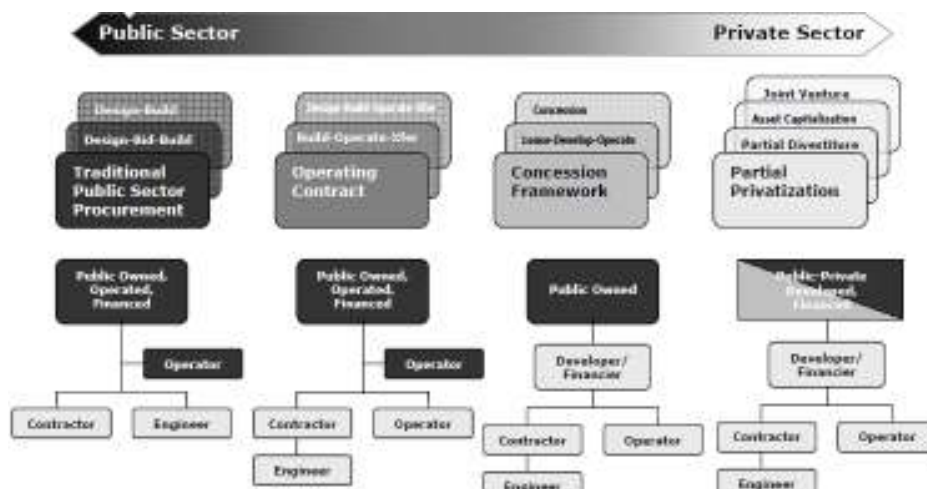


Figure 14: A spectrum of PPP models for IEs in the vicinity of RMA. Source: FIAS, 2007

⁵⁹ Reference is made throughout this paragraph to FIAS, 2007

⁶⁰ S.A. personal communication with international expert, October 2010

The ultimate aim of these IEs is to safeguard a public asset; that is to safeguard RMA. Instead of expropriating land and leaving it idle until the need for a second airport arises, the aim is to guarantee some sort of revenues on this investment, keeping in mind the welfare implications for the northern governorate. Therefore, the medium term goal is to provide industrial estates for Lebanese entrepreneurs and industrialists yearning for serviced land to accommodate the growth of their businesses. In fact, entrepreneurs have reported that a free-zone status would not be the main attraction to relocate to Quley'at but rather state of the art infrastructure and services⁶¹. Most importantly, any government subsidies to support this project would favor support for Lebanese investors rather than foreign investors. In fact, if local capital is available and businesses are thriving in the host country, supporting foreign investors to locate in enclave structures such as special economic zones has been highly criticized in the literature⁶².

Conclusion

This report was developed in response to growing interest in the revival of aviation services at Rene Mo'awad Airport in Quley'at. The report assesses whether the revival of aviation services for goods and passengers at RMA is a "viable" transportation policy option, bringing down the generalized cost of travel for suppliers and consumers alike. Drawing on international experiences of primary and secondary airports, the history of the aviation industry in Lebanon as well as the socio-economic status of the northern governorate, the report proposes three scenarios pertaining to the future of RMA: a passenger only airport, a cargo only airport, and a safeguarded public asset.

The analysis shows that demand levels associated with each of the passenger airport, and the cargo airport options do not justify the size of government investments necessary to make the airport operational for either type of uses. The aim of reducing the generalized cost of travel both to suppliers and consumers is not met, as such investment in the airport as air transport infrastructure is "not viable" as a policy option from a transport point of view.

Despite current absence of demand capable of sustaining an operational secondary airport, the objective is to ensure that this valuable public asset does not slip into dereliction. As such, this report calls for a strategy to safeguard RMA. It proposes the expropriation of lands in the vicinity of RMA, and the earmarking of a share of land for serviced industrial estates (IEs) or Special Economic Zones (SEZs). IEs or SEZs would respond to growing demands by Lebanese industrialists and investors yearning for accessible, serviced land to accommodate the growth of their industries. This third option would not only have positive welfare effects on the region's economy, but help preserve RMA. It is only a matter of fifteen to twenty years until the need for a secondary airport in Lebanon arises.

⁶¹ S.A. personal communication with entrepreneur in the furniture sector, November 2010

⁶² Jayanthakumaran, 2003, Warr 1989, Radelet, 1999, Radelet, Sachs, Cook 1999

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