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## Multi-Airport System as a Way of Sustainability for Airport Development: Evidence from an Italian Case Study

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### Abstract

Airports need to find a way to overcome economic, financial and infrastructural problems in a coherent attempt of definition of a conceptual framework of the airport business as a whole. In this context, an increasing relevance has the model of Multi-Airport System (MAS).

The research uses case study analysis approach. More in details, business and technical data accounted from “Puglia’s airports” have been considered.

Main findings seems to demonstrate that the basic hypothesis, according to which a well-structured multi-airport system can contribute significantly to infrastructure management and development, is valid only if it is supported by a coordinated managerial approach.

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Keywords: multi-airport network; competitiveness; infrastructure design policy; corporate strategy.

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## 1. Introduction

In recent years, many studies (Percoco, 2010; Siciliano and Zucchetti, 2006; Senn and Zucchetti, 2001) have defined airport business activities as not limited to merely infrastructure characteristics or economic activities but rather able to play a crucial role in increasing territorial competitiveness. Therefore, airports can generate economic and social value on two different sides: as a business activity, as infrastructure for the development of the regional economy.

Furthermore, other studies (Baccelli and Zucchetti, 2001) have shown how a specific linkage exists between territorial competitiveness and determinate airport system models.

Certainly, on the aggregate demand side, greater competition between airport services offered in adjacent geographical areas can exert a multiplier effect on a territory through secondary and tertiary multiplier effects (Graham, 2003). At the same time, regions that are experiencing increasing economic growth in sectors such as tourism are those in which more competitive airport services are localized.

Basically, then, in the airport system management one must balance two key objectives. The first, from a business point of view, is related to the corporate features of the various companies that operate in the airport, and refers to the consequent economic results which will ensure their financial sustainability over the long term. The second refers, from a planning point of view, to airport development in terms of infrastructure – both airside and landside - investments and maintenance in order to shape travel demand and air companies policy.

## 2. Background

On the basis of these previous considerations it is possible to better understand the impact of the transportation industry in its relative territorial development. During the last few years – taking into consideration sectorial regulatory changes (Oum, 1998) – which generated a transition from positioning airports solely as public utilities towards private enterprises that offer airside and additional ancillary services (Gillen, 2011) – some Scholars (Forsyth, Niemeier and Wolf, 2011), have focused their attention on the topic of airport company management.

In this context, the configuration of a multi-airport system (MAS) seems to represent a potential key element for local competitiveness. In effect, the MAS could be a model for this particularly interesting industry because it offers the possibility of achieving a fine balance between social and economical goals. In this way, the analysis of a MAS can be conducted, at least, under two different strategic points of view: financial-economic and infrastructural-planning issues.

According to de Neufville (1995), MAS is “the set of airports that serve the traffic of a metropolitan area”. For example, the MAS in London is formed, in addition to Heathrow, Gatwick and Stansted airports, which are under the ownership and management of the British Airport Authority (BAA), also by the independent Luton Airport.

A MAS, consistent with the definition cited above, is also defined as “the set of two or more major airports that serve commercial traffic within a metropolitan region” (Bonnefoy, 2010). According to these definitions, the crucial element in defining a multi-airport system is that of the territory it represents. Instead, in this paper a managerial approach is developed in order to highlight the importance that companies’ ownership and management can play in the identification of a multi-airport system.

The definitions provided by literature, focusing only on the territorial aspect and considering generally all airports located in a more or less large geographical area, is not adequate in describing the real configuration of a MAS. These definitions cannot be accepted without the correct consideration of all aspects relating to the management of the system.

In this sense, Gillen (2011), by examining the management structures of different airports, emphasize the differences existing between multi-airport companies and strategic airport alliances. They argue that the creation

of a multi-airport company generates a centralized management structure in which a hierarchical decision making process for all of the merged companies takes place. In contrast, in the case of an alliance, partners coordinate their strategies while remaining independent. This decision-making process integral to an alliance is decentralized in the sense that all partners decide on their operations but guarantee to each other to take into account the consequences of their decisions. In other words, they state that a multi-airport system exists where “companies which involve common ownership of a number of airports, or cases in which an airport has the majority of shares, or at least a strategic minority holding, in other airports”.

Thus, a preliminary attempt at classification of the different multi-airport system might be accomplished by considering both the geographical aspect (metropolitan or regional) and managerial integration (Table1).

Table 1 – A preliminary classification of the multi-airport system

<b>Managerial integration</b>	<i>High</i>	<b>I</b>	<b>II</b>
	<i>Low</i>	<b>III</b>	<b>IV</b>
		<i>Regional</i>	<i>Metropolitan</i>
<b>Geographical area</b>			

In this way, we obtain different MAS: some of these are characterized by a high level of managerial integration existing between airports (I and II), while in the others, MAS airports are not involved in a high level of managerial integration and lacking, therefore, any organizational concept of coordination.

This fact refers to a set of airports that share a “common strategic plan” – regardless of ownership or control relationships – as a result of a voluntary process of business strategy definition. The following Table 2 shows a further elaboration of the first classification by encompassing both ownership management and strategic planning integration or differentiation.

In this context, the impact of government regulatory agencies that might impose unifying constraints on different management systems should be considered.

Table 2 – Second classification of the multi-airport system

<b>Ownership and management</b>	<i>Integrated</i>	<b>I</b>	<b>II</b>
	<i>Differentiated</i>	<b>III</b>	<b>IV</b>
		<i>Integrated</i>	<i>Differentiated</i>
<b>Strategic planning</b>			

The table shows how that there are some cases in which several airports – with shared common ownership and management – adopt integrated strategic planning and follow a consistent and shared objective (I) or, other airports that despite integrated ownership and management, each single airport defines and follows differentiated strategies (II).

In the other cases – characterized by differentiated ownership and management – regional or metropolitan airports define and follow, through more or less formal agreements, either shared strategies (III) or independent and single strategic planning (IV).

The case of a multi-airport system according to this hypothesis seems to be a specific example of a well-functioning network. About infrastructure planning development, MAS typology can affect quality of investment and their time allocation. In other words, airport infrastructure design and management depending by ownership strategy can be extremely different if airport company be competing against one another in the same region.

Martin and Voltes (2011) compared the different levels of efficiency that are found in MAS to the point where airport’s services were aggregated. Because the results indicate the presence of a non-exhausted “economies of

scale” at the current levels of production, they conclude that the “atomization” of air traffic increases operating costs at a system level.

Vaishnav study’s (2011), concerning Essential Air Service (EAS), provides insights into policy changes that address the importance of small airports and rural air connectivity.

Curi et al. (2011) evaluate the efficiency of Italian airports by analyzing the production process from two perspectives: technical and financial. An airport, in fact, could be considered “as a multi-product firm, where disparate elements and activities are brought together to facilitate, for passengers/customers and freight, an interchange between air and surface transport”. In their study, they state that airport dimension is not necessarily critical in creating differences in operational efficiency in Italian airports and assume, instead, greater weight when the business is considered as a whole.

In synthesis, as shown also in the Portuguese experience (Marques, 2011), the research results demonstrate how, especially for the existing small airports, the creation of an airport network through reduction of overlapping services can promote widespread and non-centralized regional development.

### 3. Aims, Hypothesis and Methodology

In this study we seek to understand if, and under which conditions, a multi-airport system might be implemented to sustain the long-lasting competitiveness both at a business and infrastructural level. Where this positive outcome is achieved we seek to determine what role was played by managers and technicians.

The analysis utilizes data resulting from the experience of Puglia’s airports. These operations represent interesting “laboratories” for data information implemented by adopting the framework of local development policies defined by European Union funding.

The basic hypothesis of the study is that a well-organized multi-airport system can contribute to sustain both business development and infrastructural planning. What supposed is true under the condition that the MAS is supported by the definition of specific and effective coordinated managerial approaches aimed at improving the correct functioning of airport activities. In this sense, the related hypothesis is that the implementation of an efficient multi-airport system can be useful:

- to overcome economic and financial issues related to the airport business;
- to direct toward sustainable design and planning of the airport infrastructures.

The methodological approach used is the case study analysis (Yin, 1994).

In the selection of case studies for this research project, we have used a non probabilistic (judgemental), sampling technique. We also utilized so-called “purposive sampling”, often used to obtain illustrative outlines of specific realities through the use of particularly representative cases. The study was carried out and the relevant analysis performed by considering secondary data documents (i.e. financial reports, Airport Masterplan 2009/2012, etc).

### 4. Case Study Analysis: the Experience of “Aeroporti di Puglia S.P.A.”

#### 4.1. Initial notes

“Aeroporti di Puglia S.p.A.” (AdP) consistent with the already defined framework is configured as a multi-airport system under the management of a single legal entity in which the main shareholder is the Puglia Region. It is, therefore, a situation in which integrated ownership and management is exercised from a public entity that clearly aims to define a harmonious development of the business entities by combining economic and territorial growth.

In 2009, the indicator that measures the number of aircraft movements (Air Transport Movements) amounted to 44,395 between landings and take-offs, the number of passengers almost 4 million units and transport of cargo, 3,400,000 kg (ENAC, 2010). Regarding the financial aspects, described in the annual financial reports for the years 2007-2010, we can say that the results were somewhat fluctuating. Referring to the income components, although revenues rose steadily, the operating profit was positive in the years 2007, 2009 and 2010; largely negative, instead, (-4,844,055 €) in 2008, due to a significant increase in other operating expenses. The global net result was positive in the last annual report + 750,005 €, in 2010, + 558,129 € in 2009, and largely negative in 2008 (- 7,634,575 €).

Regarding the planned investment in AdP Masterplan 2009-2012, of particular interest are those reported at the airport of Brindisi Papola (see Figure 1) and Bari-Palese (see Figure 2).

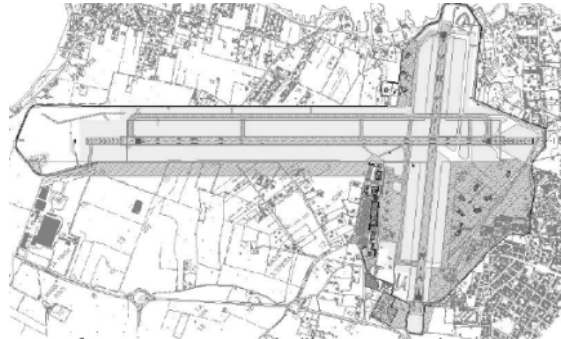


Figure 1 – Brindisi Papole Airport layout

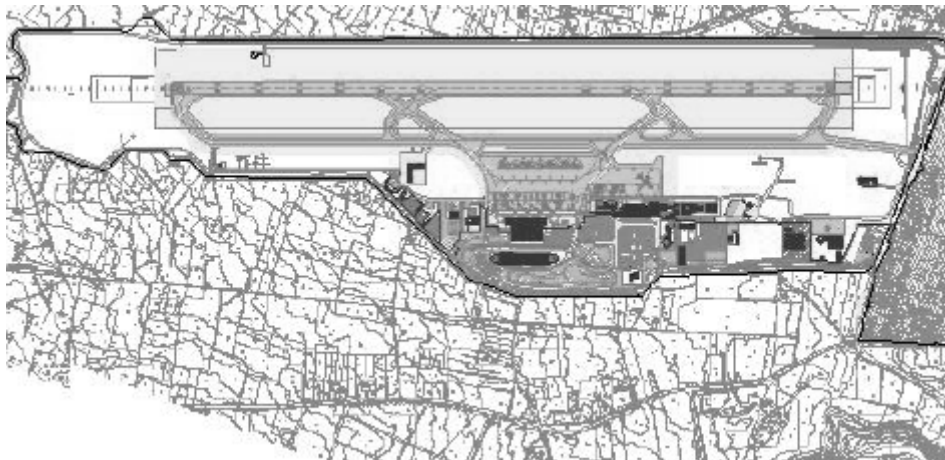


Figure 2 - Bari Palese Airport layout

#### 4.2. Strategic business planning and infrastructural development

In the last few years, AdP's management has tried to anticipate the corporate collapse of national carrier (i.e. Alitalia airlines) by developing the supply of air mobility from Puglia airports of type "point to point", with the gradual implementation of a low cost fares structure in domestic and international routes, to the detriment of the

management model “hub and spoke” of Alitalia that for example favored in the recent past the transition from the airports of Rome-Fiumicino and Milan-Malpensa.

With the aim of allowing Puglia to promote economic integration in the European and Mediterranean area, the management of AdP jointly operated in three directions:

- activate two operating bases operated by Ryanair air company;
- increase travel connection frequencies toward major domestic and European destinations;
- guarantee travel connection linkage effectively with the most important hub of reference for international and intercontinental networks.

The strategic decisions, briefly mentioned above, received full support from the Puglia Region, through the Regional Department of Tourism, and shared a project to develop promotional activities in support of the development policies of incoming tourism and with the aim of qualifying the image of the Puglia Region in the tourists’ home markets.

In order to promote territorial development, the Region is trying to extend the catchment area of Puglia’s airport to areas such as Molise, Abruzzo, Basilicata, Campania, and Calabria by reducing the connection time through important infrastructural investment. In this sense, in addition to rail transport, the Regional Department of Transport has promoted road transport through the definition and funding of the “Pugliairbus” project.

Regarding airport management planning strategy, the AdP Masterplan has been implemented with the aim to match the real needs of traffic supply and demand. Observing the graphs reported in Figure 3 and 4, concerning respectively Bari Palese and Brindisi Papole airport, has been compared landside (Terminal area) and airside (runway/apron) improvement.

In both cases it is possible to observe how the development of the landside at 2008 has been necessary in relation to the growth trend of the airports and infrastructure. Regarding the flight infrastructure, the features of the two airports are different: the airport of Bari Palese combines the Apron capacity increasing to a significant rehabilitation of the runway; while in the case of Brindisi Papole airport interventions are provided solely for the adaptation and functional rehabilitation of infrastructures, that are already compatible with the estimates of likely demand for local traffic.

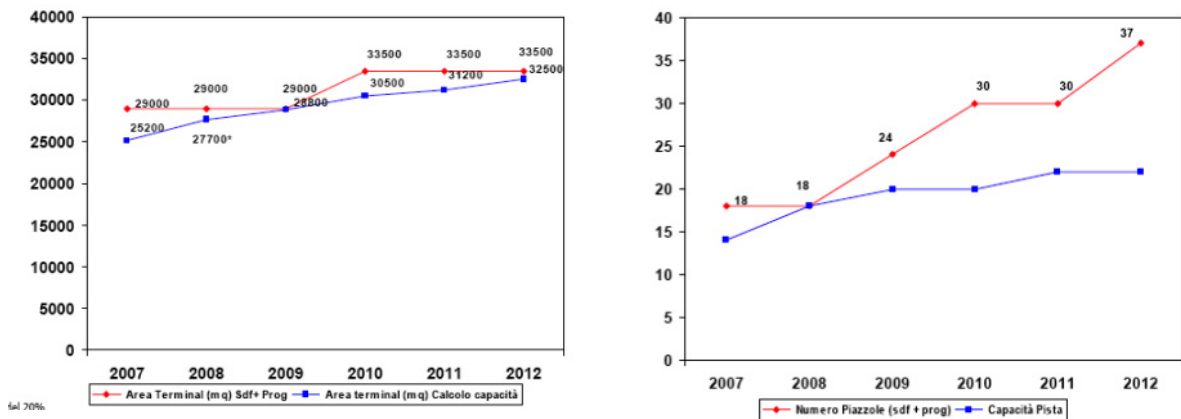


Figure 3 – Landside and airside infrastructure improvement. Bari Palese Airport

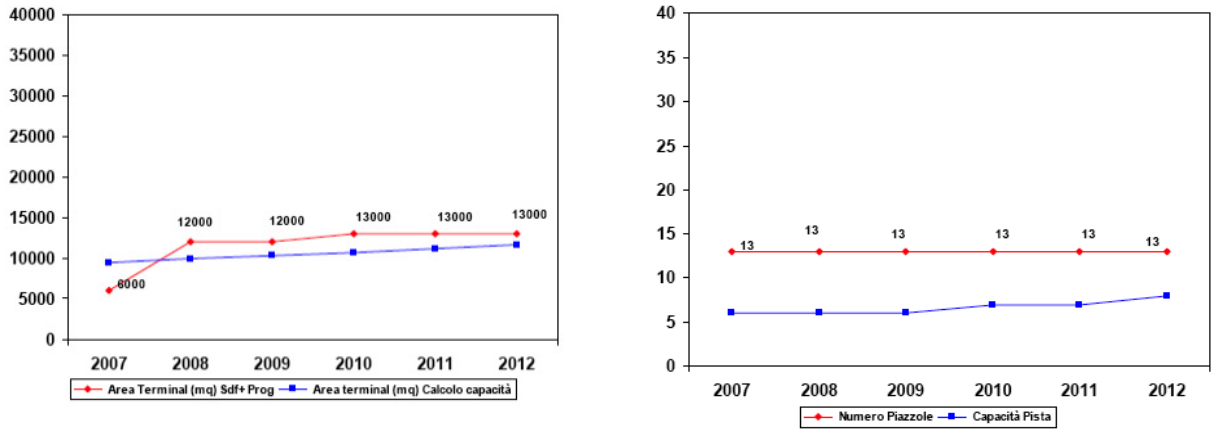


Figure 4 - Landside and airside infrastructure improvement. Brindisi Papoli Airport

Concerning Brindisi Papole airport, for new projects only (see Figure 5), planned investments in the period 2008-2012 amounted to a value of about 76 M€, divided into: extension of existing runway and taxiway 14/32, RESA upgrade, strip rehabilitation, extension of existing runway 05/23, stormwater disposal, new goods yard, dock landing ships for good chain, access roads and parking areas.

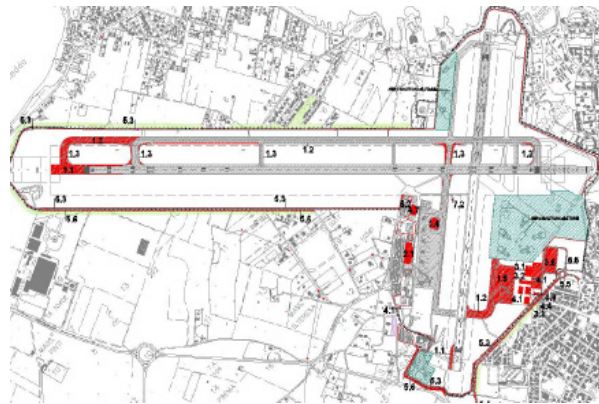


Figure 5 - Brindisi Papole Airport forecast layout

To previous ones referred above should be added investments necessary to complete the maintenance or mitigation of environmental impact, amounting to a value of about 42 M€ in 2008-2012. The interventions include the redevelopment of the Aprons, the restructuring of the passenger terminal, the conversion of military areas, etc.

Regarding the Bari Palese airport, for new projects only (see Figure 6), planned investments in the period 2008-2012 amounted to a value of about 41 M€, divided into: extension of existing runway from actual '2,440 m \*45 m' to '3,000 m x 45 m', extension of the current taxiway, new taxiway "G", widening the Apron west side / east side of approximately 113,000 m2, flights apron contaminated, upgrading stormwater disposal network, access roads and parking areas, Air Flight Assistance (Help Glider, RVR, Ceilometer) and Visual Aids Light (Shining Path).

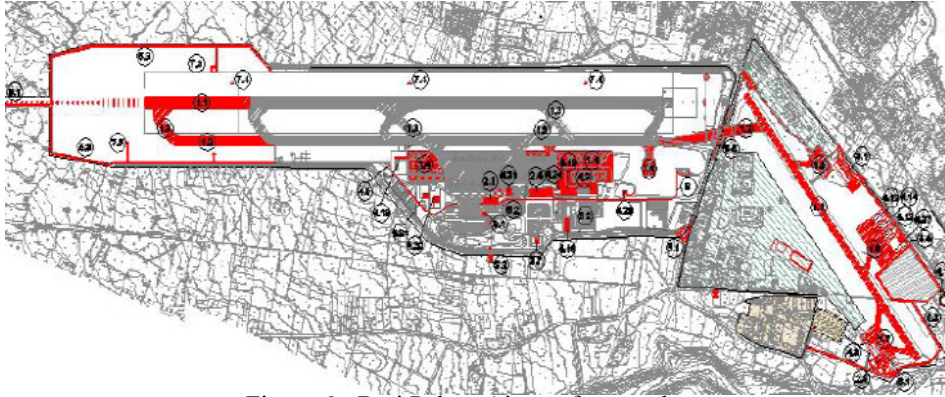


Figure 6 - Bari Palese Airport forecast layout

Particular emphasis covers the extension of the existing passenger terminal (see Figure 7), which consists in expanding the ground floor of the arrivals area on the first floor of the departures area with the installation of two loading bridges one of which is similar to those already built and one outer for aircraft category "E". The planned intervention was determined by a significant increase in traffic volume from 2005 to 2008 with percentages above 19% for passengers and 15% year-on aircraft than planned conservatively for future forecasts (increase of 4 % from 2009). The expansion will consist of a main building, to be carried out in adherence to the current new terminal, whose size will be about m '21.00 \* 106.00', for a total area of expansion between the ground and first floor of approximately 4,500 m<sup>2</sup>, for a total volume of about 27,600 m<sup>3</sup>.

To previous ones referred above should be added investments necessary to complete the maintenance or mitigation of environmental impact, amounting to a value of about 50 M€ in 2008-2012. The interventions include the redevelopment of the Aprons, the conversion of the military hangars, barracks for the fire brigade, etc.



Figure 7 – Design of new Bari Palese passenger terminal



#### 4.3. Final discussion

The case of Puglia airports is an emblematic example of creating a multi-airport system as a tool for regional development. It represents a concrete attempt of realization of a MAS, in which a single legal entity and major shareholder – the Puglia Region – delegated to the management of four regional airports.

The multi-airport system, as highlighted above, is an approach through which airport management can facilitate and unify their objectives by policies reconciling:

- economic and financial sustainability for the single airport and for the network,
- sustainability of infrastructures planning and development.

The first profile, economic and financial sustainability, suggests the development of multi-airport facilities especially related to secondary airports that, can block the possibility of financial continuity and therefore also compromise the economic growth of an area. In this context, achieving conditions for continuity and development depends, substantially, on the level of air transport movement and the ability to offer specialized services in compliance with the specific needs of the individual areas served by airports.

Referring to the second point, infrastructural planning and development, the creation of a multi-airport appears to be important, although not essential, for the revitalization of infrastructures investments. This revitalization cannot be separate, clearly, from the adoption of a logical system and involve the major stakeholders.

In light of the above, we can highlight certain difficulties related to the creation of a regional airport network as the case study examined. First, the main problems are largely caused by air traffic that, although improving, has not yet increased to a satisfactory level, and this has subsequently created only a partial specialization of the secondary airports of Foggia and Taranto. Unfortunately, there also lack the necessary transport infrastructures that could enable more rapid and economical regional and intra-regional connections. Despite the difficulties, however, the path that has been undertaken in recent years is particularly interesting and offers a potentially successful outcomes. The Puglia Region, in fact, intends to establish an airport system that is modern, efficient, with high levels of service and fully integrated with the territory, promoting a harmonic process of economic and social development in the region while also strengthening its role and image in the Mediterranean area.

## 5. CONCLUSION

Although still far from full and complete implementation of a multi-airport system, sustainable in economic, financial and patrimonial terms in which the components (airports) define perfectly complementary strategies and follow a common strategic plan Puglia seems to be initiating a path of economic development. Moreover this remains a potentially positive process from all points of view.

In general the research seems to demonstrate that the basic hypothesis, according to which a good multi-airport system can contribute significantly to the sustainability of the airport at both level as a business and infrastructure, is valid only if it is supported by a coordinated managerial approach.

In this sense, the MAS can be useful to better perform in economic and financial terms, and for improving infrastructural competitiveness.

In conclusion, it should be noted that a multi-airport system, which represents the result of a complex and nonlinear way, is not to be considered necessarily the only alternative available, the unique solution valid in any space-time context towards sustainable airport model.

Further research are needed to compare this specific framework with developments at other separately-owned airports in order to show whether the integrated model delivered benefit that non-integrated one would have struggle to achieved.

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