

## ERSA 2003 - The 43<sup>rd</sup> European Congress of the Regional Science Association

### THE CONTRIBUTION OF AIR LOGISTICS TO THE DEVELOPMENT OF SICILIAN ECONOMY

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#### ABSTRACT

The role, played by globalization and the “*just in time*” supplying logic in the present world economic scenario, implies that the opportunity of frequent, quick, safe and low-priced freight deliveries can be considered a key element for competitiveness. In the last years, transportation systems have been characterized by the diffusion of intermodalism and the “*hub and spoke*” distribution pattern. The phenomenon of organizing freight transport services according to a network and modal integration logic has involved also the air transport field. The present research aims at determining the contribution that can derive from the development of air logistics to face a challenging problem, that is overcoming the peripheral role, in international trade, played by Sicily, which can boast high quality outputs in the agroindustrial sector and in the high technology one.

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## INTRODUCTION

An efficient transport network creates positive externalities of provisioning, distribution and production, improving efficiency, reducing costs and the time that intervenes between the order and the delivery (lead time). This is particularly remarkable for the Sicilian Region whose productive structure is mainly characterized by the presence of small enterprises. Some of them, operating at international level, suffer from the lack of a suitable network of connections and communications.

Logistics provides an important contribute to territorial planning allowing the infrastructural and service optimization. So, economical areas characterized by an advanced logistics service supply attract tertiary activities and investors, thus producing added value and occupation.

The globalization phenomenon has brought firms to have industrial fittings and distribution centres scattered in several continents.

The airline network structure plays an important role in understanding airline economics (see, e.g., Levine, 1987). This is demonstrated by the achievement of the *hub-and-spoke* structure, a consequence of airline liberalisation and privatization of airline industry, now focused on a profit maximization strategy. In fact, *hub-and-spoke* networks allow airlines to obtain important productive efficiencies; moreover an airline with a large presence in a hub airport gains significant customer loyalty advantages, through the fact that customers value *hub-and-spoke* network characteristics such as higher frequencies of service, wider variety/selection of destinations, etc. (Nero 1999).

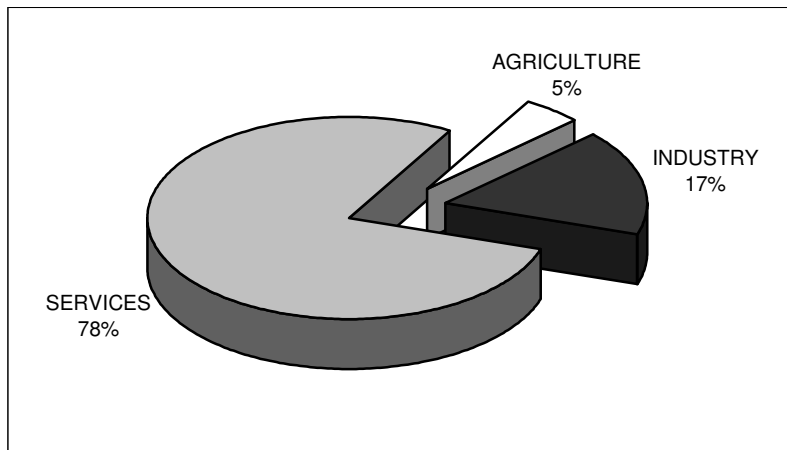
Air cargo plays an important role in ensuring the competitiveness and commercial success of a large number of industries. In terms of incidence, air cargo accounts for only about the 2% of all cargo moving world-wide; at present, it represents more than one third of the freight world trade.

The demand for transporting such commodity types involves the solution of sophisticated logistics problems, as minimizing costs guaranteeing the maximum safety and timeliness of the transport. This aim can be obtained by the adoption of air-land intermodalism.

## 1. The Current Scenario of Sicilian Economy

Traditionally, the Sicilian economy has been characterized by the leading role of primary sector; now, data on the regional added value in 2000 show for Sicily a very developed services sector (the 78% of the Sicilian added value can be referred to services, while the 17% to industry and only the 5% to primary sector).

**Fig. 1 - Economical sector incidences on the Sicilian added value**



Source: National Institute of Statistics, 2000

Moreover, the last Services and Industry Survey, carried out by The National Institute of Statistics in 2001, points out a great presence of small-sized enterprises.

As a consequence, Sicilian economy can be considered weak from a productive point of view, mainly consumer oriented. To confirm this, data on freight traffic can be analysed: they show that the amount of the goods coming in the region is greater than the quantity of the goods leaving the island.

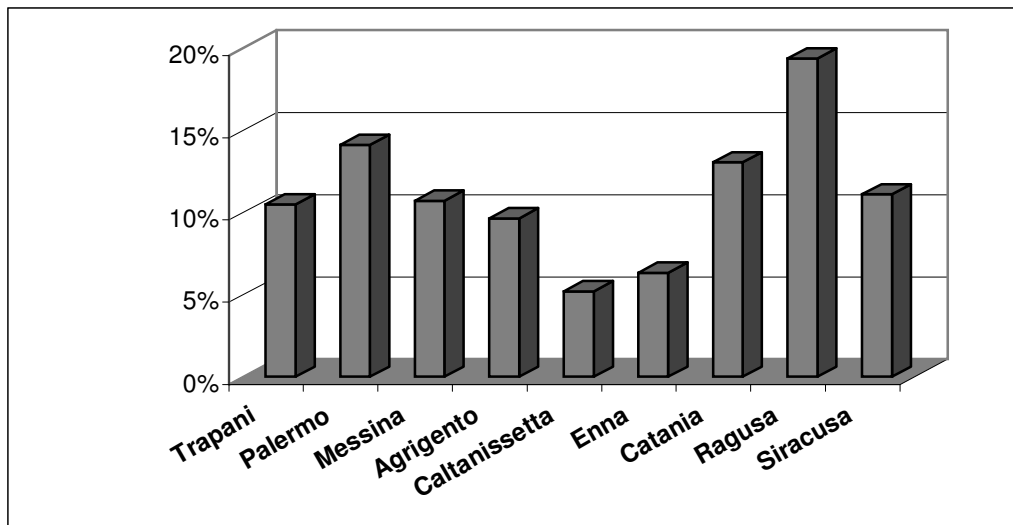
This situation has a negative influence on the efficiency of the regional logistics system, in terms of low load factors. This causes high transportation costs for goods, making Sicily less attractive for domestic and foreign investors, precluding the Sicilian area chances of overcoming its peripheral economic role.

Data on Sicilian exports can be considered to identify the commodity types which show the best performances in competitiveness, thus representing for Sicily a chance of future economic growth. So, if we refer to the “Notes on Sicilian Economy in 2000” by The Italian Central Bank, we can notice that the commodities showing the highest incidences on Sicilian exports (values in euros) are oil products (48%), chemical

products (12%), electrical and precision instruments (11%), agriculture and fishing (6%), food-stuffs (5%) and motor vehicles (5%). Some of these ones can take advantage of the development of air logistics in Sicily; in particular, they are agricultural goods and electrical/precision instruments. In this case, in fact, we have those characteristics of physical/economical perishability that require air transport for distribution.

As for the primary sector, we have to underline the leading role of the provincial area of Ragusa and the relevant performances of Catania and Palermo.

**Fig. 2 - Sicilian provinces incidences on the global agricultural production (euros) in 2000**



Source: G. Tagliacarne Institute

Furthermore, with regard to Sicilian agricultural production, the main commodity classes are the following ones: vegetables (about the 23% of the total), which represent the strength point of the primary sector in Ragusa; fruit and citrus cultivation (about the 20% of the total), that are important in Palermo and especially in Catania, representing for this area a real vocation.

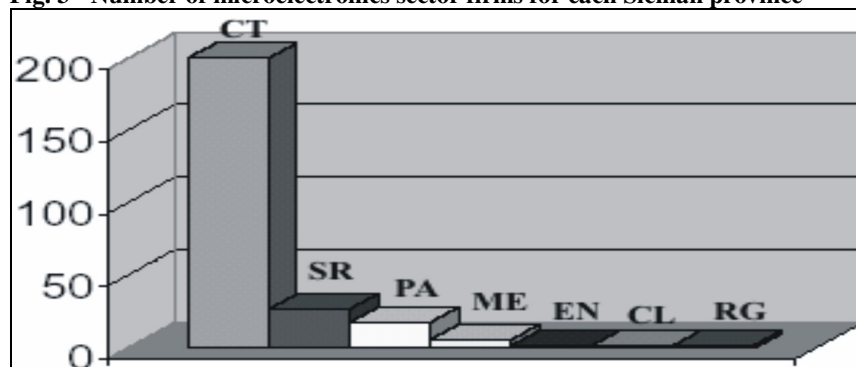
**Table 1 - Primary sector production (euros) in Sicily per commodity and per province – 2000**

	Cereals	Dry legumes	Vegetables	Vine growing	Olive growing	Fruit citrus	Livestock	Milk	Services	Forest products	Others
TP	5,70%	0,03%	28,57%	38,49%	7,92%	4,06%	3,66%	1,84%	4,12%	0,00%	5,62%
PA	14,49%	0,55%	10,84%	10,46%	9,75%	<b>18,21%</b>	10,24%	6,63%	9,61%	0,01%	9,20%
ME	0,50%	0,14%	10,36%	2,47%	15,07%	27,00%	19,61%	5,25%	10,06%	0,53%	9,00%
AG	8,88%	1,11%	20,02%	22,86%	8,33%	17,00%	7,19%	4,60%	7,29%	0,01%	2,71%
CL	13,58%	0,48%	42,91%	9,66%	5,36%	6,23%	5,32%	4,07%	5,73%	0,20%	6,45%
EN	17,68%	0,48%	2,47%	1,39%	5,80%	13,96%	26,11%	7,51%	14,80%	0,04%	9,76%
CT	6,21%	0,08%	6,25%	5,49%	7,34%	<b>50,02%</b>	8,80%	3,44%	5,12%	0,23%	7,01%
RG	2,77%	0,10%	<b>42,10%</b>	2,28%	2,77%	7,97%	8,98%	5,32%	5,27%	0,00%	22,44%
SR	2,21%	0,06%	36,55%	1,63%	4,92%	32,56%	8,33%	2,75%	5,79%	0,00%	5,20%
Sicily	6,97%	0,30%	<b>22,98%</b>	9,91%	7,31%	<b>20,42%</b>	10,36%	4,61%	7,14%	0,10%	9,90%

Source: G. Tagliacarne Institute

With reference to data on electrical/precision instruments exports, we can highlight that they are the signal of an ongoing development in the high-tech market, especially for microelectronics. The centre of this process is the high-tech district of Catania, also known as “Etna-Valley”. In fact, the economical structure of Catania is quite different from the rest of the regional area: about the 27% of the labour force is employed in industry and a great rate of this percentage (10%) refers to “new economy” (“Etna Valley Report”, I.S.S.R.F., 2003). A great contribution to this scenario derives from the STMicroelectronics, one of the most important producers of integrated circuits for several applications in the world market. Its successful initiative has attracted in Sicily other giants of the high-tech field, such as Nokia, Accent and IBM, now among the main protagonists of the “Etna Valley” experience.

**Fig. 3 - Number of microelectronics sector firms for each Sicilian province**



Source: “Etna Valley Report”, I.S.S.R.F., 2003

## 2. The Air Freight Transport in Sicily

In Sicily, air freight transport has been considered as a residual activity, in comparison with the more profitable passenger business. This is also highlighted by the infrastructural characteristics of the Sicilian airports that are not adequately equipped with dedicated areas and services for air cargo. The consequence is shown by a less freight flow in comparison to other national airports more opportunely provided with facilities. The main Sicilian airports are the following ones: Palermo-Punta Raisi "Falcone e Borsellino"; Catania Fontanarossa and Trapani Birgi "Vincenzo Florio" (chiefly for military purposes).

With regard to the catchment area of each airport, it can be stated that the provinces of Palermo and Trapani gravitate towards the airport of Palermo, while those ones of Messina, Catania, Syracuse, Ragusa, Enna and Caltanissetta are served by the airport of Catania-Fontanarossa. This is true both for passenger traffic and for the freight one.

National air freight transport has registered a rising trend in the observed period (from 2000 to 2002), passing from a total of 703.084 tons, in 2000, to 728.060, in 2002, (+3,55%) (Assaeroporti, 2003).

However, such growth doesn't concern all the national airports. In fact, with reference, for instance, to the two principal Italian hubs, mainly dealing with such typology of traffic - that are the airport Leonardo da Vinci of Rome Fiumicino and the airport Malpensa in Milan - it is possible to observe a constant growth of air freight for the Malpensa airport (it rises from 291.191 tons in the year 2000 to 314.747 tons in the year 2002) and, on the contrary, a constant decrease for the roman airport (154.257 tons in 2000 versus 130.755 tons in 2002).

Air freight transport produced by the three main Sicilian airports, in the last three years, is shown in table n. 2.

**Tab. 2 – Air freight transport for Sicilian airports in 2000-2002**

Years	Palermo		Catania		Trapani	
	Freight (tons.)	%*	Freight (tons.)	%*	Freight (tons.)	%*
2000	3.752	-13,8	8.139	17,3	0	-100
2001	3.229	-13,9	9.147	12,4	2.760	100
2002	3.708	14,8	6.677	-27	0	-100
<b>Totale</b>	<b>10.689</b>		<b>23.963</b>		<b>2.760</b>	

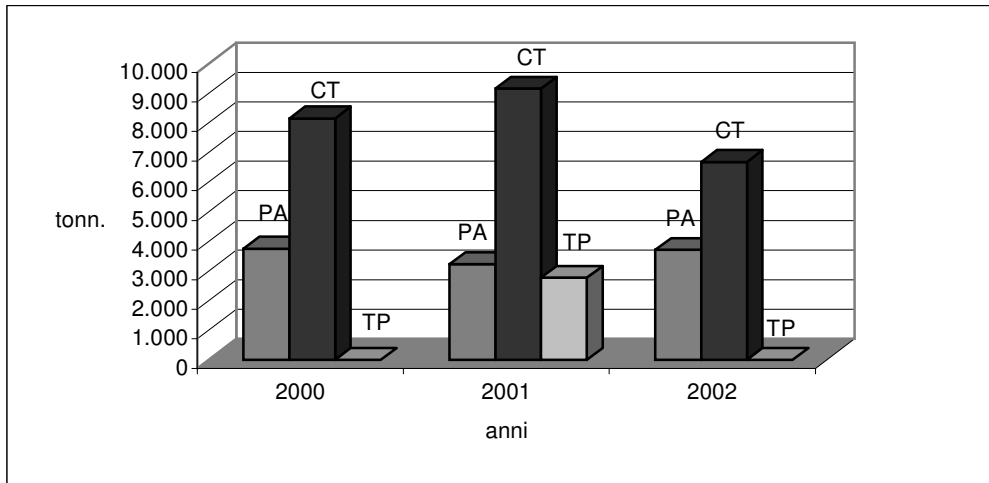
\* The percentages refer to the traffic development from one year of the period to the next one

Source: Assaeroporti, 2003

Total = in flows + out flows. Data on traffic per commodity are not available.

Traffic trend for the three airports in the considered period can be observed in figure n.4.

**Fig. 4 – Air freight transport trend in the Sicilian airports (2000-2002)**



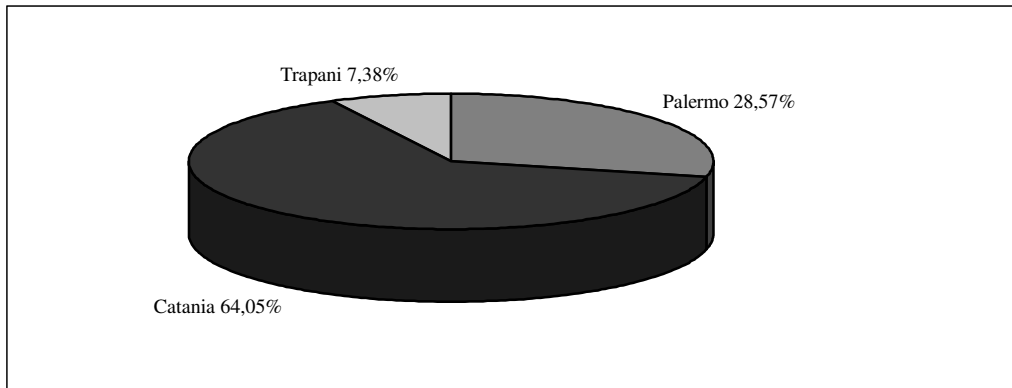
Source: data by Assaeroporti 2003; data processing by authors

The Sicilian airport producing the greatest freight traffic rate is Catania, followed by Palermo; Trapani is the last one in the ranking (data available only for 2001).

Catania can boast a positive trend both for 2000 and for 2001; in 2002, its traffic drops down. Palermo shows a negative trend, decrease in 2000 and in 2001 and growth in 2002.

Nevertheless, Catania is the first regional airport in terms of freight traffic. In fact, concerning the total air freight flows in the observed period, equal to 37.412 tons, Catania has a 64,05% incidence, the rate for Palermo is 28,57% and the one for Trapani is 7,38% (fig. 5).

**Fig. 5 - Percentage incidence of the single Sicilian airports**



Source: data by Assaeroporti 2003; data processing by authors

The development of air freight transport has been drawn by the market. This attitude, reactive but not proactive, has been influenced by the regional economy characteristics, in terms of the leading role of services.

Air freight transport can provide an important contribution to the development of economical competitiveness in Sicily, if policy makers take into account that a competitive air transport system needs to be well connected with the inland network, thus really making the logistics chain improve in efficiency and effectiveness.

### **3. Extensions**

This article constitutes the first phase of a research on the role of airports for logistics in Sicily. The next steps of the research are the following ones:

1. Analysing the Sicilian freight transport system, with regard to the demand-supply relationship, paying particular attention to the commodity typologies mentioned above.
2. Identifying key actions for the air cargo services, in order to make Sicily improve in competitiveness, also taking into account the possibility of connecting Sicily with hub airports, developing airport-hinterland links (through the road network and the railway one) and setting a telematic system to optimize relationships among the different operators of the air cargo market.
3. Identifying infrastructural solutions for the air cargo system, in order to create the conditions for the development of intermodalism and logistics.
4. Estimating commercial flows that could be attracted by the Sicilian airport system, by implementing the proposed solution set.



5. Determining the economic and social impact of the proposed solutions, considering different evolutionary scenarios and using also input-output analysis techniques.

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