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A Feasibility Study for New Transport Connections between Italy and Algeria

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Abstract: The present study is part of the Executive Scientific Project 2 in the ItalMed Project which aims to elaborate a feasibility study for new transport connections between Italy and Algeria. The main objectives of the study are to increase the degree of economic integration between the two countries and improve commercial exchanges and direct investments in Algeria by Italian private companies. Moreover, the study tries to promote Italy's role as logistic platform for Mediterranean Countries along the east-west and north-south corridors and to improve the capacity of Italian regions to manage international cooperation programs on transport and logistics, finally, to support regional entrepreneurship in the foreign services sector.

Key words: Freight, stated preference, potential demand, cost model.

1. Introduction—Current Dynamics of Algerian Economy

Algerian economy is nowadays based on production and manufacture of hydrocarbons (natural gas and oil); natural gas fields are almost inexhaustible so as to ensure future continuity of the most important sectors in the budget of the country.

This sector (production and manufacture of hydrocarbons), therefore, contributes to almost half of the country's GDP (gross domestic product).

For transports and logistics features, the hydrocarbons sector does not present special problems because the exchange with Italy occurs mostly via pipelines that link Italy with Algeria, crossing Tunisia.

In the last years, the value of Italian export to Algeria is increasing while import of Algerian goods to Italy is always fluctuating.

Among Italian exports to Algeria, there are thermal and hydraulic turbines and other machines that produce mechanical energy, including parts and accessories which constitute the second largest item of export; moreover, emulsions of bitumen, tar and binders for road use are, in terms of value, the third largest export in 2008.

The Algerian government is generally committed to open the country's economy and attract more foreign investments, particularly in areas not related to hydrocarbons. The expansion of the construction sector is guided by the government program to improve infrastructure and building economic expansion for the growing young population.

This should also encourage the creation of new jobs and a strong demand for material and construction equipment.

This policies and dynamics are a good opportunity for Italian firms from both manufacturing than distribution companies, from the logistics and infrastructure modernization process currently underway in Algeria.

A large part of active population works in agriculture and the government is committed to this area, strongly

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rooted in the culture of the country, trying to increase their yields through programs for the expansion of irrigated areas. Despite Algerian government efforts, the country is still heavily dependent on other countries by importing large quantities of food and agricultural products. This is another chance for many Italian farms.

The success of the "Made in Italy" in the Algerian market (usually characterized by the 4A—Agribusiness, Furniture, Clothing/Fashion, Industrial Automation, in italian language Agroalimentare, Arredamento, Abbigliamento/Moda and Automazione industriale) occurs mainly through the industrial automation sector, which represents over 75% of the Algerian demand of Italian goods.

Among consumer goods, before the decline in the clothing sector, which is affected by smuggling, we report the growth of luxury goods with respect to the field of jewelry, showing big boom in 2007, amounting in absolute terms at around €33 million in sales. Even the first half year of 2009 confirms the trend with a sales progression of more than 50%.

Between interesting sectors for investments, as well as the exploitation of oil fields, infrastructure is another big investment, including enlargement of Algiers port and the restructuring of other ports, construction of roads, tunnels, new whether railways, water works and sewage treatment works.

Very interesting are the high-tech sectors: the eGovernment, the pharmaceutical industry, the defense industry and the public utilities. Also very promising is the field of telecommunications, for which Algeria will be opened in a short time to market.

The analysis is divided in four parts:

- hypothesis definition of scheduled services between Italian ports/airports and Algeria;
- comparative analysis of the competitiveness of hypothetical scheduled services in relation to existing services;
- analysis of constraints to the development of the proposed routes;
- estimation of the potential demand for the scheduled services envisaged in the project.

In this paper, only the first, second and third parts are described due to their geographical and modeling approach.

2. Analysis of Existing Connection between Italy and Algeria

This first part consisted in the research and analysis of existing connections, with a focus on actual quantities of goods exported and imported from Algeria, so as to allow the analysis of transport supply and demand.

With regard to information on existing routes between the two countries, it has been collected data from specialized journals (Messaggero Marittimo and Avvisatore Marittimo of September 2011) which set forth the current routes, represented schematically in Fig. 1.

The analysis of existing routes showed that the connections are prevalent in the north-central area of Italy, while the central area between the south of Tuscany and Lazio is totally absent of links. In real-world, this area is comprised in the center Tyrrhenian-Adriatic Logistics Platform (as called in the National Logistics Plan).

A second phase regards the actual import-export trends analyzed starting from the data of European section of ISTAT (Italian Statistical Agency) called COWEB. In this database, traffic of goods is quantified in euro for each year, for each goods type and for each province.

The following Figs. 2, 3 and Table 1 show the elaborated data by means of GIS (Geographic Information System) [1, 2] software and they represent the total import and export values between Italy and Algeria in the years 2009 and 2010.

These first results show that the import market from Algeria is limited to only 20 Italian provinces with the first four that cover more than 98% of the total. The result is a very concentrated market (see Table 1).

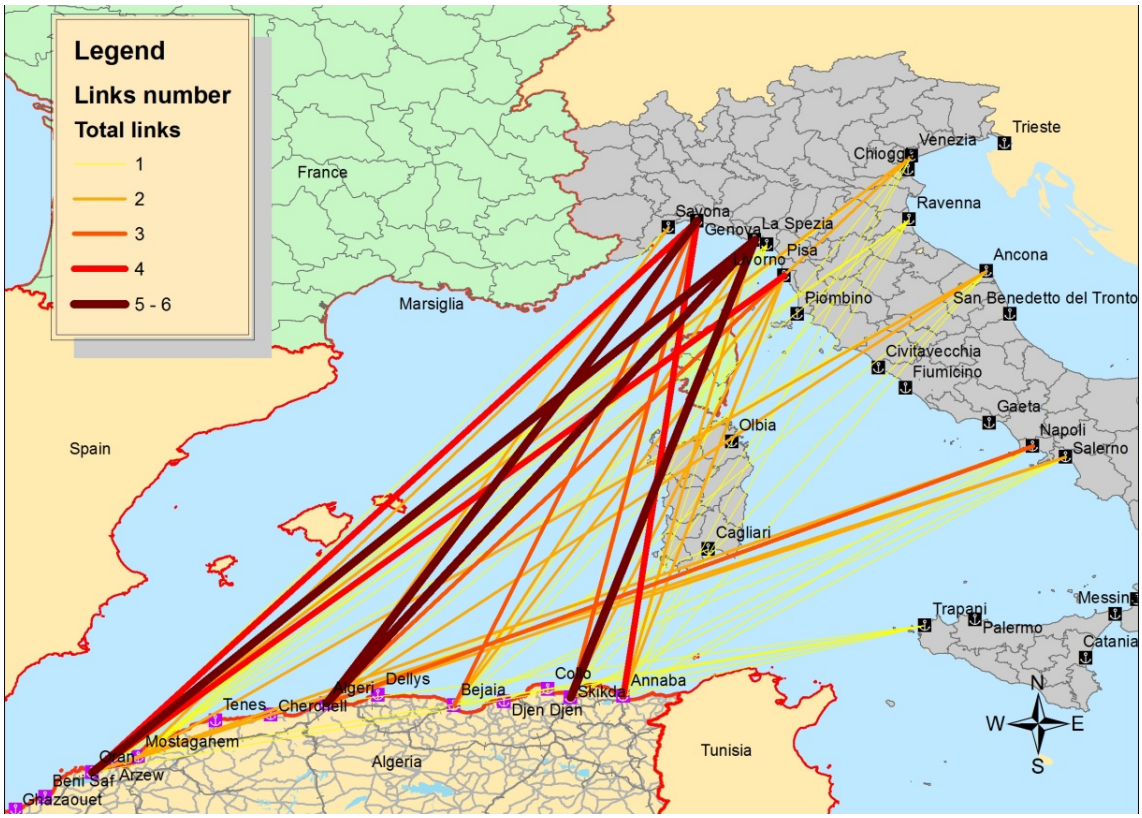

Fig. 1 The actual sea routes between Algeria and Italy.

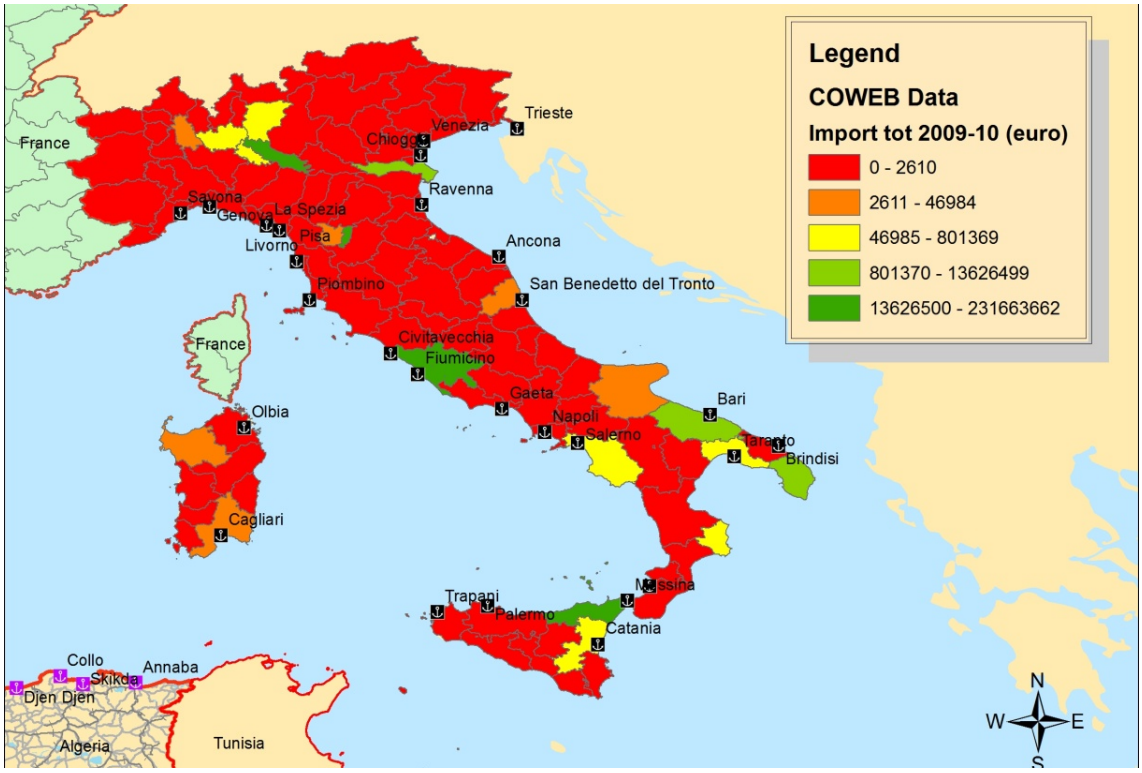

Fig. 2 Total import from Algeria to Italy (total freight traffic in euro, Year 2009 and 2010).

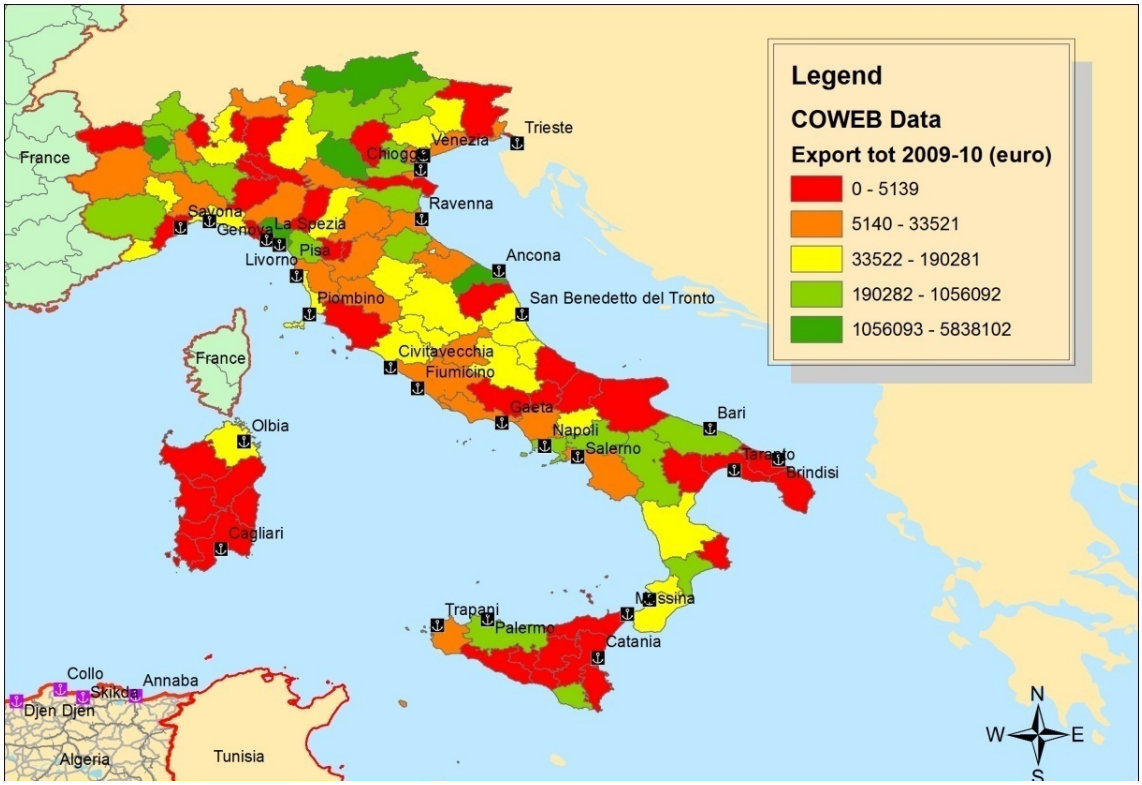

Fig. 3 Total export from Italy to Algeria (total freight traffic in euro, Year 2009 and 2010).

Table 1 Total import and export from Algeria.

Pseudo-subsections	Cluster	IMP2009	EXP2009	Province
BB—Mineral extraction products from quarries and mines		2,167,967,435	0	Not specified Province
BB—Mineral extraction products from quarries and mines		80,561,605	19,752	Roma
BB—Mineral extraction products from quarries and mines		74,485,608	0	Prato
CD—Coke and refined petroleum products		71,691,629	38,000	Napoli
BB—Mineral extraction products from quarries and mines		32,353,808	41,726	Milano
CD—Coke and refined petroleum products		4,928,092	61,000	La Spezia
CD—Coke and refined petroleum products		4,898,864	0	Caltanisetta
CD—Coke and refined petroleum products		4,000,733	32,700	Livorno
CE—Chemicals		3,326,680	52,878	Ravenna
CB—Textiles, clothing, skins and accessories		2,106,303	0	Avellino
CG—Articles of rubber and of plastics, other products of the termination of non-metallic minerals		2,027,017	57,851	Cuneo
AA—Products of agriculture, forestry and fishing		2,001,561	216,810	Bari
CD—Coke and refined petroleum products		1,612,260	4,255,620	Roma
CH—Basic metals and metal products, except machinery and equipment		1,243,147	6,847,541	Udine
VV—Goods declared as on board, national goods return and rejected, various goods		897,983	0	Milano
CH—Basic metals and metal products, except machinery and equipment		627,884	75,780,873	Brescia
CE—Chemicals		558,044	7,514	Trieste
CD—Coke and refined petroleum products		480,262	0	Sassari
AA—Products of agriculture, forestry and fishing		413,600	0	Bergamo
CL—Transport means		326,800	0	Crotone
CE—Chemicals		323,948	0	Frosinone

Unlike imports, exports from Algeria have a greater geographical spread, but smaller quantities of goods (5.5% of imports, that is to say 21.6 mil. € vs. 394 mil. €).

Finally, the data from the European project DATELINE were collected to evaluate the demand from passengers transport from EU to Algeria. In fact, this project has elaborated a survey to European citizens (interviews with a sample of more than 86,000 residents in the European Union and their journeys with distance greater than 100 km). From these data, it was reconstructed the O/D matrix for all long distance journeys and relative to all transport modes (see Fig. 4).

The previous Fig. 4 shows that in the central-southern Italy, the only area with a good number of long distance journeys to Africa is the region Lazio. The European countries with more LD journeys are France, Germany, United Kingdom and Spain; the proposed routes must create a network with these countries with maritime ro-ro types or air connections.

3. Definition of Hypothesis of Scheduled Services between Italian Ports and Airports and Algeria

In terms of airplane traffic, the company with the largest number of links between these four countries and Italy is Ryanair. After Milan and Rome airports, the biggest number of connections are destinated to Pisa Airport; for these reasons, it has been hypothesized a route between Pisa and Algiers, which allows to build a network of connections throughout Europe.

In the following Table 2 and Fig. 5, all the proposed connections are described in their geographical and qualitative features.

3.1 Analysis of Constraints to the Development of the Proposed Routes

The analysis carried out shows that the potential

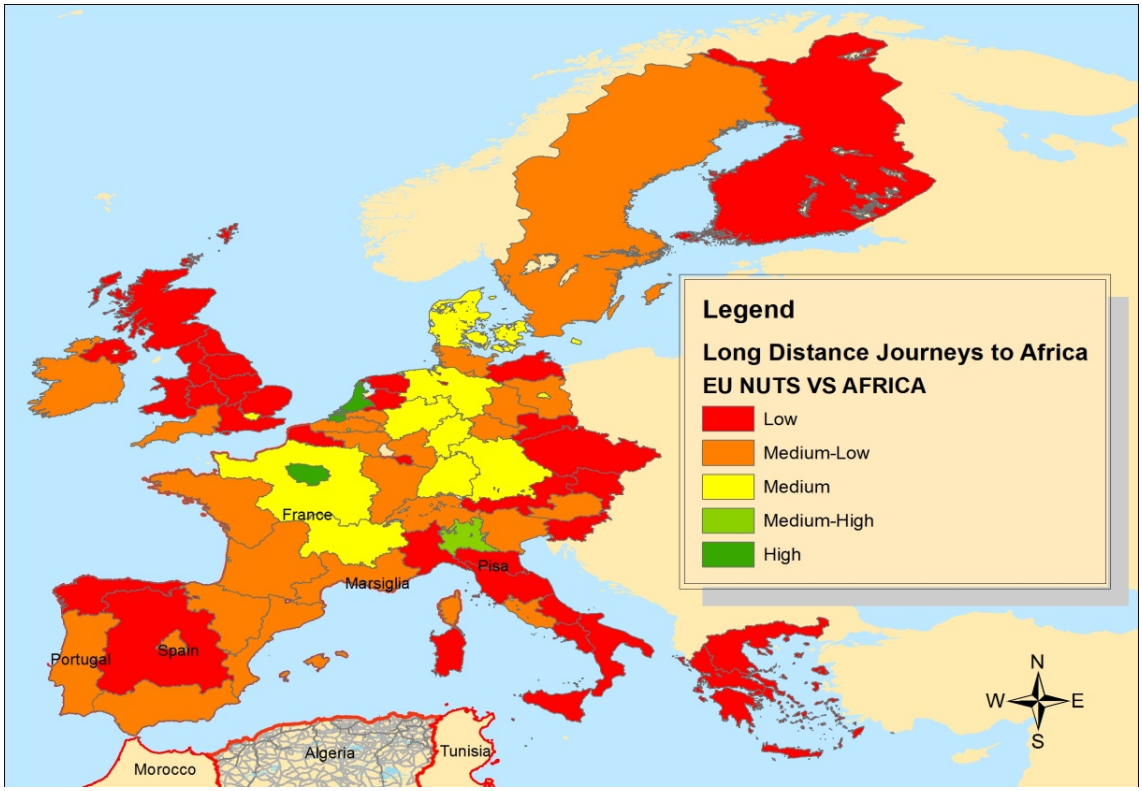

Fig. 4 Number of LDJ (long distance journey) made from European citizens with destination Africa.

Table 2 Proposed routes properties.

Hypotesis 1	Route	Service type	Frequency
Shipping line	Civitavecchia-Algeri	Ro-ro-pax	Weekly
Air line	Pisa-Algeri	Passengers	Biweekly
Shipping line	Marsiglia-Livorno-Napoli-Algeri	Ro-ro-pax	Weekly
Shipping line	Livorno-Algeri	Container	Weekly

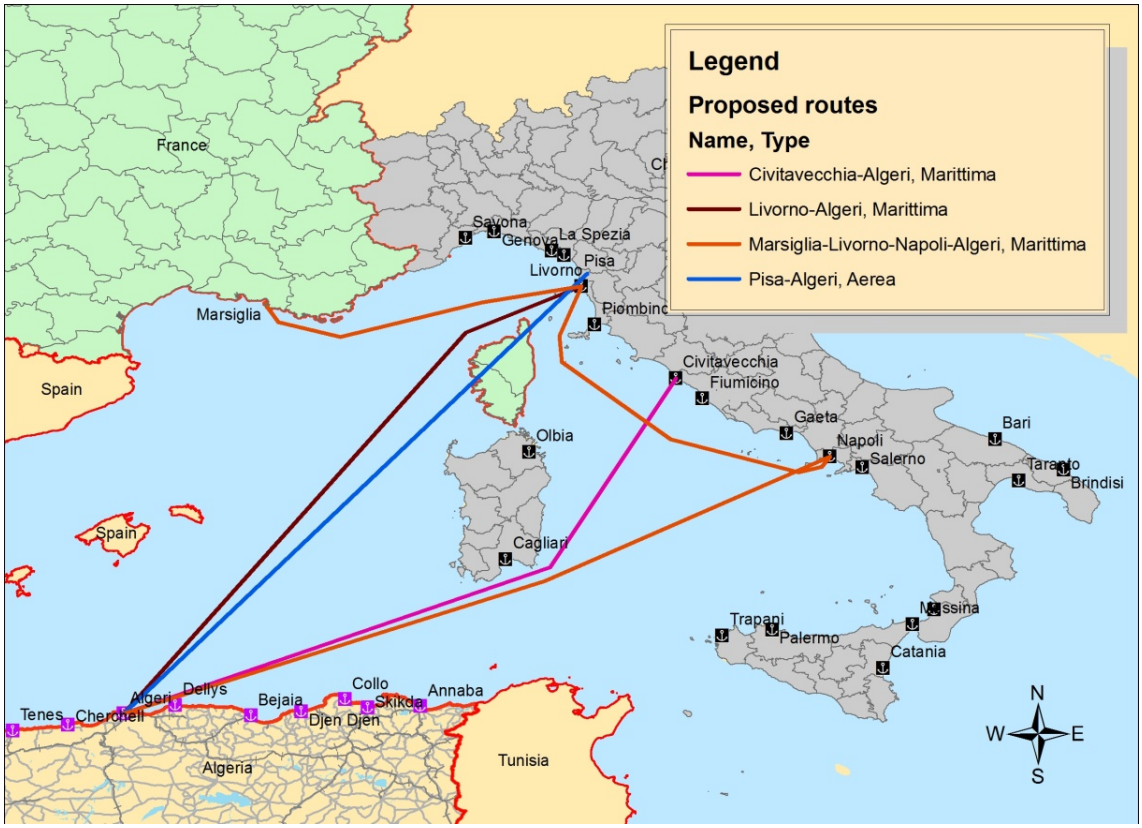

Fig. 5 The proposed routes between Italy and Algeria.

attractiveness of the new routes is very high for both imports than exports to Algeria, but, at present, this possibility is limited by high port costs (e.g., cost of goods handling) and excessive bureaucracy impact (e.g., number of documents and others).

In the following, shipping cost and time for some north-african countries are compared (Figs. 6 and 7).

Algeria seems to be the countries with the biggest port costs (eight out of ten cost items are the major) and the countries with the biggest port times (eight out of twelve time items are the major).

Therefore, one of the causes of the high increase in freight traffic to Morocco facing a more static (even political) behavior of the Algerian country is clear.

3.2 Estimation of the Potential Demand for the Maritime Scheduled Services Envisaged in the Project

3.2.1 The Cost and Time Transport Model

Once outlined the possible routes and the existing constraints to their growth, it was investigated the possible demand both from Italy side than Algeria one. To do this, the land-side road network was reconstructed for both countries.

Moreover, by means of the following cost functions (see Figs. 6a, 6b and 7) [3, 4], the travel impedance for each road segment was evaluated so as to construct the gravitational area of each port both for Italy than Algeria. The network was classified with a hierarchical structure so as to apply different cost function for each road.

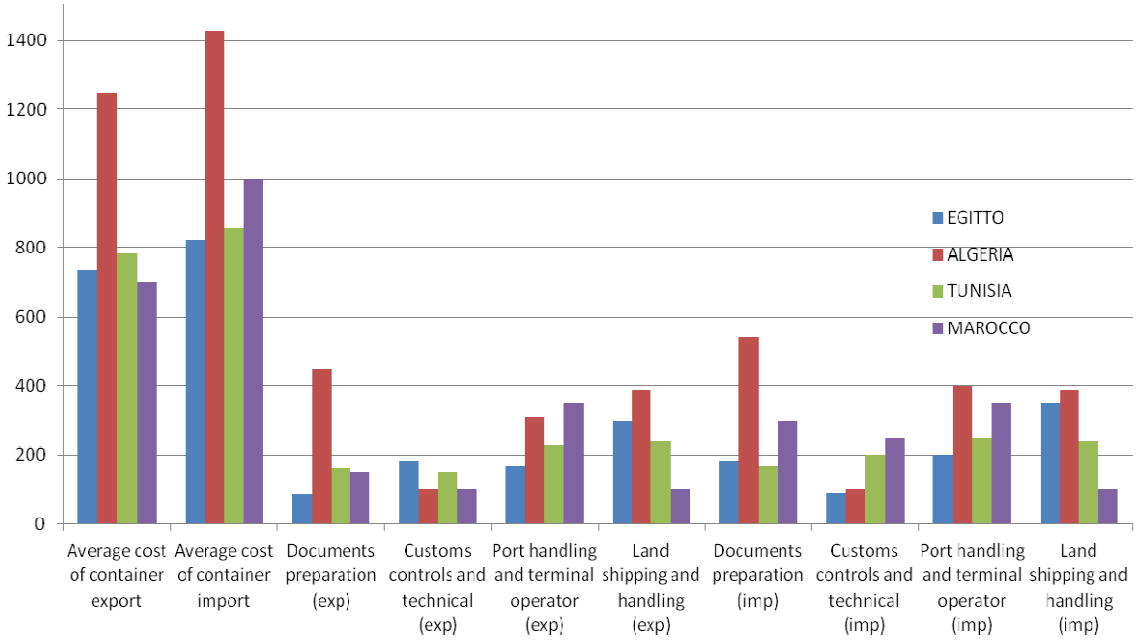

Fig. 6 Cost (euro) comparison for some African countries.

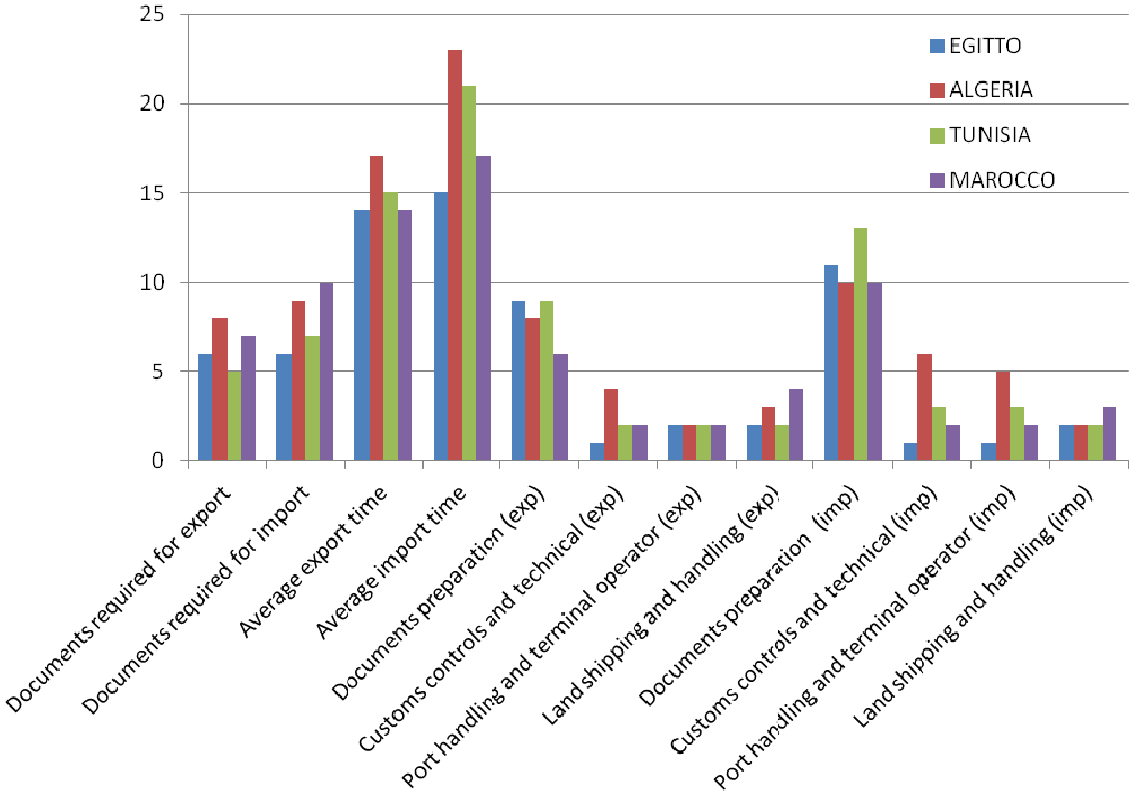

Fig. 7 Time (days) comparison for some African countries.

After the transport model construction, a survey was started with an interview to some companies that have been identified as possible users of the shipping services designed or that currently trade with Algeria.

The survey is divided in three parts: in the first part, there is the collection of data about each company (for

example, geographical localization, size, logistic organization, etc.). In the second part, there are some questions about actual market (origin/destination of goods, frequency, mean cost and time for each leaving and arriving goods). In the third part, there is a stated preference survey [5-7] related to one of the new scheduled service where the future service is characterized by different levels of cost, time, frequency, reliability and punctuality.

Stated preferences are conceptually equivalent to a laboratory experiment that can be designed with a larger number of degrees of freedom. These surveys are a set of techniques that use the statements of respondents about their preferences in hypothetical scenarios or contexts. They are based on the possibility to control the experiment by designing the context of choice to be submitted to the interviewee rather than retrospective record as in usual Revealed Preference Surveys.

The survey is still ongoing but, once completed, it will help to establish the category and the internal and external characteristics (for example, the type of logistics present) in order to reconstruct the potential demand [8], always remaining within the calculated gravitational areas; in fact, it will be a support to design, in detail the future service by comparing the importance of different service attributes included in the choice scenario and their variation with the company characteristics (Sections 1 and 2 of the survey).

The first results of the model, still to be completed with the part about the discrete choice model (see Figs. 8 and 9), show how the demand Italy-side, intercepted from the port of Livorno, is mainly regional, due to the conformation of the Italian road network (see Fig. 10) with a possible expansion to Emilia Romagna and Veneto regions. Instead, the Civitavecchia and Naples ports have a greater gravitational basin so, therefore, to fully justify the suggested routes. In addition, the route Marseille-Algiers-Livorno-Napoli is also appealing for passengers movement because of the touched touristic destination and the results of the long distance journeys analysis.

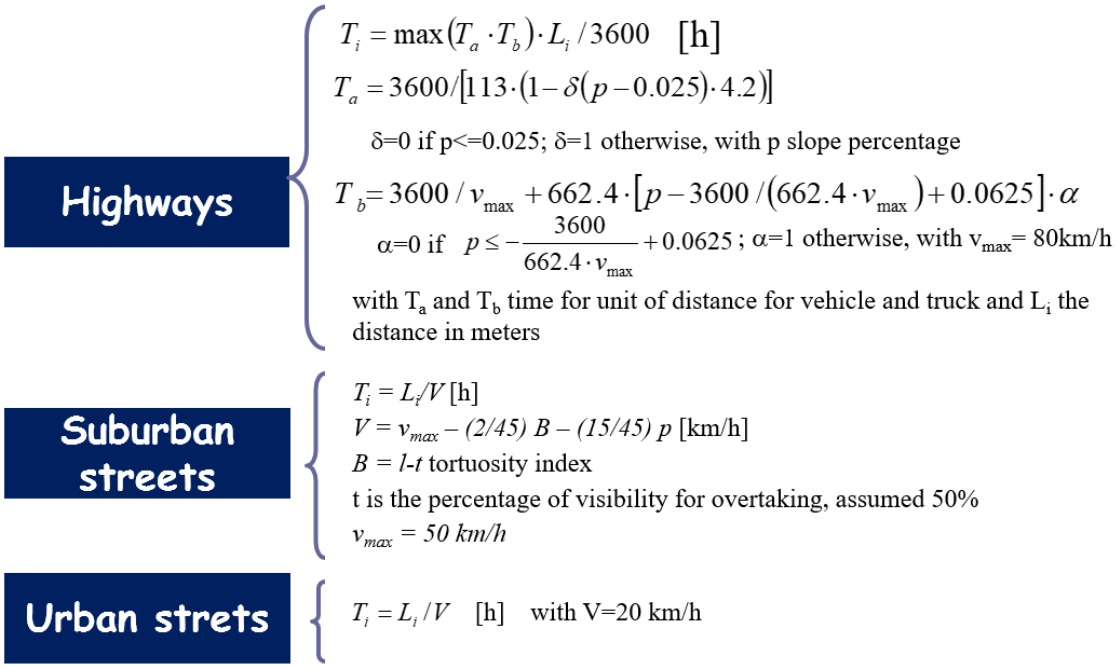

Fig. 8 Time cost functions for different street types.

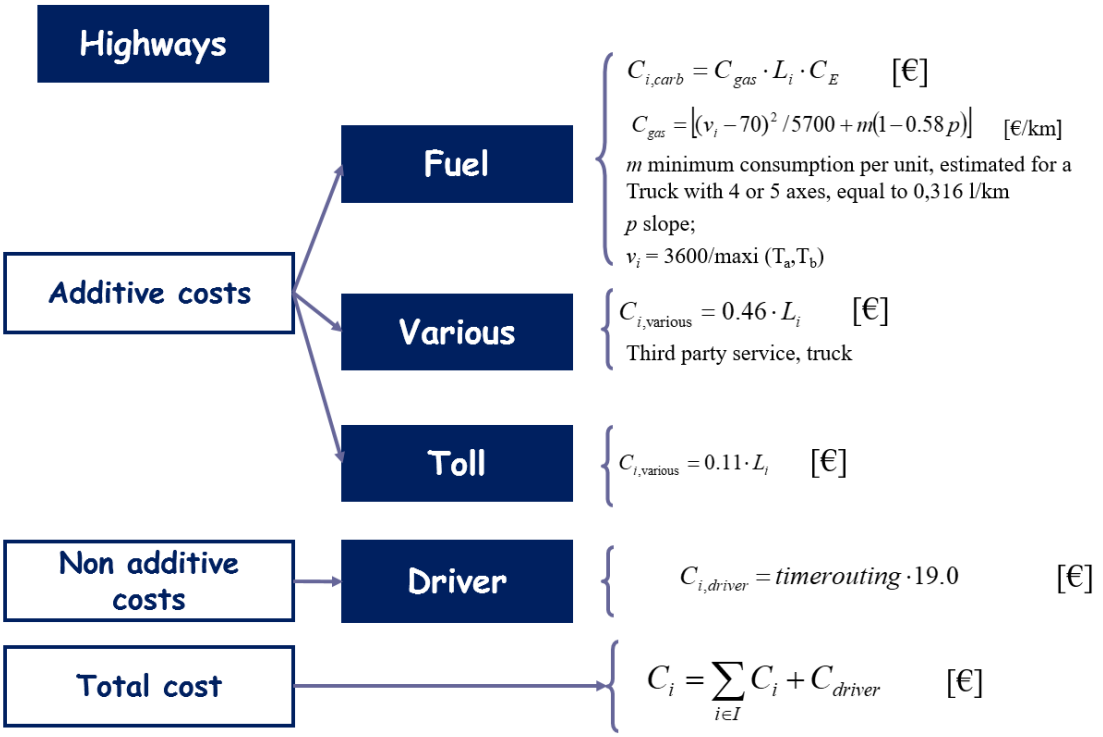

Fig. 9 Monetary cost functions for highways.

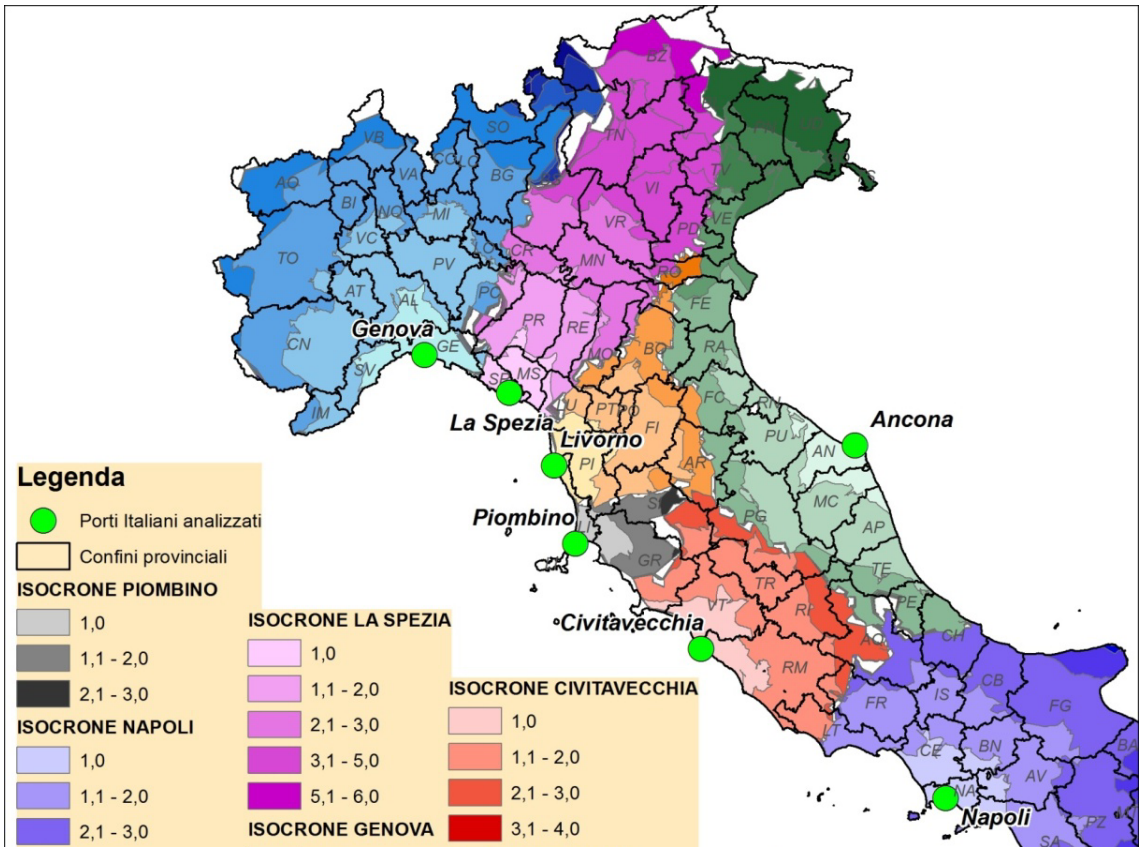

Fig. 10 Service areas of the analyzed ports.

4. Conclusions

The analysis of the political-economic dynamics shows a favorable condition to increase traffic between Europe and Algeria. In particular, Italy becomes a key partner for the trade of building materials, for the needs of agriculture modernization (new agricultural machinery, etc.) and for the industrial automation sector.

The analysis of existing routes and the results of port influence delimitation have demonstrated the feasibility of new routes, especially in the south central area of the west coast.

In fact, the port of Civitavecchia becomes a new bridge connecting north Africa for all Italian companies located in the area from Naples and Livorno, for which it would lead to a significant increase of accessibility.

Since this area is almost entirely included within the basin of the port of Civitavecchia, it results in an important solution for the recovery of the Made in Italy in Algeria.

The analysis of existing constraints highlights the need for a streamlining bureaucratic both to lighten the timing for goods input/output than port costs. This becomes a condition *sine qua non* which is difficult to think to a quantitatively significant increase in trade between Algeria and European countries, even starting from the suggested routes.

With regard to stated preference interviews [9], this work is still ongoing; we are encountering more difficulties, from the Italian companies, to provide data on their current cargo traffic while the section on scenarios of choice, constructed on the basis of a hypothetical service (to date for the route primary already highlighted Civitavecchia-Algiers), is less problematic.

Since this second part is the most important section, for the reconstruction of the users and the evaluation of potential demand, we are planning to remove the part relating to the reconstruction of existing traffic to avoid a source of friction in the compilation of the survey. Once the survey will be concluded, the model will be integrated with the data about the estimated demand for the proposed scenario and it will be elaborated a cost-benefit analysis to understand the real possibility to develop the new services. In case of positive economic results, it will be a start in the phase of involvement of the most important stakeholders.

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