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The Role of the Corinth Canal in the Development of the S.E. European Short Sea Shipping

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Abstract

This paper aims at identifying the role of the Corinth Canal in the development of the short sea shipping transport system of the southeastern. Europe. The Corinth Canal, which construction was completed in the 19th century is considered to be one of the biggest technical undertakings in Greece. It serves the sea transport of goods as well as human mobility in a national but also in an international scale. The canal can operate as a node of the transport network of Greece and also of the short sea shipping system of the southeast Europe. This is due to the important advantage of faster and safest sea route that the canal offers for the transportation between the ports of the Black Sea and Eastern Europe with those of the West Greece, Ionian Sea and the greater region of Central Europe. In order for the Corinth Canal to adjust to the ongoing developments and trends that have to do with the promotion of environmentally friendly means of transport, the integration of the different modes of transport and the establishment of a single intermodal transport network, its management has to proceed to the development and materialization of a suitable policy. The paper includes the findings of a survey conducted for the Corinth Canal authorities and concludes with certain propositions so as the Canal can revitalize and upgrade its position in the short sea shipping network of the S.E. Europe.

1. Introduction

The Corinth Canal and its contribution to the rational development of the short sea shipping network of the S.E. Europe, is examined in this article. Greece itself shows a special geopolitical importance as it is situated in the crossroad between three Continents, Europe, Asia and Africa and can be therefore considered as a natural bridge between Europe, Middle East and North Africa. Additionally Greece can be considered as the South - East Gate of E.U. (figure 1).

The geographic location of the Corinth Canal serves the cohesion of the Greek port system as well as the wider area between the Eastern and Western Mediterranean Sea and also the Black Sea ports. The importance of the Canal for the short sea shipping network of the S.E. European region lies mainly to the advantages that the Canal offers to the sea trade at a national and international level. These are examined through a research survey that took place in 1999 regarding the possible expansion of its market.

Through the general directions of the E.U. on the development of Short Sea Shipping, the paper focuses on the role that the Canal can play in it.

Figure 1: The Corinth Canal in the international maritime system



2. The development of Short Sea Shipping in Europe

According to the prevailing notion and as recommended by the European Union. Short Sea Shipping (SSS) refers to the movement of cargo and passengers by sea between ports situated in the European area or between European ports and ports in third countries, that have a coastline and their sea is adjusted to the E.U. Short Sea Shipping includes the domestic and international maritime transport not including the ocean crossing that includes the feeder services (the fill and emptiness of the goods (mainly containers), the redirection from or towards an open sea service to one of these ports -hubs) along the coast to and from the islands, rivers and lakes. It is therefore referring also to the sea transport between the member states and Norway, Island and other members of the Baltic Sea as well as the N.E. Europe including the Black Sea and the Mediterranean Sea.

According to the E.U. the European Short Sea Shipping fleet constitutes of the 40% of the world fleet, while at the same time, the open sea fleet is 50% of the corresponding world fleet.

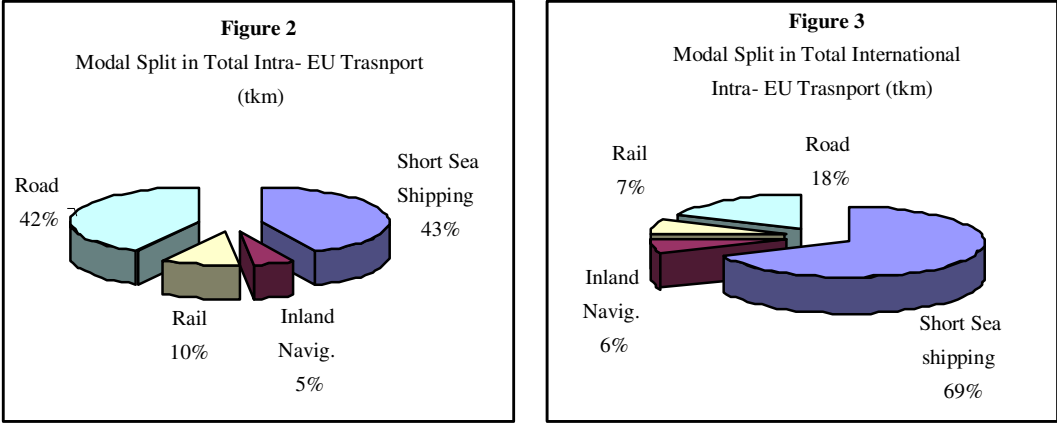
The evolution of E.U. sea trade is presented in the following table for domestic and international intra European sea transport, according to which domestic goods transport has increased for almost 67% while transport between member states has increased by almost 144%.

Table 1: Evolution of E.U. Goods Sea Trade

	1970	1980	1990	1992	1994	1996	1997	1998
Sea Domestic Transport (in 000 mio tkm)	97,3	147,2	152,4	148,5	145,4	159,3	156,5	162,5
Sea International Intra – E.U. Transport (in 000 mio tkm)	374,9	632,8	770,0	826,2	810,4	869,8	916,5	914,0

Source: Eurostat

Based on the information available (E.U. 1999), short sea shipping has increased considerably from 1990 to 1997 by 17% in tones and 23% in tkm. Of the total tkm in the EU, the shares of short sea shipping and road are almost equal. In terms of international tkm, short sea shipping has by far the largest share (see figures 1,2).



Source: COM (1999) 317 final

Regarding the S.S.S. fleet and its composition on the basis of the main goods transported, in the beginning of 1990's dry cargo vessels represented more than 50% of the fleet, while the percentage for liquid cargo vessels was below 20%. Greece was second in the number of vessels after the ex. Soviet Union fleet, but comes first in E.U. Short Sea Shipping fleet with almost 12% of the total S.S.S. E.U. fleet. Additionally, EU member countries represented a significant percentage of the total S.S.S. in Europe (almost 45%). In the following years, according to available data (E.U. 1999) from the E.U., the fastest growing segment of short sea shipping from 1993 to 1997 has been the containerized cargo, which rose by 44% (in tones).

As to the determination of the vessel types operating in the S.S.S. system there are no predetermined dimensional characteristics. On the contrary the dimensions and the tonnage of the vessels vary according to the market they operate, the type of cargo they carry and the volume of the shipment. Many operators in the market of dry cargo consider the S.S.S. vessels to be up to 3.000 dwt while others regard it to be around 6.000 dwt but 10.000 dwt is regarded to be the maximum tonnage level in intra EU sea trade (Tinsley 1991). In this context we see handy size vessels used for the carriage of grains from Britain and S. France to the Mediterranean, Panamax vessels with self loading possibilities in G. Britain's coastal transport lines and even container ships up to 1000 TEU's in intra regional activities. The average gross tonnage for vessels operating in S.S.S. is determined at 1.654 grt in the E.U. and there is a trend towards increasing it while the upper limit is determined around 6.000 grt (Delft 1995).

3. Greece and the promotion of Short Sea Shipping in E.U.

3.1 S.S.S. in the E.U.

It is expected that the development and establishment of a single market, the liberalization of markets and the removal of all obstacles in trade will boost intra E.U. trade. Different perceptions of demand and the notion of just in time in production and therefore in transportation, point out the importance of time and also quality of service. In this context efficient and effective transport connections are of vital importance.

Within the frame of free and unbiased choice of transport means the promotion of Short Sea Shipping is based on the supply of a sustainable and efficient alternative solution for the products carried and the transport units that can be transported by all means of transport. Sea transport has many advantages to offer to the E.U. transport system since it contributes to the relief from pressured and congested road networks, the cohesion of the market as well the revitalization of regional ports and areas (E.U. 2000).

The continuous increase of Short Sea Shipping in Europe and the special focus of the European transport policy on seaborne trade is mainly attributed to the advantages that Short Sea Shipping shows. Within the context of sustainable mobility and development, there are three main reasons for promoting Short Sea Shipping, and these include as reported by E.U. (E.U. 1999):

- The promotion of the general sustainability of transport. S.S.S. is emphasized as an environmentally friendly and safe alternative, in particular, to congested road transport.
- The strengthening of the cohesion and the facilitation of connections between different States and between regions in Europe and the revitalization of peripheral regions.
- The increase of the efficiency of transport in order to meet current and future demands arising from economic growth. For this purpose, S.S.S. should be developed into an integral part of the logistic transport chain and also a door-to-door service.

The above justify the increasing effort of the European Union to increase the use of Short Sea Shipping as an alternative transport means within the E.U. and against the externalities the transport system shows (congestion, pollution, accidents etc) that burdens sustainable development.

3.2 The role of Greece in the Mediterranean seaborne trade

In the sea borne trade in the Mediterranean, Greece has developed into a node in the international transport network. More specifically, Greece plays a significant role in the international sea trade route in the Mediterranean Sea, from the Suez Canal to Gibraltar. In this network Greece through its ports have a double role to play (Sambracos 1999):

- First, as a point of destination, where open sea vessels carrying out international trade serve the import of goods covering domestic demand. In this case goods arrive at Greek ports (mainly in Piraeus and Thessaloniki) and are then transported to the mainland through the road network and to the insular Greece through the domestic coastal shipping fleet.
- Secondly, as a point of goods' transshipment and transit to other countries of the S.E. Europe. The ports serve as hubs, where freight (usually containers) is unloaded from mother ships, consolidated and redistributed to other countries with small vessels forming a short sea shipping - feeder network or by using the land transport network (road, rail) to the Balkans peninsula and from there to the rest of Europe.

Among Greek ports, the ports of Piraeus and Thessaloniki have a strategic position in the Greek port system serving both the import of goods and their transshipment to other neighboring countries. Available data on both ports show that the total freight traffic in Piraeus has increased for 48% over the period 1994-1998 and in the Port of Thessaloniki for 14,5% (1997-2000). Container traffic has shown an increase of 80% in Piraeus and of 37% in Thessaloniki.

4. The Corinth Canal in the Greek sea trade system

4.1 General characteristics and data

The geographic position of the Corinth Canal serves the cohesion of the Greek port system since it connects the western with the eastern Greece (Sambracos et.al 2000). Its importance as a link between western and eastern Greece was early recognized and its construction was finalized at the end of the 19th century. Its dimensions reflect the sea transport market of that period, the vessels and the trade that was then conducted (Table 2). Taking into consideration the data presented in Table 3 it is concluded that the average tonnage is determined at around 425 n.r.t.(net registered tonnage).

Table 2: Dimensional characteristics of vessels passing the Canal

Vessels Width (m)	Max. Draught (m)
16,0 - 16,6	6,2
15,5 - 16,0	6,2
15,0 - 15,5	6,6
14,5 - 15,0	6,8
14,0 - 14,5	7,0

The max. draught for vessels with width smaller than 14m is 7,2m
The max. width of a vessel to pass the Canal is 18,3m

Table 3: Traffic through the Canal

	No of Transits	Tonnage n.r.t	Avg tonnage n.r.t
1990	10.109	4.418.850	437,12
1991	9.639	3.970.237	411,89
1992	10.653	4.435.122	416,33
1993	11.018	3.799.754	344,87
1994	11.853	4.462.668	376,50
1995	12.545	5.625.123	448,40
1996	12.459	5.748.401	461,39
1997	11.026	4.950.959	449,03
1998	10.662	4.502.325	422,28
1999	11.011	4.897.925	444,82
2000	11.715	5.464.824	466,48

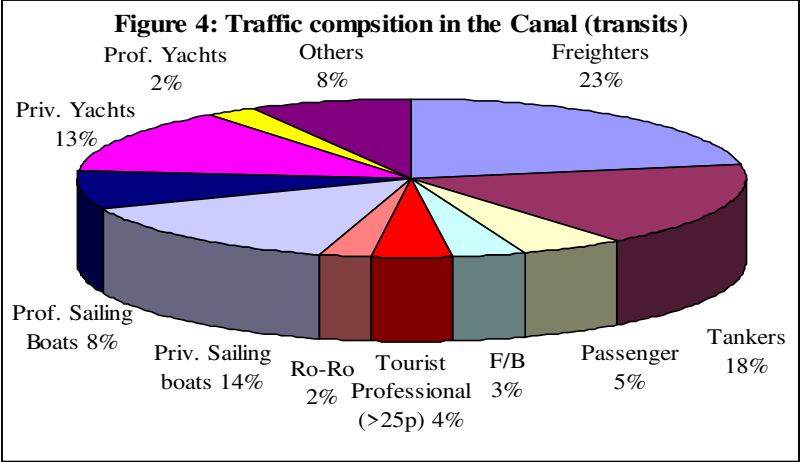
Source: Corinth Canal S.A.

As for the types of commercial vessels they can be categorized into the following main categories:

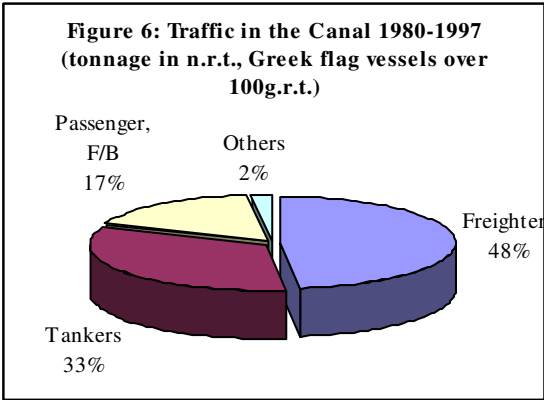
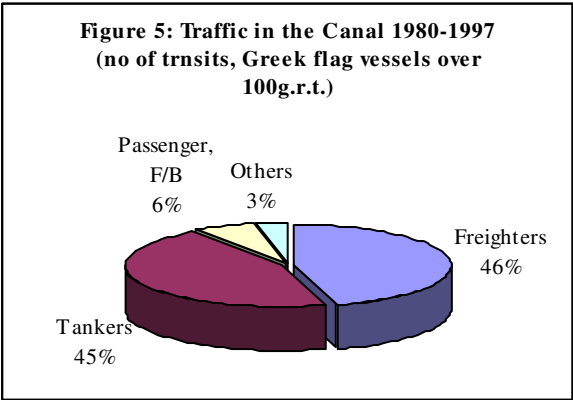
- Freighters that carry bulk and general cargo,
- Tankers, LPG's
- Ro-Ro, container vessels
- Passenger ships, ferryboats, professional tourist vessels (carrying over 25 passengers)
- Sailing boats and yachts (private and professional), professional tourist vessels (carrying less than 25 passengers)
- Other vessels (diesel vessels, fight ships, Port Police, tugs, fire vessels, lifeboats etc)

For cargo carrying vessels the average tonnage is around 650n.r.t., for tankers it is 458n.r.t. and for passenger vessels it is 1583 n.r.t.

For the year 1998, the composition of the Canal's traffic (in number of transits) is presented in the following figure, according to which, freighters and tankers are the most regular customers since they have performed the majority of transits, followed by the private sailing boats and yachts respectively (figure 4). For the same year, the majority of the vessels (43% of transits) were under Greek flag operating in domestic lines while 40% of transits referred to vessels under foreign flag operating in the lines Black Sea and eastern Mediterranean Sea to Greece or have called ports in Albania and Yugoslavia up to Italy. A small percentage (4%) were vessels under foreign flag that operated in the line S. Africa - Gibraltar or vessels under Greek flag operating in the line W. Mediteranean Sea and N. Europe to Greece. The rest of the vessels were barges, floating cranes, dredges as well as Greek professional tourist and fishing boats registered in local registries.



Additionally, for the years 1980 – 1997 and for the vessels over 100g.r.t and under the Greek flag an average percentage of 46% and 45% of the total transits referred to freighters and tankers respectively, while passenger vessels' share was only 6%. In terms of tonnage (in n.r.t.) freighters have by far the biggest share (av. 48%), followed by tankers (av. 33%) and Passenger carrying vessels (av. 17%).



4.3 The importance of the Corinth Canal for S.S.S.

4.3.1. Advantages for navigation

The importance of the Canal for navigation is great considering that the Peloponnese round is avoided, with positive consequences for the travel distances, time and safety for national and international trade. In particular, the S.S.S. navigation between Black Sea - Aegean Sea - Ionian Sea - Adriatic Sea has to choose between the round of Peloponnese or the passage through the Canal. At the same time, the hub role of Piraeus port situated on this route plays also a significant role for the operation and promotion of the S.S.S. concept if there are advantages in favor of the Canal.

The advantage of the Canal in comparison with the Peloponnese round is summarized in table 5, that presents the traveling distances (in nautical miles) of the alternative navigation routes between the main destinations the Canal serves.

Table 4: Advantage of the Corinth Canal in traveling distances

Origin	Destination	Distance (nautical miles)		
		Through the Canal	Through the Peloponnese round	Difference
Messini	Piraeus	403	477	74
Venice	Piraeus	721	851	130
Printesi	Piraeus	333	464	131
Corfu	Piraeus	237	370	133
Patra	Piraeus	100	295	195
Messini	Sounio	428	463	35
Venice	Sounio	745	837	92
Printesi	Sounio	358	450	92
Corfu	Sounio	262	355	93

Source: Ministry of Merchant Marine

From the above-presented data, it can be concluded that:

- The Canal shows great advantage for the domestic navigation between the Piraeus port and the ports in the Gulf of Patras.
- Important is also the advantage for sea trade between Italian ports and the port of Piraeus as well as between Ionian ports and Piraeus.
- Satisfactory is the advantage between the ports of Adriatic sea and Ionian sea with the ports in N.E. Aegean and Black Sea.
- Finally, minimum is the advantage between, the ports of West- Southwest Mediterranean and North – Northeast Mediterranean

The reduction in distances for about 100 nautical miles average means also time economy for the user of the Canal, that can be translated into further economy in fuels and lubricants, working hours of seamen and also reduction in damages. All these result in lower variable operating costs. Additionally, the round of Peloponnese involves higher navigation risk and danger especially during the wintertime. The risk is higher for non-loaded vessels of up to, 1000grt. The contribution of the Canal to navigation safety means fewer accidents for transit vessels reducing the social cost of the transport. Finally, trading is a function of distance and time. The Canal, by reducing distance and traveling time has resulted in greater demand for freight transport and has promoted the development of new trade zones.

4.3.2 The importance of the Canal through a research survey

The importance of the Canal for the national and also international trade can be seen through the results of a survey that took place during summer 1999 on account of the Corinth Canal

S.A. and in cooperation with the University of Piraeus (University of Piraeus, 1999). The survey was conducted through two sub-surveys that took place in parallel as following:

- the first survey referred to vessels that went through the Canal in the period between June 28 and July 23, 1999. The survey took place in the Canal and focused on three main vessel categories, the freighters (bulkers, tankers, Ro-Ro, containers), the passenger ships (including ferryboats) and the leisure boats. The categorization was based on the pricing policy of the Canal, that includes six pricing categories according to the type of the vessels and their origin-destination.
- the second survey referred to the maritime companies that were or still are customers of the Canal.

The Surveys were conducted through questionnaires that included questions regarding:

- The vessels and their routes
- The use of the canal and the factors affecting the demand for transport services
- The customers opinions regarding
 - a. the quality of the services
 - b. the possible additional services the passengers might require

In this period 680 vessels crossed the canal and from those 188 questionnaires were gathered. The sample (%) of the vessels that were questioned in comparison with the total vessels that crossed the canal per type was:

- 17% of bulk carries
- 25% of tankers
- 45% of Ro-Ro vessels,
- 20% of passengers,
- 50% of ferryboats
- 24% of the leisure boats

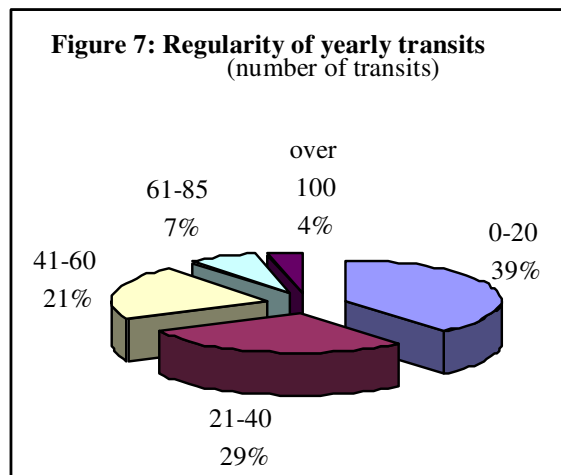
Also, questionnaires were gathered by 35 maritime companies that owed a fleet of 228 vessels using the Canal's services. We should mention here two facts, first the majority of companies-customers of the Canal referred to the same operator, who was the one to answer in account of the companies he operated and secondly, there were companies that were not the owners of the vessels but agents, who were unable to express the owners opinion regarding the Canal's services.

The results of the survey are presented in the following paragraphs for the cargo vessels.

4.3.2.1 Freight carriers

Among the freight carriers that took place in the survey 51% were bulk carriers, 30% were tankers and 9% were Ro-Ro vessels. The majority of the vessels (55%) were under the Greek flag while the other used Ukraine, Russian, Malta, Albania, Panama and Germany. The tonnage of the vessels was up to 2000 n.r.t., while the majority of vessels were between 100-1000n.r.t. (21% were above 1000 n.r.t.). As for their employment, over 60% of the vessels were tramp ones, while the majority of vessels under Greek flag (especially tankers) were liners and had regular and frequent transits through the Canal.

The majority of the vessels (64%) mentioned that they use the Canal on a monthly basis while a percentage of 18% uses the Canal only for 2 – 7 transits per year. The transits per year are - presented in the following figure 7.



Regarding the use of the Canals service and the round of Peloponnese 78% of the vessels responded. From them 28% reported that in certain cases they have chosen the Peloponnese round. Most of them perform regular transits through the Canal and almost half of them were over 1000nrt. The main reasons for not using the Canal are related with the cost of the transit, the lack of time constraints and the favorable weather conditions. Most of them were tramp vessels.

As for the reasons for using the Canal we have the following results:

For liner vessels

- the factor of time economy was reported to be the most important reason for using the Canal
- the fuel economy was reported by 90% of the vessels
- the risk, danger avoidance was reported by 80%, of the vessels
- the reduction of damages and wearing by 70% of the vessels
- the lack of anchorages by 60% of the vessels

For tramp vessels:

- the factor of time economy was reported to be the most important reason by 88% of the vessels
- the avoidance of risk and danger was reported by 53% of the vessels
- the fuel economy by 47% of the vessels
- the reduction of damages and wearing by 35% of the vessels
- the lack of anchorages during the round of Peloponnese by 30% of the vessels

4.3.2.2 Survey on the maritime companies

A total number of 35 maritime companies participated in the survey with 228 vessels. From them the majority was companies with freight vessels and tankers (22 and 6 companies with 140 and 20 vessels respectively). The other companies have Ro-Ro vessels, containers, LPG etc. The main cargoes transported are general and bulk cargo (dry and liquid) such as grains,

timber, paper, ore, cement, fertilizers, salt, wine, oils etc. as well as chemical products, diesel, oil, Gas oil, olive oil etc.

The main routes followed by each category are in the area of S.E Europe and more specifically:

a. Cargo vessels cover the routes:

- Black Sea – Mediterranean Sea
- Black Sea – Adriatic Sea,
- Black Sea – Turkey-Greece-Italy
- Greece-Italy
- Greece – Albania
- East Mediterranean – Italy – Yugoslavia
- Scandinavia – Greece – Cyprus

b. Tankers cover the routes:

- Athens - Rio
- E. Mediterranean – Black Sea
- Mediterranean – Black Sea
- Israel – Italy

c. RO-RO vessels cover the routes

- Greece – Italy
- W. Mediterranean – Adriatic – Greece – East Mediterranean
- Black Sea – Adriatic Sea
- Piraeus – Adriatic Sea
- Slovenia – Piraeus

d. Container ships usually operate in East Mediterranean and LPG's in the line Greece - Italy

As for the reason why using the Canal the majority of the companies reported as main reason the time economy and then the economy in fuels and lubricants. A third reason was the dangerousness and risk of the Peloponnese round especially during wintertime. Some of them reported also the wearing of the vessels and the luck of anchorages during the round. From the companies that use the Canal, some of them reported that they also use the Peloponnese round mainly for the cost of the Canal's transit and the possible delays. Thus in the case the difference in time between the two alternatives is small then, the round is preferred (for example companies prefer the Canal when the port of origin is in south Adriatic Sea and the port of destination on north Aegean or Black Sea).

4.3.2.3 The Canals operation from the demand size - Conclusions

As already presented above the Canal serves small and medium sized vessels mainly with a tonnage of 500-2000nr.t. The reasons for using the Canal are in order of importance:

- 1st the time economy
- 2nd the fuel economy
- 3rd the safety
- 4th the reduction of wearing and damages
- 5th the luck of anchorages during the Peloponnese round

Both liners and tramp vessels give the above factors the same weight of importance. These factors seem to overwhelm the factor of “transit cost”, since most of the commercial vessels considered it to be the number one reason along with delays (avg waiting time 30’ – 1 h) for not preferring the Canal. In spite of that, vessels most of the times use the Canal for its advantages and only prefer the round when there are no time constraints and the whether is good.

The survey pointed out that the adequacy of the currently offered services (piloting and towage) but pointed out that the way the payment is conducted causes delays to the vessels and that it is essential to develop intermediate ways of payment (through bank accounts) or electronic collection systems especially for regular users. Additionally, users propose the development of new services. For cargo vessels, the most important new service is the provision with fuel and foodstuff as well as the possibility for embarkation and disembarkation in the area of the Canal.

It is therefore understood that the Canal plays an important role not only for the Greek fleet and the Greek goods transport but also for the Short Ship Shipping industry of S.E. Europe. We can highlight that most of the users of the Canal show regular transits. If there was no interest wouldn't the Canal and the specific market have already been deserted?

5. Discovering measures for the upgrading of the Canals role

The position and the dimensional characteristics of the Canal (small – medium vessels) already serve the main routes in the S.E. Europe Short Sea shipping trade. As indicated from the survey that was conducted the Canal can become an important node in the national and international S.S.S. market since it allows for the cohesion of the East and West Mediterranean Sea.

In order for the Canal to exploit the current developments and trends regarding the promotion of sea transport, its management needs to proceed to the development of a suitable operation policy. Such a policy should focus on macroeconomic and also microeconomic short time objectives.

In this context, the Canal' s orientation should be towards three main policies pricing, investment and institutional framework

5.1. The Pricing policy of the Canal

The price of the offered service is one of the major factors determining the level of demand especially in these niches of sea transport that show high elasticity of demand. So far the structure of the current pricing policy is determined according to the following pricing principles:

- All vessels wishing to transit the Canal pay fees (towing and piloting fees)
- The payment of tolls and other dues varies depending on six categories that have been developed based on the following factors:
 - The type of the vessels
 - Origin and destination of the vessels
 - Flag of the vessels
 - Dimensional characteristics of the vessels (tonnage, length etc)
 - The type of some floating buildings

The aforementioned categories include the following:

- Category A: passenger vessels, freighters or motorboats under Greek flag (except barges, sailing boats or floating equipment), that operate in solely on domestic routes or make occasional calls to foreign ports
- Category B: passenger vessels, freighters or motorboats that have called port in Albania, Yugoslavia and then in Italy until Taranta. Also, vessels that come for the Black Sea and Eastern Mediterranean Sea (until the port of Alexandria) heading to a Greek port and vice versa. Finally vessels under foreign flag that have origin or destination Greek ports.
- Category C: passenger vessels, freighters or motorboats that that have a port of origin or destination in S. Africa (western than Alexandria) until Gibraltar. Also vessels under Greek flag that have as port of origin or destination in W. Mediteranean Sea, N. Europe and call port in W. Greece or in the Korinthean Gulf.
- Category D: barges, floating cranes, dredges etc.
- Category E: Greek professional tourist and fishing boats under 100n.r.t. registered in local registries (Isthmia, Loutraki, Corinthos)
- Category F: Sailing boats and yachts (except professional tourist vessels carrying over 25 passengers)
- Special categories that allow for increases in the fees (in all shipwrecks, night passages, passages during holidays, use of more than one tows or pilots etc.) or reductions (in professional tourist vessels carrying less than 25 passengers).

The applied pricing policy is in favor of vessels under Greek flag operating mainly in the domestic market. On the contrary, the fees are higher in the case of the vessels of category B, mainly due to the fact that these vessels enjoy many advantages when using the Canal in comparison with the other vessels. Therefore, there a price discrimination philosophy based on the level of benefit that the user enjoys when passing through the Canal and on their flag. There is no connection whatsoever between the fees and the cost of the Canals services (tolls, pilot, towage).

According to the survey on the vessels and the companies we can see that 33% of the companies consider the transit fees to be rational while the remaining 66% of the companies consider the fees to be expensive. Accordingly, from the survey on the vessels the majority of them consider the fees to be rational.

Taking into consideration the results of the surveys and the general pricing policy principles, the implementation of a price discrimination policy (Sambracos 2001) according to the user of the canal and the development of special prices should be the base of the pricing policy that needs to be applied. The proposed policy is based on the following key aspects:

- abolition of flag discrimination
- categorization of the users that operate in domestic and international lines
- pricing based on free competition criteria
- determination of the elasticity of the users

For national lines, the pricing policy should focus on the marginal or average cost that will also maximize the economic welfare. For international lines, pricing should be according to "what the market can bear" as determined by the elasticity of the user and the differential cost between the Canal and the Peloponnese circumnavigation. Additionally, a form of user discrimination policy should be added in favor of regular customers or customers that schedule their transits.

5.2 The investment policy

The existence of suitable infrastructure in the Canal area is an additional factor that determines the demand for transport services. This infrastructure includes technical issues such as berths and breakwaters as well as towboats to serve the passage and temporary anchoring of the vessels.

In the long run period such policy should examine the possibility for larger dimensions the Canal so as to support the passage of bigger vessels based on the results of a feasibility study. In the short period the development of suitable facilities and equipment is important so as to facilitate the need for continuous communication and information diffusion. Information technology is a supportive tool that acts as an enabler covering the need of communication in the Canal and also between, the Canal and its users. Thus the development of new facilities (banking, supplies etc) should also be considered.

5.3 The institutional operating framework

According to the existed institutional operating framework the Canal was a public organization whose status did not allow for any commercial initiatives apart from the transit of vessels. This restricted institutional framework needs to evolve bearing in mind the demand and the developments towards a more integrated transport system. In this network the Canal is a node and therefore should be able to offer new services that mostly have a qualitative character. They include new investment plans in accordance with the market demand, such as:

- Additional port facilities, berths, marinas, piers etc. for the temporary anchoring of commercial vessels in order to take or leave seamen,
- Additional services that may include the procurement of fuel, lubricants, water, spare parts etc.
- Sufficient connection with the other modes of transport (intermodality).
- Reception facilities that include restaurants rest areas, banking services etc.

Regarding the institutional framework it should be mentioned that from the current year the proprietary regime of the Canal has changed and now the operation of the Canal (not the infrastructure) is engaged by a private company.

6. Conclusions - Epilogue

The Canal and its dimensional characteristics allows for its further development within the Short Sea Shipping trade market. Especially, the Canal serves the operation and development of feeder services since it allows for the transit of small – medium sized vessels up to 2000n.r.t. that covers small distances between the Eastern and Western Mediterranean and also Black Sea ports.

Knowing the objectives of the E.U. regarding sustainable transport of goods and minimization of transport externalities, there should be a special focus on the Canal for the service of the southern eastern European edge. The existing congested road networks on one hand and the lack of efficient infrastructure in many countries (especially non E.U. ones) on the other hand upgrade the role of sea transport in this area. This is due to the fact that sea transport is the most economic means of transport and there is no demand for infrastructure since it possesses natural navigable corridors. The incorporation of sea transport and more specifically S.S.S. in the intermodal transport chain is also a perspective seriously observed by the E.U.

Furthermore another aspect is the connection of SSS with inland navigation in the Central and also Eastern Europe and through the Canal. Our region offers the possibility of the creation of a new navigable network connecting the Mediterranean Sea with Danube. The importance for the Balkan countries of such an undertaking can be appreciated through several arguments such as:

1. access to the navigable network of Europe
2. access to new, fast developed markets of the Central and East Europe
3. development of a new land transport system and entrance/exit of these countries to the Mediterranean Sea.
4. further development of the competitiveness of the means of transport resulting to the reduction of the final price of our products in the European markets
5. development of the sea and river ports

Finally in what concerns the Corinth Canal in connection with the two main ports of Greece, Piraeus and Thessaloniki we can underline the following:

The fact that Piraeus is close, in terms of distance and time to the main commercial routes of the Mediterranean Sea, provides it with the opportunity to become a hub port for S.E. Europe. This can be achieved through two alternative ways (Sambracos 1988,1999). The first way includes the open sea – road/rail transport. This means that the goods are unloaded by mother - ships in the port of Piraeus and then through the road/rail networks they are carried to the other Balkan countries and Central Europe. The second one includes the sea - river transport. The goods are transhipped in Piraeus or Thessaloniki and then with feeder ships via the Aegean and Black Sea they are carried to the other countries through the Danube river and also to the West Mediterranean Sea. We should also consider the possibility of a SSS-inland navigation network from Thessaloniki via Axios-Vardar river to Danube (Sambracos 1999).

The second alternative is the most appealing one since there is no use of the road or rail network. In this context the Canals role is special since it can offer its services to the small sea-river going vessels, not only because of the time economy it offers but also for the safety it provides.

In order for the Corinth Canal to exploit the emerging intermodal market it is essential to proceed to short and long run plans that will allow for the reengineering of its operation. As the market survey indicated, the key aspects of this reorganization lie in the fields of the pricing policy and the development of new services, while in the long run there is a need for new investments, in accordance with the dimensional characteristics and needs of the maritime market.

Finally it should be mentioned that S.S.S. should not be considered as a microcosm of the traditional open sea transport. Short Sea Shipping has unique operational needs since it refers to the transport of goods for small distances and with small vessels. S.S.S. could be easily considered to be a viable alternative to road transport and should be promoted accordingly as the most economic means in terms of private and social cost of transport. The Corinth Canal needs to revitalize its position through macro and microeconomic objectives and actions in order to play an active role in the Mediterranean S.S.S. industry.

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