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2004

WORLD MARITIME UNIVERSITY

Malmö, Sweden

**The importance of the Rhine-Main-Danube,
transport corridor. Its impact on the Central and
East European countries, with an emphasis on
Romania**

By

**Constantin Sava
Romania**

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in


General Maritime Administration & Environment Protection

1997

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.



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Abstract

This dissertation tries to analyse the importance of a major waterway transport that is the Rhine-Main-Danube corridor, both for Romania and the Danube's riparian countries.

Made up through the connection of two major European rivers, the Danube and the Rhine, the corridor connects not only two seas - the North Sea and the Black Sea - but also the two halves of Europe, the West and the East.

In the past, the Danube has connected the eastern Europe with some of the western countries - Germany and Austria - but the political and economical systems' differences have prevented the development of closer connections across the Iron Curtain.

Now, with the curtain no more in place and with the corridor's access to the Rhine and the port of Rotterdam, this water highway has a great future to becoming the main transport artery of Europe.

The analysis has been concentrated more on legislative and technical aspects than economic ones. On one hand, the statistical system of the former communist countries is still under construction and economic data is generally difficult to access. On the other hand, due to the Yugoslavian conflict, the traffic along the Danube has come to a halt between 1990 and 1995. As is well known, the United Nation Organisation imposed an embargo against the former Yugoslavia, which in retaliation, blocked the Danube along its border.

The dissertation is structured into two parts. The first one concerns the subject from the Romanian perspective, assessing its economic framework and the transport sector reforms. It also analyses the role of the main port, Constantza situated at one end of the corridor and the Rhine-Main-Danube waterway characteristics. We also considered important to have a look into the European harmonising tendencies, concerning internal waterways, with an accent on the Danube.

The second part analyses the corridor from a European perspective. That is why we went through the European inland waterway network and its classification and the development of the transport infrastructure in Europe. We also made a parallel between technical and navigational rules along Rhine and Danube as well as a legislative comparison between the Rhine-Main-Danube corridor's main Conventions.

It is a fact that European Union has back-up policy against the inland waterway transport. That is why we analysed the regional co-operation and overall integration in Europe, the role of Economic and Technical Research and the European Union's Transport Policy. We also made a brief assessment of the various modes of transport along the corridor, such as the passengers, containers, and combined transport.

The European transport policy is oriented not only toward efficiency but also toward environment conservation. This is why we collected data concerning levels of traffic on various modes of transport and their influence upon the environment. The conclusion is clear that the waterway transport is a clear winner in the environmental race.

We may conclude that the transport corridor, even if not totally permissive, due to legislative and technical problems and differences, has an important role to play within the future transport network of Europe.

Romania, with its southern border constituted by the Danube and with an increasing role among the Black Sea countries has the right position and capabilities, to becoming an important hub for the European - Asian trade.

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List of Abbreviations

RMD	Rhine Main Danube
ECMT	European Conference of Ministers of Transport
EC	European Commission
EU	European Union
MOT	Ministry of Transport
OECD	Organisation for Economic Co-operation and Development
DC	Danube Commission
CCCR	Central Commission for the navigation on Rhine
ERS	European Rail Shuttle
DWT	Dead Weight Ton
BSEC	Black Sea Economic Co-operation
CEE	Central and East European
NAFTA	North American Free Trade Agreement
EEC	European Economic Commission
IRU	International Road Transport Union
ISO	International Organisation for Standardisation
UIC	International Union of Railways
BIC	International Container Bureau
EIA	International Intermodal Association
CEVNI	Internal Waterway European Code

INTRODUCTION

This dissertation is intended to present a clear picture of Europe's main inland waterway, The Rhine-Main-Danube corridor, accompanied by economic and technical considerations and to stimulate the reader interest for this alternative mode of transport.

It will also compare the inland water transport with other modes, underlining its advantages and weaknesses. It will be also analysed the role and importance of the Black Sea - North Sea transport corridor, along the Danube, Main and Rhine rivers.

The Danube was always used as a major European transport artery and Romania didn't make any exception from this. In fact it has always used the Danube as the main water link to connect its economy with other European states, both for its own commerce and for cabotage as well. Therefore, the dissertation will analyse the change brought by the opening of the Rhine-Main-Danube not only for Romania but also for the Europe as a whole.

At a simple glance, the big technical achievement of connecting two of the Continent's biggest rivers, seems not only impressive but also the best solution for the most economical trans-European transport connection. The fact is there are still legal and technical that have to be solved.

A short history of the European Inland Waterways Transport

The World history gives evidence of many cases of inland shipping, starting with the Egyptians, Chinese, Dutch and Britons. The use of rivers and the building of canals to avoid hindrances to navigation came naturally. The initial uses were for passenger traffic and latter for goods transport.

The industrial revolution, started in England, required large quantities of raw materials to supply the new industries. It could be said that this was the moment when inland shipping started to be used extensively and became an industrial process.

The technical changes also brought the revolutionary invention of the steam engine. It changed completely the transport industry and changed the order of important modes of transport, with railways being first. With, technical improvements of engines and the extensive construction of roads, road haulage vehicles became the first choice on the exporters.

The European inland waterway system was used all trough the Continent's history and it played a similar role for industrial development, like the North American rivers played for the USA.

Benefiting from the cities' positions along big rivers, and from the fact that Europe has a lot of important and deep waterways, the industrial regions took advantage of it. A lot of raw materials have been transported along the network, the exporters used it

extensively, taking advantage of the much higher carrying capacity compared with the railway and the possibility to transport larger shipments of cargo.

The Economics of developing larger river ships and carrying units.

The very beginning of inland river crafts were self propelled barges, but very rapidly, with the advent of steam engines, the idea of towing more barges, as a first idea of economy of scale was developed. On the Rhine, the transport started with self propelled barges sometimes towing a simple one but toward 1900s, steam tugs were already in use. In forty years, the tugs power doubled from 2,000 HP at the beginning of the century, to 4,000 HP just after the Second World War.

As mentioned earlier, in the United States the inland waterways were extensively used, with the Mississippi being the major north-south artery. That was the place where a new technique of towing barges was introduced: pushing them. The idea was imported in Europe during the 50s, after tests showed that the new method to be more advantageous with the propulsive efficiency increased compared to pull tows.

The idea of pushing barges was enthusiastically embraced by the industry and soon only the waterway size was limiting the size of the convoy. As a natural follow-up, new generations of standard barges and tugs have been constructed, opening the way for interchangeability between various operators.

Waterways' attractiveness.

When discussing the attractivity of this transport mode, what matters is the economics behind it and make cost comparisons with the other modes. The basic method is to compare fuel costs or to find out which mode uses less fuel for the transported unit of cargo, considering that fuel costs account for almost a third of the total transport costs.

Such an analysis is not easy, some of the available statistics are confusing, depending on who produced them. Also fuel consumption depends on the types of engines used, on waterway characteristics and on weather. It was estimated for instance that waterways in Russia are up to 50 % cheaper than the railways (Prokhorenko E.; Blue roads of the European USSR), while the oil transport costs on the Volga are similar to those for transport by pipeline (Postnikov, V.I.- Main trends in the development of river transport).

Even though it is not so obvious, inland waterways could offer comparable speed with road transport. If the waterway is large enough and there are not so many locks along it, the river cargo transit could be competitive. The same sources mentioned above show that on the Volga river, the speeds could reach 25 Km/hour giving a distance of roughly 500 Km/day. A test done on the Rhine, concerning a container transport, showed that a trip from Basel to Rotterdam by train is time equivalent to transporting it down river, by barge (Elle, D.1987-A buoyant future beckons Rhine Barges. Containerisation International, August 1987.)

The content of the research has been devised into two parts.

Part 1 one contains the relevant data, seen from the Romanian and Danube view point. So, chapter 1 analyses the Romanian economic frame and the description of its transport sector. The importance of the port of Constantza, situated at the Eastern end of the corridor is underlined in chapter 2. The next chapter gives the basic information concerning the two rivers, the Rhine and the Danube, characteristics of their fleets and cargo traffic data. Chapter 4 comprises the basic data referring to the corridor's riparian countries as the market that use it. At the end of part 1, the chapter 5 makes the transition toward the second part by analysing the European Conference of the Ministers of Transport (ECMT) works and resolutions, with an impact upon the waterway network. It also underlines the CEE technical and safety prescription.

Part 2 moves the dissertation's perspective from the West and this is how chapter 1 deals with the European inland waterway network, its present state and the latest evolution of the EC river fleet. Chapter 2 puts together and compare the technical and navigational rules along the two rivers, Rhine and Danube. For the moment the navigation along the corridor is regulated by two separate Conventions and this is what chapter 3 analyses as well as the historic development of the waterway. The last chapter of the second part elaborates on modern uses of the waterways for the transport of passengers and containers.

1.1. Today's Romania

Assessment of institutional and legal issues

1.1.1. Assessment of the Economic Framework and Recent socio-economic Developments

Currently, Romania is in a transition period from a centrally planned, to a free market economy. Over the period 1990 to date, various steps were initiated providing the first moves toward re-organisation of transport sector.

The idea behind the reforms plan is laid out in the government's 1992-1993 "Economical and Social Reform Strategy". It is the official document that focuses on the need for the country to engage in market economy mechanisms, not only in general, but also in the specific sector of transportation. An additional set of legal and institutional instruments is essential for these concepts, to be developed.

It is well demonstrated and widely accepted that the passage from a centralised economy to a market-oriented one creates serious economic and social problems. The effects of this transition process are clearly demonstrated in the decline in real GDP growth since 1988.

It should be noted however that already before 1989 the rate of growth of the economy was in decline, as the forced investment programme in heavy industries and in infrastructure did not compensate the deterioration in other sectors of the economy. The growth of GDP in 1993 is mainly due to the increase of agriculture output by a recovery of the harvest after a severe drought in 1992 and to a slight recovery in industrial production.

The Romanian economy has witnessed a shift in the composition of its GDP. Industrial output, which was encouraged actively before 1989, has become a much less important component of GDP, although its share remains high in comparison with international standards for modern economies. The width of services has grown in importance but their contribution to GDP is still well below the average proportion of services in other countries in the region that are also adapting to a market oriented economy.

Economic development has nevertheless taken place under the conditions generated by the transition to a market economy, despite the imbalance within various sectors and branches, acute shortages of financial and material resources as well as an unfavourable international conjuncture.

The private sector contributed to the formation of more than a quarter of the gross domestic product.

The sharp decline of industrial production, which still prevails as a major part of the gross domestic product, resolutely influences the evolution of the whole economy. From the available data, the volume of foreign investments can be estimated at more than USD 100 million representing almost 13% of the gross domestic product.

Reforms brought an increase in unemployment, a decrease of the purchasing power and a depreciation of the national currency. The populations consumption decreased to a great extent because of the reduction in the real incomes of various categories.

The economy, inherited from the totalitarian regime was characterised by:

- ubiquitous socialist (state and co-operative) property, as private property was not practically allowed;
- excessive centralisation, rigid planning and low efficiency;
- imbalance among the productive branches and sub-branches;
- forced, over dimensioned and energy-intensive industrialisation without correlation with the country's raw material sources;

The exaggerated cutbacks in imports and the forced promotion of exports, were aimed at paying off foreign debts early in 1989 and deepened the crisis in all branches of the economy, bringing about an extremely low quality of life.

The Government which took office after the May 20, 1990 elections, took radical measures for a swift transition to a market economy including the dismantling of the command economy, the turning of state-run enterprises into autonomous units (regie autonome) and commercial companies, price liberalisation, the passing of the privatisation laws and the encouragement of foreign investments.

The energy and raw material crisis, the reduction of investments, repeated labour conflicts, difficulties related to the implementation of the land law (which restores 8 million hectares-about 80% of the country's arable land to the former owners or to their offspring), the financial blockage, as well as the dramatic fall in exports due to the dissolution of CMEA have all contributed to the economic situation during this period of transition. The industrial output of 1992 having decreased for instance, by 54% compared to that 1989.

Foreign investment in Romania

In December 1989 Romania embarked on the path to market reforms. The authorities have systematically set out to encourage a hospitable business environment and to establish a framework of positive incentives. In this respect, the legislation established the basic principles of the equality of treatment for foreign investors, non-interference by the Government and unrestricted access to all sectors of the Romanian economy.

Guarantees are provided for up to 100% foreign ownership, full repatriation of profits and capital, full retention and free use of export earnings. At the same time, major investment incentives include substantial tax holidays and customs duty exemptions are provided on imported equipment.

Given the importance of foreign investment for the reform process, in 1991 the Romanian Government established the Romanian Development Agency (ARD) with the main objective to welcome and facilitate foreign investors. With the headquarters in Bucharest and a network of regional staff throughout Romania, the ARD is the first call for investors seeking to establish operations in the country or wishing to make contact with Romanian businessmen. On 31 December 1993 foreign investments in Romania totalled 760.5 million dollars and the number of companies with foreign capital participation stood at 29,134. The number of investing countries was 127, but 84% of the invested capital came from G 24 member states. (Romanian Statistic Agency)

Between the Eastern European countries, representing a huge market, Romania made important economic steps recently, to attract foreign investments and co-operation.

As it was mentioned by the Romania Encyclopaedic Survey, on 31 March 1995, foreign investments in Romania totalled 1.329 billion dollars and the number of foreign capital companies stood at 44,847. The number of investing countries was 139, and 72% of the invested capital came from OECD Member, States (47% from European Union Member States).

The principal investors came from South Korea, USA, Germany, Italy, France, Netherlands, Luxembourg, Canada and UK. In 1992 Romania joined the Multilateral Investment Guarantee Agency (MIGA) and the Bank for International Settlements (BIS).

Romania's advantages as a location for investment generally include:

- a large domestic market (23 million consumers), the largest in SE Europe and the second largest (after Poland) in Central Europe;
- excellent location at the cross-roads of traditional trade routes, which allows access to over 200 million customers within a 1,000 km radius;
- extensive sea and river navigation facilities ;
- Constantza being the largest Black Sea port ;
- a skilled labour force, with training in technology and engineering, at relatively low wages;
- a wide range of natural resources, including fertile farmland and a significant tourism potential;
- a diversified industrial structure allowing the local purchase of intermediate inputs; attractive foreign investment legislation.

As of 1 January 1994 Romania has applied a new system of Generally Accepted Accounting Principles (GAAP) which is similar to the French GAAP system. Romania has signed agreements on the avoidance of double taxation with 29 states (Germany, USA, France, United Kingdom, Japan, China, Russia) and Accords on mutual investment guarantees with 33 states (Austria, China, France, Germany, United Kingdom, The Netherlands, South Korea, USA).

1.1.2. Privatisation process

The privatisation process is a vital component of economic reforms, aiming not only at fundamentally changing the structure of property but also at re-launching economic activity.

The implementation of the process included the creation of an adequate legislative framework regarding the restructuring of state owned companies, setting up specific institutions (like State Ownership Fund or Private Ownership Fund) and mechanisms. A particular aspect is that 30% of state interests in all companies has been transferred free of charge to the population.

The privatisation process is supervised by the National Agency for Privatisation while the technical operations are carried out by the State Ownership Fund and five Private Ownership Funds). By mid 1993 the development of a private sector in Romania had recorded some significant results: establishment of almost 400,000 small private companies that represent 28% of GDP, employ 36.6% of the labour force and carry out 45% of all retail trade and about one third of all foreign trade. (National Agency for Privatisation published data)

So far as the state industrial sector is concerned, while 1992 and 1993 can be regarded as the period of establishing the privatisation mechanisms as a pilot test, 1994 represented the start of the large scale privatisation by the public offer of shares, the sale of shares by tender, direct negotiation with selected partners, and management and employee buy-out schemes.

Privatisation started in 1993 when the State Ownership Fund proposed 669 companies for privatisation and by the end of the year 134 small companies were privatised.

The Banking sector

The Romanian banking sector underwent a major restructuring within and for the support of the reform process. In March 1991 a new banking system was established, having two levels: the National Bank of Romania with the functions of a central bank and the other banks which became commercial banks.

The commercial banks are freely competing on the financial market. Subsidiaries and branches of foreign banks can operate in Romania subject to authorisation from the National Bank. By 1993 in Romania there were 7 banks with state capital, 5 banks with private capital, 3 subsidiaries of joint venture banks and 2 branches of foreign banks. Starting in November of 1991, a limited, internal convertibility of Romanian currency became operational. The exchange rate of Romanian currency is determined daily by the National Bank that authorise commercial banks fixing procedure.

1.1.3. Assessment of Reforms in the Transport Sector.

The issues at stake for the last seven years, were the decentralisation of the decision-making process and the strengthening of the autonomy of a special organism called "State-Owned Enterprises Fund".

There are two main groups of reforms which have been carried out:

- By 1991, the Ministry of Transport and Public Works was split into two separate Ministries: Ministry of Transport (MOT) and the Ministry of Public Works. The objective of this split was to focus on the need for intermodal co-ordination and to make the changes necessitated by the revocation of the centralised planning system. The core of this reform was to get the MOT to concentrate on the policy making and regulation functions rather than being an operator of transport means.

- After 1991 some partial restructuring also took place in road, railway, shipping and civil aviation fields by dividing certain large companies into smaller state - owned enterprises (SOE). The restructuring of SOEs in the transport sector was carried out by two way of two systems: "corporatisation" and "commercialisation".

In Romania, corporate enterprises are best -known under the denomination of "Regie Autonomous" (RA). Today there are RA in the transport sector and they are under MOT supervision. They are to be found in the sectors of: railways, highways, ports, civil aviation and waterways.

The commercialised enterprises are also public companies but the MOT's intention to privatise them is much stronger. The transport sector has some 300 such companies and they will be privatised as soon as possible.

The government's benefits from the corporatisation are supposed to be a better division of responsibilities (MOT concentrates on policy and the running of the enterprises is delegated to a Board).

There are also expected benefits from corporatisation for the enterprise managers. This will be a clearer distinction of responsibilities within the company, which gives the management well-defined autonomy in the day-to-day commercial decisions and operations of the company.

On the other hand, the commercialisation of small scale SOEs is also considered to be a valuable expected input. However the determination of the proper place for enterprise restructuring in relation to privatisation programmes has given rise to controversy.

Implication for the Transport Sector. General Background

Romania has build a good transport infrastructure over the years. The railway system is extensively electrified, the road network covers the whole country and important investments have been done into the building of waterways and ports. Lack of funds for maintenance and technical upgrading ruined a great potential of this infrastructure and prevented the future development of the sector. Today the government makes great efforts to adapt the national transport network to the European standards. A road building programme was launched, both river and sea going fleets are under privatisation. The national airline company went through a process of restructuring and the plane fleet was renewed.

A short inventory shows that the railway network totals 11,430 km, of which 3,782 km electrified track (33.1%).

The public road network totals 72.816 km, of which 16,938 km are modernised roads (22.8%). The main national roads largely follow the railway lines, pointing almost to the same destination, the capital.

River-borne traffic is almost exclusively done on the Danube: from Bazias (at its entry into Romania) up to Braila it is navigable for small draught ships (up to 2 m), while the "maritime Danube" between Braila and Sulina is navigable for up to 7m draught ships.

For air transport there are three airlines, TAROM (Romanian Air Transport), LAR (Romanian Air Lines) and ROMAVIA, with such major airports like Bucharest Otopeni, Bucharest - Baneasa, Constantza - Mihail Kogalniceanu, Timisoara and Suceava, serving 17 towns in the country and over 50 cities on four continents.

The transport sector contributes over 4% to GDP and employs about 7.8% of the total labour force. Since 1989, the sector has declined considerably, as a direct result of the general downturn of the economy. The negative growth rate of the transport and communications sector has even accelerated during recent years. The causes for this negative trend in the transport sector appear to be threefold:

a. National statistic data indicates that gross income for households dropped sharply in the period 1989-1992. Increasing unemployment has also depressed the real income of households. The demands for transport services is generally rather elastic thus the demand for private travel has decreased.

b. In the past, the transport sector was closely related to the heavy industry sector. In turn this required heavy investments in infrastructure and to some extent also in industries manufacturing transport equipment. The transport sector has thus to a certain extent been doubly hit by the decline in activity in the industrial sector .

c. The transport sector has the lowest penetration of private enterprises and has probably been affected less than more dynamic sectors by economic reforms and the restructuring programme (National Privatisation Agency Report).

The importance of the transport sector in the future.

The evaluation of the future volume and pattern of future transport demand is an important economic issue. The transition to a market oriented economy will certainly result in less prominence of transport intensive industries such as steel, cement and petrochemicals and more rapid development of higher value-added light industry such as textiles and agro-industries. The transport demand generated by the latter will generally be less voluminous and be more oriented toward road transport.

The gradual elimination of energy subsidies will diminish demand for coal transport. This tendency may even be accelerated by an increase in railway coal tariffs and industries resorting to fuel savings in order to reduce operating costs.

The reduction of subsidies will continue to cause upward pressure on passenger tariffs for all modes of transport(this actually happens, the tariffs being revised quarterly). This could moderate travel demand for the next few years, until income growth resume. On the other hand, road traffic is likely to continue to grow significantly, with the economy gaining pace.

Thus is to be expected that the role of road transport for freight and passengers will increase with the structural reform of the economy. Demand forecasts for the individual modes, in particular rail and water transport, will have to be carefully tested for coherence with the general development scenario.

Financial issues

There is a considerable backlog of infrastructure investments required in the transport sector for rehabilitation of infrastructure at the national and regional level. At the same time, new investments are required to adapt the infrastructure to the demands of a market economy, which will call for adjustment in the existing transport plan.

The needed resources have been financed through the government budget either directly or through the deficits of the public companies and recently by external project financing, in particular for rehabilitation of the road network.

It is generally accepted that the share of straightforward budget allocations should be reduced in the future. Increasingly, external financing sources will be solicited and contributions will be demanded from users of the transport infrastructure. Another option is to finance transport investments through the market and let the users pay market prices for the other economic services.

The main financial issues in the transport infrastructure area will be:

- The determination of financing procedures between modes.

In general, road and waterway infrastructure are generally financed out of budget resources. Rail infrastructure is financed by the rail operator. To avoid distortions and misallocations in an environment of a market oriented economy it is essential that the financial conditions between modes are equitable.

- The establishment of user charges.

As in most other countries the state contribution to the transport sector includes subsidies to the companies or the state organisations providing public transport services.

In the past the transport sector has been no exception to the general distortions resulting from administrative rather than market prices. In the future, where according to the current policy, transport services will be the responsibility of independently run, private or public enterprises, it is essential that a clear distinction be made between subsidies to certain categories of users and operating inefficiencies due to other causes.

1.1.4. General description of the Transport Sector The Geographic Importance of the Sector.

Romania has an area of 237,500 square Km and about 23 million inhabitants. Due to its geographical position, i.e. the access to the Black Sea, Romania has a key position in facilitating the links with the countries situated in the area of the Black Sea and the Mediterranean and in connecting Europe with the Near East and Middle East.

The priority transport corridors transiting Romania comprise three main roads, six main rail links, and the multimodal corridor Rhine-Main-Danube.

Recent developments in the Transport Sector

Since 1989, the decrease in production in the two main sectors of the economy (industry and agriculture) has led to a drastic reduction in transport demand. This has been accompanied by the disappearance of monopoly positions of the railway in

domestic traffic for certain types of cargo together with a decline in the purchasing power of major export markets.

Maritime transport in the export-import traffic has also suffered for the same reasons. On the other hand, there has been increased penetration into the passenger and freight transport markets of private Romanian and foreign companies, in particular international transport and a liberalisation of supply conditions.

Freight transport by mode in 1995

	tons '000	% change since 1992	tons/Km million	% change since 1992
Total	171,694.7	- 71.2	70,291.2	- 48.0
Rail	98,961.0	- 67.7	25,170.1	- 69.0
Road	45,290.7	- 88.2	2,774.9	- 52.7
River	7,074.0	- 81.1	1,592.6	- 56.6
Sea	6,918.0	- 33.7	38,174.6	- 35.5
Air	35.0	- 31.4	108.0	- 38.5
Pipelines	13,416.0	- 56.2	2,471.0	- 62.9

Source: Transport Research Institute - Bucharest (INCERTRANS)

The dramatic decline in tonnage transported by road in the statistics will thus represent in part a shift from the state enterprises to the public sector. However, due to the problems associated with the collection of information in this transition period, the extent of the shift will be difficult to establish.

Although some of this traffic might be increased through international traffic, it seems probable that road transport has in fact remained relatively stable, or has only declined moderately.

As for the other modes of transport, the recorded fall in transport volumes and performance reflects a real decline. The number of passengers transported by all modes, decreased by almost 50 % during the period 1989-1993 and in terms of passengers/Km, the decline was a little over 30 % during the same period.

Domestic Passenger transport by mode in 1995

	passengers millions	% change since 1992	passengers/Km millions	% change since 1989
TOTAL	734.1	- 46.2	41,941.7	- 32.8
Rail	225.1	- 53.2	19,401.9	- 45.6
Road	506.1	- 42.2	19,816.5	- 14.1
River	0.9	- 51.4	25.1	- 65.4
Air	1.7	- 49.1	2,698.2	-29.8

Source : INCERTRANS

It is perhaps interesting to note that, contrary to the freight transport statistics, the decline in passenger road transport has been considerably less than for other modes of transport. This is probably due to the fact that the statistics reflect more accurately the trend of the transition period as passenger transport by road has been less deregulated than freight transport, thus statistics have been more constant.

1.1.5. The Transport Sector in the European Context.

The policy of modal distribution and complementary character of the transport sector in the European Union is carried out at the European scale, at the inner size of the European Union and at the national dimensions:

Modal distribution of passenger traffic in EU in %

	rail	road	river
Total within country	6.0	92.0	2.0
distance < 50 Km	3.2	95.6	1.2
distance > 50 Km	12.5	83.0	4.5
Internal to EU	12.5	78.5	9.0
International EU	14.0	46.0	40.0

Source INCERTRANS

For EU, it has been estimated that the traffic areas will be subjected to important shifts, from 1995 onwards, especially caused by the extension of the area of the road and partially river transport, but investment is also taking place in the rail sector. According to the national forecasts, the movement of modal shares in Romania would contradict this trend.

Forecast of freight transport in EU and Romania in %

Transport type	European Union		Romania	
	Present situation (1995)	Forecast for year 2000	Present situation (1995)	Forecast for year 2000
Road	78.5	83	84	86
Rail	12.5	8	15	13
River	9.0	9	1	1
Total	100.0	100	100	100

Source : INCERTRANS

The data for EU clearly shows the major and constant increasing emphasis on road transport and in view of the transition process and the process of European integration a similar trend might be expected in Romania.

The evolution of the foreign trade

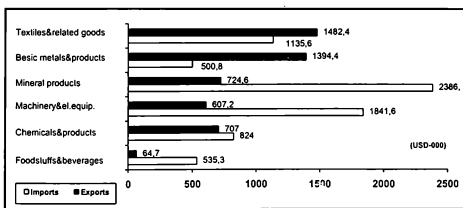
World Fact Book published by CIA (<http://cliffie.nosc.mil/>) showed that export in 1995 valued USD 6 billion (f.o.b.) and were comprised of commodities such as metals and metal products 17.6%, mineral products 11.9%, textiles 18.5%, electric machines and equipment 8.4%, transport materials 6.5% .

The main export partners were: EC 36.1%, developing countries 27.4%, East and Central Europe 14.9%, EFTA 5.1%, Russia 5%, Japan 1.4%, US 1.3%.

For the same year, the imports were USD 6.3 billion (f.o.b.) formed by commodities such as minerals 21.1%, machinery and equipment 19.7%, textiles 11.5%, agricultural goods 9.2%.

The main importing sources were: EC 45.8%, East and Central Europe 8.6%, developing countries 22.6%, Russia 11%, EFTA 6.2%, US 5.0%, Japan 0.8%.

The structure of the Romanian foreign trade by commodity groups looks like this:



Source: Romanian Ministry of Commerce

The structure of foreign trade devised by groups of countries shows the new orientation toward European markets:

- EXPORT: developed countries (44%, EEC - 32.5%),
countries in process of transition (28.9%),
developing countries (27.1%).
- IMPORT: developed countries (51.6%; EEC - 37.5%),
countries in process of transition (25.6%),
developing countries (22.8%).

Principal trade partners in 1996 (convertible currency):

Exports fob (USD million)		Imports cif (USD million)	
Germany	1113.5	Germany	1252.0
Italy	1014.5	Italy	1194.7
France	343.0	Russia	963.3
Turkey	311.3	France	359.6
Holland	263.1	USA	287.4
UK	175.9	Korea	248.4
Egypt	171.7	Austria	232.7
India	148.0	UK	202.9
Greece	136.6	Iran	192.0
USA	130.9	Holland	181.1

Source: Romanian Ministry of Commerce

The new Romanian government is determined to boost the chances to become an important transit point toward Europe. One of the initiatives is the recently (1997) launched programme, "Romania at the cross-roads", that could transform it into an energy exporter for EU. The programme aims toward the creation of an economic corridor between Central Asia and Europe, passing through Romania.

Various accords have been concluded between Romania and countries like Japan, China and India, not mentioning those comprised within the regional co-operation area. The key to the whole project is the access to the oil and gas fields, situated within the Caspian Sea area. They are considered one the most important reserves in the world.

Today's production from this area is 23 million tons per year and the reserves could amount to 3 billion tons. Some of the most important oil companies are involved in the area, such as Chevron, Mobil, BP and the Russian Lukoil.

The proposed transport corridor starts in Azerbaidjan and reaches Georgia's port Poti, than crosses the Black Sea to Constantza.

The oil terminal in Constantza and the Romanian refining industry, with a capacity of 30 million tons per year will play than an important role. The raw materials and the products could afterward be transported using rails way services, pipelines or the Danube-Main-Rhine transport corridor.

There are two other solutions. Transport may take place through pipes to the Russian port of Novorosiisk and then across the Bosphorous Strait. The second possibility, also by pipelines is via Moscow, Kiev, Budapest or Warsaw to Berlin.

Both are more difficult than the Romanian solution either because of large investments needed or the technical problems imposed by the passage of the Bosphorous Strait.

Another important asset for the development as transit market toward Europe could be the development of free trade zones that could be integrated into the project. The most important and already operational is Constantza free trade zone. It is connected to the future container terminal, a ferry terminal, a Ro-Ro terminal and the Black Sea -Danube canal.

The second important is the free trade zone of Sulina. It is situated at the end of the Danube (Sulina is the last port on the Danube's Delta), close to the border with Moldova and Ukraine. Along the Danube are situated some other Free trade zones within ports like Galatzi and Braila. Both are connected via roads and railways with the two former Russian republics

The newest such trade zone is situated close to the capital city of Bucharest in another Danube port called Giurgiu. It is close to the trans-European transport corridor no.4 (from Germany through the Czech Republic, Slovakia, Hungary, Romania, Bulgaria and ends in Turkey), corridor no.7 that runs along the Danube and corridor no. 9 (from Finland through Russia, Moldova, Romania, Bulgaria and ends in Greece).

This project could bring prosperity into the region that could develop into a common market in the future. This market could be interesting for Romanian products, European Union or Central European Free Trade Accord (CEFTA) and Black Sea Economic Conference (BSEC). Some other related projects are worth mentioning.

One of them is the World Bank line of credit worth USD 625 million, intended for the development of the Galatzi port and its free trade zone. It is so far, the biggest single development concerning the transport infrastructure. The project will attract business and investors to an area near large markets of Russia, Moldova and Ukraine. The port could accommodate sea going ships up to 50,000 dwt, and is close to Romanian's biggest steel plant. The construction of two big oil terminals within the zone is also being considered.

The establishment of the Galatzi free trade zone follows the plans of expansion of the port of Constantza, based on a loan from the European Investment Bank of USD 40 million

Apart from the co-operation within the Black Sea Economic Conference, Romania has to compete with its neighbours within the Black Sea, for the future traffic patterns.

One of the competitors is former Russian republic and presently independent state of Moldova that has raised USD 28 million from the European Bank for Reconstruction and Development for the extension of its river port's oil terminal. Armenia has also called for the extension of the fourth European transport corridor, connecting it to the European market, in connection with the future oil and gas traffic across the Black Sea.

Due to the increasing competition, Romania tried hard to boost its chances by improving its transport infrastructure. Out of the last World Bank loan of USD 625 million, the government will spend a quarter on improving the infrastructure.

The latest position of the Romanian transport minister, was expressed on the occasion of a conference held in Berlin this summer. He said that Romania would like to improve its position on the European energy market and transport, playing an important role for the oil and gas transport from the Caspian region, toward Europe, through the Danube corridor.

This first chapter was underlined the main strengths and weaknesses of the Romanian economy and its transport sector. It also emphasised the co-operation within the Black Sea area and the competition amongst surrounding countries, for bigger shares of the developing market.

The Rhine-Main-Danube waterway could play a major role for the future economic development of the area and for an increased trade with Europe.

The Black Sea end of the transport corridor represented by the waterway, is the Port of Constantza. Itself connected via a relatively new build canal with the river Danube, the port is the most important in the Black Sea area. Its role as hub port for the future transit of cargoes from Middle East toward Europe will be assessed within the next chapter.

1.2. The potential brought about by the junction of the port of Constantza with the river transport system

1.2.1. The Black Sea region description

Apart from Turkey, the Black Sea surrounding countries are former communist ones like Romania, Bulgaria, or former Russian republics and now independent states, like Moldova, Ukraine and Georgia.

From the economic view point, there will not be overnight upturns into their economic culture. Many key shipping activities still experience fundamental problems ranging from bureaucracy, communication, financial lack of resources and poor inland connections.

On the other side, Turkey's economic development has been hampered by a series of political problems over the years, combined with changes in their economic policy. All this has restrained Turkey's potential influence over the Black Sea maritime trade. Therefore, the economic competition in the Black Sea basin, has opened in the early 90's on an equally base.

Out of these countries, Bulgaria and Romania tend to expand their influence in the regional trade as transit countries for the international traffic. Ports serving Danube related trade, like Constantza in Romania and Varna in Bulgaria seem to have good prospects for development. The end of the Yugoslavian war allowed a recovery of the trade between Danube riparian countries (some of them landlocked) and important impediments and restrictions have been lifted.

Being aware of this situation, the port of Constantza Administration committed itself toward developing the port as a future regional hub. The key aspect is of course the addition of a new container terminal, with the assistance of the consultancy firm Coopers & Lybrand, and the Netherlands' Frederic R. Harris and Rotterdam Maritime Group. The finance of the project, will be assured by Japanese Banks.

The port administration agrees on the need to improve multi-modal links with Europe. This is supported by the Commission of the European Communities, assessing the volume of cargo through the Rhine-Main-Danube corridor to reach 8-10 million tons by year 2000. This will certainly require the integration of the port into the European multimodal network, prepared for door-to-door transportation.

In 1995 the Constantza Port Administration prepared an analysis of the port traffic. It showed that in 1994, the port throughput amounted only to 31 million tons, of which 80 % represented bulk products, but in 1996 it handled 44 million tonnes. The figure is still far away from the 60 million tonnes handled in 1980's, but is the fifth year in row with an increase. In this context, the favourable prospect for bulk cargo through Rhine-Main-Danube corridor cannot be neglected. This is why, the port's

Administration plans for the building of the new container terminal and for the expanding of the existing grain terminal.

The port is to become a distribution centre for the Community of Independent States (CIS) raw materials to the central Europe and vice-versa and for grains coming from Romania and Hungary toward the CIS.

1.2.2. Port of Constanza general presentation.

Located on the western coast of the Black Sea, about 179 Nm from the Bosphorus Strait, Constanza Port has been gradually developed to reach the present capacity of 75 millions tons/year. The port development has been carried out in several large phases.

The first phase began in around 1900 at the same time with the port construction, according to a unitary concept; until 1950's, a precinct of 199 hectares was completed.

The second phase took place between 1950 and 1960, when within the already constructed enclosure, new quays with a landing depth of 9 and 10 m were erected, completing what is known as "the old port".

The third phase, including works for the old port extension, started in 1960 and developed during about 20 years.

Within this period, a new enclosure of about 523 hectares was constructed toward the south, resulting in a new port provided with modern facilities. It includes special sections for oil products, ore, cereals, containers, steel products, stored general goods, as well as storage space.

The fourth and last phase derived from the necessity of providing new port capacities to meet the continuous growth of good's traffic, carried out by high capacity ships, that are not admitted now into the port. Consequently, in 1976 the construction of a new port was started. The name is Constanza-South and covers 2,500 hectares and permits the landing of ships up to 250,000 dwt.

The Port Administration data shows that port activity is performed by 12 trade companies. A number of 3,500-4,000 ships may be operated every year and the average cargo traffic of about 62 million tonnes can be accommodated.

The ships average period, spent for operation inside the port, is about 3.5 days. For instance, in 1995 a total number of 4,261 ships called at the port, an increase of 19% on 1994.

A break down of the total number of ships shows looks like this:

Total no.	General cargo	Bulks	Boxships	Tankers	Ro-Ro
4,261	2,250	724	571	472	244

Source: Constantza Port Administration statistics

A surface of about 39,000 square meters (sq.m.) is provided for covered storage and about 172,000 sq.m of platforms; the port includes also a compound railway network of 190 km and a road system of about 100 km. About 12,000 people are employed for the port activities. (Lloyd's of London Press Ltd. March 12, 1996)

The port provides qualified facilities and services for the transport and economic activities as follows:

- modern shipyard with two dry docks (360 m length and 58 m width)
 - the biggest oil terminal in the Black Sea (can accommodate tankers up to 165,000 dwt and has a storage capacity of 1.7 million cubic metres (c.m.)
 - the bulk terminal is one of the most important, not only in Black Sea, but also in the Mediterranean Sea. It can accommodate ships up to 165,000 dwt and the storage capacity is 3.5 mil tones.
 - the container terminal handles 70,000 TEU /year and a new one is design to be constructed in the south port and is intended to handle gradually, up to 800,000 TEU/year.
 - the Ro-Ro terminal has two parking lots, each with a capacity of 120 vehicles and can accommodate ships with a 14 m draft.
 - the ferry terminal is designed to accommodate ships up to 12,000 dwt and entered into operation last year to connect Constantza with Samsun in Turkey.
 - for a future co-operation with foreign partners, a free zone area was established within the south part of the port, where some 5,5000 m of quays have been realised as well as 40,000 sq.m. of concrete platforms, warehouses, road and railway access as well as communication systems.
- (Lloyd's of London Press Ltd. March 12, 1996)

Constantza Port capacity should be additionally developed toward Black Sea trade, by providing an area connection for Europe, Middle and Far East. The Black Sea basin includes 10 large ports and the outlet mouth of three navigable river streams: the Danube, the Nipper and the Don. Nine countries located in the Black Sea basin and also Greece and Albania have decided to develop a special area for economical co-operation called the Black Sea Economic Conference (BSEC).

Being the largest port in the area, Constantza has a very high capability to develop in four possible directions:

- as a main transit port, including Ro-Ro services between the Black Sea area and the West Europe; as a transshipment centre the port can play a major role toward the landlocked central European countries of Austria, Hungary, Slovakia and the Czech Republic.
- as a junction for traffic of goods between the Independent States Community and Europe;
- as an important terminal for the short sea shipments among the countries within the Black Sea basin;
- as a distribution centre for the large ships loading and unloading activities, related to the goods trade among surrounding markets.

In an article published by Lloyd's of London Press.Ltd, in its edition of May 14, 1997, it was underlined the port slowly recovery from recent years' decline. The traffic during 1995 increased with 12.7 % compared to 1994 and in 1996 the transport volume increased by 11 % to almost 40 million tonnes, compared with 35.1 millions in 1995. Unfortunately this is still below the 62.3 m tonnes handled during the peak year of 1988.

Container turnover has increased by 23.8 % to a total of 90,000 TEU. A new container terminal is on the drawing board, with investments coming from Japanese sources. In fact the Japanese government gave the go ahead for an initial phase costing USD 130 million. Its final capacity will be 800,000 TEU/year. Its first stage will become operational within two years and will have an annual throughput of 337,000 TEU. The quays length will be 625 m, the water depth 14.5m and it will be equipped with three panamax container cranes, serving the two berths. The stacking area will be of 90,000 square metres. It will be directly opposite the entrance of the Danube Black Sea Canal.

The main companies interested to use the new facilities are: ZIM Israel, Compagnie Maritime D'Affretment, Metz, Container Line Limassol and Delmar Line Pireaus. Evergreen and Maersk have already expressed their interest. German and Austrian companies intend to use the new facilities and start regular services using the Danube-Main-Rhine corridor.

Main cargo throughput for the first nine months of 1996,

Cargo type	Traffic (million tons)	Cargo type	Traffic (million tons)
crude oil	6.1	fertilisers	2.1
oil products	4.1	cereals	1.7
iron ore	3.4	transit cargo	2.1
coal	2.2	building materials	1.3

Source: Black Sea-Danube canal administration statistics

Another major developing plan concerns the building of a new cereal silos. The final capacity will be 300,000 tonnes and the annual throughput will be 5 million tonnes. The new silos will have a daily handling capacity of 18,000 tonnes, triple the present one. The financial support will come from the World Bank and will reach USD 40 million. Cereals production has undergone a noticeable change. In 1989 Romania depended on imports but in 1995 it exported 845,000 tonnes. The port administration sees a great promise in cereals in transit. In 1995, the port handled 350,000 tonnes from Hungary, Slovakia and Serbia. (Romanian Ministry of Transport-Naval Department)

The port's investment book includes improvements and investments projects up to USD 62 million for the northern port and USD 2.65 billion for the southern port.

An important terminal for liquefied gases is to be constructed also, with a capacity of 1 million tonnes. It will be a joint venture between two Romanian companies (Rompetrol and Romgaz) and the American companies UGI Inc., Valley Forge-Pennsylvania and Energy Transportation Group-New York. It will be placed on the southern reclaimed area of the port and will have a capacity of 1 million tonnes annually. The total cost is estimated to USD 150 million and will include the building of a pipeline to the capital city, 150 Km. away. (Lloyd's of London, April 18, 1997)

The port administration is also prepared for the passenger traffic rise to 15,000 passengers a year and plans are on the drawing boards for a new terminal costing USD 7 million.

There are three shipping lines connecting Constantza with Asia, via Istanbul. A *passenger* line that tends to develop its traffic, a *ferry line* (Turkish Cargo Line), representing a vital link in the overland route between western Europe and Turkey, Syria and Jordan and finally a Ro-Ro line which uses the southern port. The port statistics showed that the international lorry traffic has grown steadily since its opening in 1992. In 1993 more than 14,700 lorries used the terminal compared with 12,000, during the first year.

Constantza is a gate for central Asian, via the existing and planned routes in the Caucasian and Central Asia region as well as for the Russian Federation and Ukraine. It is also connected with Asia via the Black Sea ports of Batumi and Poti in Georgia and from there via railway to Azerbaijan. Through its rail and road connections, the port is connected to the European network of transport corridors.

Constantza port also provides access to the European inland waterway system, via the Danube and Rhine-Main canal. The traffic along the corridor will greatly

increase in the future, once the UN embargo on the former Yugoslavia is lifted. This will open the Danube corridor again towards Central Europe and the Black Sea.

1.2.3. Short history of the building of the Constantza - Danube canal.

Just as the Bosphorus Strait serves as the maritime corridor for Black Sea traffic, the river Danube is vital for countries of Central and Eastern Europe. The Danube has a particular importance for Romania due to the fact that out of 2,413 Km, representing its navigable length, 1,075 Km are on Romanian territory.

The idea of connecting the main port Constantza directly with the Danube, arrived after the occupation of the Danube Delta and its mouth by the Czarist empire in 1812. Yet the idea of short cutting the Danube course to the sea is even older. In fact the present location of the canal is based on the course of a natural valley that almost connects the Danube and the Black Sea. The distance at this point is only 60 Km.

The first engineering studies concerning the construction of a waterway between the Danube and the Black Sea dates since 1834-1837. It was anticipated two decades before the works of the Suez Canal. The issue of building such a waterway was recurrent in experts attention over the last 150 years. They have presented numerous studies, technical reports, projects and economic analyses motivating the importance of the project.

During the communist regime, the authorities used forced work (political prisoners mostly) to dig a canal by rudimentary means. It was finished in 1953 and the result was used for irrigation only.

The modern approach to the same idea begun back in 1972, with a feasibility study. The economic and technical studies followed. The canal was dug on its existing position between 1976 and 1984. Later on, a northern ramification was realised, between 1984 and 1987.

As can be seen from the following table, the construction characteristics put the Danube -Black Sea canal in the class of the modern constructions of this kind in Europe .

The usual convoy sailing on the main canal is formed with 6 pushed barges of 3,000 tons each and the convoy on the northern branch is formed by one barge and one pusher only.

The building of the Black Sea-Danube canal and the Constantza South Port, connected the TransEuropean Navigation System to a maritime port of utmost importance via a route 400 km shorter than the one following the river Danube.

The main characteristics of the system composed from the main Danube-Black Sea canal and its northern branch are reflected in the following table:

Main Characteristics	Units.	Main canal	It's branch
Navigable length	Km	64.2	31.2
Navigable breadth	m	90.0	50.0
Canal draft	m	7.0	5.5
Air draft	m	17.0	13.0
River convoy characteristics			
- capacity	ton	6x3,000	3,000
- length	m	296.0	119.4
- breadth	m	22.8	11.4
- draft	m	3.8	3.8
Double locks characteristics			
- length	m	310.0	145.0
- breadth	m	25.0	12.5
- depth	m	7.5	6.0
Canal harbours		Cernavoda Medgidia, Basarabi	Ovidiu Luminita
Maritime harbours		Constantza	Midia

Source : Black Sea-Danube canal Administration

The importance of the canal consists not only of the shortcut mentioned already. It permits the transport of various kinds of cargo brought in by sea-going ships that cannot enter the Danube.

The junction of the port of Constantza with the TransEuropean Navigation Waterway Rhine-Main-Danube, confirms and consolidates its position, transforming it from the most important port of Romania into a very important port for the Central Europe countries in their economic relations with countries from the Gulf region, South and south-eastern Asia and Australia.

Developing its role as a storage, delivery and transhipment port, Constantza has the chance of becoming a logistic platform of utmost importance in the Black Sea region.

Both the port and the canal, by their position at the Eastern end of no.7 European transport corridor (the Danube) and the facilities offered (Ro-Ro specialised berths, ferry terminal, free trade zone), have a positive influence upon the development of the whole region along the transport axis that now stretches from Rotterdam to Constantza.

This axis represents a genuine transport corridor between the Black Sea and the North Sea. By diagonally crossing the continent, the Rhine-Danube corridor has

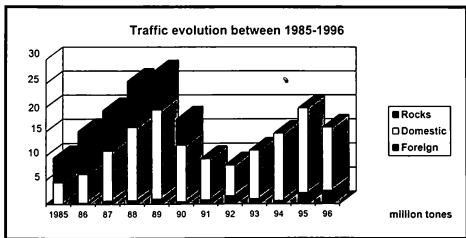
ensured the necessary conditions to become a trade space, with characteristic functions, regarding the transport flow, free zones, financial-banking facilities and the standardisation of regulations.

The Constantza port, the Black Sea-Danube canal and the Danube itself represent some important elements for integration into the European Union transport activities, with a real perspective of for development in the future.

1.2.4. The Danube-Black Sea canal main advantages.

The overall capacity of the canals system is 100 million tones/year. The influence of the canal on the Constantza harbour comes from the connection made between the port and the Danube transport system creating good promises for:

- lower cost for the transport of the goods by sea to the Constantza port, as long as big ships can be used;
- increased traffic attracted to the port and consequently an increased volume of import-export;
- free trade zone arrangements within South Constantza port, already in operation;
- development of an important external traffic volume, in transit toward the Central and Eastern Europe.



Source : Black Sea-Danube canal Administration

The role of Constantza port as a reloading station for the ore and coal in transit for Europe has increased. In 1996, the canal traffic was up 12.4% from 8,217 million tonnes to 9,379 million tonnes. The structure of the traffic was mostly solid bulk

(from 7,723 million tons to 8,971 million tons) and general cargo (down from 494,000 tons to 408,306 tons). (Lloyd's of London, April 18, 1997).

The latest news concerning the Canal are encouraging. It seems that the ease of the Balkans' tension, due to the end of the Yugoslavian war and the cease of the trade embargo against Serbia, influenced already the transport demand of the waterway.

The access to the Black Sea, the potential of the port of Constantza, the waterway infrastructure represented by the Black Sea-Danube canal and last but not least the co-operation within Black Sea Economic Conference are important assets that could increase Romania's chances for a new economic start.

The importance of these assets cannot be fully understood unless we analyse the importance of the whole corridor. This is what the next chapter will do, by examining the history of the Rhine, the Danube and the Rhine -Main-Danube as well as their present traffic and economic importance.

1.3. The Rhine-Main-Danube Waterway

By finalising the Main-Danube connection back in 1992, Black Sea-North Sea the corridor has been inaugurated.

Considering that the sphere of influence of the two rivers, includes intense economical and social activity, the increasing interest of the riparian countries to cooperate within a European general context is understandable.

The Rhine-Main-Danube waterway has the best credentials to become the most important European transport corridor considering only that, no less than 20 industrialised cities, (4 being the capital cities Belgrade, Budapest, Bratislava and Vienna) lay along the corridor.

1.3.1. The Danube

The Danube is the second biggest river in Europe after the Volga, with a collecting basin of 805,300 sq.km, out of which 221,670 sq.km belong to Romania. Navigable for most of its route, the Danube plays an important role in the commerce of Europe. It is the only major European river to flow from west to east. About 60 of the approximately 300 tributaries of the Danube are also navigable. Canals link the Danube to the Main, Rhine and Oder rivers, providing an important commercial route. (http://cyberfair.gsn.org/real_sr/edonau.htm)

Its history

The Danube has always been an important route between western Europe and the Black Sea. It formed, in the 3rd century a.d., the northern boundary of the Roman Empire in south-eastern Europe. It served as an artery for the Crusaders into Byzantium (Constantinople) and from there to the Holy Land; later it eased the advancement of the Ottoman Turks into western and central Europe.

In the 19th century it became an essential link between the growing industrial centres of Germany and the agrarian areas of the Balkans. At that time, most of the river's middle and upper course lay within the Austrian empire; the lower part belonged to the decaying Turk empire.

As the Turkish control over the Balkans weakened, Austria and other European powers moved to prevent Russia from acquiring the strategic Danube Delta. By the terms of the Treaty of Paris (1856), terminating the Crimean War, a European Commission was established to control the delta. The commission made a number of changes in the delta and in the lower reaches of the river, beneficial to its navigation.

In 1890 the Austrian government began a series of improvements in the part of the river known as the Iron Gates, today in Romanian territory.

The treaty of Versailles (1919), concluded World War I and included in its recommendations, the maintenance of the European Commission. It also set another Commission to control the Danube's lower part ending within the Delta. During the World War II (1939-1945) both Commissions were abolished by Nazi Germany, which controlled all of the river from 1940 to 1944. After the war, the Communist-bloc countries bordering the river formed a new Danube Commission, headquartered at Budapest. Austria was admitted in 1960 and West Germany in 1963.

According to the Romanian Institute for Transport Design (IPTANA), the Danube has three sectors divided as follows:

- *the high course* extends from the source - Schwarzwald mountains to Bratislava and goes through the Swiss Alps, the Austrian Alps and the Vienna basin. After the confluence with river Inn close to Passau, the Danube becomes a river, with a rate of 1,440 cm/sec. The medium slope varies between 0.6-0.9 % and water speed reaches 1-3.5m/sec, making the navigation difficult. The river becomes navigable from Ulm, where the depth is in excess of 1.2m. Within this sector the main industrial city is Regensburg which together with Passau and Deggendorf represent the main ports.

- *the medium course* starts at one point between the Alps and the Carpath mountains just before the confluence with Morava and lasts until Bazias, the entrance point in Romania. Over this sector the Danube becomes impressive, with a width of 300 m. Alongside this sector, the Danube receives tributaries like the Drava, Tisa, Sava and Timis. They influence its flow, over the year. The slope is reduced at about 0.05% and the water speed is 0.9-1.5m/sec.

- *the lower course* lays entirely in the Romanian territory, from Bazias to the Black Sea, over 1,075 km or 45% of its navigable length;

Due to natural aspects, this last sector is itself divided into 4 smaller ones;

- the first sector (Bazias-Gura Vail) extends over 144 km and is regulated through two hydroelectric power plants;

- the second sector (Gura Vail-Calarasi) is longer, measuring 566 km. The slope decreases to 0.03-0.08% and the river width increases to 1,000 m. The natural depths decrease sometimes to 1.7m where additional dredging is being done to ensure a minimum depth of 2.0m.

- the third sector (Calarsi-Braila) runs on flat land and the river is divided into branches by some big islands.

- the fourth sector (Braila-Sulina) also known as the low Danube or maritime Danube extends over 170 km. The water depth permits the access of sea going ships with a draft of 7.0m.

1.3.2. The Rhine

Judging by the archaeological discoveries, the Rhine was used for transport from Basel to the North Sea, since some 2000 years ago, during the Roman Empire.

Modern navigation along the Rhine began at Basel on 2 June 1904 with a steamship carrying a barge loaded with 300 tons of coal. Prior to the 20th century, barges moving upstream were towed by either teams of horses or groups of men.

With the rise of modern navigation beginning in the 19th century, there was the introduction of steam-powered and, subsequently, diesel-powered tugs. Today, for instance, one of the most successful Rhine companies, Hamburger Lloyd employs self-propelled river tankers equipped with radar and communication systems for 24 hour service. The tanks are double hulled, made of stainless steel and designed to carry up to eight different products simultaneously. (Hamburger Lloyd website)

The navigation along the river was regulated from the beginning through various navigation agreements. The principle of free navigation on the Rhine was agreed upon by the Congress of Vienna in 1815 and the first treaty was simplified and revised in the Mannheim Convention of 1868 and extended in 1918. Since 1868, the Rhine river has been kept open almost continuously, with just three closures, in the years 1915, 1916 and 1940.

The Rhine is definitely one of the most important arteries of industrial transport in Europe. The river is navigable for 870 km (540 miles), from Basel to Rotterdam and more than 250 million tons of goods are transported every year. For instance one-fifth of the world's chemical demands are manufactured by companies situated along the Rhine.

Practically, the navigation on the Rhine is open 24 hours a day, no matter what the weather conditions. The minimum depth guaranteed by the local responsible authorities is 3.2 m.

The Rhine is in the middle of a vast European waterways network. Its main tributaries are the Neckar and Main, both channelled, the first over 203 Km and the second over 297 Km. The higher Rhine is connected via a dense network of rivers and canals with Belgium's and Netherlands' waterways .

Eventually, this vast interior waterway network will be completed in the future, with a common co-operation programme between Germany and France. A new canal will be built to connect the Rhine and the Rhone, and implicitly the ports at the Mediterranean Sea and those countries served by the Rhine-Main-Danube waterway.

The history of the Rhine-Main-Danube-Canal

For centuries it has been an international desire to connect the two rivers, the Main and the Danube (in the south of Germany) in a way that creates a waterway across Europe to connect the North and the Black Sea.

The first steps were taken by Charlemagne in 793. There were several more attempts to get the rivers connected, but not before 1846 (after working on the construction for nine years) were the Main and the Danube linked. The so-called "Ludwig-Donau-Kanal" ("Ludwig-Danube-Canal") was constructed after King Ludwig I of Bavaria had given orders to do so. Soon this canal was too small. In WW II it was damaged and was not used anymore after 1950. (http://cyberfair.gsn.org/real_sr/edonau.htm)

A new, contemporary canal was constructed from the confluence of the Rhine and the Main, up to Nuremberg by the year 1972 (several hydroelectric power plants were also built, so that electricity could be generated as well). The distance between Nuremberg and Kelheim (along the Altmuehl valley) was opened in 1992.

The canal scheme comprises 297 km of the Main river, 171 km of a new canal between Bamberg and Kelheim, incorporating parts of the rivers Regnitz and Altmuehl at the ends and 209 km of river the Danube.

The technical characteristics include :

- 40 m wide;
- 4m depth;
- locks dimensions: 190m x 12m;
- ships size: 1,500 tonnes;
- convoys size: two barge of 3,300 tonnes

In order for bigger vessels to be able to use the Danube as a waterway as far as the Black Sea, the Rhine-Main-Donau AG changed the Danube into a canal between the cities of Regensburg and Straubing.

This section was completed in 1992 and the dam and lock at Straubing was finished in 1993. By then, the river did not have its own dynamics anymore. The speed of the current and the periodical changes of the water level had been greatly diminished. Wetlands along the river are not being flooded regularly anymore. The landscape along the river has changed completely with negative consequences for the animals

and for vegetation (population of protected species diminished and plants lost their natural habitat and died.)

Apart from these environmental problems, the construction of the 677 km canal is still considered the most important European development, as regards the inland waterways. As a result, a considerable increase in the traffic within the Danube riparian countries and along the Main and Rhine rivers is expected, despite the numerous technical restrictions of the waterway. This is expected to happen due to the cheaper transport costs achieved by the eastern European barge operators, both because of the state subsidies they enjoy and the reduced manpower costs.

In the mean time, important changes could occur in the North Sea ports' traffic. The study "*New canal could be a threat to Bremen and Hamburg*" by S. Edelgard and published in 1984, mentioned the possibility that 80 % of West Germany ports such as Hamburg and Bremen, could be lost to Rotterdam and Antwerp, due to the opening of the Main-Danube canal.

The costs of the canal building have been impressive. Up to 1980, the Rhine-Main-Donau AG has invested more than DM 3.7 billion, DM 232.7 million in 1985 and in 1986 another DM 256.4 million.

Apart from the economical benefits of the waterway transport, the canal will bring further advantages such as:

- flood control and industrial water management schemes;
- leisure and environmental investments;
- power generation and providing employment.

A cost recovery method of power generation was largely used in the Main-Danube canal case. It is considered that half of the construction cost could be reimbursed through the sale of electricity generated within the 60 power plants built along. The system can provide a collective output of 570 MW. Its efficiency was proved between 1983 and 1986 when DM 40 million worth of electricity was produced.

1.3.3. The Black Sea - North Sea corridor. Its European importance

The construction of the two canals, Danube-Black Sea and Main-Danube represents the final stage of the achievement of the intercontinental navigational connection. The waterway crosses an important number of countries with different economies but also with strong economic ties.

The corridor could play a major role, due to its position on the European map, as a reference for the future development of the continent's waterway network, as well as for the future planning of other means of transport.

It is obvious that the corridor should be promoted through various actions intended to stimulate specific its importance and value such as:

- free and fluent traffic;
- intermodal connections;
- warehouses and distribution centres ;
- ship repairs centres;
- free trade zones;
- insurance and banking centres;
- supporting communication and computer networking;
- intermodal platforms;
- cargo pools;

Many zones of strong economic power and social activity are distributed along the corridor; these generate import and export demands for transportation

The deep transformations that have taken place in the former East European communist countries, will modify the configuration of the European cargo traffic patterns, by adding new economic zones. The Central and East European (CEE) region has become one of the most active trading regions of the world, during the last seven years. The trade between the Western Europe and CEE is increasing both ways, with 60 % increase from CEE toward Western Europe.

The CEE region received more than US80 billion over the last seven years, which is a lot for the 18 countries, which form the group. This market area of some 340 million people is a little bit smaller than North American Free Trade Agreement market (NAFTA) - 363.4 million which together with EU are the world's two largest markets. The most advanced countries of the region, the Czech Republic, Poland and Hungary have a growth rate of more than 4% annually, equal to NAFTA and double compared to the EU.

The region's problem is still the purchasing power. The gross domestic product per capita as a percentage of absolute purchasing power is still only a tenth of the EU's.

In a recent article, July 22, 1997, published by Herald Tribune under the title "Reintegrating Europe", it was noted that "all 10 formally Soviet bloc nations of Eastern and Central Europe, would increase the European Union's population by a third but its economic strength by only 5 percent".

This relatively poor economic condition is a burden to the EU. Despite of this, future integration is considered as essential for the Western market and an encouragement to Eastern democracies.

On the other hand the slowness of the EU in reaching agreements concerning the integration is disappointing. After eight years since the Iron Curtain begun to lift, only five countries have been named as potential candidates for joining the EU and their membership is unlikely for the next five years. For the rest of them, including Romania, they will have to wait at least another decade or more.

The recent years have shown that some investements went more to some CEE countries (Hungary, Poland, Czech Republic) than to others. The interest manifested by foreign investors in those cases, has its explanation in the so called effect of proximity. This means that the investing areas are situated within a day's travel by truck or ship from the west, reducing the limiting effect of transport costs.

The percent of CEE exports toward West Europe, Asia and American markets, increased by 60 %, almost doubling the 1990 figure, showing basically the success of the industrial sector in restructuring and reorienting its market outreach.

UN has reported the region's rises in industrial output over the last three years at the following levels:

- Poland	33%	- Czech Republic	19%
- Romania	24 %	- Slovakia	16 %.

Nearly all of the new goods that the CEE countries import, come from the EU, or putting it in other terms, the CEE market has become the principal interest for the western exporters. Keeping pace with the demand will require the build-up of a door-to-door transport system and a distribution network.

At the present moment, in Europe two geographical zones co-exist, characterised by specific social, economic and logistic trends. The Western part and the Central and Eastern part. Practically, the Iron Curtain has been replaced by a logistic one. This two macroeconomic zones, separated logistically, have now a great possibility of connecting their cargo traffics through the Rhine-Main-Danube canal. Intermodal transport, acting as an integrating factor can have a favourable impact upon the corridor.

In its crossing of Europe the Rhine–Main–Danube canal intersects important economic zones and other European traffic corridors. The most important are: Rotterdam, Ruhr, Frankfurt, Belgrade, Giurgiu, Russe, Bucharest, Constantza, Hamburg, Antwerp, Amsterdam and river ports like Duisburg, Nurnberg, Vienna, Bratislava, Budapest and Galatzi.

The problem is how to develop the intermodal systems at the intersection points in order to stimulate the use of the Rhine–Main–Danube waterway. In fact, it is not about attracting the traffic through protective measures, but by offering cheaper and safer services. Practical solutions should include the build up of container terminals in critical areas and the introduction of Ro-Ro technology.

Within the increasing competition in transport, both with other corridors and other modes of transport, the Rhine–Main–Danube should co-operate with them and try not to be isolated. The strategic solution should include:

- active participation in the workings of various European transport Committees;
- development of river crossing points;
- the elimination of bottlenecks at borders;
- low taxes for using the canal's;
- diversifying the transport technologies;
- modernisation of the telecommunication systems;
- data exchange system development;
- supporting the maritime lines across the Black Sea;
- increasing the role of Constantza as a hub port for the Black Sea region.

1.3.4. Corridor's Cargo Traffic

Providing for a traffic prognosis right now is a risky venture. All that could be done, is underlining some traffic tendencies. The corridor is affected by its complexity, its length, the number of countries that use it, and finally by the global world.

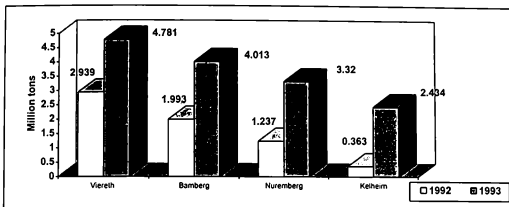
Some of these considerations will be analysed below:

- Both the Black Sea and the North Sea connections to the outside world take logistic considerations beyond the European level. They enter into the world of competition for maritime connections, as well as with transcontinental bridges (transsiberian for instance).
- The transport sector develops together with national economies but with different elasticity, experienced from one mode to another.

- Romanian transport on the corridor will evolve in correlation with the economies of other riparian countries as well as any other country situated in the corridor's zone of influence.
- The corridor's traffic could be stimulated through the use of other transport infrastructures, modern ways of transport and modern services, intended to facilitate the internal and international products exchange along it.
- Romania, as a transit country, between west, north and south Europe, as well as between Europe and the Middle East, could stimulate the corridor's traffic by realising new transport technical systems and by introducing services oriented toward this strategic objective.
- The maritime traffic would attach to both ends of the corridor, in Constantza and Rotterdam which will in some ways compete from this point of view. Therefore, there will be an even point on the corridor, where the cost for transport of the cargo from either end, will be the same. Compared to this point the traffic will be attracted either through Rotterdam or Constantza. However, this point will shift Eastward or Westward depending on the point of origin of the cargo.
- The traffic along the Rhine is stabilised at around 140million tons/year and on the Danube, around 90million tons/year. The current decrease of the Danube traffic over the last years is only temporary. Since the conflict in former Yugoslavia is over and the economies of the former Eastern Communist countries are recovering, it will start to grow again.
- The Rhine traffic is dominated by Germany and Netherlands, while the Danube traffic is better distributed among the riparian countries.
- The modal distribution of the transport along the waterway, shows that the rivers' share is stable and in the mean time a shift is under way from the rail to road transport.
- An analysis done by the Romanian Transport Research Institute and concerning the railway transport traffic between Romania and the Rhine riparian countries respectively: Germany, Netherlands, Belgium, France and Switzerland shows that some 80% of the total 1.7million tons transported by rail could be shifted to the Rhine-Main-Danube waterway.

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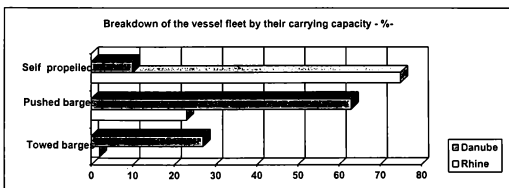
Freight transport on the Main-Danube canal demonstrated a strong evolution between 1992 and 1993 with more than 50 %.



Source: Annuaire statistique de la Commission du Danube

1.3.5. Composition of vessel fleets operating on the Rhine and on the Danube. Analysis of the Romanian river-ships fleet

Making a comparative analysis between the Rhine and the Danube fleets help us to draw conclusions with reference to the future policy of adapting the Romanian river fleet to the corridor requirements.



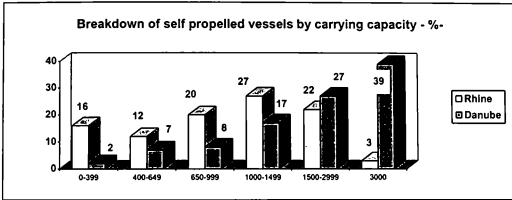
Source: Annuaire statistique de la Commission du Danube; Rapport annuel de la CCNR; Calculation by the ECE secretariat

The graph clearly shows a totally different structure for the two fleets. On the Rhine the biggest percent of ships are those that are self propelled (75%). On the Danube the pushed barges are in greater number (63%).

The fact that the Rhine fleet is composed mostly of self propelled ships, gives it two main advantages:

- a higher flexibility in choosing the cargo and the routes;
- shorter turn around times due to increased manoeuvrability and mobility of this particular type of ships;

On the other hand, the above structure tells us that the competition along the corridor will not be about the ships (because the fleets are complementary), but about their carrying capacity. Another feature of the Main-Danube canal is that it acts as a filter for the transport units. Self propelled ships will transit more easily than pushed convoys.

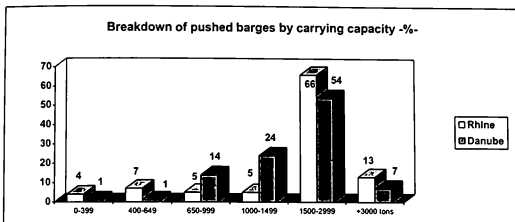


Source: Annuaire statistique de la Commission du Danube : Rapport annuel de la CCNR, Calculation by the ECE secretariat

The above graph shows that the Rhine's self propelled fleet is better balanced. Out of the 75% of the self propelled vessels, 20% are in the 650-999 tons category, 27% in the 1,000-1,499 tons category and 22% in the 1,500-2,999 tons category.

The Danube fleet, with only 10% self propelled vessels, tends toward larger capacities, 27% in the 1,500-2,999 tons category and 39% in the +3,000 tons category.

The conclusion is that the competition will be in the range of 1,500-2,999 tons type ships, where the percentage are close.



Source: Annuaire statistique de la Commission du Danube ; Rapport annuel de la CCNR, Calculation by the ECE secretariat

The pushed barges fleets are much more similar than the self propelled. The major competition will be in the area of 1,500-2,999 tons type, where the percentages are close (66 against 54%).

Some basic considerations are:

- The Rhine fleet is much bigger than that of Danube, more than 70% of it is represented by self propelled ships, compared to the barge predominance of the Danube's fleet.
- The Danube fleet is much newer compared to the one sailing on the Rhine; 30% of the Danube fleet was build after 1980 and 85% of the Rhine fleet was built before 1969.

This facts suggest that the increase of the Danube fleet competitiveness may be achieved at least by two ways:

- intensive action to modernise the Danube ships, because even if they are newer, they don't fulfil the technical conditions required for the Rhine navigation;
- the adoption of a new shipbuilding strategy, based on the diversification of ship type; types like self-propelled, portcontainer and Ro-Ro barges must have priority in the future.

Romania has the biggest river fleet on the Danube with more than 2,000 units. Unfortunately, only a small portion could be used along the whole corridor. It could be said that the Romanian river fleet is not able to serve the transport needs along the Main-Rhine sector, due to the technical performance required for the Rhine navigation by the European Economic Commission (EEC).

Some aspects that limit the access of the Romanian river ships along the West Europe waterways should be underlined:

- The most common types of pushers used along the Danube by the Romanian companies are those with 2x800 and 2x1200 HP. Their technical design is obsolete by today's standards, and their owners have to modernise them, prior to asking a classification society to assess their condition.
- The river barges called Europe II exist in small number only and are not equipped with the accessories that will permit them to transport containers or Ro-Ro cargo. They also need some extra technical arrangements to be in accordance with the EEC recommendations.
- A new generation of river transport units has to be launched by Romanian shipyards
 - modern pushers with a power up to 2x2,000 HP;
 - Ro-Ro ships for the transport of trucks and cars;
 - portcontainer ships with a capacity of 500-1,600 tons (20-75 TEU); and
 - oil tankers with a capacity of 1,600-2,000 tons.

1.4. Geographical Characteristics and Economical Trends within the Rhine-Main-Danube adjacent space.

1.4.1. Austria

Austria is a federal republic with 9 administrative divisions and a surface of 83,849 sq.km. It is crossed by important traffic corridors between the Baltic and Mediterranean Seas, the West and Central Europe, the South East and East Europe. Austria is a landlocked country, with a strategic location at the cross-roads of central Europe. The major river is the Danube. Its population of 7,986,664 is concentrated mostly in Vienna area.

The Economy

Austria boasts a prosperous and stable market economy with a sizeable but falling proportion of nationalised industry. Thanks to its raw material endowment, a technically skilled labour force, and strong links to German industrial firms, Austria occupies specialised niches in European industry and services (tourism, banking).

After 11 consecutive years of growth, the Austrian economy experienced a mild recession in 1993, but growth resumed in 1994. Unemployment is 4.3% and will likely stay at that level as companies adjust to the competition of EU membership beginning 1 January 1995.

To prepare for EU membership, Austria's government has taken measures to open the economy by introducing a major tax reform, privatising state-owned firms, and liberalising cross-border capital movements.

The industrial development is based on important hydro-energetic resources, oil, natural gas, iron ore, timber, magnesite, aluminium, lead, coal, lignite and copper.

The main industries are food, iron and steel, machinery, textiles, chemicals, electrical, paper and pulp, tourism, mining, motor vehicles.

Transport

Due to its geographical position, Austria is a transit country, both for passenger and cargo. The inland waterways extend over 446 km. The main ports are Linz and Vienna. Even as a landlocked country, Austria has a merchant marine with a total of 32 seagoing ships totalling 235,719 DWT.

Foreign Trade

The exports reached \$88 billion in 1995 including machinery and equipment, iron and steel, lumber, textiles, paper products and chemicals. The main partners were EC 63.5% (Germany 38.9%), EFTA 9.0%, Eastern Europe 12.3%, Japan 1.5%, US 3.4%.

The imports reached \$90.3 billion including petroleum, foodstuffs, machinery and equipment, vehicles, chemicals, textiles, clothing and pharmaceuticals.

The main partners were EC 66.8% (Germany 41.3%), EFTA 6.7%, Eastern Europe 7.5%, Japan 4.4%, US 4.4%.

1.4.2. Netherlands

Its surface is 37,330 sq km with a land area of 33,920 sq km and has a coastline of only 451 km which are very well used.

Its natural resources are natural gas, petroleum and a fertile soil.

Of great importance for country's economy is the river Rhine with its low course and its delta.

The population is 15,452,903 (July 1995), almost half of it being concentrated in the western part of the country, where the shipping and port activities have developed most.

The Economy

The main branches are: agroindustries, metal and engineering products, electrical machinery and equipment, chemicals, petroleum, fishing, construction and micro electronics.

The energy industry flourished during the last decade, with Holland being one of the most important gas producers.

The trade and financial services sector contributes over 50% of GDP. Industrial activity provides about 25% of GDP and is led by the food-processing, oil-refining, and metalworking industries.

Transport

The most important waterway is the Rhine which is divided into two branches Lek and Waal. Inland waterways measure 6,340 km, of which 35% are usable by craft of 1,000 metric ton capacity or larger.

The maritime traffic is concentrated mostly in Rotterdam, the biggest European port, situated on the Rhine and having direct access to the sea through the Nieuwe Waterweg canal. Rotterdam's traffic importance is connected to its transit role, mostly for Germany. Amsterdam is the second important port, especially for raw materials like minerals, oil, coke and cereals.

The merchant marine has a total of 343 ships, totalling 3,337,307 dwt.

Foreign Trade

Exports reached \$210.7 billion in 1995 and consisted of such commodities as: metal products, chemicals, processed food and tobacco. The trade partners are EC 77% (Germany 27%, Belgium-Luxembourg 15%, UK 10%), Central and Eastern Europe 10%, US 4%.

The imports reached \$185.5 billion and have been mostly raw materials and semifinished products, consumer goods, transportation equipment, crude oil and food products. The main trade partners were EC 64% (Germany 26%, Belgium-Luxembourg 14%, UK 8%), US 8%.

1.4.3. Belgium

Its surface is 30,513 sq.km out of which the land area is 30,230 sq.km, and has a population of 10 million. Due to its natural resources (coal and gas) and geographical position, Belgium has experienced an increased industrial development.

The Economy

Three-fourths of Belgium trade is done with other EU countries. The economy grew at a strong 4% pace during the period 1988-90, slowed to 1% in 1991-92, dropped by 1.5% in 1993, and recovered with 2.3% growth in 1994.

The main industries are engineering and metal products, motor vehicle assembly, processed food and beverages, chemicals, basic metals, textiles, glass, petroleum, coal .

Machinery producing industry is the most important Belgian industrial branch and is based on big industrial units located in Liege, Charleroi and Brussels. Shipbuilding is concentrated in Antwerp.

The agriculture accounts for 2.0% of the GDP. The emphasis is on livestock production (70 % of the total production) - beef, veal, pork and milk; major crops are sugar beets, fresh vegetables, fruits, grain and tobacco. Belgium is a net importer of farm products.

Transports

Belgium is one of the countries with a very dense waterway network. There are two main rivers used for navigation, Schelde and Meuse, together with a large number of navigable canals. Total inland waterways: 2,043 km (1,528 km in regular commercial use). The river and maritime traffic reflect the industrial output. During 1930-1939, the Albert canal was constructed, over 130 Km in length, to connect Antwerp and Liege. The connection with the sea is done through the Zeebrugge-Brugge, Terneuzen-Gent and Rupel-Bruxelles canal. The merchant marine has approximately 20 ships) totalling nearly 60,000 DWT .

Foreign Trade

The main exports consist of products of the metallurgic industry, machinery producing industry, chemicals and textiles. The import relies on raw materials and combustibles.

The exports reached \$195.5 billion in 1995 including iron and steel, transportation equipment, tractors, diamonds, petroleum products having as main partners: EC 75.5%, US 3.7%, former Communist countries 1.4%.

The imports reached \$182.4 billion including fuels, grains, chemicals, foodstuffs with partners like: EC 73%, US 4.8%, former Communist countries 1.8%.

1.4.4. Switzerland

Switzerland has a surface of 41,294 sq.km and is part of Central Europe. It is a transit country, crossed by important railways and highways. Its natural resources are hydropower potential, timber and salt.

The population reached 7 million and is concentrated more or less into some zones such as Basel, Geneva and Zurich.

The country has few mineral resources, but its spectacular natural beauty sustains a substantial tourism industry. The lack of raw materials, a large production of hydro-electricity (allowing the development of electro-metallurgy and electro-chemistry industries) as well as the presence of a highly qualified work force, explain why the Swiss industry has developed toward those economic branches using few raw materials and highly skilled workers.

The Economy

The main industrial products are machinery, chemicals, watches, textiles and precision instruments. The metallurgic industry has a small production but the steel's quality is higher than average. Aluminium is produced on a larger scale, based on the abundant electrical power available and the raw materials, imported from France.

The chemical industry has developed toward the dyes industry and medicine.

Transport

Switzerland has a dense network of transport modes, able to cope with important passenger and cargo traffic.

Railway transport is the most important with its routes St. Gotthard and Simplon making the connection with Italy.

Road transport is served by an important, modern network of highways, some of them crossing the Alps through high altitude tunnels like St. Bernard and St. Gotthard.

The inland waterways network measures 65 km and consists of the Rhine (Basel to Rheinfelden and Schaffhausen to Bodensee) and 12 navigable lakes.

Switzerland has a merchant marine with a total of 22 ships totalling 669,353 DWT.

The foreign trade

The exports reached \$107.9 billion in 1995 including machinery and equipment, precision instruments, metal products, foodstuffs, textiles and clothing. Main partners were Western Europe 63.1% (EU countries 56%, other 7.1%), US 8.8%, Japan 3.4%

The imports reached \$95.8 billion including agricultural products, machinery transportation equipment, chemicals, textiles and construction materials. Main partners: Western Europe 79.2% (EU countries 72.3%, other 6.9%), US 6.4%

1.4.5. Germany

Germany has access both to the North Sea and the Baltic over a sea coastline of 2,389 km and is crossed by the Rhine-Main-Danube canal. Location: Central Europe, bordering the Baltic Sea and the North Sea, between the Netherlands and Poland, south of Denmark

Its territory covers an area of 356,910 sq km out of which 349,520 sq km is land and its population is about 81,337,541. .

Natural resources: iron ore, coal, potash, timber, lignite, uranium, copper, natural gas, salt and nickel.

The Economy

The main industrial branches are divided between the western part which include some of the world's largest and technologically advanced producers of iron, steel, coal, cement, chemicals, machinery, vehicles, machine tools, electronics; food and beverages and the eastern part including metal fabrication, chemicals, brown coal, shipbuilding, machine building, food and beverages, textiles and petroleum refining

The transport

The transportation system is well balanced between railroads with a total of 43,457 km, highways with a total of 636,282 km and inland waterways.

The inland waterway western system has a length of 5,222 km, of which almost 70% are used by craft of 1,000-metric-ton capacity or larger; major rivers include the Rhine and Elbe; the Kiel Canal is an important connection between the Baltic Sea and North Sea.

The German merchant marine is comprised of 481 seagoing ships totalling 6,409,198 DWT.

Foreign Trade

The exports had a total value of \$570 billion in 1995 and included manufactured goods 89.3% (including machines and machine tools, chemicals, motor vehicles, iron and steel products), agricultural products 5.5%, raw materials 2.7%, and fuel 1.3%.

The main partners have been EC 47.9% (France 11.7%, Netherlands 7.4%, Italy 7.5%, UK 7.7%, Belgium-Luxembourg 6.6%), EFTA 15.5%, US 7.7%, Eastern Europe 5.2%, OPEC 3.0%.

The imports reached \$550 billion in 1995. The main commodities were manufactured goods 75.1%, agricultural products 10.0%, fuels 8.3%, raw materials 5.0% .

The main partners for imports have been: EC 46.4% (France 11.3%, Netherlands 8.4%, Italy 8.1%, UK 6.0%, Belgium-Luxembourg 5.7%), EFTA 14.3%, US 7.3%, Japan 6.3%, Eastern Europe 5.1%, OPEC 2.6% .

1.4.6. Hungary

Hungary is a Central European country situated Northwest of Romania and has an area of 93,030 sq km. It is another landlocked country but with a strategic location astride main land routes between Western Europe and the Balkan Peninsula as well as between Ukraine and the Mediterranean basin.

Hungary has some natural resources such as bauxite, coal, natural gas and fertile soil. Its population is of is about 10.3 million.

The Economy

The transformation of the economy has proved difficult. On the bright side, the four-year decline in output finally ended in 1994, as real GDP increased an estimated 3%. This growth helped reduce unemployment to just over 10% by yearend, down from a peak of 13%. In 1995 the government pledged to accelerate privatisation and lowered the budget deficit to 5.5% of GDP.

The Industry

The Hungarian economy relies on such industries as mining, metallurgy, construction materials, processed foods, textiles, chemicals (especially pharmaceuticals), buses, automobiles.

The agriculture, including forestry, accounts for 15% of GDP and 16% of employment; highly diversified crop and livestock farming with principal products like wheat, corn, sunflowers, potatoes and sugar beets.

The Transports

Hungary has a good road network, with a total length of 158,711 km (441 km of expressways). Its railway lines measure only 7,785 km.

The inland waterways network extends over 1,622 km, mainly on the Danube with its main ports, Budapest and Dunaujvaros.

Hungary has a merchant marine fleet, totalling 10 cargo ships totalling 61,613 DWT.

The Foreign Trade

The exports reached \$15.2 billion in 1995 and included raw materials and semi-finished goods 30.0%, machinery and transport equipment 20.1%, consumer goods 25.2%, food and agriculture 21.4%, fuels and energy 3.4%.

The main partners were Germany 25.3%, Italy 8.3%, Austria 10.5%, Russia 14.0% and US 4.3% .

The imports reached \$16.2 billion in 1995 including fuels and energy 12.6%, raw materials, semi-finished goods 27.3%, machinery, transport equipment 33.0%, consumer goods 21.2%, food and agriculture products 5.9%. Main partners were Germany 21.5%, Italy 6.1%, Austria 11.8%, Russia 20.9% and US 4.3%

1.4.7. Bulgaria

Bulgaria is located in South-eastern Europe, bordering the Black Sea, between Romania and Turkey and has an area of 110,910 sq km. Its coastline measures 354 km. The natural resources include bauxite, copper, lead, zinc, coal and timber. The population numbered 8.7 million in 1995.

The Economy

The Bulgarian economy continued its painful adjustment in 1994 from the misdirected development undertaken during four decades of Communist rule. Many aspects of a market economy have been put in place and have begun to function, but much of the economy, especially the industrial sector, has yet to re-establish market links lost with the collapse of the other centrally planned Soviet Bloc economies. The prices of many imported industrial inputs, especially energy products, have risen markedly, and falling real wages have not sufficed to restore competitiveness. The government plans more extensive privatisation in 1995 to improve the management of enterprises and to encourage foreign investment.

The Industry is based on machine building and metal working, food processing, chemicals, textiles, building materials, ferrous and non-ferrous metals.

The agriculture supports livestock raising and the growing of various grain crops, oilseeds, vegetables, fruits, and tobacco; more than one-third of the arable land is devoted to grain; Bulgaria is the world's fourth-largest tobacco exporter;

Transportation

The railroads network extends over 4,294 km, the highways over 36,932 km and the inland waterways over 470 km. The main maritime ports are Burgas, Lom, Nesebur, Ruse, Varna and Vidin. Its merchant marine has a total of 109 ships totalling 1.7 million DWT

Foreign Trade

The exports reached \$3.6 billion in 1993 including machinery and equipment 30.6%; agricultural products 24%, manufactured consumer goods 22.2%, fuels, minerals, raw materials and metals 10.5%. The most common partners were former CEMA countries 57.7% (Russia 48.6%, Poland 2.1%, Czechoslovakia 0.9%) and developed countries 26.3% (Germany 4.8%, Greece 2.2%);

The imports reached \$4.3 billion in 1993 including fuels, minerals, raw materials 58.7%, machinery and equipment 15.8%, manufactured consumer goods 4.4% and agricultural products 15.2%. The most common partners were former CEMA countries 51.0% (Russia 43.2%, Poland 3.7%) and developed countries 32.8% (Germany 7.0%, Austria 4.7%);

1.4.8. Slovakia

Slovakia is located in Central Europe, south of Poland and has an area of 48,845 sq km. Its population is 5,432,383 (July 1995)

The Economy

During the last years, Slovakia continued to have difficulty attracting foreign investment, because of perceived political instability and halting progress in privatisation. The actual government prepared property worth nearly \$2 billion for the privatisation campaign and sold participation in the program to over 80% of Slovakian's citizens.

The new government's targets for 1995 included GDP growth of 3%, inflation of 8%-10%, unemployment of 15%, and a budget deficit under 3% of GDP. Continuing economic recovery in western Europe should boost Slovak exports and production, but Slovakian's image with foreign creditors and investors suffered setbacks in 1995 because of the stalled progress on privatisation and the budget deficits that mounted beyond IMF recommended levels.

The main industrial products have been: metal and metal products, food and beverages, electricity, gas, oil production nuclear fuel production, chemicals, machinery, paper, earthenware, transport vehicles, textiles, electrical and optical apparatus and rubber products.

Slovakia is self-sufficient in food production. Its agriculture is characterised by a diversified crop and livestock production, including grains, potatoes, sugar beets, hops, fruit, hogs, cattle and poultry.

Transportation

Slovakia has a railroads network totalling 3,660 km and a total highway system totalling 17,650 km (1990).

The main Danube's ports are Bratislava and Komarno. The merchant marine is comprised by 2 cargo ships totalling 6,163 DWT

Foreign Trade

The exports reached: \$6.3 billion (fob 1994) and included commodities such as: machinery, transport equipment, chemicals, fuels, minerals, metals and agricultural products. The main partners have been: the Czech Republic 37.7%, Germany 17.1%, Hungary 5.3%, Austria 5.3%, Italy 4.6%, Russia 4.0%, Poland 2.6%, Ukraine 1.8%, US 1.6%

The imports reached: \$6.1 billion (fob 1994) and included commodities such as: machinery, transport equipment, fuels, lubricants, manufactured goods, raw materials, chemicals and agricultural products. The main partners have been: the Czech Republic 29.9%, Russia 19.0%, Germany 13.2%, Austria 5.8%, Italy 4.3%, US 2.6%, Poland 2.4%, Ukraine 1.9%, Hungary 1.6%

1.4.9. Croatia

Croatia is located in the south-eastern Europe and is bordered by the Adriatic Sea, Bosnia, Herzegovina and Slovenia. It covers an area of : 56,538 sq km and has a population of 4.6million (July 1995 est.). Croatia has a coastline of 5,790 km. Its natural resources include coal, bauxite, iron ore, calcium, asphalt, silica, mica, clays and salt.

The Economy

Before the dissolution of Yugoslavia, the republic of Croatia was the second most prosperous and industrialised area. Right now, Croatia faces serious economic problems stemming from the legacy of former communist management of the economy, the foreign debt and the damage during the war.

The main industrial products have been chemicals and plastics, machine tools, fabricated metal, electronics, pig iron and rolled steel products, aluminium reduction, paper, wood products (including furniture), building materials (including cement), textiles, shipbuilding, petroleum and petroleum refining, food processing and beverages.

The Croatian agriculture normally produces a food surplus. Most agricultural land is private and the main crops are wheat, corn, sugar beets, sunflowers, cereal production, orchards, vineyards, livestock breeding, and dairy farming; coastal areas.

Transportation

The railroad network totals 2,699 km (963 km electrified) and the highway network totals 27,368 km. The inland waterways comprises 785 km perennially navigable. The main maritime ports are Dubrovnik, Omis, Ploce, Pula, Rijeka, Sibenik, Split, Zadar. Its merchant marine has a total of 35 ships totalling 225,533 DWT.

Foreign Trade

The exports reached \$3.9 billion (fob 1993) including machinery, transport equipment 30%, other manufacturers 37%, chemicals 11%, food and live animals 9%, raw materials 6.5% and fuels and lubricants 5%. The main partners have been the EC countries and Slovenia.

The imports reached \$4.7 billion (cif 1993) and included machinery and transport equipment 21%, fuels and lubricants 19%, food and live animals 16%, chemicals 14%, manufactured goods 13%, miscellaneous manufactured articles 9%, raw materials 6.5%, beverages and tobacco 1%. The main partners have been the EC countries, Slovenia, and FSU countries.

1.4.10. Moldova

Moldova is situated within the Eastern Europe, Northeast of Romania. It has an area of 33,700 sq km and a population of 4,489,657 (July 1995 est.). Its natural resources include lignite, phosphorites and gypsum.

The Economy

Moldova has a good farmland but has no major mineral deposits. As a result, Moldova's economy is primarily based on agriculture, featuring fruits, vegetables, wine, and tobacco. Moldova must import all of its supplies of oil, coal, and natural gas.

The main industrial products have been canned food, agricultural machinery, foundry equipment, refrigerators and freezers, washing machines, hosiery, refined sugar, vegetable oil, shoes and textiles.

The agriculture accounts for about 40% of GDP and is Moldova's principal economic activity. The main agricultural products are vegetables, fruits, wine, grain, sugar beets, sunflower seed, meat, milk and tobacco.

Transports

The railroads network totals 1,150 km in common carrier service and the highways network totals 20,000 km.

The Foreign Trade

The exports reached \$144 million with over 70% of exports going to FSU countries (1994). It included foodstuffs, wine, tobacco, textiles and footwear, machinery and chemicals. The main partners have been Russia, Kazakhstan, Ukraine, Romania, and Germany .

The imports reached \$174 million from outside the FSU countries (1994). Over 70% of imports are from FSU countries and included oil, gas, coal, steel, machinery, foodstuffs and automobiles. The main partners have been Russia, Ukraine, Uzbekistan, Romania and Germany .

1.4.11. Ukraine

Ukraine is located within the Eastern Europe, bordering the Black Sea, Poland and Russia. It covers an area of 603,700 sq km has a coastline of 2,782 km and has a population of 51.8 million. (July 1995 est.) Its natural resources include iron ore, coal, manganese, natural gas, oil, salt, sulphur, graphite, titanium, magnesium, kaolin, nickel, mercury and timber.

The Economy

Ukraine is second only to Russia within the former USSR. Due to the quality of its soil, its agriculture generated more than one-fourth of the Soviet agricultural output, with substantial quantities of meat, milk, grain, and vegetables.

The most important events after 1990 was the liberalisation of most prices and the legal framework for privatisation that was put in place.

The main industrial products have been coal, electric power, ferrous and non-ferrous metals, machinery and transport equipment, chemicals and processed food (especially sugar).

The agriculture accounts for about 25% of GDP. The main crops are grain, vegetables, meat, milk and sugar beets.

Transportation

The Ukrainian railroads network covers 23,350 km and its highways system covers a total of 273,700 km. The inland waterways stretches over 1,672 km perennially navigable and the main maritime ports are Berdyansk, Illichivsk, Izmayil, Kerch, Kherson, Kiev, Mariupol, Mykolayiv, Odesa, Pivdenne, Reni.

The merchant marine has a total of 379 ships with 5,071,175 DWT.

Foreign Trade

The exports reached \$11.8 billion in 1994 and included coal, electric power, ferrous and non-ferrous metals, chemicals, machinery and transport equipment, grain and meat. The main partners have been FSU countries, China, Italy and Switzerland.

The imports reached \$14.2 billion and included energy, machinery and parts, transportation equipment, chemicals and textiles. The main partners have been FSU countries, Germany, Poland and Czech Republic.

The previous characterisations of the countries situated alongside the Rhine-Main-Danube corridor have been compiled using information published by OECD, namely *National Accounts*, Paris, 1997 and *Trade by Commodities*, Series C, Paris 1997 as well as the Internet Web site of CIA *World Fact Book 1995*(<http://cliffie.nosc.mil/>).

All of these countries cover the whole spectrum of economic development, from the developing countries like Moldova, Bulgaria, Ukraine, Romania to the highly developed ones like Germany, Netherlands, Belgium or Switzerland.

The corridor could therefore transfer the raw materials one way and the final products the other way, between the developed countries and the developing ones, where the workforce is many times cheaper.

The statistics show that apart from the inter EU trade, there is a growing economic exchanges between the countries situated along the corridor. Romania has also a growing trade with those countries as shown in the annexes. This traffic will increase with the expected enlargement of EU. For the moment only Hungary out of the five countries expected to start the negotiations is situated along the corridor. Romania has also great hopes to join the first team of five. Anyway, sooner or later at least Romania, Slovakia and Croatia will join the EU and then the role of the corridor will increase considerably.

1.5. European harmonising tendencies, concerning internal waterways, with an accent on the Danube

1.5.1. European waterway network and the European Conference of the Ministries of Transport (ECMT),

The decrease of traffic along the European major waterways obliged international institutions like the European Conference of the Ministries of Transport (ECMT), the European Community Commission and the United Nation Commission for Europe, to initiate various specific studies to identify the cause of this phenomenon. One of the conclusions has been that a major obstacle against the development of the internal waterway transport system in Europe is the network's technical conditions.

The ECMT Council of Ministers that met in Athens, on 11 and 12 June 1992, decided through the Resolution no. 92/2 upon the new classification of inland waterways [CEMT/CM(92)6/FINAL] and made some recommendations concerning the technical aspects of the infrastructure.

The main recommendations were directed toward the governments that should give proper consideration to the classification of European inland waterways, by classifying their own country's inland waterways, as a first step toward future unification.

Other recommendation were:

- Maps of national networks should be drawn in line with the new classification and documents should be set out considering all the characteristics of any waterway or part of it (waterway outline, fairway location, permissible draught, minimum height under bridges). The main aim is to achieve the most complete exchange of information between each inland waterway user.
- Governments should take into consideration this new classification in their modernisation and improvement plans for their network or when renewing the structures. For instance when a regional, or Class IV waterway is to be modernised, the new parameters should be at least Class Va. When modernising or creating a waterway of international importance, the parameters to be used should be at least Class Vb (minimum draught of 2.80 metres and a minimum height under bridges of 7.00 metres where necessary for container transport).
- Additional to the infrastructure modernisation, navigational techniques can be improved. The construction and equipment of vessels should be improved handling of traditional bulk traffic and research on new types of vessels should be amongst the priorities.

Special consideration should be accorded to the promotion of initiatives for the modernisation of transport equipment and the equipment used for loading, unloading and transhipment.

National authorities are responsible for the smooth integration of inland navigation into a single market, able to absorb the traffic and to adapt to the management, business and navigational techniques that will be developed in the next years.

A first step into deepening these studies has been taken by the ECMT that decided back in 1964, that a list with most important European waterways should be established.

The list contained various projects concerning the construction of new waterways as well as the modernisation of existing ones.

Among the main projects one that may be recalled as a success was the realisation of the Rhine - Danube connection and consequent technical upgrading for the Main and Danube on some important sectors.

E C M T policy, regarding inland waterways development policy

During the above mentioned meeting in Athens, the issue of the future development of the inland waterways network was discussed as well. It was decided that, as a first step, the governments should recognise the importance of inland waterways transport.

This is not a new matter on the Conference Agenda, the preoccupation going back to 25 October 1989, when the conclusions of report CM(89)27 underlined the role of inland navigation in transport economics at both national and international levels.

The importance of the entry into service of the Rhine-Main-Danube link and the opening of the East European countries to the market economy have been taken into consideration. These two important events will influence the establishment of new links and probably modify existing flows of traffic. The transition between the two systems should be as smooth as possible, so that vessels can make use of the whole of the European network.

Studies of combined transport have been undertaken, mainly in connection with rail/road links. The ECMT considers that it is time for the inland waterways to be incorporated into such systems. Apparently, there is an available capacity on the European network which can be used without substantial investments.

The ECMT, was founded on 17 October 1953 and is comprised of the Ministers of Transport of 33 European countries: Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, FYROM (Former Yugoslav Republic of Macedonia), Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, The Netherlands, Norway, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and the United Kingdom. Six countries are Associate Members: Australia, Canada, Japan, New Zealand, the Russian Federation and the United States. Albania, Armenia, Azerbaijan, Belarus, Georgia and Morocco are also represented with observer status.

Due to the competition that exists between different types of infrastructure, the partial transfer of road and rail traffic toward the waterways is suggested as a solution for the traffic congestion and environmental improvement. In the ECMT view point, the industry, shippers and potential users should benefit from incentives of their governments that should find the partial transfer of traffic to be, a response to the problems of congestion and environmental disamenities which are becoming increasingly difficult.

Another recent development concerning the pan European transport policy was the Council of Ministers of the ECMT that held its 80th Session on Wednesday 29 and Thursday 30 May 1996 in Budapest (Hungary). Apart from receiving new member countries, high on the agenda was the Pan-European Transport Policy and Infrastructure Development. The discussion contributed toward significant progress in identifying common solutions for sustainable mobility in Europe, considering at the same time a balance between:

- the general desire for mobility and access to an ever-increasing number of goods and services, as well as the need for a cleaner, quieter and congestion free transport system;
- the need for a harmonised transport policy at a pan-European level and the specific need of certain States to develop their transport infrastructure, particularly in the road sector;
- improved efficiency through greater use of the market, deregulation, and privatisation and the need to safeguard the environment.

This meeting was a good opportunity for Transport Ministers to discuss the infrastructure projects under preparation and express their views on the various measures envisaged to improve traffic flows.

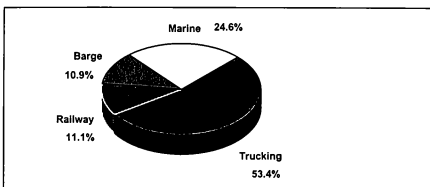
The importance of the following were underlined:

- The need for a European-wide level of a clear, environmentally responsible transport strategy with an accent on rail transport, inland waterways and combined transport. Such a strategy should establish framework conditions that will enable different modes of transport to play their role to their full potential.
- The need to introduce charges for infrastructure use. Such charges, which would benefit from harmonisation at a European-wide level, should be based on costs, in particular external costs.
- The aim for achieving an effective pan-European system of transport infrastructure that is environment friendly.

The corridors defined at the 2nd Pan-European Conference in Crete play an important role between the trans-European network of the European Union and the countries of Central and Eastern Europe. Singular investments such as for road transport only, would lead to a dead end. The development of a pan-European network that is to be viable in the long term must continue to devote significant investments to railways and inland waterways.

1.5.2. Considerations about the western inland waterways fleet

Deciding to analyse the trend of an economic sector such as the maritime industry with an emphasis on port traffic, the easiest way is to look closely at one of the most representative ports. In this case, a glimpse at Rotterdam port traffic will give us a clear picture of the western maritime industry. The container transshipment methods within the port, shows the interrelation of different modes.



Source: Compiled by IBJ on its 1989 report: "Present Condition of the Distribution in the European Community and Its Future Outlook".

Knowing that Rotterdam is not only the biggest port by many statistics, but also the biggest transit port in the world, it is understandable why it has such an important impact on the European inland waterway system. The port is representative of a transit port with ships unloading both to the pier and to the barge. In Rotterdam, the inland shipping sector is so interrelated with its deep sea sector that more barges can be seen in Rotterdam, than sea going ships.

The connection between the two sectors is so close that one influences the other. Usually the dominant one is the maritime sector. That is the reason why when the maritime sector is in recession so is the inland one. Therefore the decrease of the maritime traffic was reflected by the overcapacity crisis of the inland waterways' transport.

“Good inland shipping is the port of Rotterdam strength” once declared the secretary of the Inland Waterways Information Bureau Mr. Kees de Vries. The Netherland’s Schuttevaer (the shippers association) is very optimistic about what they call the strong position of waterway sector. The association asserted that the waterway transport accounts for 154 million tons of cargo-almost 50% of the total transport between Rotterdam and Germany. The Dutch shipowners are the strongest, transporting 60% of the cargo, outside The Netherlands. They also transport 43% of the Rhine-Main-Danube canal’s cargo. (Cargoweb: Pillars of the Port - Rutger Groot)

This problem was addressed at EU level but mostly by barge owners or operators, both from The Netherlands and Germany. These represent the ownership of nearly half of the west Europe capacity. They decided upon tough measures to improve their activity. These included:

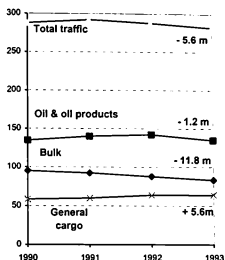
- the limitation of working hours mostly to daylight;
- reduced commissions for the agents;
- a new and more complex charter system for their units.

The aim was to address the overcapacity by reducing operating costs.

Unilateral measures have been considered also and this was why The Netherlands government tried to make a transition from the traditional cargo allocation system toward a open cargo market. There are two systems of cargo allocation in force in The Netherlands: the traditional one is where the barge activity is regulated by the Rotterdam barge bourse and the newer one is where some big companies simply avoid the bourse and transport the cargo based on their own arrangements. The government tries to discourage the eventual monopoly of the market, by the big companies by offering the market a share of 6 million tons of bulk cargo, through the bourse system.

Recent statistics related to the port are illustrated by the table and graph below and show the slight decrease of Rotterdam’s throughput traffic between 1990 and 1993. The reason for this evolution was the lower imports of bulk products and the lower exports for oil and related products. The trend of the container sector showed an increase influencing the general cargo sector trend as well.

x m tons	1990	1991	1992	1993
Agribulk	20.3	17.9	16.8	17.3
Ores	41.8	42.7	40.8	38.1
Coal	21.4	23.7	23	19.5
Other	16.7	18.1	19.2	15.9
PRODUCTS	29.3	25.2	20.4	20.2
Crude oil	88.5	96.6	102.3	97.2
Other	16.7	18.1	19.2	15.9
Other	11.7	12.5	12.2	11.0
RO-RO	7.3	7.1	7.2	7.2
Cont.	39.3	40.3	44.3	45.7
Other	11.7	12.5	12.2	11.0
GENERAL	287.8	292.0	287.8	282.2



Source: Lloyd's List June 1994

Even when the traffic increases, individual barge operators will not be able to reach some special cargo like containers, coal, phosphates and iron ore. The dry bulk cargo transporters are not the only ones affected. The inland tanker sector experienced also troubles during the last period to such an extent, that the Dutch government offered special programmes for the barge owners, that leave the business, offering them qualification courses to start new careers and homes if they accept a move to shoreside employment.

The global solution analysed at the EU level to counter the overcapacity is the scrapping of some of the existing tonnage. Tanker owners hope that EU will design new regulations to control the newbuildings by relating this activity to the compulsory scrapping of older vessels. Another idea is that the owner might receive a cash based premium payment when scrapping a vessel.

Another tanker owners concern is the increased use of former NATO pipeline system in Europe, to connect Rotterdam with main cities in Germany and in The Netherlands. The Netherlands barge owners have been specially concerned by the plans to pump jet fuel from Rotterdam to Schipol airport, seriously affecting their business. The director of Hamburg Lloyd inland shipping company, Mr. Ad Oerlmans declared about that that "that's fine as far as I'm concerned, but then only at market prices". The competition that his company's thirty tanker fleet has to fight is not only against the pipeline project but against the Polish and East European fleets as well. Their arrival send the cargo prices falling by 30%. (Pillars of the Port - Rutger Groot)

Falling freight rates was a major reason for the market condition governing the last years. The concern was general and contributed to the signing of an agreement during the 1994 summer between brokers and barge owners that kept up the rates for a limited period. It didn't help the industry very much, and after two months, the rates collapsed again.

It is interesting to mention here two positions that emphasise the importance of the inland shipping in Europe. One belongs to the European Union's Council of Transport Ministers (Lloyd's of London Press Ltd. Mar. 15, 1996) and the other one to the British Inland Shipping Group (Lloyd's of London Press Ltd. Sep. 27, 1996).

In the first case, the European Union's Council of Transport Ministers approved the liberalisation of the inland shipping sector. For years, the inland bound cargo traffic's allocation relayed on the so called "tour-de-role" system. Under these rules, the freight is allocated to barge owners on a rotational system, that guarantees minimum rates for transporters. By changing the system, the experts hope to make the sector more efficient by increasing its competitiveness. Practically, the pricing system will be deregulated to create a better balance between demand and supply. Considering it contrary to the free market principles, the European Union's Council of Transport Ministers allocated a period of three years for the change, starting from 1996.

The "tour-de role" or rotation system, has been described often as a "taxi rank, with the shipper obliged to use the first barge in the queue at a fixed price" and is affecting the inland transport on the North-South route, between France, Belgium, The Netherlands and Germany.

However, because the great majority of shipowners in those countries, are individual small carriers that could be affected by this measure, the Council will support new parallel actions of inland waterway transport promotion. Some promotional actions could be the co-financement of investments into EU member states for inland waterways terminals and the purchase of specialised equipment.

The reducing of the sector's overcapacity is also targeted, intending for the total capacity to be 15% less by year 1998. The costs for supporting this scrapping programme will be split between EU by Ecu 40million and the member states and barge operators with Ecu 150million.

The second case concerns the British government's inland transport policy. The traditional Europhobia expressed by the government resulted in an unwillingness to classify canals as part of the European network. Therefore, people involved in the inland waterway transport, organised themselves into a non-profit group, called Inland Shipping Group, intending to launch a lobbying campaign for this particular mode of transport. The initiative was also supported by the Royal Commission on Environmental Pollution that recommended an increase in the use of waterways for transport.

The environmental concern is based on the statistics showing that in 1984 the road transport covered 7% of the total cargo traffic. By 1994, 62% of the traffic went to the roads with a correspondent in the increase of truck number rushing along the motorways. It seems that by the years 2000, the use of roads might double, bringing an increased congestion as well as pollution.

The task of shifting the freight from road to waterways is a difficult one. At present 65% of inland freight movement is done by road and shippers will need a lot of incentives to change their habits. Putt in other words, the government must inject a lot of public funds into the system in order to make it more attractive. If the Labour administration will adopt a different attitude toward British waterways, by classifying them under the EU rules, then it might get access to EU Trans European Network development funds.

All of these problems got an increasing attention during the last years and different solutions designed. One of them was proposed by the Van Duursen Commission, established in The Netherlands and consist in building floating container terminals that will bring more flexibility to the container transport. They will act like sorting centres, preparing the container shipments for loading. Especially the Dutch government is so keen to develop the container services along the waterways that the present Minister of Transport allocated 10 million of guilders to be invested in infrastructure projects like bridges and locks. (Pillar of the Ports- Rutger Groot)

The Netherlands major interest in the inland waterway transport is underlined also by the following table that analyses the place of the inland waterway transport within the whole transport picture for some OECD countries.

Country	Freight Transport billion tonne-kilometres								
	Rail		Roads		Inland waterways		Pipelines		Total inland
Austria	13.7	45%	8.0	26.4%	2.0	6.6%	6.7	22%	30.4
Belgium	7.2	12.8%	42.5	75.8%	5.0	8.9%	1.37	2.5%	56.0
Germany	69.1	19.8%	200.1	57.5%	63.9	18.4%	14.8	4.3%	348.0
Netherlands	3.1	4.5%	27.1	38.7%	34.5	49.3%	5.28	7.5%	69.9
Switzerland	8.1	39.2%	11.2	53.9%	0.2	1.0%	1.22	5.9%	20.7
USA	1906	39.9%	1,345	28.3%	642.8	13.4%	874.5	18.4%	4,768

Source : European Conference of Ministers of Transport (ECMT) Paris 1997

We choose USA as a comparison and as country with an extensive waterway system. The range of inland waterway transport compared to the total inland transport in percents extends from 1% to 49.3%. The geography of the country plays an important role. Switzerland, a mountainous country cannot use most of river for navigation but

instead uses its road network. Germany is in the middle with 18.4 % similar to rail transport and with road transport leading. The most waterway pro is of course the Netherlands, advantaged by its great number of canals and rivers. The waterway transport rivals the road (34.5% compared to 38.7%) with rail trailing far behind.

The main attraction of the inland waterways lies in fact in the minimal maintenance costs of its infrastructure. Inland navigation is safe and its harmful emissions are six times less compared to the road transport. The waterway borne air pollution is only one seventh of that of road transport, in terms of social costs.

Shifting the transport from roads to waterways could bring tremendous advantages in terms of environment protection. The Ministry of Transport of Germany published a report about the construction of the Mittellandkanal and Elbe-Havel Canal. The report concluded that the construction of the waterways and the subsequent shift in traffic from roads reduced the CO₂ emissions by 200,000 tons /year. (UN- Economic and Social Council 22 June 1994)

More than that, other advantages could be added such as marketing oriented toward customer oriented activities (intermodalism). Perhaps the solution suggested by Professor Arie van der Zwan from Erasmus University in Rotterdam is the closest to the ideal solution. He said that "distance is itself competitive in the combination of road and water transport compared to road transport alone". (Pillars of the Port-Rutger Groot)

1.5.3. The European Commission project for an European Accord, regarding the main waterways

Aiming to improve the international co-operation and to promote and finance the development of the internal navigation network, the Economical Commission for Europe's member states proposed during the June 1994 session a project of European accord concerning the main navigable waterways, that are considered to have international importance.

This project has been elaborated by a special group of experts. The project's work has been facilitated by the adoption of a new classification for European waterways.

The major conclusion of the European waterway support campaign is that the system should be:

- homogenous - adapted to ships and pushed convoys of any kind
- adaptable - toward economical international transport, and ready even for the navigation of mixed sea-river ships.
- integrated - the complete integration between different rivers to be ensured through newly built canals.
- ready - to receive increasing traffic density, a characteristic to be gained through proper development of the waterway network within all the

European interested countries, including those of Central and East Europe.

Apart from the main content of the Accord, its three annexes seem particularly important.

- Annex I - Denomination of the internationally important waterways.
- Annex II - Main river ports of international importance.
- Annex III - Technical and operational characteristics of internationally important waterways.

Denomination of the internationally important waterways.

- 1) All the internationally important waterways are identified by the letter E followed by a two or four digits number.
- 2) The most important waterways and most important of the network's elements received two digit numbers while primary and secondary branches received four and six digits numbers.
- 3) The radial waterways, are those oriented from North - to South, giving access to the maritime ports. Diametrical waterways are the important radial ones, connecting one maritime basin to another.
- 4) Transversal waterways are those oriented from West-to East.
- 5) Diametrical waterways are numbered 10, 20, 30, 40, 50 increasing from the West to East. The main transversal waterways are numbered form 60, 70, 80 and 90, increasing from North to South.

The Danube is a transversal main waterway numbered E 70 and its main and secondary branches are numbered E 70, followed by an additional two or four digit number.

The Danube and its branches- E type waterways

E waterway number			Route description
Diametrical	Radial	Branches	
1	2	3	
E 70			Danube from Kelheim to Sulina
		E 70 - 08	Dunare - canal Sava : Vucovar to Samac
		E 70 - 03	Tisa until Szeged
		E 70 - 03 - 02	Bega until Timisoara
		E 70 - 10	Sava until Sisak
		E 70 - 05	Olt
		E 70 - 07	Danube - Bucharest Canal
		E 70 - 12	Danube - Black Sea Canal
		E 70 - 12 - 01	Poarta Alba - Navodari Canal
		E 70 - 09	Prut
		E 70 - 11	Danube - Chilia branch
		E 70 - 14	Danube - Sfantu Gheorghe branch

Technical characteristics of the E type waterways

In order to assure a profitable international traffic, E type waterways should have the following characteristics:

- 1) Unlimited access over the whole navigational period with some specified interruption periods.
- 2) The navigational period should not be less than 365 days, except those countries with very difficult winters and where due to the ice, the navigation could be stopped during specific periods. In this case, the closed periods must known in advance.
- 3) The duration of interruptions of the navigation should be limited by technical measures, intended to assure the following maximum values:
 - *Interruption periods due to the ice - 14 days ;*
 - *Interruption periods due to the floods - 7 days ;*
 - *Interruption periods due to lock maintenance - 7 days.*
- 4) If the overall interruption duration allocated for maintenance cannot be assured, new parallel locks should be constructed.
- 5) Navigation shall be free 24 hours a day.

Technical characteristics of E type ports.

The internal waterway system will be completed by a system of ports of international importance. Each one of them will have the following technical and operational features:

- should be situated along a E type waterway;
- to be capable to receive ships or convoys utilised on a E type waterway;
- will have access to important railway and road lines (preferably international ones)
- total traffic capacity must be at least 0.5 million tons/year;
- should allow container traffic and the development of an industrial harbour zone;
- the distances between E type ports must be as such as to ensure the ships' safety.

1.5.4. The technical and safety prescriptions concerning the interior navigation, proposed by CEE/UN

The navigation regime on the European waterways is regulated by both national and international rules concerning the following:

1. navigation rules
2. interior navigation ships' construction certificate
3. interior navigation captain's certificate
4. pollution prevention on the internal waterways
5. dangerous cargoes transport rules

1. Navigation regulation

The unification of the navigation rules for the internal navigation happened when CEE / UN adopted in 1982 the "Internal Waterway Semnalisation Code" (SIGNI) and the "Internal Waterway European Code" (CEVNI) in 1985. These two instruments exist as recommendation made by CEE / UN and are periodically revised.

SIGNI and CEVNI are analogue instruments to those used on the Rhine and have served as examples for the Danube Commission when elaborating "The Fundamental Dispositions related to the Navigation on the Danube" (DFND-1990).

2. River ships building certificate - ship's certificate

CEE adopted in 1975 a series of technical prescriptions concerning the construction of river going ships. In 1982, the European Community Council adopted the directive 82/714/EEC, containing similar technical prescription for river going ships, under revision.

In 1992, the Danube Commission decided to enforce the CEE recommendations "Minimal technical prescriptions for the river going ships, sailing on the Danube". On the Rhine, a revised version of the old "Ship's Sailing Rules" entered into force from January 1, 1995.

Under the plans to increase the traffic on the Rhine-Main-Danube corridor a unification of all the rules relating to the building of river ships that will sail on the two rivers, Rhine and Danube, is necessary.

In the past, the lack of uniform technical prescriptions for the ship's building industry, has been a break for traffic development.

The Danube Commission adopted in 1993 the Ships' Certificate, using the CEE prescriptions as a model. On the Rhine the situation is a little different. There the Mannheim Convention is still valid and article 22 stipulates that all ships entering the river should have a certificate issued by one of the riparian states.

For the sake of future development of the navigation along the Rhine -Main-Danube corridor, one unique certificate must be issued for all ships.

The Danube Commission and its German counterpart CCNR, work for unification on all matters related to the issuance and content of ship's captain certificate that will be recognised by all the riparian states.

3. Pollution prevention by ships.

CEE/UN adopted in 1982, a series of recommendations concerning pollution prevention from the river going ships. At the present CEE/UN has elaborated certain amendments referring to the above mentioned recommendations. They include the present anti-pollution rules, that are in force on the Rhine and the Danube. These define the main pollutants, the latest techniques regarding pollution prevention as well as remedies.

4. Dangerous cargo transport.

At present there is no pan-European Convention referring to the transport of dangerous cargo.

Nevertheless, the basic document for the regulation of this kind of transport is the 1976 Resolution no. 223 with its annex "European prescription referring to the dangerous cargo transport, along the interior waterways".

Later on, this annex was revised based on the "Rules for the Dangerous Cargoes Transport on the Rhine".

Conclusions

The Rhine river-going fleet is well organised, highly competitive and backed-up by EEC. Once the Rhine-Main-Danube traffic corridor was opened, the differences between the two rivers' infrastructures and fleets came on the agenda of the ECMT. The aim of the commonly agreed Transport Policy and Policy Development is to harmonise the water transport infrastructure at European level.

In recent ECMT's views, the waterborne transport is to increase its role within the combined transport, through increased competitiveness.

Through the common work of Danube Commission and CCNR, all the matters concerning the navigation along the corridor and still unsolved will be dealt with in the best way possible.

For a better understanding of the problems and perspectives faced by the Rhine-Main-Danube corridor a general view of the European Inland Waterway Network will be given in the next chapter. The corridor will have to fight not only with other modes of transport but with other waterways' markets. At the end of the day, this competition will bring benefits to all European States developing their inland waterway transport.

2.1. European Inland water network and its classification

2.1.1. Main trans European waterlinks

The increased importance of foreign trade in all European countries, resulted in greater significance of the sea ports and industrial sites along the sea coast. The connection of these sites with traditional European industrial agglomerations can be considered as the most dominant function of the European waterway network. The European waterway system was classified in the early 50's and consists of seven categories. They are determined by the maximum size of vessel being that is able to operate on the waterways.

The most important European waterlinks that are situated in our area of interest (Germany, The Netherlands, Belgium) could be classified as follows:

a. The Rhine link

The Rhine link connects the main Dutch and Belgian seaports (Rotterdam, Antwerp, Ghent) with Germany, France (Strasbourg and the Metz-Nancy industrial region) and the north of Switzerland (Basel). The main waterways are the Rhine and its tributaries (Main and Neckar), to which should be added the Weser-Datteln canal and the Rhine-Herne canal which connect the Rhine and the waterways of northern Germany.

b. The East-West link

The east-west link connects certain northern and eastern areas of Germany with the western part of Germany, the Netherlands and Belgium. The most important waterways are the Elbe, the Weser and the Ems plus Dortmund-Ems canal, Elbe-Seitenkanal and the Elbe-Lubeck canal.

c. The North-South link

The north-south link connects the Netherlands, Belgium and France via waterways other than the Rhine. Two rivers, the Meuse and the Scheldt, link the Dutch and Belgian seaports, as well as Dunkirk, with the interior of the Benelux countries and the industrial regions around Lille in the north of France.

d. The South-East link

The south-east link, includes navigation in the countries through which the Danube flows. As a result of the liberalisation policies embarked upon by the countries of central and eastern Europe, this river has taken on a new importance for the European Community. The Danube flows from southern Germany to the Black Sea, through

Austria, Slovakia, Hungary, Croatia, Yugoslavia, Romania, Bulgaria, Moldavia and Ukraine.

2.1.2. Development of the transport infrastructure in Europe

Due to rapid growth of European-wide transportation in all sectors, the development of the transport infrastructure is inevitable. In line with the developing European internal market and with the new organisation in Eastern European Countries (EEC), EC is actively planning measurements to support the transport infrastructure in these countries. The aim is to establish a trans-European network for each mode of transport, gradually integrating them in a multimodal approach. The Community will accordingly restrict itself to promoting and encouraging national projects of interest to the Community.

a. The European Union's Transport Policy

During the last decade, the European Union has acted towards creating a common market by breaking down the barriers between its Member States. Movement of people and goods more easily, are main goal for the future of this single market.

The rise of new democracies in Eastern Europe, representing an important potential market will also require transport networks to be developed with EU.

Bearing in mind that transport accounts for an estimated 6.5% of the EU's gross national product, and employs more than 6 million people we can easily understand why the EU's transport policy seeks to achieve an integrated trans-European transport network which responds to the standards of environment and safety and has a reliable mobility.

The activities toward this achievement, developed both at the European Community level and the Commission and Member States level, looking for integrated national transport policies, competition between transport suppliers and infrastructure development. The present Commission took office in January 1995, and it has put special emphasis on establishing a better balance between road and other means of transport so as to reduce pollution and congestion and increase safety.

One of the Commission last documents was a "Green Paper on Progress Towards Fair and Efficient Pricing" aiming to examining ways in which transport prices can better reflect the costs of pollution, road congestion and accidents. The general understanding is that a better prices' balance, will be reflected into a better balance between different forms of transport.

The Treaty of Rome that is the birth certificate of the European Union, stipulates in its article 74 the need for a for a common transport policy, but the progress into this matter was slow until 1985 when the Court of Justice partially upheld an action brought against the Council of Ministers by the European Parliament. The Court ruled that the Council had infringed the Treaty's rules on the freedom to provide international transport services.

This decision, together with the Community's commitment toward a single transport market by the end of 1992, established a political momentum that helped progress for:

- liberalisation of the international road transport of goods with full freedom to operate in other member states from 1998 (cabotage);
setting safety standards for road vehicles limiting the risks involved in the carriage of dangerous goods;
- planing for an integrated trans-European transport network;
- realising the connections with the countries of central and eastern Europe;

EU's Instruments of Transport Policy

Legislation: communitary transport law is based on directives and regulations aiming toward the harmonisation of fiscal, technical and social provisions of the national law systems of the Member States, affecting competition between companies in the transport sector.

The legal basis are the articles 3e, 74 and 75 of the EEC Treaty, that require the Community institutions to establish a common policy in the field of transport and Articles 61 and 75 to 84 include various provisions relating to questions of transport policy. Articles 129b-129d cover Trans-European Networks.

The most important legal institutions of the Community are:

- *the European Parliament:* transport legislation is dealt with under the co-operation procedure and the Parliament has the opportunity to amend proposals. The final decision is taken by the Council that can reject Parliament's amendments.;
- *the Council of Ministers:* most transport policy decisions are through voting except when going against the proposal of the Commission. Laying down guidelines for TEN's, need a co decision procedure involving both Parliament and Council;
- *the Commission:* it initiates the proposals for new legislation and manages the funds spend on transport projects. Usually the financing of such projects are a matter of public/private partnerships. Within the Commission, the Directorate General VII is responsible for transport policy.

Guidelines: usually these are technical studies with detailed maps, presenting sometimes, the "missing link," cross-border projects needed to eliminate the bottlenecks of the trans-European transport networks; they refer to national infrastructures for road, rail, air, sea and inland waterway transport.

Research and Technical Development-RTD: as mentioned before, the development programmes focus on the introduction of new digital information technologies to road, rail, air and water traffic management to make travel safer, easier and less environmentally polluting. Started back in 1994 and stretching until 1998, this programmes will bring an influx of more than ECU 900 million in transport related RTD .

Financing: A lot of money is and will invested into supporting transport projects within member states via the European Regional Development Fund and the so called Cohesion Fund.

2.1.3. On the Creation of a European Inland Waterway Network

2.1.3.1. The importance of inland waterways.

A sound infrastructure is one of the factors on which the development of a single internal market and economic growth throughout Europe depend. Together with road and rail, inland waterways form one of the three so-called modes of surface transport. As such it forms within Europe part of a very diversified network of differing capacity. Its role is not simply confined to that of transport, having other contributions to make, to the economy.

Many predictions, done by various economic research institutions have emphasised, that road and even rail infrastructure have now reached a saturation point in many places. It is unlikely that the problem can be solved by simply developing or improving road transport or building new rail links. There will have to be an attempt to develop inland waterway transport which is cheap, non-polluting, consumes little energy and has spare infrastructure and vessel capacity. Inland waterways have a very special role to play in the Europe transport infrastructure policy, as they can link up national networks and operate in conjunction with other modes of transport.

Such is the perception of many experts, and some of them support the idea of surcharges against road transport as a means of easing the saturation.

In September 1995, EU sponsored a conference on river-sea shipping (Lloyd's of London Press Ltd. Oct. 9,1995). On this occasion, it was said that the road transport industry doesn't pay its share toward solving environmental, health and traffic congestion problems. For this reason and also to shift goods from road to water, a

surcharge has to be imposed on road transport. First on the list to be shifted need to be dangerous and toxic goods, and then the outsized cargoes, that block the roads for days in some cases. Speakers at that conference even suggested that all designs for new factories and assembly sites must take into consideration the access to a waterway, or at least to a railway line.

Inland waterway transport may lack some factors that characterise road transport:

- just in time delivery;
- door-to-door handling;
- market specificity (specific cargo that doesn't build up to shipment sizes).

but instead offers big advantages such as:

- lower fuel consumption and reduced manning costs in relation to cargo volume;
- economy of scale;
- no "road like" restrictions and no "road like" taxes;
- no "rail like" delays, different gauges or permitted loads problems;

The main factors of concern remain nevertheless, the unfair subsidising of the rail and road transport. Because of the subsidies received on some of its sectors, the market doesn't deliver an optimal distribution of the cargoes among various modes of transport. Most agree that this will be achieved only when the negative impacts of road transport are no more considered acceptable.

One case that can be cited was that of Austria. Prior to becoming an EU member, Austria charged lorries 940 Shillings for a 110 Km cross. After becoming a member, the cost came down to 240 Schillings and will decrease even more to 80 Schillings in 1997. As a result, during only five months of 1995, the road traffic increased by 17 %.

Under these circumstances, it's worth mentioning the position of Mr. Neil Kinnock, head of the European Union Transport Commission - known as DG VII - and former leader of Britain's Labour Party. *"The demand for transport is set to double in Europe by the year 2010. If you think how clogged the roads are already, you realise the need to act"* he says.

He wants to establish European freeways for rail freight and also to promote the use of waterways and sea to ease the traffic pressure off the roads. The funding of such trans-European infrastructure projects should be done, in his opinion by means of private and public financing.

2.1.3.2. Road haulage and train transport against Inland Water Transport

As mentioned before, and as it gains more and more support today, inland water transport is definitely cheaper than road transport. The average freight rate for 100 Km is ECU 4 for road and ECU 1 for water.

Comparison for road haulage and inland navigation (in ECU per ton)

Transport element	Road haulage	Inland haulage and additional road haulage
1. Bulk truck	19	2.5
vessel	-	4.5
transhipment	-	3.0
TOTAL COST/TON	19.0	10.0
2. General cargo truck	18.0	4.5
vessel	-	7.5
transhipment	-	10.0
TOTAL COST/TON	18.0	22.0

Source: Transport Symposium at Delft University, 1990

Note: transhipment in this case means the cargo transfer from one mode of transport to another.

This cost calculation shows the difference between road haulage on the same area, but with two commodities, requiring different techniques.

In case 1, the commodity being bulk cargo, the total cost/ton is smaller for the waterway transport. In the second case, having general cargo as a commodity, the example shows that the additional road transport that is required, adds inevitably to the water transport cost, mostly because of the transhipment's cost.

During the last years, the European freight transport sector has developed at an increased pace. Some years ago, a number of shipping companies, frustrated by their lack of success in competing over a shrinking market, decided to expand into rail freight transport and funded the European Rail Shuttle (ERS).

The Dutch freight railway sector followed this example and developed at a high rate. The latest such company is the group Trailstar which launch a direct train connection from Rotterdam to Bratislava, in July of this year. The company is specialised in multimodal transport and is co-owned by Nedloyd, the Dutch state rail company and the road company Harry Vos.

Another example of the increasing role of rail transport developing to the deficit of the waterways is a multinational company formed by more than 30 Russian, Belorussian, Polish and Dutch organisations, that developed the "Salad Shuttle",

offering a container transport service to Russia, mostly for agricultural, horticultural and food products. The core of those companies is formed by the Dutch CMG, Sea-Land, Intercontinental Interfrigo, Optimal and Trans-Siberian Express Service.

Putting their efforts together, these companies managed to deal with the poor rail connections, border bottlenecks and red tape.

In order to solve the cargo tracking problem, satellite tracing techniques have been introduced as well as logistical support, realising the "impossible": an uninterrupted, remote cooling, 5 days journey, from the producer to the Russian consumer. Harm Holthuizen, CMG's manager declared in an interview to Lloyd's of London, from March 16, 1997, that the service is considered as a multimodal transport management system, aiming toward having daily shipments from Rotterdam to Moscow.

Another operator in this field is Container Train Netherlands. It operates container services to Prague, Budapest, Slovakia and Poland. The new train will be called Tatra Express and links Rotterdam to Ukraine.

A typical such train is formed by 20, 60 ft wagons and transports raw materials and semi-finished goods from the eastern countries toward further manufacturing processes as far as Asia. The cargo list comprises also agricultural products and food as well as furniture and glassware.

Most of these new players on the rail freight market apply new management techniques, such as the Intermodal Marketing Company. It means that they doesn't get involved in operating rails equipment by themselves but simply buy transport capacity from the railway company. They have also eliminated the intermediaries, being in direct contact with the shippers.

An even more ambitious project concerns the inauguration of a link between UK and such eastern countries as Hungary, Russia and Ukraine, Romania, Bulgaria, or even Greece. The project, planned to start in 1998, is part of the EU transport commissioner Neil Kinnock to shift cargo transport from road to the rail. Together with other connections such as Rotterdam-Milan and Amsterdam-Spain, it will be a part of a future Trans European rail freight Network.

In order to overcome the time difference between road and rail transport (3-4 days for trucks compared to 7 days for trains), some basic problems should be solved such as : lay-ups at borders, change of crews, red tape and paper work. The initial parameters tend toward figures like: 800-1,200 tonnes per train with two or three daily departure in each direction.

Work already undertaken by European Commission

The European Commission recently decided to hold a meeting of a group composed of government representatives from Member States and organisations representing inland waterways operators and users. Representatives of the UN Economic Commission for Europe, The European Conference of the Ministries of Transport and the Central Commission for Navigation of the Rhine were also invited to attend as observers. In the course of the discussions, attention was paid to the need to eliminate bottlenecks and weaknesses in the links to and from Central and Eastern Europe.

The Group has been asked by the Commission to consider the following aspects:

1. a plan of waterway infrastructure in the Member States;
2. identification of priority projects;
3. establishment of a masterplan for inland waterways of Community interest;

The main conclusion drawn after the above mentioned meeting was that inland waterways transport offers a real alternative to road and rail transport which, on some major routes in Europe, are becoming congested and whose growing use can have a deleterious impact both on the environment and freight transport costs.

Some other conclusions were:

- If inland waterway transport is to be made more attractive and more economic, a more integrated European network must be created. This can be done by completing the links which are missing and eliminating the main bottlenecks which exist at present.
- In order to promote its integration with other modes of transport, the opportunities offered by combined transport need to be taken into account, especially for the initial and final stages of freight operations, and certain inland ports need to be carefully developed as intermodal logistics centres for this type of transport.
- These objectives need to be given practical expression in a masterplan of inland waterways of Community interest. Such a plan should be based on the present and anticipated pattern of inter-regional traffic flows and take into account of opportunities for transfer from other modes of transport.

The European Commission Proposals concerning the waterway network

In order to develop the European waterway network and improve the existing water links, the European Commission suggests that the European Council:

- approves the masterplan drawn up on the basis of available data;
- approves the following list of missing links and bottlenecks to be given priority within an appropriate framework;
 - upgrading of the Mittellandkanal and construction of an aqueduct over the Elbe at Magdeburg;
 - upgrading of the links between the Elbe and the Oder;
 - linking the Twentakanal and the Mittellandkanal;
 - linking the Seine and Scheldt in France and Belgium;
 - upgrading the Scheldt-Rhine link in Belgium
 - upgrading the eastern section of the north-south link to the Rhine;
 - linking the Rhine and Rhone;
 - upgrading the Elbe between Magdeburg and the Czech border;
 - upgrading the river Main and Danube between Straubing and Vilshofen;
 - upgrading the Danube between Vienna and Budapest.

Analysis of the Waterways' Traffic Flows

According to the forecasts done by various institutes for economic studies, the anticipated changes in transport demand and logistic needs, will lead to an increase in the volume of traffic on the Rhine from 297.5 million tonnes in 1989 to 309.9 million tonnes in the year 2000.

On the east-west link, around six millions tonnes were carried in 1988 between the two German states. Inland waterway transport demand between Germany and the countries of the eastern Europe is expected to raise to around 19.4 million tonnes toward year 2000.

Although traffic on the north-south link as a whole increased by some 8 % between 1982 and 1987, it is important to note that all the flows to and from France, Belgium and the Netherlands registered a decline during this period. According to estimates, traffic could be expected to grow by 1.78 million tonnes in the year 2000, providing freight regulations on the north-south market are liberalised.

In 1988, only 2.5 million tonnes of south-east were recorded between Germany and the countries through which the Danube flows. Experts predict that the volume of traffic will rise in the future to 5 - 7 million tonnes. If trade between Germany and other Danube States is taken into consideration, total transport demand on the south-east link could reach between 8 and 10 million tonnes.

Traffic flows on the main European waterways links (million of tonnes)

	Rhine link	East-west link	North-south link	South-east link
1989	297.5	8.3	47.3	2-7
2000	309.9	19.4	49.1	8-10

Changes in the Market Trends

During the last years the European inland waterway transport market was affected by an overcapacity crisis, especially in Germany and in The Netherlands. The European waterway transport system was also affected by the transport market changes.

One major shift is toward increased containerisation and door-to-door transport. The evolution of the last one, tends to concentrate the cargo traffic in big ports, sometimes. Small or low performant ports will lose traffic.

Changes in the products characteristics also affect both shipping companies and river ports. Bulk products that used to cover the largest percent of the shipments in the past (coal or oil) are diminishing. This is due to less demand and relocation of some of the traditional industries, due to the globalisation of trade.

The future of inland waterway transport is difficult to predict. Due to the permanent change of the market characteristics, the demands on transport will change as well. The result will be that in order to survive the competition with rail and road transport, waterway freight transport has to become more flexible in order to attract new shippers through cost effective services.

Another pressure facing waterway transport comes from the liberalisation of transport within the EU, operational from since 1992. This has brought even more competition from the other modes.

The main requirements for survival and compete effectively on the transport market are flexibility, versatility and adaptability.

2.1.4. Analysis of the present state of the European waterway network

During the latest years, a need was felt for the reclassification of the European waterway system.

The determination of the bottlenecks within the central European waterway network had to be take into account, as well as the new technical characteristics of the newer ships. New designs are proposed, one example being the replacement of the old type

of barge Europe I with a new type barge called Europe II (76,5 m length, 11,4m width and 3.0 m draught).

Looking at the potentials created by new kinds of transportation demand that require specialised vessels, most of the waterways classified as category IV pose problems for economical operation. This is why the Economic Commission for Europe just recently proposed a review of their classification.

A number of seven waterway categories has been established. The first three of them permit the access of small vessels, up to 1,000 tons and are mostly of a local importance. The next four categories are international ones and allow the access of a self propelled barge, type Europe as well as pushed convoys, using Europe II type barges.

There is a close connection between the waterway class and the configuration of their convoys:

- one barge + one pusher - have access on class IV waterway;
- two in-line barges + one pusher - have access on class V waterway;
- four barges (two in parallel) + one pusher - have access on class VI waterway;
- six barges (three in parallel) + one pusher access on class VII waterway.

The European standard barges have the following maximum dimensions (in meters):

Ship's type	Length	Breadth	Draught
standard barge Europe II	76.7	11.4	2.5
standard self propelled barge Europe	80.0	9.5	2.5
standard pusher	32.0	11.4	2.5

One thing is for sure. The emerging Eastern and Central European economies, those of Poland, the Czech Republic, Slovakia, Hungary and Romania will need the waterway transport as a connection to Western Europe. Unfortunately, this network is not prepared to take an increase.

In order to eliminate some of problems the European Community, Transport Directorate - DG VII has some short and medium term priorities concerning the inland waterways such as:

- completion of the Rhine-Main-Danube link (upgrading of the Main-Danube canal) and the elimination of bottlenecks represented by the small draft at some points;
- extension of the network toward Poland and Netherlands; improvements done to the Elbe up to the Czech border;
- upgrading of networks linking Benelux seaports with eastern Belgium and Paris region;

Considered expensive and complex investments, the building of new inland waterways is still on some governments agenda. The most recent such an example is the French initiative to build a canal between Dunkirk and the river Rhine via Paris.

(Lloyd's of London Press Ltd. - Jul 3, 1996).

The canal will accommodate barge loads of up to 6,000 tonnes and will cost USD 2.8 billion. From a starting 8 million tons of freight annually, the capacity will reach 13 million tons.

Being one of the latest canals being built, the case is instructive related to concerns for the time, energy and costs involved in such an adventure. Only the planning and public inquiries are expected to take four years, almost equal to the construction period which will cover five years.

There is another interesting characteristic of the project, which is its mode of financing. Francois Bawdry, the chairman of "Vois Navigable de France" said that the project will be financed through a special fund, reserved for their development of waterways. A third of the fund comes from motorways tolls in France while the rest is generated by fees from hydroelectric generation. All together, the fund receives approximately USD 3 billion annually from those sources.

Built under the European directive for inland waterways, the canal will connect France to the European network and its two main arteries, the Rhine and Danube rivers.

The French authorities already have plans for the future cargo, which they say, will be grain and aggregates, fertilisers and general bulk materials, coal and steel products.

The South East link characteristics.

The South East link is the one that is of main interest, as the link toward Eastern Europe. The missing link on this direction was eliminated by the opening of the Main-Danube canal. Actually it is navigable for two barge pushed convoys. The works continue for the deepening of the river Main to bring the draught up to 2.9-3.1 metres on some sections.

Work is being carried out also in Austria and on the German section of the Danube downstream of Regensburg, aiming to make the Danube navigable for four barge pushed trains. Unfortunately, the air draught over the Main and the Main-Danube canal will still be an impediment to container traffic on this route.

Once the Main-Danube link was opened, a direct link was inaugurated from Rotterdam to Constantza and the rest of the Black Sea ports. The main difficulty on this route is the draught between Bratislava and Budapest (1.6m) and the ice during winter months.

The dams' problem is another issue of concern; three of them are planned for the Vienna-Budapest section. Two, planned at Hainburg and Nagynaros have not been built for environmental reasons but the Gabčíkovo (Slovakia) has been finished after a long dispute that ended recently at the International Court of Justice in Hague. Partly because of this, the upper section of the Danube will continue to be hampered by bottlenecks because of low draught.

If the importance of Rotterdam at one end of the corridor is beyond doubt the importance of the Constantza Port situated at the other end is still to be proved. A good news for its future role was the decision of the US Trade Development Administration to approve a USD 450,000 study into intermodal transport facilities concerning the port. (Lloyd's of London, Apr. 18, 1997).

In the coming years it may arise the need to develop new links between the east-west route and the Danube, meaning new canals between the Elbe, Oder and Danube. This is based on the 1982 feasibility study presented by a group of UN experts.

The present chapter analysed the present situation of the European Inland waterway network in order to give the reader a closer picture of this particular type of transport infrastructure at the European level. The main trans-European waterlinks are so dense in some areas that they can compete with the railway lines. The Creation of an integrated European Inland Waterway Network is of paramount importance for the development of the transport infrastructure within the enlarged Europe.

In order to prepare themselves for the future integrated transport market, the east European countries and especially the Danube's riparian ones have to make efforts toward upgrading their fleets and adapt the laws governing the navigation on their waterways. This could be done through closer co-operation between them and careful negotiations with the European Union's Directorate for Transport. This will be the subject of the next chapter.

2.2. Technical and navigational rules along Rhine and Danube

2.2.1. Unification of certain technical rules, as analysed during the latest sessions of EEC/UN

The unification of the navigational rules on the two main rivers in question, the Rhine and the Danube, have to include apart from the legislative aspects, the technical ones as well.

The specifics of every navigational system, the tradition and the historical development have been reflected in the technical characteristics of the two fleets.

Therefore for the right understanding of the complexity of the problem, an analysis of the technical aspects could be helpful.

Coupling devices for barges, tugs or self propelled ships.

An analysis upon the technical prescriptions concerning the coupling devices between the tugs and the barges has been proposed by the Central Commission for the navigation on the Rhine (CCNR). The Central commission will analyse as well proposals made by the Austrian and Slovakian governments, as Danube riparian countries.

The final results will be used to assess the possible interchangeability between the two fleets.

The harmonisation of the prescriptions concerning anchors used in internal navigation.

The necessity of a common formula used for the calculation of the anchors' mass, has been established. This formula should take into account both self propelled ships and convoys, sailing on various European rivers.

The best solution would be the finding of a common solution, to be applied all over Europe's waterways.

Technical prescriptions for ships' manoeuvrability during inland sailing.

A project concerning minimum navigability and manoeuvrability characteristics for inland vessels has been developed by EEC and correlated with the one proposed by CCNR.

The minimum number of crew, and maximum working hours for inland vessels.

When elaborating on these matters, a number of points must be taken into account:

- a) The most important criteria concerning self-propelled ships, is their length; for pushers and convoys it is the number of barges and overall dimensions of the train; for passenger ships, the number of passengers.
- b) The daily use of inland ships must be 14, 18 or 24 hours depending on the waterway class.
- c) Another factor to be considered in connection with crew size is ship's degree of automation.

Portcontainer ships' stability.

It has been proposed that the Rhine stability prescriptions should be taken into consideration, for further development of unified rules.

2.2.1. The necessity of unifying the navigation rules, along the Danube, with the international ones.

The regime of liability limitation, for inland ships' owners.

EEC/UN has elaborated a number of international Conventions aiming to reduce transport risks and to facilitate inland waterway transport. If the navigation along the river Danube is to become incorporated within the European waterways network, then its legislative portfolio should be brought into the international context, by adopting new rules and amending the old ones.

The Convention referring to certain rules regarding the safety(collisions) of inland navigation (1960)

This Convention concerns the payment of any damage arising-to the ship or to the cargo- after a collision between two inland ships, while sailing within the waters of a signatory party. It has been in force since 1966 and ten European countries enforced it.

The Convention referring to the registration of river going ships (1965)

This Convention establishes the registration regime for river going ships, as well as the rules for the change of register or for termination of such a registration.

It has been in force since 1982 and has been ratified by six countries.

The Convention concerning the limitation of liability (1973), modified by the 1978 Protocol.

This international instrument permits to the owner of a river-going ship to limit his liability, based on the existence of a liability fund in one of the signatory states.

There are three kind of liability funds :

- against the damages done to the cargo;
- against the damages done to the environment;
- against damages suffered by persons;

The Convention is not yet in force. The Interior Transport Committee of EEC has decided, in February 1990, that a new juridical instrument is needed, concerning the limitation of liability of European river going ships' owners.

Two proposals have been made: the states that are not yet parties to the CCNR Liability Convention should become so or a new pan European instrument, based on the CCNR Convention, should be developed.

The Convention concerning international contracts for the transport of cargo and passengers along rivers (1976), modified by the 1978 Protocol.

This Convention contains some regulation referring to the responsibility assumed by the carrier for the safe transport of passengers and their luggage and establishes the limits of the responsibility. There is no party to this Convention for the moment.

Project for a Convention on the cargo transport contracts

Right now, there are no governmental agreements concerning the cargo transport contracts. All the rules referring to such contracts are only between individual companies. On the Rhine, the most used cargo transport contracts are based on a set of regulations called Rhine-Verde und Transportsbedingungen (VTB). They stipulate the main causes that a transport contract should contain.

A similar agreement was signed by the major Danube river companies, in 1995 and the agreement is called "Bratislava Agreement". It comprises six agreements that are in force:

- General conditions for the International Transport of Goods;
- Uniform International Tariffs;
- Towing, Assistance and Agent Services;
- Mutual Repair of Vessels;
- International Transport of Containers;
- Co-operation between Danubian Shipping Companies - parties to the Bratislava Agreements.

Agreement on the general conditions for international transport of goods on the Danube

This Agreement was signed on 26 September 1955 between the Bulgarian company BRP, a Hungarian company, the Romanian company NAVROM, the Russian company SCP and Czech company CSPO.

It entered into force the same year and was joined by the Yugoslavian company IRB in 1966, a west German company in 1968 and another Yugoslavian company KRAJINA in 1984.

The Agreement covers subject like:

- cargo transport requests;
- transport documents;
- cargo owner and carrier responsibility ;
- freight calculation ;
- ship's loading and unloading ;
- carrier's responsibility relating to the delivery data;

Agreement concerning uniform international tariffs applied on the Danube

Signed in Czechoslovakia in 1979 between: West German company "BAVARSKY LLOYD, Bulgarian BRP, Hungarian MAHART, Romanian NAVROM, Russian SDP, Czech CSPD and Yugoslavian companies IRB and DUNAISKI LLOYD.

It entered into force on the 18 September 1980 and was later joined by another Yugoslavian company, KRAJINA in 1984.

It refers mainly to:

- the freight calculation to be based under unique principles
- the agreement's area of authority
- list of cargoes and tariffs
- heavy or special cargoes
- cargoes in packaged forms
- minimum freight level.

General Agreement concerning towing, salvage and general safety and agent services;

This Agreement was signed in Bratislava on the 26 September 1955, between the Bulgarian BRP, Hungarian MAHART, Romanian NAVROM, Russian SDP and Czech company CSPD.

It entered into force on the 31 September 1955 and was later joined by two Yugoslavia companies IRB and DUNAISKY LLOYD in 1966, west German

BAVARSKY LLOYD in 1968 and another Yugoslavian company KRAJINA in 1984.

This Agreement deals mainly with :

1. reciprocal towing
2. reciprocal technical help in emergency situations
3. reciprocal agency service
4. reciprocal manning services

Agreement on the transport of containers in the international traffic along the Danube.

This agreement was signed in Yugoslavia in 1984 by: West German company BAVARSKI LLOYD, Bulgarian company BRP, Hungarian company MAHART, Romanian NAVROM, Russian SDP, Czech CSPD, Yugoslavian IRB, DUNAISKI LLOYD and KRAJINA (RBK).

The Agreement entered into force on 1 January 1985 and refers mainly to:

- types of cargoes accepted for transport
- container loading
- transport documents, cargo owner's responsibility
- carrier responsibilities
- changing of loading or unloading ports;

Agreements concerning Danube river shipping companies' mutual ship repairs.

This Agreement was signed in Budapest, on 3 September 1965, by: Bulgarian BRP, Hungarian MAHART, Romanian NAVROM, Russian SDP and Czech company CSPD.

It entered into force on 1 January 1966 and was later joined by the Yugoslav companies IRB and DC. It was designed to increase the efficiency of ships exploitation by allowing the repairs for Danube going ships, to be done all over along the Danube between the signatories states.

The Bratislava Agreements established a rigid frame for the tariff system along Danube and introduced also a complex procedure of cargo sharing between riparian countries. The use of cargo sharing system and fixed tariffs make the Danubian shipping market close to outsiders and the same could be said about the Rhine market.

EEC/UN put a lot of efforts into drafting an intergovernmental "Convention project, concerning the transport contract for the inland waterway transport". The draft never became a Convention, because of the divergence of opinions between EEC/UN member states.

Such a pan-European convention is needed, when considering the existence of similar conventions for other modes of transport such as:

- International Convention regarding the contract for road transport of cargo - 1956 modified by the 1978 Protocol.
- International uniform rules regarding the contract for the railway cargo transport 1980
- International UN Convention regarding the transport of maritime cargo- Hamburg 1978
- International Convention for the unification of some rules, referring to air transport - Warsaw 1929
- UN International Convention regarding the intermodal transport of cargo (not in force).

2.2.3. Assessment of the impact brought by third countries, upon the EU waterway system

The existing rules in this domain are very diverse. Most of the EU Member States concluded bilateral agreements with their counterparts and the others are considering to doing the same. Usually, such bilateral agreements regulate the provisions concerning tariffs, traffic sharing between two countries' carriers and the conditions for free transit. It may happen that some cabotage rights are agreed upon, under special authorisation.

Under the latest EEC rules and Court of Justice decisions, current bilateral agreements have to be negotiated and brought into conformity. This refers mostly to all restrictions imposed on a carriers' nationality and place of establishment that have to be abolished.

Similar problems are encountered on discussing the problem of the market access, which is in most cases restricted. Most of the internal Community market is still reserved for national carriers. To by-pass this, some of the bilateral agreements provide for third countries, under a special authorisation, the right to carry on cabotage transport within the Community.

A clear consequence of the creation of the internal Community transport area, will be the free access of third countries to this market. The problem is that the Community member states' fleets are subject to the EEC Regulation 1101/89, concerning structural improvement measures. This means that new ships could be built under certain circumstances (by scrapping an equivalent old tonnage), in order to fight the over-capacity.

Therefore, confronted with the future access of third countries to the common market, the Community is concerned about the impact against unfair competition, due to the third country companies not being subject to the same economic rules. It makes sense that the carriers from third countries will soon have to observe the common rules along Community companies.

2.2.4 The future co-operation of the Danube's riparian countries

Possible co-operation in the navigation field.

During the last session of the Danube Commission a lot of discussion took place, concerning the improvement of navigation along the Danube.

The conclusions have been:

- The necessity of the free navigation on the Danube. The Danube Commission does not have the right to take binding decisions. All of them are only recommendations. For the future, the right of decision should be transferred from the member states to the Commission.
- The Commission's competency and area of responsibility should increase
- The Black Sea surrounding countries should have the right of legal use of the Danube. The Danube riparian countries should have legal access to the Black Sea.
- The rules of the Danube Commission and Central Commission for the Rhine navigation should be harmonised and the navigation regimes regarding the two rivers must be synchronised.

Danube navigation and its European integration

The same Danube Commission, mentioned before decided upon the following matters:

- Future co-operation along the Danube should not interfere with pan European integration aspirations; consequently, it is expected that this co-operation will gain, in time, European dimensions. This could be supported by the Danube riparian countries to associate themselves to the European Union.
- A new formula for a modern co-operation along the Danube should take into consideration a large spectrum of problems, such as:
 - simultaneous participation both within the Danube Commission and European Union;
 - the application of Community waterway transport principles, along their Danube sectors, by those countries that will become members of the European Union;

- the use of those Community principles concerning waterway transport within the associations and co-operation accords, signed between UE members and Danube riparian countries.

It should be mentioned here, the already existing co-operation between the Danube Commission (DC) and other international organisations concerning navigation. It is focused on problems like navigation safety, human safety, environment protection, harmonisation of national and international technical prescriptions, concerning ships and European inland waterways.

The Danube Commission has adopted all the decisions taken by the Final Act concerning Security and Co-operation in Europe (Helsinki 1975) and Ministers' Conferences in Budapest and Prague (1991) dealing with the harmonisation of river regimes on the Danube and the Rhine.

The future co-operation to improve the navigation on the Danube should built on previous developments that served to the opening of the Danube basin to pan-European ideas. The DC will have to co-operate more fully with CCNR, aiming to support navigation along the whole transport corridor, Rhine-Main-Danube.

Perhaps it is worth recalling that CCNR member states agreed in 1994 that their association should enforce gradually the principles of free navigation and equal partnership as well as the harmonisation of technical prescriptions and transport conditions.

CCNR makes efforts on recognising the Danube Commission support for the free market economy principles and for European Community laws.

The technical, professional and juridical co-operation between the Danube Commission and CCNR is limited by the Mannheim Convention text:

- the second protocol of the revised Convention stipulates that on the Rhine, the cargo and passengers traffic belong, in principle, to the Renan navigation;
- articles 1-5 of the Convention say basically that the pilot of a ship sailing on the Rhine should have a licence issued by one of the contracting states;
- article 22 of the Convention concerning ships' certificate says that the certificate should be issued, following an expert inspection, by the competent authority of a riparian state;

Basically, all the above mentioned problems, mean that the process of unification or harmonisation between the two basins (Danube and Rhine) will be successful only if the Mannheim Convention will be amended.

2.2.5. Proposals for co-operation between the two systems

The two systems brought together by the Rhine-Main-Danube canal, are of course the Danube and the Rhine system. They constitute two major traffic arteries working at different traffic pressures. By putting them together it must be ensured enough similarity.

For decades, the two rivers have also been separated by the social and economic characteristics of their riparian countries. Alongside the Rhine there have been very strong, free market economies, while along the Danube, existed a closed system formerly known as COMECON.

The most suitable EU approach toward third countries (Poland and contracting parties to the Danube Convention) is to encourage the establishment of common rules aiming for the harmonisation of transport conditions, with an accent on waterway transport. The process should be encouraged by more and more rapid economic conversion of the former communist countries toward free market principles.

The first step of the future co-operation must concentrate either on the conclusion of new bilateral agreements or the upgrading of the existing ones. Both have to lay down the new principles of waterway traffic between the two parts, European Community on the one side and third countries on the other.

During this first stage, the cabotage problem should be dealt with, perhaps on a reciprocal basis. Other subjects for discussion could be: transport prices, traffic sharing, operating costs structure (subsidies or no subsidies), equal conditions for access to the market.

We may expect that those new agreements will offer the market some advantages:

- a first step toward further co-operation and commerce liberalisation;
- bilateral trade will be regulated by clear principles and rules;
- the influx of more vessels on the Community waterways could be negotiated so that it will not endanger the efforts to reduce over-capacity;
- new market opportunity guaranteed for EC vessels;
- elimination of red tape from both administrative sides.

After a sufficient degree of harmonisation is attained after the first phase, a second step could be taken, aiming at a further liberalisation of market access on both sides.

Rates and subsidies

The present technicalities that are used by the CCNR to limit the traffic coming from the East toward the West has its explanation in the threat posed by the state subsidised East European river fleets to the West inland waterway market.

The governments on both sides tried to regulate through negotiations, a system similar to road international transport, based on some kind of quota, on the maximum number of ships, allowed to enter the West waters.

In order not to interfere with the Mannheim Convention, which declares the river Rhine free for international navigation, Germany declared the connection between the Danube system and the Rhine system, the Main-Danube canal, "not a free way", under its the jurisdiction.

In principle, the canal traffic will be shared equally between western and eastern operators and the rates will be negotiable, giving Westerners acceptable profits. Cabotage will be negotiated separately, through bilateral agreements.

This chapter was intended to examine the main technical and navigational rules in place along the Rhine and the Danube. The differences originated in the historical developments of the respective riparian countries. The future enlarged Europe will ask for common rules in force over the whole waterway network, if possible. The need for unification of certain technical rules, was analysed during the latest sessions of EEC and the specialised Directorate for Transport DC VII.

For a better understanding of the original differences, the next chapter will examine the two main conventions regulating the navigation and the legal regime of the two rivers the Danube and the Rhine.

2.3. The Rhine-Main-Danube corridor and its main Conventions

2.3.1. Rhine-Main-Danube historical development

On July 31 1992, the last section of the Rhine-Main-Danube canal was flooded, completing the almost 700 Km waterway. It ended a project that started back in 1961 and moved some 93 million cubic metres of earth, poured in approx. 2.6 million cubic metres of concrete and 190,000 tons of steel.

On September 25, the same year, the whole 3,500 Km long waterway connecting the Rhine ports and the North Sea with the Danube ports and the Black Sea was inaugurated.

The canal has been constructed and will be operated by a company called Rhein-Main-Donau AG (RMD). The company is owned 66 % by the German federal government and 34% by the state of Bavaria. Officials of the company declared that the cost of the waterway will be in the range of 7.8 billion Dm (USD 5.2 billion). Out of this, 4.7 billion Dm was spent for the construction itself and an additional 2.7 bn Dm was spent for the construction of 57 hydroelectric power stations, able to produce 505.5 megawatts.

The above mentioned RMD company expects to recover some of the huge construction costs through electricity sale operations. The electrical power produced will cover 3.2% of the region needs at the 1991 level.

The main construction problem, experts have had to deal with, was the canal cross-section dimensions, taking into account the rule that a waterway should have a cross section, seven times the cross-section of an unloaded vessel.

Finally, the canal was designed with a width of 55 m at the surface and a depth of 4 m. In dtw terms it means, free access for vessels up to 1,500 dtw and pushed barge convoys of up to 3,300 dtw. Its locks measure 190 m long and 12 m width.

Unfortunately, the Main-Danube and Danube-Black Sea are the only parts of the whole traffic corridor that are open for navigation all year round. In some sections of the Main, and especially on the Danube, the water depth is too low, depending to the season, making the navigation unsafe (the Danube has an average of 90 days of restrictions per year).

RMD acts as a contractor for works of widening and deepening of the Danube, between Regensburg and Vilshofen, where due to either low or high water levels, navigation has to be restricted (meaning that the ships can only sail, partly loaded). It is hoped that the works will be finished around year 2000.

Apart from the money invested and the duration of works, a difficult technical problem was the canal altitude. The highest point is at 406 m above the sea level. This means the canal is higher than the river Main by 175m and by 67.8m than the Danube. The decision in this case had been to build the necessary number of locks. Finally, realising some locks with the highest lifting height in Germany (24 m), the builders limited the number to 16 locks only. The total number of locks is in fact much bigger. For instance, between Frankfurt and Lintz, there are 54 locks.

Canal total designed transport capacity is 18 million tonnes per year. Regarding the expected traffic volume, prognoses indicate figures around 10 million tons for the year 2000. It should be noted *inter alia*, that the total waterway transport within the Community amounts to roughly 425 million tons per annum.

Taxes that will be paid by ships crossing the waterway, will be only in the region of 0.5-1.5 pfennings per ton and Km. The navigation on the Danube and on the Rhine, two international waterways, is free.

The canal limits pushed convoys to two barges and containers can be stacked in two rows, because of air draft limitations.

It should be also noted that the restricted width of the locks (only 12 metres) does not allow certain units to pass from one side to the other.

During the first year of operation, the canal had been transited by 4.5million tons of cargo. Passengers vessels corresponding to 3.5 million tons also pass through the canal.

2.3.2. The transport corridor main advantages:

- the immediate advantage of the canal for West European barge owners is the facilities they got in order to position and re-position their barges on the newly opened markets
- one of the main advantages is the stimulation of the local transport in countries such as Germany, Austria, Hungary, The Czech Republic and Slovakia.
- its availability for the future. It will provide one very competitive alternative for the road and rail transport.

The role of the canal will certainly increase in the future. The role played by third countries fleets on the Rhine, was limited to Switzerland until present times. This was due to Europe's political situation, divided between East and West and to the lack of connections between the two sides.

Following the major changes within the Central and Eastern Europe, both the political and transport sectors have suffered changes. Economically speaking, those

former communist countries have shifted from centralised economies to free market ones, opened toward the West rather than the East.

On the other hand, the German unification has brought two major waterways into the European network: the Elbe and the Oder. The conclusion out of this is that waterway traffic between west Europe and third countries will intensify.

2.3.3. Presentation of the Danube Convention

Short history of the Convention.

On 12 December 1946, Russia, Bulgaria, Hungary, Romania, Czechoslovakia, Ukraine and Yugoslavia decided to organise a Conference to decide upon the navigation regime of the river Danube.

The main desire of the representatives of the six countries was to ensure the free navigation on the Danube and closer economic and cultural connections between the riparian countries.

The general principles, underlined in the Convention are:

- the navigation along the Danube will be free and open to any enterprise, commercial ship and cargo belonging to any state, based on the equality principle characterising the ports, fees imposed on the navigation, as well as the conditions imposed to commercial navigation.

- the regime that had been established through the Convention, applies to the navigable part of the Danube, from Ulm (Germany) to Sulina (Romania).

The riparian countries had assumed the obligation to maintain their sectors in a navigable state, for the river or maritime ships and not to forbid or endanger the free navigation on the river.

In general, the signatory states agreed to inform the Danube Commission about their works along the river, including the reasons why it should be undertaken and a short technical description.

When a riparian country cannot maintain its sector of the river, then it is the Danube Commission's responsibility to take any appropriate measures, for the maintenance work to be done.

On those portions of the river, constituting a frontier between two countries, it is also the Danube Commission that is to decide which is the best way of maintaining the river infrastructure for every one of them.

Danube Commission. Principal responsibilities. Organisation.

Based on the above mentioned Convention, the Danube Commission was established, comprised of the representatives of the signatory riparian countries.

Its president, vice-president and the secretary, are elected from these representatives. To fulfil its responsibilities, the Danube Commission has at its disposal, a secretariat and various offices who's personnel are recruited from among the experts of the riparian countries.

The Commission has the status of juridical person in conformity with the law of a host country and the official languages are Russian and French. The Commission's decisions are adopted through simple majority.

The Danube Commission's main responsibilities are:

- supervision of compliance with the Convention rules;
- based on riparian countries and national river administrations, the Commission draws up the general plan of necessary works along the Danube; it also estimates the necessary costs;
- to execute the works related to good navigability, where the respective countries do not have the means to do that;
- to play the role of a consultant and in this respect to make recommendations to the riparian states concerning technical and economical problems and exchange information with them;
- to co-ordinate the activity of specialised hydrological and meteorological offices along the Danube, and to edit a special bulletin concerning hydrological prognosis, for short and long term for the river Danube;
- to collect all statistic data concerning Danube's navigation;
- to edit maps, atlases, books, all referring to the Danube navigation;
- to prepare and approve the Danube Commission's budget;

Based on the Danube Convention, on the low Danube (situated on the Romanian territory) a special river administration has been created, dealing with hydro-technical works and safety of navigation.

Navigation regime on the Danube.

Navigation along the Danube's various sectors is done in conformity with the national rules, imposed by the respective countries. These rules shall be established taking into account the Danube Convention fundamental rules.

All the ships sailing along the Danube have the right, under the conformity with the rules imposed by the riparian states, to enter the ports, to load or discharge cargo, embark or disembark passengers, to take on board fuel, oil, food, etc.

The customs, sanitary and navigational controls on the Danube are fulfilled by every country, along its territory.

They have the obligation of announcing to the Danube Commission all the national rules imposed for the Danube, along its territory, in order to be unified.

As a basic rule, all the regulations are supposed to help, through their implementation, the normal navigation on the river, avoiding any kind of inconvenience.

All the specialised ships, such as those belonging to custom control or river control, may sail on the Danube, limited to inside their national borders, once outside having to ask permission from the respective states.

The navigation of military ships belonging to foreign (non-riparian) states is forbidden. All other military ships may sail only inside their national boundaries. Sailing outside requires a bilateral accord signed between the interested countries.

These days many experts think that the Danube Convention-Belgrade 1948, should be revised at least because of the following reasons:

- Eastern Europe has during the last seven years experienced a lot of changes, both economic and political;
- the desire of some non-riparian states to become members of the Convention: Turkey, Greece and the Netherlands;
- the need to harmonise the rules with the latest European decisions regarding interior navigation, issued by: UN Economical Commission for Europe (CEE/UN), European Community (CE), European Conference of Transport Ministers (ECMT), Central Commission for the Navigation on the Rhine (CCNR) and the Danube Commission (CD).

The changes in Eastern Europe, having a major impact on the Danube Convention, are:

- Ukraine becoming independent and replacing the former USSR as a riparian country;
- Slovak Republic becoming independent and replacing the former Czechoslovakia as a riparian country;

- the implications of the recent conflict in former Yugoslavia, that apart from the UN economic embargo brought a new riparian country, namely Croatia.

2.3.4. Presentation of the Revised Convention on Navigation of the Rhine

The original Convention was concluded in Mainz on 31 March 1831.

The initial signatories decided to revise the Convention soon, and they signed the revised form, often called *Act of Mannheim* on 17 October 1868. The signatories were France, Grand Duchy of Baden, Bavaria, Grand Duchy of Hessen, Holland and Prussia.

Eventually, the Act of Mannheim was amended on 20 November 1963 in Strasbourg by the signing of the revised Convention for the Rhine Navigation.

Stating that the navigation on the Rhine and its estuaries is free for vessels of all nations, the Convention established the frame for the specific administration of the river.

Although the navigation is free for all the signatory states, there are some limits regarding cabotage and foreign flag vessels.

Apart from the free navigation, the Convention states other kind of activities that may be done free:

- entries into ports;
- entry or exit of the merchandise on the Rhine;
- transit of cargo from Basel to the open sea;

Article 22 is important from today's point of view, because it states that "before a vessel makes its first voyage on the Rhine, the owner or person in charge must obtain a certificate stating that the vessel has the strength and equipment necessary for the navigation of that part of the river for which it is intended."

The importance of this article is that it acts as a barrier for the non-signatory states, who's ships are supposed to be able to sail on the Rhine.

The obligation of the riparian countries is to maintain the towpath and the channels. The governments of adjacent countries exchange information on technical projects and support half of the costs of setting and maintaining the navigational buoys.

A unique feature characterises the Convention and that is the river tribunals. They are established by the government of the riparian countries and are empowered to hear the following cases:

- criminal matters related to offences to the navigation and river police;
- civil matters concerning various disputes such as
 - duties for pilotage, crannage, port and warfage;
 - obstructions done by individuals to the towpath;
 - damage caused by watermen during the voyage or collision;
 - complains against ship owners;

The river is divided into inspection districts, each State appointing an inspector for each district, in its territory. Basically there have been four districts from Basel to the open sea. Such an inspector is responsible for a survey over his district twice a year, in order to check for navigation obstacles on the river or any problems that may occur to the towpath. They have to report to the Central Commission.

The Central Commission of the Rhine is located in Mannheim and meets once a year, every August. Every country should delegate a Commissioner to take part in the joint meetings of the Commission.

The new revised Convention, signed in Strasbourg in 1963, is intended to adapt the organisation and the activity of the Central Commission to present day conditions. Their signatories are: Germany, Belgium, France, United Kingdom, Netherlands and Switzerland .

The revised Convention asks each signatory State to designate one to four Commissioners, all of them forming the Central Commission in Strasbourg which meets twice annually.

We may conclude by saying that the final Convention of 1968, ensures free and unrestricted transport along the river Rhine and its estuaries from Basel to the open sea.

The Central Rhine Commission bases its legal regime on the Rhine Convention, acting as an international legal authority. In this respect it decides on traffic and ships' safety and technical constructions along the river, the responsibility of rules' implementation being held by the Ministries of Transport.

2.4. Modern use of the inland waterway transport

2.4.1. Passengers transport.

In order to have a better picture of the river passenger transport market, perhaps it is worth mentioning a recent study concerning the German market and published in Lloyd's of London, May 5, 1997.

The study underlined that 1996 was a successful year for river cruise companies, operating on the German market.

Both number of passengers and total turnover went up compared to previous years. The survey, sponsored by the German association Deutscher Reisbuero-Verband (DRV) concludes that the trend will continue in the future even if the prices went up by 2.8%, basically for a standard cruise period of 8 days.

Surprisingly, the most popular destination was the Danube waters that accounted for 36 % followed by the German waterways with 26 %, Russian rivers with 8% and French rivers with 7%.

2.4.2. Containers along the inland waterways.

The international waterways concerned with container traffic are: the Rhine, Elbe, Danube, Lys and Dortmund canal. There are of course other important river, at national levels such as: Seine, Rhone, Weser or Scheldt.

Containers constitute a small proportion of the waterborne freight compared to the bulk materials and fuels.

There are also great differences between various rivers' traffic, concerning the number of the containers carried.

Waterway	Service	Annual traffic (TEU)
Anvers - Rotterdam	Inter-port	440,000
Rhine	from/to Benelux ports	500,000
Elbe	Central Europe-Hamburg	small
Danube	Central Europe-Black Sea	small

Source: Containers inland 1994 rapport, by MDS Transmodal

Containers started to be transported via waterways in the early 70's, quite late compared to other modes of transport such as road or rail. In Europe, the Rhine river offered the best conditions for such transport. There were enough barges and specialised ports, suitable cargoes and great interest from cargo owners.

The new mode entered the market with great difficulties due to its small share of cargo and the time disadvantage compared to other modes.

It took some time for the market to realise that water transport was the missing link of intermodal transport, when speaking about containers. The waterways and their ports, offered good infrastructure almost unlimited possibilities for forwarding and transport, storage areas, specialised terminals as well as container repair possibilities.

The river Rhine was the pioneer for river container transport. It offers almost 800 Km of waterway, stretching from north to south and serving major European ports like Rotterdam, Amsterdam and Anvers.

A whole chain of terminals have been established at Duisburg, Köln, Dusseldorf, Mainz, Frankfurt, Mannheim, Ludwigshafen, Karlsruhe, Strasbourg and Basel.

The river offers more than 13 million tons capacity, provided by a large number of companies, 11,000. The services are generally organised based on a river Rhine division into three parts: upper (to Switzerland), middle (to Mannheim) and lower (to Dusseldorf). Other rivers suitable for container traffic, within our area of interest are the Main and Neckar. (*PdI* October 1993-Germany Rhine Container Traffic)

There are of course impediments, preventing the future, large scale development of container transport, upon waterways. Water drafts, low bridges, speed limits, locks, navigational restrictions, all are disadvantageous. The time problem in container transit is paramount but, if the overall fuel costs changes, it might be that the time factor will not play such a big role. (Inland waterways-tomorrow choice?-WeberE, Transmode 82 Conference)

There is also a great dependency on the sea leg of container transport and with competition from other transport modes. Some of the terminals simply can't compete with container road transport's costs or they fail to meet their required handling capacity.

Nevertheless, expanding their activity into container handling seems to be the thinking of many river port administrations especially along the Danube. The Austrian ports of Lintz and Vienna and the German-Regensburg have decided to expand their container facilities with complete new ones.

New container lines operates already, like the one offering services between Daggendorf in Germany and the Black Sea.

On the other hand, container transport along the Danube suffered from the impact of various political decisions or regional wars like the war in Yugoslavia. During the subsequent embargo imposed by UN, the total traffic disruption occurred.

In addition to that kind of obstacles, direct competition with the Adriatic Sea ports has increased.

Competitiveness of the river transported containers

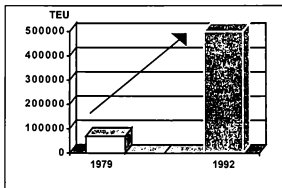
Theoretically, the river transported containers should offer the same possibilities as sea carried containers:

- regular and frequent departures;
- quick journey time;
- fixed schedules between terminals;
- door-to-door service;
- storage in depots and repairs services;

As mentioned previously, a quick journey time is difficult to be ensured because of seasonal variation of water levels, numerous locks or difficult navigation conditions. This is why a container line should decide together with the shipper whether or not the water transport is efficient for his type of cargo.

When coming to the door to door service problem, then the water transport leg of the transport should be combined with a land bridge by train or truck.

Source: Containers inland 1994 rapport, by MDS Transmodal



Based on this, the container traffic started to grow along the Rhine from 1979, starting with a low 70,000 TEU and increasing to 500,000 TEU in 1992.

The increase, small by road or rail standards, demonstrates the importance and the interest raised by this form of transport.

It is evident that inland waterway traffic is already part of the overall container transport system. It is price competitive on long distances, and by using large push barge systems. Based on the good infrastructure and the regular barge service, characterising today's inland waterways, the inland transport become more interesting for shippers.

For instance, a convoy formed with four barges can transport up to 260 TEU, the equivalent of a load carrying capacity of almost four train loads.

The so much analysed time factor doesn't really always make the difference between waterway transport and road transport. Barges can sail 24 hours a day, on weekends and during holidays which is not the case for road transport.

For example, from the North Sea to the Black Sea it will take 25 days in one direction and 40 days in the other, Rotterdam to Vienna 11 days overall and Rotterdam to Budapest 14 days.

It might be interesting to mention here some of the data we obtained from the German river transport company Hamburger Lloyd. Basically the company transports containers along the Rhine-Main-Danube corridor under these conditions:

- the voyage duration for a loaded barge between Rotterdam and Constantza is approximately three weeks (one way);
- between those two seaports the convoys have to negotiate more than 30 Locks;
- the maximum loading capacity for one barge considering an optimum Danube level is approximately 1,000 tons.
- statistics of the Danube's level shows that on average during 1/3 of the year the river's level would just allow the transport of 50 % of the maximum loading capacity for a given barge;
- the daily freight rate for the average Hamburger Lloyd barge is approx. of 5,000 DM.

One recent technical development will surely influence the future profitability of waterway transport and is considered worth mentioning.

A vessel, chartered by Bavaria Schifffahrts & Speditionen and used to carry bulk cargo on various European waterways including the Danube, has been upgraded by its owner in order to increase its productivity. The medium speed engine was replaced by a high speed propulsion unit. It is US owned, UK produced engine developing 1,800 hp, which is said to have reduced running costs and provided 60 % more power than the first unit. The increase in power occurred with almost the same fuel consumption. Overall, the improved technical capabilities, means 20% faster turnarounds. (Lloyd's of London Mar.19, 1997)

Having said this, one conclusion may be, that given the actual river transportation limitations, the maritime transport's cost and inland waterway transport's cost between Rotterdam and Constantza, are not comparable because the inland waterway route will take much longer and therefore the costs will be greater too.

The whole situation could change if technical improvements similar to the one mentioned above will be introduced by the inland waterways operators.

The "business logic" of the Danube waterway route may arise for a shipment that doesn't include two seaports, like between a city in Romania and another one in Austria or Germany or even between Basle and Romania.

From the foregoing we had concluded that the waterway transport of containers is competitive with other modes, at least concerning the time factor and can ensure fixed schedules of the operations, one of the most important qualities of the container business. On the other hand, environmentalists have always asked for the reduction of the cargo transported by road and railway. Inland waterway systems could be the answer expected by everybody for these concerns.

Some environmental advantages worth mentioning are:

- a container barge can carry the equivalent of 100 trucks. Therefore some 2.5 Km. of road space is saved by shifting from truck transport to barge transport; (PdI-October 1993-Rhine and reason)
the energy consumed for the transport of a ton of cargo over a Km of road, water and rail, favours the barge against the lorry and the train. Putting it differently we may say that a barge moves 4,000 kg/hp, a truck 150 kg/hp and the train 500 kg/hp.
- air pollution and noise pollution are very low;
- dangerous goods could be transported more safely by barge than by other means of transport;

Many transport experts agree about the advantages offered by the water transport:

- reduced congestion problems;
- 24 hours a day, 7 days a week working time;
- easy transportation of various cargoes from containers to abnormal loads;
- low cost of manpower;
- complex and well equipped European water network.

When a shipper takes into account his choices related to the transport of a cargo parcels, he will take into account, the following considerations :

- operational
- environmental
- cost effectiveness
- urgency of the cargo
- time factor

Transit time is only important for certain time sensitive cargoes and in fact much of the inland waterways container traffic is homogeneous and repetitive. Shipping managers have to consider apart from the above considerations, capacity, punctuality, reliability, as well as security. Barge transport fulfil these requirements.

It is generally accepted that less than 35 % of all cargo movements require delivery within 24 hours. The rest is non-urgent cargo and could be transported over long distances with the above mentioned advantages of water transport.

The potential is immense and many north European seaports have noticed that and acted accordingly. Rotterdam only, which places a lot of emphasis on the use of the Rhine decided to build a new barge terminal. The result will be that the number of boxes transported from the port will increase from 643,000 TEU in 1995 to 1.2 million TEU by year 2010.

Constantza, through its future development of a new container terminal, will certainly attract major deep sea container lines. Having as main customers the shipping lines/agents, the short sea inter Black Sea companies, freight forwarders and the major Danube riparian countries as importers and exporters, the port could develop into a transit point for the Eastern Europe.

Although the transport on the Danube, raises navigational problems, such as poor vessel utilisation (containers can be stowed two high only) or water levels and ice during winter, some companies started already to operate on some segments of the river.

Penta Group, Interrijn and Rhinecontainer have formed Danube Container Service, starting with a weekly service between Rotterdam and Budapest, with ports of call, Lintz, Vienna and Bratislava.

Another container service is offered by Combined Container Service (CCS) and DDSG Cargo of Austria. They use RMD canal to connect the Benelux ports with Budapest, with a transshipment at Ginsheim-Gustavsburg.

There are also container operators along the Danube as well, the main being Interlighter International Shipping Co. They use LASH vessels calling ports at the Black Sea and the lighters travel up to Vienna. The specialised infrastructure, needed by the those ports along the Rhine and the Danube is already built and many terminals are under development.

Main inland container ports in Europe :

Waterway	Port	Terminal operator
Lower Rhine	Nijmegen	Container Terminal Nijmegen BV
	Emmerich	Rhein-Waal-Terminal
	Duisburg	Duisburg-Ruhrorter Hafen
	Dusseldorf	CCS
	Neuss	Rhenania Container
	Dormagen	Lenkering Montan Transport
Middle Rhine	Cologne	Hafen und Guterkehr Koln
	Mainz	Frankenbach Container Service
	Frankfurt	Rhenania Container
	Ginsheim-Gustavsburg	CCS
	Ludwigshafen	CCS
	Mannheim	Rhenania Container
Upper Rhine	Germesheim	Cont. Term. und Transp. Zentrum
	Worth	Unikai Hafbetrieb Worth
	Karlsruhe	KALAG Lagerhaus und Spedition
	Strasbourg	Port Autonome de Strasbourg
	Basel	Schweizerische Reederei und Neptun
	Basel	Centeba Container Terminal
Danube	Deggendorf (Aus)	Donau Hafengesellschaft
	Vienna (Aus)	WienCont Container Terminal
	Bratislava (Slo)	WienCont-ReMain IKT CSPD
	Budapest (Hun)	Budapest Free Port
	Braila (Ro)	Braila Free Port
	Medgidia (Ro)	Port Auth.
	Constantza South Port	Free Port.

Source: Pdf-October 1993-Rhine and reason

2.4.3. Combined Transport

Apart from the waterways' container transport, their use as a segment of the more complex combined transport could be a great advantage in the future.

Today Europe's roads and railways have already approached the limits of their capacity on the main routes, therefore the spare capacity of the inland waterway transport system could be used, within the form of combined transport.

Container and RO-RO traffic is growing both on the Rhine and on the Danube. The year 1990, showed an increase of the container transport on the Rhine from 40,000 to 450,000 TEU. (Pdf October 1993-Rhine and the Reason)

In order to use the advantages presented by the waterway transport, new projects are needed, concerning both the infrastructure and the ships:

- vessels (barges and pushers)
- waterways (geometrical dimensions, locks, dams)

- transshipment points (ports/terminals)

Considering that, the following waterways are suited for combined transport:

- Rhine (from Basel to the North Sea);
- the North-South route;
- the Danube, downstream Degendorf;

The latest EU initiatives showed the general interest toward combined transport. EU funded a 36 month project aiming to increase the efficiency of the European waterway transportation, based on a Pan-European consortium works, wrote David Tinsley in Lloyd's of London Press Ltd from May 3, 1996.

The study, named "improved port/ship interface" (IPSI) is intended to improve the door-to-door transport through technological stimulation of the inland and short sea modes of transport. The project's cost is USD 4.4 million and will be half covered by the EU. It has two aims: accounting for environmental gains from shifting cargo off roads, toward competitive short sea and inland waterways routes and the economic bonuses from that move.

The leading researcher group is the Norwegian group Kvaerner Ships Equipment and includes the Bergen based Jepsen Eurocarriers and the research institutes Sintek and Marintek. The consortium includes also the French logistic companies Saga and PTC, the Germans Bremen Lagerhaus Gesellschaft and Fraunhofer Gesellschaft. The main goal is "developing new concepts for flexible port/ship interface operations, in a context of added value considerations and European intermodal or through-transport logistics, based on increased use of sea, river and canal routes".

The main challenge of the IPSI consortium is to demonstrate that the entire logistic chain based on waterborne transport is cost competitive and reliable, compared to land routes. This could be proved by demonstrating that ports could become logistic hubs and interfaces in the logistic chains, using all modes of transport, interconnected there.

The solution for an increase in the ports' efficiency is within new ship designs to be developed (such as combined sea/river-going vessels and inland craft). Cargo handling technologies are also under scrutiny together with management techniques and information exchanging systems.

The objective is the reduction of the number and costs of transfers of freight during the door-to-door transport chain, thereby raising the overall competitiveness of the process. Sellers' and buyers' application of just-in-time practices, minimising therefore the inventory costs, will be taken into consideration very seriously.

The importance given to the combined transport, is reflected by the last meeting of the UN-Economic Commission for Europe, Inland Transport Committee-Working Party on Combined Transport in its twenty-seventh session (15 and 16 April 1997)

The list of attendance was comprised of practically all European states: Austria; Belgium; Croatia; the Czech Republic; France; Germany; Greece; Hungary; Italy; Netherlands; Poland; Romania; Russian Federation; Slovakia; Slovenia; Switzerland; Turkey; United Kingdom; United States of America, the European Community (EC) and the United Nations Conference on Trade and Development (UNCTAD).

The following intergovernmental organisations were also represented:

- Committee of the Organisation for Co-operation between Railways(OSZhD);
- European Conference of Ministers of Transport (ECMT)
as well as the following non-governmental organizations:
- International Road Transport Union (IRU);
- International Organisation for Standardisation (ISO);
- International Union of Railways (UIC);
- International Container Bureau (BIC);
- European Intermodal Association (EIA).

During the session, it was noted that a Pilot Action for Combined Transport (PACT) was initiated and it will continue until the year 2001.

It was also mentioned that the Council of Ministers of the European Conference of Ministers of Transport, during their annual meeting in Berlin (21-22 April 1997), decided to adopt a resolution on the development of combined transport providing for an extension of EC Directive 92/106 on the liberalisation of terminal hauls to all ECMT member countries.

The representative of OSZhD informed the Working Party that 18 States, members of OSZhD, were expected to sign an Agreement on Combined Transport covering railway lines linking Europe and Asia. The objective of this Agreement was to provide for a harmonised inter-regional combined transport system.

The European Agreement on important International Combined Transport Lines and Related Installations (AGTC) has been the subject of long discussions. It was concluded that until 1 February 1997 the following 20 countries were Contracting Parties to the AGTC Agreement: Austria; Bulgaria; Croatia; Czech Republic; Denmark; France; Germany; Greece; Hungary; Italy; Luxembourg; Netherlands; Norway; Portugal; Romania; Russian Federation; Slovakia; Slovenia, Switzerland and Turkey and on 3 June 1997, Belarus will become the twenty-first Contracting Party to the Convention. A number of countries have also signed the AGTC Agreement, but have not yet become Contracting Parties to it: Belgium; Finland and Poland.

Extensive work was carried out for the drafting of the *Protocol on Combined Transport on Inland Waterways* to the European Agreement on important International Combined Transport Lines and Related Installations (AGTC)

The text of the Protocol to the AGTC Agreement covering inland water transport and certain coastal routes was adopted by the Inland Transport Committee, at its fifty-ninth session in January 1997. The Protocol would be opened for signature from 1 November 1997 to 31 October 1998 which would allow Governments to sign the Protocol on the occasion of the 1997 Conference on Transport and the Environment (Vienna, 12-14 November 1997).

2.4.4. World and EU trade growth and its influence upon inland waterway transport

According to the latest report of World Trade Organisation it appears that after two years of growth, the world trade returned to earlier levels in 1996. A slow growth is expected during 1997, based on the economic growth in Western Europe and Asia.

The growth in trade volume (exports and imports combined) is twice as large as the GDP growth, in some areas as North America, Latin America and Western Europe, while for the transition economies, estimated growth was negative (mostly under the influence of Russia and Ukraine) but the trade volume growth was above the world average.

The WTO's outlook for 1997 shows an anticipated recovery of the trade volumes in Western Europe, with a pace in excess of the 4 per cent increase recorded during 1996.

Growth in the volume of merchandise trade, 1990 -1996

(Annual percentage increase)

Exports				Imports		
Average 1990-96	1995	1996		Average 1990-96	1995	1996
5.5	8.5	4.0	World	6.0	8.5	4.5
5.0	7.5	4.0	West Europe	4.0	6.5	3.0
5.0	8.0	4.0	EU (15)	4.0	6.0	2.5
3.5	14.5	3.5	Transition economies	2.5	11.5	12.0

Source : WTO - Report (10 April 1997)

The table above shows explosive levels of increase for the 1995 exports of the transition economies 14.5% and close percent of increase for their imports during 1995 and 1996. In the mean time the EU's trade increase had its peak during 1995

with 8% increase of exports and 6 % increase of imports. A lot of the this trade took place within Europe and the increased levels of cargo traffic influenced the inland waterway traffic.

The next table shows the growth in the value of world merchandise trade between 1990 and 1996 :

(Billion dollars and percentage)

Export fob			Import cif	
Annual	% change		Annual	% change
1995	1996		1995	1996
19.5	4.0	World	19.0	4.0
22.5	3.0	West Europe	21.0	1.5
23.0	3.0	E U	20.5	1.0
29.0	6.0	Transition economies	25.0	12.5
26.5	2.0	Central/East Europe	29.5	12.5

Source : WTO - Report (10 April 1997)

This table proves that the increase in value of the world trade within Europe was above the world average during 1995 (3.5% more on exports and 1.5% on imports) and the Central and East Europe countries experienced even higher percent of increase (7% for exports and 10.5% for imports).

The trend was not confirmed during 1996 when some Central and East European countries experienced economic set backs and slower pace of growth.

The trade within Europe increased even if at a slower pace. Once again the Central and East Europe countries increased their trade and especially their imports with a percent well above the world average (8.5% more).

Leading exporters and importers in world merchandise trade during 1996

(Billion dollars and percentage)

World Rank	Exporter	Value f.o.b	Share %	Change in value in 1996	Rank	Importer	Value c.i.f	Share %	Change in value in 1996
2	Germany	521.2	9.9	-0.3	2	Germany	456.3	8.5	-1.5
4	France	290.3	5.5	1.3	5	France	275.3	5.1	-0.2
8	Holland	197.1	3.8	0.9	9	Holland	174.1	3.2	-1.0
10	Belgium Luxemb.	166.7	3.2	-1.8	10	Belgium Luxemb.	154.6	2.9	-0.4
22	Austria	58.0	1.1	1.0	22	Austria	66.0	1.2	1.0
	TOTAL	1253.3	23.5				1136.3	21.9	

Source : WTO - Report (10 April 1997)

The table above concern the leading exporters and importers in world merchandise trade (excluding the European Union inter-trade) during 1996. The WTO report underlines the leading role of European Union countries (Germany France, Holland,

Belgium and Luxembourg and Austria), that ranks within the first top 10 world's trading countries. All of them are situated in the area of influence of the river Rhine and Danube and normally, a great share of their export and import went toward waterway transport.

(Billion dollars and percentage)

World Rank	Exporter	Value f.o.b	Share %	Change in value in 1996	World Rank	Importer	Value c.i.f	Share %	Change in value in 1996
1	EU	800.0	20.2	6.5	2	EU	725.0	17.8	1.7

Source : WTO - Report (10 April 1997)

This last table shows that, as a consequence of the leading positions of most of Europe's industrialised countries, Europe itself occupies the first place as a world exporter and the second position as an importer. Of course, these imports and exports were done outside EU borders but in order to realise such figures, a lot of inter European trade took place. As a consequence of Europe's world leading position the inland waterway transport received its increased share of traffic as well as the other modes of transport.

All of these suppositions are confirmed in fact by the last ECMT report. Every year ECMT publishes a short report summarising recent trends in the transport sector in different European countries.

Lately, the ECMT published a retrospective analysis of the period 1970-1995, a period far longer than that covered by comparable studies, attempting to examine recent developments in passenger and freight transport in Europe in the light of long-term trends in the transport sector.

This report provides detailed statistics on trends in the transport sector in both Western European countries and the countries of Central and Eastern Europe.

In Western Europe, the economic recovery whose positive impacts had been felt throughout 1994 gradually began to falter in 1995, leading to a new downturn in the economic climate. While overall growth in gross domestic product in Western European countries rose in real terms by around 2.7 % in 1995, the year ended with the economies of many countries virtually stagnant and with output in some countries actually starting to fall.

The change in the economic climate also made itself felt in the freight transport sector, where the overall volume of traffic in tonne-km grew by merely 3.2 % compared with 3.7 % in 1994 and where traffic levels declined sharply in the second

half of the year. This trend did not affect all modes of transport in the same way, however.

A 4.3 % increase in freight traffic allowed road transport to increase its market share yet again, while growth in the rail, inland waterway and pipeline sectors remained below 1 %.

Most of the countries of Central and Eastern Europe experienced a marked improvement in their economic situation in 1995 with growth in GDP averaging around 5.4 %, mainly as a result of strong growth in industrial output and a steady rise in foreign trade. This pick-up in economic growth, combined with the gradual cessation of hostilities in the former Yugoslavia, produced an increase of almost 8.5 % in ton/km in the freight transport sector the highest rate of growth reported since 1970. With the exception of transport by pipeline, the only sector in which activity declined, all inland modes benefited from the overall increase in freight traffic in 1995.

The main beneficiaries, however, remained the road sector (+13.5 %) and the inland waterways (+30 %), while growth in the rail sector amounted to over 5.9 %. With regard to passenger traffic, transport by rail (-3.6 %) and by bus and coach (-4.1 %) again declined. This decrease was mainly attributable to a decline in individual mobility due to falling incomes, and in some cases substantial increases in public transport tariffs, but also to increased competition from private cars as a result of strong growth in car ownership levels.

The conclusions to this chapter will follow somehow the findings of the last ECMT's Council of Ministers meeting, that held its 80th Session on Wednesday 29 and Thursday 30 May 1996 in Budapest (Hungary). The transport ministers examined a report describing recent trends in traffic and a series of national and international forecasts.

The trends observed over the past few years reveal:

- substantial growth in road transport at the expense of other modes;
- low performances of the railway system;
- a higher rate of growth of international traffic compared with domestic flows;
- the increase of international traffic (t/km.) is superior to the increase measured in tons.

The explanation for the last point above is that the transport distances increase all the time (about 1 % per year), the average distance right now, being about 600 km for international rail and road traffic.

It is undoubted that the significance of international transports will increase also in the future. Projections until 2010/2030 estimate an average annual growth of tons-kilometres in Western Europe of 2.0 to 2.8 %. This characteristic could prove an important incentive later on, for the development of the waterway transport.

Latest forecasts indicate that the rate of growth in international traffic will continue to outpace the growth in domestic traffic over the next years. The trend towards greater use of road transport will be maintained, if for no other reason than the expansion of this mode of transport in the CEECs and the changes in the geopolitical map of Europe. The result is that policy decisions are needed, with regard to *management of traffic* flows with an increased use of the inland waterways and *future investment in new infrastructure*, to avoid the risk of the transport system being blocked by congestion which will be the case if the present trend toward road transport is maintained..

3. Conclusions and Recommendations

3.1. The necessity of new marketing policy for the Romanian inland waterway companies.

Contrary to the large capacity of the Romanian river fleet and its leading role on the East Europe market, from the technical point of view, it is hampered by obsolete designs and lack of sufficient modern ships able to compete along the new waterway.

These problems could be solved through a proper campaign of planned new buildings. The renewal of the fleet should be supported by the shipping companies through a proper marketing activity.

The shipping companies should analyse their activity and realise that their business' success depends on the market oriented, decision-making process.

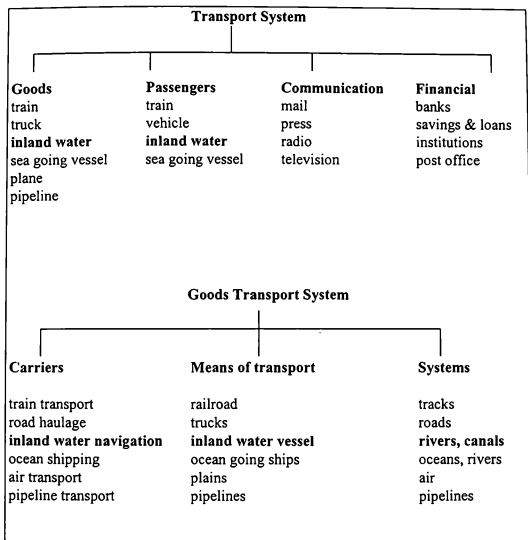
Main marketing principles such as: creating and supplying the market, performance evaluation, sales and marketing of services, could be applied to the inland shipping market as a part of the country's economic plan. The product in this case, will be the services offered by the shipping companies.

The previous Danube transport market, served by the Romanian fleet was the kind of "seller's market" where the demand for water transport exceeded the supply of such services. On the other side of the Rhine-Main-Danube canal is another kind of a market "a buyer's market" with excess of ships, competing for cargo.

To apply marketing principles for the inland waterway transport system, the whole economy of a country should be considered responsible for satisfying the needs of its individuals. The economy of the country develops only if its overall transport system develops as well.

There is a close interdependence between all the economical links, like production, trade, the service sector and the transport sector of the economy.

The national transport systems differ from country to country and reflect the geographical position and the economic development. There are also differences emerging from the different transport policies of various governments. The waterway transport system may occupy a larger or a smaller percent but generally speaking, it has its own place within the general picture of the transport system as reflected by the next diagram.



As a division of the transport network, inland waterway transport is an important part of the Romanian economy. The transport services offered by the shipping companies could be marketed like any other products, or goods.

There is no doubt that there is a close interdependence within the Romanian economy, between the industry/production, trade/service sector and the shipping industry. The existence of a professional shipping industry is of paramount importance for the well functioning of the economy.

The inland shipping industry should evolve from the "simple carrier" characteristic toward a modern marketing industry. That is, the whole activity should be related to the market needs. In doing that, the companies' management teams must bear in mind the different marketing-related advantages of the inland water transport:

- best means for transporting bulk cargo;
- best means for transporting large or heavy cargoes;
- low actual and operating costs;
- lowest carriage costs;
- easy integration into a transportation multimodal chain.

There could be various marketing goals for an inland shipping company. One general goal should be to maximise the sales of the company product. The product of a shipping company is transportation under the best rates possible. This means the maximisation of the transportation routes and transport services with which the highest return is achieved.

Another marketing goal is the customer satisfaction. The responsibility of the managerial team will be, in this case, toward a good transport service (dependable and high quality transport services), keeping up with various changes in customer's requests, by adapting the company's services to these wishes.

The need for a better organisation and development of a new marketing concept

The companies should clearly define their objectives through their strategic planning into a business plan. It must be based on the company location and area of operation. Then an analysis of the available towing boats and barges, together with the company's representatives abroad must be done. Some other criteria for ascertaining the situation are:

- what are the supplementary services, offered in addition to the water transportation itself (forwarding, cargo consolidation, door-to door transport)
- traffic balance analysis; the one way traffic could be avoided through bilateral accords and following co-operation with business partners in finding possibilities for limited cabotage transport; investigation into whether or not goods currently carried by rail or road could be switched to inland water transport; finding out details about the most important customers' business structure, most common destinations, tonnage, commodity, rates; who are company's competitors; the better the competition will be known, the more successful on the market, the company will be.

2. An analysis of the common types of inland shipping operators.

Shipping companies

They are the most common operators within the Romanian transport system. Right now, they are under a difficult and important process of privatisation, but for the moment the State is still the main share holder. The shipping companies are commercially run businesses and run the majority of inland water transport. They have representatives abroad, i.e. in Vienna and Bratislava that are operated through ship brokers located at the largest ports along the Danube. To avoid empty runs, sometimes their ships navigate in cabotage on the upper Danube (like was the case during the Yugoslavian war and the consequent blockage of the river).

Industrial shipping companies

This is the case of some industrial or commercial corporations, like a huge steel mill in the city of Galatzi or various construction companies that have their own shipping space, used for the transport of iron ore, coke, cement or construction materials.

Generally they do not offer transport services for other companies, as third parties.

Owner - operator

They have only recently appeared on the Romanian transport market as a consequence of the privatisation campaign. Owner - operator are independent barge and tug operators. It might be that the crew has taken over by buying the ship and operating it, or just the captain may have become the owner. The system is largely used on the west European waterways where, in most of the cases, the captain-owner, lives on board and takes cargo on his behalf or charters his ship to a shipping company.

Co-operatives

This form of organisation is only at the beginning of its existence in Romania, but it will become more and more popular between individual shipowners. This kind of co-operation helps the small companies to organise their cargo procurement through a common office. The co-operative also tries to find cargo for their members for the return voyage, usually under better conditions, compared with the individual barge operators.

Shippers

It is more common these days, in the Romanian inland waterway transport to find more people involved in the transport business as shippers than owners-operators. The explanation lies in the high costs needed for acquiring a ship. Practically they don't own their transport spaces, but they sign freight contracts, take care of the goods by transferring them on board ships. Their responsibilities are similar to those of forwarding agents.

The marketing mix and today's development of Romanian shipping companies

Today's shipping picture is no more crystal clear, like it used to be. Gone are those days when a shipping operator waited for the cargo to come, his only concern being its proper transport to the destination.

Everybody in the transport business, transport corporations, shipping companies, forwarding agents, inland shipping companies, land transporters have all realised that things have changed. Adjusting to the rapid changes in the market is the key to success.

Without a permanent adaptation to the customers needs, nobody in the business can rely anymore on the existing flow of goods and traditional customers.

The Romanian economy is under a very complex and difficult process of privatisation. Some plants and factories will have to be closed down and others will diversify their products. Therefore, the structure of the products transported on the inland waterways will change. The general trend is toward a shift from bulk cargoes such as coal, metals products, fuel, agricultural products/fertilisers or building materials, to general cargo or even containers.

The railway and road competition in addition to the bulk cargo decline means that the inland shipping sector will have to make large investments in order to survive. These investments must be funnelled toward larger pushers, specialised barges, self propelled units, container vessels and tankers. Furthermore, the shift of the Romanian shipping market from a seller's market characteristic toward a buyer's type market represents a fundamental change.

Because of the changes undertaken by former large companies dealing in the steel or building industry, their production drooped significantly, leading to a smaller need for waterway transport. The fleets are not fully utilised anymore and new markets and customers have to be found.

The solution to all of these problems must be a rethinking process of the whole system in order to respond to the drastic inland changes in shipping. The companies should adjust their policies to the marketing rules and principles. One of the marketing tools is the marketing mix. A set of marketing factors has to be considered, in order to satisfy the new customers. The mix(ture) is composed of :

- the service type,
- the place where the service can be offered,
- availability in time
- the sale of the service and its price.

3.3. The importance of logistics for the inland shipping companies.

Logistics is an issue of major importance not only to companies but also to regions and governments. Complex systems, based on the latest advances in information technology, are now beginning to appear at the interface between transport flow generation and the corresponding aspects of industrial organisation. In response to the globalisation of trade, firms are increasingly tailoring their in-house logistics structures and associated transport operations to meet their own specific needs.

Where there are logistics centres or terminals, potentially large flows of freight to and from them generate demand for good-quality, high-capacity infrastructure links between such centres. The result is corridors that are strategically important for freight transport, regardless of whether they are in central or peripheral areas.

These corridors are necessarily multimodal and, given the very real constraints on road infrastructure development (financial, environmental,) this calls for a few comments.

The "commercialisation" of the railways, i.e. bringing railway services closer into line with real demand in the transport market, is of the utmost importance if the provision of road-only corridors is to be avoided. The quality of service provision alone goes a long way to explaining the current modal split.

It is important to redevelop maritime sites (ports), which although they are currently under-utilised as a realistic alternative to road transport, offer great development potential. Port areas will be vital centres for the concentration of activities in the future, if only because they are principal gateways to Europe, which is almost like an island from the standpoint of the context of the globalisation of trade.

The environment is also becoming a key factor in policy decisions. In view of these developments, how will logistics systems evolve in the future? Is the current trend in

logistics systems towards greater polarisation or wider dispersion? What role will individual modes of transport play in these systems?

There are three possible scenarios, depending on what action the government takes:

- freight terminals concentrated at a limited number of sites;
- the "do-nothing" scenario which could lead to the creeping paralysis of transport networks already at a saturation point;

a wider spread of freight terminals if government and the private sector pay greater attention to congestion and the environment.

For the moment, the Romanian scene is dominated by the conservation and development of old freight terminals. In order to attract new funds for development, basically from the private sector, a series of free trade zones have been developed along the Danube, usually, adjacent to the traditional ports. Today, their number has increased so much that a special organisation has been put in place. It is called the Free Trade Zone Agency and is under Ministry of Transport structure.

Nowadays, Europe is moving toward integration. The unique currency will be the coronation of an activity that started decades ago. The transport sector made no exemption from the integration process.

The historical changes that took place in Europe after 1990, put both EU and former Comecom countries in front of a new situation. Instead of cold war, economic co-operation. This cannot be achieved successfully without proper transportation. If the maritime transport has been a motif of national pride and this sector is quite strong, the rest of the transport structure is affected by lack of efficiency.

If all of these former communist countries are to become someday part of EU they should not only modernise their economies and increase the standards of living of their citizens but also upgrade their transport networks to and from west.

Romania is no exemption from this general picture, but in its case the structural changes of the transport system have been late and slow. The reform process was slowed down by the war in the former Yugoslavia and the government hesitance. Admitted already within the Council of Europe and still waiting for the decision concerning its admission in the EU, Romania is preoccupied to catch up with the leading group formed by Poland, The Czech Republic and Hungary.

For Romania, the Rhine-Main-Danube (RMD) corridor means a new gate toward West Europe that is slightly ajar now. A good portion of its trade is done with EU and especially with RMD riparian countries like Germany, Switzerland, Austria and France.

The river going fleet has a leading role on the Danube transport market. This should be maintained through a development policy through the building of new and modern river ships, both barges and pushers.

The activity of the Romanian representatives in the Danube Commission should be oriented toward a general approach and integration between the Danube Convention and the Mannheim Convention. The elimination of all technical and legal problems that affect the continuity of navigation across the Danube-Rhine canal will ensure an increased traffic between the two navigable systems.

It could be said that the Rhine-Main-Danube corridor unites physically the two halves of Europe, the West and the East. The waterway transport sector suffers from its own overcapacity crisis and from increased economic concurrence from other modes of transport like the road and railways. It has to survive not only its own weaknesses but the subsidies received by other modes. Its main support is the increasing traffic with the CEE countries and the pressure of environmentalist groups and governments. Presently, the EC, DG VII group fully supports the shift of cargo volumes especially from roads toward railways and waterway transport.

If this geographical connection will become an economic success, especially for the Central and Eastern European countries depends largely on their determination toward European standards and goals the success of their economic reforms and the EU determination to back up a potentially successful mode of transport.

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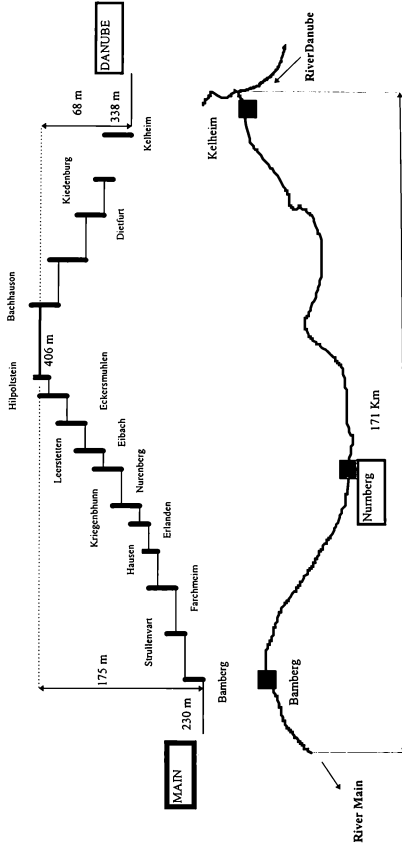
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APPENDICES

The Main-Danube Canal Locks' positions and their heights.



Characteristic data concerning the Danube fleet
- 1993 -

Annex 2

Country	Ships under operation		Carrying capacity tons	Total power pushers fleet Kw
	Number of units total	out of which pushers		
Romania	2199	132	1,186,411	143,163
Ukraine	998	69	760,980	110,711
Bulgaria	211	17	261,232	22,301
Jugoslavia	729	44	382,812	49,977
Hungary	461	26	195,735	22,101
Czechoslovakia	320	38	301,890	41,850
Austria	226	4	131,591	6,930
Germany	69	4	30,386	1,577
TOTAL	5,144	330	3,220,651	397,033

Source : Danube's Commission statistics

Romanian Commerce with the Rhine-Main-Danube Corridor Riparian Countries

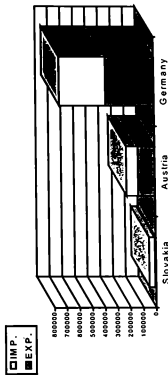
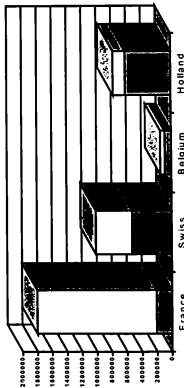
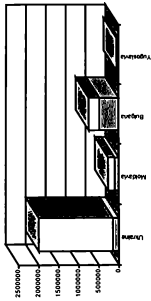
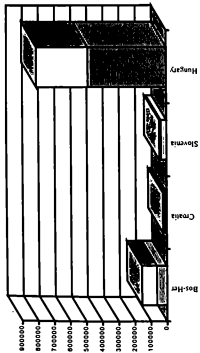
Annex 3

- 1993 -

Country	Tons		Value		.000 USD	
	Export to	Import from	TOTAL	Export to	Import from	TOTAL
Ukraine	148,390	1,853,844	200,234	104,690	133,269	237,959
Moldavia	104,381	161,677	266,058	94,180	86,723	180,903
Bulgaria	483,679	268,487	752,166	102,889	71,418	174,307
Yugoslavia	46,578	103	46,681	7,948	229	8,177
Bosnia Herzegovina	63,720	92,605	156,325	7,305	15,195	22,500
Croatia	10,784	13,085	23,869	3,752	3,495	7,247
Slovenia	35,175	10,237	45,412	11,925	9,859	21,784
Hungary	485,087	320,618	805,705	117,022	167,737	284,759
Czech Rep.	15,483	56,049	71,532	9,562	36,040	45,602
Slovakia	9,728	44,425	54,153	5,828	23,241	29,069
Austria	134,492	91,043	225,535	75,773	165,519	241,292
Germany	383,716	367,830	751,546	699,723	1,031,223	1,730,946
France	208,141	1,595,359	1,803,500	219,347	506,716	726,063
Switzerland	530,802	484,617	1,015,419	119,486	147,794	267,280
Belgium	88,644	59,489	148,133	75,936	85,197	161,133
Netherlands	617,657	160,987	778,644	212,166	157,044	369,210

Source : Romanian Ministry of Commerce Statistics

Romanian trade with the Rhine-Main-Danube's countries during 1993 (tons)



Source: Romanian Ministry of Commerce statistics

Romania's commerce with the Rhine-Main-Danube
riparian countries in 1993 (tons)



-U.S.D-



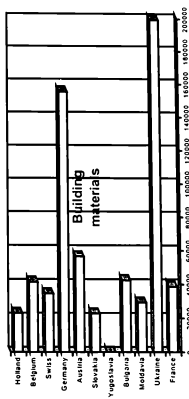
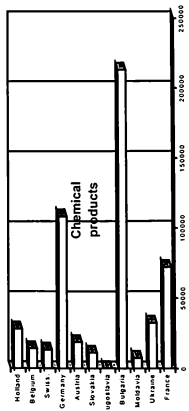
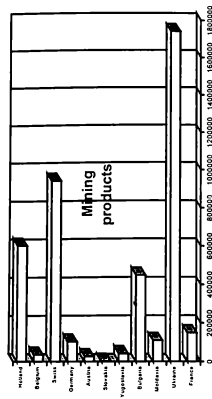
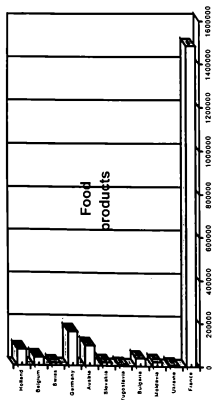
Source : Romanian Ministry of Commerce statistics

**Types of cargo, traded by Romania with the Rhine-Main-Danube's
riparian countries during 1993**

thousand tons

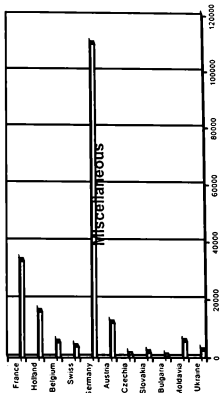
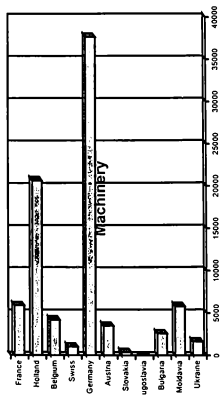
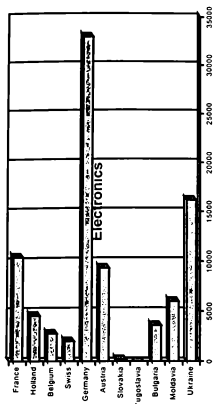
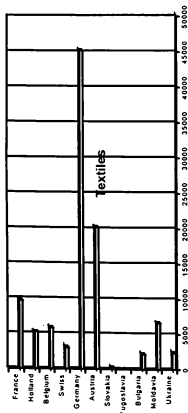
Goods	Ukraine	Moldavia	Bulgaria	Yugo.	Slovakia	Austria	Germany	Swiss.	Belgium	Holland	France
1 Food ind.	6,896	21,246	36,551	4,833	16,543	95,136	158,825	12,483	38,422	74,958	1,484,579
2 Mining ind.	1,740,938	110,343	450,041	41,754	1,326	27,144	103,272	945,47	36,273	606,278	148,888
3 Chemicals	32,343	7,332	213,085	47	11,066	18,700	108,543	13,071	14,013	28,208	71,981
4 Building ind	199,441	29,128	42,410	37	22,780	56,365	155,357	34,534	41,367	22,961	38,708
5 Textiles	2,403	6,650	2,210	6	222	20,247	45,195	3,097	5,853	5,240	9,747
6 Electronics	16,173	5,990	3,605	2	194	9,332	32,920	2,016	2,786	4,564	10,428
7 Machinery	1,654	5,816	2,624	2	384	3,513	37,670	1,057	4,224	20,693	5,930
8 Miscellaneous	2,386	5,468	503	-	1,638	11,866	109,747	3,679	5,189	15,722	33,218

Source: Romanian Ministry of Commerce Statistics

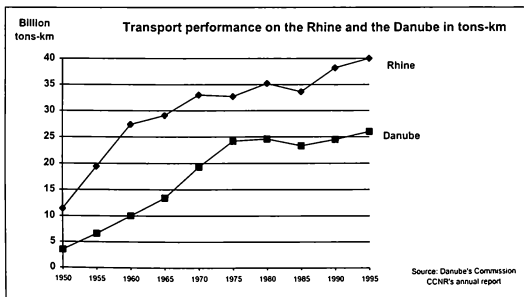
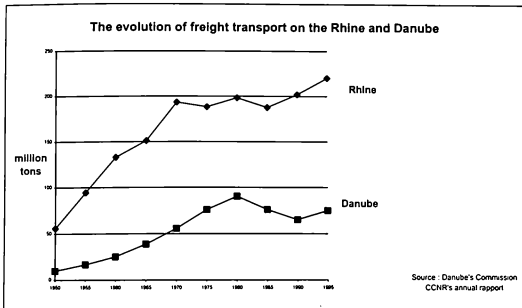


Source : Romanian Ministry of Commerce statistics

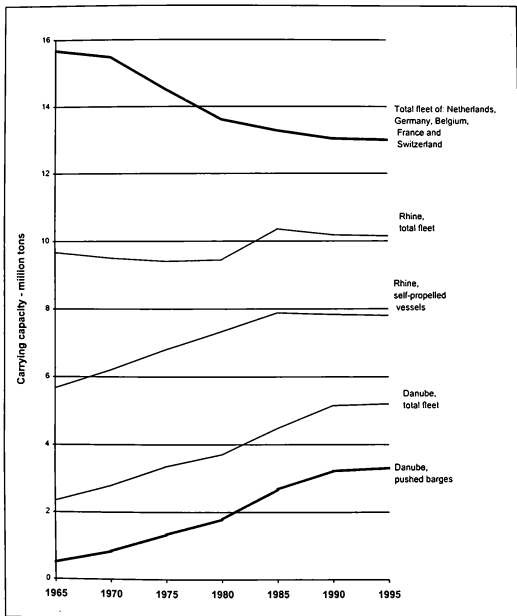
Types of cargo, traded by Romania with the Rhine-Main-Danube's riparian countries during 1993



Source : Romanian Ministry of Commerce statistics

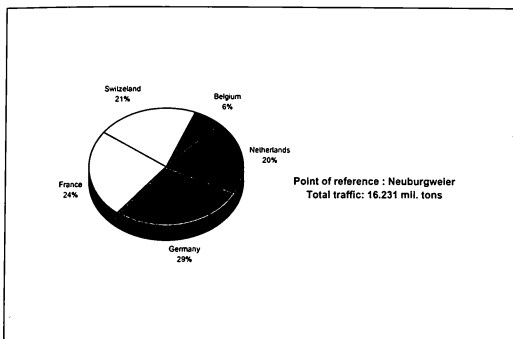


**The evolution of the inland navigation fleets
along the Rhine and Danube rivers**

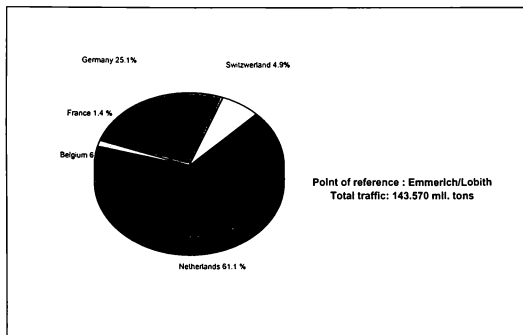


Source: Annuaire statistique de la Commission du Danube
 Binnenschifffahrt in Zahlen 1992
 Bedeutung der Binnenschifffahrt in Europa 1991

**Distribution of freight traffic by flags on two specific locations along
the river Rhine in 1990**



The information relates only to two points of reference along the Rhine and gives an idea about the distribution of the freight amongst the various Rhine fleets during that particular year.

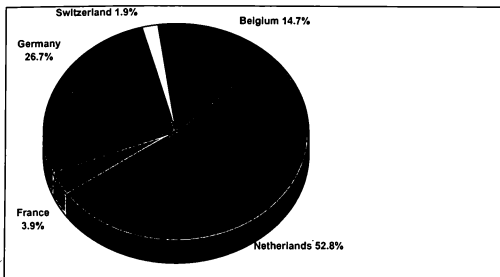


Source: CCNR's annual report

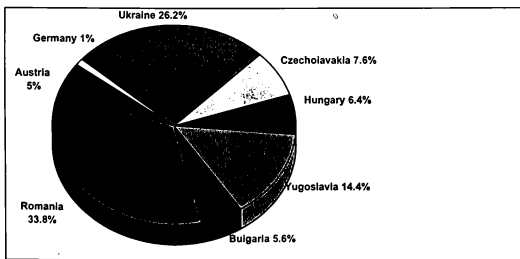
**Breakdown of the Rhine and Danube fleets
carrying capacity
(1990)**

Annex 12

Rhine fleet



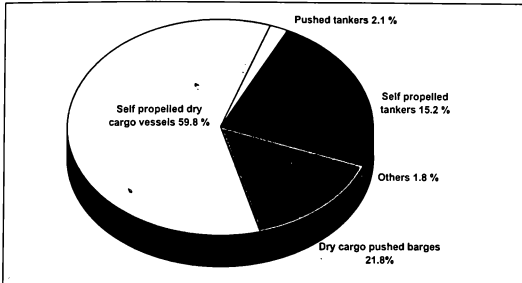
Danube fleet



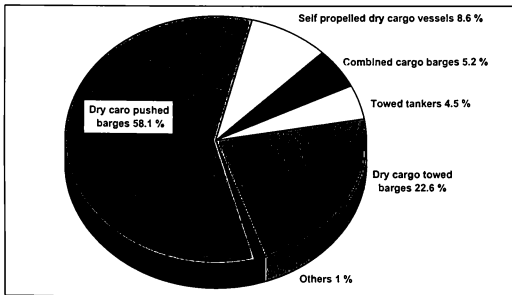
Source : Danube's Commission
CCNR's annual report

**Breakdown of vessels fleet on the Rhine and the Danube
by vessel type, (1990)**

Rhine fleet



Danube fleet

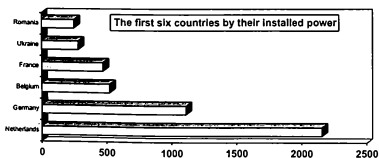
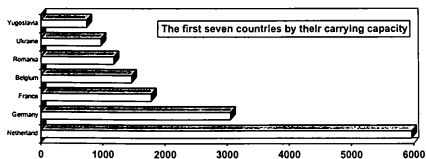


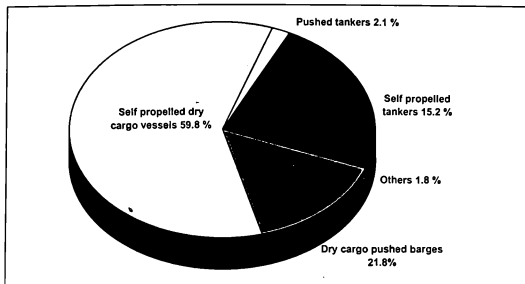
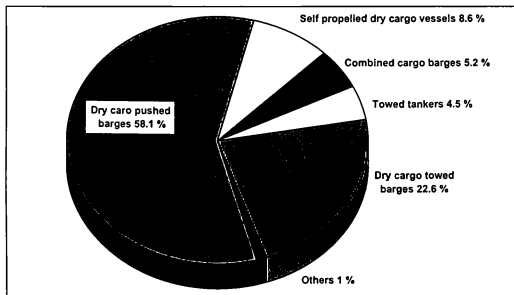
Source : Danube Commission
CNNR annual report

**Development of the European inland navigation fleets, per countries
- 1991 -**

Country	Number of vessels	Carrying capacity <i>thousand tons</i>	Power <i>thousand KW</i>
Austria	226	251.3	41.7
Belgium	1,796	1,465.1	525.7
Bulgaria	211	282.8	30.7
Czech Republic	836	620.7	159.9
France	3,251	1,781.7	474.3
Germany	3,077	3,056.0	1,111.9
Hungary	201	207.5	35.8
Luxembourg	26	24.9	13.2
Netherlands	6,998	5,969.0	2,156.0
Poland	2,655	969.8	167.5
Romania	2,199	1,178.1	251.7
Switzerland	185	290	124.2
Ukraine	886	970.5	283.0
UK	812	209.0	69.0
Yugoslavia (former)	1,139	741.9	118.8

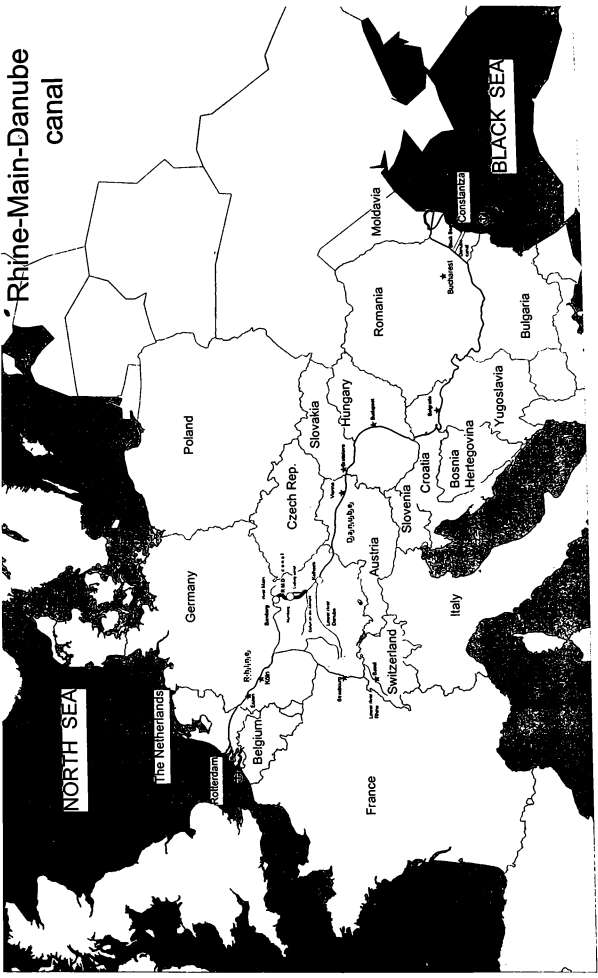
Source : Statistics of the Danube Commission



**Breakdown of vessels fleet on the Rhine and the Danube
by vessel type, (1990)****Rhine fleet****Danube fleet**

Source : Danube Commission
CNNR annual report

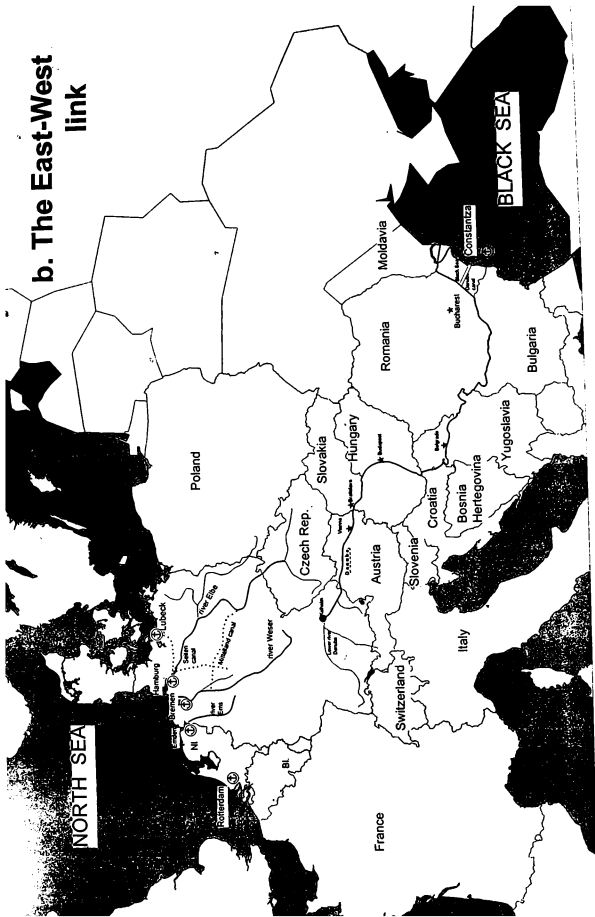
Rhine-Main-Danube canal



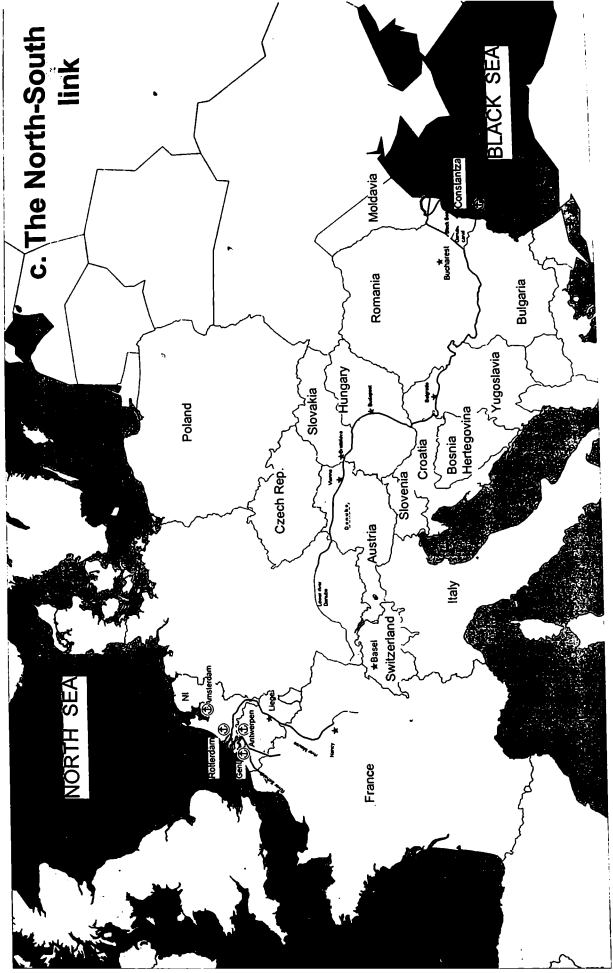
a. The Rhine link



b. The East-West link



C. The North-South link



NORTH SEA

link

