

Port-Net Study 03-2

Traffic flows between the Baltic Ports and other major European ports

with focus on the UK Ports within Port-Net in preparation for Motorways of the Sea



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- Haven Gateway Partnership (HGP)



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1. Cargo flows analysis

1.1. Analysis of the economic development, foreign trade and cargo flows between the Baltic countries and other EU member states (especially U.K.)

The evaluation of the Baltic Motorways of the Seas (MoS) establishment potential on the Baltic should begin from analysis of the size and population of particular countries in the Region. Nine countries with a variety of area and population characteristics are taken into account. The unquestionable leader of these two comparisons is Russia. The remaining countries could be divided into two groups. In terms of area we can indicate four bigger countries (Sweden, Germany, Finland and Poland) and four smaller ones (Denmark, Estonia, Latvia and Lithuania). Besides the country area the location and land shaping will have significant influence on the transport activities. Countries like Poland, Lithuania, Latvia or Estonia have a good position for transit cargo flows service. Much more visible are differences in the countries' population. That characteristic is important for a country's level of economic development and the transport intensity, both passengers and cargo. The scales of consumption and communication needs are strictly connected with transport performance. For that reason Germany and Poland stand out clearly. More than 81% of the Baltic Region's population resides in these two countries (excl. Russia).

Figure 1. The Baltic Sea Region



The next level of research is economic development. In 2004 the aggregated GDP of the BSR economies, excluding Russia and non-BSR regions of Germany, was 1 609 598 million euros. If the whole of Russia is included, the volume would be 2 056 742 million.

Although eight of nine of the Baltic coastal countries are members of the Community, the differences between the countries of the former EU 15 and the new Member States are visible. On the basis of an absolute level of GDP, Germany differs from other countries and is responsible for over

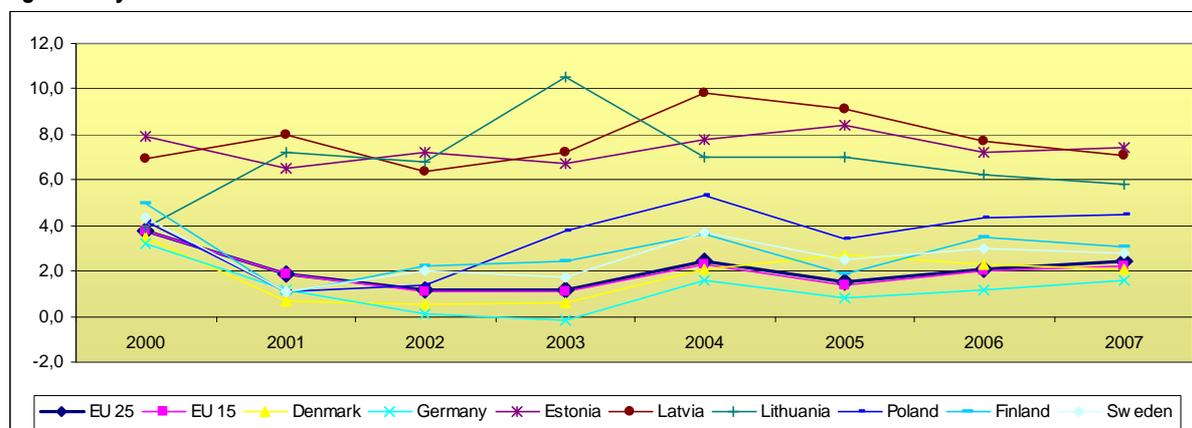
61,8% of the Region's GDP. The next group of countries achieved levels of 155 – 447 billions € of GDP. Estonia, Latvia and Lithuania are characterized by the lowest levels of GDP but the population of these three countries is also not big. On the other hand absolute comparisons are not suitable for international analyzes. Therefore, GDP *per capita* level should be presented.

Table 1. Basic data of the Baltic countries economic statistics.

Country	Area	Population	GDP market prices 2004	GDP per capita	GDP per capita 2004	GDP per capita 2005 (PPS)
	(thou. Km ²)	thou.	m Euro	Euro	Total = 100	UE25 = 100
Denmark	43,1	5 411,0	208 206,1	38 478	221,8	124,1
Estonia	45,2	1 347,0	10 540,2	7 825	45,1	58,9
Finland	338,1	5 236,0	155 320,0	29 664	171,0	115,2
Germany	375,0	82 500,0	2 245 500,0	27 218	156,9	107,4
Latvia	64,6	2 306,0	12 789,1	5 546	32,0	49,5
Lithuania	65,2	3 425,0	20 587,3	6 011	34,7	53,3
Poland	312,7	38 173,0	240 540,1	6 301	36,3	51,0
Russia	17 075,4	143 954,0	447 000,2	3 105	17,9	.
Sweden	450,0	9 011,0	287 977,4	31 958	184,2	119,2
Total:	18 769,3	291 363,0	3 628 460,4	17 345	100,0	72,3
U.K.	244,8	60 034,0	1 768 549,3	29 459	.	115,8

With reference to the mentioned parameter, two levels of economic development exist. Countries such as Germany, Denmark, Sweden and Finland (former EU 15) are characterized by one of the highest levels of GDP *per capita* in the EU and additionally by a relatively low level of economic growth. On the other hand, the new member states are marked by a lower level of current economic development (49 - 58% of the EU 25 average level) connected with an excellent rate of annual growth of GDP (6% - 10%). The fastest growing economies (1995 – 2004) were Lithuania with a growth of 366.8 percent, Estonia (309%) and Latvia (296%) and the slowest Germany (21%), Denmark (41%) and Sweden (47%). The Russian economy grew by 88 percent. The aggregated growth for the BSR between 1995 and 2004, excluding Russia and non-BSR regions of Germany, was 42 percent or a yearly average of 4 percent. Generally BSR economies are growing faster than the EU average¹.

Figure 2. Dynamics of GDP of the Baltic Countries.



¹ Baltic Maritime Outlook 2006

According to the GDP development forecast for the Baltic countries, Poland will be the most intensive developing country. In 2015, Poland can overtake Sweden and Denmark (absolute level of GDP) and in the year 2030 reach a level of over 600 000 million €. Unfortunately, the difference of the population between the abovementioned countries limited the growth of GDP *per capita*.

Last but not least, the question concerning the Baltic countries' economic position is their national competitive level. The rank position is estimated on the basis of various elements² describing the current economic situation of the country. A strict share of the BSR countries into two groups at a competitive level can be indicated. What is important, Estonia belongs to the first group of the most competitive economies in the world. Other new member countries occupied positions up to 40. The competitive level has a strict influence on the GDP development in the South – East Baltic countries, therefore, the most dynamic economy of the region is only in Estonia. On the other hand, the poor position of the Polish economy is mainly caused by the size of the country and the scope of economic problems. A separate case is the competitiveness position occupied by Russia's low position in the rankings (WEF). A characteristic for this kind of ranking is the different scope and direction of time changes indicated in particular countries. It is caused by various methodologies of estimation used by assessment organization.

Table 2. The Baltic Countries in the World Competitiveness Reports 2005 (World Economic Forum, Institute for Management development)

	World Economic Forum		Institute of Management development	
	2001	2005	2001	2005
Finland	2	1	3	6
Sweden	5	3	8	14
Denmark	10	4	15	7
UK	11	13	19	22
Germany	14	15	12	23
Estonia	27	20	16 ³	20
Lithuania	39	43	-	-
Latvia	43	44	-	-
Russian Federation	66	75	26 ⁴	54
Poland	41	51	47	57

Source: Internet: www.weforum.org, www.imd.ch

Continuing our research, it can be assumed that the economic development of countries affects the volume of foreign trade and also the transport activity of particular states while, simultaneously, the level of foreign trade stimulates economic growth. Export and import of investment and consumption goods need proper transport services. According to the statistics, external trade of the Baltic countries achieved a level of over 1.9 billion € in year 2004 (excl. Russia). The biggest trader in the Region, responsible for 68% of the exchange was Germany. In the case of other BSR countries significant changes have been noticed from year 2004. Membership in the European Union has helped to intensify the foreign trade between the Community members. Closer institutional cooperation, abolition of borders and simplification of the exchange procedures connected with the new transport infrastructure financing would raise the external trade volume. A significant growth in foreign trade during 2004 is illustrated in

² E.g. trade, fiscal burden, public authorities' influence, monetary policy, foreign investments, banking and finance, ratio salary/prices, ownership laws, economy regulation, black market, etc.

³ Scoreboard – Group II, Population less than 20 million.

⁴ Scoreboard – Group I, Population over 20 million.

Figure 3. According to the graph, the highest level of foreign trade dynamics was achieved by Estonia, Latvia and Poland.

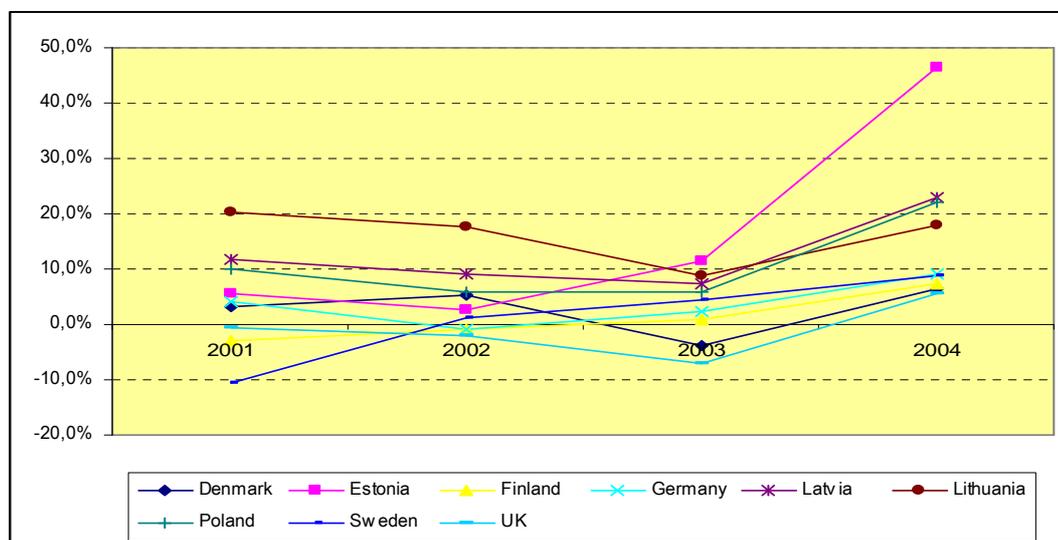
Table 3. External trade of the Baltic Countries (2004) mln €

Country	IMPORT					EXPORT				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Denmark	49,33	50,6	53,22	50,77	54,77	55,54	57,73	60,8	58,8	61,78
Estonia	4,62	4,8	5,08	5,73	6,75	3,44	3,7	3,64	4	7,49
Finland	37,29	36,44	36,19	37,58	41,36	49,92	48,28	47,74	47	49,46
Germany	538,33	542,79	518,49	534,49	576,35	597,46	638,28	651,26	664,39	733,39
Latvia	3,47	3,91	4,28	4,63	5,65	2,02	2,23	2,42	2,56	3,19
Lithuania	5,68	6,69	7,96	8,53	9,87	3,85	4,78	5,54	6,16	7,45
Poland	53,08	56,03	58,48	60,5	71,69	34,37	40,19	43,5	47,53	60,18
Sweden	78,91	70,57	70,81	73,85	80,06	94,34	84,46	86,19	90,26	98,69
Total:	770,71	771,83	754,51	776,08	846,5	840,94	879,65	901,09	920,7	1021,63
U.K.	372,21	371,82	366,24	346,5	372,59	309,04	304,51	296,31	270,18	278,85

Source: Eurostat [4.05.2006]

What is of importance is that the EU expansion also had a positive influence on international trade of the original member states (EU 15). Generally, all BSR countries notice an increase in foreign trade in 2004 (incl. U.K.). According to foreign trade forecasts, these positive trends should be kept in the next years. Besides foreign trade values, the creation of the Baltic MoS depends on the exchange direction. The main foreign trade partners of BSR countries are located in the Baltic region. The Baltic Sea in many cases is, therefore, the barrier separating these partners.

Figure 3. Dynamics of foreign trade of BSR countries 2001 - 2004



On the other hand, it is the shortest and easiest way of goods exchange. As a consequence, the level of foreign trade in countries like Estonia, Latvia, Lithuania and Poland will rise significantly. Identification of the main trading partners for these particular Baltic countries will help estimate the potential of the maritime transport freight volume. The following countries are the most important for the foreign trade of Baltic countries:

1. Denmark:
 - a. Germany, Sweden and the United Kingdom;

2. Estonia:
 - a. Exp: Finland, Sweden, Latvia, Russia;
 - b. Imp: Finland, Germany, Russia, Sweden;
3. Lithuania:
 - a. Exp: Switzerland, Russia, Germany, Latvia;
 - b. Imp: Russia, Germany, Poland, Italy.
4. Poland:
 - a. Exp: Germany, the Czech Republic, Austria;
 - b. Imp: Russia, Germany, the Ukraine.
5. Germany:
 - a. Exp: France, the United States, the United Kingdom, Italy;
 - b. Imp: France, Netherlands, the United States, China.
6. Sweden:
 - a. Exp: the United States, Germany, Norway, the United Kingdom;
 - b. Imp: Germany, Denmark, Norway, the Netherlands.
7. Finland:
 - a. Exp: Russia, Sweden, Germany, the United Kingdom;
 - b. Imp: Germany, Russia, Sweden, the United Kingdom.
8. Latvia:
 - a. Germany, Lithuania, Russia, Sweden, Estonia, the United Kingdom;
9. Russia:
 - a. Germany, the Netherlands, Italy, China;
10. the United Kingdom:
 - a. Exp: the United States, Germany, France, the Netherlands;
 - b. Imp: Germany, the United States, France, the Netherlands.

The next step in this research is the presentation of BSR countries' foreign trade put into goods flows (tons). In the year 2003, trade to and from the BSR countries achieved a level of 1 515.1 million tons, imports 713.7 and exports 801.4 millions tons (Figure 4)⁵. Inter BSR external exchange achieved a volume of 511.3 (2 x 255.65) thou. tons (Table 4).

Table 4. Inter Baltic Countries external exchange (2003)

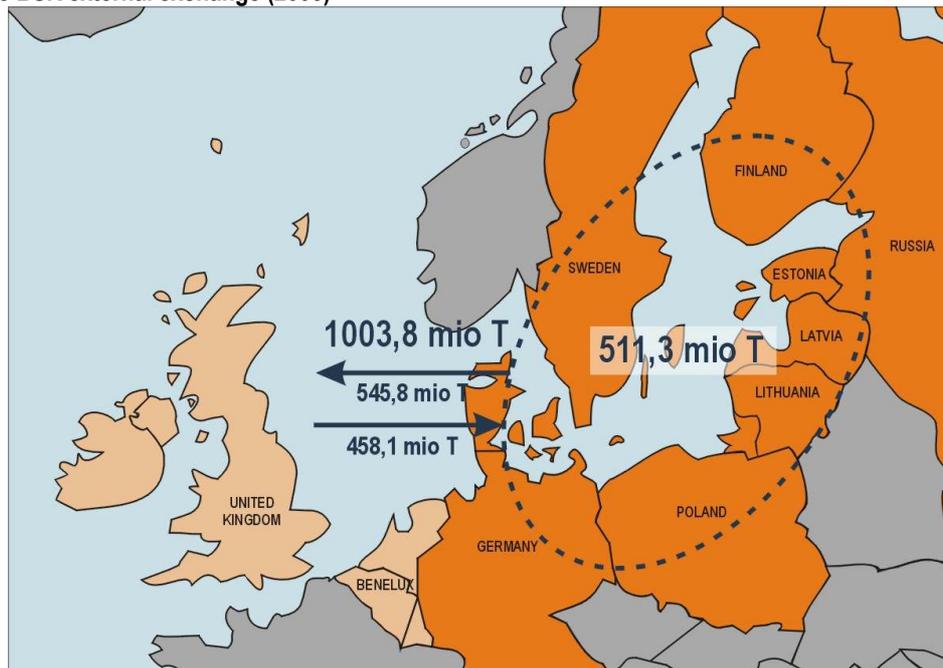
From/to	Imports 1000 t									
	Sweden	Poland	Finland	Denmark	Estonia	Lithuania	Germany	Russia	Latvia	Total
Exports 1000 t										
Sweden	0	1 617	5 711	6 403	264	402	11 693	465	247	26 802
Poland	1 883	0	2 178	2 808	140	832	23 279	1 413	248	32 781
Finland	4 365	605	0	1 182	1 130	96	6 205	1 626	197	15 406
Denmark	8 069	574	3 328	0	62	127	6 500	428	50	19 138
Estonia	2 634	72	1 705	362	0	230	1 136	208	567	6 914
Lithuania	1 159	926	226	542	561	0	1 067	608	1 443	6 532
Germany	5 733	8 220	2 226	6 053	272	491	0	2 430	264	25 689
Russia	6 602	22 641	24 680	3 196	3 450	12 164	40 113	0	1 308	114 154
Latvia	5 015	89	640	827	323	352	802	186	0	8 234
Total	35 460	34 744	40 694	21 373	6 202	14 694	90 795	7 364	4 324	255 650

Source: Baltic Maritime Outlook 2006

⁵ Baltic Maritime Outlook 2006

The most important inter-Baltic exporters are Russia (46%⁶ of the total external exchange of countries), Poland (50%), Sweden (47%) and Germany (10%). With reference to import, the following countries should be indicated: Germany (30%), Finland (80%), Sweden (70%) and Poland (51%). Moreover, it could be stated that approximately 42% of the exchange has a cross Baltic character⁷. Of course external exchange could be serviced by both maritime and land transport. A mutual location of the trade partners has a significant influence on the mode choice. On the other hand, in particular cases, substitute routes of transport could be used. Therefore, cross Baltic maritime connections concern intra and outer BSR goods exchange has a significant importance in terms of the MoS development process.

Figure 4. The BSR external exchange (2003)



On the other hand, extra BSR cargo flows have significant importance in the maritime transport activation. They are responsible for 76% of the total maritime transport of BSR countries (Figure 5), so development of MoS will depend on the extra BSR cargo flows to a large extent.

In the case of present research, the extra BSR trade connections with the United Kingdom are essential. Therefore, indication of the trade value and volume is necessary. According to the collected data and further estimation, the overall foreign trade value achieved a level of EURO 134.1m (excl. Russia and incl. the northern part of Germany). The ratio of the UK's trade value – import/export is like 58/42. The main trade partner of the UK in the BSR is Germany who is responsible for 75.4% of the trade value. The second level of analysis is the external exchange cargo volume between the UK and the BSR.

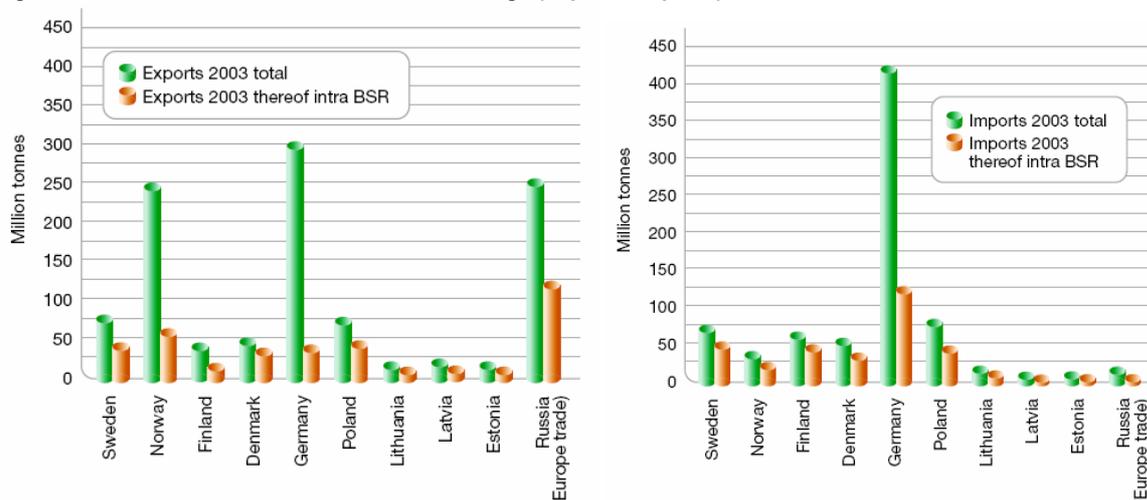
The total exchange volume in the presented relation has achieved a level of 92.8 m tons in year 2004 (Table 5, Figure 6). Import in total volume is 67.33%. According to the available data about 87.6% of the volume has been served by maritime transport. Germany, the main BSR trading partner of the UK

⁶ Europe trade.

⁷ More than two national borders of separation.

(43%), is characteristic by a slight domination of export to the UK. Second on the list is Russia with a 25% share and Sweden with 12% (Figure 7). An interesting issue connected with the external exchange is the cargo flow in a particular direction. Very visible differences are noticed in the case of the Baltic States and Poland. The main reason for this phenomenon is that import of Russian bulk cargoes is via Latvian, Estonian and Lithuanian seaports.

Figure 5. Inter – Baltic Countries external exchange (imports, exports).



Source: Baltic Maritime Outlook 2006

As mentioned above, the structure of the foreign trade has a direct influence on the exchange volume. Therefore, a short characteristic of the particular BSR countries trade is presented.

Table 5. UK foreign trade by Baltic Sea partners (2004)

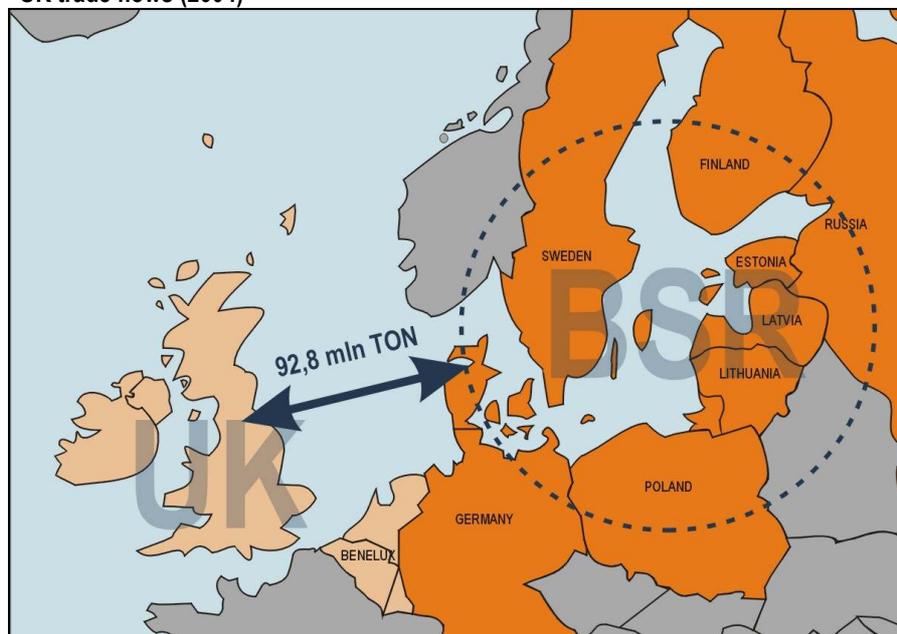
	m EURO			tons		
	Import	Export	Total	Import	Export	Total
Denmark	5,45	3,31	8,76	2 412 581,7	991 089,4	3 403 671,1
Germany	61,68	39,41	101,09	18 656 293,5	21 115 805,4	39 772 098,9
Estonia	0,26	0,15	0,41	100 000,0	220 000,0	320 000,0
Latvia	0,39		0,39	3 716 738,2	-	3 716 738,2
Lithuania	0,33	0,48	0,81	1 200 000,0	190 000,0	1 390 000,0
Poland	2,15	3,61	5,76	3 655 541,9	792 015,4	4 447 557,3
Finland	3,15	2,09	5,24	3 933 824,7	1 461 023,9	5 394 848,6
Russia				22 640 198,8	538 518,7	23 178 717,5
Sweden	4,72	6,91	11,63	6 167 357,0	5 010 000,3	11 177 357,3
	78,13	55,96	134,09	62 482 535,8	30 318 453,1	92 800 988,9
	58,27%	41,73%	100,00%	67,33%	32,67%	100,00%

Source: Individual estimation on the basis of national statistics data; Eurostat; UK Tradeinfo.

In **Sweden**, the industrial production is concentrated in sectors that use domestic raw materials, such as timber, iron and other metals. Among the most important production sectors are wood pulp, paper and metal production, car manufacturing, production of machinery, telecommunication and pharmaceutical products. In the case of **Finland** which has a highly industrialized economy, the key economic sector is manufacturing - principally wood, metals, engineering, telecommunications, and electronics industries. **Russia** has a complete range of mining and extractive industries producing coal, oil, gas, chemicals, and metals; all forms of machine building, consumer durables, textiles, foodstuffs and handicrafts. However, only a few Russian firms are competitive on the international markets. Their

industrial production is technologically outdated and very energy intensive; it needs modernization. A high share of liquid and dry bulk cargo in the Russian external exchange via the Baltic Sea puts down the importance of the MoS establishment. On the other hand dynamic growth of the container transshipment in the Russian ports is an important issue in the MoS concept implementation.

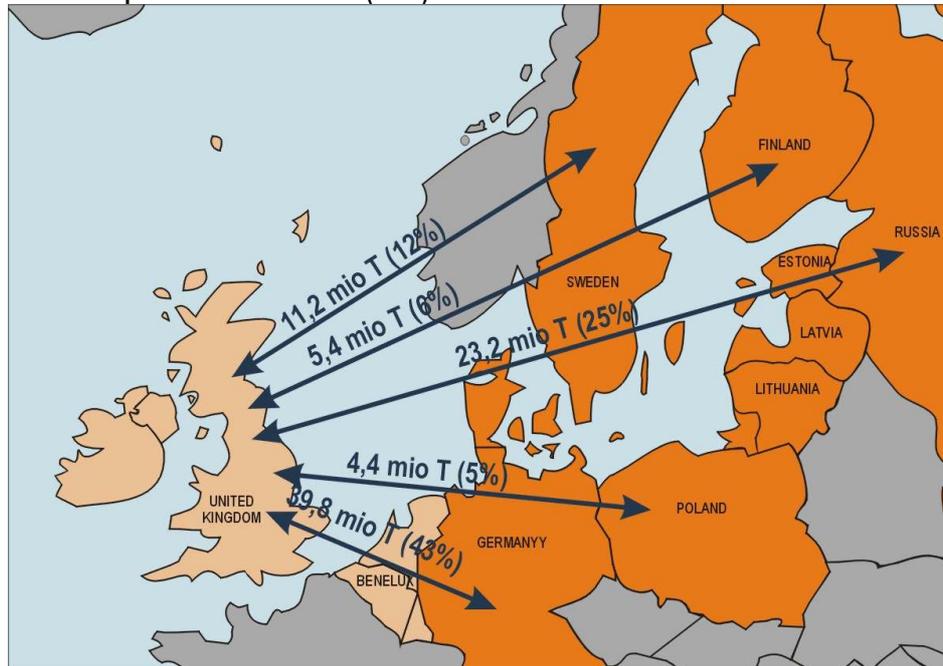
Figure 6. BSR – UK trade flows (2004)



The economies of Estonia, Latvia and Lithuania have undergone profound structural changes during the last decade. A prominent feature is the rapid growth of the private service sector which today accounts for over half of the total employment. In comparison with its neighbors, **Latvia** has an undersized industrial sector. During the Soviet era, Latvia had the most diversified industrial base among these countries but much of it was not competitive in the new economic environment in the 1990s. The **Estonian** economy benefits from strong electronics and telecommunications sectors and is greatly influenced by developments in Finland, Sweden, and Germany, three major trading partners. It also has a strong food processing and textile industry. The Estonian industry is characterized by small enterprises and diversified production. It is, however, dependent on imports for energy and raw materials. **Lithuania's** biggest employers are textiles and food processing industries. **Poland** has pursued a policy of economic liberalization throughout the 1990s and today stands out as a success story among transition economies. The privatization of small and medium-sized state-owned companies and the liberal law on establishing new firms, have encouraged the development of the private business sector. Poland has also made massive investments into the production infrastructure, which has caused a rapid growth of industrial production. The three largest industry sectors in the country are food processing and beverage production, vehicle manufacturing, and chemical industry. As in most other large economies, **Germany's** industrial sector has declined in favor of the service sector. Germany is among the world's largest and most technologically advanced producers of iron, steel, cement, chemicals, machinery, motor vehicles, machine tools, electronics and ships. Major German car manufacturers and huge international German based corporations rank among the world's largest firms. The steel and iron industry together with the chemical industry remain the backbone of basic German industry. The most important industry sectors in **Denmark** are metal, chemical, food processing,

machinery and electronics industry. However, during the past few years, the GDP share of raw material-based industries has been reduced in favor of high-tech industries. Danish industry is characterized by a high number of highly specialized small and medium sized enterprises (SMEs)⁸.

Figure 7. Main UK trade partners from the BSR (2003)



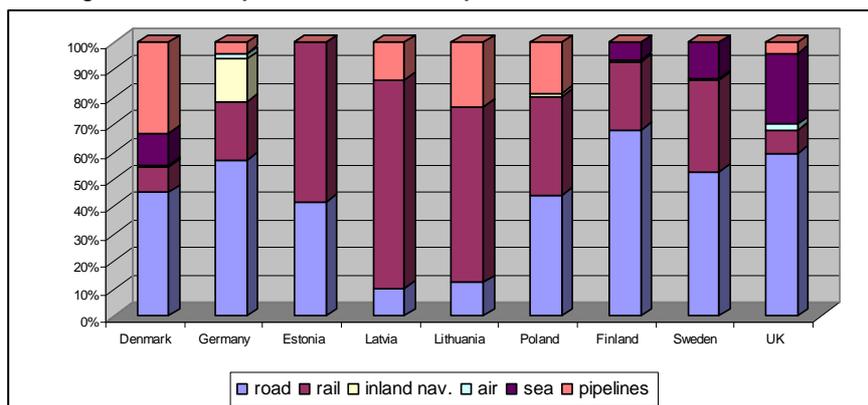
The above presented volume of external exchange of BSR countries has to be served by international transport. The goods category (bulk, general cargo) have significant influence on the transport mode choice. In the case of the Baltic MoS concept, implementation focusing on the general cargo carriage is necessary. Therefore, analysis of the modal split of domestic and international transport of the BSR countries is another step in the research.

1.2. Modal split in the BSR countries transport systems

As was mentioned before, estimation of the Baltic MoS potential should also cover the modal split analysis. The first level of the BSR countries' modal split research is the structure of domestic transport. It could refer to the transport turnover (tons) and performance (tkm) in the particular branches of transportation. Because the transport turnover does not take into account the average distance of carriage, it is useless in international comparisons. So, we are focusing on transport performance. On the basis of collected data, the average level of the BSR countries modal split could be characterized in the following parameters: road 51.5%, rail 28.7%, inland navigation 8.9%, pipelines 7.8%, sea 1.9% and air 1.1% (2004). Moreover, BSR countries can be divided into two groups. The first group includes initial EU countries (Denmark, Germany, Finland, Sweden and additionally the UK) and characterizes road transport domination. Also that the modal split structure is time stable. On the other hand, in the new member EU countries, the superiority of rail transport is noticed.

⁸ Baltic Maritime Outlook 2006

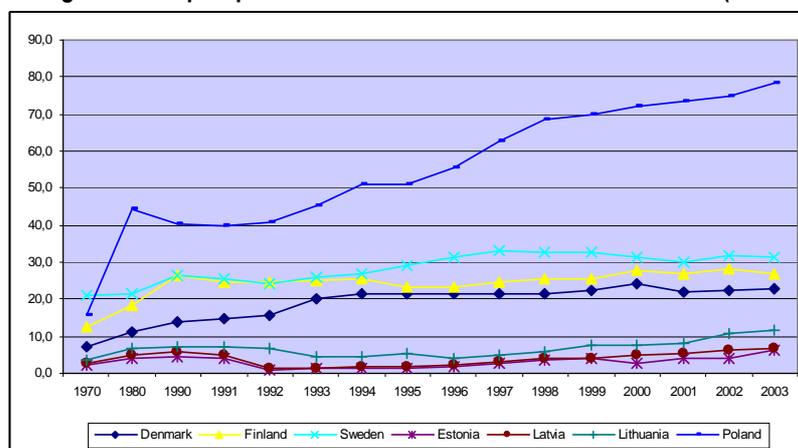
Figure 8. Modal split of domestic transport of the Baltic countries in 2004.



Source: *Energy & transport in Figures 2005. Pocket book.*

Poland occupies a specific position in the presented comparison. Because of its central location in Europe and wide country area, modal split changes are most visible. What is more, the Polish economy is not as dependent on the transit of Russian bulk cargo (oil, gas) as Latvia, Lithuania or Estonia. Nevertheless, dynamic growth of the road transport market in Poland (Figure 9) has caused restriction of the rail performance (Figure 10). In year 2000 the road transport share in inland carriage was 49% but by the end of year 2004 it achieved a level of 58.8%. The important incentives of the wide utilization of road transport are the changes of structure of national production (high technology and service development), liberalization of the EU road transport (high competitiveness of the mode) and the redefinition of the foreign trade directions (intra – Europe). Poland’s integration with the EU is another element of road transport activation.

Figure 9. Road goods transport performance in the Baltic countries 1970-2003 (1000 million tkm)⁹.



Source: *The Baltic Transport ranking for 2005. "Baltic Transport Journal" No 4/2005 (6).*

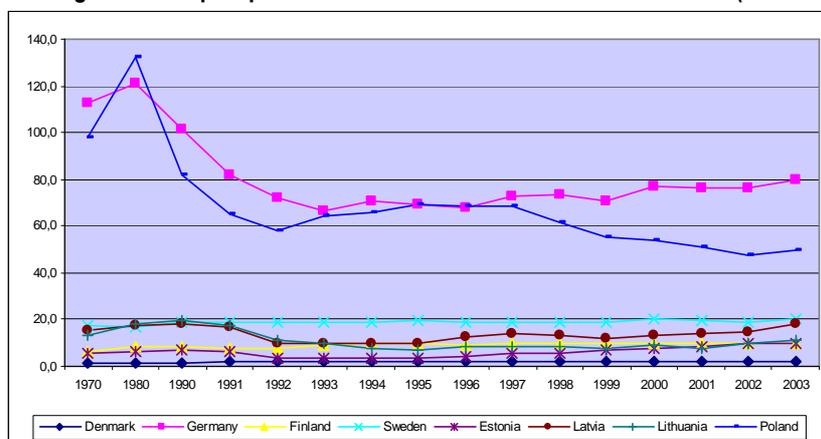
The stock of the goods transport has also increased especially in the accession countries during the last years. From 1995 to 2004 stock of goods vehicles have increased by 37% and achieved an amount of 6 691 thou. items. Germany (2.76m) and Poland (2.39m) have the biggest road fleet and are responsible for 77% of BSR’s goods vehicles. Poland has also achieved an impressive increase of stock estimated at one million vehicles (1995-2004). They are also commonly used in international haulage.

⁹ Germany: 290,9 1000 mio tkm (year 2003).

The bulk trans-shipment in the Baltic ports is mainly based on rail transport. Nevertheless, the market share of rail has gradually decreased since 1980. It is mainly due to the road transport competition. Currently, the utility level of rail is relatively constant. What is more important, the trend is similar in all Baltic countries. Currently implemented EU regulation of the rail market (rail package I, II and III) aimed at mode liberalization will cause an increase in branch utilization. Market changes indicated in EU directives will have a significant influence on BSR rail. Development of private companies connected with wide access to the common freight market will also cause an increase in competitive rail transport.

Political decisions are the most important issues in the pipeline transport performance. Hence, there is no point in analyzing its development trends. Pipeline transport occupies an important position in the national transport system in the cases of: Denmark, Poland, Lithuania, Latvia, and Estonia¹⁰. The pipeline system also has no importance in the MoS development.

Figure 10. Rail goods transport performance in the Baltic countries 1970-2003 (1000 million tkm).



Source: *The Baltic Transport ranking for 2005. "Baltic Transport Journal" No 4/2005 (6).*

Only in Germany is inland navigation widely used in the transport system (15.7%). In other BSR countries there is no proper infrastructure for inland navigation development. Despite this, some carriages are executed in Poland and Finland. On the other hand inland navigation could perfectly complete the MoS connections by extending the water part of the carriage.

1.3. Cargo flows between the Baltic States and Europe (UK) by other means of transport.

Contemporary European transport has been struggling with an unfavorably structure of the modal split for years. The liberalization process conducted throughout EU transport but completed in few cases and the redefinition of market expectation caused a fast growth in road transport importance. Despite numerous initiatives and EU regulations, rail and inland navigation are still a decreasing trend. In the case of maritime transport, the European situation looks quite different. On the one hand, sea transport is in many cases the only way of transportation. On the other hand, the concept of Short Sea Shipping and EU activities in this field gave results (a 41% market growth¹¹). For that reason, in the case of analyzing the total EU modal split, maritime transport occupies a strong position with a share of

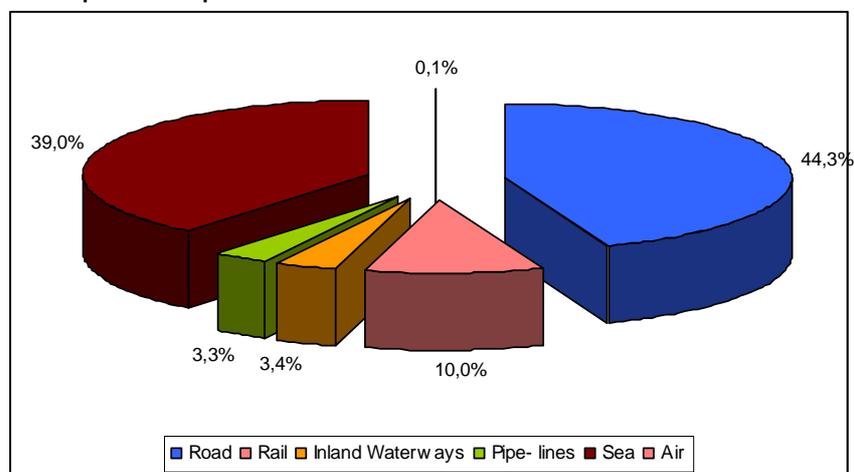
¹⁰ Latvia and Estonia – lack of proper statistics.

¹¹ White Paper. European Transport Policy for 2010: Time to Decide.

39% in 2004. A full range of EU transport modal split is presented in Figure 11. Superiority of road transport is more visible in the case of land transport. European statistics indicates a road transport share of 72.6% (rail 16.4%, inland navigation 5.6%, pipelines 5.4%). Utilization of particular modes of transport in EU member states depends on the country size, location or external trade main directions. Therefore, focusing on the selected cases is necessary.

As was mentioned before, the transport connections between the Baltic countries could have a different character. They are neighboring relations with the carriage by land infrastructure or overseas relation with maritime or air transport with ports. On the other hand, the present research is focusing on cargo flows between Baltic countries and Western Europe, especially the United Kingdom. In that case also land and maritime transport could be used. On the other hand, land transport relations could also consist of different modes of transport. Therefore, the share of particular transport branches in external exchange service is a practical problem.

Figure 11. EU 25 modal split of transport in 2004.



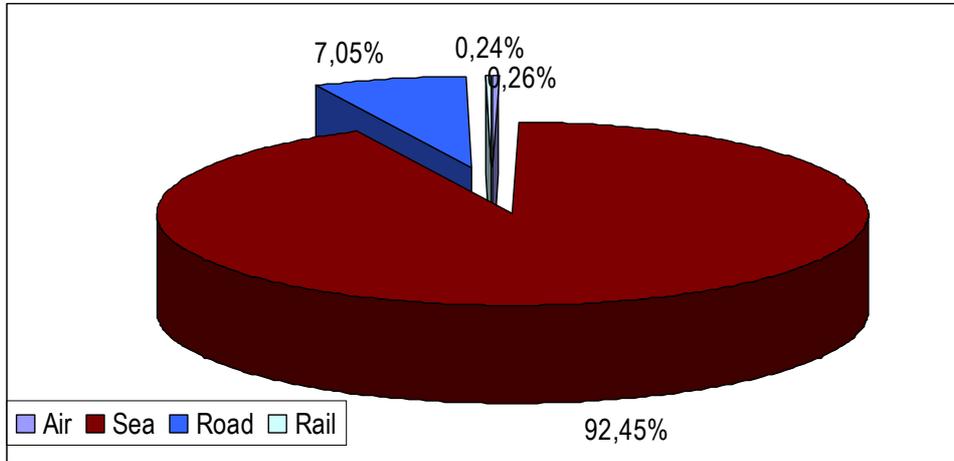
Źródło: Internet: <http://epp.eurostat.ec.eu.int> z dnia 19.04.2006 r.

According to data indicated in Figures 12,13 and Table 6, the majority of cargo flows are serviced by maritime transport. Presented sea transport data are taking into account both bulk and general cargo carriages. In the case of MoS establishing general cargo flows are essential, therefore, more detailed information is necessary. General cargo presents only 35.7% of the UK ports' turnover in the BSR direction (excl. Russia). The volume of 21.9m tons is mostly transferred as freight containers or Ro-Ro units. The highest share of general cargo transferred between the UK and BSR ports is noticed in Finland (68.2%), Lithuania (59.3%) and Denmark (57.5%).

Simultaneously, Sweden (6.15m tons), Germany (4.97) and Finland (3.73) are characterized by the highest volume of cargo sea exchange. The UK seaports' turnover volume is also different in the case of inwards (15.7m tons) and outwards (4.6m tons) directions. On the other hand, bulk cargo (liquid and dry) is the majority of port trans-shipment with reference to Estonia (91.1%), Poland (79.8%) and Latvia (77.8%). Development of the Baltic MoS connecting the region with Western Europe (especially the UK) will be based on general cargo transport, therefore, bulk cargoes should not be taken into consideration. However, estimation of the potential of other modes of transport services cargoes flow on this connection is crucial.

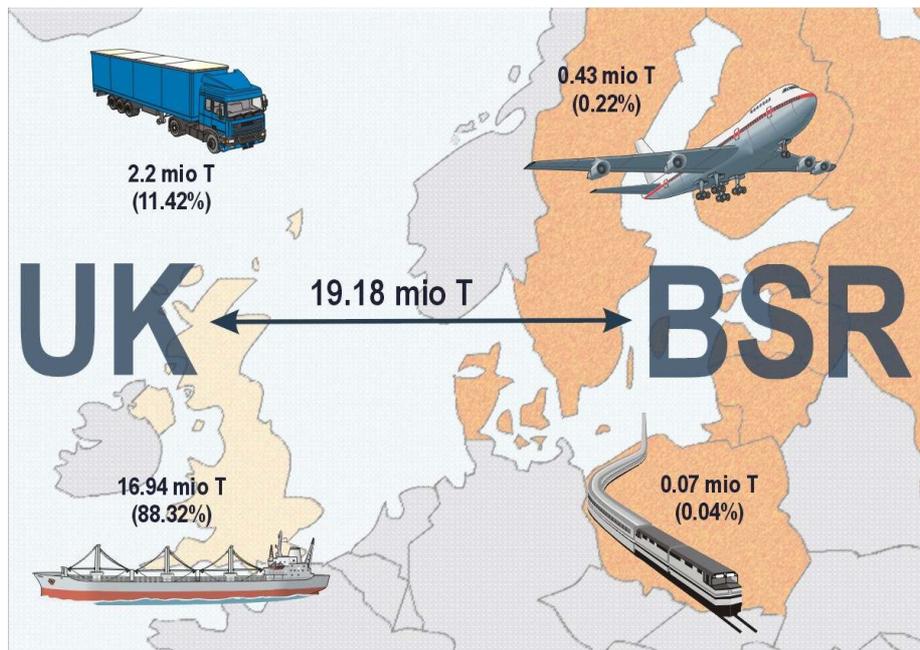
As was presented, the road haulage should be the main area of interest. In 2004 road transport turnover achieved a level of 2.2m tons (excluding Germany). This means that only 11.42% of the transferred goods are carried by trucks. It can also be indicated that the annual number of trucks traveling from South – East Baltic countries to the UK is 64 900.

Figure 12. Modal split of the cargo exchange: the UK – BSR countries [tons].



Approximately 84% of that movement is vehicles originating their travel in Poland. In the case of general cargo, it is 23.16% of the freight turnover. It could be said that part of the presented volume is the future, additional potential for MoS development. Because of its island location, the UK's utilization of ferry or rail (channel tunnel) is necessary. Nevertheless, short distance Ro-Ro connections could not be considered as an element of the Motorway of the Seas.

Figure 13. Modal split of the BSR – UK general cargo transport (2004) – excl. Germany



Rail transport is functioning in a limited scope (0.04%) of the presented connections. Both the unfavorable location of trade partners and rail freight structure have a significant influence on the exchange volume. Cross Baltic connections are serviced mostly by maritime transport and by trucks on the closest routes. Maritime transport is also more suitable for bulk cargo transport to the island. On the

other hand, only rail transport functions in the channel tunnel, therefore, it directly services all truck movement. Unfortunately, the rail part of the tunnel carriage is not continuing to the island or mainland area.

Table 6. Modal split of general cargo flows [thou. tons] between UK and the BSR countries (2004).

	Air ¹²	Maritime ¹³	Road ¹⁴	Rail	Total
Denmark	16,7	2 253	249,0	0,0	2 518,7
Germany	138,3	4 956	3 195,0	195,0	8 484,3
Estonia	0,0	486	36,8	0,0	522,8
Latvia	0,0	1 650	29,9	0,0	1 679,9
Lithuania	0,0	445	231,5	0,0	676,5
Poland	2,1	732	1 624,5	0,0	2 358,6
Finland	5,3	3 709	6,0	7,0	3 727,3
Russia	5,5	1 552	0,0	0,0	1 557,5
Sweden	13,4	6 114	13,0	0,0	6 140,4
Total (excl. Germany)	43,0	16 941,0	2 190,7	7,0	19 181,7
Total	181,3	21 897,0	5 385,7	202,0	27 666,0

A similar level of share of the goods exchange, like rail, is achieved by air transport (0.22%). Specifically, air connections concern low load capacity of planes restricted utilization of that mode. Valuable commodities, mail or parcels are the majority of transported cargo. Because of important differences between air and maritime transport speed, there does not exist a direct competition between these two modes of transport. So cargo carried by air could not become a part of MoS.

As was mentioned in the previous part of the analysis, inland navigation routes are mostly supplemented in relation to maritime transport and MoS. Furthermore, poor utilization of inland transport in the BSR countries makes wider activation impossible. A low rate of inland infrastructure development (excl. Germany) is also connected.

To sum up, the most important transport mode connecting the BSR countries and the UK is maritime transport. Therefore, a high volume of goods transported by other modes of transport on this route does not exist. In the development process of the Baltic MoS (BSR – UK) an increase in the economy of particular BSR countries is the main incentive for activation.

1.4. Competitiveness estimation of particular modes of transport

The numerous elements of particular transport branches have an influence on the estimation of its competitive level. The basic comparison could be prepared on the basis of modal split characteristics presented above. Significant influences on the competitive level estimation have such issues like: mode infrastructure development, technical advanced and modern technology utilization, mode accessibility, freight rate level and quality of service.

On the **European Union level**, road haulage is the most competitive mode of transport. It refers to the total transport turnover and land connections. A reason for this situation can be indicated in the following incentives: completed process of liberalization (excluding kabotage transport of particular new

¹² Arrivals and departures at UK airports.

¹³ Port turnover covered inwards and outwards relation (general cargo, TEU, Ro-Ro).

¹⁴ Trucks loaded and unloaded in UK on particular directions.

member states), intra – mode competition, a low level of freight rate, a high-flexibility of mode and a huge volume of international exchange in land connections. On the other hand, road transport is the main producer of external costs in transport. It is responsible for 99.7% of transport fatalities (43 359 persons killed on EU 25 roads in 2004), 97% of air pollutions and 88% of noise. According to the estimations, external costs of transport has achieved a level of EURO 160 billion which is equal to 2% of EU GDP. Therefore, the European Union is continuing its limitation process of negative factors. Internalization of the external costs of transport is one of the main aims of the European transport policy. An example of these activities can be indicated in the implementation of emission standards, like Euro IV (10.2006) and Euro V (probably from year 2008) or the road taxation concept. These regulations lead to the restriction of the competitiveness level of road transport because of the increased financial burden on the transport companies. A relatively low freight rate should therefore rise.

A direct competitor to road transport is rail. As was mentioned before, after years of poor results of EU market liberalization, important changes are expected in the near future. The most important issues in this process are free access to the freight national and international carriage implemented in year 2007 and Trans European Rail Freight Network established from 2008. These activities will probably increase the competitiveness level of rail in Europe. The main reason of that process will be access to the freight market of various and numerous rail transport companies. Direct intra – mode competitiveness should cause an increase in quality and decrease the rail freight rate. Furthermore, an international extension of the rail connections will increase the companies' profitability. Free access to the market is also a chance for private carriers. Another incentive of the rail competitiveness position improvement is the development of multimodal services. A wide use of containers and ecological restrictions have a significant influence on the rail activities.

Another important branch of European transport is inland navigation. Because of the natural character of inland infrastructure, utilization in all EU countries is impossible. River and canal connections exist in 18 countries. Only ten EU countries have access to inland international transport. For this reason, a direct comparison of inland transport with other modes of transport is incorrect. Simultaneously, inland navigation is not an alternative but supplement to the MoS functioning.

Pipeline transport strictly connected with the energy sector in the EU is not a competitor of other modes of transport. It can only be compared with maritime transport but, in the case of the EU, this kind of analysis is pointless.

The special case of the transport competitiveness comparison is the **level of BSR countries**. In particular, the modal split structure is quite different than the EU average in the BSR countries. The main issues are the stronger position of rail transport and importance of transit of Russian mineral resources by pipeline and ships. Furthermore, underdevelopment of road infrastructure (motorways system) restricts the growth of road haulage. Despite having a more 'European' modal split than in Western Europe, the BSR transport system is changing in the 'wrong' way. Paradoxically, financial assistance of European funds is mainly helping to develop road infrastructure in the new member countries. As a consequence, the competitiveness level of road haulage is constantly increasing. Additionally, Eastern European road companies are still cheaper than other EU carriers. Abolition of kabotage restrictions will effect further growth of the road transport conduct by Baltic State drivers. In the case of Latvia or Lithuania, international haulage is the majority of road transport (Table 7).

Table 7. Road national and international haulage of BSR countries in year 2004 [mio tkm].

	Denmark	Germany	Estonia	Latvia	Lithuania	Poland	Finland	Sweden	UK
National	10,5	232,3	7,7	2,4	2,2	58,8	27,3	32,7	154,3
International	12,6	71,4	3,6	5,0	10,1	44,0	5,0	4,3	13,7
Total	23,1	303,7	11,3	7,4	12,3	102,8	32,3	37,0	168,0
% of International	54,5%	23,5%	31,9%	67,6%	82,1%	42,8%	15,5%	11,6%	8,2%

Source: Eurostat

The last level of mode competitiveness research is the **UK – BSR connections level**. According to the presented data, the highest share of external exchange is occupied by maritime transport. So, it could be indicated that this mode is placed highest on the rank of competitiveness. On the other hand, in many cases, the sea is the only way for goods transport or land distance is much longer than by sea (ferry connections via channel La Manche or rail transport into the channel tunnel are not taken into account). So far, the important advantage of maritime transport has been the lack of borders and direct goods transfer to the specific country. The problems of border crossing in land transport disappeared from the new member accession day, May 2004. Future implementation of the Schengen regulations will further increase the competitiveness level of road and rail transport.

Figure 14. TEN-T projects in the BSR.



Source: TEN-T priority axes and projects 2005.

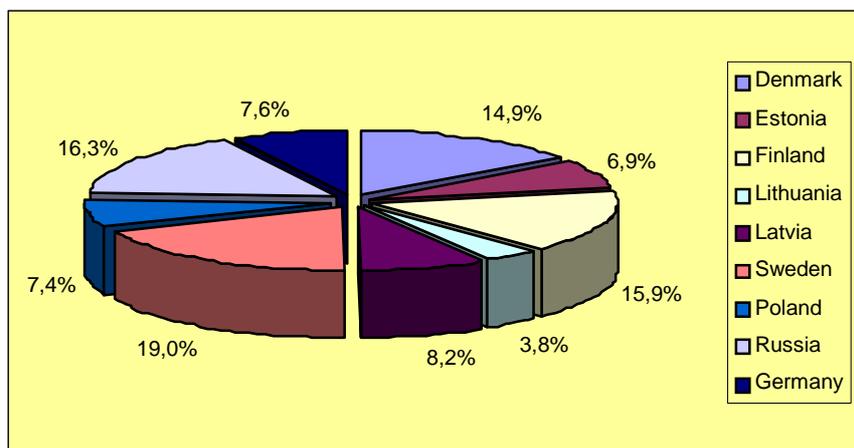
The development of the road infrastructure in the TEN-T framework will be another incentive for the land transport attractiveness process (e.g. Øresund fixed link, Rail Baltica, Nordic Triangle, Fehmarn belt railway axis or United Kingdom/Ireland/ Benelux road axis). On the other hand, the MoS concept could be considered as a competitive concept to the land infrastructure development.

Separate issues are the multimodal links mostly functioning between Scandinavia (Finland) and the UK. These consist of maritime and road/rail transport parts. For instance, the short sea distances between Finland and Sweden or Sweden and the UK are serviced by ferries. Across Finland, Sweden and the UK goods are carried by trucks or trains. In that case competitiveness of the whole logistic chain, not mode, could be indicated.

1.5. The current maritime cargo flows in the Baltic seaports

At present there are more than 400 ports of various types, sizes and volumes operating on the Baltic Sea. In 2005 they have generated a total turnover of 687m tons. The ten leading ports exceeded the barrier of 20m tons of transshipment, and according to expectations this result in 2006 will be even better.

Figure 15. Share of individual states in the Baltic turnover in 2004.



Source: *TERMS AND PROSPECTS FOR THE DEVELOPMENT OF POLISH SEA PORTS, 2006. Actia Forum 2006.*

While analyzing the share of individual states on the Baltic Sea in total port turnover, the leading position is held by Sweden. Next in the ranking are as follows: Russia and Finland¹⁵. An important phenomenon in this regard is the constant increase of the Russian ports' share in the turnover, which in period 2005/2004 achieved a level of 23.7%. This is certainly due to the development of new massive ports in the St. Petersburg region. Most probably next year the leader will change. All other countries, except for Finland which maintained a constant share of the market, suffered losses in their competitive position.

In order to systemize the results of individual Baltic ports, they will be presented with reference to basic cargo groups. Ports have been ordered according to the transshipment turnover they generate. The following areas of business will be analyzed: trans-shipment of liquid bulk cargo (crude oil), transshipment of dry bulk cargo and transshipment of conventional general cargo. Moreover, the most important passenger ports of the Baltic have been presented. With reference to the MoS development on the Baltic Sea, the containerized cargoes and Ro-Ro trans-shipment will be also researched.

In 2005 the largest Baltic port was St. Petersburg with 57.482m tons transshipped. Significantly, this result reveals a 12.3% increase of turnover within one year. During sixteen years, this port has increased its transshipment over four times. The second Baltic port, Primorsk, is also in Russia. This complex was created only five years ago and it mostly handles the export of Russian crude oil. The next ports include: Tallinn, Göteborg, Ventspils, Lübeck, Riga, Gdańsk, Rostock and Klaipėda.

¹⁵ The data for Denmark also include the trans-shipment of non-Baltic ports.

Table 8. Total cargo turnover in the Baltic seaports (1990-2005).

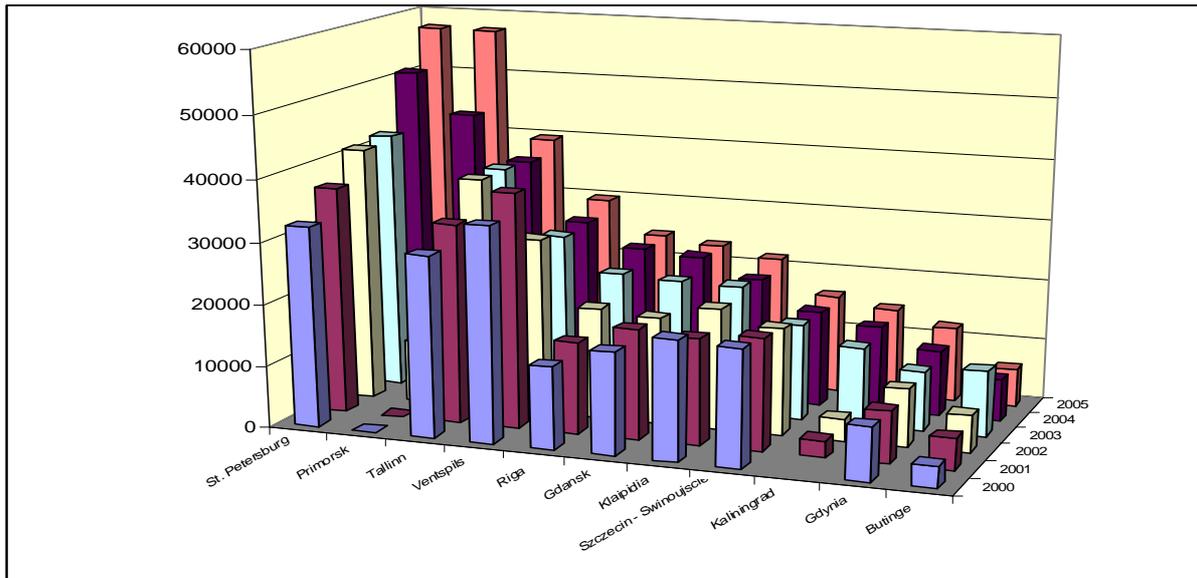
Port	1990	1995	2000	2001	2002	2003	2004	2005
<i>St. Petersburg</i>	10 800	11 878	32 400	36 900	41 307	42 051	51 182	57 482
<i>Primorsk</i>	0	0	0	0	10 083	17 690	44 565	57 338
<i>Tallinn</i>	8 440	13 044	29 342	32 316	37 855	37 833	37 400	39 528
<i>Göteborg</i>	26 140	<u>30 342</u>	33 261	32 965	32 294	33 356	34 940	37 081
<i>Ventspils</i>	31 200	29 600	34 757	37 937	28 703	27 316	27 809	29 863
<i>Lübeck</i>	12 106	14 865	23 610	22 352	22 564	23 092	24 670	24 618
<i>Riga</i>	6 000	7 400	13 352	14 884	18 109	21 722	23 990	24 429
<i>Gdańsk</i>	18 613	18 262	16 596	17 884	17 372	21 292	23 310	23 341
<i>Rostock</i>	13 197	18 506	20 050	20 500	22 250	21 600	21 800	22 900
<i>Klaipėda</i>	15 300	12 709	19 396	17 236	19 740	21 192	20 250	21 733
<i>Skoeldvik</i>	-	-	15 883	16 522	17 580	17 453	19 248	17 362
<i>Szczecin - Świnoujście</i>	14 593	15 569	18 876	18 161	17 367	15 646	15 570	16 081
<i>Copenhagen/Malmö</i>	-	-	-	13 500	13 400	14 800	14 800	15 200
<i>Kaliningrad</i>				2 719	3 615	12 710	13 870	14 619
<i>Gdynia</i>	9 967	7 633	8 599	8 458	9 365	9 748	10 740	12 231
<i>Aarhus</i>	-	<u>7 264</u>	9 937	10 138	9 836	10 141	9 980	11 287
<i>Helsinki</i>	7 164	9 313	10 881	11 416	11 500	11 652	12 250	11 054
<i>Trelleborg</i>	6 589	<u>8 725</u>	10 334	9 849	10 336	10 800	10 800	10 542
<i>Kotka</i>	5 824	<u>7 899</u>	6 957	8 050	8 250	8 380	8 630	8 422
Total:	185 933	213 009	304 231	331 787	351 526	378 474	425 804	455 111

As has been presented in Table 6, among the first 20 ports ten are South – East Baltic ports. Therefore, it is justified to say that these are important ports on the Baltic market. An important issue is also the dynamics of the transshipment turnover growth, which shows the poles of the Baltic Sea traffic growth. Apart from Primorsk (28.7%) and St. Petersburg, this group of ports includes, Gdynia (13.9%), Aarhus (13.1%) and Klaipėda (7.3%). It is visible that the South-Eastern Baltic has a strong position in this ranking. To sum up, the total growth of turnover in the presented 20 Baltic ports in the years 2005/2004 was almost 6.9%, which is only about half of the growth during 2004/2003 (12.1%).

The comparison of total turnover does not include many important operating characteristics of the seaports on the Baltic. Two elements that should be taken into account include the direction of trans-shipment relations (import-export) and the type of handled cargoes. The ports that handle bulk cargoes, particularly only in one relation, e.g. Primorsk, are in a much better situation. On the other hand, any changes in the turnover of such ports depends to a large degree on strategic political decisions, which limits the possibilities of ports in soliciting services and the potential development and hence increasing the trans-shipment turnover. Figure 17 presents the structure of trans-shipment in the largest Baltic ports. It is evident that bulk cargoes are the majority of trans-shipments in the ports such as Primorsk, Skoeldvik, Ventspils, Gdańsk, and Tallinn. Therefore, the high positions of other ports, such as St. Petersburg, Lübeck, Rostock, and Göteborg have to be recognized.

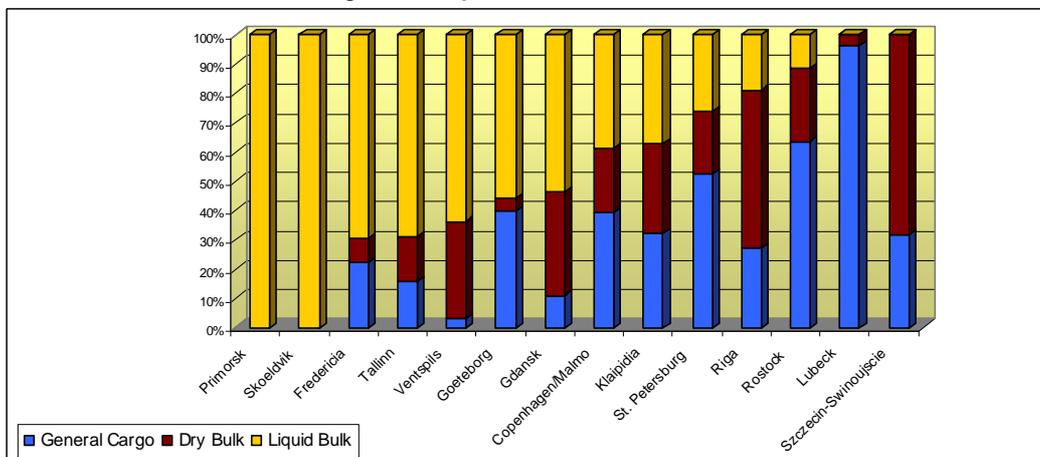
As was stated before, establishment of the Baltic Motorways depends upon general cargo flows. Therefore, this part of the maritime transport market is crucial for our analysis. It especially refers to the unitized transport technology – container and Ro-Ro.

Figure 16. Dynamics of total trans-shipment changes in the North - East Baltic ports 2000-2005 (thou. tons)



The presented structure reveals that the largest Baltic ports handle liquid bulk cargoes. The leader in this regard is Primorsk. Other ports are Tallinn, Göteborg, Skoeldvik, and Ventspils. On the other hand, while analyzing the dynamics of the turnover growth (2004/2003), the first position is occupied by Primorsk (151.9%), followed by Gdańsk (26%), Göteborg (16%) and Klaipėda (15%). However, there are also examples of significant drops in the trans-shipment, e.g. in St. Petersburg (31%), Riga (10%) and Ventspils (4%). This phenomenon is due to Primorsk taking over bulk cargo.

Figure17. Structure of turnover in the largest Baltic ports in 2004.



Source: *The Baltic Transport ranking for 2005. "Baltic Transport Journal" No 4/2005 (6).*

Another important group of cargo handled in Baltic ports is dry bulk cargo (e.g. coal, ore, fertilizers, grain). The first position, both in terms of turnover volume and dynamics of its growth (2004/2003), is occupied by Riga. The ports of Tallinn and Ventspils have reached similarly high dynamics of growth. Polish ports are also in the top ten of this ranking, with Szczecin - Świnoujście as the leader in Poland. Gdynia, even though mostly a general cargo port, has reached the ninth position.

Table 9. Container turnover in the Baltic seaports (1990-2005)

Port	1990	1995	2000	2001	2002	2003	2004	2005
<i>St. Petersburg</i>	61 000	92 000	289 730	480 659	580 639	656 183	776 576	1 119 346
<i>Göteborg</i>	351 633	460 000	685 637	662 908	725 652	634 690	722 205	771 679
<i>Helsinki</i>	235 366	338 000	376 340	438 260	456 598	472 000	500 000	459 744
<i>Gdynia</i>	118 838	141 042	188 272	217 024	252 247	308 619	377 236	400 165
<i>Aarhus</i>	230 000	247 000	291 181	307 067	307 756	330 084	370 000	390 000
<i>Kotka</i>	45 175	130 000	192 108	201 004	243 803	268 592	325 730	366 667
<i>Klaipėda</i>	8 000	30 000	39 955	51 135	71 589	118 366	174 241	214 307
<i>Hamina</i>	28 000	28 000	96 345	93 851	89 958	106 995	144 066	159 783
<i>Riga</i>	10 000	119 000	84 928	101 077	121 784	145 655	152 166	156 008
<i>Copenhagen/Malmö</i>	178 000	178 000	130 000	126 000	128 615	135 000	144 000	155 000
<i>Rauma</i>	11 000	40 000	90 451	83 850	97 455	110 100	115 821	120 234
<i>Lübeck</i>						100 000	100 000	119 500
<i>Tallinn</i>	16 700	39 000	76 692	78 072	87 912	99 629	113 081	119 114
<i>Helsingborg</i>	45 880	58 000	97 261	85 593	84 948	86 109	99 115	115 158
<i>Kaliningrad</i>			14 381	16 280	27 871	44 687	72 094	97 154
<i>Gdańsk</i>	3 852	3 064	18 037	24 435	20 136	22 537	43 739	70 014
<i>Gavle</i>			46 480	40 253	44 810	46 379	46 613	48 161
<i>Stockholm</i>	29 414		30 702	34 682	36 289	34 244	33 726	38 122
<i>Szczecin - Świnoujście</i>	17 493	12 479	21 865	19 960	19 367	21 628	27 680	36 453
<i>Malarhamnar</i>			30 010	32 844	31 520	33 944	36 374	33 454
<i>Åhus</i>			13 822	22 489	28 610	25 511	27 147	18 715
<i>Noorköping</i>			18 890	19 065	22 740	21 974	18 228	13 338
<i>Liepāja</i>			3 278	2 276	2 798	2 651	2 764	3 144
<i>Ventspils</i>			207	0	1 044	2 573	292	559
Total:	1 390 351	1 915 585	2 836 572	3 138 784	3 484 141	3 828 150	4 422 894	5 025 819

The last but not least analyzed group is general cargo. It is simultaneously the most important market part for the MoS concept development. This concerns both conventional cargoes and unitized ones (containers, Ro-Ro). The largest and at the same time very similar turnover has been achieved by the ports in St. Petersburg and Lübeck. In the first case, this position results from the high container turnover in 2005. Lübeck has based its success on ferry transport and Ro-Ro technology. In terms of the growth dynamics Gdynia is the leader, as it has increased its general cargo trans-shipment by 10.5% in one year. A key factor in this regard was cargoes handled at BTC and the development of ferry connections by *StenaLine*. Gdynia is followed by St. Petersburg with a 19.7% growth.

The Baltic port container turnover exceeding 5m TEU per year amounts to slightly more than 1.2% of the world's trans-shipment. The peripheral location of the Sea and the limitations formed by the Danish Straits are the main causes of this very small share. Another element that reduces the container transport (Lo-Lo technology) is a very well developed system of ferry transport in the Baltic Sea. On the other hand, containerization is an area that has been recognized by most Baltic States for only a few years. This was due to the changes in the economic transformation as the former socialist countries focused on heavy industry and now developing their industrial potential in highly processed goods that require logistics within trading. Thus containerization is becoming one of the key tools of this development. The balancing of the container port potential is noticeable in the whole area of the Baltic Sea. The best example of this is the change of leader in this regard. In 2003 the Port of Petersburg exceeded Göteborg in container trans-shipments. Also most container investments are located on the Southeast coast of the Baltic Sea. Still it should not be expected that Baltic ports will be a match for

hubs such as Rotterdam (8 280 786 TEU), Hamburg (7 003 479 TEU) or Antwerp (6 063 746 TEU)¹⁶. The list presented in Table 9 shows the 20 largest Baltic container ports. Gdynia has a high position, although the turnover is only a half of that generated by the leader.

While analyzing the growth dynamics of ports in the years of 2005/2004, the results of ports in Gdańsk (60.1%), St. Petersburg (44.1%), Kaliningrad (34.8%) and Szczecin - Świnoujście (31.7%) have to be emphasized. However, it has to be remembered that these changes are taking place for a low level of an absolute container turnover.

The United Kingdom holds one of the most important positions of the European container market. 8.023 m TEU was serviced in UK ports in 2004. According to the presented data, the total container turnover of the UK seaports outnumbered the overall container turnover of the BSR seaports. Container ports in the UK are also characterized by significant growth. Turnover increases achieved a level of 49.7% in period 1995 – 2004. This means an additional 2.66 m TEU annually. The biggest container port in the UK is Felixstowe which occupies position No 29 on the World Top Containers Port ranking (2004).

Table 10. UK container ports turnover 2000 – 2004 [TEU]

PORT	2000	2001	2002	2003	2004
FELIXSTOWE	2 793 217	2 800 000	2 684 000	2 482 000	2 675 000
SOUTHAMPTON	1 062 535	1 163 722	1 275 322	1 377 775	1 441 012
LONDON/TILBURY	478 128	481 502	528 406	579 216	711 775
LONDON PORT AUTH.	-	-	-	-	1 704 000
MEDWAY	-	-	-	-	632 000
LIVERPOOL	-	-	-	-	603 000
THAMESPORT	504 000	513 000	505 000	518 000	565 000
HULL	-	-	-	-	310 000
TOTAL	4 837 880	4 958 224	4 992 728	4 956 991	5 392 787

The containers are usually serviced by lo-lo trans-shipment technology. Simultaneously, very important parts of the market are ferry connections servicing Ro-Ro trans-shipment (road and rail units).

This transport technology is directly connected with the 'from road to sea' concept implementation. In other words, Ro-Ro ferries and their operation are the most important elements of establishing MoS. Therefore, it is necessary to illustrate current Ro-Ro turnover on the Baltic Sea (Table 11). According to the presented data, total Ro-Ro turnover in 2004 achieved a level of almost 6m cars and 2.8m trailers. Additionally, the service of new cars was another 1.3 m units.

Where the ferry traffic is the most intensive could be distinguished in three main geographic directions and these are the short connections between Denmark, Germany and Sweden¹⁷ on the West Baltic and connections between Sweden, Finland and Estonia on the East Baltic. Long distance services operating between Western and Eastern parts of the Sea or North – South ferry connections between Central European countries and Scandinavia are also important parts of the market. Therefore, the majority of ferry traffic on the Baltic has an inner nature.

¹⁶ Data for 2004.

¹⁷ Realization of Øresund road-rail connections caused a significant decrease in ferry traffic in this region. It is possible that construction of the Fehmarn Belt connection will cause further limitations in ferry traffic.

This part of the market is noticing a significant speed of growth during the past few years. This speed, according to the previous considerations, would increase even more in the next years. Development of the Sea Motorway concept would be very helpful in this case. The combination of the ideas such as short sea shipping development, sustainable development and activation of intermodal transport in Europe would in turn lead to further market development.

Table 11. Ro-Ro ferry traffic through Baltic seaports in year 2003 (units)

Port	Cars	Trailers	Trade cars	Total
Lübeck	71 319	731 500	167 809	970 628
Helsinki	667 000	240 000	45 000	952 000
Trelleborg	366 765	484 455	-	851 220
Rostock	431 100	93 300	305 900	830 300
Tallinn	530 528	227 671	-	758 199
Trondheim	680 483	-	-	680 483
Stockholm	440 541	98 360	28 327	567 228
Turku	341287	119540	75 547	536 374
Copenhagen¹⁸	249 000	-	275 000	524 000
Malmö	-	219 669	258297	477 966
Ystad	324630	129 453	-	454 083
<u>Poole¹⁹</u>	329 581	79 681	-	409 262
Nynashamn	299 606	43 722	997	344 325
Rønne	306 117	-	-	306 117
Stromstad	287 242	17 578	-	304 820
Sassnitz	198 926	49 327	-	248 253
Świnoujście	76 204	-	118 520	194 724
Klaipėda	-	149 257	-	149 257
Gdynia	54 076	44 171	-	98 247
<u>Varberg</u>	42327	35 260	-	77 587
<u>Hanko</u>	56 985	-	-	56 985
Gdańsk	31 773	7 990	15 087	54 850
Riga	50445	-	-	50 445
<u>Visby</u>	1871	40 854	-	42 725
<u>Vasa</u>	28078	5 582	-	33 660
Umea	24565	7 589	-	32 154
Landskorona	29 135	-	2 058	31 193
Ventspils	4 016	19 269	-	23 285
Liepāja	22 099	-	-	22 099
	5 945 699	2 844 228	1 292 542	10 082 469

Source: Maritime Economy Statistic Revive 2003. Maritime Institute in Gdańsk; Transit Latvia, Internet: www.transport.lv; CMP Annual Report 2005, K. Misztal: Kształtowanie się potoków ładunkowych w regionie Morza Bałtyckiego. Międzynarodowa Konferencja Polskie Porty Morskie 2006, Szczecin 31.05.2006 r.

1.6. Passenger movement in the Baltic Sea region

An additional part of the analysis is the passenger movements over the Baltic Sea Region. The movement of BSR passengers could be described in a domestic and an international point of view.

¹⁸ Year 2005

¹⁹ Year 2003

Furthermore, in the case of international connections, two kinds of relations could be indicated – neighboring and cross-sea routes.

According to the presented data, the most important means of transport servicing passenger movement in the BSR countries is passenger cars (80.3%). In the case of the new member countries, this ratio is quite lower than in initial EU member states but the dynamic development of the individual motorization causes the equalization of this parameter. In connection with that statement, two issues should be indicated: the rapid growth in the number of private cars in the new member countries, and a decrease in the importance of public transport. The average number of private cars in the new member states has increased from 132 units/thou. people (1990) to 336 units/thou. people (2004). Also that, different levels of motorization are noticed in particular countries, e.g. Germany (546²⁰), Sweden (456), Finland (448), Latvia (297), Denmark (354), Estonia (350), Poland (314) and Lithuania (384)²¹.

On the other hand, in the accession countries, the passengers' rail performance is still decreasing. Because of the lack of development of high speed trains in Western Europe, the branch cannot compete with road and air transport. Thanks to connections like TGV or ICE in Western Europe, a negative trend in rail has been stopped and gradual growth is now observed. What is more, rail connections compete successfully with air transport. For instance, air flights between Paris and Brussels or Köln and Düsseldorf have been suspended. Because of the environmentally friendly character of the mode, the wide use of rail transport in the European Union is promoted. The main reason for this is that a significantly lower level of the external costs discharges in comparison with road transport (average ratio about 1:13²²). Unfortunately, a poor quality of rail service in the new member countries makes wide utilization of the mode difficult.

A similar structure of the modal split is noticed with reference to the international neighboring travels between BSR countries. Cars are responsible for 74.4% of passenger transport performance in the EU 25. Buses and coaches have achieved a share of 8.1%, air 7.5% and railway 5.8%. An important problem for the land. On the other hand, cross Baltic Sea connection could be serviced only by air and maritime transport.

Table 12. Modal split of passenger land transport of BSR countries in year 2003 [mio tkm].

	Passenger Cars	Buses and Coaches	Railways	Tram & Metro
Denmark	80,4	11,9	7,7	0,1
Germany	84,8	6,7	7,1	1,5
Estonia	79,5	18,2	1,4	0,8
Latria	73,2	18,7	5,6	2,5
Lithuania	86,5	11,5	1,9	-
Poland	76,1	13,2	8,7	2,0
Finland	83,8	10,8	4,7	0,7
Sweden	81,7	8,9	7,7	1,7
UK	87,5	6,1	5,3	1,1
BSR:	80,3	13,4	5,8	1,4
EU25:	83,2	9,0	6,5	1,4

Source: Energy & transport in Figures 2005. Eurostat

²⁰ Units/thou. people.

²¹ Energy & transport in figures 2005. Eurostat

²² In terms of: number of dead and injures, traffic safety, air pollution and noise.

In 2004 passenger air movement between the BSR countries achieved a level of 166.95m PAX. The most intensive passenger traffic existed on the German – UK route. These are simultaneously the biggest between analyzed air markets. An important part of the air transport market has become low cost airlines. A significant decrease in ticket prices caused an impressive increase in air travel demand. It refers to both domestic and international flights. What is important, a dynamic growth of the air movement is noticed on the South – West Baltic countries and the UK. These travels are mostly connected with the existence of the open labor market in the UK and Ireland. Simultaneously, BSR airports gain an impressive development in passenger traffic. It especially refers to the Baltic States and Poland. A magnificent increase ratio was achieved in the following airports: 88.6% Kraków, 77.2% Riga, 75.5% Katowice and 44% Gdańsk. Also that other new EU member airports have noticed an impressive traffic development.

Table 13. Air passenger traffic between BSR countries in year 2004 (1000 PAX)

Partner Declarer	Denmark	Germany	Estonia	Latvia	Lithuania	Poland	Finland	Sweden	UK	Total:
Denmark	1 608.9	1 680.4	116.7	124.0	132.8	159.5	685.0	1 808.2	2 194.1	8 509.6
Germany	1 743.1	21 385.0	143.2	163.7	135.5	694.6	1 156.2	1 241.0	10 275.2	36 937.5
Estonia	116.4	141.6	16.5	21.6	33.6	17.5	167.0	108.1	0.0	622.3
Latvia	123.9	162.5	21.2	0.1	16.3	21.9	99.5	59.3	0.0	504.7
Lithuania	149.3	164.9	29.8	16.5	2.0	45.9	49.3	40.4	0.0	498.1
Poland	345.5	1 250.8	17.6	21.9	45.5	892.7	91.6	76.3	997.7	3 739.6
Finland	683.8	1 112.1	168.3	99.8	49.1	90.2	2 862.2	1 306.4	812.6	7 184.5
Sweden	1 892.3	1 601.2	106.5	59.4	30.5	78.0	1 220.3	7 029.7	2 253.0	14 270.9
UK	2 209.4	9 898.5	83.5	126.4	94.2	666.1	776.7	1 383.0	25 741.5	40 979.3
Total:	8 872.6	37 397.0	703.3	633.4	539.5	2 666.4	7 107.8	13 052.4	42 274.1	113 246.5

Source: Energy & transport in Figures 2005. Eurostat

A second area of air traffic development was Berlin. Passenger movement has increased there from 23.4% (Tempelhof) to 50.1% (Schoenefeld). According to the information presented in Table 14, the biggest 26 BSR airports served 108.9m passengers in 2005. This means that the annual turnover growth achieved a level of 21.5% (2005/2004).

Another important mode in cross Baltic connections is the sea passenger traffic. It is worth remembering that the Baltic Sea is one of the three most intensely used bodies of water for passenger transport in Europe. In 2004 Baltic ports transported more than 56m passengers²³. Two of the Baltic regions are the most important in this regard, namely the western Baltic (triangle: Germany-Denmark-Sweden) and eastern Baltic (triangle: Estonia-Finland-Sweden). In both cases the distance between ports is not long, which makes a journey relatively quick. What is more, ferry lines connect large economic centers that generate sufficient streams of passengers.

The largest passenger ports are: Helsingborg, Helsingør, Helsinki, Stockholm, Tallinn and Turku (2005). An important issue referring to sea passenger movement is its 2.7% traffic decrease²⁴. The largest drop of turnover has been generated by Copenhagen/Malmö (25.7%), Szczecin-Świnoujście (23.4%) and Trelleborg (12.9%). On the other hand, Stockholm and Tallinn have noticed the biggest growth in traffic. The percentage changes, however, do not sufficiently reflect the changes in the turnover that take place in individual ports. For example more than a 12.6% growth of the passenger

²³ The results of the largest 22 Baltic passenger ports.

²⁴ 22 biggest Baltic passenger ports

traffic in Ystad is the result of an additional 202 thou. passengers, whereas 'only' a 4.8% growth of the passenger traffic in Stockholm equals as many as 373 thou. passengers.

Table 14. Passenger traffic in the Baltic Airports 2000 – 2004.

Airport	2000	2002	2004	2005	2005/2004
Copenhagen – Kastrup	18 430 204	18 272 173	19 034 585	19 981 872	5,0%
Stockholm – Arlanda	18 264 000	16 431 000	16 253 872	17 101 478	5,2%
Berlin – Tegel	-	-	11 047 954	11 533 428	4,4%
Helsinki – Vantaa	10 004 000	9 606 000	10 729 977	11 130 589	3,7%
Hamburg	9 949 269	8 946 505	9 893 703	10 667 268	7,8%
Warsaw – Chopin	4 325 814	4 936 835	6 085 111	7 071 881	16,2%
Berlin – Schoenefeld	-	1 688 028	3 382 166	5 075 172	50,1%
St. Petersburg – Pulkowo	2 572 370	3 154 945	4 337 613	4 337 613 ²⁵	-
Göteborg – Landvetter	4 205 541	3 908 462	3 897 296	4 075 692	4,6%
Billund	1 768 274	1 603 980	1 816 975	1 980 470	9,0%
Riga International Airport	574 000	633 000	1 060 000	1 878 000	77,2%
Malmö – Sturup	2 036 414	1 913 834	1 719 055	1 817 371	5,7%
Kraków - J.P. II	517 015	500 852	841 123	1 586 130	88,6%
Tallinna – Lennujaam	559 658	605 697	997 475	1 401 059	40,5%
Stockholm – Bromma	999 212	1 044 151	1 258 246	1 343 091	6,7%
Vilnius International Airport	521 529	634 991	994 161	1 281 872	28,9%
International Airport Katowice	168 126	202 267	622 612	1 092 385	75,5%
Lulea Airport	977 449	894 774	899 345	902 176	0,3%
Oulu Airport	-	637 700	772 331	810 454	4,9%
Umea	736 313	721 752	742 591	810 274	9,1%
Aalborg	721 395	661 197	656 170	684 000	4,2%
Gdańsk – Wałęsa	269 960	318 033	466 691	672 186	44,0%
Tampere – Pirkkala	-	-	495 892	597 102	20,4%
Berlin – Tempelhof	-	612 867	441 580	545 600	23,6%
Aarhus	640 504	579 400	524 532	538 000	2,6%

Apart from the regular ferry connections, tourist cruises are developing more and more intensively on the Baltic Sea. The annual growth of this type of traveling, and hence the passenger traffic in seaports, is estimated at 9%. Interestingly, the Baltic Sea with 11.1m passengers has a market larger than that of the Caribbean Islands (8.4 m passengers), considered to be the most important cruising area in the world²⁶. The illusive character of this comparison is revealed by the number of tourists served by tourist lines in 2004, namely 260 000 tourists. This means that the Baltic constitutes only 2% of the world market. Most passengers of cruisers on the Baltic Sea are Americans, Germans, Swedes and Finns. The most popular ports are Copenhagen, St. Petersburg, Stockholm and Tallinn.

An important phenomenon on the tourist market that also affected the passenger traffic volume was the terrorist attack in 2001. After a resulting small decrease in the traffic in 2002, there was a significant growth, amounting to 58.8% over two years.

²⁵ Year 2004

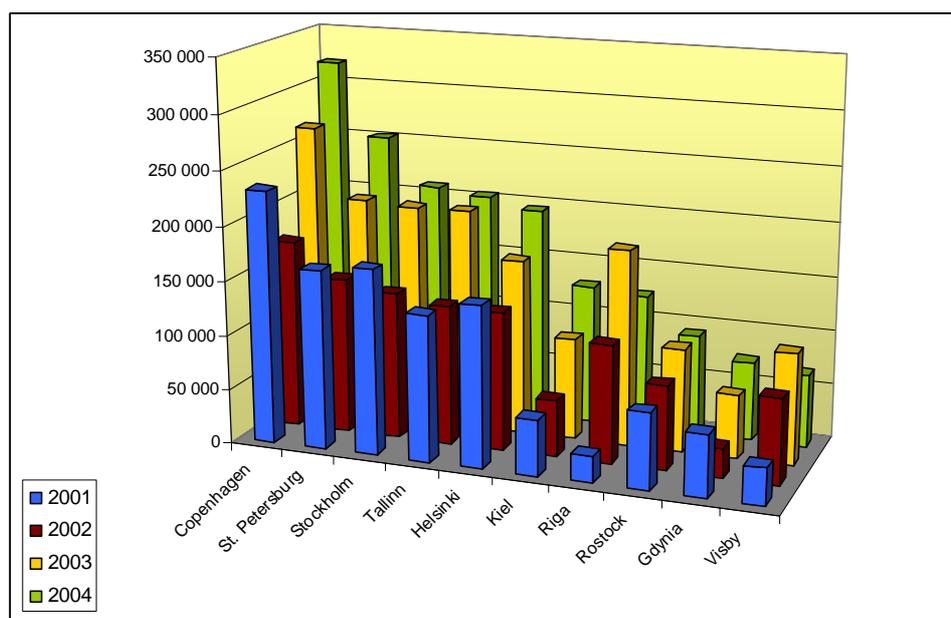
²⁶ The reason for this phenomenon is the definition of a cruiser passenger, i.e. the person who stays onboard for at least 24 hours. Longer Baltic lines operated by regular connections require such travel times, which result in including their passengers into cruiser passengers.

Table 15. Passenger traffic in the main Baltic seaports 2000 – 2005 (PAX)

Port	2000	2001	2002	2003	2004	2005
Helsingborg	13 524 614	11 770 673	11 666 203	11 692 843	11 808 160	11 102 138
Helsingør	13 322 000	11 700 000	11 609 000	11 646 000	11 800 000	11 032 000
Helsinki	9 251 041	8 980 979	9 094 608	8 676 410	8 716 000	8 809 327
Stockholm	7 745 597	7 000 786	6 826 214	7 293 839	7 813 346	8 187 001
Tallinn	6 020 000	5 740 000	5 945 000	5 862 000	6 740 000	7 008 000
Turku	3 513 812	3 534 823	3 514 512	3 558 068	3 356 399	3 232 376
Göteborg	2 936 500	2 657 898	2 746 753	2 750 462	2 606 336	2 264 376
Rostock	1 969 000	2 005 000	2 169 000	2 331 000	2 249 000	2 220 000
Ystad	1 136 310	1 284 528	1 430 890	1 472 134	1 612 178	1 815 014
Aarhus	-	-	-	1 700 000	1 700 000	1 700 000
Trelleborg	2 085 823	1 852 968	1 855 312	2 100 037	1 940 503	1 690 758
Kapellskar	639 700	1 280 913	1 514 002	1 440 330	1 405 574	1 430 904
Nynashamn	-	-	-	1 150 524	1 244 763	1 267 888
Stromstad	-	-	-	1 282 442	1 285 618	1 210 171
Copenhagen/Malmö	3 821 000	2 199 000	1 366 000	1 291 000	1 200 000	892 000
Szczecin - Swinoujście	2 203 000	2 651 000	748 000	867 000	695 000	532 389
Gdynia	256 000	289 000	364 202	442 000	496 000	448 515
Lübeck	473 181	484 189	356 071	356 114	298 338	295 897
Gdańsk	120 034	117 457	117 804	234 443	165 477	182 819
Hanko	-	69 864	165 508	170 915	176 793	175 870
	69 017 612	63 619 078	61 489 079	66 317 561	59 496 139	65 497 443

This was due to the fact that passengers searched for more peaceful seas that are also interesting for sightseeing. An additional incentive was the accession of the southern Baltic States to the European Union. Polish ports are also becoming more and more popular points on the routes of cruisers. In 2004 Gdynia was visited by 82 vessels with almost 73 thousand passengers, whereas the following year there were 94 ships with 88.7 thousand passengers onboard. Gdańsk was visited by 28 cruisers with more than 7 thousand passengers onboard.

Figure18. Cruise passenger traffic on the Baltic Sea in the years 2001-2004.



Source: TERMS AND PROSPECTS FOR THE DEVELOPMENT OF POLISH SEA PORTS, 2006. Actia Forum 2006.

On the other hand, the rise in the domestic product increased the population's mobility in particular countries. There are more and more work and tourist travels, especially in the Baltic States. In majority it is caused by the common use of private cars. Sea and air travels are also more popular. Development of low cost air carriers is the main incentive for an increase in activity. Increase in transport traffic volume, therefore, is necessary. The Baltic Region, regarded as economically and politically more stable, far from global conflicts and terrorist activity became more interesting as a tourist trip destination. Abundance of historic monuments and beautiful countryside attract foreigners' attention.

1.7. Predictions of traffic across the Baltic States and BSR – North Sea

The presented part of the elaboration indicates the forecasts and predictions concerning maritime traffic on the Baltic Sea development. During the analysis, the following scheme is used: GDP – foreign trade – goods exchange – transport – maritime and ports turnover. The main assumption of that methodology is a positive correlation between particular elements. On the other hand, the intensity of that connection is difficult to estimate and the influence of the structural incentives on mutual relations is unknown.

Table 16. Rates of GDP development in the Baltic countries 2000-2030.

No.	Country	1990 - 2000	2000 - 2010	2010 - 2020	2020 - 2030
1	Poland	3.94%	4.10%	4.74%	3.90%
2	Lithuania	-2.90%	5.34%	4.14%	2.81%
3	Latvia	-3.30%	5.87%	3.36%	2.04%
4	Sweden	1.74%	2.29%	2.13%	2.04%
5	Germany	1.53%	2.10%	2.09%	1.94%
6	Estonia	-1.20%	4.62%	2.76%	1.72%
7	Denmark	2.34%	2.16%	1.84%	1.71%
8	Finland	2.15%	2.55%	1.62%	1.48%
Average:		1,69 %	2,31 %	2,29 %	2,11 %

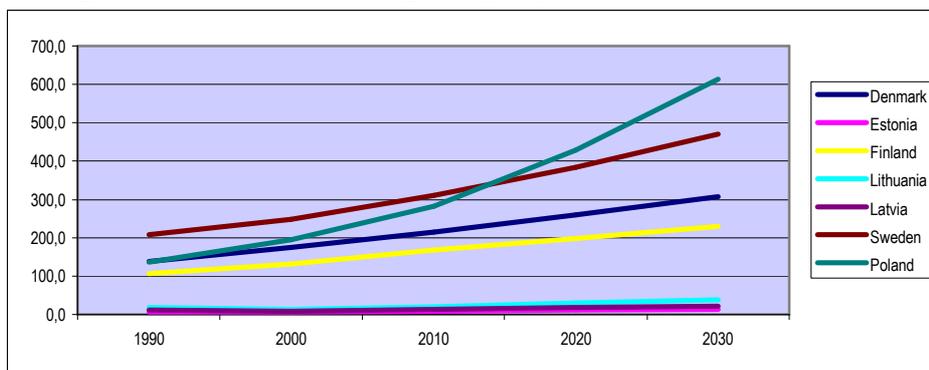
Source: European Energy and Transport – Trends to 2030.

In particular, BSR countries' **GDP development** forecast is definitely different. As in the case of previous EU countries, a growth from 1.53% to 2.55% is expected. Much better predictions are formulated for the new member countries. According to the official EU forecasts, GDP development should achieve a level up to 5.97% (Table 16). In reality, growth rates are higher than in the presented forecast. In 2005 the GDP annual growth achieved a level of: 10.2% in Latvia, 9.8% in Estonia, 7.5% in Lithuania and 3.2% in Poland. The presented trends should be kept during the next years with little decrees in case of Estonia, Latvia and Lithuania. GDP development in Poland should achieve a level of 4.5%. According to the graph (Figure 16), Poland will be the most intensive developing country. In 2015, Poland can overtake Sweden and Denmark and in the year 2030 reach the level of GDP over 600 000 million €. Unfortunately, the difference of the population between the abovementioned countries limits the growth of GDP *per capita*.

A dynamic GDP growth is strictly connected with national production and consumption. Therefore, increasing levels of **foreign trade** is necessary for satisfying future supply (production) and demand (consumption). As a consequence, the level of the foreign trade in countries like Estonia, Latvia, Lithuania and Poland will rise significantly. In 2010 the total cargo exchange of BSR countries

will achieve a level of 1.77 m tons (+16.6%²⁷) and ten years later a quantity of 2.28 m tons (+50.3%)²⁸. The Intra-BSR exchange volume will be 691.9 thou. tons (2010) and 924.6 thou. tons (2020). It means that the share of intra BSR will increase from 39.1% to 40.6%. Important differences are also expected in reference to exchange increases in particular directions. Exports of the BSR countries are expected to increase by 58.4% and imports by 41.3% in the period 2003–2020. A detailed prediction of the external exchange of goods between the BSR countries is indicated in Table 17.

Figure 19. Forecast of economic growth (GDP) of the Baltic countries 1990-2030²⁹.



Source: European Energy and Transport – Trends to 2030.

Besides GDP growth, other elements will also have a significant influence on the future transport turnover. Membership in the European Union will additionally help to intensify the foreign trade between the new and former Community members. Closer institutional cooperation, abolition of borders and simplification of the exchange procedures connected with the new transport infrastructure financing will affect the external trade volume rise. An increase in the **transport traffic volume** is, therefore, necessary. On the other hand, a rise in the domestic product increases the population’s mobility in particular countries.

Table 17. BSE external exchange in year 2020 [thou. tons]

From/to	Imports 1000 t									Total
	Sweden	Poland	Finland	Denmark	Estonia	Lithuania	Germany	Russia	Latvia	
Sweden	0	2 912	8 263	7 878	474	844	11 842	983	501	33 697
Poland	2 588	0	2 989	2 516	309	1 759	41 098	2 324	523	54 106
Finland	5 991	1 162	0	1 472	2 314	198	7 702	3 141	382	22 362
Denmark	12 630	1 015	6 572	0	120	259	7 698	566	90	28 950
Estonia	4 946	139	3 618	662	0	460	1 971	407	1 088	13 291
Lithuania	2 265	1 927	476	1 104	1 062	0	1 652	1 110	2 667	12 263
Germany	7 059	16 029	3 476	10 589	553	973	0	3 931	469	43 079
Russia	12 121	39 592	10 465	3 451	6 832	24 884	63 845	0	2 467	163 657
Latvia	11 125	146	832	1 711	624	690	1 425	351	0	16 904
Total	58 725	62 922	36 691	29 383	12 288	30 067	137 233	12 813	8 187	388 309

Source: Baltic Maritime Outlook 2006.

There are more and more work and tourist travels, especially in the Baltic States. The Baltic Region is regarded as more economically and politically stable, far from global conflicts and terrorist activity and has therefore become a more interesting tourist trip destination. An abundance of historic monuments and beautiful countrysides attract the foreigners' attention. In majority it is caused by the

²⁷ Years 2003 - 2020

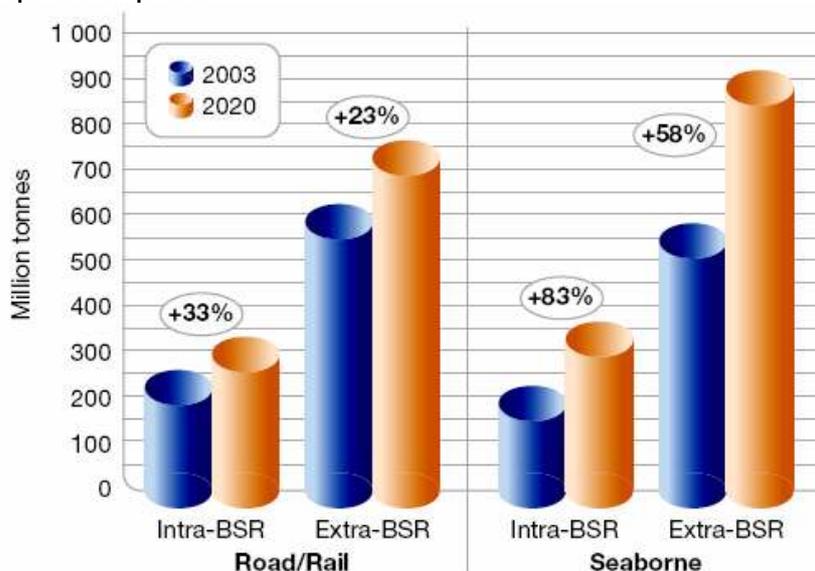
²⁸ On the basis of: Baltic Maritime Outlook 2006.

²⁹ 1000 million Euro '00.

common use of private cars. Sea and air travels are also more popular. Development of low cost air carriers is the main incentive for the increased in activity.

Cargo flow development in the BSR should also be divided into main modes of transport. The predictions indicate the fastest growth in the case of maritime transport both intra and extra BSR (Figure 17). The overall growth rate of maritime transport will achieve a level of 64%. Road and rail carriages will increase with a tempo of 27% (2003-2020).

Figure 20. BSR transport development.



Source: Baltic Maritime Outlook 2006.

These estimates have also been confirmed by the *British Maritime Technology Group*, who expects that a growth in the Baltic turnover in the next decade will amount to 50-70%. This mostly concerns trading among Scandinavian countries and the new EU members³⁰. Very good forecasts are also given in the most important transport document of the Community, i.e. the *White Paper. European Transport Policy for 2010: time to decide*³¹. The development of Baltic transport is described as an *explosive development*³².

The activation of sea transport within the Baltic is feasible mostly due to the freedom that resulted from the accession of the Baltic States into the EU. It is estimated that due to the lifting of borders in the transfer of persons and goods, there will be an increase in the transport of cargo by about 75% and in passenger traffic by almost 60 until 2015 %³³. According to the *Venäläinen & Viitanen* analysis from 2001, the expected growth of the transport sea volume should amount to about 2% per year until 2010 in Sweden. Finnish sea transport should reach a turnover of 110m tons in 2010 and 130m tons in 2020. The sea transport of Latvia should double by 2020 which will imply the transport of about 120m tons per year. A large part of the turnover, about 55m tons in 2010 and 75m tons in 2020,

³⁰ *Studying the corridors*. IFW 23.02.2004

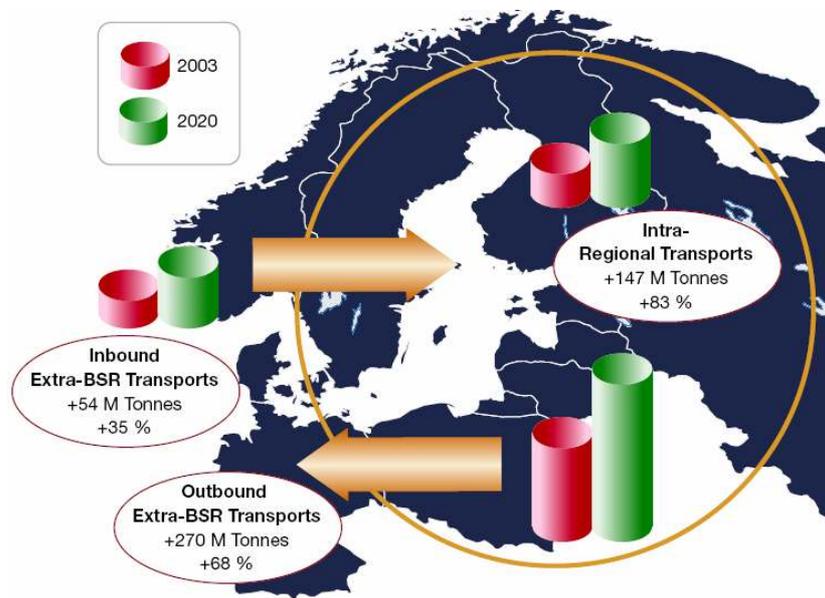
³¹ *White Paper. European Transport Policy for 2010 Time to Decide*. European Commission 2001.

³² So-called explosive development – explosion of transport turnover.

³³ Z. Bączczyńska-Jelonek: *Revision of the transport corridor network as a requirement for integrating Europe*. „Spedycja i Transport” No. 1/2002, p. 5.

will be handled in the port of Ventspils³⁴. The Lithuanian port of Klaipėda should generate a turnover of about 35m tons in 2010 and 40m tons in 2020. For Polish ports the turnover should grow to 76.5m tons in 2010 and 94.5m tons in 2020. Also German Baltic ports may count on a dynamic development. According to estimates in 2015, they should reach a level of 101.24m tons of trans-shipment³⁵.

Figure 21. BSR maritime transport development.



Source: Baltic Maritime Outlook 2006.

The last area of analysis is the **cargo flow development in the UK – BSR** maritime connections. It is probable that the growth rate noticed on this route will be similar to the whole BSR. So, cargo traffic between 2003 and 2020 should increase by 48.8 m tons. Import to the UK is 73.8% of that volume. If the modal split structure will keep in the future, then the maritime transport will achieve a volume of about 107.6 m tons of turnover in 2020. For the MoS development the most important part of the maritime cargo flow is general cargo. According to the previous information and presented predictions, the volume of this kind of cargo should achieve an amount of 42,2 m tons in 2020.

Table 18. Forecast of cargo flow development BSR – UK (2004 – 2020)

	2004				2020			
	Total ³⁶ BSR	UK - BSR	General Cargo	Maritime	Total - BSR	UK - BSR	General Cargo	Maritime
Denmark	91,20	3,40	2,52	2,25	133,80	4,99	3,70	3,31
Germany	713,00	39,77	8,48	4,96	955,50	53,30	11,37	6,64
Estonia	19,40	0,32	0,52	0,49	38,10	0,63	1,03	0,95
Latvia	20,50	3,72	1,68	1,65	38,80	7,03	3,18	3,12
Lithuania	30,50	1,39	0,68	0,45	59,60	2,72	1,32	0,87
Poland	145,90	4,45	2,36	0,73	244,80	7,46	3,96	1,23
Finland	90,20	5,39	3,73	3,71	139,20	8,33	5,75	5,72
Russia	261,90	23,18	1,56	1,55	470,40	41,63	2,80	2,79
Sweden	142,50	11,18	6,14	6,11	197,40	15,48	8,51	8,47
Total:	1 515,10	92,80	27,67	21,90	2 277,60	141,57	42,21	33,41
				<i>Change:</i>	762,50	48,77	14,54	11,51

³⁴ These estimates did not take into account the dynamic development of Russian ports.

³⁵ *Statistical Analyses of the Baltic Maritime Traffic*. VTT Technical Research Centre of Finland 30.09.2002.

³⁶ Year 2003

An important part of the future MoS functioning is the maritime container transport development. According to the predictions, the growth rate for 2005–2010 should achieve a level 64% – 44% and a level of 151% - 100% between 2005-2015. Container terminal capacity development plans confirm the presented forecast.

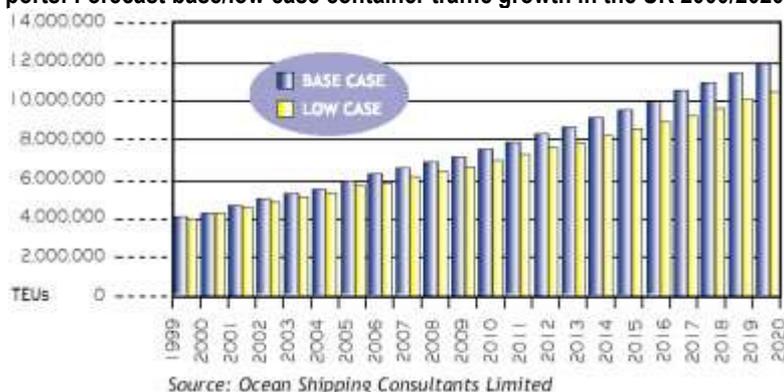
Table 19. Forecast of the container throughput by South-East Baltic ports up to 2015 (million TEU).

	2000	2005	2010	2015
Base case	0,8	2,08	3,41	5,22
Low case	0,8	1,74	2,51	3,48

Source: Maritime Economy Statistic Review 2003. *Maritime Institute in Gdańsk. Gdańsk 2003, p. 180.*

A doubled container turnover in the period 2005 - 2020 is also predicted in the UK seaports. The UK ports will service from 10.5 to 12 m TEU in 2020 (Figure 22).

Figure 22. Major UK ports: Forecast base/low case container traffic growth in the UK 2000/2020



At the end of the following part of the Study, the most important elements of the maritime and the land transport development can be presented again. The future development of the Motorways of the Seas will mostly be connected with economic development of the engaged countries. For that reason the BSR countries, especially the new member states, are the place where the MoS could be established. GDP development exceeding 10%³⁷ will simultaneously cause a dynamic growth in foreign trade, both in the case of value and volume. According to forecasts, the BSR external exchange should increase over 50% until year 2020 (2 277m tons). An important part of that exchange will be served by maritime transport, which is crucial in the MoS development. Today, the exact indication of the BSR – UK share is impossible. In that case, a deep econometrical study should be provided. The wide range of issues discussed in the following elaboration limited this kind of research. Besides, many of the external elements could distort the results obtained from these detailed evaluations. From the practical point of view, most of the exchange served by maritime transport will probably be transferred by German or ARA³⁸ seaports.

³⁷ Latvia 13.1% in the 1st quarter of year 2006.

³⁸ Amsterdam, Rotterdam, Antwerp.

2. Traffic Flows Analysis

Shipping traffic between the Baltic and the North Sea amounted to over 80 000 passages through four maritime links between the two seas. The highest number of passing ships was achieved by the Nord – Ostsee - Kanal (Kiel Canal) with a number of 42 552 in 2005. The second is the strait Great Belt which scored about 26 000 passages, but the Skaw was passed by ships about 42 000 times in 2005.

Those numbers should be corrected by passages generated by coastwise shipping. For example in 2003, 10 735 passages through the Kiel Canal were for German domestic trade (27 % from the number 39,797). Swedish coastwise shipping also makes considerable traffic in the Øresund and Danish in all narrow Baltic Straits.

As to volume of transported cargo, about 360 million tons was carried in 2005 through links between the North Sea and the Baltic. 81 million tons of freight was transported through the Kiel Canal (excluding German domestic trade) and about 260 million tons via the Baltic Straits (excluding Göteborg and other ports situated in Kattegat).

The main difference in traffic between the Kiel Canal and the Baltic Straits is due to two reasons:

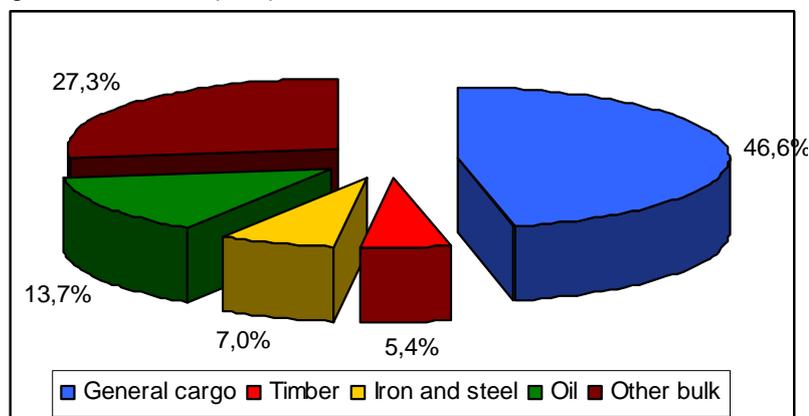
- firstly: ships passing the Kiel Canal are limited in their dimensions, most important is the limited draft which excludes fully-laden oil tankers and most of bulk carriers;
- secondly: transit dues are profitable for ship operators if a shortening of mileage is considerable and/or turnover of a ship on a route is much higher.

It gives a strong competitive advantage for the German North Sea ports as hubs for container liner traffic.

Actually the Kiel Canal is an intra-European waterway, because only 0.5 % of the passing ships have ports of origin or destinations on other continents (1.2 % by volume of shipped commodities), specifically it is a route directing the traffic from the Baltic to the western German ports. 56 % of passages and 47 % of the volume is directed to and from German ports situated on the North Sea coast.

Kiel Canal is mostly a route for general cargo and other cargoes which are transported mainly or very often by scheduled liners (nowadays also timber, wood pulp, metals).

Figure 23. The Kiel Canal cargo traffic structure (2003)



Canal statistics from 2003 show that general cargo made up 46.6% of the transported volume, timber – 5.4%, iron and steel – 7% etc. On the other hand, crude oil and petroleum products were 13.7% of the

volume and other bulk cargoes 27.3%. So it can be estimated that about 60% of the volume transported through the Canal is shipped by liner or semi-liner traffic. In the second link, the Great Belt, wet and dry bulk cargoes dominate the traffic.

2.1. Vessel traffic and the shipping connections on the Baltic Sea

The key goals of the programs Marco Polo („from road to sea”) and „Motorways of the Sea” should focus on traffic vessels carrying „general cargo”, mainly in liner or semi-liner services. It is a rule that transport modes do not compete for wet and dry cargoes in bulk in large quantities. They are transported to the loading ports by rail and/or by pipelines and, after discharging, consumed by industries located mostly in ports or having their own ports.

Firstly it should be noted that developments in unitization techniques, ship construction, modes of operation, etc., made a deep split in the liner services. In the traffic between the North Sea and the Baltic we note four main types of services:

- a) Ro-Ro lines served by so called Ro-Ro ships which are the most universal general cargo ships, they can carry all types of unitized cargo including unaccompanied cars, trailers, containers, oversized pieces, etc.
- b) container lines served by cellular container ships up to a 1200 TEU capacity, they are subdivided into:
 - feeder services which deliver containers to and from hubs in Western European ports
 - intra-European lines which serve intra-European trade (distinction between both subgroups is not clear).
- c) general cargo lines served by multipurpose ships, tweendeckers or sideloaders, often dedicated to one class of cargo, mostly timber;
- d) industrial liner carriers, often closed for shippers from the market or scheduled in one direction only, usually serve constant ports but, if scheduled, they can be flexible etc.; they use Ro-Ro ships (for paper), car carriers and multipurpose vessels (i.e. for metals).

The authors only carried out in-depth research for the three first aforementioned groups making only rough estimates for the last category due to limited sources.

The calculation of actual traffic flows needs determination of real turnovers of individual vessels in separate services. Sailing lists presented by operators or by ports are often confusing because one ship can work for many operators and/or pool agreements include ships mentioned in many schedules [sometimes sources are contradictory or unclear].

So the researcher recognized all or mostly all liners sailing between the Baltic and the North Sea, checked the published schedules or wrote down real schedules on the basis of different Internet sources and identified all pool agreements, even lines which have no cargo between final destinations of a loop. Calculations of traffic flows are based on schedules and on individual capacity of sailing ships which means that actually they present the maximum capacity in one direction. The author assumes that almost every ship utilizes most of her capacity at least in one direction. In the case of Finnish Ro-Ro ships all should be „down to the mark” in west-bound voyages thanks to loads of heavy paper. In the case of container ships sailing to Russia they are full of laden containers in east-bound voyages due to shipments of consumer goods.

Control of such calculations can be done by crosschecking the results. For example, total container turnover in Finnish, Estonian and Russian ports in the Bay of Finland in 2005 was 2.25 million TEU if the findings show the total capacity of feeder shipping to and from the Bay of Finland on the level of 1.2 million TEU in one direction.

Additionally 10 industrial services with a capacity of about 3 million tons link the Baltic and the North Sea ports. They execute about 750 round trips per year. Westbound flows dominate the services for paper and metal industries but in the case of automotive services eastbound flow is prevailing.

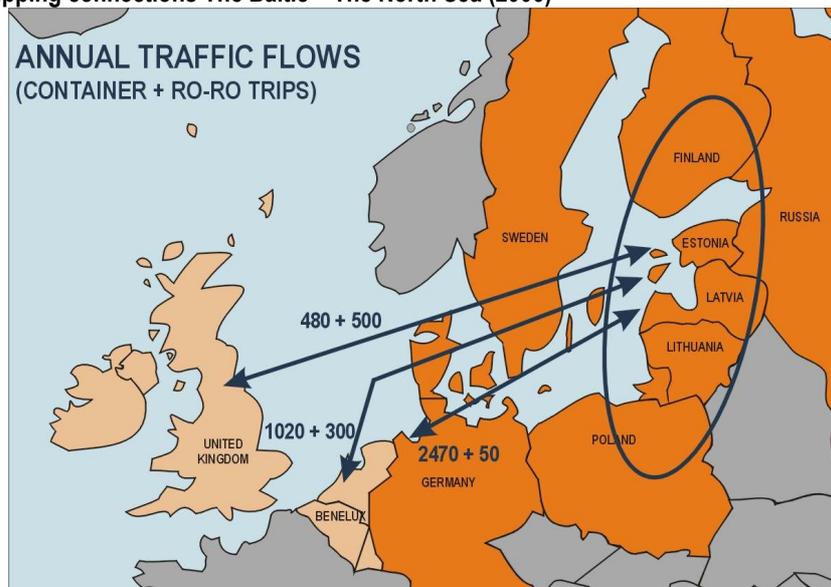
Notes:

- weekly services are counted as 50 round trips per year
- net weight of one TEU is assumed to be 11 tons
- net weight of one lorry or trailer is assumed to be 23 tons

Five regions in the Baltic have been identified on the basis of economy and geography, i.e. the distance to Western Europe and the UK, competitive position to land modes of transport and interconnections made by shipping lines:

- a) The Bay of Finland which includes the biggest ports of Russia, Finland and Estonia with a total turnover of about 230 million tons
- b) The eastern coast of the Bay of Bothnia with only Finnish ports (turnover of 35 million tons),
- c) The eastern coast of the Baltic with the ports of Latvia, Lithuania and the Russian region of Kaliningrad (total turnover of 103 million tons)
- d) Poland (total turnover of 55 million tons)
- e) The eastern coast of Sweden (turnover of 55 million tons – excluding Baltic ports in the southernmost part of the country)

Figure 24. Annual shipping connections The Baltic – The North Sea (2006)



The Bay of Finland has 2500 regular sailings by liner ships (actual round trips) to ports in Germany, Netherlands and Belgium (later as ARA) and to the UK per year with a total capacity of over 17 million tons (in one direction). In that number 1950 round trips are made by container ships and 550 by Ro-Ro ships. From the number of container ships, 1070 departures are to German ports only, 350 to ARA ports only and 400

departures include both destinations. 130 departures are destined to ARA and the UK ports. From Ro-Ro sailings 150 are destined to ARA only, 200 to the UK only, 150 join both destinations, 50 sailings are destined to the UK and Germany. Eight ports are served: in Finland five (from east to west: Hamina, Kotka, Helsinki, Hanko, Turku), in Russia one (St. Petersburg) and in Estonia two (Muga, Paldiski).

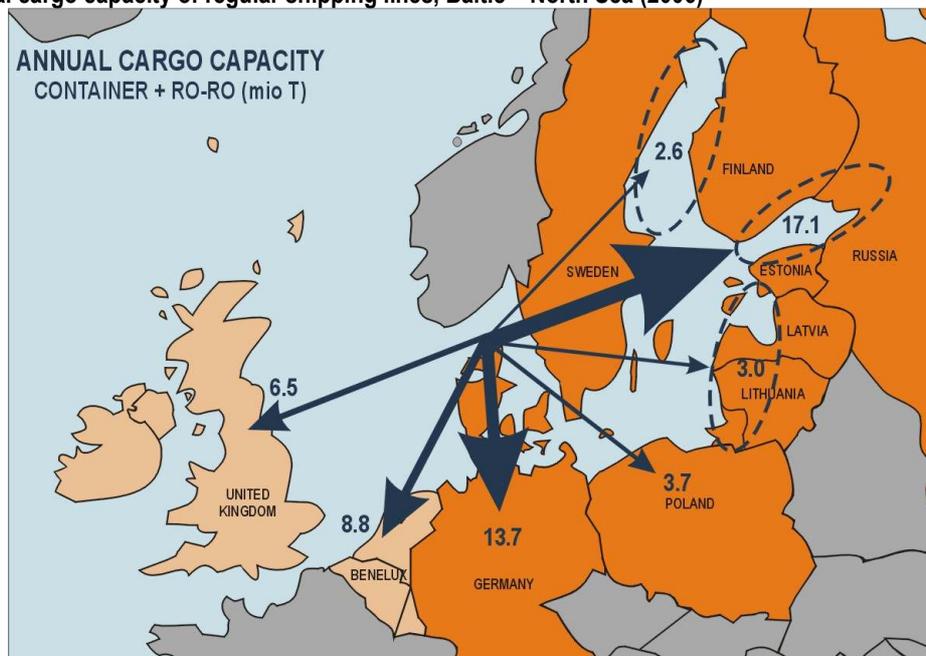
The Finnish Bay of Bothnia has 450 liner departures: 200 by Ro-Ro ships, 150 container departures, 100 with general cargo. All sailings of container ships are to German ports only, 100 sailings of Ro-Ro ships are to the UK ports only, 100 are to the UK and ARA. All departures by general cargo ships are to the UK. Seven ports are regularly linked, starting from the northern most port of Tornio, to the south: Kemi, Oulu, Kokkola, Pietarsari, Pori, Rauma.

Table 20. Potential capacity of liner services between regions (in one direction) (million tons)

	Germany	ARA	UK	Total
Gulf of Finland	7,5	6,7	2,9	17,1
Gulf of Bothnia	0,7	0,4	1,5	2,6
East coast	2,0	0,5	0,5	3,0
Poland	2,6	0,2	0,9	3,7
Sweden	0,9	1,0	0,7	2,6
total	13,7	8,8	6,5	29,0

The eastern coast of the Baltic has only 820 liner sailings by container ships: 380 to German ports only, 100 to ARA ports only, 200 to both destinations, 45 to the UK and 95 sailings join the UK and ARA ports as a destination. 280 sailings are interconnected with other regions on the Baltic. One regular general cargo service gives 50 sailings to the UK. Five ports are linked to the North Sea ports: Riga, Ventspils and Liepaja in Latvia, Klaipėda in Lithuania and Kaliningrad in Russia.

Figure 25. Annual cargo capacity of regular shipping lines, Baltic – North Sea (2006)



Poland has only 750 connections by container ships: 500 to German ports only, 100 to Germany and ARA, 100 to the UK only and 50 sailings join the UK and German ports as a destination. 150 sailings are interconnected with other regions on the Baltic. Additionally, one semi-regular general cargo service gives 40-

50 sailings to the UK. In Poland liner services to and from the North Sea are highly concentrated in Gdynia and Gdańsk. The western ports of Szczecin and Świnoujście each have one sailing per week.

The Baltic coast of Sweden (excluding ports in the Baltic Straits) have 500 regular departures, 200 by Ro-Ro ships to ARA, in which 100 pass additionally to the UK ports, and 300 by container vessels, 200 to German ports and 100 to the UK. Even there one semi-regular general cargo service gives 40 sailings to the UK. 15 ports have regular links to the North Sea: from Umea in the North to Åhus on southern coast.

Summarizing, about 5100 regular, scheduled liner round trips per year are executed between the Baltic and the North Sea ports which makes 10,200 passings through the Kiel Canal or the Skaw.

The table shows the different importance of liner services to and from the Baltic for selected countries. Sweden is a special case because of its North Sea coast. Göteborg concentrates cargo flows from all parts of the country including the industrial region of Stockholm. The port of Göteborg offers 600 sailings to the UK and 650 to the Netherlands per year by Ro-Ro ships only with a total capacity about 10 million tons in one direction. It is six times more than the capacity of all Swedish Baltic services to the North Sea ports (we do not mention container services to and from Göteborg).

Table 21. Most important liner ports on the Eastern Coast of the Baltic Sea number of calls/departures of liners from/to the North Sea per year

No.	Port	Total	Container	Ro-Ro
1	Helsinki	1175	925	250
2	St. Petersburg	1000	950	50
3	Klaipėda	590	590	-
4	Hamina	575	175	400
5	Gdynia	550	550	-
6	Kotka	550	550	-
7	Tallinn	525	475	50
8	Riga	275	275	-
9	Gdańsk	250	250	-
10	Hanko	250	-	250

Poland is another case because of its proximity to the centers of production and consumption in Western Europe which gives it a competitive advantage for land modes of transport. The maritime traffic to and from German and ARA ports is made by feederling. It should be noted that Szczecin and Świnoujście are the most western-situated ports on the southern coast of the Baltic which offer regular sailings to the North Sea ports.

It is also worth mentioning that Finnish and Swedish intra-European trade uses mostly Ro-Ro ships which disappeared from services on east-west links.

2.2. Current maritime traffic flows on the Baltic and North Sea connections

The total mass of commodities transported from the Baltic countries (excluding countries with access to the North Sea) to the UK totaled 42.5 million tons in 2005, of which 41 million tons were transported by sea. The largest exporting country was Russia – 33.2 million tons, the second was Finland – 3.2 million tons, the next, Poland – 3.0 million tons, Latvia – 2.5 million tons, Estonia and Lithuania together contributed about 0.5 million tons. In each case imports from the UK was smaller. Significant volumes were in the trade with Finland (1.88 million tons), Poland (0.87 million tons) and Russia (0.55 million tons) only. From the total mass exported from the Baltic, crude oil, petroleum products and dry bulk made up about 36 million tons and other goods,

including timber, about 6.5 million tons, of which 5 million tons were transported by sea. Modal split mostly depends on a distance to the UK. In the case of Finnish export only 4500 tons reached the destination by accompanied lorries. The majority of cargo from Finland has been delivered by ships, mostly by Ro-Ro vessels employed in regular services. Also multipurpose vessels carrying timber sails on regular or semi-regular schedules leaving very little for traditional tramping.

Table 22. BSR - UK maritime traffic (Bay of Finland: Estonia, Finland, Russia)

No	PORT	PORTS		CAPACITY – SHIPS				VOY PER YEAR	CAPACITY PER YEAR	
		BALTIC	UK	DWT	TEU	Lane	Real		To UK	Continent
1	Finnlines (Ro-Ro)	Helsinki Hamina Muga St. Petersburg	Zeebrugge Amsterdam Antwerp Tilbury	13 000	800	2 170	10 000	50	250 000	250 000
2	Finnlines (Ro-Ro)	Helsinki Hamina	Hull	8 700	440	1 890	7 000	100	700 000	-
3	Transfennica (Ro-Ro)	Hamina Paldiski	Tilbury	7 000	-	-	6 000	100	600 000	-
4	Mann Lines (Ro-Ro)	Turku Paldiski	Harwich Bremen	9 700	-	2 270	8 000	50	300 000	100 000
5	Containerships (Container)	St. Petersburg Helsinki	Tilbury Teesport Rotterdam	13 000	900	-	10 000	100	700 000	300 000
6	ESF Euroservices (Container)	ST. Petersburg	Hull Rotterdam	-	896	-	9 000	50	225 000	225 000
7	TEW Lines (Container)	Muga Helsinki	Felixtowe Rotterdam Antwerpen	3 200	266	-	3 000	25	35 000	40 000
TOTAL:				54 600	3 302	6 330	53 000	475	2 810 000	915 000

Table 23. BSR - UK maritime traffic (Bay of Bothnia: Finland)

No	PORT	PORTS		CAPACITY - SHIPS				VOY PER YEAR	CAPACITY PER YEAR	
		BALTIC	UK	DWT	TEU	Lane	Real		To UK	Continent
1	Finnlines (Ro-Ro)	Kemi Oulu Turku Helsinki	Felixstowe Tilbury Antwerp Amsterdam	8 850	537	1 690	7 000	100	350 000	350 000
2	Finnlines (Ro-Ro)	Rauma	Hull	8 700	440	1 890	7 000	50	350 000	-
3	Transfennica (Ro-Ro)	Rauma	Tilbury	7 200	303	1 600	6 000	50	300 000	-
4	Carl Bom (G. Cargo)	Rauma Kokkola	Immingham	6 000	-	-	5 500	50	275 000	-
5	Nordic Charter (G. Cargo)	Pietarsari Pori Kotka	Belfast + others	3 500	-	-	3 000	50	150 000	-
TOTAL:				34 250	1 280	5 180	28 500	300	1 425 000	350 000

From the Polish export of 3.0 million tons in 2005 about one million tons was comprised of dry and wet bulk cargo (coal – 0.81 million tons, petroleum products – 0.12 million tons), which was delivered to the UK by ships. Other commodities, subject to modal competition, were transported mostly by truckers – 1.2 million tons (54 000 lorries) and by shipping – 0,8 million tons.

Table 24. BSR - UK maritime traffic (South coast: Poland)

No	Port	PORTS		CAPACITY - SHIPS				VOY PER YEAR	CAPACITY PER YEAR	
		BALTIC	UK	DWT	TEU	Lane	Real		To UK	Continent
1	Kursiu (Container)	Liepaja Klaipėda Gdańsk	Teesport	-	301	-	3 300	45	100 000	-
2	Kursiu (Container)	Liepaja Klaipėda	Ipswich Rotterdam	-	340	-	3 700	45	100 000	65 000
3	Samskip (Container)	Ventspils Klaipėda	Hull Rotterdam	-	350	-	3 800	50	150 000	40 000
4	Rix Line (G. Cargo)	Riga, Klaipėda	Hull Teesport	2 350	-	-	2 200	50	110 000	-
TOTAL:				2 350	991	0	13 000	190	460 000	105 000

Another major contribution to road traffic are cargoes from Lithuania – 0.17 million tons (7500 lorries) were delivered by truckers, which is about half of the whole export to the UK.

Table 25. BSR maritime traffic (East coast: Latvia, Lithuania)

No	PORT	PORTS		CAPACITY - SHIPS				VOY PER YEAR	CAPACITY PER YEAR	
		BALTIC	UK	DWT	TEU	Lane	Real		To UK	Continent
1	Euroafrica Andrews (Container)	Gdynia	Felixstowe	13 000	750	-	8 250	50	330 000	100 000
2	Euroafrica Andrews (Container)	Gdynia	Hull	6 850	560	-	6 160	50	320 000	-
3	Kursiu (Container)	Gdańsk Liepaja Klaipėda	Teesport	-	301	-	3 300	45	50 000	-
4	Containerships (Container)	Gdańsk Helsinki, St. Petersburg	Teesport Rotterdam	13 000	900	-	10 000	50	100 000	50 000
5	Fast Lines (Container)	Szczecin Gdańsk Gdynia	Different	2 400	-	-	2 200	45	100 000	-
TOTAL:				35 250	2 511	0	29 910	240	900 000	150 000

It should be noted that the level of concentration of cargo flows is rather high because five of the mentioned ports are concentrated in two groups: Hull and Immingham form the one (total 2085 thousand tons) and Ipswich, Felixstowe and Harwich the second (total 940 thousand tons).

Table 26. The UK ports linked to the Baltic ports (except Sweden) Potential discharging/loading estimated on basis of ships' capacity ports from north to south (in thousands tons)

	<i>Poland</i>	<i>Latvia, Lithuania</i>	<i>Est. Fin. Russia</i>	<i>Total</i>
Teesport	150	150	350	650
Hull	320	210	1280	1810
Immingham	-	-	275	275
Ipswich	-	100	-	100
Felixstowe	330	-	210	540
Harwich	-	-	300	300
Tilbury	-	-	1675	1675
Other ports	100	-	150	250
Total:	900	460	4240	5600

All ports are on the eastern coast of England which means that their hinterlands include western ports of the UK and Northern Ireland. „Other ports” include Belfast and in fact ports of the Republic of Ireland, but they form a network for general cargo liners.

2.3. Ships and operators

15 operators, or pools, or companies using different brand names are serving feeder traffic between the Baltic and the North Sea. They operate about 140 ships in North European feeding. Only two operators together have almost half of vessels: Unifeeder (36 ships) and Team Lines (27 ships). Most of the ships are chartered by German ship-owners.

From the aforementioned number of 140, 95 vessels trade between the North Sea and the Baltic in 35 scheduled services. This includes three global operators: OOCL, MSC and Mærsk Line which have established their own feeder services with nine loops and 16 ships. Other companies operate with 10 to two ships in one-three services usually serving the market limited to one region.

The capacity of purpose-built feeder vessels vary from 266 TEU to 1200 TEU and the average age is eight years (the average age of the container world fleet is 11 years). The average capacity of feeders built before 1996 is 400 TEU. Feeders built in the years 1996-2000 have an average capacity of 600 TEU and ships from XXI century – 750 TEU. A special exception is the OOCL company which uses former ocean container vessels for feeding with a capacity of up to 1254 TEU. Another difference related to the age is noted because of the growing speed – ships from the nineties have a speed in the range 14-16 knots, all newer ships achieve over 18 knots.

Quality split is noted between companies and services in geographical relation: the newest, largest and fastest vessels are concentrated in services to the Bay of Finland, for example, all the newest and largest vessels (over 800 TEU) of Unifeeder sail to St. Petersburg. The average capacity of vessels of ESF Euroservices, which sail only to the Bay of Finland, is 800 TEU. All ships trading in northern routes have ice class A 1. On the other hand, small, independent companies serving the eastern and southern coasts of the Baltic operate ships with an average of 400 TEU.

The largest purpose-built feeder vessel in the Baltic trade is „Mærsk Amalthea”, built 2001, with a cargo capacity of 1200 TEU (tonnages: GT 14.290, deadweight 14.900 metric tons; dimensions: length 158.75 m, breadth 25.6 m, draft 9.2 m; speed 22.2 knots). The largest feeders with A1 ice class are „Containerships VI” and „Containerships VII”, built in 2002, capacity 966 TEU (tonnages: GT 9953, deadweight 13,645 metric tons; dimensions: length 154.5 m, breadth 21.8 m, draft 8.9 m; speed 20.7 knots). The largest feeding vessels are „MSC Eyra” and four sisterships, capacity 1254 TEU, built 1982-84 for overseas trade and lengthened at the end of eighties (tonnages: GT 21.586, deadweight 21.370 tons, dimensions: length 203.1 m, breadth 25.5 m, draft 9.82 m, speed 16 knots).

Only three companies operate Ro-Ro services between the Baltic and North Sea. They use 15 vessels in eight scheduled services. All but three ships are built after 1996 and have a deadweight tonnage between 7400 tons and 13.770 tons.

A phenomenon in the Ro-Ro sector is the lack of a positive relation between age and tonnage of ships still in service in the Baltic trade. The average deadweight of ships built before 1991 is 11.000 tons. Ships built between 1991-2000 have an average of 7600 tons. More radical growth is noted after 2002 in cargo capacity measured by the length of a cargo lane. For example m/v Merchant (1982), sailing from the Gulf of Finland to the North Sea, measures 13.025 tons and 2170 lane meters. All new buildings with a deadweight capacity over 13.000 tons have a cargo lane of over 2600 meters.

Taking lane length into account, the largest capacity in the Baltic-North Sea trade have ships of Stena Forecaster class, built 2003 – 3000 meters (this is equivalent of 197 trailer slots). Their GT is 24,688, deadweight – 12,300 tons, length – 195.3 m, breadth – 25.8 m, draft – 7.5 m. Speed is 22.5 knots. Vessels have the ice class A 1.

Smaller ships represent Sietas types 1 and 2 (for example Pauline Russ operated by Transfennica and Miranda operated by Finnlines), built 1998-1999. They have GT 10,471, deadweight 7440 tons. The dimensions are: length 153.5 m, breadth 20.6, draft 7.0 m. The speed is 20 knots. Ships are built to the ice class A 1 Super.

2.4. Estimation for traffic growth forecast in the identified areas till year 2025. Vessel type shaping and size development

In the later half of the second and in the third decade of XXI century we should expect some phenomenon which will modify the traffic between the North Sea and the Baltic.

The first modification will be made by a new hub port in the Eastern Baltic, which will attract two-three deep-sea shipping lines with 100-150 calls per year. In the next year the new Deepwater Container Terminal in Gdańsk will be able to serve container ships up to 7000 TEU. It seems that the non-freezing duo-port of Gdańsk-Gdynia is the best place to organize such a hub and the intra-Baltic feeding network because of its proximity to other ports on the Eastern Baltic and concentration of links to southern and southeastern hinterland in Central Europe.

The second change, which can be expected, is the emergence of services using so called „cascaded ships” which do not need feeding as a rule. They call straight to some, usually 4-5, large enough feeder ports. But it seems that in the Baltic „cascaded ships” would not do without some help from feeder services.

A predicted overcapacity in container tonnage, particularly in the large ships sector, could prove a catalyst for such innovations and/or experiments. Expected lower rates in long routes could result in passing on the high costs of feeding.

But still most of overseas trade containers will be trans-shipped to the North Sea ports and delivered to the Baltic by feeder ships. They will grow up to a capacity of 2000 TEU, but most of the tonnage in the trade between both seas will be in the range of 1200-1500 TEU. Smaller and older ships, below 1000 TEU, will serve intra-Baltic feeder services. Also some old units 2500-2700 TEU moved from deep-sea services will join the feeder fleet.

Most of the feeders built in the last years of XX century will still be in service thanks to the high quality of shipyard work and good maintenance. So the average age of ships will grow up to 15 years in the case of larger feeders and to more than 20 years for smaller ones.

Direct calls by deep-sea container ships and the growing average capacity of feeders in the North Sea-Baltic trade will cause that the number of voyages between both seas would not grow significantly.

In the Ro-Ro sector on routes from the Bay of Finland to Western Europe the growth of traffic will be slower and demand for new ships and services will be low. All Ro-Ro ships with a deadweight capacity over 10 thousand tons built at the beginning of the XXI century will be in service after 2020. They will be supplemented

by some bigger ships but not over 15 thousand tons deadweight. So the average capacity will be 50 percent bigger than at present and the average age will be little over 15 years.

After 2015 one or two new Ro-Ro services will emerge between Latvian and/or Lithuanian ports and Western Europe. They will utilize some smaller ships taken from the North-South trade and will have a low frequency i.e. two departures per week.

Simultaneously, the Con-Ro ships will not be utilized on the MoS connections because they cause a limitation of this transport system with comparison to the land axes or dedicated maritime connections. What is more, Con-Ro vessels need dedicated seaport terminals equipped with both a Ro-Ro ramp and container cranes. For that reason the costs of construction and operation of these terminals is much higher than in regular container terminals. Con-Ro ships could also be serviced in a couple of terminals (Ro-Ro or container) but it requires longer stops in seaports and increases the risk of congestion, especially in container terminals. Another reason of importance is the limitation of Con-Ro vessels with their low level of flexibility (limited charter market). Currently operated Con-Ro vessels which have been built in the seventies (*Baltic Print, Astrea, Birka Trader*) are engaged in 'industrial carriers' (transport of Scandinavian paper). Therefore, it is not used in the carriages on the open market.

To sum up, the parallel utilization of two types of vessels on the one MoS connection is more probably than the universal (Con-Ro) ships because MoS axes are more flexible and the market requirements could be satisfied on the highest level.

3. Infrastructure Analysis

A presented part of the Report indicates basic information concerning port infrastructure and hinterland connection potential. Our interest is focusing on the South – East Baltic countries and their seaports. Establishment of the Motorways of the Baltic Sea, as an alternative route to the land connections (road, rail), needs a proper capacity at the container and Ro-Ro terminals. Therefore, research will focus on that kind of seaport operation. Also that the future plans of port development are described, both general and concerning containers and Ro-Ro parts.

3.1. Key ports services and shipping infrastructure

Today's world seaports are very complex and sophisticated kinds of companies operate on the international market. Because of a wide range of rendered services and a large amount of trans-shipped goods, seaports occupy huge land areas. They are administrating kilometers of berths and hundreds of square meters of storage. Basic information concerning the Baltic South – East seaports is presented in Table 27. An indication of the biggest presented ports is not easy. Different configurations of parameters are caused by characteristics of the transferred cargo (see chapter 1.5). In the case of 'bulk' ports, a wide range of open and liquid storage capacity is characteristic. On the other hand 'general cargo' seaports mostly operate close storages. Unfortunately, most of the storages are old buildings that do not square with current logistics needs. The prospect of the MoS development in the near future will cause a development for modern close storage capacity. For that reason, the planned logistic centers are located close to the seaport area. On the other hand, parameters like length of berth or maximum depth are not so important for the Baltic MoS development. The most interesting are parameters of trans-shipment facilities. The number of Ro-Ro ramps or container terminal storage capacity is crucial information.

Table 27. Basic infrastructure parameters of the South – East Baltic Seaports.

		Ventspils	Klaipėda	Tallinn	Riga	Gdańsk	Gdynia	Szczecin - Świnoujście	Kaliningrad
Port area	ha	1 240	415	606	2 530	653	240	-	-
Maximum depth	m	17,5	14,5	18,0	12,2	17,0	13,0	13,2	9,4
Overall length of berths	km	11,0	18,2	11,9	13,8	10,0	10,0	10,8	3,5
Open storage capacity	m ²	190 000	454 920	530 100	250 000	548 000	400 000	568 000	290 000
Close storage capacity	m ²	170 000	136 136	123 546	82 300	106 300	230 000	200 000	104 000
Liquid cargo capacity	m ³	1.5 mio	350 000	745 600	-	-	-	-	240 000
Cold storage area	m ²	5 000	23 254	28 200	-	-	-	-	24 000

Nevertheless, all presented ports have the necessary potential for future development which includes construction of the MoS infrastructure. Detailed analysis of the infrastructure seaport potential in reference to the MoS development should concern the container and Ro-Ro turnover facilities. The MoS concept applies to general cargo transport taking advantage of unitized technology. Most important unitized cargo terminals in the South-East Baltic Seaports are indicated in Table 28. The biggest Ro-Ro seaport is Tallinn. The direct and relatively short ferry connections to Finland, Sweden and Russia is the main reason of its turnover volume (over 557.7 thou. units in 2003). What is more, Ro-Ro capacity at Tallinn's port is still increasing.

Table 28. Unitized cargo infrastructure in the South-East Baltic Seaports [basic data].

Port	Terminal/Operator	Activities	Basic infrastructure data
Gdańsk	GTK Gdańsk Container terminal	TEU ³⁹	Berths 360m, Draught 9.7m, 2 vessel stands
	Westerplatte Ferry Terminal	PAX + Ro-Ro	1 Ro-Ro ramp, berths 1434m, Draught 9.6m
	WOC Gdańsk	Ro-Ro	1 Ro-Ro ramp, berths 1166m, Draught 8.5m
Gdynia	BCT Baltic Container Terminal	TEU + Ro-Ro + PAX	2 level Ro-Ro ramp, Berths 967m, Draught 10-13m
	BTDG Baltic General Cargo Terminal	Ro-Ro	4 Ro-Ro ramp, 7 Berths of 3742m, Depths up to 12m
	GCT Gdynia Container Terminal	TEU	Berths 117m, Depths 10m, 2 level Ro-Ro ramp
Kaliningrad	Sea Commercial Port	TEU + Ro-Ro	2 Ro-Ro ramps, Berths 3017m,
Klaipėda	Klaipėda Terminalo Grupe, JTS	TEU + Ro-Ro	2 Ro-Ro ramps, 5 berths of 1150m, Depths 10,5m
	KLASCO Klaipėda Stevedoring Company	Ro-Ro	5 berths of 1000m, Depths 9.4m
Riga	PLC Baltic Container Terminal	TEU + Ro-Ro	Berths 405m, Draught 10.06m
	JSC terminals Vecmil Gravis	Ro-Ro	-
	PLC 'WT Terminal'	Ro-Ro	-
	PCL 'Rigas Pasazierv Terminals'	Ro-Ro + PAX	-
Szczecin - Świnoujście	VGN Polska	TEU	Berths 313m, depths 13.2m
	Drobnica – Port Szczecin	TEU + Ro-Ro	Berths 1033m, Depth 9.15m,
	Terminal Promowy Świnoujście	Ro-Ro + PAX	-
Tallinn	Container and Ro-Ro Muuga Terminal	TEU + Ro-Ro	-
	Old City Harbor passengers terminals	PAX + Ro-Ro	4 terminals, Berths 4100m, Depths 10.7m,
	Paldiski passenger and Ro-Ro terminals	PAX + Ro-Ro	Berths 1400m, Depths 13m
Ventspils	Nord Natie Ventspils Terminals LTD	TEU	2 Ro-Ro ramps, Berths 1168m, Depths up to 14.2m

Currently the most developed Ro-Ro infrastructure is possessed by the port of Tallinn. The short sea distance between Finnish, Swedish and Russian ports is an important incentive in the ferry traffic activation. Six dedicated Ro-Ro terminals with very well developed infrastructure (e.g. depths up to 13 meters) operate there. Also that, high capacity of passenger terminals is an important issue in the future port development as 'entrance' to the Baltic MoS.

On the other hand, the most important container ports can be indicated. The biggest container seaport on the Baltic is St. Petersburg but its location outside the European Union restricts its future importance in the Baltic MoS system. Gdynia should be, therefore, shown as the most important container port. Currently the available overall annual capacity of Polish ports is estimated on 0.8 m TEU. Development plans, presented in the next chapter, can change the container market overview and indicates Poland as a Baltic center of container turnover. These changes will occur mostly between two Polish ports (Gdynia – Gdańsk).

The comparison of the currently functioning seaport infrastructure and vessel parameters (section 2.3.) indicates that even today MoS connections could be launched on the Baltic. The berth parameters (depth and length) are proper even for future development of ships sizes.

3.2. Port development plans and potential for the future

Within the last years the cargo turnover in Baltic ports has been increasing systematically by about 14% per year. Importantly, this steady trend is expected to continue for at least another decade. To fulfill the

³⁹ TEU – Containers Lo-Lo trans-shipment technology.

growing trans-shipment demand, an adequate scope of investment in ports has to be provided. While analyzing the development plans of ports' basic trends and operating areas of the transport market can be identified, where the largest growth is expected. Such areas certainly include container trans-shipment and ferry connections. The second area of development involves the construction of bulk cargo terminals adapted to handle liquid cargo (crude oil, gas) and dry bulk (coal). Port investments may involve the development of existing terminals (e.g. Göteborg) or the creation of new ones (e.g. Ventspils), as well as, for example, in Russia the formation of entirely new ports (e.g. Lomonosov).

a) The Baltic seaports' development plans

The widest range of investments with regard to each of the categories is planned in Russian ports. Importantly many of the development plans included in the *National modernization plan of the Russian transport system* are already being implemented (e.g. Primorsk). According to this plan, the trans-shipment capacity of Leningradzki Oblast will increase to 322m tons in 2010. The most important investments relating to this development include: construction of the Primorsk port (cost: USD 118m), development of the fuel terminal in the Port of Wysotsk to a capacity of 12m tons per year, the construction of a bulk terminal in the port of Ust-Luga and investments in the port of St. Petersburg⁴⁰. The most important project planned in St. Petersburg involves terminals for frozen and cooled cargo, as well as the construction of a ferry-passenger terminal with a capacity of 900 000 passengers per year⁴¹.

A wide investment program is planned in the port of Tallinn as well. The most important development directions have been defined in the *Expansion Plan for the Port of Muuga 2005-2010*⁴² where the following projects have been identified:

- Development of the Muuga Industry Park. In the years of 2004-2006 a 70ha development area shall be prepared for the location of industry and added value logistics services.
- The development of the eastern part of the Muuga port. In the first stage of the project a metal terminal will be constructed as well as a dry bulk cargo terminal. The second phase involves the construction of a general cargo terminal. The last phase is the second stage of the container terminal development. At present feasibility studies are being prepared for the project, in addition to technical projects and the assessment of environmental impact. These projects will be implemented with funding from the Cohesion Fund.
- Construction of the transport infrastructure back-up: development of the Muuga railway station, construction of two road viaducts and an extension of breakwaters.

Development programs will also be conducted in the ports of Old City, Paldiski and Saaremaa. The development of office and residential areas as well as tourist services is the main development direction for the Old City Harbour in Tallinn. In the Paldiski port, a new wharf for bulk cargo and a general cargo terminal is planned (implementation in 2006-2007). As a result the passenger area will be excluded from handling bulk cargoes at the location where a terminal for personal cars has been planned. At the same time road connections to the terminal will be developed. In the long term general cargo may also be developed together with necessary hydrotechnical infrastructure. The investment project preparation is planned in 2006-2007, whereas the work is scheduled to start in 2009. The project will be co-financed by the Cohesion Fund. The

⁴⁰ Additionally the development of container potential is planned, as described in Chapter VI of the Study.

⁴¹ *Terms and prospects of the development of Polish ports*. Actia Forum. Gdynia 2006.

⁴² Internet: http://www.portoftallinn.com/port_info/investments.shtml of 2.01.2006.

main function of the Saaremaa port is for tourist traffic. For this purpose a terminal for cruisers is being constructed, to be completed in 2006.

The development of the Ventspils port has three targets:

- Maintain and strengthen the present position of the port on the dry bulk and liquid bulk cargo market;
- Development of new port technologies⁴³;
- Development of the port industry.

With regard to bulk cargoes two development investments have been planned. The construction of a coal terminal with an annual capacity of 5m tons (a construction permit was obtained in 2003) and a grain terminal of a similar capacity (the construction started in 2004). The development directions of the port industry have been included in the document called *Ventspils Industrial Development Strategy*⁴⁴, adopted in March 2003. The Strategy emphasizes the necessity of coherent cooperation between the port and the city⁴⁵.

In the port of Riga there is also an investment program with a value of USD 160m, which includes the construction of a communication tunnel under the River of Daugava, deepening the access way to the port and access canal to 15m and the modernization of road connections to the port. The investment will be completed in 2006.

The most important investments in the port of Liepaja are as follows: liquid bulk cargo terminal with a gas terminal. Due to the large area reserves, this port has been named as a future development center of new technologies supported with modern logistics solutions⁴⁶.

With regard to the Klaipėda port, the investment plan was implemented during 2002-2005 and included: modernization of the approach way, the reconstruction of canals and wharves as well as investments in the land transport infrastructure (roads, railway). The total cost of the whole program has been estimated at USD 107m⁴⁷.

The ports of Kaliningradzki Oblast⁴⁸ are also planning to expand their offer gradually, and one of the ways of reaching this goal will be with investments. One of the projects is the construction of a deepwater port in the eastern part of the Baltijsk port. An important element will be a ferry terminal (car-railway). The investment, whose costs are estimated at USD 126m, is financed by ROSMORPORT. In order to provide accessibility to the port in 2005, the approach way was modernized (cost of USD 3m). Another new investment in Kaliningradzki Oblast will be the construction of a fuel terminal in the town of Yantamy. The terminal, to be commissioned at the end of 2006, will provide the trans-shipment of 5m tons per year.

Even though at present the highest scope of investments occurs in the southeast Baltic ports, in other countries the development process in ports is also continued. An example of this may be the investments in German Baltic ports. In Rostock the investment program mostly involves the development of the potential for handling cargo ferries (ramp construction and road connections) as well as passenger ferries (*Warnemunde*

⁴³ Construction of the *Noord Natie Ventspils Terminals LTD terminal*.

⁴⁴ eng.- *Ventspils Industrial Development Strategy*

⁴⁵ Internet: <http://www.portofventspils.lv/?lang=EN&menu=10> (12.11.2005)

⁴⁶ Internet: <http://www.transport.lv/?sadala=225> of 20.12.2005.

⁴⁷ Internet: http://www.portofklaipeda.lt/en.php/general_information/investment_projects/277 of 10.01.2006.

⁴⁸ Commercial Sea Port Kaliningrad, Kaliningrad Fishery Port, River Port Kaliningrad, Kaliningrad Port Oil Terminal, Kaliningradzkaya Portovaya Neftebaza, Port Pioniersky of the Pionierskaya Base of the Oceanic Fishery Fleet

Cruise Terminal commissioned in May 2005). The latest port investment was the creation of a 25ha industrial zone in the port, where the producer of trans-shipment equipment, Liebherr, has its plant⁴⁹.

Danish ports are also trying to develop their trans-shipment potential. A good example is the Strategy 2010 prepared by ADP⁵⁰. Within the Strategy for the Port of Fredericia (Masterplan) the following port areas that handle cargoes will be developed: containers (*Ny Møllebugthavn*), dry bulk (*Centerhavn*), general cargo (*Vesthavn*) and crude oil (*Skanseodde Havn*). Masterplan for the Port of Nyborg includes the development of terminals for: liquid bulk cargo (*Nyborg Avenakke Terminal*), Ro-Ro general cargo (*Nyborg Terminal I*) and containers (*Nyborg Terminal II*)⁵¹.

In Swedish ports the development of a container and ferry potential is emphasized. An example of an investment already being implemented is the Skania Harbour container terminal in Göteborg. The '2005 Vision' project for the Port of Trelleborg (described in Chapter 5.3) and the construction of a new passenger terminal in Ystad⁵² are projects presently being carried out. And the construction of a new port in Norvik close to Stockholm is a future development vision (described in Chapter 5.3).

Development works are also important for Finnish ports, where the most noteworthy project is *Vuosaari Project Port* in Helsinki. The project whose cost is estimated at EURO 260m encompasses an area of 150ha and includes a container and Ro-Ro terminal, logistics park, an economic zone and the development of the approach infrastructure both on the seaside (approach way) and on the landside (roads, rail lines). Completion of this project is planned for 2009⁵³.

b) The Baltic seaports container capacity development

Estimation of the competition level of the maritime transport versus other means of transport strictly corresponds to the land infrastructure development.

Further changes in the container turnover will very much depend on new investments planned in the ports of the Baltic Sea. The largest investments are planned in Russian ports in the St. Petersburg region. Until 2007, in St. Petersburg only, the trans-shipment capacities of the port will be increased to 1.35m TEU (*First Container Terminal*). Moreover, there are two investments planned in the nearby ports of Ust-Luga and Lomonosov. In the first case 110km away from St. Petersburg a deepwater (14.5m deep with the option of deepening to 16m) container terminal *Baltic Container Terminal* will be commissioned with an annual capacity of 900 000 TEU generated until 2007. The project involves the further development of the terminal to a volume of 3.3m TEU per year. The costs of executing the first stage will amount to USD 167m. USD 60m will be government funds spent on hydrotechnical work, area preparation and development and the construction of a wharf wall. Another USD 107m will come from private investors. German companies Eurogate and HHLA are involved in the implementation of the project. HPH shows high activity in the region and is close to acquiring the shares valued at USD 150m in the NCC (*National Container Company*) and hence in the *First Container Terminal* (50% shares) and the *Baltic Container Terminal* (37% shares)⁵⁴. Moreover, HPH has won a contract for the construction of another terminal in the port of Lomonosov near St. Petersburg. The terminal with an area of 34ha is to reach 1m TEU trans-shipment capacity. The costs of the investment are estimated at USD

⁴⁹ Internet: <http://www.rostock-port.de/Investment.131+B6Jkw9MQ...0.html> of 2.01.2006.

⁵⁰ ADP – Associated Danish Ports

⁵¹ Strategy 2010. ADP. Internet: http://www.adp-as.com/Home/Indhold/Bestil_materiale/Strategibrochure_2010.aspx of 12.01.2006.

⁵² Ystad – the Gate of Scandinavia. Press release, Ystad Hamn Logistyk AB", 1.03.2005.

⁵³ Internet: <http://www.vuosaarensatama.fi/harbour/> of 10.01.2006.

220-300m⁵⁵. Another Russian port where the container potential is being developed is Petrolesport. In 2006 the terminal capacity should increase from 70 000 to 220 000 TEU. In this case, one shareholder is the German company HHL (*Hamburger Hafen und Lagerhauf AG*) which holds 25% of the shares in Petrolesport. By 2015 the terminal will be developed to a capacity of 500 000 TEU.

Table 29. Container terminal potential and future development in Russia

No.	Terminal/ support	Operator	Current capacity	Future development
1	First Container Terminal	National Container Company [HPH]	500 000	1 350 000
2	PetroLesPort	HHLA/Petrolesport	220 000	500 000
3	Kronstadt	Containerships	75 000	160 000
4	Lomonosow	HPH	-	1 000 000
5	Baltic Container Terminal	NCC/EUROGATE [HPH]	900 000	3 300 000
			1 695 000	6 310 000

Also Estonian ports are focusing on the development of container potential. Among the most important investments in the years of 2005-2010, the development of a container terminal in the Port of Muuga with a capacity of 500 000 TEU per year is listed (at present 150 000 TEU)⁵⁶. The construction of a container terminal with an annual capacity of 250 000 TEU is also one of the main targets of a 'Five-Year Investment Plan of the Port of Tallinn in the years of 2004-2008'.

The Port in Klaipėda in Lithuania is another location of container investment. At the end of 2005 the operator of the terminal, Klaipėda Terminal Group, commenced a project aimed at doubling the trans-shipment capacity of the terminal, targeting a growth up to 300 000 TEU per year, which will correspond to the capacity of handling 2.5m tons of cargoes⁵⁷.

Furthermore the ports located in other parts of the Baltic Sea are competing for investments focused on the development of their container servicing capacities. One example of this is the Danish port in Aarhus, where in 2001 the Container Terminal East was commissioned, operated by APM Terminals⁵⁸ and at the end of 2004 the project called ARR@HUB was implemented. In 2005 the trans-shipment handled in two container terminals of ARR@HUB, Multiterminalu (Finnlines and Scandlines) and the terminal Mols-Linien, reached a volume of 803 000 TEU (containers and trailers). Therefore, investment work is being carried out involving the extension of the wharf by 800m and the development of the yard for container trans-shipment by 330 thou. m². The completion of the investment planned for this year will provide the trans-shipment capacity for the port in the following years⁵⁹. Also in ADP ports (Associated Danish Ports) the existing container potential is planned for development, namely Ny Møllebugthavn in Fredericia and Terminal II in Nyborg⁶⁰.

⁵⁴ Internet: http://petersburgcity.com/news/business/2005/10/27/investment_hutchison/ of 1.01.2006.

⁵⁵ Internet: http://www.interexlebanon.com/serv/frame_dynamique.asp?url=/oport/default.asp?PARTIE=oport&ATLAS=44&SECUID=25 of 1.01.2006.

⁵⁶ Internet: http://www.portoftallinn.com/port_info/investments.shtml of 1.01.2006.

⁵⁷ Internet: <http://www.terminalas.lt/index.php> of 1.01.2006.

⁵⁸ Internet: http://www.aAarhushavn.dk/pages/omraader/container_uk.htm of 1.01.2006.

⁵⁹ *With AAR@HUB the cargo trans-shipment in the port will increase.* 'Media release of AARHUS HAVN' 8.02.2006.

⁶⁰ *ADP Strategy 2010.* Internet: http://www.adp-as.com/Home/Indhold/Bestil_materiale/Strategibrochure_2010.aspx of 2.01.2006.

The Finnish Port of Helsinki is also developing its container service capacities by implementing the Vuossari Harbour Project, whose complete trans-shipment capacity will be reached in 2009 (the project is described in 6.2.)⁶¹.

The examples of Swedish investments in the container potential are as follows: a project of a new port in Norvik and the implementation of the 'Vision 2005' project in Trelleborg. The first project will include a container and ferry Ro-Ro terminal located 50km away from Stockholm near the town of Nynäshamn. Its construction is planned in the years of 2007-2010 and it will cost EURO 280m. In 2015 this port should reach a turnover of 300 000 TEU. The container terminal will be built by a private investor. According to the information provided by the representatives of the Port of Stockholm, negotiations are being conducted with several partners, including Hutchison WPA. An important element that will complement the investment will be the already started construction of a four-lane motorway connecting the port with Stockholm, which will improve the communication with the hinterland⁶². Another example of developing the trans-shipment and servicing potential for the unitised technology is the 'Vision 2005' program. The implementation of the largest investment in the history of the Port of Trelleborg started in 2005. At present a new logistics center of the area of 13.5 thou. m² is being constructed. Construction work is also being performed at the ferry wharf (enhancing road and railway traffic) and the terminal for combined transport, whose annual trans-shipment potential will exceed 100 000 TEU. The development of the port will end in 2007 and its estimated costs amount to EURO 49m⁶³.

According to European and global trends, the container potential in Polish ports is also being developed. This concerns both modernization and development of existing terminals and new investments, supported by global magnates, such as e.g. HPH. The first group of investments includes the extension of the Szczecińskie Wharf by 92m (total 360m), which enables the Gdańsk Container Terminal to handle two large or three smaller container ships. At present the program of further development of this terminal is being implemented, which includes in its first stage: widening the access road, moving a gate, hardening yards, constructing car parks and a sewage system as well as premises for terminal customers. The first stage shall cost PLN 3.6m, out of a total of PLN 13m. Moreover, in the next years, two more hectares of stacking yards will be added for containers, car parks for trucks and a sanitary sewage system. The planned work will be supplemented with the construction of a warehouse, a shelter and an office container building. The investment should increase the capacity of GTK from the present level of 50 thou. TEU per year to about 100-130 thou. TEU⁶⁴. In Gdynia development plans for existing terminals are also being formulated. An example of such a plan is the extension of Bułgarskie Wharf line to a distance of 250m and the preparation and development of direct maneuver-stacking yards, which will initially be used for the Ro-Ro trans-shipment. However, ultimately, after the transfer of the ferry terminal, they will become an extension of the BCT.

'New' container investments in Polish ports also include the following projects: the Deepwater Container Terminal DCT Gdańsk SA, GCT – Gdynia Container Terminal SA and Ostrów Grabowski Container Terminal – Szczecin.

The Deepwater Container Terminal (DCT) is the largest and most important investment at the Port of Gdańsk. On 25th October, 2005, the construction of the terminal was officially commenced (1st stage). The main contractor is the German construction concern, *Hochtief*. A long-term contract for the lease of port areas

⁶¹ Internet: <http://www.vuosaarensatama.fi/harbour/> of 2.01.2006.

⁶² U. Nordholm: *It's Norvik's time*. "Baltic Transport Journal" No. 1/2006 (9), p. 18.

⁶³ *Development of the Port of Trelleborg*. 'Media release', Trelleborgs Hamn AB" 06.2005

⁶⁴ *Far from the end (of possibilities)*. Namiary na Morze i Handel. 22/2004 r., p. 17.

(30 years with the option of extending for the next 30 years) with the British consortium *Deepwater Container Terminal Gdańsk SA (DCT)* was executed on 28th January, 2004. In September 2005 most of the stocks (the value of the transaction is EURO 190m) in DCT Gdańsk SA were acquired by *Macquaire Global Infrastructure Fund II (GIF II)* from Australia, a fund that belongs to the *Macquaire Bank Group* from Sydney⁶⁵. The whole investment shall be implemented in two stages. The costs of the 1st stage have been estimated at about EURO 190m. The terminal in Gdańsk will be financed by *Macquarie Bank* and *DVB Bank AG* (Germany). The investment will involve the construction of two stations at a total annual trans-shipment capacity of 500 thou. TEU, with one of the stations adapted to handle Ro-Ro cargoes. In the second stage new stations will be developed in order to reach the annual trans-shipment capacity of 1m TEU. The first container to call at the pier of the new terminal has been planned for May 2007. The investor is planning to also become involved in the construction of PCL⁶⁶ logistics centre and a ferry/Ro-Ro/passenger terminal, whose construction is also included in the plans of the Gdańsk Authority SA. In 10-12 years DCT is planning to invest about USD 500m in the Port of Gdańsk⁶⁷.

Another investment, which will increase the present container trans-shipment potential of Polish ports significantly, is the Gdynia Container Terminal SA (GCT) located at the Bułgarskie Wharf. The investor here is an international company, the largest global operator of container terminals, Hutchison Port Holdings, which under the contract of 18th January, 2005, acquired 83.6% of the stocks in WOG. The construction and equipment of the terminal with a capacity of 150 000 TEU per year will cost PLN 90m. The target capacity will amount to 440 000 TEU and its cost will reach a value of PLN 225m. On 19th April, 2005, the Company obtained a construction permit and as early as on 18th August, the first general cargo vessel, 'Annette' docked at the Bułgarskie Wharf with 4-yard gantries for GCT onboard. Intense work is being carried out at the wharf and on the terminal yard to prepare it for container trans-shipments. The commencement of trans-shipments was planned in May 2006.

Table 30. Container terminal potential and future development in Poland

No.	Terminal	Current potential	Investments in realization	Future development
1	BCT Gdynia	600 000		600 000
2	BTDG Gdynia	25 000		
3	DCT Gdańsk SA		500 000	500 000
4	Drobnica Port Szczecin	53 000		
5	GCT Gdynia		150 000	290 000
6	GTK Gdańsk	60 000		70 000
7	Ostrow Grabowski Container Terminal - Szczecin		80 000	
8	VGN Poland - Swinoujscie	50 000		
		788 000	730 000	1 460 000
		788 000	1 518 000	2 978 000

A container investment is also being carried out at the Port of Szczecin – the Ostrów Grabowski Container Terminal with a planned trans-shipment capacity of 80 000 TEU per year. The preparation of a convenient transport connection and adjacent development areas (stacking yards of the area of 55 thou. m²) has been financed by the Port Authority of Szczecin and Świnoujście SA and with the participation of a credit

⁶⁵ Internet: <http://www.wirtualny.Gdansk.pl/wiadomosci/wydarzenia/14728> of 20.12.2005.

⁶⁶ Pomorskie Logistics Centre

⁶⁷ Internet: <http://www.portGdansk.pl/index.php?id=211&lg=pl> of 20.12.2005./

given by the World Bank during the years of 2002-2006. The next stage will be the development of a 15ha area planned for the container terminal. The infrastructure for the terminal will be developed with the assistance from ERDF which is providing an amount of PLN 53.4m (the total cost is PLN 70m). The Port Authority is looking for an investor who will commence the trans-shipment operation in the constructed infrastructure.

To sum up, during the next two years there should be about 730 000 TEU of trans-shipment capacity added in Poland, which together with the present terminals will give a total of 1.52m TEU. Plans for further development are made that should lead to an increase of the terminal capacity to 2.98m TEU⁶⁸. A wide range of investments in container terminals in Poland will only not be a response to the growing interest in this form of transport among carriers, but also an additional incentive and factor increasing the competitiveness of sea transport compared to other transport sectors. Hopefully other elements of the national transport system (mostly the road and railway infrastructure) will catch up with the development of ports and their container potential. The back-up requirements for the transport services in the container turnover in seaports may be a factor that will guarantee an adequate intensity of road traffic, necessary for generating the required income by license holders constructing motorways (particularly A1).

The rapid growth of the container turnover is also foreseen in the United Kingdom seaports. UK seaports transferred 8.023m TEU in the year 2004. What is more, the level of 12m TEU yearly turnover is expected in year 2020. It means a 36% - 42% increase in a six-year period (2004 – 2010). The main container port operator is Hutchison Port Holding who operates at the container terminal Felixtowe⁶⁹, the biggest UK container ports with a capacity of 2.8m TEU (Trinity Terminal). A 1.7m TEU capacity terminal is owned by a second UK seaport, Harwich – Bathside Bay (current turnover achieved level of 61 thou. TEU [2004]). On the other hand, the construction process in the Shell Haven (London) container terminal (P&O Ports) will achieve an annual capacity of 3.5m TEU.

The above investments reveal optimistic forecasts concerning the container turnover on the Baltic Sea. Importantly these projects are often financed by international capital, therefore, the forecast of trans-shipment levels may actually be reached. Naturally, the future market trends are never certain, and it may be the case, as for example in Ventspils, that in spite of the involvement of foreign investors and high expenditures incurred in the construction of a terminal, the increase of turnover will not occur. On the other hand, the operation of terminals will definitely facilitate the opportunities on the open European transport market, creating additional cargo mass handled with unitized technologies.

3.3. Hinterland connections to the ports, current situation and development

Proper functioning of the maritime transport in the Baltic countries is strictly dependent on the development of a national transport system and its performance. Two issues have significant influence on the future activities of the Baltic transport; the land infrastructure development and the level of transport demand. The land infrastructure is necessary for connecting the transport demand sources with the transport nodes like seaports. Without appropriate infrastructure with suitable technical and operation parameters, effective and efficient transport could not exist. Therefore, along with the development of port infrastructure, improvement of land connections is essential. In the case of transport demand, attention should be focused on two elements -

⁶⁸ BCT Gdynia the target capacity of 1.2m TEU.

economic development, which was our interest at the beginning of this elaboration, and transport performance trends in terms of particular countries.

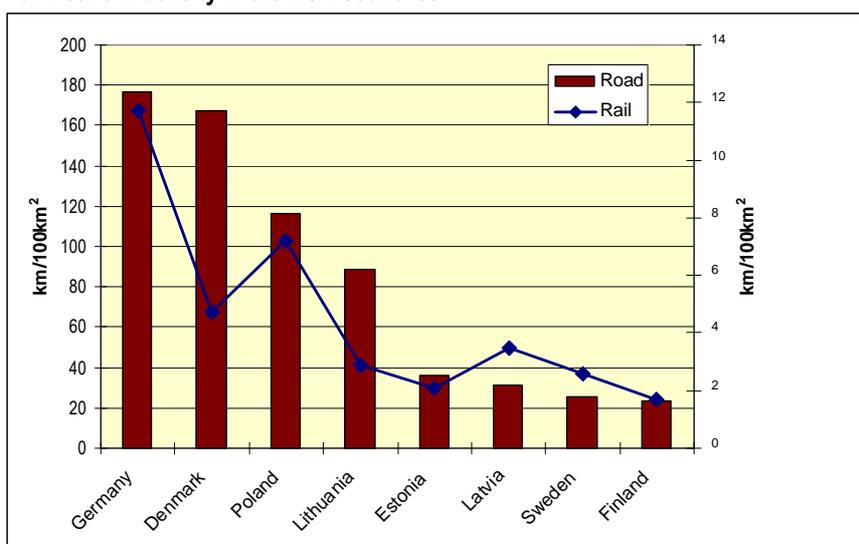
Table 31. Ports hinterland connections (land infrastructure)

Country	Road		Rail	
	Km/100 sq km	Km	km/100 sq km	km
Denmark	167,2	72 075	4,7	2 047
Estonia	36,5	16 459	2,1	971
Finland	23,1	78 168	1,7	5 741
Germany	176,4	661 400	11,7	43 800
Latvia	31,4	20 300	3,5	2 270
Lithuania	88,3	57 560	2,9	1 905
Poland	116,6	364 700	7,2	22 560
Sweden	25,5	114 720	2,6	11 827

The comparison of the total length of the land infrastructure is useless. Therefore, the analysis also presents infrastructure density. In the case of roads, the highest rate is noted in Germany, Denmark and Poland. The road development in Germany could be regarded as a benchmark. The outcomes of Denmark (small country), Sweden and Finland (northern location) are incomparable. The development of road network is connected mainly with the general cargo and container turnover in seaports.

The rail transport is essential in the case of dry and liquid bulk seaports trans-shipment. In relation to passenger transport, rail is commonly used to communicate between city centers and airports. The best developed rail infrastructure is located in Germany and Poland. Unfortunately, the technical conditions and the operational parameters of the rail infrastructure are different in EU 15 countries and the new members. On the other hand, the lack of high speed trains in the Eastern Baltic countries has triggered a more dynamic development of air connections. On the basis of the European experience, it could be stated that there is fierce competition between aircrafts and the trains like TGV, Eurostar or ICE.

Figure 26. Road and rail network density in the BSR countries.



The pipeline transport, dealing with crude oil and natural gas, is responsible for about 60% of the total turnover of the Baltic seaports. The major pipelines servicing Baltic seaports are located in the territory of Russia. In the Baltic States, therefore, the existing pipelines only connect national borders with seaports. The

⁶⁹ UK box ports.... Lloyd's List; January 2006

lengths of pipeline connections are: Latvia 437 km, Lithuania 399 km and Estonia 2000 km (gas pipeline). The other Baltic countries also possess pipeline infrastructure, but it is not strictly connected with seaports. Poland (2 278 km) and Germany (2 400 km) are the countries with East–West pipelines crossing. Pipelines are also an important element in the Danish transport infrastructure (2460 km).

Figure 27. Major crude oil ports and essential pipeline infrastructure.



Source: Internet: <http://www.eia.doe.gov/emeu/cabs/baltics.html> (21.05.2005)

Inland navigation is another mode of transport which could be important for seaport activity. Unfortunately, the natural origin of inland infrastructure limits the utility of this mode. The inland navigation occupies an important position in the national transport system in Germany, where it is responsible for 13% of total transport performance. The inland navigation utility in the German Baltic seaports is, unfortunately, limited.

Development of the land infrastructure in the Baltic countries is another part of this analysis. The most important issue connected with the MoS development is establishing competitive land connections between South – East and Western Europe. Construction of a high capacity road or rail infrastructure crossing South Baltic countries will be dangerous to the MoS concept implementation.

The basic issues concerning land infrastructure development are the TEN-T projects. It is possible to indicate several investments which could substitute future MoS connections. What is more important, the presented projects significantly increase the competitiveness level of land transport (rail and road) versus maritime. These are the following projects:

- Nordic triangle railway/road axis;
- Fehmarn belt railway [road] axis;
- 'Rail Baltica' axis Warsaw – Kaunas – Riga – Tallinn – Helsinki (TINA corridor no I).

The multimodal Nordic triangle scheme is upgrading road, rail and maritime infrastructures in Sweden and Finland to improve freight and passenger transport between the Øresund fixed link, which is part of the Nordic triangle, Stockholm, Oslo, Turku, Helsinki and the Finnish–Russian border. Upgrading rail lines should make it possible to reach speeds of 160 km/h and even, on some sections, more than 200 km/h. The distances covered by this project connecting Malmö, Stockholm, Oslo, Turku, Helsinki and the Finnish–Russian border are immense: totaling nearly 1 900 km of road and 2 000 km of rail track. Fehmarn belt railway axis is also an extension of the Øresund crossing and the Nordic triangle road and rail links and is a key component in the main north–south route connecting central Europe and the Nordic countries. It involves constructing either a bridge or a tunnel to form a fixed road and rail link spanning the 19 km - wide Fehmarn

Strait between Germany and Denmark. It will substitute for the ferry link between Rødby (Denmark) and Puttgarden (Germany). Completion of this link will also require improvements to domestic road and rail links in both Denmark and Germany. The Baltic countries currently make little use of rail for international traffic in the north–south direction. The existing network, built according to Russian standards, is slow, and is not interoperable with the Polish and German networks. Near the Lithuanian and Polish border, for example, considerable delays for passenger and freight trains occur. In some sections, speed is limited to 40–60 km/h. The three Baltic countries already have a recently renewed north–south road axis, the so-called ‘Via Baltica’, which provides an improved road link with central and southern Europe. To boost European integration further, technical options for developing the rail network on the same north–south axis now need to be examined.

Figure 28. TEN-T priority projects in the BSR



Source: TEN-T priority axes and projects 2005

On the other hand, there exist TEN-T project investments indirectly supported the Baltic MoS development. Motorway axis Gdańsk – Brno/Bratislava – Vienna and Railway axis Gdańsk – Warsaw – Brno/Bratislava – Vienna could be indicated (TINA corridor no. VI). It is crucial that presented links are located mostly on the Poland territory.

Besides the European programs (TEN-T, TINA) the national land infrastructure development plans are important for the land transport functioning. Significant delays in infrastructure development among the EU15 and new member countries caused the necessity of intensive work on road and rail route construction and modernization. On the other hand, because of the difference in country sizes, a higher scope of investments is foreseen in Poland. The works are concentrating on the railway network updating and high capacity road network development. In case of new member countries, utilization of the European cohesion and structural funds is a crucial element of investment co-financing.

3.4. Influence of the EU legislation and widening of the ports' situation

The widening of the European Union occurring in 2004 had an important influence on the seaport situation. It refers to both the West European and BSR new member's ports. The changes can also be divided into the following group: convenience, inconvenience and requirements.

Accession of the ten new member states to the EU caused a growth in the Community population by 75 m people and a widening of its territory by 738,5 thou. km². Thanks to that, the common market has significantly increased. Therefore, the first convenience is the **extension of European market** demand. On the other hand, new competitors on the common market make functioning difficult for a lot of companies. These situations also concern the transport sector. Development of transport needs and fierce competition with abroad carriers is the current market reality. The difference in transport costs (caused mainly by the level of salary) is the most important problem (road transport). In the case of the seaport sector, which has operated on an international area, the changes were not so essential. Much more important has been the changes of the 1990s, when the former 'East direction' was replaced by a western one. A rapid slump in maritime carriage has a significant influence on the port functioning. Fortunately, the seaports of new member countries rebuilt their market position after couple of years.

Utilization of the **European funds** is the one of the most important accession effects gained by the new member countries. It mostly refers to the structural and cohesion funds. Financial resources from the funds are also allocated in the transport infrastructure projects. Today, a couple of projects are realizing in the seaports. Some of these are also prepared according to the MoS needs. For example, the future EU fund contribution to the Polish transport projects is estimated at EURO 15 290m (2007-2013)⁷⁰

The second source of financial help for transport infrastructure development is projects in the framework of **Trans European Transport Network** (TEN-T). Three out of 30 priority TEN-T projects are located in the South – East Europe and include the access and port infrastructure in Gdańsk, Gdynia, Helsinki and Tallinn. The location of these investments takes advantage of the maritime transport development (North – South axes). Thanks to that, direct financial assistance could be given by the European Union. Most of the expenditures should be used on concept and design works. The co-financing level from that source could achieve the level of 30%. Motorways of the Seas is also one of the priority TEN-T projects.

European projects promoting intermodal transport is another way of supporting the new member countries. Initiatives like *Marco Polo* or *PACT* prepared activation of 'ecological' modes of transport (rail, inland navigation, short sea shipping) could co-finance separated projects. Seaports are one of the important parts of this concept. Simultaneously, strong support from the European Union for the SSS concept is also activating current functioning and the future development of seaports.

The stronger competition between companies could be indicated as an inconvenience of the EU extension for the transport sector. The concept of free market has caused a wide access of foreign carriers to the new member states. In the case of road or rail companies, this 'new' reality causes difficulties in market decisions, restrictions of the freight rate level and a decrease in profitability. It is important that transport companies from the new member countries are currently on the lower level of technical and technological development, therefore direct competition with modern carriers from Western Europe is very hard. Because of immobility of port activity, direct competition has not occurred. On the other hand, abolition of customs clearance on the borders and the abolition of borders in the future (Schengen agreement) has integrated the hinterland of the European ports. In other words, a trans-shipment service could be rendered in selected seaports and the goods could be delivered in any place in Europe via land transport. It is at the same time another incentive in land transport activation. Currently shuttle trains are connecting central Europe (Poland, the Czech Republic, Slovakia, Hungary) with North Sea hub ports (Hamburg, Rotterdam, Antwerp).

⁷⁰ Operational Program – Infrastructure and Environment 2007-2013.

Unfortunately, not only rail transport operates on the European port hinterland. Road transport is responsible for a majority of carriage, what is connected with external costs emission.

Requirements against transport companies are another important element of European integration. Legislation concerning **restricted access** to the transport **profession** and transport **market** is compulsory for all EU carriers. Issues like: financial resources, good reputation and professional license should be fulfilled by all companies. This regulation could be regarded as convenient or a problem. They protect transport customers against dishonest carriers but on the other hand are connected with additional costs for transport companies, especially small road haulages. Nevertheless, Implementation of that legislation is necessary in prospect of open market functioning.

Important requirements with reference to the new member seaports are **environmental issues**. The most important regulation concerns the port reception facilities for ship-generated waste and cargo residues. Additional duty imposed on the seaports has caused organizational problems and operational costs to increase.

The process of market **liberalization** was also conducted with reference to the **seaports**. In 2001 the European Commission prepared its first document called *Directive on Market Access to Port Service*. The port services cover services of a commercial value which are provided against payment to port users in a seaport and whose payment is not normally included in the charges collected for being allowed to call at or operate in a port. This relates to the following services:

- Technical-nautical services of pilotage;
- Towage and mooring;
- Cargo handling operations (loading, unloading, stevedoring, trans-shipment and other intra-terminal transport);
- Passenger services.

The Ports' Package proposal led to an extensive debate, both within the inter-institutional legislative process, but also with and between stakeholders. On 20 November 2003, the European Parliament in a Plenary Session rejected a compromise text. After rejection of the first Directive by the Parliament, and after various debates the Commission put forward a new and revised proposal for a Directive on market access to port services called *Port Directive*⁷¹. After discussion and as a result of seaport workers' trade union protests the directive has also been rejected, on 18 January 2006. Currently, works on the next version of document are discontinued.

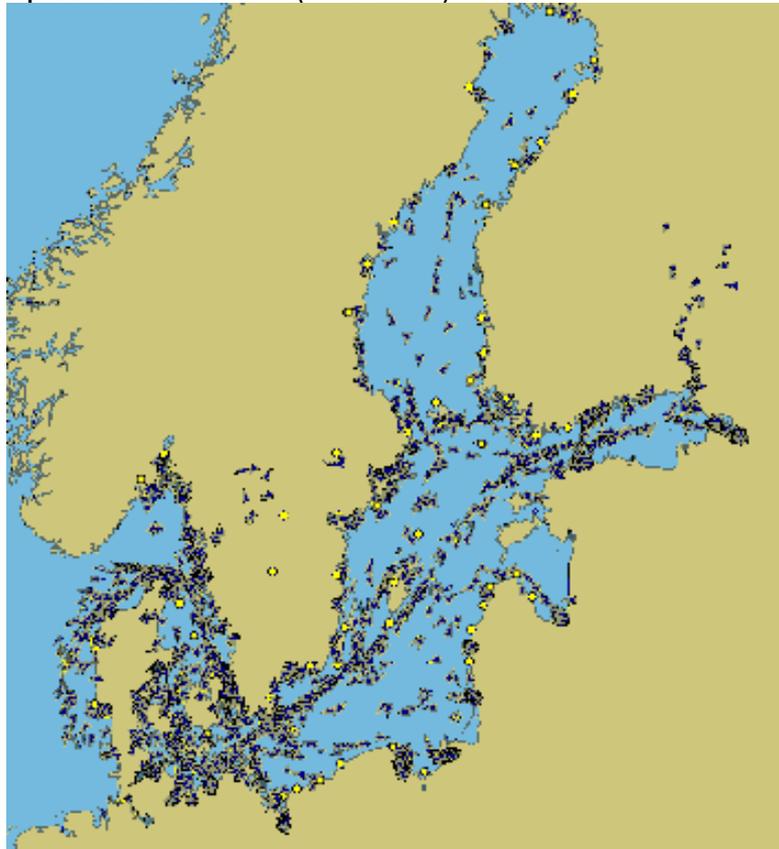
3.5. Environmental impact of the MoS concept implementation.

The implementation of the concept of Motorways of the Seas is based on the necessity of the limitation of external costs of transport. Therefore, environmental issues are an integral part of the MoS concept. Under the 'from road to sea' strategy the MoS concept has been developed and implemented in the future. According to the data presented in this report concerning the modal splits in different regional levels (EU, BSR) a drastic restriction in the road transport is impossible. Therefore; the development of the MoS should be based on the future growth of the cargo flows. Maximizing the share of the maritime transport in the carriage of new cargo volumes will result in positive changes in the EU modal split.

⁷¹ Complementary Economic Evaluation study on the Commission proposal for a Directive on market access to port services. Final Report, Framework Contract No TREN/A1/17-2003/Lot 1

General cargo is the main kind of cargo transported by sea transport. As it was mentioned before, only container ships and Ro-Ro vessels will navigate in the MoS framework. These are the most modern vessels used in world shipping. The period of fleet renewing in the case of Finland – Sweden is estimated to 3 – 4 years. On the other hand, the ships operating on the Baltic Sea have limited sizes, which is positive in the case of sea safety.

Figure 29. Snapshot of ship' traffic in the Baltic Sea (October 2005)



Source: Overview of the ships' traffic in the Baltic Sea

Development of the Baltic MoS could also have negative effects on local scales. Intensification of the hinterland connection, mostly serviced by road transport, will cause raising the quantity of air pollution and limitation of road safety. Moreover; the road infrastructure projects will cause land consumption. A more effective solution is the connection of MoS with rail or/and inland shipping. In that case both organization and infrastructural issues are important. Unfortunately, the level of development of these modes of transport in the new member countries is still low.

a) Impact of shipping (comparison with other modes of transport)

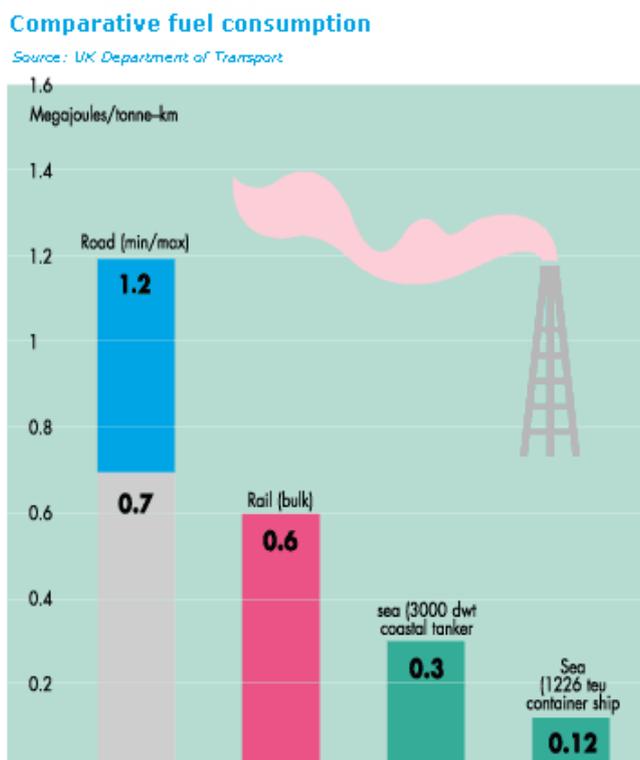
Sea transport is one of the most environmentally friendly modes of transport. When compared with land based industry, it is a comparatively minor contributor to marine pollution from human activities. Taking the energy efficiency as a comparative parameter, shipping remains by far the most energy efficient form of transport. As the International Chamber of Shipping and International Shipping Federation reports; studies carried out by the UK government has demonstrated that energy consumption of road transport by trucks lie in the range of 0.7 to 1.2 MJ/tkm. By comparison, the consumption of a 3,000 dwt coastal tanker at 14 knots is about 0.3 MJ/tkm and a medium size container ship (1,226 TEU) at 18.5 knots about 0.12 MJ/tkm.

Emissions from ships still remain one of the main concerns as regards to the impact of shipping on the environment. Emissions of SO_x from shipping due to combustion of marine fuels with a high sulphur content contribute to air pollution in the form of sulphur dioxide and particulate matter, harming the environment through acidification as well as human health, mainly around coastal areas and ports. Following the Helcom data (in both Baltic and North Seas) shipping is among the largest contributors to NO_x deposition to the Baltic Sea. According to the report on ship emissions in 2000 by the EU Commission emissions of NO_x from international shipping are expected to increase by two-thirds even after the implementation of Annex VI of MARPOL 73/78 concerning air pollution by ships.

In addition to SO_x and NO_x shipping is also contributing to the emissions of greenhouse gases (mainly CO₂) - ozone-depleting substances. It is important to underline that Annex VI of MARPOL 73/78 on "Regulations for the Prevention of Air Pollution from Ships" made the Baltic a "SO_x emission control area", demanding as of 19 May 2006 that all ships either use fuel oil with sulphur content not exceeding 1.5% or emission-cleaning systems reaching equivalent standards.

During the last years there have been significant improvements in engine efficiency. Improved ship design and the use of ships with larger cargo carrying capacities have led to a reduction in emissions and an increase in fuel efficiency. However, there is worldwide concern about atmospheric pollution and global warming and the shipping industry is playing its part with a new Protocol to the IMO MARPOL Convention which entered into force in 2004.

Figure 30. Comparative fuel consumption



Sources: <http://www.marisec.org/> - International Chamber of Shipping, International Shipping Federation

The major task for the future is to improve the quality of fuel oil supplied to ships by the oil companies, the sulphur content of which is relatively high. Improvements in hull design are expected to lead to further reductions in fuel oil consumption with consequent reductions in air pollution. The latest marine engines give a 30%-40% reduction in discharges of nitrogen oxide, with reductions of 60% likely in the future.

b) Growth of shipping traffic in the Baltic

This substantial reduction of environmental impact of sea transport should lead to further strengthening of the MoS concept in the fast growing Baltic region. However; the growing shipping traffic in the Baltic stimulated by the export of oil from Russian ports causes concerns among the international societies and environmental bodies.

The Baltic Sea is one of the busiest seas in the world and both the number of ships and the quantities of cargo afloat on the Baltic are growing rapidly. There are 2000 ships every day on the Baltic, about 200 ships are carrying oil or other dangerous goods. According to the Finnish Environment Institute in Ministry of Traffic and Communications, the Gulf of Finland will be the area with the highest growth in ship traffic. By 2015 the number of ships will increase by 50 percent to 70 000 vessels per annum in the Gulf of Finland, while the overall number of ships entering the Baltic Sea could reach a level of 140 000 vessels per year.

The increase of Russian oil export from Primorsk (recently about 60m tons a year), and thus an increase in the number of voyages of oil tankers in the Baltic together with the overall growing traffic in the Baltic increase the risk of oils spills. So far, there has been no large oil spill in the Baltic. The most dangerous one occurred in 2001 in the Danish Straits when the freighter Tern collided with tanker Baltic Carrier. The Baltic Carrier tanker was carrying 30.000 tons of heavy fuel oil 380. Release of oil began immediately from a hole in the starboard side of the tanker Baltic Carrier. This tank contained about 2.700 tons of oil. Due to the sea condition (~2,5m waves) and the extent of the boat damages, attempt failed to control the release of oil.

Table 32. Major oil incidents in the Baltic Sea 1988 - 2003 resulting in an outflow of more than 100 tons of oil

Year	Name of ship	Tons of oil spilled	Location
2003	Fu Shan Hai	1,200	Bornholm, Denmark/Sweden
2001	Baltic Carrier	2,700	Kadetrenden, Denmark
1998	Nunki	100 m3	Kalundborg Fjord, Denmark
1995	Hual Trooper	180	The Sound, Sweden
1990	Volgoneft	1,000	Karlskrona, Sweden

Source: Helcom

Following this accident in September 2001 the Environment and Transport Ministers from nine Baltic countries and an EU representative adopted a new package of measures to improve the safety of navigation in the Baltic Sea - the [HELCOM Copenhagen Declaration](#).

According to the latest Helcom studies almost 160 mln tons of oil cargo has been transported in 2004 in all majors oil terminals in the Baltic ports, while in the four largest oil terminals in the Gulf of Finland the volumes reached almost 100 mln tons.

While implementing the MoS concept in the Baltic as well as in the North Sea, environmental concerns caused by shipping growth should be taken into account at various levels (international, European, regional - Baltic). Many regulations undertaken by IMO, EU or Helcom have already been implemented or are being implemented. However; one of the most important concerns still remains as the top priority: the growing number of ships (including oil tankers) in the Baltic significantly increase the risk of collisions and oil spills. The reduction of this risk should be an integral part of implementation of the MoS concept in the Baltic.

Furthermore; the concentrations of the cargo flow that is associated with the MoS development in the ports and its surroundings should have a limited impact on the local and regional environment. Both the infrastructure projects in hinterlands and multimodal technology applied in the ports should provide a smooth cargo transfer (to avoid bottlenecks) and high land utilization and energy efficiency in the ports.

4. Market expectations

Baltic Sea is practically an internal sea surrounded by the European Union states except Russia. The industrially developed region is very a important trading and transport part of Europe with all 9 countries engaged in economic co-operation – with a lot of industry and trade units concentrated in seaports and related to the shipping sector. The Baltic Region's economic space includes more than 160 million people overcoming 350 million while taking into consideration all potentially interested countries from a direct ports' hinterland – that is an immense consumption potential for the sea borne industries.

The Baltic Sea Region continues to register strong growth in prosperity, out pacing the rate of growth in the Central European Region and the EU-25, and continues to approach the EU-25 GDP level.

The development of Estonia, Latvia and Lithuania has been achieved by the willingness of these countries to pursue an active reform process towards a market economy from the very first day of their independence. Poland – the pioneer of political and economical changes in the region is presently evolving a bit slower, but its strong commercial and industrial potential is and definitely be an indisputable advantage in the long-term future. Nordic countries will stay on their EU-level of progress lead by Finland as one of the world leaders of competitiveness.

Nothing should be taken for granted so there are opinions stated by serious market players that the Baltic Sea is ready to accept a “hub-port” – a central port receiving transcontinental containers with the aim to further cargo distribution to other ports by local feeder-vessels. Such action will be necessary and profitable for all participants when the amount of boxes will reach a number of 3-5 million TEU. Now it is approaching 2.0 – 2.2 million TEU, so those preparing new infrastructure and modernizing existing facilities in South and East Baltic ports to be ready in five years, have already made decisions confirming the change of the regional service pattern in the future. Annual trade is predicted to grow from 3% to 7% and there are clear signals from various ports that the “hub-port” idea is very seriously treated among them. These scenarios match with the SSS (Short Sea Shipping) and MOS (Motorways of the Seas) concepts of the European Union to improve transport in the whole of Europe. It may be the road to success but must be supported by all transport business sector participants, also those making vital decisions outside Europe.

The development of transport activity will be achievable as only the level of economic potential in the region will be both export and import oriented and foreign trade exchange between the Baltic Region and countries in the Northern Sea region and the rest of the world will be indispensable. EU Member States should expand initiatives to enhance small and medium sized enterprises as they are the main driving force of the economy. Maritime transport business and transit transport as one of the strongest factors in the economy are also inseparable in the Baltic region from state international relations and foreign policy. New members of the EU are actively interested in using recent political circumstances to create profits for all transport road map, directed to cargo movement.

General economic factors in the Baltic region indispensable for future development and unquestionable for steady growth in the transport industry may be stated as following:

- 1) The region's competitiveness must be increased and transport is the most important factor to make it possible and feasible to enable a common approach in economic growth issues; thanks to its geographical location, ports in the South and East Baltic are members of transit corridors between Western Europe and CIS countries;

- 2) High interest of foreign investors in the Baltic region – the area is treated as a stable developing market with rising prices and demand and an excellent window of opportunity for an interesting deal-making – new investments are formed in the shape of successful partnerships, ranging from residential developments and office buildings to industrial parks, leisure facilities and retail centers;
- 3) Opportunity costs - cost of something that one has decided not to take as an opportunity to buy – is of great importance in transport economics. In this case, the choice of alternative transport branches plays a crucial part of business decisions;
- 4) Comparison of costs of alternative transport roads – pure economic choice is not always the most important factor – personal connections, long-term customs which are compulsory and favorable;
- 5) Politics and behaviorist factors - strict economic laws count most often more than ever, especially in new EU members and in Russia;
- 6) Information age – using of the latest IT achievements is the “must” for all performed activities;
- 7) Nowadays every prediction should be treated as an open case for further studies, mainly because of rapid and unpredictable courses of incidents – one should remember that the European economy is only two years after the biggest enlargement in the history and many of the so far predictable correlations can not be treated as everlasting and as a fundamental base for the future – unforeseeable events are more and more often decisive factors modeling commercial relations which are the background for transport decisions;
- 8) Emerging markets of the Baltic region – economic development and financial stability still have a relatively significant political risk;
- 9) The growth rate in these countries accelerated and stabilized on a high level – the main reasons: EU membership, open markets, adjustment of production and service sectors offers higher market requirements in EU-15 countries, free capital flow, Direct Foreign Investments as one of the main growth reasons;
- 10) The scenario for transport resulting from all the above-mentioned circumstances should imply a steady growth in volume – as in the EU, the rate of maritime transport in foreign trade overcomes 90%, the future increase should be considerably high;
- 11) Opening of economies of Baltic States and Poland supplemented by external finance sources are the main reasons for the investment boom;
- 12) A direct effect is fulfilling growing export rates which is a necessary foundation for international trade which in the end is the pushing element for maritime transport;
- 13) The Global reason – a growing rate of foreign trade with Far East countries: China, India, Philippines, Indonesia and Malaysia – the growth level in these countries is caused by making use of internal savings and relatively cheap labor costs, import from these countries is very much noticeable in the Baltic region;
- 14) Growth acceleration is also observed in Russia due to the high prices of oil and oil products – these tendencies are going to stay steady, as one has to be conscious that the oil price is very flexible;
- 15) Political risks diminished during the past years mainly because the new EU members adjusted to EU standards;

- 16) Poland is considered a stable business partner, has a very good and attractive location on the main transport routes, ca 1,2% of world FDI amounting to 650 billions of USD was invested here and Poland is expects a fifth position by the world foreign investors due to its attractiveness for them after China, India, USA and the UK – a very convenient position as a starting point for trading with East European countries;
- 17) The Baltic region will stay the most competitive region in Europe.

4.1. Expectation from existing traffic flows and from the analysis of predicted growth

The following conclusions results from the regional market analysis:

- 1) The Baltic Transport Market is developing under the influence of the global economic course of actions on one hand, and, under local alliances and co-operation agreements on the other – the last mentioned are very often the results of regional Direct Foreign Investments;
- 2) Sea ports are the integral part of the maritime transport chain – all performed actions should make carriage of goods easier, faster, more functional, cheap, effective and easily available – all truism but still most importantly, necessary and prerequisite conditions;
- 3) Simplicity is and should be one of the main factors and reasons of the MOS creation as written down in the EU White Paper – all due actions will be highly appreciated by all transport chains users;
- 4) Implementation of harmonized competitive relations between maritime transport and other branches should be the crucial point of sustainable development taking into consideration that maritime transport is the most ecological mode of transport;
- 5) The highest frequency and capacity in the Baltic Sea area exists between Germany and Finland, Southern Denmark/Germany and Baltic States and Poland and Eastern Sweden;
- 6) Successively new innovative technologies in maritime transport must be developed, such as integrated standardized solutions for ports and vessels using multimodal transport elements with effective trans-shipment of goods in sea ports with a high engagement of IT and VTS models;
- 7) Construction of regional logistics centers and industrial and technological parks in ports and in ports' direct hinterland, rendering value added services for goods and transport vehicles must accompany all internal investment port's projects;
- 8) New transport routes are a consequence of port investments which are an obligatory condition for the diminishing of still inexorable growth of road transport, especially on East-West-East direction;
- 9) According to the EU Commission's White Paper, three major actions should be performed: changing of the modal split in the long term horizon, eliminating bottlenecks in ports through tackling of the congestion and placing of safety and quality as one of the most important items of transport policy;
- 10) Short sea shipping and motorways of the seas will become the main target as the only vital alternative for land transport, but on the other hand, they must be simultaneously supplemented by efficient and well accessible road and railway connections in the hinterland;
- 11) All new ports' infrastructure projects will be based on reasonable and updated turnover capacity, transparent procedures and tariffs;

- 12) Public-private partnerships will be treated as one the most important alternatives for future investment in infrastructural projects, as mentioned in the EU White Paper;
- 13) All stakeholders engaged in maritime transport should give a considerable amount of thought to make seaports more and more effective – to enhance the overall productivity, environmental friendliness and safety regulations for all cargo and all turnover operations – namely to make port facilities – land infra- and superstructure and hydrographic infrastructure optimal on the highest possible level, the reduction of ships turn-round times in seaport terminals;
- 14) Referring to vessels: assistance of ship approaches in all weather and hydrographic conditions, remote control of ships, navigation and maneuvering assistance systems, effective and safe tugboats and mooring operations;
- 15) Integration within logistics chains and regional logistics platforms creating the most possible under certain market conditions intermodal forms: integration on container traffic for lo-lo, Ro-Ro and dedicated and public feeder operations, including bulk vessels wherever and whenever necessary (harmonizing of public and private business ventures and implementing of uniform documentation standards);
- 16) Optimization of waste management systems due to compulsory EU regulations;
- 17) Implementation of national and international user friendly legislation and lobbying activities in governmental and institutional agencies;
- 18) Introduction of all new research developments, innovations and latest possible IT technology not only in the transport sector but in all interrelated sectors of national economies - IT and modern communication systems will be indispensable for keeping maritime transport on a competitive level;
- 19) Value innovation challenges – what has been done and what is performed: improving the efficiency of all service providers of the maritime transport chain to obtain a cost level lower than in land transport;
- 20) SSS and MOS must be vital parts of fully integrated European supply systems in terms of costs, reliability, safety, environmental friendliness, ease and transparency of choice, security to cope with market demand;
- 21) Ports must introduce faster cargo handlings to maximize port throughput - new terminals and hinterland connections must be planned subject to growing ships sizes, both ships and port terminal facilities must meet their construction limits to ensure the efficiency of waterborne transport to obtain the shortest possible turnaround of cargo in ports;
- 22) River-sea transport should be considered as one of the most perspective and cost effective modes of transport for the region – comparatively expensive investments projects should in the long-term period bring very significant results in terms of savings related to sustainable development (lack of such systems in Poland is the main bottleneck for water connections between the Baltic and Mediterranean seas);
- 23) Integration of ICT (Information and Communication Technologies) and ITS (Integrated Transport Solutions) are planned to be developed to make cargo flow cost-effective and logical within the scope of planning phases of transport, booking orders, monitoring of goods' carriage and establishing of all supporting jobs and services – in all mentioned range of activities all stakeholders of the European Transport Network should and must be engaged.

4.2. Market transformations and outlines to influence current and future traffic flows in the Baltic Region

All what is being performed in the Baltic region, in that part of Europe is the reflection of the procedures and undertakings being implemented in the global markets of transport services determined by the world economy. New projects are most often the compilation of different aspects in micro and macro scales defined by economies of countries located directly on the sea coast as well as from long distance hinterland cargo owners. The most important factor for all new intentions is time – the only good which cannot be bought and saved for the future when the economic situation will improve. That is why it is priceless as, once wasted, it may lead to a completely different paradigm not always compatible to our plans and intentions. The other very significant feature seems to be finance, and no doubt it is – but even more consequential items to rethink again and again in the transport sector are with whom and where to invest, and whether and when, as such decisions are costly and always of long-term consequences. New transport projects may for many years change existing service patterns which sometimes are so deeply encoded in decision makers' minds they even do not expect that a 'wind of change is blowing' and taking away most of the present profits and maintenances.

Having in mind the above-mentioned statements and predictions, new alternative schemes for transport solutions may be presented as follows:

- 1) Main Baltic Sea and road transport corridors in the Baltic region will remain in an east-west-east direction;
- 2) Big business from Russia is moving to St. Petersburg and its neighborhood, a lot of new investments are under construction (car industry [Nissan, Toyota]) and the level of consumption will undoubtedly grow. The cost of construction of the new City is estimated to 2 billion USD but oil companies and financial institutions and banks are moving their headquarters there.
- 3) Construction of industrial parks in Latvia – more than 20 companies are engaged in these projects, most of them are located in seaports of Riga, Liepaja and Ventspils, by the end of 2007 16 new projects will be open on a total area of 254 hectares, usually it takes about 3 years to build a network of customers, this is an effective mechanism to rebirth and recovery from crisis situations, brings regional economic prosperity and hundreds of thousands of new jobs, they are commercial projects providing companies with infrastructure for doing business.
- 4) Growth in the real estate market in Lithuania, Latvia and Estonia, also in Poland exceeds most experts' expectations, percentage change in average sale prices amounts to 25-30% and they still have enough space to grow, in the next five years even by 100% as there is still a big difference between new EU countries and Nordic countries and Germany. Prices of real estate are always predetermined by supply and demand factors of the market and growth of loan and mortgage credit portfolio which is the result of the growth of the consumer improving expectations so the fundamental factor is economic growth – especially the Baltic States have been the most dynamic region in the EU (decrease of unemployment level together with acceleration of wages), the highest price of office space is in Tallinn and Vilnius – demand is still considerably high what is the confirmation of regional business development;
- 5) In 2005 the Baltic States showed the most robust growth race in the enlarged EU, in terms of real GDP growth Latvia took a leading position posting an annual rate of 10.2%, whereas Estonia and Lithuania were 9.8% and 7.5%, respectively. The main growth driver in all three economies was domestic demand –

low interest rates and brightening expectations of business fuel final consumption and investment expenditures; foreign trade – EU accession removed trade barriers within the single EU market – economic outlook continues to be good – the growth will not reach the same rates (stagnating export markets, high international oil prices and labor emigration) but still record-low interest rates will continue to stimulate consumption and investment, EU structural funds call for economic restructuring and there is a boost in the service sector after the EU entry .

- 6) In the nearest future, the Baltic economies of newcomers will continue their success by growing at the highest pace in the enlarged EU and under the assumption that the economies of the old EU members will grow at annual rate of 2.0%, the Baltic States can reach their standards in 15-20 years – so this interval should be a period of profitable transport activities;
- 7) April 2006 – an agreement between Russian and German railways concerning transit of goods from Far East countries to Germany through Russia by rail;
- 8) Russian railway freight tariff policy has and will have a direct influence on cargo turnover in Baltic State ports;
- 9) Transit: Russia – by the 2009 Russia may gradually reduce high railway tariffs for cargo aimed for the Baltic ports, on the contrary Riga increases freight tariffs on Latvian territory – this may lead to a loss of clients and redistribution of flows. The main cause of this action is the increasing of wages of medium and low-level staff – a problem of emigration to Western European countries;
- 10) Transit: expanding co-operation opportunities are discussed for future development between Latvia and Belarus – the new geopolitical reality in the region facilitates more active commercial relations, Latvia for Belarus is not only the trade partner but is an important transport corridor: 88% of Belarus cargo is sent abroad by Latvian ports, i.e. 25-27% of total turnover of Latvian ports, they are the main gate to Europe and the World; these economic ties will only grow stronger and stronger each year, but some shipments may be moved to Lithuania because of the rise of rail freight rates by 20-26% ;
- 11) Transit: good economic relations with Kazakhstan – Kazakhs are interested in increasing cargo transportation to the markets of Western Europe through the port of Klaipėda and shuttle container trains, this would positively influence the co-operation of both countries with Russia in transit sector; this will secure the handling of Russian and Central Asian countries' transit cargo; the situation may improve considering the forthcoming Russian admission to the World Trade Organization – Russia will have to equalize railway tariffs and apply equal prices both inside the country and for international transportation – it will be necessary to combine interests of all participants of transport chain: cargo owners, railways, ports and shipping lines;
- 12) Transit: train *Viking* running between Odessa and Klaipėda connecting the Black Sea and Baltic regions and *Mercury* running by the route Klaipėda/Kaliningrad-Minsk-Moscow allowing cargo owners and forwarders use of the most favorable and suitable model of logistics chain are day by day justifying themselves;
- 13) Co-operation possibilities using various funds from the European Union between Kaliningrad, Lithuania and Poland – the main task is to increase the Kaliningrad region: in five years the construction of dwelling houses should increase by 7-8 times and not less than 700 km of modern highways should be built – the new tax law in Russia might be interesting for investors;

- 14) Total investments in new container terminals in Polish seaports amounts in prospect to 730 000 TEU, taking into consideration the existing potential it may reach 1.52 mln TEU during the next 5 years – this is the answer for the present demand and the guarantee that maritime transport will become a more and more competitive branch of transport. This will force to establish new hinterland connections to enable steady and smooth transport of boxes to and from seaports;
- 15) Rapid and embracing almost all airports of the Baltic region development of passenger air traffic caused mainly by the low cost airlines will in long-term future diminish the present amount of passengers traveling by ferries and ro-pax vessels within the Baltic and using connections between the Baltic and the rest of Europe;
- 16) Cruising within the Baltic Region having connections with North Sea ports will definitively grow after the EU enlargement – this will force new investments in seaports.

4.3. Recapitulation

The main idea of the motorways of the sea concept is the shortening of the transport distance by service providers and resulting in the most effective logistics solution for all transport users. The paradox of such an undoubtedly legitimate intention is the necessity of the construction of completely new or modernized land highways in seaport hinterlands as without them the MOS will be a road to nowhere; taking advantage of the definitely exceptional new added value which the MOS may bring cannot be utilized.

New investments must be performed in parallel to port and shipping sectors, and one has to be aware that the tonnage essential for such special needs of short sea vessels is not in disposal which may guarantee its common availability for all new planned connections.

One of the most trustworthy items which definitely gave an assurance to all decision makers responsible for seaborne transport was the EU enlargement in 2004 and all projects which are under construction and which are both terminated and planned to be commenced in very near future.

Regional “hub-port” for all vessels which may due to the depth of Danish Straits enter the Baltic Sea is a project which will during next 5 to 10 years change existing ship to shore patterns – nobody is able to make a prediction how big such remodeling can be still today but everybody should be almost daily updated.

The paper was prepared based on a desk research method and some of its items may be enlarged due to the direct talks and discussion with all major market players – the transport system in the Baltic region is changing very rapidly after May 2004 so a constant thorough examination is recommended to all parties involved.

5. Recommendations

The analytical part of the study has focused on: 1) trade and cargo flows analysis, 2) traffic flows analysis and 3) general overview of existing market expectations in the Baltic Sea region (BSR). The **final outcomes** of the accomplished research part emphasized that:

- 1) The BSR is a specific European region with still existing significant social, economic and structural differences among the countries surrounding the Baltic Sea which at this early stage of the integration of their economies - mainly due to ongoing liberalization have triggered rapid GDP growth and trade development within this region and with the countries of the North Sea, especially with the UK.
- 2) The growth dynamic is differentiated between the group of still transforming their economies, new EU member states, which have grown in the recent years at the rate of 6-8 % annually (GDP growth in Latvia reached even 13.1 % in this year) and the group of the well developed old EU member states, which growth dynamic is much slower but stable and much more sustainable than in the first group of BSR countries.
- 3) The new rapidly growing EU BSR countries, closely cooperated with other BSR neighboring countries, except for Poland, do not generate substantial trade potential in terms of value and volume for this region and the North Sea region (NSR); their economic and trade potential is relatively low and mainly concentrates on the intra - Baltic trade, especially with Russia and Germany. That general tendency will not change over the next 8 – 12 years.
- 4) The main trade flows between BSR and NSR (United Kingdom) are being generated by the old EU BSR countries such as Germany, Denmark, Sweden and Finland, where the UK belongs to the group 3 - 5 most important foreign trade partners. That is not the case for Poland, where the PL - UK trade relations are not very intensive in terms of value and volume as well. None, except for Germany, of the BSR countries belongs to the group of the five most important UK foreign trade partners.
- 5) Apart from Germany, the total foreign trade exchange volume of all EU Baltic countries with the UK has been practically equal to that of Russia (22 – 24 ml ton). It will grow in the next 5 – 10 years much faster than the foreign trade of the EU BSR countries and may dominate this trade and transport relations in terms of volume.
- 6) Only one tenth of the total external exchange volume of the BSR countries accounts for the UK trade relations, i.e. ca. 93 m tons. It will grow significantly mainly due to the development of two dominant trade relations: Russia – UK and Germany – UK. Approximately in the next 10 years the annual rate of growth amounts to 3 - 4 % in average. Later on, the trade volume might stabilize at a level of 138 - 146 m tons.
- 7) Sea transport plays an absolutely dominant role in serving the trade volume between the BSR and the UK. Nowadays it accounts for more than 92% of the total modal split existing in these relations. Only 6.7% of commodities are carried by road and very few by rail and air. Such modal splits preferring short sea shipping give a clear signal that the Motorways of the Baltic Sea connected with those of the North Sea and directly linking the BSR with the UK are really needed at this stage of economic and trade relations.
- 8) Much more of a transparent view, especially with connection to the MOS can be obtained, while only taking into consideration general cargo flows on that route. It only amounts to 19.2 m tons, i.e. a little bit less than one fifth of the total cargo turnover passing that route. However, general cargo flows constitute

the only regular and relatively stable commodity streams transported by container vessels, Ro-Ro ships and ferries crossing the Baltic and North Sea east- and westwards. Moreover, it constitutes the real base for MOS arrangements in those relations.

- 9) In that case, however, the modal split is less favorable to maritime transport. Indeed, transport by sea accounts for more than 88%, but road share increases to about 12%. The rail and air play quite marginal roles (0.3%) in BSR –UK transport relations.
- 10) The relatively high position of road haulage as compared to shipping is a result of achieved market shares by road haulers in this transport relation mainly from Poland and Germany as well as other North Sea continental countries reaching the UK by the English Channel or by sea from German and Dutch seaports. The existing well developed road transport subsystem, i.e. motorways and expressways e.g. the recently built up new excellent A 20 road connection between Lübeck and the eastern German border (Szczecin), free well logistically organized access to the internal EU market (except for cabotage for Polish and other new EU member state haulers) as well as the relatively high flexibility of that transport mode in operational and pure economic terms (costs and time savings) favors it still considerably compared to maritime transport.
- 11) On the one hand, the currently obtained market share by road haulers on those relations is a result of the above-mentioned high flexibility of road operators, but on the other hand, it reflects the existing weaknesses of short sea shipping nowadays, especially in the south-mid and east Baltic Region, namely the lack of appropriate hinterland transport connections to the main seaports (Poland) and the highly dispersed volume and spatial demand for transport services on those relations, i.e. to the UK. Due to this specific demand-oriented market situation, mainly from general cargo originating in Poland and the lack or underdevelopment of logistics and distribution logistics centers located in the hinterland, which might concentrate a larger volume of cargoes, road haulages are in a quite natural way, just from the market point of view, privileged to serve those relations either directly or indirectly. In fact, taking into account the relatively small quantities of commodities (containers) coming from many dispersed points of origin and destinations, which create narrow streams of cargo carried on those relations, road haulages are almost in a monopolistic market position in inter modal competition.
- 12) However, it may be assumed that road haulage as an alternative and to some extent competitive to maritime routes, transport connections in a BSR – UK relation (except in many areas of Germany and partially Poland, as mentioned above) do not currently play a special important role and due to the elaborated prognosis relating to the EU modal split by the end 2010 and 2020, it will not strengthen today's position significantly. Moreover, the development of short sea shipping on that relation and the creation of the motorways of the sea connecting the BSR and NSR as well as enhancing ports – hinterland transport connections and development of distribution-logistics centers ought to improve and enhance the competitive position of the maritime transport in servicing BSR – UK trade relations. As a result, due to the implementation of the EU transport policy measures, and among other things, the pricing policy based on social marginal costs, the road haulage position will gradually be diminishing by 2012 - 2015 while the maritime transport increasing. Consequently, its share in the modal split on the BSR – UK transport market is to be reached by 2015 at least 92 - 94%. To the main beneficiaries of that process will belong among others Polish seaport operators from Gdynia/Gdańsk and

Szczecin/Świnoujście as well as short sea shipping companies operating on those routes and logistics operators as main actors who will be able to enforce it.

- 13) According to the trustworthy trade and transport forecasts issued by the German, Swedish and Finnish institutes as well as published in EC, OECD and UNCTAD reports and analytical communications, due to the rapidly growing external trade mainly of the BSR countries but UK too, general cargo flows in this direction will continuously grow by 3 - 4% a year till 2010 and 2 - 3% annually in the next 5 years, reaching 26 - 28 m tons by the end of 2015. This rate of growth will be much lower than in intra Baltic relations (5 - 6%) and less than the rate of growth of liquid and dry bulk cargoes carried on the BSR - UK route (annually 4 - 5% in average).
- 14) The two main maritime transport routes in the BSR - UK trade and shipping relations will predominantly be: 1) the Baltic route Finland/Russia - UK and 2) the North Sea German/Holland- UK. The last one, besides German and Dutch general cargo flows, will concentrate on commodities provided by feeder ships from the Baltic States, mainly from Latvia, and Lithuania as well as Poland. It means, that the already existing third shipping route, directly connecting the seaports of those countries with German and Dutch ports, will be as an indirect connection BSR - UK further developed and even strengthened, constituting like the two main above mentioned maritime transport routes, the real base for the next MOS in this region.
- 15) It is likely to increase the concentration on the both routes, as a result of growing trade flows and the forthcoming development of MOS projects in this region. Additionally, the environmental friendly policy carried out by EC and BSR countries (CBSC, HELCOM) as well as adopting safety and security measures are creating the necessary grounds for concentration of the traffic flows in the Baltic Sea. Both, economic and environmental factors as well as political ones seem to strengthen the process of concentration of cargo flows (mainly liquid bulk cargo and hazardous goods) on the BSR - NSR shipping routes.
- 16) However, it does not mean that the nowadays-existing number of shipping lines and maritime connections linking both regions and the shipping density will increase substantially. The concentration of traffic flows will undoubtedly enforce and speed up the slowly ongoing process of horizontal and vertical concentration (merges, alliances, etc.) among the operating shipping companies, port terminals operators, railway companies, logistics supply chain managing companies and other participants of intermodal logistics transport chains. They will need to apply new information and intermodal, logistics standards in the whole supply chain and adapt themselves to much higher market expectations and more transparent competition within and between the supply chains. Moreover, such a process will strengthen a tendency towards installing bigger ships (economies of scale) on the shipping routes mainly connecting F/R - UK and G/H - UK ports. On the third, indirect direction L/L/P - G/H that last named tendency will not be so visible in the next 4 - 5 years. We will envisage it after 2010-2012, when much more traffic will be generated from those countries and additionally transit goods from Belarus, the Ukraine as well as southeastern European countries and Kazakhstan.
- 17) The growing trade and traffic on the BSR - NSR routes has had vital impact on seaports and their development. The total throughput in the main seaports of the Baltic Sea countries has gradually been growing since the end of 90s. The annual average rate of growth accounts for 4 - 5%. This trend, due to increasing seaborne trade among the BSR countries and with other EU countries will continue over the next decade. It should be emphasized that not only the cargo turnover and the total passenger traffic in

the top Baltic seaports has grown significantly in the recent 5 years, mainly in east – west relations, but the structure of the handling goods is steadily being changed in accordance with the structural changes of the seaborne trade passing the BSR seaports. Those seaports have envisaged the growing volume of general cargo and especially in this group container and Ro-Ro traffic. Referring to the recent forecasts, the expected growth rate in that segment of general cargo traffic amounts to 7 – 8% annually.

- 18) Due to the growing cargo turnover as well intra and inter port competition, the handling capacity of those ports has substantially been increased and modernized. The huge investment programs have been carried out in the group of biggest and most competitive Baltic ports in the recent few years and a great deal of new spectacular in many cases investment programs (Russian, Finnish, Latvian and Polish seaports) are being undertaken or will be in the next years. Apart from some liquid and dry balt cargo terminals (Finland, Latvia and Russia), the main efforts are being focused on the development of the container terminal capacity. This kind of handling potential and port activity seems to be for universal seaports in both BSR and NSR most prospective and progressing.
- 19) Besides the undertaking and accomplishment of several significant investment projects, new handling technologies, organization, information and logistics systems are being adopted by the majority of the most important and competitive BSR seaports. They have adopted and applied new environmental and safety standards set up by IMO, Helcom and EMSA too. These seaports are generally in line with the shippers and shipping operators' expectations, simultaneously being strongly market oriented towards meeting the effective and potential demand for services provided by the terminal operators. As a result of such a market oriented strategy, their markets for port services are not only an integral part of the transport markets existing in that region but they are, in fact, mostly fully integrated in the transport markets surrounding those seaports.
- 20) Although the majority of seaports and the biggest container/Ro–Ro port terminals in BSR are sufficiently connected with the hinterland by road and rail as well as inland waterways, being in fact an integral part of the TEN – T priority axes and other important EU transport corridors, some suffer from the lack of that kind of hinterland transport infrastructure. First of all, to that group belong Polish ports and a few ports in the Baltic States. They are naturally handicapped in such a way, being not suitable enough to develop at this stage better foreland connections (in the form of short sea shipping) and not eligible to apply for MOS construction and EU start – up aid. Furthermore, those ports encountering such transport barriers can not be efficiently linked to the intermodal transport corridors staying practically outside the EU programs supporting the development of combined transport aimed at strengthening intermodality in land – sea connections (Marco Polo).
- 21) The transport obstacles, hampering to great extent the quality of ports' hinterland connections to the main manufacturing, consumption and distribution centers, do not enable those seaports to construct and develop logistic centers and transform themselves into the logistics platforms. Consequently, such seaports can not be fully incorporated in the intermodal logistics supply chains and can not generate sufficient added value to all users interested in multiplying it thanks to a continuously progressing liberalization and deregulation of trade and transport markets in the EU and in the global scale.
- 22) The lack of full liberalization on the transport markets in the EU, as a result of the lagging liberalization of railway markets (several times the deregulation of the railway sector and freeing of freight and passenger markets has been postponed) as well as an existing diversity in charging practices for the use of transport

infrastructure between the modes of transport and among the EU countries, hamper no less than serious shortcomings in the transport infrastructure, the transport markets transparency. As a result, the efficient and effective choices of supply and transport chains are in fact very difficult. Such heterogeneous transport systems existing in the BSR (much more intensive) and in the NSR (less intensive) countries can hinder to some extent the process of efficient establishing of MOS in both regions. It might lead to serious competition distortions not only between the maritime transport and other transport branches but among the supply chains crossing the BSR and NSR as well.

- 23) Subsequently, the development of short sea shipping and the motorways of the sea will improve the nowadays-existing competitive position of the maritime transport in some trade relations in the BSR. Its competitive advantage is to be reached at those routes where the traffic flow concentration will be particularly high and the MOS – land TEN – T connection will be fully integrated guaranteeing all users and transport operators some kind of added value in terms of time and cost.

Taking the results of the study into account, the following **general conclusions** may be drawn up:

- 1) On the BSR – NSR routes there currently is, with particular attention to the UK ports, appropriate and required market potentials determined in terms of cargo flow intensity, adequate tonnage and carriage capacity as well as seaports handling capacity to install motorways of the sea in those relations.
- 2) Many nowadays existing shipping relations connecting mainly northern and eastern BSR ports with German and Dutch ports as well as UK seaports have already fulfilled all requirements and a relatively high-standard criteria set by the EC. As a result, there are eligible types of MOS projects meeting the requirements laid down by the Decision No 884/2004 (OJ L 167, 30.4.2004) and by Regulation (EC) No 807/2004 of the EP and of the Council (OJ L 143, 30.4.2004).
- 3) To those possible maritime routes (countries' maritime relations) suitable for Motorways of the Sea, which can potentially generate MOS projects already meeting the EC criteria, belong: 1) on the Baltic Sea: a) German /Rostock, Lübeck, Kiel / - Russia/Lithuania/Latvia; b) German Baltic seaports – Finland/Estonia; c) German Baltic seaports – Denmark/Sweden, 2) on the North Sea – Baltic Sea relations: a) UK seaports – Dutch seaports (supported by feeder services from Polish, Russian and Lithuanian ports); b) UK seaports - German seaports (Hamburg, Bremerhaven) strongly supported by the well developed network of feeder services connecting those ports with Polish, Finnish and other eastern Baltic seaports; c) UK seaports – Swedish and Danish seaports.
- 4) In five or six years time but no earlier than 2010, after completing new hinterland transport relations, especially in Poland and constructing the necessary logistic centers in the seaports and at their hinterlands, due to the growing foreign trade potential with the Baltic countries as well as UK and shifting a great amount of cargo from road to the sea (50-60 % of the current volume might be possible), new MOSs in the BSR and NSR are to be installed. The possible routes suitable for those MOSs are: 1) within the Baltic Sea area: a) Polish seaports (Gdynia, Świnoujście) - Swedish/Danish seaports, based mainly on well developed ferry relations; b) Polish seaports (Gdynia, Gdańsk, Szczecin) - Finnish/Estonian seaports, 2) on BSR – NSR routes: a) Polish seaports – German/Dutch seaports; b) Russian Baltic ports (St. Petersburg, Kaliningrad) - UK seaports. Nowadays there are no real grounds indicating that till 2015 a direct MOS connecting Polish and UK/NI seaports may be established.

- 5) The indicated MOS projects in the BSR and NSR, based on existing and predicted traffic flows intensity and still ongoing concentration of commodities supply chains, will take advantage of well developed transport infrastructure network, mainly EU TEN – T priority axes. Poor quality standards of the underdeveloped hinterland transport infrastructure will be in some parts of the BSR (Poland, Russia) the main technical and organizational barrier of MOS development and the creation of efficient logistics intermodal transport chains.
- 6) Taking into account the existing and predicting modal split in carriage of goods in relation between the BSR and NSR, MOS projects will not cause any significant cargo and traffic shift ‘ from road to sea ‘. Only in the southwestern part of the BSR (Poland, Germany) such a shifting is potentially possible but on a minimum scale. In this context, the MOS projects in the BSR will be specific to some extent and not fully in line with the EC expectations.
- 7) The MoS development in the BSR and the NSR will cause significant changes in the transport market structure. As a result of the additionally enforced traffic flow concentration, horizontal and vertical capital concentration in the particular supply chains will be accelerated. New mergers and alliances will be set up on the Baltic transport market. The big logistics and transport operators will be getting bigger and stronger. Consequently, an oligopolistic form of the Baltic maritime market will emerge.

The conclusions drawn up from the analytical part of the project constitute an appropriate and sufficient ground for pointing out some recommendations aimed at the **European Commission** and other parties and actors directly committed in the MoS development. First of all, they should be addressed to the EC and especially **DG TREN**, in charge of efficient implementation of the MoS on an EU scale. Therefore, the following recommendations are being addressed to the EC:

- 1) The specific character of the Baltic Sea Motorways (BSMs) should be recognized. The European Commission ought to admit and accept such a mainly maritime oriented status of major BSMs, which is quite atypical for other programming in the EU motorways of the sea. Though, BSMs will not change the effective and potential transport demand structure on the Baltic market and do not cause any significant changes in the nowadays-existing modal split. As a consequence, they will not meet at least one of the objectives laid down in Article 12 a of the Decision No 1692/96/EC amended by Decision 884/2004.
- 2) BSMs planning in south – north relations needs to be particularly supported by the EC in order to establish an appropriate proportion - a kind of balance, between them and the east – west BSMs, since the formal requirements set by EC in Art. 12 of the TEN – T Guidelines (A *Vademecum* issued in conjunction with the call for proposals TEN – T) especially for seaports, are very high and they might be in the southern part of BSR in the next 4 – 5 years not fulfilled. In order to create such a balance in the BSR, the funding instruments allowed for all infrastructures and facility categories as well as services, e.g. those applicable under the TEN – Regulation and TEN – T Guidelines as well as other programs (Marco Polo, regional funds, etc.) are to be combined with start-up aid and state aid funding sources to accelerate bridging the existing gaps in this area nowadays. In this regard, Article 9 of Regulation 1382/2003 is to be redefined allowing so-called ‘double funding‘ in those particular cases. Moreover, Article 12a (5) TEN – T Guidelines should in such cases enable to grant start-up aid for more than two years even if public support (state aid) is necessary to commence the project.
- 3) BSM and NSM development has to be duly coordinated and synchronized with the development of TEN-T projects (Decision No 884/2004/EC of 29 April 2004, OJ L 167). The first ones, regarded as an integral

part of the TEN – T priority projects, need to be operational by the end of 2010, while many of the rest of TEN – T projects listed in Annex II of the said Decision should be concluded by 2020. Without proper supervision of the accomplishment of the TEN – T program competition distortions on the BSR countries transport markets may occur, influencing the trade and traffic flows and transport relations in the framework of BSMs.

- 4) Homogeneous charging practices in all modes of transport need to be worked out as soon as possible, relating to the recommendations defined in the EC White Paper on fair payment for infrastructure use (A phased approach to the common transport infrastructure charging framework in the EU; COM (1998) 466 final) and White Paper on European transport policy for 2010: time to decide (COM (2001) 370, Brussels, 12.09.2001). Only long-term social marginal costs shall be implemented as a cost-based principle of charging for infrastructure use in the logistics supply and transport chains which will constitute the BSMs and NSMs. Due to that solution, much more traffic, than nowadays expected in the framework of existing heterogeneous charging practices, will be shifted 'from road to sea' on the Baltic Sea routes and the Baltic transport market will be much more transparent. Otherwise, as a result of the BSM development and their interconnections with the NSM, significant competition and market distortion are not to be avoided.
- 5) The EC needs to consequently support the further development of short sea shipping and the combined transport in land – sea relations. New incentives for all parties involved in carrying out those concepts should be set up, aimed at accelerating the development of intermodality and better interconnections among the Baltic Sea countries and the BSR with the NSR in terms of establishing new and much more reliable transport ties. Programs for the Promotion of Short Sea Shipping (Proposal for a Directive of the European Parliament and of the Council on Intermodal Loading Units. COM(2003) 155 final, Brussels, 2003) and Marco Polo (Bottlenecks in Door-to Door Short Sea Shipping and a Potential Solution DG TREN. Internal documents and comments. Brussels, May 2005) as well as and many other documents and initiatives need to be supplemented by the EC and promoted by the use of new economic and financial measures. Without those initiatives and realistic programs the establishment of BSMs, especially in the south eastern part of that region will be postponed after the year 2010 with all negative consequences for the affected parties.
- 6) It is important to indicate, that some necessary momentum in the interoperability of the transport system of the BSR countries should be reached. It especially refers to the railway sector of those countries where huge technical, technological and operational diversity in existing railway infrastructure and traffic management systems has been identified. Without setting up TSI (technical standards of interoperability in the EU conventional railway system (Directive 2004/50, OJ L 164 of 30 April 2004; second railway package) it will be very difficult to develop a homogenous and integrated railway market in that region. Such a kind of market is very important for the development of railway ferry connections, which constitute the real base for BSMs – particularly in east – west relations. Additionally, with respect to railway transport, the EC shall speed up the process of railway market liberalization and deregulation. The freight as well as passenger markets should be open for all EU licensed railway operators before 2010. Otherwise, the program of MoS development will be not coordinated and synchronized enough with creating a common European transport market. It could be very painful for BSMs operators and users.
- 7) All identified barriers hampering the development of tourism in the BSR (e.g. Vistula bay at the Russian/Polish border) and influencing a free as well as a smooth flow of passengers on maritime routes

need to be removed. Much more EU commitment in that area seems to be necessary. Other parties, e.g. CBSS, interested in passenger traffic growth need to be involved too. Passenger traffic flows might significantly strengthen the existing maritime transport routes and facilitate BSMs development.

- 8) The European Commission at the stage of gathering of MoS proposals should cooperate more closely with all representatives of seaports (ESPO, FEPORT, BPO), ship owners and shippers deeply interested in BSMs development. Such kinds of cooperation may bring additional benefits in the form of synergy effects in this area and allow taking the decision in line with the market requirements.

In order to strengthen the efforts aimed at developing the MoS in both regions other directly interested parties, apart from international organizations and institutions, need to be much more committed in those undertakings. It regards mainly respective member states and particularly transport ministries in those countries. They should not focus only or even exclusively on hinterland transport infrastructure (TEN – T) but take into account that seaports have since 2001 been an integral part of the TEN – T infrastructure (Decision 1346/2001/EC) and MoS belong to that EU priority transport axes. As a result, those maritime sectors need to be funded much more from the public sources. They should enjoy more financial support granted EU member states under the TEN – Regulation and structural funds too. Thanks to such investment financial support directed at seaports, being potentially an integral part of the BSMs, not only those projects are getting reliable but an establishment Common European Maritime Area (or at least Baltic and North Sea) will be possible. Without such efforts creation of integrated European maritime policy, presented in the Green Paper a few days ago, seem to be unrealistic (Green Paper: Towards a future maritime policy for the Union: A European vision for the oceans and seas. SEC (2006) 689).

Much more attention is to be paid to the deregulating and liberalizing of railway markets in the BSR countries and make them more mature and competitive towards the rapidly developing road markets. In order to reach those goals the development of intermodal transport should be supported. The Marco Polo program connected with short sea shipping and BSMs development needs to be regarded as a main priority in maritime policy. The governments and transport ministers should not forget that MoS constitutes an integral part of land motorways and TERFN enabling only lengthening them through maritime areas.

Another package of actions and measures is to be recommended to other parties acting in **maritime industry and logistics transport chains**. They need to be interested in:

- 1) Applying much more market oriented strategies, looking for vertical or if necessary horizontal integration of the logistics supplies chains they serve. In fact, they create the MoS and need to run operating and investments risks connected with development of such a new transport corridors.
- 2) Adopting new technology, information systems including traffic management (VTMS) and electronic reporting systems as well as logistics management systems to comply with all requirements set up by the DG TREN relating to the BSMs and other MoS which have to be fully operational till 2010.
- 3) Respecting all safety and security measures related to maritime transport and the Baltic as well as North Sea seaports (IMO, EC, Helcom) to perform sustainable transport activity, being fully in line with environmentally friendly policies persistently pursued by the European Commission (European Maritime Safety Agency) and CBSS in cooperation with Helcom towards the Baltic Sea and its marine resources.

- 4) Better cooperation with governments to improve and enhance administration and management as well as customs procedures to reduce costs and time of transport and transport related operations; as a result, the capital costs tied up in commodities transported by sea should not rise.
- 5) Improving seaport infrastructure and facilities as well as their hinterland connections by rail, inland waterways and roads, by taking initiatives and pressing governments to invest more in land – sea transport infrastructure and to facilitate the development of intermodal transport on those relations.
- 6) Responding quicker and much more complex to all new EC initiatives and programs, promoting short sea shipping, intermodal transport and motorways of the sea, as well as establishing a consortia if necessary to fulfill the EC requirements concerning efficient cargo shifting from road to sea,
- 7) Successful applying for acceptable state aid and Marco Polo funding relating predominantly to start-up aid for transport services. As far as state aid for maritime companies is concerned, the criteria have been specified in the Communication of the Commission on “Community guidelines on state aid to maritime transport of January 2004” (COM(2004) 43, OJ of 17 January 2004). In such a way, short sea shipping detailed projects may be supported by up to 30 % of the operational costs of the service and/or 10 % of trans-shipment. It is vital to use those funding forms in the most efficient way in order to develop BSMs and finally concentrate more demand to the detriment of road transport.
- 8) Adjusting handling capacities in the main terminals and tonnage used on those relations by shipping operators to the new requirements, the BSMs need to be fully functional and operational as well as efficient and useful for the customers with high commercial and logistics expectation. That is why, the seaport terminals and shipping operators acting on BSMs and NSMs have to provide services of high quality, offering all users specific ‘motorways of the sea value added ‘.
- 9) Generating high but fair and transparent competitive market relations on the routes they serve, giving evidence that MoS *a priori* creates competitive advantages to other traditional transport connections existing on the Baltic and North Sea.

The pointed out actions and recommendations directed in fact to all parties committed to the BSMs and the NSMs establishment and development shall be undertaken in a coordinated way. It should be performed by the European Commission, which has already launched many initiatives and documents directly referring to those issues. However, the EC itself as the highest executive organ in the EU, due to its function and role as a supervisor (promoter) and reviewer of the MoS projects, will not be able to fulfill such a task. In view of that, the already existing ‘Baltic Sea motorway task force’, active since early 2004 and having the aim to make the whole concept more concrete and viable need to take over additional obligations of that kind. Its main objective to work out and develop a specific masterplan, providing a basis for further and more detailed planning of BSMs with their connections to NSMs, would be in such a way to some extent enriched and much more realistic in its executive terms. It could be better coordinated among the representatives of all sectors and relevant parties as well, including the European Commission and the EU member states.

6. Analysis Summary – SWOT

In case of the current and future potential for The Baltic Sea Region – United Kingdom Motorway of the Sea establishment, the following issues should be listed again.

Strengths	Weakness
<ul style="list-style-type: none"> - High competitiveness level and over average economic development of BSR (former EU15 countries); - Rapid growth of the GDP level in the new member countries; - Foreign trade value and external exchange volume increase; - Strong position of maritime transport in the BSR – UK cargo flows servicing; - Well developed seaports infrastructure in the Baltic countries and UK (container and Ro-Ro terminals); - The Baltic Ro-Ro carriages intensification; - Efficient system of vessel traffic on the Baltic; - High potential of the regular (container, Ro-Ro) shipping lines. 	<ul style="list-style-type: none"> - Low level of competitiveness and economic development in the BSR new member states; - Low rate of road transport share in the external trade BSR – UK (mode shifting limitation); - Unfavorable direction of foreign trade (mainland partners majority); - Growth of road transport share in modal split (Poland); - Strong position of German seaports as a intercontinental container hubs; - Concentration of the shipping lines in the Bay of Finland; - Poor condition of hinterland connection development (road, rail) in South-East BSR countries; - Importance of bulk cargo in South-East BSR seaports turnover (policy influence); - Underdevelopment of the inland navigation (infrastructure); - Lack of cooperation between authorities (EC, national), ports, shipping lines and maritime organizations;
Opportunities	Threats
<ul style="list-style-type: none"> - High and constant economic development of the South-East Baltic countries; - External exchange future development and increasing of the cargo flows; - Seaports investment projects (container capacity); - Financial assistance of EU in the infrastructure development (e.g. hinterland TEN-T links, Structural and Cohesion Funds); - European 'environmental' legislation (limitation of road transport competitiveness level); - Structural changes of the BSR countries (new member states) production (high technology development); - Dynamic development of the BSR and UK seaports turnover (especially containers); - Passenger traffic intensification (work and tourist travels); - Constant increasing of the vessels sizes on the Baltic (especially containers); - The Baltic Sea container HUB establishment; - New commercial relationships in East Europe (BSR - Ukraine, Belarus, Kazakhstan); 	<ul style="list-style-type: none"> - Long distance of economic development between 'old' and new member states; - Sophisticated requirements of EU in the MoS financial assistance application; - Low level of the EC co financing in the MoS implementation; - Liberalization process of European rail; - Competitive TEN-T land connections development; - Significant development of air traffic in the Baltic countries; - Further concentration of the Russian cargo in the national seaports; - More probable development of the connections between Bay of Finland – Germany; - A growing number of ships in the Baltic will significantly increase the risk of collisions and oil spills; - Hinterland traffic development will cause more external costs in the local scope.

7. The future recommendations for the Port Net Project

Today, a new quality of transport is implemented in the European Union. It is mainly a necessity with reference to the contemporary economy and society. The following elements have a significant influence on the future development of the European transport system:

- new EU legislation (e.g. III railway package);
- beginning of the new financial perspective (2007-2013);
- half-way point of the European Common Transport Policy implementation (Mid-term review of the 2001 Transport White Paper).

On the other hand, only two years of the EU 25 functioning is a relatively short period for an indication of the important economic and transport changes. This specific turning point of the European Union transport development is therefore a very interesting subject of analysis. Future development of the Port Net Project in the researched field could focus on the following aspects of the MoS concept:

1. Current and constant monitoring of the MoS concept implementation. Who are the MoS partners and when are the connections being developed?
2. Further analysis of cargo flows with reference to the modal split changes. Future actions and initiatives of the member states and the EU will have a significant influence on the European modal split. Development of the motorways system (especially in Poland and in Northern Germany), a wide range of terminal investments in the Baltic Seaports (especially Russia, Poland) or implementation of the railway packages are the most important examples.
3. Detailed research of the Baltic countries' economy (e.g. production and consumption volume and geographical location, industry characteristics, main kinds of imported and exported commodities). Forecasts of a particular industry development could be a good basis of the future potential of the MoS estimation. Advanced econometrical tools utilization is necessary in that case.
4. Relationships of the Short Sea Shipping and the MoS concepts in the new financial EU perspective 2007 – 2013. Influence of the EU project and programs (e.g. Marco Polo, TEN-T) on the future maritime transport development.
5. The importance and the place of the MoS concept in the EU maritime policy (analysis of the Green Paper on the future EU maritime policy).
6. Influence of the Marginal Social Costs concept implementation on the future competitive position of particular modes of transport in Europe. The fiscal burden for road transport could probably activate the utilization of the other branches, including maritime. How deep changes can be caused by this action?