Pekka Leviäkangas, Jarkko Lehtinen,
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Pol-Corridor

Assessment of Demand for the Blue Shuttle Train's Services in North and South European Markets

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Keywords corridors, intermodal transport, freight flow, Polcorridor, train services, North Europe, South Europe, market assessment, feasibility, economy

Abstract

This report describes the prospects of a new trans-European freight supply network stretching from the Nordic countries to Central, Southern and South-eastern Europe. The northern part of the corridor consists of sea-land connections from Sweden, Finland and Norway to an intermodal hub in Poland. From there, the corridor connects via a regularly scheduled block train – the "Blue Shuttle Train" – to an intermodal hub in Vienna. The southern part of the corridor comprises the existing land connections to destinations in most of Central, Southern and South-eastern Europe.

This report covers results of Work Package 1 of the Pol-Corridor project – Assessing the Demand for Blue Shuttle Train's Services in North and South European Markets. The main objectives of Work Package 1 were to assess the freight volumes currently shipped in the North-South direction and to forecast the international freight volumes in the near future.

First, the assessment of Pol-Corridor's potential for carrying Finnish flows and the method for assessment are presented. Most of the potential destination countries can be identified as well as the countries that are insignificant for the Pol-Corridor concept. Also the maximum and minimum potential for Blue Shuttle Train and the issue of balanced transportation in North-South directions are discussed.

Second, the potential for Nordic flows has been assessed by using the same method presented with the Finnish flows. This assessment provides deeper insight to possible future development. Scenarios projected till the beginning of 2006 are defined in order to probe the business potential for Blue Shuttle Train.

It can be concluded that Pol-Corridor and Blue Shuttle Train will be an alternative for international north-south logistics provided if either of the following preconditions is fulfilled: 1) many countries at the south-end of Pol-Corridor will direct their Northbound flows to Blue Shuttle Train instead of to trailers on roads; or 2) Austrian and Italian exports will use Blue Shuttle Train and Pol-Corridor for their northbound transport.

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Tiivistelmä

Tässä tutkimuksessa analysoidaan Puolan läpi kulkevan rahtikäytävän potentiaalia. Käytävä, Pol-Corridor, sijoittuu Pohjoismaiden ja kaakkoisen Manner-Euroopan välille. Puola ja Tšekin tasavalta ovat Pol-Corridorin transitomaita. Käytävän oleellisin osa on sukkulajunakonsepti Puolan satamien ja Wienin kaupungin välillä. Wienistä etelään käytävä jatkuu maitse, ja Puolan satamat yhdistyvät Pohjoismaihin merikuljetuksin.

Julkaisussa esitellään Pol-Corridor-hankkeen ensimmäisen työvaiheen tulokset: rahtikäytävän tavaravirtapotentiaali ja sukkulajunan kysynnän analyysi. Työvaiheen tavoitteena oli tutkia tavaravirtojen määrää nykyisin, virtojen kasvupotentiaalia ja sukkulajunan toimintaedellytyksiä. Tutkimuksen motiivina ovat laajentuneen EU:n kasvavat markkinat ja niiden myötä tarvittavat uudet logistiikkakonseptit.

Tutkimuksen alkuosassa analysoidaan pelkästään Suomen vienti- ja tuontivirtoja, jotka voisivat käyttää Pol-Corridor-käytävää. Analyysiin sisällytetään ainoastaan Pol-Corridor-konseptin kannalta lupaavat maat. Tämän jälkeen arvioidaan tavaravirtojen kasvua sekä sukkulajunan potentiaalista kysyntää. Sukkulajunan palvelutarjonnan kannalta paluukuormat ja -kuljetukset etelästä pohjoiseen nousevat ratkaisevaan asemaan.

Samaa metodiikkaa käyttäen analysoidaan Suomen, Ruotsin ja Norjan vienti- ja tuontikuljetusten yhdistettyä potentiaalia. Ensin analysoidaan tavaravirtapotentiaali, sen kasvumahdollisuudet sekä lopuksi itse sukkulajunakuljetusten kysyntä. Tätä tietoa käytetään sukkulajunan liiketoimintamahdollisuuksien arvioinnissa. Kasvulukuja arvioidaan vain vuoden 2006 alkuun saakka.

Tutkimuksen johtopäätös on, että Pol-Corridor ja sukkulajuna (Blue Shuttle Train) ovat vaihtoehto jo nykyisille kuljetuksille. Suuri mahdollisuus liiketoiminnalle ja uudelle logistiikkaväylälle ja -konseptille on selkeästi olemassa. Tällöin kuitenkin jommankumman seuraavista perusolettamuksista on täytyttävä: 1) Sukkulajuna onnistuu voittamaan kuljetusten markkinaosuutta tiekuljetuksilta nykyisessä markkinatilanteessa ja tulevan kasvun osalta. 2) Itävallan ja Italian kuljetuksissa etelästä pohjoiseen käytetään sukkulajunaa tietai muiden kuljetusten asemesta, jolloin paluukuormaongelmat ratkeavat.

Preface

The Pol-Corridor project is a part of EUREKA's LOGCHAIN programme. The main financier of Pol-Corridor in Finland is TEKES, the Finnish Technology Agency, through its ELO programme. Other financiers are the Ministry of Transport and Communications Finland, the harbours of Turku, Helsinki, Kotka and Hamina, and Finnlines Ltd. These organisations nominated the Finnish steering committee for the project which was chaired by Senior Advisor Mr. Jari Gröhn from the Ministry. Other members were R&D Manager Mr. Rainer Merus from Finnlines, Finance Director Mr. Reijo Toivonen from Turku Harbour, Managing Director Mr. Kimmo Naski from Kotka Harbour, Deputy Director Ms. Eve Tuomola-Oinonen from Helsinki Harbour, Managing Director Mr. Seppo Herrala from Hamina Harbour, and Technology Advisor Ms. Heidi Lindroth from TEKES. Mr. Kari Ruutu from TEKES has been the Finnish EUREKA Coordinator for the project. We wish to express our gratitude to these persons for their contribution and guidance.

VTT, The Technical Research Centre of Finland, has been the coordinator in Finland. The coordination team included Senior Research Scientists Mr. Pekka Leviäkangas and Mr. Jarkko Lehtinen, and Research Scientist Ms. Inna Berg. Research Scientist Ms. Anna-Maija Alaruikka and Ms. Outi Nietola assisted the team on several occasions. Senior Research Scientist Mr. Peet Ranniste has acted as quality controller of this report.

A number of companies and organisations have contributed to this project by providing advice and data. The authors wish to thank especially Logistics Director Mr. Sjaak Klap from Outokumpu Ltd., Managing Director Mr. Reijo Ojala from JIT-Trans Ltd. and Logistics Manager Mr. Kari Anttila from StoraEnso Plc.

We also thank our consortium partners from Norway, Poland, Sweden and Czech Republic for fruitful and pleasant working relations.

VTT Building and Transport, April 2005,

Pekka Leviäkangas, Jarkko Lehtinen, Inna Berg & Anna-Maija Alaruikka

Contents

1. Introduction

The Pol-Corridor project investigates the prospects of a new trans-European freight supply network stretching from the Nordic countries to Central, Southern and South-eastern Europe.

This first phase of the report assesses the demand and supply of the Pol-Corridor concept. The later phases of the project take the form of practical test runs, provided that this first phase investigation gives promising results for such a concept.

The northern part of the corridor consists of sea-land connections from Sweden, Finland and Norway to an intermodal hub in Poland. From there, the corridor connects via a regularly scheduled block train – the ”Blue Shuttle Train” – to an intermodal hub in Vienna. The southern part of the corridor comprises the existing land connections to destinations in most of Central, Southern and South-eastern Europe (Figure 1).

One of the competitive advantages of the Blue Shuttle Train will be the ability to move cargo quickly and cost-efficiently across borders. Cost-efficiency is pursued by combining Nordic flows (upwards and downwards) so that significant volumes and necessary frequencies are achieved, turning them ultimately into economies of scale and learning curve benefits. Time required for border crossings will be minimised as freight will be transported on an environmentally-friendly block train system without the need for shunting. A high level of frequency and punctuality as well as large capacity and advanced information systems will be emphasized. This new trans-European freight network will also contribute to opening new markets and increasing trade all along the supply corridor. The corridor will integrate new accession states more firmly to the Single Market.

The entire research and piloting project will be conducted in the following sequence (Ludvigsen, 2003):

(1) Phase 1 – Market Assessment (work package I) and Technical/Operational Feasibility (work package II). This memorandum concerns work package I.

(2) Phase 2 – Evaluation of Results from work packages I and II, and Go/Do Not Go Decision (work packages III and IV).

(3) Phase 3 – Economic and Financial Assessment (work package V) and Lab-Tests of IT Service Provision System (work package VI).

(4) Phase 4 – Evaluation of Results from work packages V and VI. Conclusions/Verdict for industrial exploitation based on results of the entire research study (work packages VII and VIII). Results are published in work package IX.

GEOGRAPHICAL HINTERLAND OF POLCORRIDOR "BLUE SHUTTLE TRAIN"

Figure 1. PolCorridor Overall System Chart (Ludvigsen, 2003).

The main results of Work Package 1 (WP1) are summarized in this memorandum. The objectives of WP1 were:

- Assess the quality of service required by logistical operators, shippers and consignees in the Nordic region, Central and South-eastern Europe. This objective relates to WP1 Sub-tasks 1.1 and 1.4.
- Assess freight volumes currently shipped in north-south transport based on private operators' data and national statistics. This objective relates to Sub-task 1.2.
- Provide a robust forecast of international freight flows for the next five years. This objective relates to Sub-task 1.3.
- Assess the quality of service required from Polish State Railways, Czech State Railways, Hungarian State Railways and Austrian Federal Railways. The quality of service concerns both operations and infrastructure provision. This objective relates to Sub-tasks 1.4 and 1.5.

Preliminary design of operational pilots (sub-task 1.6).

Sub-tasks of WP1 are as follows:

- Sub-task 1.1: Identification of Most Valuable Customers: Forwarders, Logistical Operators and Large Industrial Shippers/Consignees
- Sub-task 1.2: Assessment of Present Flows from National/Private Statistics
- Sub-task 1.3: Flow Projections for the Next Five Years
- Sub-task 1.4: Definition of Service Quality Required by PolCorridor Users
- Sub-task 1.5: Benchmarks of Competitive Corridors & Modes: door-to-door all-road and inter-modal freight supply solutions in Austria, Germany, Finland, Switzerland, Sweden and Norway
- Sub-task 1.6: Design of Piloting Programme.

This report follows closely this structure, but leaving out Sub-tasks 1.5 and 1.6.

1.1 FACT BOX: Introduction

Fact Box: Introduction

- The PolCorridor project investigates the prospects of a new trans-European freight supply network stretching from the Nordic countries to Central and South-eastern Europe.
- The northern part of the corridor consists of sea-land connections from Sweden, Finland and Norway to an intermodal hub in Poland. From there, the corridor connects via a regularly scheduled block train – the ”Blue Shuttle Train” – to an intermodal hub in Vienna. The Southern part of the corridor involves the existing land connections to destinations in most of Central, Southern and South-eastern Europe.
- This new freight corridor will also contribute to opening new markets and increasing trade all along the supply corridor. The corridor will anchor new accession states more firmly to the single market.
- Political aspects of the project cover main European transport policy objectives and policies such as intermodality and integration of modes, seamless transport across national borders, motorways of the sea and revitalising railways.
- The project is phased in 4 parts: Phase 1 – Market Assessment, Phase 2 – Evaluation of Results Go/Not Go Decision, Phase 3 – Economic and Financial Assessment and Lab-Tests of IT Service Provision System, Phase 4 – Evaluation of Results and Conclusions/Verdict for Industrial Exploitation.
- The project is carried out by an international consortium. VTT is coordinating the project in Finland.
- This report covers Work Package 1 results.

2. The Scope and Analysis Process

This reports covers work package 1 of the Pol-Corridor project. In chapters 3–7, the Finnish trade flows, as well as trade growth scenarios between Finland and South-Eastern Europe, are examined and analysed. Furthermore, the detailed method of assessing the potential for cargo shuttle train service through Poland is described using the Finnish trade data as a baseline.

In chapter 8, the same methodology is again described from a slightly different angle using total Nordic trade flows and combining these with similar trade growth scenarios. Finally, the results are transformed in representative business cases of the Blue Shuttle Train, i.e. by estimating the number of trains that could transit via Poland transporting goods between the Nordic countries of Finland, Sweden and Norway and South-European markets (Figure 2).

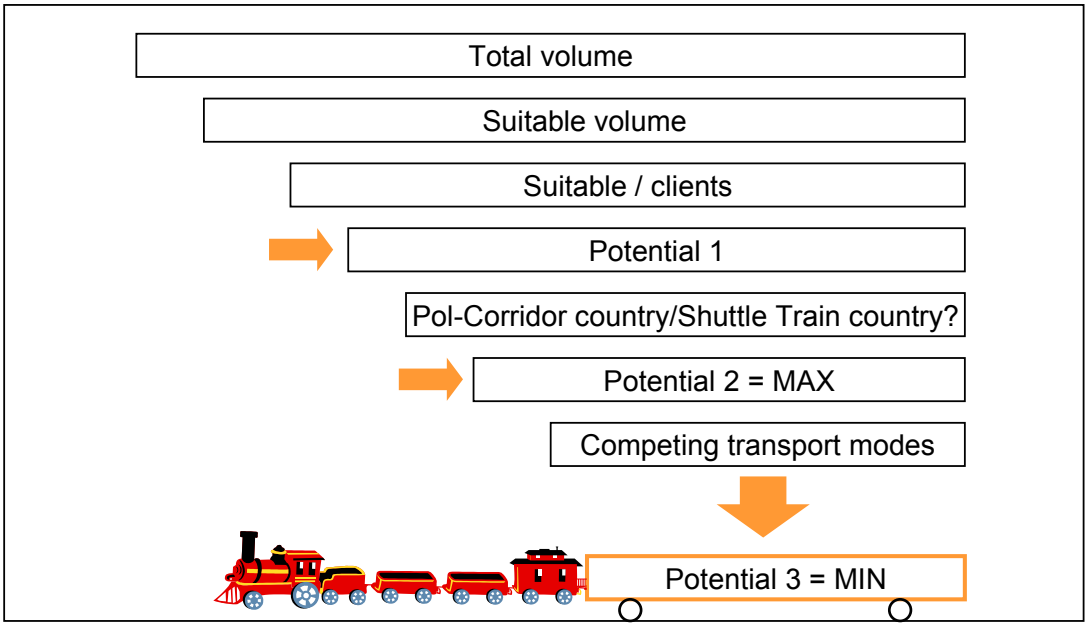

Figure 2. Data refining process.

Chapter 3 concentrates on identifying the most important Finnish stakeholders of the Pol-Corridor concept. These include exporters and importers of goods and raw materials, shipping lines, ports and other logistics operators and service providers such as forwarders.

In Chapter 4, the present trade volumes are analysed and the type of cargo that can be transported via Pol-Corridor is sorted and selected from the aggregate cargo flows (”Suitable volume” in Figure 2). The analysis is based on Finnish Customs Official Foreign Trade Statistics and the data is collected from Customs databases. Actual collection was done *in situ*, within the Customs as the data was stored on microfilms. Also IT databases were utilised.

The trade flows were projected up to 2006 using the information services of the Economist Intelligence Unit (EIU, http://www.eiu.com) in 2002. EIU provides country-specific forecasts and country descriptions about the economy and trade of approximately 200 countries around the world. EIU is the business information arm of The Economist Group, publisher of *The Economist, CFO* magazine, *Roll Call* and other specialist journals. These growth forecasts formed the baseline scenario for the Pol-Corridor potential analysis.

Some cargo types were given special attention, such as the Finnish paper industry products, which are suitable cargo for Pol-Corridor but were deducted from the cargo flows based on interviews and discussions with paper industry representatives in 2002. However, it is the authors' perception that paper products are still potential cargo for Pol-Corridor. This procedure resulted in the list of "Suitable clients" or "Potential 1" in Figure 2.

Some countries, namely Poland and Czech Republic, are transit countries for Pol-Corridor's Blue Shuttle Train, and these trade flows were also excluded from the potential demand analysis. However, especially Poland has an important role as a shipping line stop and Polish flows have an effect on shipping lines' decisions on their routing and thus implicitly on Pol-Corridor potential. But we excluded these countries in the analysis of the potential for Blue Shuttle Train, resulting in "Potential 2", depicted in Figure 2.

Finally, "Potential 3" in Figure 2 describes the potential for Blue Shuttle Train if the competing transport modes are considered. Based on Finnish forwarders' interviews in 2002 and their modal split assessment, the current modal split and how much of this split could be changed by capturing cargo for Blue Shuttle Train mainly from trucks with trailers was estimated.

The whole analysis process described above was first done for Finland by VTT and then extended to cover also Norway and Sweden, for which similar data was applied and analysis was carried out by TØI. This formed the Nordic view of Pol-Corridor, which is summarised in Chapter 8.

3. Important Pol-Corridor Stakeholders – Finland

3.1 Players in Finland

The most important Pol-Corridor ”customers”, or rather stakeholders or players, are the exporters, importers, operators and authorities that each have their role in trade flows between Scandinavia and Central, Southern and South-eastern Europe. In the following table (Table 1) the most important Finnish stakeholders are listed by name.

Table 1. Pol-Corridor relevant players in Finland.

Player, organisations	Primary interest, task
Ministry of Transport and Communication Finland	Support for export and import trade routes that serve the competitiveness of Finnish industries
Finnlines Ltd	Sea carrier; optimising Baltic Sea routes and efficient utilisation of vessel capacity
Ports of Helsinki, Turku, Kotka, Hamina and Oulu	Providing facilities for potential goods flows according to their geographical location and special features
Paper product producing cluster: StoraEnso, M-Real, UPM-Kymmene	Creating efficient supply chains for Pol-Corridor markets
Metal product producing cluster: Rautaruukki, AvestaPolarit	Creating efficient supply chains for Pol-Corridor markets
Finnish and multi-national forwarders and transporters cluster	Finding cost efficient and reliable trade routes for their clients
Importing and exporting SMEs	These companies many times lack a structured logistics system. A concept like Pol-Corridor could answer to their needs and could lower their logistics costs.

Many of these major players were interviewed during the work package I work. Some were interviewed with a help of an extensive table which provided more detailed information for the analysis.

3.2 The Roles and Interests of Different Finnish Players

The most important sectors as far as Pol-Corridor countries are concerned are the paper and steel industry. Transport volumes are high and the Pol-Corridor concept is adaptable to these products. On the other hand, once established, it is difficult to change the routings from one system to another. This results from the heavy logistics investments made and other obligations the particular industries are committed to. The time perspective for the relevant players (i.e. investors in the Pol-Corridor logistic system) will be about ten years and more[1]. High technology industry has also important potential, but because of its relatively low transport volumes it was not considered in this context.

[1] During discussions it was mentioned that in some cases the time perspective was several decades because of warehousing decisions.

Forwarding companies have a substantial experience in logistic services in Pol-Corridor markets. Therefore some companies were interviewed. These companies estimated the total volumes and the potential of the Pol-Corridor concept. However, these companies might lack the general view of the whole market. Therefore cross-checking of their answers was carried out.

Below, the roles and special interests of different players and groups are described in more depth.

Paper product industry

The Finnish paper industry's main markets are in the UK and in the industrialised parts of Central Europe. Substantial terminal or warehousing investments have been made in Gdansk and Gdynia port hubs which form one of the logistic node points for Finnish paper industry when considering paper exports from Finland to Central Europe. However, Gdansk and Gdynia are to be considered only in cases where paper products are stored in those terminals. In other cases, Szczecin and Swinoujscie ports might be viable alternatives especially for unitised paper product shipments further to Central and Southern Europe.

For German markets, the main ports for discharging are Lubeck and Rostock. Some smaller amounts already today go to Szczecin. One of the Finnish major companies has used successfully for several years the route Szczecin–Budapest–Hamburg–Szczecin. The goods are carried from Szczecin by rail or by barge and coaster vessel.

The "big questions" for Pol-Corridor from the Finnish paper industry's perspective are as follows:

- Are there any flows or markets (e.g. Berlin area markets) that can be served by using Szczecin and Swinoujscie ports?
- Are, for example, the transports to Mediterranean ports a potential for Pol-Corridor, e.g. transports to Italy?
- Are the frequencies and transport units such that they can be used in the Blue Shuttle Train?
- Do the flows via Germany to e.g. Italy today offer potential for Pol-Corridor?

If the answers are mainly "yes", Pol-Corridor becomes clearly interesting for these transports. It is noteworthy that even if parts of the flows that could come to Szczecin or Swinoucie do not continue by Blue Shuttle Train, these flows might add to the frequencies of shippings so that extra shipping capacity could be used by other customers benefitting from the Blue Shuttle connection.

There are further relevant questions:

- Can the Gdansk-Gdynia hub be efficiently and cost effectively integrated with the Blue Shuttle Train concept? Or will this mean another separate concept?
- Are there new potential markets to be served by the paper industry using Pol-Corridor? How about other industries?

If the answers for these questions are ”yes”, the Pol-Corridor concept has a whole new dimension for Finland. If the answers are mainly ”no”, this merely means that a large portion of paper flows must be left out from Pol-Corriodor potential. This also affects shipping line routing and shipping lines’ decisions.

Then there are the questions related to aggregating the Scandinavian flows. If the aggregation is successful, i.e. the companies find it reasonable to co-operate in logistics, the potential of the concept is increased significantly and the economy of scale principle starts to apply.

Metal and steel product producers

There are two main players in this group in Finland: Rautaruukki Plc. and Outokumpu Group, of which one of the important subsidiaries is AvestaPolarit. These companies operate their own ships and use additionally other shipping lines to supplement the capacity. Rautaruukki has outsourced all logistics to its subsidiary JIT-Trans which also offers transport to AvestaPolarit and SSAB, the Swedish steel group. JIT-Trans ships steel to Gdynia twice a month from the ports of Raahe and Lappohja.

There is logistics co-operation already today between Finnish and Swedish metal and steel product producers, even between competitors. This is a big opportunity and advantage for Pol-Corridor.

The biggest Finnish producers’ export flows interesting from Pol-Corridor point of view are to Italy and Austria which lie exactly on the Blue Shuttle route. For some products, also Czech Republic is interesting. Other interesting export destinations which have some influence on shipping frequencies are Poland and Germany. Especially Northern Italy is seen as a potential export growth area as well as the new accession countries which are likely to consume high-value-low-weight products increasingly in the future. Some of these products can probably be unitised for transport, e.g. in containers or special units. Today, transports to Italy are not sufficiently frequent and the price is high.

According to interviews, one big problem in current transports is the poor utilisation of return loads capacity. Typically the capacity of ships is utilised 90 % when exporting but only 50 % when returning. The import of metal and steel industry that is of interest consists main of coal and coke import from Poland and raw metal from Central Europe.

The Pol-Corridor system could offer a strategic alternative to serve as an export route to Central, Eastern and Southern European markets. Critical parameters for route choice are price, port handling throughput, reliability and smooth co-operation within the transport chain.

Shipping lines

Shipping lines' routings and frequencies are essential for the concept. Frequencies and volumes are the key factors to shipping lines' financial performance and efficiency.

The biggest shipping line, Finnlines Ltd., is a neutral Baltic Sea carrier that operates most major Finnish harbours. The routing is very much dictated by the paper exports. Finnlines operates between Finland and Gdynia 3 times per week and between Finland and Szczezin once a week. In addition, the paper industry ships some goods from Lake Saimaa to Szczecin (during wintertime from Hamina). JIT-Trans ships steel to Gdynia twice a month from the ports of Raahe and Lappohja. Mann Lines operates every week between Turku and Gdansk.

– Helsinki – Kotka – Helsinki – Gdynia		(Finnlines, Storo+Ro-Ro)
– Helsinki – Gdynia – Szczezin – Gdynia		(Finnlines, Storo+Ro-Ro)
– Rauma – Gdynia – Rostock – Lybeck – Helsinki		(Finnlines, Storo+Ro-Ro)
– Raahe – Gdynia	2/month	(JIT-Trans)
– Lappohja – Gdynia	2/month	(JIT-Trans)
– Turku – Paldinski – Gdansk – Kiel – Bremerhaven – Kiel – Turku	4/month	(Mann Lines Oy, Ro-Ro)
Greece		
– Kotka – Elefsis	2/month	(SolNiver, Lolo+Storo)
– Kotka – Elefsis	2/month	(Hellasco, Lolo)
– Kotka – Heraklion	2/month	(Hellasco)
– Kotka – Lolo Patras	2/month	(Hellasco, Lolo)
– Kotka – Piraeus	2/month	(SolNiver, Lolo+Storo)
– Kotka – Salonica	2/month	(Hellasco, Lolo)
– Kotka – Stylis	1/month	(Hellasco, Lolo)
Turkey		
– Kotka – Istanbul	1/month	(Wagenborg shipping, Lolo)
– Kotka – Mersin	2/month	(SolNiver, Roro + Storo + Cont + Lolo)
– Kotka – Istanbul	2/month	(SolNiver, Roro + Storo + Cont + Lolo)
Italy		
– Kotka – Marina di Carrara	2/month	(Hastshipping Ab, Lolo)
– Rauma – Genova	2/month	(Suomi Shipping, Lo-Lo)

More infrequent transports, for example to Italy, which is an interesting area, are handled by various shipping lines but customers (e.g. paper and metal industry) are constantly seeking solutions that can lower logistics costs. This, in other words, means more frequent lines. On one hand this is a threat to shipping lines but on the other hand this could enable efficient short sea shipping combined with other modes and mainly rail. Pol-Corridor and similar concepts have thus direct implications to Baltic Sea shipping lines' business strategies.

The critical question for shipping lines is the maximisation of vessel capacity and for Finnish shipping lines the return loads to Finland present a major problem. Shipping is largely feeder transport from the Finnish export point of view. The Baltic Sea is a natural "multi-stop" sea transport environment so finding a routing that can serve an optimal number of stops and having vessels circulating as full as possible is a tricky business planning question. The more shipping lines succeed in this the better opportunity this offers for Pol-Corridor.

Finnish forwarders, other transporters and logistic service providers

The forwarders select the routes for many transports and basically they are also "customers" for Pol-Corridor. However, forwarders' choices are always partly affected by functioning, historical business relations and other preferences related to their business, like ownership issues for instance. Therefore, a new trade route has to always pass a certain threshold before it really becomes an alternative. Pol-Corridor certainly faces this threshold among the Finnish forwarders and transporters. With this in mind, the forwarders' customers are the first group that needs to know about Pol-Corridor prospects.

Finnish ports

By and large, all major Finnish ports are ready to co-operate in the Pol-Corridor supply network as it is in their goal to maximise the goods throughput in their harbour regardless of the actual trade route. The only "competitor" to Finnish ports is the land transport via Northern Finland or via Russia and the Baltics. In both cases, the competition is quite marginal, but still some 60–70 million tonnes of goods are transported annually by land through St. Petersburg Region between Eastern Europe and Russia. Some fraction of this cargo is a potential for Pol-Corridor. Among the ports, competition naturally exists within Finland (Table 2).

Table 2. Some important Finnish ports and their special areas of interest.

Port	Relevant port-to-port destinations/origins	Special focus	Statistics & Notes
Helsinki	Stockholm, Helsingborg, Tallinn, Gdynia, Szcecin, Lubeck, Travemunde, Rostock, Bremerhaven, Antwerp, Zeebrugge, Amsterdam, Rotterdam, Pireues, Istanbul.	Specializes in unitized cargo transport. Biggest unitized cargo port in Finland.	Over 9 million passengers and over 10 million tons of cargo each year.
Turku	Stockholm, Bremerhaven, Hamburg, Travemünde, Antwerpen, Gdansk.	Facilities and equipment to serve trains, lorries and trailers in both Scandinavian and continental transport.	More than 4 mill. tonnes and over 4 mill. Passengers annually. Mann Lines Oy has opened a new shipping line Turku–Tallinn–Gdansk–Kiel–Bremerhaven–Kiel–Turku.
Kotka	Antwerpen, Fredericia, Tallinn, Bremen, Bremerhaven, Hamburg, Lübeck, Rostock, Elefsis, Heraklion, Patras, Piraeus, Salonica, Stylis, Marina di Carrara, Rotterdam, Amsterdam/Zaandam/Ouderkerk, Gdynia, Istanbul, Mersin.	Paper products and transit to/from Russia	More than 8 mill. tonnes per year.
Hamina	Antwerp, Copenhagen/Århus, Hamburg, Bremerhaven, Bremen, Hamburg, Lübeck, Amsterdam, Rotterdam, Terneuzen.	Specialised in forest products, containers and liquid bulk. Liquid bulk export is the main cargo group in transit transport (transit 24 % of total cargo tonnes) from Russia.	Annual transport of 5 million tonnes. In 2002 forest industry exports 49 %, forest industry related imports (3 %). 17 % is unitised cargo.

Ministry of Transport and Communications Finland, other Finnish ministries and authorities

In Finland, the Ministry has assumed a strong role in supporting the logistics sector by creating a favourable business environment for different operators and service providers. Also it is one of the key tasks of the Mnistry to ensure smooth and efficient export and import of Finnish industries. Thus the Pol-Corridor concept is politically interesting for the Ministry as it creates new logistical options for Finnish exports and imports.

3.3 FACT BOX: Important Pol-Corridor Players in Finland

FACT BOX: Important Pol-Corridor Players

- The most important Pol-Corridor ”customers”, or rather stakeholders or players, are the exporters, importers, operators and authorities.
- In Finland, the primary interest belongs to shipping lines, ports and big industrial exporters and importers such as metal and steel product producers and paper product producers.
- Already today, Polish harbours are important for Finnish exporters.
- Finnish paper industry has invested in Gdansk and Gdynia harbours.
- There is logistics co-operation already today between Finnish and Swedish metal and steel product producers, even between competitors.
- Forwarders’ route choices are always affected by functioning, historical business relations and other preferences related to their own business, like ownership issues for instance. A new trade route has to always pass a certain threshold before it really becomes an alternative.

4. Present Volumes and Flows

4.1 Finnish transport volumes 1999–2002

Table 3 and Table 4 shows the Finnish goods volumes divided into the SITC 1 commodity[2] groups traded with Pol-Corridor countries over 1999–2002.

Table 3. Total Finnish export volumes to Pol-Corridor countries, 1 000 tons (Finnish Customs 2002).

SITC_1	1999	2000	2001	2002	99–01	99–02
0. Food and live animals	13	14	20	17	54 %	33 %
1. Beverages and tobacco	4	2	3	4	–18 %	5 %
2. Crude materials, inedible, except fuels	698	654	655	702	–6 %	1 %
3. Mineral fuels, lubricants and related materials	357	38	16	36	–96 %	–90 %
4. Animal and vegetable oils, fats and waxes	0	3	1	3	118 %	488 %
5. Chemicals and related products	182	175	221	242	22 %	33 %
6. Manufactured goods	1 725	1 866	1 762	1 893	2 %	10 %
7. Machinery and transport equipment	77	123	134	89	74 %	13 %
8. Miscellaneous manufactured articles	19	22	24	19	26 %	0 %
Total	**3 075**	**2 897**	**2 836**	**3 005**	**–8 %**	**–2 %**

[2] SITC = Standard International Trade Classification.

Table 4. Total Finnish import volumes from Pol-Corridor countries, 1 000 tons (Finnish Customs 2002).

SITC_1	1999	2000	2001	2002	99–01	99–02
0. Food and live animals	79	98	97	90	22 %	14 %
1. Beverages and tobacco	14	15	13	15	–8 %	4 %
2. Crude materials, inedible, except fuels	150	149	110	115	–27 %	–23 %
3. Mineral fuels, lubricants and related materials	2 161	2 360	2 566	1 922	19 %	–11 %
4. Animal and vegetable oils, fats and waxes	0	1	1	1	2 %	58 %
5. Chemicals and related products	195	225	250	218	28 %	12 %
6. Manufactured goods	307	350	357	357	16 %	16 %
7. Machinery and transport equipment	126	128	216	156	72 %	21 %
8. Miscellaneous manufactured articles	25	28	34	30	34 %	17 %
Total	**3 057**	**3 354**	**3 644**	**2 904**	**19 %**	**–5 %**

The volume of Finnish exports has remained nearly the same over the four-year period. The total export volumes decreased 8 % from 1999 to 2001 and 2 % to 2002. The total import volumes increased from 1999 to 2001 by 19 %, but to 2002 declined by 5 %.

All commodity groups increased in volume over this four-year period except SITC groups 1, 2 and 3, which belong to the cargo type of little relevance to Pol-Corridor system.

4.2 Trade with Pol-Corridor Countries 1999–2002

Table 5 shows that Italy, Poland, Austria and Greece are the main markets for Finnish export to Pol-Corridor countries with 80 percent of the total volumes. Total volume to these countries declined 6 % between 1999 and 2002. In the same time export to other Pol-Corridor countries increased 17 %.

Italy and Poland represents together approximately 86 % of all imports from Pol-Corridor countries. Total volume from these countries declined 8 % between years 1999 and 2002. Import from other Pol-Corridor countries increased 19 %.

Table 5. Finnish trade with Pol-Corridor countries 1999–2002, 1 000 tons (Finnish Customs 2002).

FINNISH TRADE	EXPORTS						IMPORTS				
	1999	2000	2001	2002	99–02		1999	2000	2001	2002	99–02
Albania	2	1	3	2	–22 %		0	0	0	0	0 %
Austria	287	296	288	272	–5 %		90	102	98	103	14 %
Bosnia-Herzegovina	1	0	0	1	1 %		5	1	2	0	–100 %
Bulgaria	19	20	20	22	14 %		9	29	6	11	22 %
Croatia	8	11	13	15	80 %		0	1	5	2	307 %
Czech Republic	85	113	90	115	36 %		68	75	135	124	82 %
Greece	252	248	255	298	18 %		61	45	88	51	–17 %
Hungary	101	128	144	140	39 %		38	44	43	40	4 %
Italy	1 163	1 160	1 171	1 149	–1 %		256	272	318	304	19 %
Macedonia	2	1	1	1	–65 %		0	0	0	0	76 %
Poland	840	552	590	664	–21 %		2 406	2 646	2 808	2 133	–11 %
Romania	13	14	13	14	3 %		2	10	12	12	536 %
Slovakia	60	61	71	74	23 %		18	20	21	27	53 %
Slovenia	22	22	17	15	–30 %		6	9	9	9	48 %
Turkey	218	267	159	219	0 %		97	99	98	87	–9 %
Yugoslavia	2	3	1	4	80 %		1	1	1	1	68 %
Total	3 075	2 897	2 836	3 005	–2 %		3 057	3 354	3 644	2 904	–5 %

According to Alho, Kaitila & Widgrén (2001) there is a notable asymmetry between the EU and the CEE[3] countries in their bilateral trade. For the CEE countries, bilateral trade is tens-of-times more important than for the EU. The removal of the remaining trade barriers is worth only a few tenths of a percentage point of their GDP for the EU countries while it is worth at least two or three per cent of their GDP for the CEE countries. Furthermore, the EU countries are trading at very different intensities with the CEE countries, while the latter make up a relatively homogenous group in their EU trade relations. In the case of Finland, the situation differs from that of the rest of the EU in that according to results from a gravity model, Finnish exports to the CEE countries are already at their potential level, i.e. the intensity of trade is similar to that in Finland's intra-EU trade. On the other hand, there is more scope for growth in imports from the CEE countries.

Adjusted for countries' gross domestic products, Estonia is the country that Finnish exports have "conquered" the best. Finland has also found relatively well the potential demand in Latvia, Lithuania, Poland, the Czech Republic, Slovakia and Hungary. Export markets will continue to grow steadily, however, thanks to deeper integration and with average growth rates in the CEE countries exceeding those of the incumbent EU

[3] Central and Eastern Europe.

countries. In its trade with the CEE countries, Finland has specialised more in electric machinery and equipment than in its trade with other EU countries. Traditional forest industries are clearly underrepresented.

Table 6. Sea transport between Finland and some Pol-Corridor countries in 2002, 1 000 tons (Finnish Maritime Administration).

Country	Sea transport to	% exports	Sea transport from	% imports
Italy	346	30	28	9
Greece	213	71	31	61
Turkey	102	47	56	64
Poland	779	117	2 266	106

Table 6 above shows that in 2002 only 30 % of Finnish export and 9 % of import to or from Italy was transported by sea. Sea transport was used more often when transporting goods to Greece and Turkey. The Table also shows that the percentage share of trade between Finland and Poland is larger than 100 %. This is because a significant amount of goods shipped to Poland is forwarded to other countries. In other words, already today Poland is a significant transit country for Finnish trade.

The conclusion is that in general Poland is a vital node point for Finnish exports and imports if volumes are considered. However, a large portion of this is bulk and thus not that relevant for Pol-Corridor. For transit through Poland other types of goods than bulk form probably the main flow.

4.3 Russian Transit through Finland

The Russian transit question is interesting from the Pol-Corridor viewpoint but the question includes some difficulties. Firstly, Russian transit flows' origins and destinations can only be measured by analysing Russian export and import statistics. In this particular investigation, there were no resources for that. Secondly, a good analysis would have required good statistics. The authors have the presumption that such statistics are not easily available from Russia. Some Finnish transport models, e.g. FRISBEE, estimate that cargo by land between Central and Eastern European Countries and Russia transiting the St. Petersburg Region is in the neighbourhood of 60–70 million tonnes per year. Only a fraction of this volume is a potential for Pol-Corridor.

Current Russian transit through Finland is not relevant for Pol-Corridor. Russian transport to Pol-Corridor countries, however, is most significant for Pol-Corridor and may also offer a significant potential for transit through Finland.

4.4 Fact Box: Present Volumes and Flows

FACT BOX: Present Volumes and Flows

- The volume of Finnish export has remained nearly the same over 1999–2002. The total export volumes decreased 8 % from 1999 to 2001 and 2 % to 2002. The total import volumes increased from 1999 to 2001 by 19 %, but to 2002 declined by 5 %.
- Italy, Poland, Austria and Greece are the main markets for Finnish export to Pol-Corridor countries with 80 percent of the total volumes. Total volume to these countries declined 6 % between 1999 and 2002. In the same time export to other Pol-Corridor countries increased 17 %.
- Italy and Poland represents together approximately 86 % of all imports from Pol-Corridor countries. Total volume from these countries declined 8 % between years 1999 and 2002. Import from other Pol-Corridor countries increased 19 %.
- In its trade with the CEE countries, Finland has specialised more in electric machinery and equipment than in its trade with other EU countries. Traditional forest industries are clearly underrepresented.
- In general, Poland is a vital node point for Finnish exports and imports if volumes are considered.
- Current Russian transit through Finland is not significant for Pol-Corridor. Russian transport to Pol-Corridor countries, however, is most significant for Pol-Corridor and may also offer a potential for transit through Finland.

5. Flow Projections Up To 2006

5.1 Forecasts of national aggregate indicators

Forecasts of several macroeconomic variables for the Pol-Corridor countries are provided in EIU (2002). We have focused on projected growth levels in exports, imports and in private consumption. These indicators are believed to have the most causal impact on the growth of international trade in goods.

Table 7 shows the expected annual growth rates for exports over the period between 2002 and 2006 for Pol-Corridor countries. With one exception, all the annual growth rates are positive. The average expected growth rate between 2002 and 2006 is around 6 percent per annum. This indicates a tremendous growth in goods movements during the forthcoming years.

We see that high growth rates are expected for states which over the coming years will continue to open their economies to foreign trade. The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia joined the European Union in 2004. High growth in exports is closely linked to these countries' recent EU membership. It is anticipated that Bulgaria and Romania will be ready for EU membership in 2007 provided that they meet the accession criteria and successfully conclude the admittance negotiations (EC, 2003).

Table 7. Annual expected growth in export for 2002–2006 (source: EIU).

Annual export growth	2002	2003	2004	2005	2006
Austria	2.7 %	4.5 %	5.1 %	5.3 %	5.4 %
Bulgaria	0.4 %	3.6 %	6.5 %	8.5 %	9.3 %
Croatia	6.8 %	6.5 %	6.7 %	na	na
Czech rep	5.1 %	11.5 %	10.9 %	10.1 %	9.4 %
Finland	3.2 %	5.2 %	6.6 %	7.1 %	6.1 %
Greece	4.4 %	5.3 %	6.2 %	6.0 %	5.2 %
Hungary	6.9 %	8.1 %	14.5 %	12.1 %	7.0 %
Italy	–0.3 %	2.2 %	3.5 %	3.1 %	2.2 %
Norway	2.4 %	2.6 %	3.1 %	3.0 %	2.9 %
Poland	3.5 %	6.5 %	10.3 %	8.2 %	7.8 %
Slovakia	4.2 %	10.6 %	8.8 %	10.1 %	8.6 %
Slovenia	4.9 %	6.8 %	6.5 %	na	na
Sweden	2.5 %	4.3 %	4.7 %	5.0 %	5.1 %
Romania	8.7 %	7.3 %	7.0 %	5.0 %	6.0 %
Russia	4.0 %	4.0 %	5.0 %	6.0 %	6.0 %
Turkey	5.1 %	5.4 %	6.7 %	6.4 %	5.9 %

Table 8 shows the figures for expected growth in the value of imports. On average, the import growth rates lie slightly above the export rates, around 6.4 percent per year. Most countries will in other words experience a deteriorating trade balance, which in the long term might be financed by inflows of foreign direct investment, in the form of both financial capital and production assets. As with exports, the largest growth rates in imports are expected in non-EEC states. However, it is anticipated that countries that are to join the European Union shall also grow vigorously.

Table 8. Annual expected growth in import for 2002–2006 (source: EIU).

Annual import growth	2002	2003	2004	2005	2006
Austria	1.0 %	4.7 %	5.8 %	5.8 %	5.9 %
Bulgaria	2.4 %	5.2 %	6.9 %	8.5 %	9.3 %
Croatia	4.0 %	6.4 %	6.9 %	na	na
Czech rep	4.7 %	11.7 %	10.3 %	8.8 %	8.2 %
Finland	0.0 %	6.2 %	9.1 %	8.2 %	8.0 %
Greece	6.0 %	7.9 %	6.8 %	5.9 %	5.6 %
Hungary	9.1 %	10.6 %	12.3 %	12.6 %	5.4 %
Italy	–0.1 %	3.0 %	4.0 %	3.5 %	3.1 %
Norway	3.5 %	3.7 %	3.7 %	3.0 %	2.4 %
Poland	1.5 %	5.9 %	8.8 %	8.3 %	8.0 %
Slovakia	3.0 %	9.1 %	8.1 %	8.5 %	8.4 %
Slovenia	5.2 %	7.6 %	7.0 %	na	na
Sweden	0.4 %	4.6 %	5.2 %	5.6 %	5.6 %
Romania	6.9 %	8.0 %	9.0 %	7.0 %	7.0 %
Russia	9.0 %	6.0 %	8.0 %	7.0 %	8.0 %
Turkey	7.5 %	7.4 %	9.0 %	8.1 %	8.9 %

Figure 3 shows the cumulative expected growth in the value of external trade for the five years between 2002 and 2006, inclusive. The average cumulative growth in exports is 33 percent, and 37 percent for imports.

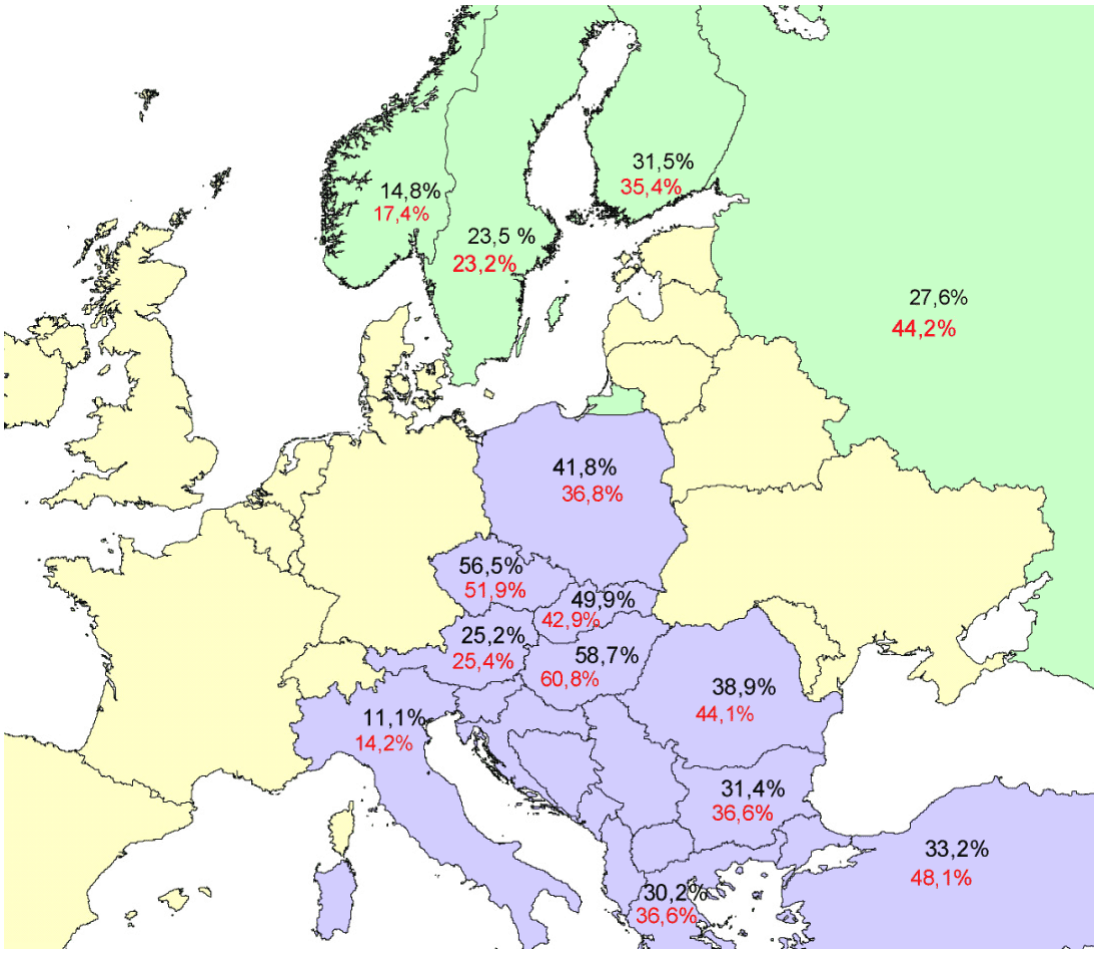

Figure 3. Cumulative expected growth in export or import between 2002 and 2006. (Upper figure is export, lower figure is import; source EIU.)

Table 9 shows expected growth rates of private consumption. Compared with the two preceding tables we see that the expected growth in consumption is far lower than the expected growth in external trade. This can be interpreted as an internationalisation of trade in these countries. While growth in private consumption will be modest, there will be a pronounced shift from a situation where the countries in question depend mostly on domestic markets towards more open economies, with increased dependence on and increased consumption of international freight transport services. This applies both to producers, who will be exporting more goods, and to consumers, who will be purchasing more imported goods.

Table 9. Annual expected growth in private consumption and cumulative growth for 2002–2006 (source: EIU).

Real growth in private consumption (%)	2002	2003	2004	2005	2006	2002–2006 cumulative
Austria	1.1 %	1.6 %	2.2 %	2.1 %	2.1 %	9.4 %
Bulgaria	3.6 %	3.8 %	4.0 %	4.0 %	3.9 %	20.8 %
Croatia	5.6 %	3.7 %	4.0 %	na	na	13.9 %*
Finland	2.0 %	2.4 %	2.7 %	2.8 %	2.8 %	13.4 %
Greece	3.0 %	3.2 %	3.2 %	3.4 %	3.2 %	17.1 %
Hungary	7.1 %	5.3 %	3.9 %	3.7 %	3.7 %	26.0 %
Italy	0.1 %	1.9 %	2.2 %	2.0 %	2.1 %	8.6 %
Norway	2.9 %	3.0 %	3.0 %	2.8 %	2.5 %	15.0 %
Poland	2.4 %	2.9 %	3.2 %	3.7 %	3.9 %	17.2 %
Slovakia	5.8 %	4.2 %	4.3 %	4.9 %	4.6 %	26.2 %
Slovenia	2.2 %	3.5 %	3.3 %	na	na	9.3 %*
Sweden	2.0 %	2.2 %	2.6 %	2.5 %	2.4 %	12.3 %
Romania	2.6 %	3.6 %	4.3 %	3.5 %	2.7 %	17.8 %
Russia	7.5 %	5.5 %	4.5 %	4.0 %	4.0 %	28.2 %
Turkey	1.0 %	3.8 %	4.2 %	4.4 %	4.9 %	19.6 %
Czech republic	4.1 %	4.8 %	4.3 %	3.8 %	3.5 %	22.2 %

Figures for Former Yugoslavia are not available.
* 2002–2004 growth.

5.2 Forecasts of the most important sectors

The paper and steel industry were identified in chapter 3.2 as the most important sectors as far as Pol-Corridor countries are concerned.

Paper industry

At the moment 3 % of global paper and paperboard is consumed in Eastern Europe. Consumption has grown 47 % in Poland, Czech, Hungary, Slovakia, Romania, Slovenia and Croatia between years 1993 and 1997. Despite this the consumption of paper products is at a very low level compared to other EU countries (excluding Romania and Croatia). However the growth is more intense in the Eastern parts of Europe; it is estimated that by the year 2010 the consumption of paper and paperboard will increase 4 % per year. The global average is 2.5 % per year. (Alho, Hazley, Hernesniemi & Widgrén 2001; Järventaus 2001.)

Steel industry

The market growth is estimated to be strongest in Eastern Europe, especially in building products. It is estimated that by 2006 15–20 % of Finnish steel production will be sold to Central and South-Eastern Europe markets.

EU-membership probably accelerates GDP growth in the new member countries, which will increase construction investment primarily in renovation. This will increase export markets for construction products. The Finnish building product industry has established itself especially in Poland but also in the Baltic countries via foreign direct investment. The companies operating in Poland produce mainly for the local market but also, to a smaller extent, for exports to other CEE countries. Eastern enlargement is likely to increase the markets of Finnish companies more via foreign direct investment than via exports from Finland. Finnish companies may also at some point begin to produce in the CEE countries for the Finnish market. (Alho, Kaitila & Widgrén 2001.)

The conclusion is that only a part of the internal economic growth of new accession countries will be reflected to e.g. Finnish export flows.

5.3 Fact Box: Flow Projections Up To 2006

FACT BOX: Flow Projections Up To 2006

- Economy growth rates are positive in Pol-Corridor countries. The average expected growth rate between 2002 and 2006 is around 6 percent per annum. This indicates a tremendous growth in goods movements during the forthcoming years.
- In those Pol-Crridor countries, excluding Nordic, the cumulative average expected growth in the value of external trade for the five years between 2002 and 2006 is 33 percent for exports, and 37 percent for imports.
- At the moment 3 % of global paper and paperboard is consumed in Eastern Europe. Consumption has grown 47 % in Poland, Czech, Hungary, Slovakia, Romania, Slovania and Croatia between years 1993 and 1997. Despite this the consumption of paper products is at a very low level compared to other EU countries (excluding Romania and Croatia). The growth will be more intense in the eastern parts of Europe.
- For steel and metal products, market growth is estimated to be strongest in Eastern Europe, especially in building products. A part of the growth will be channelled to direct production plant investments in Eastern Europe.

6. Growth of Finnish Trade for Pol-Corridor – relevant Cargo

The flow analysis is based on general Finnish Customs' statistics but has been refined by extracting some irrelevant commodity types that do not suit the Pol-Corridor concept and Blue Shuttle Train. The following SITC commodity groups were **not** included in detailed flow analysis:

1. SITC groups 00 Live animals, 01 Meat and meat preparations, 02 Dairy products and birds' eggs and 03 Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof.
2. SITC group 2: Crude materials, inedible, except fuels.
3. SITC group 3: Mineral fuels, lubricants and related materials.
4. SITC group 64: Paper, paperboard and articles of paper pulp, of paper or of paperboard (if Gdansk is not linked to PolCorridor). However, to Italy and Austria this commodity group might be potential. This potential is recognised in chapter 6 "Southbound Markets".

Tables 10 and 11 show the growth between years 1999 and 2002 if only relevant commodities are selected.

Table 10. Finnish trade with Pol-Corridor countries, 1 000 tons; export without paper products (Finnish Customs 2002).

	EXPORTS					IMPORTS				
SITC groups	**-99**	**-00**	**-01**	**-02**	**-99–02**	**-99**	**-00**	**-01**	**-02**	**-99–02**
0. Food and live animals	7*	8*	12	9	33 %	77*	95*	94	86	14 %
1. Beverages and tobacco	4	2	3	4	5 %	14	15	13	15	4 %
2. Crude materials, inedible, except fuels	0	3	1	3	488 %	0	1	1	1	58 %
3. Mineral fuels, lubricants and related materials	182	175	221	242	33 %	195	225	250	218	12 %
4. Animal and vegetable oils, fats and waxes	544*	599*	561	582	10 %	307	350	357	357	16 %
5. Chemicals and related products	77	123	134	89	13 %	126	128	156	156	21 %
6. Manufactured goods	19	22	24	19	0 %	26	28	34	30	17 %
Total	**833**	**932**	**965**	**948**	**14 %**	**745**	**842**	**863**	**863**	**16 %**

*Estimate

Table 11. Finnish trade with Pol-Corridor countries, 1 000 tons; export with paper products (Finnish Customs 2002).

	EXPORTS					IMPORTS				
SITC groups	**-99**	**-00**	**-01**	**-02**	**-99–02**	**-99**	**-00**	**-01**	**-02**	**-99–02**
0. Food and live animals	7*	8*	12	9	33 %	77*	95*	94	86	14 %
1. Beverages and tobacco	4	2	3	4	5 %	14	15	13	15	4 %
2. Crude materials, inedible, except fuels	0	3	1	3	488 %	0	1	1	1	58 %
3. Mineral fuels, lubricants and related materials	182	175	221	242	33 %	195	225	250	218	12 %
4. Animal and vegetable oils, fats and waxes	1 725	1 866	1 762	1 893	10 %	307	350	357	357	16 %
5. Chemicals and related products	77	123	134	89	13 %	126	128	156	156	21 %
6. Manufactured goods	19	22	24	19	0 %	26	28	34	30	17 %
Total	**2 011**	**2 198**	**2 160**	**2 258**	**12 %**	**745**	**842**	**863**	**863**	**16 %**

*Estimate

Volumes in both export and import have increased almost steadily since 1999. The most important commodity group in volume is SITC group ’6 Manufactured goods’. Groups ’5 Chemicals and related products’ and ’7 Machinery and transport equipment’ are also significant. Figures also reveal that the commodity structure in imports is much more diversified than in exports.

The export of paper products to Pol-Corridor countries has a clear impact on the Finnish flows of goods (Table 12). If the paper products are excluded the total export volumes decreases by approximately 60 % (Table 13).

The fluctuations and growth of different commodity groups are also represented in the figures below (Figures 4, 5 and 6).

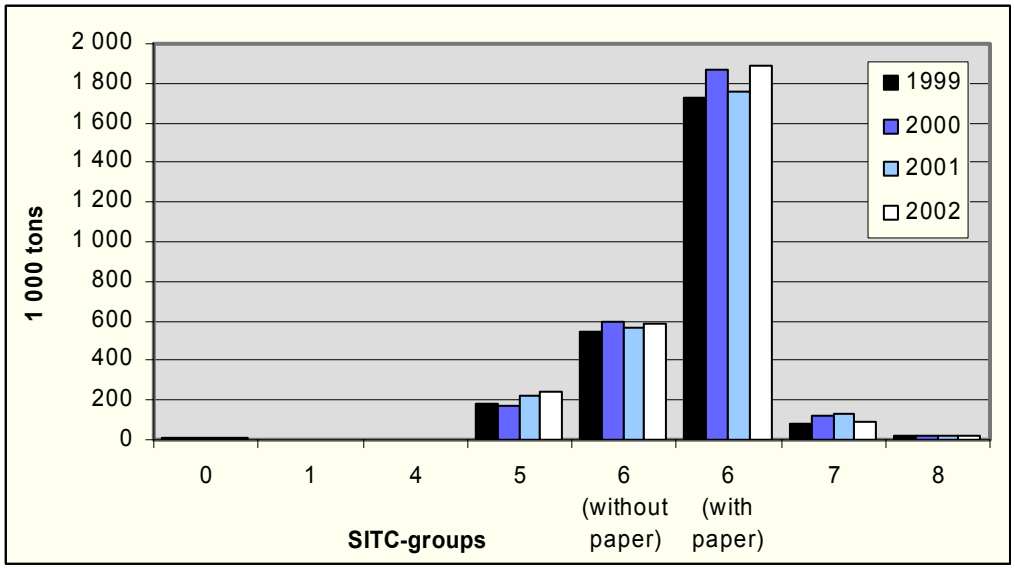

Figure 4. Total Finnish export volumes to Pol-Corridor countries, 1 000 tons (Finnish Customs 2002).

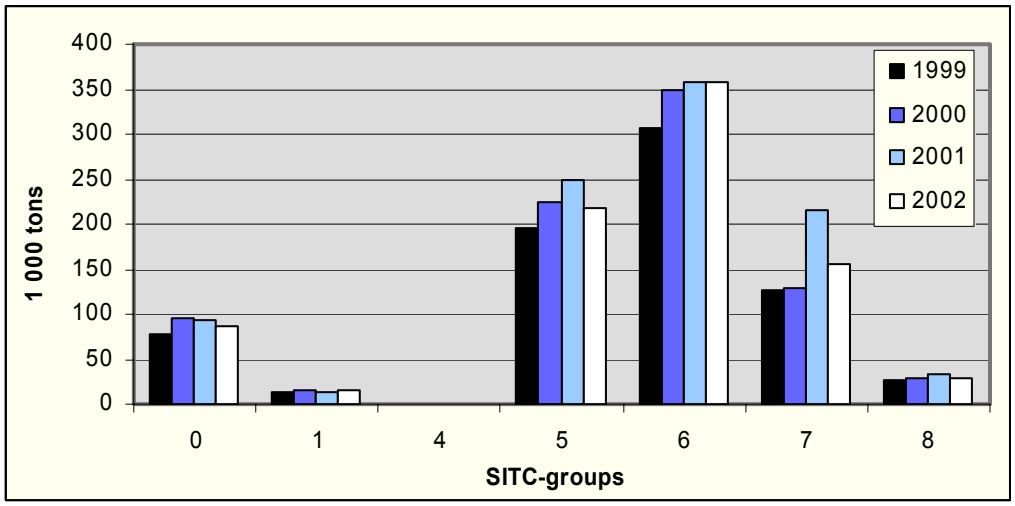

Figure 5. Total Finnish import volumes to Pol-Corridor countries, 1 000 tons (Finnish Customs 2002).

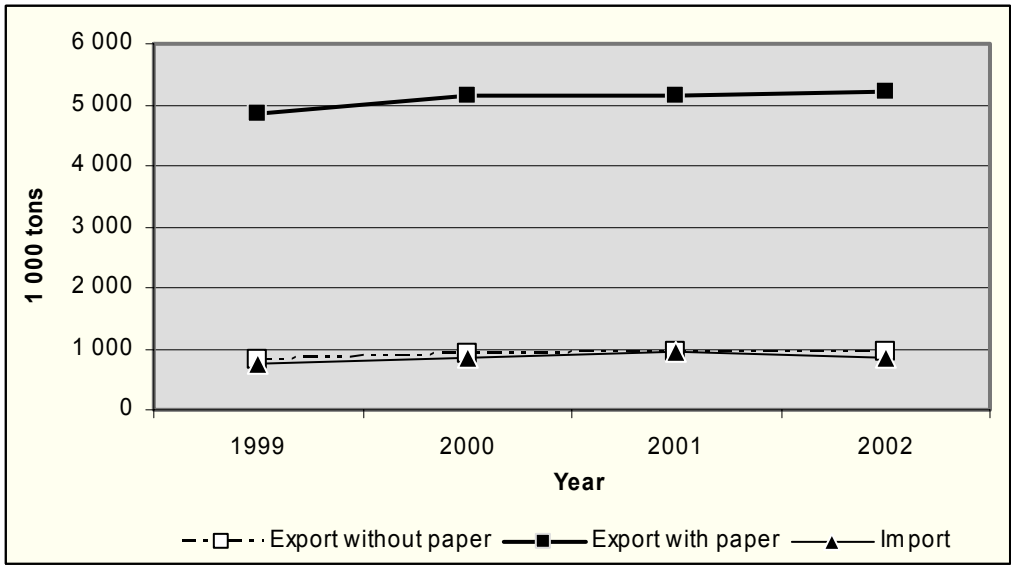

Figure 6. Balance between export and import.

Figure 6 depicts the directional balance in Southbound and Northbound transport flows. If the paper products are included, the Southbound volumes exceed the Northbound volumes considerably. On the other hand, flows are in a very good balance without paper products.

Table 12. Finnish export with Pol-Corridor countries 2001–2002, 1 000 tons; with paper products (Finnish Customs 2002).

	EXPORTS				
FINNISH TRADE	**1999**	**2000**	**2001**	**2002**	**-99–02**
Austria	209	215	214	212	1,5 %
Balkan countries	6	5	5	6	–7 %
Bulgaria	19	19	20	20	6 %
Croatia	8	10	13	15	83 %
Czech Republic	69	109	85	90	30 %
Greece	171	169	179	192	12 %
Hungary	91	115	126	127	39 %
Italy	767	820	836	811	6 %
Poland	400	441	459	499	25 %
Romania	13	14	13	14	6 %
Slovakia	58	58	68	69	19 %
Slovenia	16	16	14	13	–17 %
Turkey	183	206	130	191	4 %
Total	**2 011**	**2 199**	**2 160**	**2 258**	**12 %**

Table 13. Relevant Finnish trade with Pol-Corridor countries 1999–2002, 1 000 tons; export without paper products (Finnish Customs 2002).

	EXPORTS					IMPORTS				
FINNISH TRADE	**-99**	**-00**	**-01**	**-02**	**-99–02**	**-99**	**-00**	**-01**	**-02**	**-99–02**
Austria	86	89	78	96	12 %	75	88	86	90	21 %
Balkan countries	6	2	1	2	–96 %	7	2	3	2	–74 %
Bulgaria	4	3	4	7	76 %	4	18	3	2	–32 %
Croatia	2	3	4	3	29 %	1	0	4	1	117 %
Czech Republic	39	55	72	47	20 %	64	72	130	75	19 %
Greece	44	30	46	43	–2 %	31	43	59	51	63 %
Hungary	23	32	32	31	33 %	31	35	32	32	2 %
Italy	359	420	424	379	6 %	254	270	313	300	18 %
Poland	195	203	229	239	23 %	207	240	242	232	12%
Romania	4	5	4	6	56 %	1	1	12	2	23 %
Slovakia	13	12	14	15	11 %	17	20	20	25	45 %
Slovenia	5	5	4	5	3 %	6	9	9	9	58 %
Turkey	54	69	54	76	40 %	49	46	51	42	–14 %
Total	833	932	965	948	14 %	745	844	965	863	16 %

*Estimate

6.1 FACT BOX: Growth of Finnish Trade for Pol-Corridor Relevant Cargo

FACT BOX: Growth of Finnish Trade for Pol-Corridor Relevant Cargo

- The export of paper products to Pol-Corridor countries has a clear impact on the Finnish flows of goods. If the paper products are excluded the total export volume is approximately 60 % lower.
- If the paper products are included the Southbound volumes exceed the Northbound volumes considerably. Flows are more balanced without paper products.
- Over 1999–2002 the relevant cargo export from Finland has increased by 14 % excluding paper products and by 12 % including paper products.
- Relevant cargo import from Southend Pol-Corridor countries to Finland has increased by 16 %.

7. Pol-Corridor Potential Assessment, Finnish Flows

7.1 Introduction

It is evident that trade between Pol-Corridor countries will increase as commercial barriers progressively decrease. Business has already found this inviting market and new relations between different companies are already established. On a political level arrangements are also underway. Top-level meetings are held not only at national levels, but also between and within regions.

As a consequence of increasing trade, there is a need to develop new concepts in logistics. There are many important topics to be researched, such as infrastructure, IT, economic differences, pollution, traffic jams, customs procedures and modes of transports, to name a few.

However, potential volumes – like tons, trains, containers, trailers, ships – have not been considered in depth[4]. This is surprising as balanced logistics is one of the most important preconditions to having a productive and fruitful trade between two countries. Efficient and effective logistical solutions require a sizable volume in transport in order to gain economies of scale. Are we sure that transportation infrastructure will accommodate efficient logistics independently and spontaneously?

The purpose is to find out the potential modes of transportation between two regions in both a growing and in a new market situation. We apply the methodology described in Chapter 2, reworking existing Finnish Customs data so that it can be used solidly to estimate transportation volumes between two regions. Firstly, we start from modes of transport and consider their preconditions. Secondly, we analyse Customs data and suggest a balanced transportation network between two countries. Thirdly, we show the minimum and maximum volumes that different modes of transport can have. The prime modes of transport between Pol-Corridor countries in Continental Europe are railways and road[5], i.e. the comparison is based on comparison of trains and trucks.

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4 Different countries collect Customs data and this – and some other official data – is available. Unfortunately different country-specific standards and data collection methods do not necessarily allow direct applications.

5 Sea transport is considered as a feeder transport serving both rail and road.

7.2 Method of Assessment

In this part we analyse the transportation volumes in detail and estimate how many shuttle trains can be loaded with existing volumes. To be able to do this, we first extract volumes that are not suitable for the shuttle train-concept[6]. We found three types of restrictions:

1. Some products that cannot be transported in containers and trains.
2. Some clients that do not accept trains.
3. Some destinations that are not economical for trains.

The information is based on Customs data[7], which is given in tonnes. This we had to convert into more concrete modes: containers, trailers and wagons. The containers are of two main sizes, 20' and 40', where 1 × 40' = 2 teu (twenty-foot equivalent unit). The maximum loading is about 18 ton / 20' and 24 tons / 40 (which is only 12 ton / 1 teu). The approximate gross weight is about 14–16 tons / teu, including the weight of a container. We simplify by assuming that all road transports are done in trailers with maximum loading capacity of 24 tons.

There already exists rail transports between Finland and other Pol-Corridor countries, even though the volume is somewhat modest. We define that it is possible to load

– loose cargo 30 tons per train wagon or
– two containers (= 2 teus) or
– one trailer per train wagon.

Finnish Customs data is reliable as far as volumes are concerned, but the means of transport is not presented as unambiguously. The available data presents the volume that is transported in a first means of transportation from Finland (exports) and last means of transports (imports). As the sea almost surrounds Finland, most all of our first transports are ship transports. Therefore we have estimated the volumes in containers, road transports and rail by interviewing experts of logistic service providers[8] (forwarders). It was estimated what percent of the total volume (% of the total volume) are transported to a country in containers, road transports and trains.

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6 It is natural that black-and-white "suit / not suit" is perhaps better expressed by some more neutral terms. In transportation there are only few absolutely yes / no situations. As an example, we know that it is possible to ship coal or oil in containers, but economically we can justify our argument to consider that these products do not suit the shuttle train concept.

7 The data is based on statistics of the year 2001.

8 Five interviews were held with leading forwarders and transporters. All estimations were quite consistent.

The Pol-Corridor countries are considered in three sections:

- Nordic Countries at the Nordic end (Northbound (NB) destination)
- Countries that lie on the route of the shuttle train
- South Eastern Europe (Southbound (SB) destination).

It can be seen that the potential Pol-Corridor users are those countries that can fully utilise the corridor (Figure 7). As Poland and Czech Republic are inside the corridor, it is evident that they are not potential corridor countries[9]. As a conclusion, Finnish potential Corridor countries are:

Poland	no (corridor)
Austria	yes (partly corridor)
Italy	yes
Greece	yes
Turkey	no (difficult connection)
Slovakia	yes
Hungary	yes
Slovenia	yes
Czech	no (corridor)
Romania	yes
Bulgaria	yes
Croatia	yes
Other Balkan Countries	yes.

Some Finnish companies have made their logistical solutions already. This kind of a decision can for example mean heavy investments in the logistical chains, warehousing, handling equipment, etc. Finnish paper industry has decided to use Gdansk and Gdynia as their basic port to these countries. It is not, however, clearly stated that all of the Pol-Corridor countries will be delivered from these ports. Italy and Austria are still potential countries. On the other hand, if Pol-Corridor can also include Gdansk and Gdynia as one port that serves the corridor from a sub-hub in Poznan, the paper industry can be seen as a big potential user of the corridor. However, in our analysis we have not included the paper products, except for Italy and Austria.

9 As a matter of fact, it is not easy to define what countries are real Pol-Corridor countries. Germany, especially the southern part of it, can utilize the corridor. A northern part of Italy has been seen as a potential. According to Finnish views also the southern part of Italy should be considered as a potential origin or destination.

Figure 7. Southern POL-CORRIDOR markets, entire south Eastern European region (light blue) and core hinterland area (dark blue). Cities with population more than 250 000 are marked.

7.3 Southbound Market

Southbound exports from Finland are mainly carried by trailers according to expert estimations. The estimates varied between 75 % and 80 % of all export transport being carried by trailers. The paper industry is the biggest Finnish exporter and so the question of paper's role in shuttle train is very important. In the analysis it is expected that all paper products (SITC-code 64) except Italy and Austria use exclusively Gdansk and Gdynia ports, and thus they are considered as not being potential cargo[10]. (Table 12.)

The total volume in the year 2001 to the market is 2 835 917 tons.

[10] It is possible to change the variable in the simulation model and to estimate the effect with or without paper.

The value of goods varies between countries. For example, the value of export per ton is 1 088 EUR for Slovakia, 2 714 EUR for Croatia and for other Balkan countries 7 645 EUR per ton. On average, the whole export's value per ton is 1 624 EUR.

Potential 1 is a volume where commodity groups 00–03, 2 and 3 have been extracted. Potential 1 reflects the cargo that generally can be transported in shuttle trains. Because our purpose is to find out the approximate potential, a full analysis of the suitability of some specific products has not been considered.

An essential part of Finnish exports is comprised of the paper industry. About 42 % of total exports and 55 % of actual potential (”Potential 1”) is paper – ”SITC64”. Therefore it is important to analyse this group more deeply. As mentioned earlier, the main port to Pol-Corridor countries for paper is Gdansk and Gdynia in the northeastern part of Poland and it is unlikely that the paper industry will change its routing in the short run. Notable exceptions are Italy and Austria. For these countries – with huge volumes of paper – Pol-Corridor is an alternative to traditional routes.

Potential 2 is an estimate of the total potential on SB volumes (tons) to Pol-Corridor countries (Table 14).

Table 14: Finnish SB transport to the Pol-Corridor market, estimation of potential volumes, year 2001.

Market for SOUTHBOUND TRANSPORT:	Volume (tons) TOTAL	Value of goods (1000 e)	Value per ton	Potential 1 (tons)	Paper 64 tons TOTAL	Paper 64 potential (1/0)	Potential 2 (tons)
Poland	589 609	901 425	1 529	458 569	229 978	0	228 591
Austria	288 326	508 694	1 764	214 044	136 429	1	214 044
Italy	1 171 164	1 751 412	1 495	835 737	412 126	1	835 737
Greece	255 240	364 044	1 426	178 529	132 865	0	45 664
Turkey	159 223	261 593	1 643	130 371	76 013	0	54 358
Slovakia	71 005	77 230	1 088	68 067	54 287	0	13 780
Hungary	143 495	321 130	2 238	125 625	93 871	0	31 754
Slovenia	16 788	32 400	1 930	14 211	9 720	0	4 491
Czech	89 522	234 517	2 620	85 045	13 428	0	71 617
Romania	12 941	33 771	2 610	12 902	8 985	0	3 917
Bulgaria	20 343	44 258	2 176	19 779	15 498	0	4 281
Croatia	12 964	35 186	2 714	12 869	9 006	0	3 863
Other	5 297	40 494	7 645	4 869	3 546	0	1 323
Total	**2 835 917**	**4 606 155**	**1 624**	**2 160 617**	**1 195 752**		**1 513 420**

Modes of transport

The mode of transport is an important pointer in analysing the actual potential. The market already exists, the infrastructure is already constructed, the logistics is ready, the

trailers, containers and trains are running, the round-trip systems and terminal network exist, warehousing and client relations have been established, etc. This means that a change to a new concept does not happen overnight.

The next phase in the analysis is to find out the volumes that existing modes of transport (containers, trailers and rail) have. Table 15 presents the results. From the results we have, on a country level:

– identified the market shares for containers, trailers and rail
– divided the potential (”Potential 2”) tons according to the above market shares
– concluded how many transport units the above tons require
– concluded how many transport units the above tons are on a weekly basis.

Table 15. Finnish SB-Transport Potential 2 to Pol-Corridor countries by means of transport.

	Potential 2 by means of transport											
Market for SOUTHBOUND TRANSPORT:	**Cntrs (tons)**	**Market Share**	**Cntrs (teus/y)**	**Cntrs (teus/w)**	**Trailers (tons)**	**Market Share**	**Trailers (units/y)**	**Trailers (units/w)**	**Rail (tons)**	**Market Share**	**Waggons (per y)**	**Waggons (per w)**
Poland	34 289	15%	2 449	47	189 731	83%	10 541	203	4 572	2%	183	4
Austria	17 124	8%	1 223	24	176 586	83%	9 810	189	20 334	10%	813	16
Italy	114 914	14%	8 208	158	647 696	78%	35 983	692	73 127	9%	2 925	56
Greece	26 828	59%	1 916	37	18 608	41%	1 034	20	228	1%	9	0
Turkey	37 371	69%	2 669	51	16 715	31%	929	18	272	1%	11	0
Slovakia	1 034	8%	74	1	11 885	86%	660	13	861	6%	34	1
Hungary	2 778	9%	198	4	26 991	85%	1 499	29	1 985	6%	79	2
Slovenia	258	6%	18	0	4 008	89%	223	4	225	5%	9	0
Czech	7 162	10%	512	10	59 621	83%	3 312	64	4 834	7%	193	4
Romania	539	14%	38	1	3 300	84%	183	4	78	2%	3	0
Bulgaria	535	13%	38	1	3 671	86%	204	4	75	2%	3	0
Croatia	531	14%	38	1	3 264	85%	181	3	68	2%	3	0
Other	132	10%	9	0	1 184	90%	66	1	7	1%	0	0
Total	**243 494**	**16%**	**17 392**	**334**	**1 163 261**	**77%**	**64 626**	**1 243**	**106 665**	**7%**	**4 267**	**82**

Because Finnish Customs data does not explicitly give the market share by modes of transport, we interviewed five Finnish forwarding companies and one shipping company and asked their experts to estimate the shares. The results of the interviews were convergent enough for further conclusions. The column ”market share” is a mean of the companies’ answers.

It can be seen from the Table 15, that trailer transportation is the main mode of transport to this market (note: paper mainly excluded). Almost 80 % of the volumes are transported in trailers and about 16 % in containers leaving rail with only about 7 %. The only countries that have trailer transport less than 50 % are Greece and Turkey.

The Shuttle Train will comprise wagons and therefore the second task is to estimate how many wagons all the potential containers, trailers and rail wagons require. The following relationships were adopted:

– One wagon corresponds to two 20" containers (2 teus).
– One wagon corresponds to one trailer.
– One wagon corresponds to one wagon, obviously.

As mentioned, the most likely potential comes from containers and from existing rail transports. The amount of wagons needed for these shipments are called "MIN", meaning *minimum potential* that can be reached i.e. the existing rail transport plus the containers. The "MAX", meaning *maximum potential*, is a situation where the trailers are added to the estimate.

It can be seen from the Table 16 that for example the minimum ("MIN") potential to the whole market from Finland is about 250 wagons per week whereas the maximum ("MAX") amount grows to about 1 500 wagons. The regional differences are remarkable, see conclusions in chapter 7.5 "Blue Shuttle Train".

The question of how well a specific country suits to the new concept of "Blue Shuttle Train" is considered in the column "Pol-Corridor Country?". It is possible to estimate the value in percents (like 45 %), but our consideration has been yes (= 1) or no (0). Three countries have been excluded: Poland and Czech because they are the corridor countries[11] and Turkey because of the difficult rail connection.

Table 16 shows the first result of the study. The minimum amount of wagons needed per week is 188 and the maximum is 1 146. Further, it can be seen that in "MIN-study" there are only five countries that have any potential, and in "MAX-study" all (ten) countries, except those that were earlier excluded, have at least some potential.

It has been defined that one Shuttle Train can have 40 wagons in one go. Thus, by dividing the amount of wagons by 40, we obtain the amount of Shuttle Trains that Finland is able to fill on a weekly basis. The analysis shows that a MIN amount is estimated to be almost five (4.7) trains per week – one every working day. The MAX amount is estimated to be almost thirty (28.7) trains per week. However, a bit deeper look reveals that Italy and Austria together comprise about 90 % of the total volume.

[11] It is possible to argue that these transit countries could also utilize the connection, especially Czech. After consideration we, however, concluded that because the benefit of the corridor to these countries are at least doubtful, it is better to leave them out from the model.

Table 16. Pol-Corridor-potential. Demand for wagons and Shuttle Trains on a weekly basis.

Market for SOUTHBOUND TRANSPORT:	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	27	230	0	0	0	0.0	0.0
Austria	27	216	1	27	216	0.7	5.4
Italy	135	827	1	135	827	3.4	20.7
Greece	19	38	1	19	38	0.5	1.0
Turkey	26	44	0	0	0	0.0	0.0
Slovakia	1	14	1	1	14	0.0	0.4
Hungary	3	32	1	3	32	0.1	0.8
Slovenia	0	5	1	0	5	0.0	0.1
Czech	9	72	0	0	0	0.0	0.0
Romania	0	4	1	0	4	0.0	0.1
Bulgaria	0	4	1	0	4	0.0	0.1
Croatia	0	4	1	0	4	0.0	0.1
Other	0	1	1	0	1	0.0	0.0
Total	**249**	**1 492**	**10**	**188**	**1 146**	**4.7**	**28.7**

7.4 Northbound Markets

NB market analysis has been carried out using the same method as in the Southbound analysis. On a total volume level NB transport is much bigger than SB transport. One of the reasons is the Polish ”not-potential-cargo” (all raw materials, ”SITC-group 3”, was 2 537 032 tons year 2001; the coal alone was 2 014 126 tons). The total Potential 2 is about 965 000 tons. This is significantly less than the SB volume, only about 65 % from SB volume. This presumably means imbalance in transportation[12].

Table 17 shows that paper tons to Finland is only a marginal (Paper 64 tons TOTAL). Also the paper volumes are included in the Potential 2, because their logistics differs from those of SB transportation.

[12] The transporters employ a term ”Freight Ton”. This ratio refers to the fact that some products are heavier per Cubic Meter than the others. In principle it could be possible that there is more ”light cargo” in NB transport. In this case the balance problem decreases. From practice we know, however, that this is a hypothetical assumption. Generally, Finnish Customs data does not clearly indicate this Freight Ton ratio.

Table 17. Finnish NB transport to the Pol-Corridor market, estimation of potential; volumes for 2001.

Market for SOUTHBOUND TRANSPORT:	Volume (tons) TOTAL	Value of goods (1000 e)	Value per ton	Potential 1 (tons)	Paper 64 tons TOTAL	Paper 64 potential (1/0)	Potential 2 (tons)
Poland	2 807 685	402 715	143	242 504	3 074	1	242 504
Austria	98 465	408 349	4 147	85 710	4 512	1	85 710
Italy	317 820	1 170 619	3 683	313 376	3 775	1	313 376
Greece	87 874	70 765	805	58 940	29	1	58 940
Turkey	98 459	89 369	908	51 442	724	1	51 442
Slovakia	21 251	52 099	2 452	20 297	723	1	20 297
Hungary	42 612	147 086	3 452	32 573	220	1	32 573
Slovenia	9 114	32 328	3 547	9 012	0	1	9 012
Czech	135 053	282 642	2 093	129 651	121	1	129 651
Romania	11 982	5 857	489	11 840	0	1	11 840
Bulgaria	5 630	7 038	1 250	2 611	0	1	2 611
Croatia	5 025	8 931	1 777	4 251	0	1	4 251
Other	3 341	7 815	2 339	3 225	0	1	3 225
Total	**3 644 311**	**2 685 612**	**737**	**965 432**	**13 178**		**965 432**

Modes of transport

The mode of transport is analysed in Table 18. The percentages correspond to those in the previous SB percentages (Table 15). As noted in the previous chapter, the total volumes are far less. The level of imbalance of transport is roughly the same in all of the three modes of transport.

Table 18. Finnish NB-Transport Potential 2 to Pol-Corridor countries by means of transport.

	Potential 2 by means of transport											
Market for NORTHBOUND TRANSPORT:	**Cntrs (tons)**	**Market Share**	**Cntrs (teus/y)**	**Cntrs (teus/w)**	**Trailers (tons)**	**Market Share**	**Trailers (units/y)**	**Trailers (units/w)**	**Rail (tons)**	**Market Share**	**Waggons (per y)**	**Waggons (per w)**
Poland	27 282	11%	1 949	37	210 372	87%	11 687	225	4 850	2%	194	4
Austria	7 928	9%	566	11	68 568	80%	3 809	73	9 214	11%	369	7
Italy	43 089	14%	3 078	59	242 866	78%	13 493	259	27 420	9%	1 097	21
Greece	30 207	51%	2 158	41	28 439	48%	1 580	30	295	1%	12	0
Turkey	32 794	64%	2 342	45	18 391	36%	1 022	20	257	1%	10	0
Slovakia	1 522	8%	109	2	16 745	83%	930	18	2 030	10%	81	2
Hungary	2 850	9%	204	4	26 466	81%	1 470	28	3 257	10%	130	3
Slovenia	518	6%	37	1	8 043	89%	447	9	451	5%	18	0
Czech	14 586	11%	1 042	20	99 831	77%	5 546	107	15 234	12%	609	12
Romania	1 628	14%	116	2	9 975	84%	554	11	237	2%	9	0
Bulgaria	326	13%	23	0	2 239	86%	124	2	46	2%	2	0
Croatia	585	14%	42	1	3 592	85%	200	4	74	2%	3	0
Other	323	10%	23	0	2 886	90%	160	3	16	1%	1	0
Total	**163 638**	**17%**	**11 688**	**225**	**738 413**	**76%**	**41 023**	**789**	**63 381**	**7%**	**2 535**	**49**

Table 19 presents the results of the NB study. The total demand for wagons – potential – varies between 161 (MIN) to 950 (MAX) and the corresponding demand for Shuttle Trains varies between 2.4 (MIN) and 13.3 (MIN) trains per week. A lot of countries have such a small potential, that only few containers can be estimated to these countries on a weekly basis. As it was with SB transport, Italy and Austria are the most important countries, but also Greece shows some significance. The share of these three countries ranges from about 90 % (MIN) and 84 % (MAX).

Table 19. Pol-Corridor potential; demand for wagons and Shuttle Trains per week.

Market for SOUTHBOUND TRANSPORT:	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	22	247	0	0	0	0.0	0.0
Austria	13	86	1	13	86	0.3	2.1
Italy	51	310	1	51	310	1.3	7.8
Greece	21	51	1	21	51	0.5	1.3
Turkey	23	42	0	0	0	0.0	0.0
Slovakia	3	20	1	3	20	0.1	0.5
Hungary	4	33	1	4	33	0.1	0.8
Slovenia	1	9	1	1	9	0.0	0.2
Czech	22	128	0	0	0	0.0	0.0
Romania	1	12	1	1	12	0.0	0.3
Bulgaria	0	3	1	0	3	0.0	0.1
Croatia	0	4	1	0	4	0.0	0.1
Other	0	3	1	0	3	0.0	0.1
Total	**161**	**950**	**10**	**94**	**532**	**2.4**	**13.3**

Table 20 summarizes the coefficients used in this analysis.

There are two main types of containers, 20’ and 40’. Practically two 20’ containers are the same size as one 40’ container. To avoid misunderstanding, the abbreviation ”teu”[13] is in use. For example 10 teus can mean 10 × 20’ or 5 × 40’ or 4 × 20’ + 3 × 40’. The difference is a loading capacity: it possible to load about 18 tons in a 20’ container but ”only” 24 tons in a 40’ container (which would be 24/2 = 12 tons per teu). The experts estimated that a practical weight per teu is 14–16 tons. Finally, 14 tons was assumed.

A *trailer* is a general concept for road transports in this study. By a trailer we mean all road transport vehicles that operate between Finland and other Pol-Corridor countries, varying from vans to road trains. In practice, most of the transport is done by trailers, with a length of about 11–13.7 metres and a loading capacity of about 24 tonnes. It was estimated that the practical weight is about 18 tons.

[13] T.E.U. = twenty foot equivalent unit, ”teu”.

To be able to estimate the volumes on a weekly basis, the yearly volumes are divided by 52, the number of weeks per year.

One part of the cargo is already shipped in trains. This is mostly ”loose cargo”, shipped and loaded in wagons. Normally it is possible to load 30–50 tons in one wagon, but according to forwarders, the practical weight is about 25 tons.

The length of wagons varies even within individual countries. In theory it is possible to load three teus in one wagon. Because the type of the wagon is not yet agreed upon, a more normal 2 × 20’ was assumed.

It was estimated that one trailer corresponds to one wagon. However, this is not necessarily the case. In future it can be possible that trailers are not needed at all. There is a possibility that all the cargo will be loaded in containers[14]. The possible mistake arising from this point has an impact on our estimates. This is because the actual weight of a trailer load is 18 tons and the weight of a container load is 14 tons per teu[15].

It is not yet known how many wagons one shuttle train operates with optimally. Typically a ”Block Train” that operates between Finland and Russia has about 40 wagons.

Table 20. Assumed cargo ratios.

Coefficients needed in formulas	SB	NB
Tons / container (teu)	14	14
Tons / trailers	18	18
Weeks / year	52	52
Tons / waggon (loose cargo)	25	25
Containers / waggon	2	2
Trailer(loads) / waggon	1	1
Waggons / train	40	40

[14] This kind of a speculation is interesting, but is not within the scope of our study now. It will, however, be considered in latter parts of the research.

[15] Roughly, the loading capacity of one trailer = 2 × 20’. An estimate of 18 tons for a trailer and 2 × 14 tons = 28 tons for two containers was made. Theoretically it is possible to claim that by using 20’ containers the efficiency of a Shuttle Train would be higher than trailers.

7.5 Blue Shuttle Train

In this chapter we analyse the results of the study more carefully and estimate how many Shuttle Trains Finnish flows could provide. Finally, we consider conclusions applicable to other Nordic Countries.

Table 21 shows the potential of SB and NB volumes. First we have compared the country level volumes (SB and NB) and estimated a balanced amount of trains needed. Then the total need of trains is calculated from the country level needs. The first two columns indicate the train demand for SB transport (MIN and MAX), the second two columns indicate the train demand for NB transport and the last two are a sum of the SB and NB volumes.

Table 21. Shuttle Train potential, a balanced review.

Balanced Transport, Shuttle Trains	Trains/week, SB		Trains / week, NB		Balance	
	MIN	MAX	MIN	MAX	MIN	MAX
Poland	0.0	0.0	0.0	0.0	0.0	0.0
Austria	0.7	5.4	0.3	2.1	0.3	2.1
Italy	3.4	20.7	1.3	7.8	1.3	7.8
Greece	0.5	1.0	0.5	1.3	0.5	1.0
Turkey	0.0	0.0	0.0	0.0	0.0	0.0
Slovakia	0.0	0.4	0.1	0.5	0.0	0.4
Hungary	0.1	0.8	0.1	0.8	0.1	0.8
Slovenia	0.0	0.1	0.0	0.2	0.0	0.1
Czech	0.0	0.0	0.0	0.0	0.0	0.0
Romania	0.0	0.1	0.0	0.3	0.0	0.1
Bulgaria	0.0	0.1	0.0	0.1	0.0	0.1
Croatia	0.0	0.1	0.0	0.1	0.0	0.1
Other	0.0	0.0	0.0	0.1	0.0	0.0
Total	**4.7**	**28.7**	**2.4**	**13.3**	**2.2**	**12.4**

The last two columns indicate balanced transportation volumes in a shuttle train. For example, Austria's minimums are 0.7 (SB) and 0.3 (NB) trains per week. This means that there is an imbalance. By choosing 0.3 (minimum of the minimums) we can be secure that there are return loads on both directions. Consequently, the maximum needs are 5.4 (SB) and 2.1 (NB) shuttle trains per week meaning again an imbalance (more SB-transport). By choosing a smaller figure (minimum) we can be confident that the transport is in balance.

Conclusion 1*:* The potential of Finnish cargo flows for shuttle trains varies between 2.2 (MIN) and 12.4 (MAX) shuttle trains per week. The final amount depends on several

factors, and the most important is the trailer transport. If all the trailer users accept the new concept[16], the final amount of shuttle trains will be about 12 trains per week. If the trailer users do not accept the concept, the amount will be about 2 trains per week.

Austria, Italy, Greece and Hungary are practically the only countries that are potential users, because the volumes of other Pol-Corridor countries are small for a full-scale new concept. Furthermore, Italy's role seems a prerequisite.

***Conclusion 2**:* The trade between the following countries must grow remarkably if they are to be of interest to the Pol-Corridor concept:

- Slovakia
- Slovenia
- Romania
- Bulgaria
- Croatia
- other Balkan countries.

It seems evident that another requirement is that the paper industry accepts the concept. In this case, the connection from Gdansk and Gdynia to the shuttle train must exist[17].

The difference between MIN and MAX is significant. This difference reflects many aspects, and we would like to emphasise one: this difference is the real potential! The minimum should be reached with the existing service level, if the pricing is good enough and the level of service is acceptable. But the large difference (MIN vs. MAX) reflects a poor service level that train operations offer to their clients.

***Conclusion 3**:* The clients are likely to accept the shuttle train if the service is top-level and the price is at the right level. We claim that the difference between MIN and MAX is partly a consequence of poor service.

***Conclusion 4**:* We conclude that today's service level of rail is demonstrated very clearly and quantitatively by our calculations, that differ from the usual analysis of market shares; we demonstrate the poor utilisation of rail's true potential.

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16 This very important question is not included in this part of the study, but it is considered in Chapter 8. The answer requires deep analyses of service levels, pricing questions, and existing infrastructure to name but a few.

17 It is possible to estimate how much the growth should be. With some adjustments the model can simulate the areal requirements.

7.6 Maritime Transport Prospects

The same base data can be used to evaluate maritime transport potential. In addition, for shipping lines also those countries excluded from the Shuttle Train analysis are interesting: Poland, Czech and even southern parts of Germany. It should be underlined that without an appropriate shipping frequency the Shuttle Train concept does not work. Therefore co-operation with shipping lines is a strategic question for Blue Shuttle Train.

Shuttle Train offers an alternative for individual project shipments to Italy, Greece and even Turkey provided that service level and price is acceptable to customers.

Baltic Sea offers a perfect environment for ”multi-stop” ship circulation and thus could feed efficiently the Shuttle Train.

7.7 Limitations of the Analysis

Our analysis approach was adopted and developed to derive an understanding about the potential of a Shuttle Train in Pol-Corridor countries. The analysis of Finnish flows can be made generic and applied to any freight potential investigations.

However, a model (i.e. our analysis method and approach) can never describe the world exactly. During our work we found some limitations, which should be taken into account:

1. Our approach is technical. Peoples' deeper motives, such as personal contacts and personal preferences are not described in our analysis and yet they have an impact on decisions concerning transports.
2. The analysis does not consider the existing infrastructure. There might be problems in infrastructure that *de facto* make the system non-applicable.
3. The analysis does not consider the political climate. For example, North-South rail corridors are presently included in Pan-European transport corridors, which means that Pol-Corridor might not be prioritised when investments are concerned. Pol-Corridor should be backed with a proper investment policy. It is not in the Polish interests to invest only in the East-West direction but also to utilise opportunities in the North-South direction. Scandinavian countries and countries south of Poland should equally support these efforts.
4. There is no absolute certainty about the free access on Polish and Czech infrastructure and how this access is about to be processed. Furthermore, there are numerous other questions related to the starting of new train operations in these countries, which might be critical.

5. A new method (Shuttle Train) might look attractive, but if other logistical systems (such as trailer operations) are already established, the change might be difficult to carry out, might not be easily justified, and in some cases even practically impossible.

6. The data used is from Finnish Customs. It is not possible to analyse the annual volumes absolutely exactly. Because the purpose was to get more understanding, it was agreed that the data was processed on principal groups only (exception: the SITC-code 64, paper). This means that in the existing data there might be some products that cannot be transported in trains. However, our understanding is that these kinds of products are a minority.

7. The model is based on tons, which is also the base of Customs data. In practise, weight is only one restrictive element: a ratio between weight and space should be considered.

8. The important part of the study is based on expert interviews. Do they really know the modes of transports so well that the information can be used as a tool in the analysis? Our choice is ”yes”, they know it well enough. They do not know it exactly, but they have a deep understanding about the markets in Finland. The individual answers did not differ too much from the others, which gives us some confidence on their estimates.

9. The result of the study is a *potential.* But what does it really mean? In this very case, it does not mean promises of any transportation volumes if the Shuttle Train will be constructed. It means a rough estimation of a volume that could be reached if ”all the other things are solved”. These ”other things” we do not know exactly, but we know that there are many of those.

10. The future is not a statistical data, but a result of human beings' actions. It is possible to predict and forecast, but the growth of logistical activities does not necessarily correspond with expected trade growth curves. If an economy grows, say 3% annually, then the trade between two countries might grow 10 %, and transportation even 20 %.

7.8 Additional Arguments

There are many strategic arguments that speak *for* Pol-Corridor that cannot be estimated by using simple mathematics. The most important are:

– German infrastructure is utilised to its maximum and there is not too much free capacity offered. This affects price and speed of transports and makes Poland an alternative rail and road transit country. Furthermore, the new motorway charges planned in Germany will increase the costs in German territory. It is possible that this price increase in road transport will be reflected also in rail transport as rail may have a chance to push up tariffs.

- As Poland and other accession countries have joined the EU, this political decision will be reflected in trade and trade flows. An inevitable ”shift to East” is about to occur within the new EU. This in turn will favour Poland as a transit country and is an opportunity for Poland, as well as for Czech, to develop their infrastructure accordingly. The North-South direction will increase its weight as these countries realise the additional opportunities. When looking at the Baltic Sea geography, Poland, Czech and Slovakia are the land bridges between South-Eastern Europe and Scandinavia.
- The idea of Pol-Corridor is in line with EU transport policies. Key words such as motorways of sea, revitalised railways, intermodal transport are recogniseble in Pol-Corridor.
- Finally, the Pol-Corridor is not only a corridor between Finland and the destination countries. Sweden and Norway will also be very important players. The synergy as a result of Scandinavian co-operation decides the importance of this corridor. The next chapter considers this question.

8. Pol-Corridor Potential Assessment, Total Nordic Flows

8.1 Introduction

The previous chapters described the current Finnish flows between Pol-Corridor countries. Most of the potential destination countries can be identified as well as those countries that are non-significant for the Pol-Corridor concept. We also discussed the maximum and minimum potential for the Blue Shuttle Train and the question of balanced transportation in North-South directions. Also the restrictive factors that have an influence on the potential of the train were identified.

It is vital that every country makes its own analysis concerning Pol-Corridor as a logistics alternative. Only with an understanding of the direct, country-specific benefits, are decision-makers ready to invest in new solutions. Inevitably, Pol-Corridor contains a possibility to utilise synergy between all Pol-Corridor countries – not only Scandinavian ones. Individual trading countries do not have possibilities to establish a new route between them on a larger scale, which might also lead to mutual minor trade as a consequence of poor logistics solutions. But as soon as a group of potential countries cooperate, the benefits start to accrue and spread across the whole region.

In this paper we analyse Pol-Corridor potential as a whole including all the Scandinavian trade volumes[18].

Using the methodology introduced in the first part of the study, but taking deeper insight to possible future development, the analysis is structured as follows:

- First, all statistical data has been standardised, and country-level restrictions have been considered in assessing whether individual countries are relevant for Pol-Corridor in terms of volumes, geography and type of trade.
- Second, data is reworked and combined in order to identify all the volumes between the Pol-Corridor countries (present state).
- Third, a set of assumptions on trade (economic) growth and modal shifts from road to rail are made in order to estimate different potentials for Pol-Corridor (scenarios).
- Fourth, the estimates of potential are presented and discussed.
- Finally, the results are concluded and evaluated.

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[18] All the data was collected from statistics in Nordic Countries. These countries can provide a sophisticated and quite synchronized data base. Collecting the (same) data from the southern countries would have been more complicated.

8.2 Method

Analysis is based on customs data from Finland, Norway and Sweden. The data is collected in the same manner as it was done for Finland. Also the method for converting the volumes (tonnes) into maximum and minimum number of trains has been explained in previous chapters. The data refining process is depicted in Figure 2 in Chapter 2. From the total volume, based on customs data, only suitable product groups are included in the analysis. Other non-applicable products are also excluded, e.g. some paper products from Finland[19]. After this first round of selecting relevant volumes, the first potential is obtained:

Potential 1 = relevant cargo suitable for Pol-Corridor and Blue Shuttle Train

Some countries must be considered as non-potential. For example, Poland and Czech are transit countries who presumably cannot fully utilise the Blue Shuttle Train. The rail connection to Turkey is also considered somewhat complex so that Turkey has been considered as a non-potential country. When the volumes of these non-potential countries have been extracted, we obtain the second level potential:

Potential 2 = relevant cargo suitable for Pol-Corridor and Blue Shuttle Train AND relevant countries for Blue Shuttle Train = MAX

This is the volume that comprises all modes of land transport: truck, rail and intermodal. A careful consideration reveals that also *Potential 2* should be divided into two parts. Truck transport has gained a lot of appreciation and this volume will be more difficult to shift to shuttle train than the volumes already transported by trains or by intermodal means. Therefore, we can consider *Potential 2* as a maximum volume that can be reached if all possible transport (the right products, the right countries, all land transport) will be moved by trains.

Finally, we define

Potential 3 = relevant cargo suitable for Pol-Corridor and Blue Shuttle Train AND relevant countries for Blue Shuttle Train AND the share of land transport market that can be captured by Blue Shuttle Train = MIN

Potential 3 can be considered as the minimum potential volume for Blue Shuttle Train, reflecting the volume that can be captured from existing container and rail transport.

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[19] Based on Finnish paper industry's views on their logistics through Poland.

In the forthcoming analysis, we will concentrate especially on *Potential 2* (maximum potential) and *Potential 3* (minimum potential), because they build up the starting point for examining the business case of the Blue Shuttle Train.

The market potential analysis was executed in several phases (see Figure 8). First the data was collected from different sources. This was analysed first on a country level and then synthesized together. The simulation process (scenarios) was carried out by modifying individual variables as already depicted. The scenario results were analyzed after each simulation cycle. In this chapter, five scenarios (conclusions) are presented.

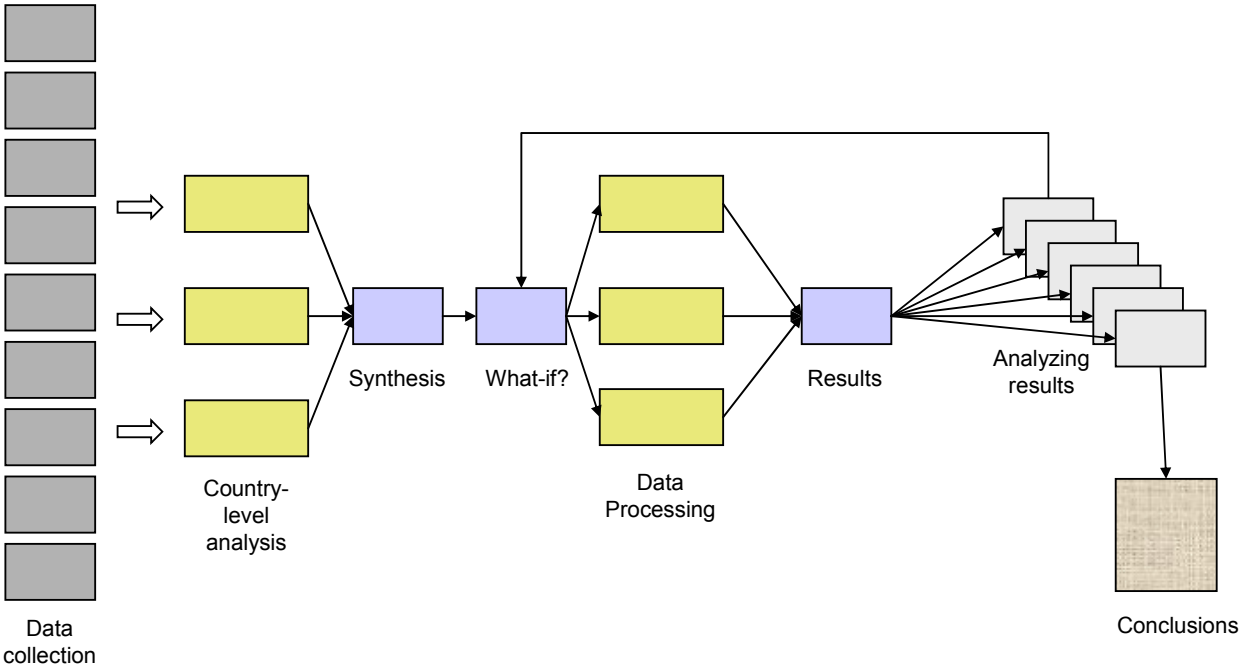

Figure 8. The Market Potential Analysis Process.

8.3 Scenarios – build-up

Scenarios are defined in order to probe the business potential for Blue Shuttle Train. These scenarios are projected up to the beginning of 2006, but the time scale in itself is not that relevant because the growth rates and modal shifts are unknown parameters, especially when it comes to time scale. We assess the time scale in order to make the comparisons more understandable and informative to the readers.

Normal Growth scenario assumes the expected bi-lateral trade growth rate across the countries as witnessed in 1999–2001. This is the scenario where we can picture quite normal, expected growth but assume that Blue Shuttle Train will not be able to conquer a new share of the transport market in Pol-Corridor.

Small Country Fast Growth Boom and Change from Trailers to Blue Shuttle Train. This scenario is a variant of the previous scenario and adds to it a rapid change from trailers to containers for these countries' trade (except for Italy and Austria). Basically it describes the impact of Blue Shuttle Train acceptance in relation to other scenarios.

Small Country Fast Growth scenario assumes doubling of all the trade flows, *except* for Italy and Austria, for which the trade grows at the expected rate (empirical rate for 1999–2001). We also assume that Blue Shuttle Train is *not* able to successfully conquer a share of the transport market for these growing market countries. This scenario will show how sensitive the Blue Shuttle business case is to big trade changes in those markets that are currently quite moderate. Quite explicitly, it also studies the impact of new accession countries' trade on cargo flows in case of their faster economic development.

Italy & Austria! scenario assumes a significant shift of trailer and other land transport to Blue Shuttle train in Northbound transport (i.e., all suitable land transport Northbound goes by Blue Shuttle Train) from Italy and Austria. This is the scenario that emphasises the criticality of Northbound transport and its ability to win a slice of the land transport market. Also it emphasises the vitality of Italy and Austria as cargo flow contributors.

8.4 Current Cargo Flows

The country-level cargo volumes sum up as the current flows. It also reveals the most and least potential countries for Pol-Corridor and Blue Shuttle Train. Furthermore, it shows the possible imbalance between Southbound and Northbound transport volumes. The volumes are based on 2002 customs statistics on export and import.

8.4.1 Southbound Transport

Table 22 depicts the results of current trade flow analysis of Southbound transport. The analysis is made on a weekly basis. The minimum amount of wagons to Austria is estimated to be 109 and maximum 951 wagons per week. Consequently, this equals to 2.7 trains (MIN) and 23.8 trains (MAX) per week, assuming 40 wagons in one train. The

total amount of wagons in the market is 1 133 (MIN) corresponding to 23.7 trains and 4 789 wagons (MAX) corresponding to 89.1 trains per week. If all the cargo could be moved by train, meaning in other words that all the trailer users accept the new concept, there would be approximately 12 Southbound trains every day (~89.1 trains / 7 days). At present, the rail transport is not even close to those figures. The minimum amount of trains per day is approximately 3.

Table 22. SB trains/week, year 2002.

PRESENT, YEAR 2002

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	54	822	0	0	0	0.0	0.0
Austria	109	951	1	109	951	2.7	23.8
Italy	640	2 031	1	640	2 031	16.0	50.8
Greece	160	203	1	160	203	4.0	5.1
Turkey	115	197	0	0	0	0.0	0.0
Slovakia	2	55	1	2	55	0.1	1.4
Hungary	19	159	1	19	159	0.5	4.0
Slovenia	1	29	1	1	29	0.0	0.7
Czech	15	205	0	0	0	0.0	0.0
Romania	3	49	1	3	49	0.1	1.2
Bulgaria	1	19	1	1	19	0.0	0.5
Croatia	2	24	1	2	24	0.0	0.6
Other	12	43	1	12	43	0.3	1.1
Total	**1 133**	**4 789**	**10**	**949**	**3 564**	**23.7**	**89.1**

The table shows that the most important potential countries are Italy and Austria, consisting about 80 % of the total potential (MAX). Generally the countries can be divided into four categories:

1. considerable potential (Austria, Italy), more than one train per day
2. medium potential (Greece, Slovakia, Hungary, Romania), more than one train per week
3. small potential (Slovenia, Bulgaria, Croatia, Other Balkan countries), less than one train per week
4. not potential (Poland, Turkey, Czech), no potential transport by train.

It should be understood that the reason why Poland, Turkey and Czech are considered as not potential, is not the volume of the cargo, but their specific location. Poland and Czech are transit countries, and Turkey is located so far away that the utilisation of the route has not been considered to be economical.

8.4.2 Northbound Transport

Table 23 depicts the NB potential. The table shows that the total volume is remarkably low compared to Southbound: the transportation is clearly imbalanced. Presumably logistics companies that operate in this market are looking for solutions to balance the transport. It may well be that Northbound transports are sold at a lower price and that price competition is harder Northbound.

According to Table 23, the minimum amount of trains is 7.9 per week, roughly one train every day. It is only 30 % of the Southbound transport (Table 22). Again, as with Southbound trains, there is a significant difference between MIN and MAX values, maximum being about 6 times that of minimum.

Table 23. NB trains/week, year 2002.

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	184	863	0	0	0	0.0	0.0
Austria	40	317	1	40	317	1.0	7.9
Italy	196	1 071	1	196	1 071	4.9	26.8
Greece	30	84	1	30	84	0.8	2.1
Turkey	56	117	0	0	0	0.0	0.0
Slovakia	29	105	1	29	105	0.7	2.6
Hungary	11	136	1	11	136	0.3	3.4
Slovenia	3	43	1	3	43	0.1	1.1
Czech	36	251	0	0	0	0.0	0.0
Romania	2	38	1	2	38	0.1	1.0
Bulgaria	3	16	1	3	16	0.1	0.4
Croatia	0	14	1	0	14	0.0	0.3
Other	2	13	1	2	13	0.0	0.3
Total	**592**	**3 068**	**10**	**316**	**1 836**	**7.9**	**45.9**

Table 23 shows that the countries with most potential are Italy and Austria accounting for about 80 % of the total potential (MAX). The countries can be divided into four categories:

1. considerable potential (Austria, Italy), more than one train per day
2. medium potential (Greece, Slovakia, Hungary, Romania, Slovenia), more than one train per week
3. small potential (Bulgaria, Croatia, Other Balkan countries), less than one train per week
4. not potential (Poland, Turkey, Czech), no potential transport by train.

8.4.3 Conclusion

Table 24 combines the potential of SB and NB volumes and inevitably focuses the attention on the NB transport. The first columns indicate the need of trains for SB transport (MIN and MAX), the middle columns the need for NB transport and the last columns provide a conclusion for SB and NB balanced transport volumes. Balanced train supply means that there are no empty wagons going in either direction.

Table 24. Shuttle Train potential, a balanced review.

Balanced Transport, Shuttle Trains	Trains/week, SB		Trains / week, NB		Balance	
	MIN	MAX	MIN	MAX	MIN	MAX
Poland	0.0	0.0	0.0	0.0	0.0	0.0
Austria	2.7	23.8	1.0	7.9	1.0	7.9
Italy	16.0	50.8	4.9	26.8	4.9	26.8
Greece	4.0	5.1	0.8	2.1	0.8	2.1
Turkey	0.0	0.0	0.0	0.0	0.0	0.0
Slovakia	0.1	1.4	0.7	2.6	0.1	1.4
Hungary	0.5	4.0	0.3	3.4	0.3	3.4
Slovenia	0.0	0.7	0.1	1.1	0.0	0.7
Czech	0.0	0.0	0.0	0.0	0.0	0.0
Romania	0.1	1.2	0.1	1.0	0.1	1.0
Bulgaria	0.0	0.5	0.1	0.4	0.0	0.4
Croatia	0.0	0.6	,	0.3	0.0	0.3
Other	0.3	1.1	,	0.3	0.0	0.3
Total	**23.7**	**89.1**	**7.9**	**45.9**	**7.2**	**44.3**

The whole current balanced potential of Nordic flows for shuttle trains varies between 7.2 (MIN) and 44.3 (MAX) shuttle trains per week. The most significant factor affecting the final amount is the trailer transport. If all the trailer users accept the new concept, the final amount of shuttle trains will be 44.3 trains per week.

We can conclude by stating that at present, Austria, Italy, Greece, and Hungary are the countries with the most potential for Pol-Corridor and Blue Shuttle Train. The first two clearly seem to dominate the flows.

8.5 Scenarios – results

8.5.1 Normal Growth

In the *Normal Growth* scenario it is assumed that the development of bi-lateral trade correspond to the development of previous years (1999–2001), and a capture from trailer transports (0–20 %) to trains in both directions, NB and SB.

Southbound

The growth of the SB market and the change rates are presented in Table 25.

Table 25. Normal Growth scenario, Southbound.

	FINLAND		NORWAY		SWEDEN	
	General growth (*)	Change trailer>cntr	General growth (*)	Change trailer>cntr	General growth (*)	Change trailer>cntr
Poland	1.23	1.20	0.77	1.20	1.29	1.20
Austria	1.12	1.20	1.09	1.20	2.64	1.20
Italy	1.06	1.20	0.94	1.20	1.09	1.20
Greece	0.98	1.20	1.08	1.00	0.95	1.10
Turkey	1.40	1.20	1.40	1.00	0.88	1.20
Slovakia	1.11	1.20	1.01	1.20	1.90	1.20
Hungary	1.35	1.20	1.14	1.20	1.20	1.20
Slovenia	1.03	1.20	1.19	1.20	1.05	1.20
Czech	1.20	1.20	1.16	1.20	0.92	1.20
Romania	1.56	1.20	1.40	1.20	1.69	1.20
Bulgaria	1.76	1.20	0.38	1.20	1.74	1.20
Croatia	1.29	1.20	1.78	1.20	1.11	1.20
Other	0.04	1.20	3.80	1.20	3.48	1.20

Table 25 depicts the scenario assumptions for Finland, Norway and Sweden. It can be seen that the trade between Finland and Poland has grown by 23 % (1.23) in 1999–2001 and that the trade between Norway and Poland has decreased 23 % (0.77). The modal shift (”Change trailer>cntr”) has been assessed by the research team based on expert

interviews. The change rate was estimated to be between 1.00 and 1.20[20]. In most cases the change is 20 % (1.20) and in some of the cases the change is less than 1.20. In these cases most of the cargo is already shipped to these countries in containers.

Table 26 indicates how the estimated changes affect the amount of shuttle trains per week. The first three columns (see Table 26) indicate the minimum (MIN or *Potential 3*) and maximum (MAX or *Potential 2*) amount of wagons that different countries can achieve weekly. The fourth column indicates whether the country is a Blue Shuttle Train country or not. As previously discussed, Poland, Turkey, and Czech are not considered suitable for Blue Shuttle Train. The next two columns show the potential MIN and MAX number of wagons. The two final columns indicate the amount of trains per week. The minimum potential of trains is 30.8 per week (*Potential 3,* MIN*)*.

[20] The following example illustrates the principle of how the change rate influences the estimation and indicates the situations when the considered rate is realistic. The general growth rate has already been taken into account before these calculations are made. In all cases (A, B, C) the rate is the same (1.2), but the volumes between the means of transport differ while the total volume remains constant. The volume of rails stays the same. The cases of A were quite common – the market share of trucking was huge. In this case, the change does not have much of an effect. The market share of trucking remains dominant and therefore the number of containers does not grow much. In case B, where the volume of containers is higher, the change is quite huge. The difference between market share of trucks and containers gets distinctly smaller. In case C, where the market share of containers was huge, the change is impossible, as in the Norway, Greece and Turkey case. Therefore these countries' rates are lower than 1.2. The following simplified example illustrates, how the calculation is made.

For case B the existing trucking volume is 20 (trucks per week) and the volume of containers is 2 (containers per week). If the change from trucks to containers is considered to be 20 % (1.2), the volume of containers will become 12 (2 ×1.2 = 12), and the volume of trucks 18 (31–1–12 = 18). These calculations show that if the original volume is low, even a change by 20 % does not affect significantly the volume of containers.

A	volume	change	result
trucks	28		27,6
cntrs	2	1,2	2,4
rail	1		1
total	31		31

B	volume	change	result
trucks	20		18
cntrs	10	1,2	12
rail	1		1
total	31		31

C	volume	change	result
trucks	4		-1,2
cntrs	26	1,2	31,2
rail	1		1
total	31		31

Table 26. Normal Growth, Southbound.

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	79	998	0	0	0	0.0	0.0
Austria	253	2 114	1	253	2 114	6.3	52.8
Italy	725	2 143	1	725	2 143	18.1	53.6
Greece	170	189	1	170	189	4.2	4.7
Turkey	152	210	0	0	0	0.0	0.0
Slovakia	3	86	1	3	86	0.1	2.2
Hungary	24	194	1	24	194	0.6	4.9
Slovenia	1	30	1	1	30	0.0	0.8
Czech	17	205	0	0	0	0.0	0.0
Romania	5	80	1	5	80	0.1	2.0
Bulgaria	2	32	1	2	32	0.1	0.8
Croatia	3	29	1	3	29	0.1	0.7
Other	43	142	1	43	142	1.1	3.5
Total	**1 479**	**6 452**	**10**	**1 231**	**5 039**	**30.8**	**126.0**

Table 26 shows that the Normal Growth scenario is affected most by Austria. For example, in 2002, the MIN number of train equivalent cargo supply to Austria was 2.07 and in the *Normal Growth* scenario the number is 6.3 (Table 26), which is about 3 times more than before the growth. Also the MAX number of shuttle trains to Austria has increased from 23.8 to 52.8 trains. The other countries are affected very significantly in absolute terms.

An interesting point is that the MAX number of shuttle trains to or from Greece will diminish from 5.1 to 4.7 trains. This is due to the fact that the estimate of the general growth is negative between Greece and Sweden and between Greece and Finland.

The total transport in the Southbound market is 1 231 wagons per week (MIN) corresponding to 30.8 trains, which is about a 30 % increase compared to year 2002, and 5 039 wagons (MAX) corresponding to 126 trains per week, or about a 40 % increase compared to year 2002.

We may conclude that *Normal Growth* scenario produces a demand for as many as 18 trains per day going Southbound. Austria, Italy and Greece together comprise almost 90 % of the total volume corresponding to almost 16 trains per day, equal to 111 trains per week. This scenario increases the SB transport about 30 %, from 23.7 to 30.8 trains per week from 2002 to the beginning of 2006.

Northbound (NB)

The growth of the NB market and the change rates are presented in Table 27.

Table 27. Two growth rates: general growth and changing from trailers to train; Northbound.

	FINLAND		NORWAY		SWEDEN	
	General growth (*)	Change trailer>cntr	General growth (*)	Change trailer>cntr	General growth (*)	Change trailer>cntr
Poland	1.12	1.20	1.74	1.20	1.29	1.20
Austria	1.21	1.20	0.99	1.20	1.23	1.20
Italy	1.18	1.20	1.17	1.20	1.19	1.20
Greece	1.63	1.20	0.94	1.20	1.27	1.20
Turkey	0.86	1.20	1.34	1.20	1.29	1.20
Slovakia	1.45	1.20	0.59	1.20	2.87	1.20
Hungary	1.02	1.20	1.80	1.20	1.12	1.20
Slovenia	1.58	1.20	1.49	1.20	1.21	1.20
Czech	1.19	1.20	1.68	1.20	1.29	1.20
Romania	1.23	1.20	2.09	1.20	1.41	1.20
Bulgaria	0.68	1.20	1.17	1.20	1.26	1.20
Croatia	2.17	1.20	1.18	1.20	0.91	1.20
Other	0.26	1.20	2.78	1.20	2.50	1.20

Table 27 depicts the two growth factors for each country the same way as with SB transport: the growth during 1999–2001 period and the change in mode from trailers to containers. Table 28 is calculated based on these growth factors.

Table 28. The growth of market, NB.

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	230	1 147	0	0	0	0.0	0.0
Austria	45	377	1	45	377	1.1	9.4
Italy	258	1 253	1	258	1 253	6.4	31.3
Greece	55	113	1	55	113	1.4	2.8
Turkey	81	129	0	0	0	0.0	0.0
Slovakia	62	255	1	62	255	1.5	6.4
Hungary	13	170	1	13	170	0.3	4.2
Slovenia	3	58	1	3	58	0.1	1.4
Czech	72	326	0	0	0	0.0	0.0
Romania	5	61	1	5	61	0.1	1.5
Bulgaria	4	18	1	4	18	0.1	0.5
Croatia	1	15	1	1	15	0.0	0.4
Other	2	30	1	2	30	0.1	0.7
Total	**830**	**3 953**	**10**	**448**	**2 350**	**11.2**	**58.8**

Normal Growth scenario assumptions do not have as strong effect on NB transport as they have on SB transport. Table 28 shows that the assumed growth affects mostly the trade with Italy. For example, in 2002 (see Table 23), the MIN amount of shuttle trains to Italy was 4.9 and in this scenario the amount is 6.4. The difference is about 50 %. The MAX amount has increased from 26.8 to 31.3 trains per week. The total amount of wagons per week in the NB market is 448 (MIN) corresponding to 11.2 trains, which is about a 40 % increase compared to the year 2002 level, and 2 350 wagons (MAX) corresponding to 58.8 trains, which is about a 30 % increase over the year 2002. Interestingly, the MAX amount of shuttle trains to Slovakia has almost tripled to 6.4 trains per week. The absolute amount of shuttle trains does not change much for other countries. Austria and Italy together comprise about 70 % of the total volume corresponding to almost 6 trains per day.

We may conclude that in this scenario there will be a total MIN demand of 11 trains per week going Northbound. The assumed scenario will increase the amount of trains only from 7.9 to 11.2 trains per week (MIN), whereas MAX is 58.8 trains per week. This is one of the most critical conclusions regarding Pol-Corridor and Blue Shuttle Train system. ”The least common denominators” dictate the frame for a balanced transport system, i.e. the least volumes define the scale of Blue Shuttle Train operations. In this scenario it is the volumes going Northbound and volumes of Austria and Italy. As to countries, the relevant group includes Austria, Italy, Greece, and Slovakia. Still, the MAX value is 58.8 trains per week. Therefore a significant potential does exist.

The business case for Pol-Corridor and Blue Shuttle Train depends largely on Northbound transport. The countries with the most potential are Italy and Austria. Therefore, the following scenarios only consider NB transport. Additionally, the analysis shows the countries, which possess likely potential.

8.5.2 Small Country Fast Growth and Change from Trailers to Blue Shuttle Train

The previous scenario assumed normal growth as observed during the years 1999–2001. However, the market can grow faster than expected. *Small Country Fast Growth and Change from Trailers to Blue Shuttle Train* scenario assumes doubling of all the trade flows *except* for Italy and Austria, the trade of which grows at the expected rate (empirical rate for 1999–2001). We also assume that Blue Shuttle Train will be able to successfully conquer a major share of the transport market, *except* for Italy and Austria.

Two different growth factors have been assessed:

1. The volume of market grows by 100 % for all countries *except* for Italy and Austria.

2. Shippers and customers are assumed to change immediately all the trailer transportation into train transportation, except in Italy and Austria (note that change rates are higher than with previous scenario; the values were estimated by researchers).

Table 29 contains growth rates separately for Finland, Norway, and Sweden as well as between these and other Pol-Corridor countries. The growth rates for trade with Poland, Austria, Italy, and Czech are assumed ”normal”. Growth rates for other countries are considered to be 2.0 i.e. 100 % doubling the market. This is an optimistic estimation, but considered possible. The modal shift changes for these countries are maximum values: all the trailers will be replaced by containers carried by Blue Shuttle Train. The higher the shift rate, the more there is potential to change the trailers to containers.

This scenario has only been studied for NB transports because the NB market is the major concern when assessing the potential of Blue Shuttle Train.

Table 29. What is ”Fast growth and rapid change from trailers to cntrs for NB markets”?

	FINLAND		NORWAY		SWEDEN	
	General growth (*)	Change trailer>cntr	General growth (*)	Change trailer>cntr	General growth (*)	Change trailer>cntr
Poland	1.12	1.20	1.74	1.20	1.29	1.20
Austria	1.21	1.20	0.99	1.20	1.23	1.20
Italy	1.18	1.20	1.17	1.20	1.19	1.20
Greece	2.00	1.90	2.00	2.00	2.00	2.00
Turkey	2.00	1.50	2.00	1.70	2.00	1.70
Slovakia	2.00	11.00	2.00	48.00	2.00	34.00
Hungary	2.00	10.00	2.00	49.00	2.00	44.00
Slovenia	2.00	16.00	2.00	32.00	2.00	31.00
Czech	1.19	1.20	1.68	1.20	1.29	1.20
Romania	2.00	7.00	2.00	16.00	2.00	15.00
Bulgaria	2.00	7.00	2.00	4.00	2.00	4.00
Croatia	2.00	7.00	2.00	970000.00	2.00	979000.00
Other	2.00	9.00	2.00	970000.00	2.00	979000.00

The results are shown in Table 30.

Rapid growth combined with modal shift has a rather significant impact on the demand for Blue Shuttle Train (Table 30). For example for Hungary, the MIN number of trains when the trailers do not accept the concept is 0.6 trains per week, i.e. only assuming the trade growth but not modal shift (see next scenario), but after changing the trailers into containers, the MIN number of trains increases to 4 trains per week (700 % increase). Totally, the potential for Nordic cargo flows for shuttle trains varies between 22.4 (MIN) and 57.2 (MAX) trains per week.

Table 30. Fast growth and rapid change from trailers to cntrs for NB markets.

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	230	1 147	0	0	0	0.0	0.0
Austria	45	377	1	45	377	1.1	9.4
Italy	258	1 253	1	258	1 253	6.4	31.3
Greece	124	132	1	124	132	3.1	3.3
Turkey	188	193	0	0	0	0.0	0.0
Slovakia	152	158	1	152	158	3.8	4.0
Hungary	179	184	1	179	184	4.5	4.6
Slovenia	55	58	1	55	58	1.4	1.4
Czech	72	326	0	0	0	0.0	0.0
Romania	48	52	1	48	52	1.2	1.3
Bulgaria	22	23	1	22	23	0.5	0.6
Croatia	5	25	1	5	25	0.1	0.6
Other	7	24	1	7	24	0.2	0.6
Total	**1 385**	**3 953**	**10**	**895**	**2 287**	**22.4**	**57.2**

We may conclude that rapid growth of new accession countries itself does not affect considerably the demand for the shuttle train, but combined with the acceptance of the new concept, the result is more visible. Together they comprise a potential entity regarding the Nordic flows.

8.5.3 Small Country Fast Growth

Small Country Fast Growth scenario assumes doubling of all the trade flows, *except* for Italy and Austria, the trade of which grows at the expected rate (empirical rate for 1999–2001). We also assume that Blue Shuttle Train is *not* able to successfully conquer a slice of the transport market for these growing market countries (Table 31). This scenario will show how sensitive the Blue Shuttle business case is to big trade changes in those markets that are currently quite moderate. Quite explicitly, it also studies the impact of new accession countries' trade on cargo flows in case of their faster economic development.

Table 31. Fast growth of NB markets.

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	230	1 147	0	0	0	0.0	0.0
Austria	45	377	1	45	377	1.1	9.4
Italy	258	1 253	1	258	1 253	6.4	31.3
Greece	77	158	1	77	158	1.9	4.0
Turkey	139	220	0	0	0	0.0	0.0
Slovakia	47	217	1	47	217	1.2	5.4
Hungary	24	270	1	24	270	0.6	6.8
Slovenia	5	86	1	5	86	0.1	2.1
Czech	72	326	0	0	0	0.0	0.0
Romania	6	76	1	6	76	0.1	1.9
Bulgaria	7	31	1	7	31	0.2	0.8
Croatia	1	28	1	1	28	0.0	0.7
Other	2	26	1	2	26	0.1	0.7
Total	**911**	**4 216**	**10**	**471**	**2 522**	**11.8**	**63.1**

Considering the rapid growth of the smaller countries, there is some increase in the potential amount of shuttle trains, but it cannot be argued that these countries are potential countries as a result of their growth potentials. The transport volumes are significantly lower than transport volumes for Austria and Italy, and therefore the potential based on growth alone is not very significant.

Compared to the current situation in 2002, the number of trains (MIN) has a growth potential from 7.9 to 11.8 trains. Growth of smaller European countries will not increase the the potential of Blue Shuttle Train significantly.

8.5.4 Italy & Austria!

Italy & Austria! scenario assumes a maximum shift of trailer and other land transport to Blue Shuttle train in the Northbound transport (i.e., all suitable land transport Northbound goes by Blue Shuttle Train) from Italy and Austria. This is the scenario that emphasises the criticality of Northbound transport and the impacts of its ability to win a piece of the land transport market. Also it emphasises the strategic position of Italy and Austria as cargo flow contributors.

The following Table 32 indicates how the rapid change from trailers to containers from Italy and Austria can affect the number of shuttle trains.

Table 32. Italy and Austria change from trailers to containers for NB markets.

	Waggons / week		PC country	Conclusion		Trains / week	
	MIN	MAX		MIN	MAX	MIN	MAX
Poland	230	1 147	0	0	0	0.0	0.0
Austria	243	267	1	243	267	6.1	6.7
Italy	851	923	1	851	923	21.3	23.1
Greece	55	113	1	55	113	1.4	2.8
Turkey	81	129	0	0	0	0.0	0.0
Slovakia	62	255	1	62	255	1.5	6.4
Hungary	13	170	1	13	170	0.3	4.2
Slovenia	3	58	1	3	58	0.1	1.4
Czech	72	326	0	0	0	0.0	0.0
Romania	5	61	1	5	61	0.1	1.5
Bulgaria	4	18	1	4	18	0.1	0.5
Croatia	1	15	1	1	15	0.0	0.4
Other	2	30	1	2	30	0.1	0.7
Total	**1 622**	**3 513**	**10**	**1 240**	**1 910**	**31.0**	**47.8**

Italian and Austrian modal shift has an immense impact on the amount of shuttle trains, both on MIN and MAX values. The total volume of shuttle trains after normal growth was about 11 trains (see Table 28), and after these two countries accept the new concept and make the modal shift, the number rises up to 31. This would significantly improve the possibilities to raise the service level of the system. After the maximum modal shift, the MAX value for trains is only 1.5 times bigger than the MIN value, whereas in the *Normal Growth* scenario the difference between MIN and MAX values was much larger (3 times).

As a conclusion, these results indicate how vital Italy and Austria are to Blue Shuttle Train when considering the total service level potential of Pol-Corridor. It is crucial for the Pol-Corridor system that these two countries have a positive attitude towards trains and containers.

8.5.5 Scenario Sum-up

In this chapter we analyse and summarise the results concerning Pol-Corridor and Blue Shuttle Train Scenarios.

Table 33 summarizes different scenarios and shows the MIN and MAX values for both Northbound and Southbound transport.

Table 33. Pol-Corridor and Blue Shuttle Train scenarios.

SCENARIO	DIRECTION	MIN	MAX
Current Cargo Flows year 2002	SB	24	89
	NB	8	46
Normal Growth	SB	31	126
	NB	11	59
Small Country Fast Growth and Change from Trailers to Blue Shuttle Train	SB	31	126
	NB	31	48
Small Country Fast Growth	SB	31	126
	NB	12	63
Italy & Austria!	SB	31	126
	NB	22	57

Conclusion 1: The potential of Nordic cargo flows for shuttle trains varies currently between 8 (MIN) and 89 (MAX) shuttle trains per week. If the growth is as expected (*Normal Growth* scenario), in the beginning of 2006 the potential varies between 11 (MIN) and 126 (MAX) trains per week. These numbers underline the fact that the current service level offered by train operators to their clients is poor. It leaves the obvious potential non-utilised. Today, trailers are having a strong position in the transport market, and one of the biggest challenges regarding the Blue Shuttle Trains is to make the customers of transport accept the use of containers in trains. These figures show that potential does exist concerning cargo flows between the Nordic and South/South-eastern Europe if the modal shift can be made successful.

Conclusion 2: Nordic market, i.e. the Northbound transport, is a clear restrictive factor when considering the potential of Blue Shuttle Train. Currently, the MAX number of trains per week going Northbound is 46 compared to 89 going Southbound. This is a severe imbalance, which will reduce the potential. Under the assumptions of expected normal growth in trade, these restrictions remain.

If the Blue Shuttle Train is widely adopted as a logistics solution by Austrian and Italian exporters Northbound, the SB/NB transport will be balanced and the economies of scale will come into play: 31 trains per week going South and 31 going North would be an ideal situation.

The balance between SB and NB markets gets also significantly better if the smaller countries adopt Blue Shuttle Train. In this case, approximately four trains go South and three return North per day. The rapid growth in the economy and trade of smaller countries is not in itself enough to enhance NB transport. There will be still the need to accept Blue Shuttle Train.

Conclusion 3: There is a considerable difference between the different countries and their interest in the Pol-Corridor and Blue Shuttle Train concept. Austria, Italy, Greece and Hungary can use their existing trade volumes to feed Blue Shuttle Train, whereas for Slovakia, Slovenia, Romania, Bulgaria, Croatia, and other Balkan countries the trade has to grow radically in order to have a noteworthy impact on the Pol-Corridor concept. The problem lies in the very low volumes they have currently. Even if the volumes were tripled, as it was done in one scenario, they still remain at the low cargo volume level.

Austria, Italy, Greece, and Hungary are the most relevant countries in this respect. As it is today, these countries are practically the only potential users of the Pol-Corridor and Blue Shuttle Train concept. A widely accepted re-direction of modal split is needed before Blue Shuttle Train can operate.

Conclusion 4: Finally, there is the question about client acceptance. How probable is the scenario that most clients accept to change the trailers to containers in Blue Shuttle Train? Some cargo exists, like chemicals and dangerous materials or other non-suitable cargo even in those groups that were included in our cargo flow estimates. Also there are prospective clients, who just do not see any benefits from changing trailers to trains, and are reluctant to adopt the new concept. Personal preferences and relations, learned ways of working and learned processes can be very hard to change.

The Finnish paper industry is one interesting client, which should be taken into account when considering the future of Blue Shuttle Train. If the paper industry accepts the concept at some point, it means that the connection from Gdansk and Gdynia must exist. This would mean on one hand a significant growth of SB transport but on the other more severe imbalance between SB and NB transports. Italy and Austria are the potential users for Blue Shuttle Train as importers of Finnish paper industry products.

8.6 Summary of Findings

Pol-Corridor and Blue Shuttle Train will be an alternative for international North-South logistics provided if either of the following clauses is fulfilled:

- Austrian and Italian exports will use Blue Shuttle Train and Pol-Corridor in their Northbound transport; this will require huge marketing work in order to penetrate that transport market and change the way the transports are operated today.
- Many countries at the south-end of Pol-Corridor will direct their Northbound flows to Blue Shuttle Train instead of trailers on roads; this will require the same kind of marketing effort.

Both these clauses will improve the balance in Blue Shuttle Train SB / NB operations.

Pol-Corridor, and especially the Blue Shuttle Train, *cannot* rely on the following assumptions:

– new EU members economic growth; this will have a minor impact on cargo flows in the end and it will not solve the imbalance problem

– Finnish paper industry's logistical choices; even if they would use Blue Shuttle Train, the imbalance problem would remain.

The large difference between MIN and MAX values leads us to consider why it is so that the rail transport is utilising so little of its true potential. The problems of European railways are known, but these figures seem to quantify what is already concluded so many times over. One of the problems surely lies in the national interests and the historical structures of national railways. Truly international heavy-weight rail operators do not exist in Europe in a way that they could dominate any major trade routes – across the continent, coast to coast. Pol-Corridor could be one such trade route, but it needs a champion, a developer and a clear business case owner. Such does not exist at the moment.

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Pol-Corridor

Assessment of Demand for the Blue Shuttle Train's Services in North and South European Markets

Abstract

This report describes the prospects of a new trans-European freight supply network stretching from the Nordic countries to Central, Southern and South-eastern Europe. The northern part of the corridor consists of sea-land connections from Sweden, Finland and Norway to an intermodal hub in Poland. From there, the corridor connects via a regularly scheduled block train – the "Blue Shuttle Train" – to an intermodal hub in Vienna. The southern part of the corridor comprises the existing land connections to destinations in most of Central, Southern and South-eastern Europe.

This report covers results of Work Package 1 of the Pol-Corridor project, assessing the demand for Blue Shuttle Train's services in North and South European markets. The main objectives of the work were to assess the freight volumes currently shipped in the North-South direction and to forecast the international freight volumes in the near future.

First, the assessment of Pol-Corridor's potential for carrying Finnish flows and the method for assessment are presented. Most of the potential destination countries can be identified as well as the countries that are insignificant for the Pol-Corridor concept. Also the maximum and minimum potential for Blue Shuttle Train and the issue of balanced transportation in North-South directions are discussed.

Second, the potential for Nordic flows has been assessed by using the same method presented with the Finnish flows. This assessment provides deeper insight to possible future development. Scenarios projected till the beginning of 2006 are defined in order to probe the business potential for Blue Shuttle Train.

It can be concluded that Pol-Corridor and Blue Shuttle Train will be an alternative for international north-south logistics provided if either of the following clauses is fulfilled: 1) many countries at the south-end of Pol-Corridor will direct their Northbound flows to Blue Shuttle Train instead of to trailers on roads or 2) Austrian and Italian exports will use Blue Shuttle Train and Pol-Corridor in their Northbound transport.

Keywords
corridors, intermodal transport, freight flow, Polcorridor, train services, North Europe, South Europe, market assessment, feasibility, economy

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Nimeke

Pol-Corridor
Rahtikäytävä laajeneville Euroopan markkinoille

Tiivistelmä

Tässä tutkimuksessa analysoidaan Puolan läpi kulkevan rahtikäytävän potentiaalia. Käytävä, Pol-Corridor, sijoittuu Pohjoismaiden ja kaakkoisen Manner-Euroopan välille. Puola ja Tšekin tasavalta ovat Pol-Corridorin transitomaita. Käytävän oleellisin osa on sukkulajunakonsepti Puolan satamien ja Wienin kaupungin välillä. Wienistä etelään käytävä jatkuu maitse, ja Puolan satamat yhdistyvät Pohjoismaihin merikuljetuksin.

Julkaisussa esitellään Pol-Corridor-hankkeen ensimmäisen työvaiheen tulokset: rahtikäytävän tavaravirtapotentiaali ja sukkulajunan kysynnän analyysi. Työvaiheen tavoitteena oli tutkia tavaravirtojen määrää nykyisin, virtojen kasvupotentiaalia ja sukkulajunan toimintaedellytyksiä. Tutkimuksen motiivina ovat laajentuneen EU:n kasvavat markkinat ja niiden myötä tarvittavat uudet logistiikkakonseptit.

Tutkimuksen alkuosassa analysoidaan pelkästään Suomen vienti- ja tuontivirtoja, jotka voisivat käyttää Pol-Corridor-käytävää. Analyysiin sisällytetään ainoastaan Pol-Corridor-konseptin kannalta lupaavat maat. Tämän jälkeen arvioidaan tavaravirtojen kasvua sekä sukkulajunan potentiaalista kysyntää. Sukkulajunan palvelutarjonnan kannalta paluukuormat ja -kuljetukset etelästä pohjoiseen nousevat ratkaisevaan asemaan.

Samaa metodiikkaa käyttäen analysoidaan Suomen, Ruotsin ja Norjan vienti- ja tuontikuljetusten yhdistettyä potentiaalia. Ensin analysoidaan tavaravirtapotentiaali, sen kasvumahdollisuudet sekä lopuksi itse sukkulajunakuljetusten kysyntä. Tätä tietoa käytetään sukkulajunan liiketoimintamahdollisuuksien arvioinnissa. Kasvulukuja arvioidaan vain vuoden 2006 alkuun saakka.

Tutkimuksen johtopäätös on, että Pol-Corridor ja sukkulajuna (Blue Shuttle Train) ovat vaihtoehto jo nykyisille kuljetuksille. Suuri mahdollisuus liiketoiminnalle ja uudelle logistiikkaväylälle ja -konseptille on selkeästi olemassa. Tällöin kuitenkin jommankumman seuraavista perusolettamuksista on täytyttävä: 1) Sukkulajuna onnistuu voittamaan kuljetusten markkinaosuutta tiekuljetuksilta nykyisessä markkinatilanteessa ja tulevan kasvun osalta. 2) Itävallan ja Italian kuljetuksissa etelästä pohjoiseen käytetään sukkulajunaa tie- tai muiden kuljetusten asemesta, jolloin paluukuormaongelmat ratkeavat.

Avainsanat
corridors, intermodal transport, freight flow, Polcorridor, train services, North Europe, South Europe, market assessment, feasibility, economy

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It can be concluded that Pol-Corridor and Blue Shuttle Train will be an alternative for international north-south logistics provided that certain preconditions are met concerning modal choices and possibilities to balance the freight flows carried by the train.

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