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**Trans-European-Networks and the
Development of Transport in the
Eastern Baltic Sea Region**

by

Claus-Friedrich Laaser



Institut für Weltwirtschaft an der Universität Kiel
The Kiel Institute of World Economics

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Abstract

The European Union's task of providing Trans-European Networks (TENs) in transportation, communications and energy transmission which has been enacted by the treaty of Maastricht, is not confined to internal networks in the EU. Since 1994 this task has been widened so as to give support to the economies in transition (EIT) in Central and Eastern Europe that have applied for EU membership.

These actions are taking place in a variety of different fields. Transport infrastructure upgrading is initiated both in general and with respect to specific links between the EU and the EIT. The international community is supporting network upgrading in all Baltic Rim EIT. Specific infrastructure measures refer to the Pan-European "Crete Corridors", i.e. the links between EU members and associated EIT. Other "hardware" measures are related to the construction of border stations or the promotion of telematics in the whole Baltic Sea Region in order to facilitate freight traffic. On the "software" side, TEN initiatives have been enacted to harmonize infrastructure cross-border planning, in particular for Crete Corridors' supervising committees, to account for network externalities. If one widens the narrow definition of infrastructure to institutions, the adjustment of EITs' transport regulatory systems to EU regulations and competition policy can also be subsumed under the heading of TENs.

The purpose of this paper is to evaluate the relative importance of the various measures taken in the course of the TEN initiative in the field of transport for economic development of the EIT on the Eastern shore of the Baltic Sea. The paper considers these actual approaches of European transport policy as well as the needs of the EIT. Though missing infrastructure links and insufficient capacities are more visible, it turns out that "software" problems (both from the sphere of regulatory regimes and from administrative procedures) seem to be the most pressing obstacles to transport and trade in the Baltic Rim. The paper discusses the pros and cons of the various TEN components in transport from the perspective of fiscal federalism and of regional development aid for the EIT. Furthermore it refers to issues of modal split, in particular with respect to Russia (for which the Baltic Rim is an important transit point), and to intermodal competition between land transport and the Baltic sea lane.

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1. Trans-European Networks in the Eastern Baltic Sea Region in a Pan-European Perspective¹

The Baltic Sea Region was, and still is, subject to far-reaching processes of both disintegration and integration. In the Eastern part of this region, Estonia, Latvia and Lithuania have gained political independence, and together with Poland, they have disintegrated from the former Soviet type division of labour and the former CMEA trade relations. From the Western side the Baltic Sea is going to become a kind of inland sea of the European Union (EU). Now, with the exception of Russia, the Economies in Transition (EIT) on the Eastern Baltic Rim have applied for full EU membership, and Estonia and Poland have been invited to participate in the first negotiation round for a future Eastern enlargement of the EU. Sooner or later, the Baltic Rim applicants will be integrated into the EU markets, and become subject to the full application of the *acquis communautaire* and the actual EU policy approaches.

This refers not the least to the transport sector, which provides the base for the physical accomplishment of market integration, and to the pertinent actual Union policy approaches for this sector: (a) the application of common rules for the transport markets' framework, and (b) the provision of Trans-European Networks (TENs) in infrastructure policy. The first approach refers to the mutually opening up of transport markets and application of EU safety, technical and competition rules in the course of the "Agenda 2000" accession preparations (see Boeing 1998). Concerning infrastructure policy, it is since 1992 that the EU quasi-federal layer has been granted with substantial new competencies of planning and co-financing TENs, providing access to them and harmonizing pertinent technical parameters.² This task has been specified by the White Paper on "Growth, Competitiveness, and Employment" of 1993 (Commission 1993). According to the White Paper, the emergence of TENs

¹ This paper draws in large parts on a joint report on obstacles to transport in the Eastern Baltic Sea Region, which has been recently prepared in the Kiel Institute of World Economics (see Böhme et al. 1998a; 1998b).

² The Treaty of Maastricht in its Art. 129b-d empowers the Union — as supra-national and quasi-federal layer — to take actions towards forming and completing TENs in transport, telecommunications, and energy. According to the Maastricht Treaty this task is to be fulfilled by (i) providing connections of the national networks of the member states, (ii) easing the access to these networks, both for service providers and end-users of these services, (iii) guaranteeing the (technical) interoperability of the networks, and (iv) helping to enhance the connections of peripheral and insular regions of the Union with the economic centers and core regions.

forms a substantial tool for enhancing both Europe's growth potential and economic cohesion. It may be seen as a sequel to the opening up of European markets by the Single Market Program of 1985 in order to avoid severe capacity bottlenecks in the Union's infrastructure networks (Vickerman 1995).

Based on considerations both on preparing the applicants in the east for future membership and on the actual needs of the EIT in the east, the task of taking action in TEN infrastructure policy has been widened from intra-EU to external networks including those of all the EIT. To be precise: This is perceived as a Pan-European task which is not confined to the EU. It was on the Second Pan-European Conference of Ministers of Transport 1994 in Crete where the so-called "Crete-Corridors", i.e. the links between EU members and associated EIT were defined. Priority action of all actors who are involved in upgrading existing and in augmenting new infrastructure capacities in Central and Eastern European reform countries will be concentrated along these corridors. But notwithstanding their Pan-European character, the Crete Corridors serve as a guiding scheme for EU accession support to associated EIT in transport infrastructure (re-) construction, and may thus be thought upon as a genuine instrument from the tool-box of the European Union's TEN policy.

The purpose of this paper is to evaluate the relative importance of the various measures taken by the international community in the field of transport for economic development of the EIT. Geographically, the paper will confine itself to the situation in the associated EIT on the Eastern shore of the Baltic Sea (Estonia, Latvia, Lithuania and Poland) with some reference given also to the Russian Baltic Rim oblasts of Kaliningrad and Leningrad because of close complementarities in geographical situation and in transport relations. The confined focus may be justified by the fact that the Baltic Sea region provides an interesting and encouraging example both of multi-modal competition and of a natural infrastructure facility being provided free of charge: the Baltic Sea itself which — even in the past of the Iron Curtain — has linked the adjacent countries rather than separating them.

The paper will consider the actual approaches of European transport policy (section 2) as well as the needs of the EIT (section 3). Though missing infrastructure links and insufficient capacities are more visible, it turns out that "software" problems (both from the sphere of regulatory regimes and from administrative procedures) seem to be the most pressing obstacles to transport and trade in the Baltic Rim. The paper will discuss the pros and cons of the various TEN components in transport from the perspective (a) of regional

development aid for the EIT and of (b) fiscal federalism consideration. (c) Furthermore it will refer to issues of modal split, in particular with respect to Russia (for which the Baltic Rim is an important transit point), and to intermodal competition between land transport and the Baltic sea lane (section 4).

2. European Transport Policy Actions Pursued in Eastern Europe

Transport infrastructure and market related actions in Eastern Europe are taking place in a variety of different fields. It is on the *hardware side of infrastructure provision* where the international community provides substantial support. Transport infrastructure upgrading is initiated both in general and with respect to the specific links between the EU and the EIT. Apparently the Baltic Rim EIT — as all former CMEA members — suffered and still suffer from the legacy of the socialist past with respect to network design, capacity and quality standards. This has been acknowledged both by the Baltic Rim EIT and by the international community which is supporting network upgrading in all Baltic Rim EIT.

Following a Commission's proposal, the transport ministers of the EU and their colleagues from the CEEC applicants jointly launched the so-called TINA initiative (Transport Infrastructure Needs Assessment) in September 1995. TINA aims at identifying necessary network infrastructure developments for a future larger Union and its findings will gain the character of a master-plan for infrastructure hardware provision in the applicant countries like the Essen summit guidelines of 1994 for EU internal TENs (Kinnock 1998).

There is a division of labour with regard to modes and countries between the European Union itself, employing funds from the PHARE and TACIS program with additional budget lines planned for the near future, EU's subsidiary EIB, and the other supra-national institutions, like the European Bank for Reconstruction and Development and the World Bank. Support is given both to all Baltic Rim applicants and to Russia, encompassing projects of airport (re-) construction, railway infrastructure upgrading and operational improvements, and road building and improving bridges, tunnels and other complementary facilities.

The core support refers to *financial aid*, as it has become clear that the public budgets of the applicant countries cannot bear the costs of network upgrading and completion on their own account so that substantial external financial support was envisaged. The European Commission currently estimates the

financial needs for improving the situation alongside the Crete Corridors to 50 Billion ECU and for the rest of the applicant countries' networks to 100 Billion ECU up to 2010.³

Of course, specific infrastructure measures refer to the "Crete Corridors" which are officially endorsed as main traffic axes with trans-national significance. By financing projects alongside the Crete corridors, the EU and the other institutions of the international community are engaging themselves also in issues of rail and road *network planning*. When nationally planned projects have to be accepted for financing on EU or supra-national level this means at least a certain involvement of the EU layer in planning tasks, which is added to national planning.⁴

Other "hardware" measures are related to support to the construction of (i) border stations to allow for rapid operational co-operation of railways and (ii) of customs clearance stations on existing or newly erected borderlines. In addition, the EU is promoting the development of telematics system in the whole Baltic Sea Region in order to facilitate freight traffic.

On the "software" side, TEN initiatives have been enacted to harmonize infrastructure cross-border planning, in particular for Crete Corridors' supervising committees, to account for network externalities and trans-border effects of networks. The *adjustment of EITs' transport regulatory systems to EU regulations* and competition policy in the course of the "Agenda 2000" pre-accession support may also be subsumed under the heading of TENs. This refers to the full adaptation of EU safety and technical norms for the various modes, the implementation of EU competition and subsidy control standards, and a progressive mutually opening up of market access to transport markets (Boeing 1998).

3. The Empirical Side: Basic Transport Needs in the Eastern Baltic Sea Region

The situation in the CEEC as regards transport infrastructure, transport regulation and the daily operation of the transport system in all its facets has

³ Cf. Kinnock (1998); Boeing (1998). This estimate has replaced an older one which was provided in the first report of the TINA group and which assessed the overall cost lying between 65 and 95 billion ECU of which 31 billion ECU would have to be incurred for the Crete Corridors. See EBRD (1997a: 20).

⁴ This is not true for the other international financial institutions WB and EIB. They are giving support on a projects base.

completely changed since the political upturn of the early 1990s and the ongoing transformation process from a centrally planned to a more or less market oriented economic system. The transport sector is as affected by the transformation as any other sector of the EIT. Thus, the question arises where the most pressing obstacles to a sound development of the transport sector in these countries can be found. Basically, three categories of potential obstacles can be discerned:

- (1) obstacles caused by capacity bottlenecks in infrastructure facilities, like ports, railway networks, roads, air-ports and complementary equipment (let us call them "hardware obstacles");
- (2) obstacles caused by deficiencies in the institutional framework of legal factors both on the international and on the national layer, like the enrollment to international treaties or national market regulations (because of their basic character they may be called "macro-software obstacles"); and
- (3) a variety of obstacles associated with the daily operation of facilities, with administrative issues, with productivity of transport firms, with the transformation process itself or coming from outside the transport sector (because they impair the smooth working of the transport system at the individual level or indirectly, like grains of sand in a gearing, let us call them "micro-software obstacles").

3.1. Infrastructure Facility Upgrading and Network Design

To be sure: It cannot be doubted that transport infrastructure in the Baltic Rim EIT suffered and still suffers from severe shortcomings, low quality and various bottlenecks. However, some reservations have to be made with respect (a) to the various modes and (b) to the relative relevance of hardware and software obstacles.

There are basically different developments in the maritime sector and concerning land-based infrastructures. In the *maritime sector*, port capacities were already provided in Soviet times to an extent which may be regarded to be sufficient for the current turnover of cargo and even for the turnover of the foreseeable future. This assessment holds true for traffic volumes which have more than recovered from the sharp decline shortly after the political changes in the early 1990 for most of the Eastern Baltic ports with the exception of Klaipeda/Lithuania (Table 1); taken together cargo turnover has passed the benchmark of 1988: 135 m. tonnes by more than 5 m. tonnes in 1996 with an upward going tendency for subsequent years (Böhme et al. 1998a: 37 ff.;

1998b: 39 ff.). The ports in the three Baltic countries Estonia, Latvia, and Lithuania had been constructed and upgraded during the Soviet era to the very end of serving as major transit points for Russian foreign trade because of their favourable geographic location and climatic (relatively ice-free) conditions.⁵ Thus, the hardware capacities in ports did not and do not make up serious bottlenecks after the recovery of trade flows. In addition, since the early 1990s, port facilities in the Baltic countries and in Poland even have been adapted rather rapidly to the structural changes towards modern forms of sea transport, like container and roll-on-roll-off traffic, which is playing a more and more important role in the general cargo segment of shippings. Where pertinent equipment like container cranes, pontoons at the cayside, or special ramps was lacking in the first place, it could be provided at comparatively short notice (Böhme et al. 1998a: 80; 1998b: 85). The same holds true for the terminal capacities which serve the rapidly growing passenger ferry traffic (Böhme et al. 1998a: 43 ff.; 1998b: 46 ff.).

Of course, serious infrastructure related problems still are encountered by transport enterprises in the Eastern Baltic ports. But these belong to the software categories of obstacles, mostly "micro software" obstacles of port operations, like low productivity of still not privatized port operators, poor intermodal co-operations or administrative and customs clearance problems.

In contrast, land-based infrastructure networks in Estonia, Latvia, Lithuania, Poland and in particular the Russian Baltic oblasts still suffer much more from the legacy of the past than maritime infrastructure. *Road, rail and air traffic infrastructure* facilities were and are still underdeveloped as regards network composition. To be sure: not the density measures (per area or population figures) make up for the problem (Tables 2 and 3), but the qualitative aspects of networks. Facility maintenance has been largely neglected in Soviet/CMEA times, and investment in network upgrades and augmentations has been below the level which is necessary to provide uncongested high capacity networks in regional markets with an intensive division of labour. Deficiencies exist with regard to a lack of high-performance corridors for rail and road, but also to lacking by-passes of congested agglomerations or even of simple villages. Moreover, tracks, roadbeds, and bridges are in large parts worn-out, or do not comply with quality standards which are necessary for easy accessibility and safe transport (e.g. concerning safe axle loads for rail tracks, roads, and

⁵ In 1990 about 30 p.c. of seaborne Russian foreign trade of around 180 m. tonnes was handled by ports on the Eastern shore of the Baltic Sea (Peters 1993: 267).

runways, or the capacity of air traffic management devices). Thus, concrete physical infrastructure bottlenecks are still hampering land and air transport in the Baltic Rim EIT much more than in the maritime sector (Böhme et al. 1998a: 87 ff.; 1998b: 93 ff.).

In addition, in the past both public planning processes for designing infrastructure networks and maintenance administrations for the capacities installed were lacking professionalism. Hence, training is financed by international support programs. Thus, also in land-based infrastructure the software-aspects which are directly complementary to the very network facilities, call for high attention.

3.2. Formation of Transport Markets in the Baltic Sea EIT

Macro-software obstacles to transport and trade in the Eastern Baltic Region resulting from lacking adherence to international regulatory agreements or missing national regulations seem to have vanished in rather short term and do no longer play a prominent role in this region.

International agreements and conventions — such as the International Convention on the Law of the Sea, bilateral shipping treaties in maritime transport, the Geneva Convention on the International Goods Transport Treaty, the Convention on International Civil Aviation — have been signed by the Baltic countries and Poland. In addition, these countries have joined the pertinent organizations — like the International Civil Aviation Organization. This allows them to negotiate bilateral agreement of market access. Also in shipping, and in road transport bilateral traffic right have been negotiated. Hence, macro software obstacles in the pertinent transport relations have lost relevance as far as the international layer is concerned, with some exceptions for Russia, e.g. in air traffic (Böhme et al. 1998a: 65 ff.; 1998b: 68 ff.). This is not to say that market access has been opened completely to foreign operators for all modes. E.g. in road transport bilateral agreements grant only partial market access to foreigners, subject to quantitative restrictions of quotas for single border-crossing trips. This may constitute a constraining barrier to entry, as has proven in the case of Baltic countries' hauliers, who began to penetrate Russian road transport markets and were banned not only by limited quotas but also by additional obstacles from the sphere of customs regulations (Böhme et al. 1998a: 68 f., 114 f.; 1998b: 72 f., 121 f.).

The process of *privatization* of former state-owned transport firms is going on for the various modes, however with different speed in the several Baltic Rim

EIT. As is the case with privatization in general, Estonia has taken the overall lead and has extended its far-reaching privatization plans (with foreign capital being invited to participate) to all kind of transport firms since 1993 and to infrastructure management like port operations. The country is even trying to find a foreign private operator for the presumably remunerative part of its rail operations, the east-west line from the Russian border to the port of Tallinn. Latvia took the lead in airline privatization inviting foreign stock-holders in 1995, followed by Estonia one year later (Böhme et al. 1998a: 69 ff.; 1998b: 73 ff.). In contrast, privatization in Lithuania and in Poland is not pursued with the same intensity as in the other two countries, e.g. in air traffic. The main opposition is raised against potential future reorganizations which would raise productivity and which would be the main economic rational for privatizing. The picture in Russia is quite more puzzling, e.g. with a co-existence of newly founded private firms, partly privatized firms, publicly owned joint-stock companies and even some combines which have survived in road transport, or with a similar phenomenon in air-transport where the all-embracing integration of former Aeroflot had to be dissolved, but where several "production associations" between airports and airlines still have survived.

As far as domestic *market access and price or quality regulations* are concerned, regulatory structures seem to emerge in the EIT which may be qualified as rather liberal compared with former Western models of tightly regulated transport markets; licensing for road transport and for air transport exists albeit without license quotas. These open access frameworks seem appropriate for the newly emerging transport markets in the EIT, and are required for adjustment to EU market regimes anyway (Böhme et al. 1998a: 77 ff.; 1998b: 81 ff.).

In sum, considerable progress has been made with respect to creating and implementing of "macro-software".

3.3. Daily Operations of Transport Infrastructures and Transport Firms

It has already been mentioned that micro-software aspects which are directly connected to planning new and operating and maintaining the existing infrastructure facilities of all modes cause larger problems in transport in the Eastern Baltic Region than the lack of facilities itself. This empirical result can be generalized. Concerning *micro-software obstacles within transport business*, impeding and costly factors stem from (i) an inefficient use of the hardware available in the sea-ports and within the rail networks due to lacking professionalism, postponed privatization of privately operational functions, and

lacking commercial attitudes, (ii) shortages in managerial and technical human-capital as well as operational and professional skills of employees in transport firms, most prominently in the national railway enterprises, (iii) missing inter-modal co-operation where transit chains are concerned and economies of scope would render such co-operation as a cost-saving solution, e.g. in port hinterland traffic, (iv) an inadequate institutional design at the lower administrative level, where state authorities necessarily are involved, which often takes the form of discriminatory behaviour of administrations, e.g. with respect to pricing of port dues, railway rates, and airport landing fees (Böhme et al. 1998a: 100 ff.; 1998b: 106 ff.).

These examples suggest the conclusion that shortages and shortcomings do not reflect structural problems of the Eastern Baltic Sea transport markets, but are more or less result of the current state of the reform process in the EIT and of still prevalent learning-by-doing deficiencies. Thus, these obstacles should be temporary. Removing them could be furthered, if the process of institutional reforms would gather more momentum.

3.4. Complementary Customs and Safety Issues

It may be surprising, but the most pressing obstacles to transport in the Eastern Baltic Sea Region stem from micro-software obstacles which are rooted outside the transport sector itself, namely from irregular and time-consuming customs procedures and from still constraining safety problems.

Complex and time-consuming *customs procedures* are encountered by transport firms: (i) Procedural obstacles stem from the mere existence of customs controls due to the fact that the countries in question are not part of the same free-trade area. Although Estonia, Latvia, Lithuania and Poland have negotiated association agreements ("Europe-agreements") with the EU granting free trade to the bulk of trade flows, and although the three Baltic countries have agreed upon a common free trade area, trade flows in this area are far from being liberalized. But the most pertinent cases are Russian and CIS im- and exports which have to pass a border with rather high tariff- and non-tariff-barriers. (ii) Transport firms are confronted with a costly instability of rule-making and rapid and often unexpected alterations of customs regulations. In this respect severe commitment problems arise and decisions are often governed by daily political or often changing protective reasons. (iii) Likewise, the application of these rules by the customs administrations varies substantially between different locations or in time, even if rules have not been changed at all. (iv) Customs administrations often are said to lack flexibility. (v) In addition, hardware

obstacles arise with shortages of border clearing facilities and of corresponding well-trained administrative staff (Böhme et al. 1998a: 112 ff.; 1998b: 119 ff.).

The costs of these customs procedures materialize in long delays of trucks or of trains at border stations, which, for the time being, eliminate or even overcompensate all gains from upgrading infrastructure networks and time-saving technical progress in transport. Moreover, additional human capital costs for adhering to the complex procedures have to be incurred. In addition, transport costs are raised directly in those cases where by-pass strategies concerning transport routes or modal shifts are followed. In the Kiel Institute study, the authors have not attempted to translate these categories in concrete money terms, but according to reports of shippers and hauliers transport costs in the relations with Russia and the CIS (both via Baltic ports and via the land-based networks through Poland) are raised by customs procedure much more than by missing infrastructure links.

Additional costs have to be incurred because of higher safety risks than in other transport relations. Criminal offences — in the form of theft of cargo, containers or even entire transport vehicles — are reported for all modes, but in particular for road transport. In most cases, complaints are directed to the situation in Russia, but because of the high share of transit trade to and from Russia and the in the Baltic republics and to a lesser extent also in Poland this obstacle relates to a high share of transport relations in this whole area. Additional costs have to be incurred by employing extra devices for trip control and planning trips to the tiniest details (Böhme et al. 1998a: 116 f; 1998b: 123 f.).

Summing up: Despite all troublesome hardware legacies from the Soviet/CMEA era there is no transport crisis in the Eastern Baltic Sea Region with respect to infrastructure facilities. The most relevant obstacles can be found in the complementary software. In some sense trade is not hampered by deficiencies in the transport system, but by trade barriers themselves.

4. An Assessment of the External TEN Policy in Eastern Europe

To assess the relative contribution of the various EU transport initiatives in Eastern European accession candidates to their national and regional, and to Union-wide economic development, two different points of departure may be taken: (i) The first relates to the contribution of active help of infrastructure policy (planning and financing) and of integrating Eastern transport market into European transport markets to overall and to regional growth in general. (ii)

The second deals with the proper federal (or in the case of the EU: quasi-federal) layer, to which competencies for these policy actions should be allocated.

Every assessment of the initiatives of international transport policy in the east, however, has also to take into account some basic features of the Eastern Baltic Sea Region: *First* one has to realize that the Baltic Sea ever has been of a connecting rather than of a separating character for the adjacent countries. It has ever been one of the most busiest parts of the world oceans (In the late 1980s about 300 m. tonnes were transported on the Baltic sea-lane; this represented nearly 8 p.c. of total world seaborne cargo, though the Baltic Sea does not make up for more than 0.15 p.c. of the world oceans' surface (Böhme 1987: 17; 1988: 383 ff.)). Thus, transport policy in this region has to pay attention to maritime transport in any case. *Second* the Baltic Sea is one of the main transit points to Russia. A substantial part of the Russian foreign trade is shipped through the Eastern Baltic Sea region, mostly via Baltic ports.⁶ Thus, future development of transport and consequently of action in transport policy depends on what is happening in Russia.

4.1. The Contribution of Infrastructure Links and of Transport Market Integration to Spatial Growth

From a very general point of view, the case for an active infrastructure policy in Eastern Europe may seem straightforward. Keeping in mind the still existing severe rail, road, and airport network bottlenecks and quality constraints, one may well contend that these bottlenecks are acting as serious developments impediments, as they impair the ability of the Eastern accession candidates to integrate their markets into the international division of labour physically.⁷

⁶ The exact share of total Russian foreign trade (including land transports) which is being shipped via Baltic ports, cannot be ascertained, but the high dependency of these ports on Russian transit may be demonstrated by the fact that the share of transit traffic in the Baltic countries ranges from 60-65 p.c. in Estonia to 85-90 p.c. in Latvia, with Lithuania lying in-between this range (cf. Hayter 1993: 296; Rutz and Laving 1997: 499; Laving 1998; Hoffmann 1998: 27 ff.).

⁷ In order to arrive at this conclusion, one does not have to go back to classical writers who compared infrastructure deficiencies, like deep potholes amidst a road, with high tariff barriers. Such a notion can be found, for example, in the work of the 19th century French advocate of free trade, Bastiat (1880). Nor one has to rely on often unprecise and biased questionnaires among enterprises willing to relocate to pertinent regions when they are asked for a ranking of important locational factors. See, e.g. Hoffmeyer et al. (1990: 96 ff.), Busch and Klös (1995: 9 ff.) or Junesch (1996: 36 ff) for a synopsis of such surveys.

It is simply the lacking *accessibility* of these countries which would prevent them from taking part in the international division of labour if both domestic and border-crossing infrastructure networks would exhibit serious bottlenecks and would hamper permeability of traffic flows. The provision of additional transport options increases the likelihood of economic contacts and thus offers options for engaging in a welfare enhancing interregional division of labour.⁸ Moreover, cross country analyses in the sequel of the well-known *Aschauer debate* (on the contribution of public investment in infrastructure facility upgrading and augmenting to aggregate productivity growth) show that productivity growth triggered off by infrastructure investment was highest in less developed countries with underdeveloped transport networks.⁹

But notwithstanding these general justifications of infrastructure policy in the east, some caveats are warranted: (i) Even in accessibility models, which seem to be exclusively related to infrastructure hardware, software improvements, like transport market deregulation, may serve the same end of enhancing physical accessibility of countries or regions as the construction of costly additional infrastructure links does. Given the high costs of constructing infrastructure facilities, the software solutions may be often superior to additional hardware. In some sense this argument refers to the debate on the relative effectiveness of hard versus soft locational factors for economic development. (ii) It may be remembered that one (among a long list) of the objections raised against Aschauer's findings of high rates of return of investment in road building was that empirical analyses often did not incorporate software solutions for a more rational utilization of existing capacities, like road pricing. Thus, hardware projects which are more visible (and according to considerations of political economy can be sold more easily to voters) may lie in the center of a political agenda while creating the complementary software of user cost regimes and of a functioning framework for transport markets would even be more important but are often opposed by vested interests.

Taking together the general justification of infrastructure policy for the east and the aforementioned caveats, one may contend that a substantial transport network upgrading workload, in particular for land-based infrastructure, is still

⁸ For a recent assessment of accessibility models see Martellato and Nijkamp (1996).

⁹ A comprehensive survey on the course and the results of the Aschauer debate can be found in Pfähler et al. (1995) and Pfähler et al. (1996).

warranted in the countries on the Eastern Baltic Rim in any case. This assessment will hold for the years to come at least with respect to land-based networks. However, the productivity of these hardware measures will be greatly enhanced by additional software development. This includes promoting (a) initiatives of including user-cost regimes and (b) the adjustment of transport market regimes of the Eastern applicants to meanwhile more liberal EU standards. Accordingly, the Polish motorway programme which widely is going to employ BOT schemes may, at least in principle, account for the need of including pricing schemes, though it can be heavily criticized because of its current concrete design and of improper legal provisions.¹⁰ Also, the EU software pre-accession aid for future member states on the Eastern Baltic Rim — in form of institutional help for opening up transport markets and applying EU safety norms (Boeing 1998: 2) — will lower transport costs in this region and enhance its accessibility. And institutional support by the EU may lower the transport cost account of these countries also indirectly: Their adjustment to the *acquis communautaire* provides the base for reliable legal systems and stable institutions (Kinnock 1998: 3), which are a particular prerequisite for foreign public or private transport infrastructure investments in these countries because of the sunk cost character and the long depreciation periods of infrastructure hardware.¹¹

4.2. Aspects of Fiscal Federalism: Centralized or De-centralized Infrastructure Planning and Development Aid to EIT?

Given the general case in favour of hardware infrastructure network development in Eastern Baltic Rim countries, the next question arises as to the competencies for the respective policy actions. Or to put it another way: Who should do the job? Is designing Pan-European TENs and Crete Corridors also in Eastern Europe and providing a large part of the necessary financial means a case for central action — in this case: mostly by the EU in conjunction with other international institutions —, or should these tasks better be pursued by the

¹⁰ Concerning planning deficiencies cf. in detail "Experten üben Kritik an Polens Autobahn-Plänen", *Handelsblatt*, Düsseldorf, of 5 March 1997. Moreover, according to European Investment Bank, the current legal framework does not account for the well-known institutional incentive problems of Public-Private Partnerships in infrastructure provision so that construction cost may well be above those which would have to be incurred for a programme entirely being performed in the public sector.

¹¹ Stable institutions seem to be even more important for private transport investment than for telecommunications investment (Laaser 1998b).

individual states according to the subsidiarity principle? Different answers may be given with respect to (i) planning and providing such networks, and (ii) financing them.

Concerning the process of *designing TENs*, i.e. planning spatially and intermodally interconnected networks and providing missing links, a lot of good economic arguments can be put forward in favour of some central competence.¹² Among them is the fact that entirely nationally provided networks might neglect international links and thus might create various kinds of externalities: (a) direct ones with respect to missing financial contributions of foreign users, and (b) network externalities due to the fact that traveling options for each user would rise more than proportionally if bottlenecks were widened and gaps were closed (Welfens 1996: 154 f., 162 f.).

However, it is open to doubt whether this central task has to encompass the process of setting up concrete infrastructure plans, a central involvement in the planning process of transport corridors or even a realization of such plans by providing specified links or not. Externalities between national infrastructure networks can also be internalized in bi- or trilateral negotiations and agreements between the parties concerned in the particular case. A genuine central task (to be provided by the EU or in a Pan-European setting by the CEMT), however, would be the design and enforcement of rules and institutions, for conflict settlement purposes and providing solutions in the case of strategic behaviour of countries. On the base of such an institutional design, the planning of border-crossing links in networks could be left to the individual countries, and hence, tax payers' money would not be wasted by duplicating the national planning task on the supra-national layer (Laaser 1998a).

This argument is reinforced by the practical way in which intra-EU TENs are planned and provided. In the first place this refers to the process of co-financing. When projects have to be accepted for co-financing from the EU budget — this co-financing is seen as incentive to build these links —, planning has to be done twice: on the national layer as before, and on the international layer for choosing between different projects under the budget constraint. Thus, a substantial part of the planning task is done twice anyway. Moreover, the EU TEN priority lists of new links between current EU member states — which should be newly provided or whose realization should be speeded up by EU TEN policy — has been compiled simply by adding up requests from the single

¹² Cf. e.g. Vickerman (1995) or Welfens (1996).

member states. Looking at these lists for the various modes renders the impression that (a) only such projects were included whose planning process had already been completed and where no planning costs could be saved, and (b) not all of the projects show a clear tendency of closing serious gaps between national networks. Instead of this, these lists seem to have been compiled according to the "me too"-principle.¹³

In how far does the assessment change if we turn to pan-European networks? At least concerning the Eastern Baltic Rim we are looking at, the picture is not very different due to formal reasons. With the exception — of course — of Russia, the EIT on the Eastern shore of the Baltic Sea have applied for EU membership, and Estonia and Poland have been considered worth of being included into the first round of accession negotiations. Latvia and Lithuania have to wait for a second round, but are included into the pre-accession partnerships and support programmes as far as transport is concerned. Taking this for granted, there cannot be a substantial difference between current and future EU member states concerning the assessment that centrally providing merely the software for co-ordinating infrastructure bottlenecks beyond borders is superior to a central network planning. Even if we take into account the information that a substantial part of Western infrastructure support programmes in the Eastern Baltic Rim countries is used for improving technical and managerial skills and professionalism in road and rail facilities planning and maintenance administration, this does not constitute a long term factor to discriminate between Western and Eastern transport network planners. Thus, if institutions and mechanisms to co-ordinate trans-border network design — between the EU and the applicants and among the applicants — are provided, the externality argument cannot support central network planning to a greater extent than in the current EU. Looking at what is actually done in these countries, it seems justified to say that internalization of network externalities is sufficiently be performed within the Joint Subcommittees on Transport, TENs and Telecommunications, which have been implemented according to the Europe agreements with Poland, Estonia, Latvia, and Lithuania in order to assess the progress of regulatory adjustment.¹⁴ Additional central planning seems questionable.

¹³ For a comprehensive description and critical assessment of intra-EU TEN policy see Sichelschmidt (1997).

¹⁴ See Boeing (1998: 4) for the mostly regulatory tasks of these committees.

Turning to the task of *financing* the envisaged transport network improvements in the Eastern Baltic Region we have to ask in how far it is efficient to involve foreign funds. Basically, the principle of fiscal equivalence (Olson 1969) has to be applied. This principle requires that the circle of users should be by and large congruent with the circles of payers and of decision-makers. Otherwise, a waste of scarce resources might occur, because illusions on financial constraints might emerge, costs could be shifted to external tax payers, and free-rider problems might result. From this it follows that the applicant countries will have to bear the bulk of financing by themselves: The bulk of utility will accrue to these countries to be connected to the economic centers by the external TENs. When they are joining the free trade regime area by TENs physically, they can internalize the gains from trade and make use of the opportunities of catching-up. Apart from this line of reasoning, gains from trade also accrue to other countries. In this context the high share of transit traffic in the Baltic countries should be remembered. Thus, both some planning and some financing duties of the international community representing the widely dispersed other users may be justified, even if we do not go back to development aid or regional policy arguments on equity grounds.¹⁵ Following this argument, the international community may not have any choice but providing financial support to infrastructure upgrading in the EIT even on efficiency grounds.

However, again some caveats are warranted. Co-financing and the formulation of guiding schemes for international investment — like the Crete Corridors — easily can lead to a concentration of efforts on inter-regional prestige links, thereby neglecting the complementary intra-regional links: Mainly these directly complementary networks are worn out in the Baltic countries and in Poland.¹⁶ It remains a question of efficient regional development policy whether a concentration of means on main transport axes is superior to a dispersion of efforts, if the most serious problems can be found just off the trunk routes. In addition, if one takes into account the empirical result from Western studies that more serious bottlenecks often can be found for a whole region to connect to an existing node of a main network spoke — regional development is impaired by the lack of an adequate additional intra-regional

¹⁵ Cf. for a similar argument Welfens (1996: 163 f.).

¹⁶ Cf. Böhme et al. (1998a: 91 f.; 1998b: 97 ff.).

network¹⁷ —, then the guiding schemes of Crete Corridors seem to be somewhat misleading.

This potential misallocation is reinforced by the negative incentive effects which is accompanying any co-financing scheme with constrained choice: If a substantial part of the financial resources is provided from outside the own coffers, then the own expenditure decision will be biased in favour of a particular project, even if its marginal return to capital would not justify the expenditure if full costs had to be borne. Now, if foreign capital provision (in this case for Crete Corridors) is directed toward projects which do not fit the development potential of the countries in question this will in addition absorb the scarce domestic funds which would have a higher marginal product in intra-regional network upgrading. In the specific case of the Eastern Baltic Rim this danger seems to be a real option with respect to the regional peculiarities, as the next sections will show.

4.3. Network Design

The first issue is concerned with the actual design of the Crete Corridors itself which proves to be problematic from a transport geographic perspective. As has already been mentioned, the bulk of traffic volumes in the three Baltic countries and in the Russian Baltic Rim oblasts as well as a lower but still substantial share of transport volumes in Poland is incoming or outgoing Russian transit traffic. The Eastern Baltic Rim is the second important transit point for Russian foreign trade (second only to the Black Sea ports, cf. Peters 1993: 267). To give way to Russian (and CIS) bound and originating traffic is and will remain the most important task for the infrastructure networks of the small countries on the Baltic Rim; transports from and to Russia will dominate domestic rail, road and pipeline traffic in Estonia, Latvia and Lithuania; to some extent Russian related transports will also influence capacity utilization of the Polish overland networks. Thus, east-west corridors are by far more important on the Eastern Baltic Rim than the respective North-South corridors are.

¹⁷ See e.g. Vickerman (1995: 248) who puts forward this argument and refers to pertinent studies for Western Europe. Similar and even more pronounced phenomena can be found in less developed countries where the central port or airport of the agglomeration of the capital may be well connected to international shipping and air-transport while adequate transport networks do not go beyond the capital's border and leave the rest of the country to the jungle.

Current transport networks in the three Baltic countries clearly reflect this traditional role of the Baltic ports as former CMEA's window to the West,¹⁸ which cannot be expected to change drastically, simply due to the relative size of population figures and markets, even if the drags to the reform process in Russia may hamper Russian economic development potentials for the foreseeable future. In contrast to this, from the three Crete Corridors that will run through this region (CC I Helsinki-Tallinn-Riga Kaunas-Warszawa = Via Baltica, with a branch Riga-Kaliningrad-Gdansk and further to the West = Via Hanseatica; CC II Berlin-Warszawa-Minsk-Moskva as the competing land-bridge; CC IX Helsinki-St. Petersburg-Moskva, with a branch St.Petersburg-Pskov-Kiew-Odessa, and another one from Kaliningrad and Klaipeda-Kaunas-Vilnius-Minsk-Kiew¹⁹), only the last one takes into account the main transport lines in this region. Thus, if foreign support for transport infrastructure construction in this region follows the guidelines which are laid down in the actual corridor concept, and if this should direct also domestic spending, too, then one can conceive that the corridor concept might lead to a non-negligible waste of resources.²⁰

But also east-west-CC IX does not take into account the other Baltic ports' role as transit point for transports from and to Moscow and the Russian mainland. At least, one may interpret the corridor design as the attempt of picking in advance the winner in the process of port competition on the Eastern Baltic Rim. This might be another source of waste given the fact that Russia is trying to initiate to construct several entirely new huge port projects in the Finnish bay near St. Petersburg probably costing at least several hundreds millions of US-Dollars, in order to get rid of its perceived dependence on the Baltic countries' ports and hard currency transit transactions (Bolz and Polkowski 1993: 53 ff.). The expected waste of such projects may come clear from the fact that Estonian, Latvian, and Lithuanian ports had been constructed or substantially upgraded during the Soviet era for the very end of serving the Soviet Union's trade requirements, with decisions being based on these ports' locational and climatic

¹⁸ See EBRD (1996: 45) and Buchhofer (1993: 127) for background information.

¹⁹ See Commission DG VII (1997).

²⁰ To be sure: The projected costs of CC I Via Baltica/Via Hanseatica with 700 MECU (rail and road) look small compared to 2700 MECU for the land-bridge CC II and 4000 MECU for CC IX (Commission DG VII 1997), but are high enough anyway. In addition, also the land-bridge CC II may receive too much attention compared with the cost-less Baltic Sea lane as will be argued below.

(ice-free) conditions which are favourable in relation to Russian ports. A de-politicization, probably privatization of decision making, the application of commercial attitudes and of hard budget constraints — all being software aspects of infrastructure provision — would be called for (Böhme et al 1998a: 129; 1998b: 136 f.).

In sum, current and expected future trade flows suggest that east-west corridors should have the highest priority. In contrast, the actual design of infrastructure facility planning which seems to follow centrally provided guidelines is in a real danger of ignoring the respective facts. There might be a systematic bias due to political economic reasons: More visible prestige projects may call more attention and support from voters and from the press than do small scale network improvements, and merely politically inspired decisions tend to ignore economic costs. One should keep in mind the above mentioned point of a potential misfit between the return on investment of these prestige projects (interregional networks) and the need of rebuilding rail and road also at a lower level, where interregional spokes have to be linked with intra-regional networks. From this perspective, the concentration of efforts on large-scale road projects like the Via Baltica and the Via Hanseatica seems questionable.

4.4. Aspects of Intermodal Competition and Modal Split

Modal split considerations are important for Russian bound and originating traffic flows which dominate Eastern Baltic Rim transport. The effect is two-fold: (a) concerning land-based hinterland traffic, and (b) concerning competition between rail and road on the one hand and the Baltic Sea lane on the other.

If one assesses the determinants of *modal split in Baltic Rim hinterland-traffic* to and from Russia, it becomes quite clear that rail transport will play a much larger role than road transport, and that rail transport will retain a much larger share in modal split than it actually has in Western European countries. The reason for this rather uncommon hypothesis does not lie in the mere fact that road networks seem to have been neglected during Soviet times and are in a even worse state than rail networks so that a Western style modal shift would take place immediately if only funds would be directed to road building. Neither are former ideologically founded regulations in favour of rail transport — which might have created path dependencies — entirely responsible for this modal split. In contrast, the reasons for the rail dominance are (a) the pattern of the location of economic activities with very long distances with bundled traffic flows dominating over short-distance dispersed

flows, (b) conditions of climate and geography making road building much more expensive in most parts of Russia than in Western Europe (see Böhme et al. 1998a: 129 ff.; 1998b: 137 ff.). The arctic climate in this region requires much more funds per km of a more or less agreeable road (see e.g. Buchhofer 1993), and in many European as well as Asian parts of Russia there is simply a lack of appropriate building materials like stone and gravel for ballast purposes which have to be supplied from far away by substantial transport costs.²¹ Thus, there is strong evidence that rail transport will retain its dominance in Russian transport as well as in the respective transit flows.

It is not surprising therefore that the World Bank study on Russian transport arrives at the conclusion that "for all practical purposes, surface transport, excluding pipelines, in Russia is rail, and will remain so for the foreseeable future despite an expected shift to road transport" (Holt 1993: 64), with a similar position being held by the study of R. North (1996). Hence, one has to conclude that any attempt to design Eastern Baltic Rim networks according to Western models would be extremely costly both for the countries concerned and for the international community which is co-financing.²² Given the important path dependencies to transport network development which are caused by the high share of sunk costs in total costs of infrastructure construction, a more careful analysis of potential costs and benefits as well as a hard budget constraint also for development aid is warranted.

The second intermodal aspect refers to the *competitive situation between constructing land-based links and the Baltic sea-lane*. Keeping in mind (i) the dominance of traffic flows from and to Russia in the Eastern Baltic Sea Region, (ii) the relative importance of east-west corridors, and (iii) the more than proportional costs of constructing land-based infrastructures in this whole region, one wonders why there is not given sufficient priority to investments which are complementary to the Baltic sea-lane. Instead, Crete Corridor I relies on the building of motorways which will run parallel to the Baltic coast-line,

²¹ Cf. Böhme et al. (1998a: 130; 1998b: 137 f.) referring to Raupach (1968) and a former study from the Kiel Institute and the Hamburg Institute (Fodors et al. 1991).

²² In the end, we arrive at the ambiguous outcome that in the current European Union one may well criticize a particular rail-bias in the internal TEN concepts, which is due to the Commissions policy of modal shift towards rail freight transport and High-Speed Rail Passenger systems in Western Europe, not the least on concepts of sustained mobility (Sichelschmidt 1997), while in Eastern Europe the same institutions are doing quite the opposite.

like the Via Hanseatica, and (to a lesser extent) the Via Baltica. From an economic perspective one can hardly understand why scarce funds are to be used for doubling up already existing infrastructures, given the fact that the sea-lane provides transport options without user-charges for this "liquefied motorway" (except port dues) and that sea transport especially on the Baltic Sea lane is rather fast though total transport distances including hinterland-links are quite long. the same reasoning can be applied to traffic from and to Finland to and from Western Europe: It is hardly any transport relation conceivable, which could not be served by maritime transport in this region at lower costs.

Moreover, in Crete Corridor II from Berlin to Warszawa and Mockva, one third of the projected 2.7 BECU are reserved for road improvement (Commission DG VII 1997: 5 f.). Although currently the bulk of means for road improvement may be devoted to projects in Poland (where road building can be justified by the high population densities and the scattered spatial structure of economic activity), the Corridor concept may well give rise to plans to rebuild the traffic axis from Central to Eastern Europe according to Western models as high capacity road. Whether this would be justified on economic grounds, may be highly questionable. In addition, one should not only take into account the probably huge construction costs, but also the path dependencies, which might be created by large-scale road building. In the case of Eastern Europe when networks still have to be constructed, we are still at a point, where we are free to choose without the impasse effects of sunk costs.

Furthermore, let me address the related issue of consistency of EU transport policy. In the core countries of the Union the EU is pursuing a "road to sea-policy" based on (i) rapidly increasing congestion in land-based networks and (ii) the aim of creating a framework for sustainable transport. It is part of this policy to redirect transport flows from land-based networks to coastal shipping. Turning to the east, it does not look very consistent to concentrate infrastructure investment to modes and corridors which are likely to divert traffic from the Baltic Sea lane in the future. In a way, here is a danger of a "sea to road-policy".

5. Conclusions

Combining the assessment of transport markets' and networks' deficiencies in the Baltic Rim EIT and the theoretical considerations on the various policy approaches renders the impression that the international community, including the EU, should provide support to the EIT, but that with respect to the

undeniable necessary hardware measures some reservations have to be made, at least in their actual design. Moreover, compared with these hardware measures the software initiatives of (i) opening up transport markets according to the "Agenda 2000" scheme, (ii) creating stable institutions for well functioning transport markets and for competitive transport firms in the EIT, and (iii) improving the productivity and professionalism of network planning and maintenance and of transport related administrations in the EIT seem even more important than the remaining hardware deficiencies.

The hardware component of providing qualified transport networks of course can be consistently seen as an indispensable prerequisite for deepening the spatial division of labour. This is what is behind the notion of infrastructure bottlenecks that hamper economic development. These negative effects, though, will be multiplied by inefficient institutions. It is the purpose of institutions to lower transaction costs in economic interaction between individuals, firms, organizations, public bodies, and states. Institutions are to provide clarity, transparency, reliability, foreseeability and stability in rule-and decision-making. If institutions fail to render these functions, economic interaction cannot function properly and may even be blocked so that hold-up situations can emerge. Such hold-ups are characterized by prohibitively high transaction costs and can make up for the most relevant obstacles to interaction, trade, and, consequently, transport. Hence, relatively poor countries will suffer from transport policy shortcomings (like delayed privatization of, say, port handling agencies, inefficient regimes of user charges) even more than do rich countries. Getting the software, i.e. the institutions, right, is, from this perspective, all the more important for the EIT because it takes such a long time to get rid of hardware bottlenecks.

Looking at the institutional design in the specific case of TENs and their extension to the east, the Crete Corridors, one may well extend the reservations against intra-EU TENs to external TEN policy. Subsidiarity is called for even in infrastructure network design, where border-crossing externalities have to be taken into account. For regional development, the connection to interregional and global axes at certain nodes and the upgrading of the complementary network which provides this access may be more important. The problem of ignoring local problems in central plans — one of the grounds of the subsidiarity principle — may also come true for TENs, and it is reinforced by means of co-financing, which guides local fund allocation.

Some characteristics of transport in the Eastern Baltic Region illustrate the background of these reservations: The dominance of Russian transit traffic favours east-west axes, but network plans are drawn which seem to be guided by equal geographical distribution considerations. Russian transit traffic also favours the railways in hinterland traffic, but it look like Western models of network design with road dominance — which may be justified under specific Western locational conditions — are transferred to the east. And it is the free of charge competition of the Baltic sea-lane, which withdraws most of the economic and social return of ambitious motorway projects, but which does not seem to be taken into account sufficiently in decision making. This may give rise to the impression that subsidiarity is not accounted for sufficiently, and too low a weight is given to complementary software aspects of transport policy including network provision.

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Tables

Table 1 – Seaborne cargo turnover of all sea-ports in Estonia, Latvia, Lithuania, Poland and the Russian Baltic rim oblasts 1980–1996

	Total	of which ports in				
		Russia ^a	Estonia	Latvia	Lithuania	Poland
Millions of metric tonnes						
1980	.	.	.	36.8	12.2	61.5
1985	.	.	.	39.6	15.6	50.1
1988	135	10.9	9.0	42.6	20.7	51.8
1989	.	.	.	44.2	21.1	48.0
1990	119	10.8	8.3	37.2	16.1	47.0
1991	.	.	.	30.3	15.7	41.8
1992	110	15.0	10.7	27.4	12.9	44.3
1993	120	13.8	12.5	27.4	15.8	50.5
1994	130	16.5	11.7	35.1	14.5	52.4
1995	135	21.4	13.0	39.0	12.7	49.2
1996	144	21.1	14.1	44.5	14.8	48.9
Shares in total turnover of port range (pct.)						
1988	100	8	7	32	15	38
1990	100	9	7	31	14	39
1992	100	14	10	25	12	40
1993	100	12	9	23	13	42
1994	100	13	9	27	11	40
1995	100	16	10	29	9	36
1996	100	15	10	31	10	34
Index numbers 1988 = 100						
1990	88	99	92	87	77	91
1992	81	138	119	64	62	86
1993	89	127	139	64	76	97
1994	96	151	130	82	70	101
1995	100	196	144	92	61	95
1996	107	194	157	106	71	94

^a Baltic ports (St. Petersburg and Kaliningrad).

Source: Böhme et al. (1998a: 150).

Table 2 – Rail Networks in Baltic Rim Countries 1994

Country	Network Length					Network Density with Respect to	
	Total km	of which Electrified km	of which Electrified p.c.	of which Double Track and more km	of which Double Track and more p.c.	Surface Area km/1 000 km ²	Population km/1 000 inhabitants
Economies in Transition							
Estonia	1 024 ^a	132	12.9	108	10.6	23	0.673
Latvia	2 413	271	11.2	304	12.6	37	0.951
Lithuania	2 002	122	6.1	560	28.0	31	0.542
Poland	24 313	11 613	47.8	8 933	36.7	75	0.632
Russian October Railways	10 186 ^b						
Western Market Economies on the Baltic Rim							
Denmark	2 349	370	15.8	897	38.2	55	0.447
Finland	5 880	1 950	33.2	496	8.4	17	1.149
Germany	41 401	17 748	42.9	17 239	41.6	116	0.506
Norway	4 023	2 422	60.2	111	2.8	12	0.924
Sweden	9 661	7 182	74.3	1 338	13.8	24	1.093

^a According to EVR (1996): 1 127 km. – ^b 11.8 p.c. of Russian railways.

Source: Böhme et al. (1998a: 148).

Table 3 – Road Networks in Baltic Rim Countries 1995

Country	Network Length ^a						Network Density ^a with Respect to	
	Total	of which Motorways (or Motorway-like Roads)		of which Highways and Primary Roads		Percentage of paved Roads ^b	Surface Area	Popu- lation
	km	km	p.c.	km	p.c.	p.c.	km/1 000 km ²	km/1 000 inhabitants
Economies in Transition								
Estonia	14 992	65	0.4	1 127	7.5	54.0	332	9.9
Latvia ^{bc}	20 402	-	-	7 024	34.4	38.3	316	8.0
Lithuania ^{bc}	21 121	394	1.9	4 479	21.2	51.0	324	5.7
Poland	372 479	257	0.07	45 420	12.2	65.3	1 152	9.7
Russia ^c	453 000	2 600	0.6	38 700	8.5	51.0	27	3.1
Western Market Economies on the Baltic Rim								
Denmark	71 420	830	1.2	3 730	5.2	100.0	1 657	13.6
Finland	77 723	394	0.5	12 366	15.9	63.0	280	15.2
Germany	650 700	11 200	1.7	41 700	6.4	99.0	1 823	8.0
Norway	90 261	105	0.1	26 452	29.3	73.5	278	20.7
Sweden	136 233	1 231	0.9	14 645	10.8	76.0	332	15.4

^aPublic networks only. – ^bCorrected for obviously misspecified data for paved roads because of the inclusion of gravel roads. – ^cAgricultural and industrial roads which are included in IRF data base omitted; figures are for Latvia: 39 644 km. Lithuania 40 321 km. Russia 416 000 km.

Source: Böhme et al. (1998a: 149).