Gaps in the European long-distance rail network Results of my Bachelor-Thesis

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Structure

- Developments in the European long-distance int. Train Service over the past Years
- Role of the EU Reforms and Competition
- Identification of Gaps Methodology
- The Gaps
- Reasons for the Gaps
- Suggestions
- Conclusion

Variety of technical / planning problems:

- differences in **gauge**:
 - standard gauge (1435 mm) in Central Europe
 - broad gauge (1520 mm) in Finland and Russia
 - Iberian broad gauge (1668 mm) in Spain and Portugal
 - Irish broad gauge (1600 mm) in Ireland and Northern Ireland
- different axle loads and different signaling systems, various electrification systems, different train control and communication systems, border controls...
- other demand structures than in national transport, different interests and planning philosophies (this complicates the integration of international traffic into the national intercity rail networks and the schedule constraints)

- in the first half of the 20th century international longdistance traffic was formed of single train pairs, mostly operated in traditional cooperation of the state railways: cross-border traffic was only possible if a partner was present on the other side of the border who wanted to take over the international train on his territory
- flagship and premium product at that time; night train services between major European cities with hotel comfort



- first sign of an integral pan-European passenger rail network for Western Europe was the introduction of the **Trans-Europ-Express (TEE)** in the **summer of 1957**
- basic idea of the participating state railways was to develop a longdistance train system with a **uniform appearance** and comfort standards (speed and first-class luxury)
- long before the border barriers in the Schengen area fell, **border controls** were performed in the TEE on a moving train



- from 1987 on, the TEE network was replaced by a so called Euro City network (with first and second class)
- this type of train was and is usually integrated in the clock-wiseschedules of the participating countries and is operated as a conventional Intercity-service in cooperation of European railways
- the introduction of the Euro City system coincided with the fall of the "iron curtain" between Eastern and Western Europe → gradual integration of Eastern European railways in the Euro City network



- Parallel to the establishment of the Euro City network: introduction of numerous international High-Speed Trains (HST) on new or upgraded lines
 - → HST substituted classic, conventional long distance trains with stops at regional centers in relations such as Cologne – Aachen – Paris, Paris – Saarbrücken – Frankfurt or Brussels – Paris
 - → the travel times between major centers could be reduced, the fares went up, the flexibility of traveling was limited by a poorer area coverage and in some cases by the introduction of reservation duties
- At the same time there was also a **decline of night trains**
- a further problem in international long-distance traffic: fares became very confusing over the last years and are still getting more complicated

Role of the EU - Reforms and Competition

- the first essential step by the EU to changes in the transport sector was taken in 1991 with the **Directive 91/440/EEC**: reform-processes were initiated since then in the railway sector of the European nations
 - → many railway reforms in the European countries (but still very different systems and philosophies)
- Treaty of Maastricht 1992: EU has the aim to build a trans-European transport network (TEN-T)
 - → funding the expansion of the major metropolitan corridors with pan-European relevance (but with priority to freight)

Role of the EU - Reforms and Competition

- overall EU transport policy trend: further liberalization of the railway sector and further promotion of competition as one of the key strategies → four railway packages:
 - 2001: railway package I (free network access for freight trains in Europe enabled)
 - 2004: railway package II (safety and interoperability guidelines)
 - 2007: railway package III (liberalization of cross-border passenger trains: "open access")
 - 2008: technical package (revision of security policies and vehicle registrations)
 - the currently discussed fourth EU railway package intended to ensure that profits from the infrastructure of the railways must be reinvested in these and will not be diverted to other areas (so-called "Chinese walls"). The planned obligation to force tenders in regional traffic as well as the "unbundling" (an even stronger organizational separation of infrastructure and operation) are still being discussed controversially...

Identification of Gaps - Methodology

- this work only contains international long-distance rail passenger transport between the member states of the European Union (due to the membership in the Schengen area Norway and Switzerland were included in the study as well)
- to generalize the issue on a good scale level and to make assumptions about potential, it made sense to make use of an existing geographic concept:
 - Concept of "metropolitan areas in Europe", created in 2010 by the Federal Institute for Building, Urban Affairs and Spatial Development (BBSR, Germany)
 - → the idea: certain European cities and metropolitan areas have an importance far beyond their own borders not only because of their high population, but also because of certain functions (economic, political, scientific, transport and culture)
 - → the assumption has been made that there is a sufficiently large potential for long-distance cross border rail traffic between the metropolitan areas of Europe due to their European importance and close linkages and interrelationships

Identification of Gaps - Methodology

- On the basis of the metropolitan area map of the BBSR a grid of locations was developed
- → between those locations gaps in the long-distance cross border passenger transport were identified

Indexwert der Metropolräume (normiert, Maximum = 100)



Anteile nach Funktionsbereichen



http://www.metropolregionmuenchen.

eu/fileadmin/user_upload/Content-Bilder/ueber_die_region/BBSR_ Metropolraume_Europa_2010.pdf



Identification of Gaps - Methodology

- The gaps were segmented into different meanings:
 - Category I: The railway across the border is out of operation or even dismantled
 - Category II: There are not more than four international long-distance train pairs on poor-quality infrastructure (few connections and long travel times)
 - Category III: There are not more than four international long-distance train pairs and few international regional traffic (less than every two hours) on high-quality infrastructure (mainly 140 to 300 km/h)
 - Category IV: Although there are cross-border regional trains (or even long-distance trains), traveling is associated with changing trains (at the country's borders), there are no or only a few continuous long-distance train pairs (≤ 2 through pairs of trains a day)

The Gaps - Category I

Category I: The railway across the border is out of operation or even dismantled

- primarily states with current financial problems in South-West and South-Eastern Europe
- very serious problem: Greece (no international passenger rail traffic)
- further examples: Italy Slovenia, Spain Portugal, the Baltics





Further Examples of Category I Gaps

- Lisboa Sevilla (*Linha do Algarve*)
- Lisboa Madrid (Linha do Leste, Ramal de Cáceres)
- Porto Madrid (*Linha do Douro*)
- Zaragoza Canfranc Toulouse
- Berlin Rostock København
- Venezia Ljubljana
- Vilnius Šiauliai Riga
- Athinai Thessaloniki Sofija

The Gaps - Category II

- Category II: There are not more than four international long-distance train pairs on poorquality infrastructure (few connections and long travel times)
- numerous routes between metropolitan areas in Europe whose infrastructure is in a poor condition, especially in South East and Eastern Europe (relations of Austria to Slovenia and Croatia, from Germany to the Czech Republic, from Czech Republic to Poland, from Poland to Lithuania, Latvia, Estonia, Hungary to Romania and from Romania to Bulgaria)
- but even in the cross-border train service North Spain France and Spain – Portugal you can identify similar problems (winding railways through the mountains)



Example for Category II: The Euro City "Wawel"

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Example for Category II: The Euro City "Wawel"

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- = weitere regionale Strecken (Auswahl)
- - = Landesgrenze

Further Examples of Category II Gaps:

- Lisboa Madrid (Linha do Norte)
- Madrid (Bilbao) Bordeaux
- Grenoble Torino
- Nürnberg Cheb / Furth im Wald – Praha
- München Praha
- Praha Wrocław
- Brno Wrocław
- Praha Kraków
- Brno Kraków
- Linz Praha

- Salzburg Villach Lujbljana
- Wien Graz Lujbljana
- Ljubljana Zalaegerszeg – Budapest
- Zagreb –Ljubljana
- Zagreb Budapest
- Berlin Wrocław Kraków
- Bratislava Kraków
- Budapest Timisoara – Bucuresti
- Budapest Arad Simeria – Brasov – Bucuresti

- Budapest Arad Simeria – Videle – Bucuresti
- Budapest Oradea – Cluj-Napoca – Brasov – Bucuresti
- Riga Tallin
- Vilnius Riga
- Warszawa Vilnius
- Sofija Vidin (Ferry) – Calafat – Bucuresti
- Sofija Ruse Bucuresti

The Gaps - Category III

Category III: There are not more than four international long-distance train pairs and few international regional traffic (less than every two hours) on high-quality infrastructure (mainly 140 to 300 km/h)

- often cited example: Pontebbana from Udine to Villach, as part of the connection Wien – Venezia / Roma
- other examples: international TGV services from Paris to Northern Spain, Northern Italy and Switzerland (railways allow in sections up to 300 km/h), as well as connections from Warsaw to Prague, Vienna and Bratislava (railways allow in sections up to 200 km/h), also between Leipzig, Dresden and Wrocław there is an infrastructure for 120 to 160 km/h, which is used only by a few pairs of trains, similar examples can be found between Norway and Sweden





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Route of the Connection Wien – Villach – Venezia



Further Examples of Category III Gaps:

- Barcelona Montpellier / Toulouse
- Milano Torino Lyon (– Paris)
- Paris Bern / Lausanne
- (Berlin –) Hamburg Puttgarden (Ferry) Rødbyhavn København (Vogelfluglinie)
- Oslo Stockholm (Värmlandsbanan)
- Oslo Göteborg (Norgebanan)
- Venezia Villach (– Wien) (Pontebbana, Südbahn, Semmeringbahn)
- Berlin Poznan Warszawa
- Dresden Görlitz Wroclaw
- Wien Warszawa
- Praha Warszawa

The Gaps - Category IV

Category IV: Although there are cross-border regional trains (or even long-distance trains), traveling is associated with changing trains (at the country's borders), there are no or only few continuous longdistance trains (≤ 2 through pairs of trains a day)

- the connection Brussels Luxemburg Strasburg Basel links the three EU centers with each other and Switzerland, but only two Euro - City train pairs provide continuous connections, all other connections require a change of trains in Luxemburg Ville and possibly also Metz
- the lack of continuous long-distance transport between the metropolitan areas of Europe is concentrated spatially on cross border connections in **Central Europe**

Category IV. gaps:

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Example for Category IV: The Connection Basel – Strasbourg – Luxembourg – Bruxelles 

Further Examples of Category IV Gaps:

- Marseille Nice Genova
- London Lille Bruxelles Aachen Köln
- Gent Rotterdam
- Bruxelles Luxembourg Strasbourg Basel Zürich
- Luxembourg Köln
- Luxembourg Frankfurt Main
- (Amsterdam –) Eindhoven Köln
- (Amsterdam –) Eindhoven Aachen
- (Den Haag –) Eindhoven Düsseldorf
- Amsterdam Münster
- Groningen Bremen
- Århus Hamburg
- München / Stuttgart Zürich Milano

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– complete map (2013/2014) M. Bienick

Reference:

Bienick , M. (2013): Bachelor Thesis Gaps in the European long-distance rail network . Geographical Institute of the RWTH Aachen, June 2013 (unpublished).



Reasons for the Gaps

The still existing and growing divergence between European railway systems as well as the gaps in the mainline system are thought-provoking. In international long-distance railway traffic the influence of an integrating Europe can be felt only slightly. The seemingly unbridgeable technical, political and actor-related barriers that come to light in many cases are simply too high. There are several reasons for the existing gaps, which can be summarized as follows:

- International long-distance railway transport has to be operated **commercially**, on the **own risk** of train operating companies. Additionally they have to deal with difficult demand structures and volumes.
- **Technical barriers** namely in terms of infrastructure, vehicle compatibility, the (growing) divergence of power, signalling, communication and security systems of the different railway networks in Europe make it a difficult economical operation.

Reasons for the Gaps

- There are numerous international long-distance **interfaces** which have to be coordinated **by various partners**. Accordingly, the synchronization of different regional and national interests represents a major challenge.
- International long distance connections often fail due to the absence of cooperation will across the boundaries.
- Gaps in the mainline system can also have **historical and political reasons**, e.g. changes in boundaries.
- As a consequence of **decades of neglect**, the railway infrastructure, especially in South-West, South-East and Eastern Europe, is often in a poor condition.
- A **failed infrastructure policy** contributes to a further worsening of the problem. One significant example is the highway extension in the course of the 2004 enlargement of the EU without any corresponding expansion of parallel rail lines.

Reasons for the Gaps

- The international railway traffic has an **image problem**: In some European countries railway transport is held in low esteem from both a political and a social point of view.
- There are **funding problems** due to unilateral capital tied up in large projects with no significant necessity for the network (like *Stuttgart 21*).
- In countries such as Portugal, Spain and Greece, saving efforts as a result of the **financial crisis** led to a **priorization of national traffic**. As a consequence, international traffic has been reduced on many routes.
- An **unequal intermodal competition** caused by (hidden) subsidies for road and air traffic prevents a fair deal for rail.

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Suggestions

Infrastructural measures:

- there are **large-scale projects** within the framework of the TEN (often **critical**): A few projects in Europe **tie up capital**, so that there is not enough money for the area-wide and Europe-wide expansion of conventional infrastructure
- the managing of the interfaces on the railway system, especially in an international context, requires a high level of experience and coordination, the EU commissions' planned "unbundling" (an even stronger separation of infrastructure and rail operations) could reduce synergies and make the pan-European rail system inefficient → the degree of further implementation of this EU project is therefore to be reviewed and followed up

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Suggestions

Political measures:

- privileges for climate-damaging transport (taxes) have to be stopped
- EU countries should take early and proactive work towards **sustainable transport improvements** before economic and ecological constraints (such as "peak oil") "force" a rethinking abruptly
- As a result of an intense political discourse an Europe-wide consensus about the following questions is needed: Which aims do the railways of Europe have? Profit and train services on a few main axes? Or even nationwide and international services that meet both the regional economy and the national economy and climate policy goals? → the establishment of a pan-European long-distance railway network should be a clear political target

Suggestions

Operational measures:

- as a basic requirement between metropolitan areas of Europe there should exist a service of four daily Euro City train pairs (every four hours), the goal should be a "Europe clock-wise timetable" with an integral clock schedule every two hours
- Europe needs a simple, transparent and accessible fare system "Europe fare" with a dense network of points of sale
- the Euro City trains in the "Europe clock-wise timetable" should be offered without the force of reservation (otherwise flexibility and competitive advantages of rail vs. air travel are not fully exploited)

Suggestions

Operational measures:

 an offensive Euro City strategy must be underpinned by solid product characteristics → ensuring that the trains also have guaranteed comfort features such as a dining car. The train type Euro City is back to prove with classical positive attributes such as reliability, solid connections, comfort and travel culture.



Suggestions

Operational measures:

- in addition also a **night train offensive** is needed to exploit the "overnight" competitive advantages of rail: ÖBB for example shows, what is possible (comfortable rolling stock , moderate overnight train fares and an intensive marketing)
- develop appropriate financial instruments for long-distance train services which cannot run commercially (at the moment), but which are necessary for local economies → such a new strategy would be a distinct break and reversal of the previous liberalization-orientation of the EU

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Conclusion

- The EU's intentions to remedy the shortcomings are honourable, but the **track record** of previous strategies, which are mainly based on competition, **remains doubtful**.
- For a substantial improvement, however, the nations of Europe are invited to formulate and promote a **clear target for their railways**. From a political perspective, the international long-distance railway transport does not get enough attention.
- In many countries of the EU there is an urgent need for launching an intensive discussion concerning the future of transport in general and the role of the railway in particular. In other words: it is necessary to raise **people's awareness** for the value of rail transport.
- The central question: Is politics ready for such a rethinking process or will the international long-distance rail traffic still be neglected in the future?

Conclusion

- In the course of dwindling fossil fuels and the "energy turn" one could say that long-distance railway services could play a **key role for reaching climate goals in the future**. Rising oil prices will inevitably have impacts on the gasoline, diesel and kerosene prices and thus cause rising costs of mobility.
- Besides, the **external costs of transport** (health, environment, accidents) should not be neglected. In this context, spending money on the expansion of sustainable, resource-efficient alternatives to fossil mobility would be a good investment.
- Presumably, the connection to the international train network will not only be influenced by climate policy, but even more by location policy. As regards the process of location, especially those metropolitan areas with good railway connections to the European core area could profit in the international locationcompetition.