Integration into the European network: passenger transport

(Einbindung der Schweiz in die Transeuropäischen Verkehrsnetze: Personenverkehr)

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Summary

S1 The Current Situation

The Environment

Trans-European Networks (TEN) are currently being constructed around Switzerland. The transport networks – together with energy and telecommunication networks – represent an important pillar of European Union policies with the objectives of strengthening EU cohesion, promoting trade within the European market, and to trigger regional initiatives for further development.

The overall transport package of TEN is made up of various different parts, such as the so-called guideline schedules determining the infrastructure aspects of TEN. For each part – road network, railway systems, inland waterways, seaports, airports and the network for combined transport – a separate schedule has been developed. The necessary „software“ also needs to be developed. The transport element of TEN includes a marine transport management and information network system, an air traffic management network system, as well as a navigating and positioning network system. Intermodality and interoperability between these systems are areas of major concern for the EU's TEN policies.

The basic TEN policy principles for transport are, for the most part, congruent with Switzerland's transport policies, which means that the co-ordination of Swiss infrastructure planning with the EU's TEN politics is not only feasible, but desirable.

The EU is planning to implement TEN in several stages.

New perspectives for Switzerland's integration on a sustainable basis are to be developed by this National Funding Project within the NFP 41 framework „Transport and the Environment – Interchange Switzerland - Europe“.

Spatial Framework

Transport infrastructures are connected with well-developed spatial patterns. Suitable regional differentiation is therefore of paramount importance for a useful analysis of these interactions. This study is based on the following regional differentiation:

- Switzerland: 11 larger regions including adjacent foreign regions (Geneva and Basle to be viewed in connection with Kreuzlingen/Germany and Lugano/Italy) are investigated together with selected medium-sized regions, including several important tourism areas.
- 33 foreign regions and 10 transit corridors (regional transport interchanges for large, relatively widely spread regions).

S2 Institutional Preconditions

A large number of committees control and enforce the TEN of transport with varying degrees of influence. These include:

- The TEN committee which is „independent“ but reports to the European Commission. This body has little formal power but, in practice, it is the one institution that is capable of conveying the most direction to TEN.
- Several technical committees influence special issues such as the distribution of funds, determining planning criteria, and developing interfaces between different transport providers („Ad-hoc Group Multi-modality“).
- Other important bodies such as standardisation committees, which were not established within the TEN framework, but exercise a strong influence on TEN and it’s service provisions because of their tasks in regulating the interoperability of railway systems.

The responsibility for funding lies mainly with national governments who therefore exercise considerable influence and do not limit themselves to the project stage, but also participate in sending delegates to the committees controlling and influencing TEN.

In general, and despite its foundation on EU policies, the TEN concept could be regarded as an „bottom up“ concept. It does not implement those projects that have been recognised as paramount by an Europe-wide analysis, but is focused on projects named as priorities by individual countries. Accordingly, in the list of the 14 most important projects there is at least one from each country.

From a Swiss viewpoint, this means that the most important issue would be the co-ordination of schedules with neighbouring countries for an international railway system.

S3 Integrating Switzerland into the European Transport Network: Current Situation and Plans

The quality of a transport system is determined by four factors:

- Travelling time
- Price
- Frequency
- Comfort

The following results stem from an analysis of some of these aspects with regard to connections between the 11 Swiss regions and the 33 foreign regions. In some cases we have made a distinction between these foreign centres according to their distance from Swiss centres):

- Day journeys, i.e. to destinations reached within four hours (one way)
- Two-day journeys, i.e. to destinations too far away to be reached in one day, and too close for a comfortable night journey (four to eight hours travelling time, one way)
- Distant destinations requiring more than eight hours travelling time (one way)

This represents the transport-specific analysis framework for present and future integration projects.

Travelling Times and Speed

Travelling times of less than four hours are the main criteria for a destination's attractiveness and for the volume of passengers.

An analysis has proved that only a small percentage of the population (between 4% and 8%) in 33 centres in Western, Central and Southern Europe can be reached by day journeys. The exceptions are Lugano with 10% (because of Milan), Lausanne with 15% and Geneva with 17% (because of Paris). This overall low percentage does not lead to the conclusion that the larger centres or a certain part of the country are well integrated into Europe, but that Switzerland is generally more or less equally badly integrated.

This impression has been confirmed by an analysis of average rail travelling speeds. Table S-1 illustrates the evaluation of a total of 363 calculated travelling speeds (11 Swiss regions with 33 European centres).

SWISS CENTRES	**CONNECTION**				
	very good (≥120 km/hr)	**quite good** (100-120 km/hr)	**moderate** (80-100 km/hr)	**bad** (60-80 km/hr)	**very bad** (<60 km/hr)
City Centres (Zurich, Geneva)	3	14	41	36	6
Large Urban Centres (Bern, Lausanne, Basle)	6	12	40	34	8
6 Medium-sized Centres	1	8	28	39	24

Table S- 1:
Average travelling speeds from three categories of Swiss centres to 33 European centres (percentage of all connections)

Just 3% (nine out of 363) of all connections are very good, i.e. faster than 120 km/hr.

Only 8 to 14% can be considered fast with between 100 and 120 km/hr and between 42 and 63% of travelling times to European centres are bad or give reason for concern.

Individual cases prove that travelling times to nearby centres are rather bad, whereas relatively distant destinations (Paris, London, Hamburg, and Rome) can be reached via fast tracks in a relatively significantly shorter time.

For the five large Swiss urban centres, connecting travelling speeds of between 83 km/hr (to Bern) and 85 km/hr (Geneve, Lausanne and Basle) have been calculated. This means that none of these five centres enjoys particular advantages or suffers special disadvantages, whereas the picture looks quite different with regard to connections between medium-sized and large urban centres with average speeds of 67 km/hr to Lugano and 77 km/hr to Interlaken. This discrepancy is also shown in Table K-1. A quarter of these connections has to be considered as very bad indeed.

Number and Quality of International Connections

Although frequency is a major element for the attractiveness of rail transport, international rail travellers demand a further element of quality, if possible - they want to reach their destination directly and without having to change.

An analysis of these two elements (frequency and directness) proves that:–

- Day journey destinations are reached only slightly more frequently than two-day journeys;
- With the exception of Basle and Geneva (the latter, albeit, with relatively few, i.e. eight connections per day) less than a quarter of these connections provide through-travel. In the case of Lucerne just 5% of connections are direct, and in the case of the urban conglomeration of Kreuzlingen/Constance none provide this element of comfort.
- The frequency of connections from Switzerland's five large urban centres to the European centres is the same as from the medium-sized centres, although they offer a slightly higher proportion of direct connections.

Competitiveness of Rail Transport in relation to Individual Motor Vehicle Transport (IMVT) and Air Transport

The competitive edge of rail transport in comparison with other transport means is determined by a variety of factors: travelling time, price, quality and comfort.

With regard to quality (as a service element) individual motor vehicles are unrivalled as they always reach their destination directly. As far as the actual travelling comfort is concerned, rail transport could be considered to be equal. The price needs to be considered in a differentiated way, as several cost factors and the number of passengers in a vehicle needs to be taken into account. In general, as far as costs are concerned, rail transport appears to have the edge over individual motorised transport.

An analysis of travelling times shows that rail transport offers advantages in only relatively few cases (20%), or is at best level with individual motor vehicles. Significantly more often, rail transport is slower than the motor car by 10 to 40%. Raising the speed of rail transport by about

25% would almost remove its disadvantage in comparison with individual motor vehicle transport.

It is unfortunate that a travel time comparison for one-day destinations is also frequently significantly in favour of road transport.

Comparisons with air transport need to be differentiated, and show inconsistent results. Air transport is categorised as public transport and in most cases it shows worse levels with regard to quality (number of necessary changes), about the same, or worse, levels with regard to frequency, and similar levels with regard to comfort. An analysis of door to door travelling times, however, reveals a rather chequered scenario. A comparison with rail travelling times shows enormous differences. In some cases rail transport is faster by 20 per cent, in other cases it can be up to three times as long. Of special interest are the connections to German and Italian destinations where rail transport is currently slower by 20 to 50% and where improvements of up to 30% could win market share from air transport.

Planning for a better Integration of Switzerland

For all border-crossing corridors of Switzerland, plans exist for improvement of the country's integration into the European transport infrastructure. Almost all plans have been developed on the basis of particular regional interests and prioritise the improvement of certain locations within a certain area. They all differ with regard to individual expectations, framework conditions, time factors, anticipated impacts, etc. In some cases, conflicting or unrealistic travelling times, etc., are quoted, which means that they can serve only in a limited way as foundations for Switzerland's integration into TEN. Surprisingly few studies are based on provision concepts, and almost all of them discuss the construction of infrastructures.

S4 Demand for Target and Source Traffic in Switzerland

Current Demand Scenario

Analyses of the demand situation are of critical importance as the basis for the development of optimum integration concepts. For this reason, the study had to establish a database in order to enable comparisons between transport providers. As far as we know, this study is the first to present transport volumes by destination for all three major transport providers within a uniform regional structure. Air transport data is of excellent quality (from a survey of 50%), public transport data is slightly less good. The most difficult category, with a survey representation of less than one per cent, is the data for individual motorised vehicle transport, even if it is limited to the volume of long-distance traffic (over 50 km travel).

The following traffic volumes have been analysed for all three transport providers (1996/97):

- Rail: 12 million journeys per year
- Road: 143 million journeys per year

- Air: 14 million journeys per year

Table S- 2 illustrates the frequencies of target/source traffic of Switzerland's three main transport providers.

	Cross Section of Loads		
	Target/Source Rail Traffic	Target/Source Road Traffic	Target/Source Air Traffic
1A Gotthard - Italy	3,0	22,5	0,8
1B Simplon South	3,0	11,8	0,2
2A Lyon - S. France	0,4	26,6	2,3
2B Paris - London	1,3	16,0	4,7
3A Strasbourg - Belgium	0,4	27,9	0,6
3B Rhine Corridor	2,1	18,2	3,5
4 North-East	1,4	11,9	1,7
5 East	0,6	7,9	0,2
Total	12,1	142,8	14,2

Table S- 2: Demand for rail transport, motor vehicle transport and air transport on the various routes for Target/Source traffic with Switzerland (in million journeys per year)

These figures can be utilised for calculating an approximate modal split (see Fig. S-3).

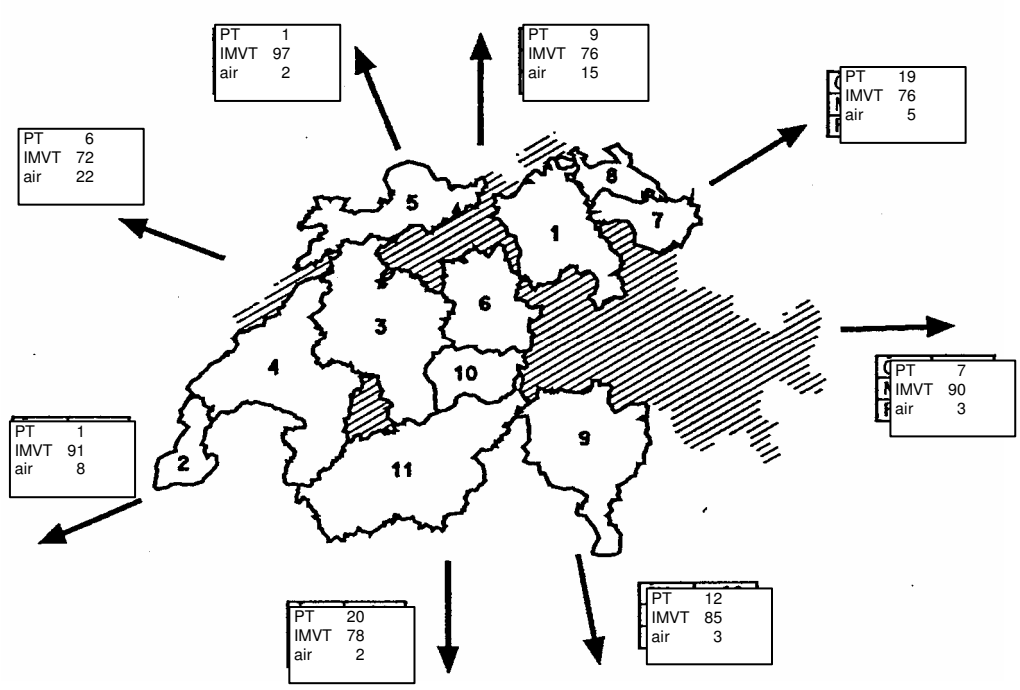

Table S- 3: Modal split of Target/Source traffic for Switzerland by routes

These figures provide something of a problem for Switzerland's international transport policies, as the potential for changeover from road and air transport is not necessarily congruent.

- The routes to and from Southern and Western France, from Eastern France and Italy (through the Gotthard Tunnel), show the highest potential for changeover from road transport.
- The routes from and to Paris/London and Frankfurt/Northern Germany/Scandinavia show the highest potential for changeover from air transport.

This means that one can hardly kill two birds with one stone – just one or the other.

Future Demand

In accordance with traffic volume predictions of recent years, between 1995 and 2010 air traffic will show the highest growth (40% to 45%), in comparison with a 35% increase in road traffic and a 15 to 20% increase in rail traffic.

A far more important issue for future developments of target/source traffic is the development of border-limiting factors. If these are reduced to 2 from a plausible present value of 3, then this alone could provide 50% growth.

Estimated Demand

The existence of demand figures has been utilised for analysing the behaviour patterns for international rail passenger transport (Table S- 4).

Region	R^2	Independent Variables					
		Population	Travel Time Public Transport	Ratio Travel Time Public Transport/Motor Car	Price Public Transport	Ratio Price Public Transport/	Frequency Public Transport (direct connections, weighted three-fold)
Zurich	41%	0.29					0.69
Geneva	53%	0.35	-0.32				0.45
Bern	58%	0.89	-0.41				
Lausanne	49%	0.40			-0.52		0.43
Basle	65%	0.46	-0.40			-0.32	0.44
Lucerne	35%						0.61
St. Gallen	31%						0.58
Kreuzlingen/ Constance	56%	0.64			-0.62		0.48
Lugano	59%			-0.28			0.67
Interlaken	51%			-0.43			0.51
Sion	52%			-0.47			0.56

Table S- 4: Results of estimated demands for rail transport on routes for Switzerland's target/source traffic by regions

This leads to the following conclusions:

- The best-documented influence is created by frequencies where direct connections are weighted three-fold. The elasticity of the offer is relatively homogenous (between 0.4 and 0.7).
- Traffic volumes do not increase in proportion to the importance of the destinations.
- Travelling times of public transport are influential in only very few cases (all of them large centres, incidentally). Time-elasticity values are relatively low (ca. -0.4).
- Comparisons of travelling times with road traffic are of consequence in very few cases and, interestingly, with regard to all medium-sized centres with tourism traffic.
- Price-related influences can only be determined in a few cases, but values of ca. –0.6 seem to be plausible.

These results should be considered as preliminary.

S5 Optimum Integration of Switzerland in TEN

Approach ...

The evaluation of concepts for Switzerland's integration in TEN needs to fulfil sustainability criteria: protection of resources, balanced development of regions and social structures.

The following criteria have been chosen in accordance with EBP 1998:

- Changeover from air transport and individual motorised vehicle transport as an indicator for the saving of non-renewable resources.
- Investment costs as an indicator of the consumption of public economic resources.
- Mileage of new track as an indicator of damage to countryside and rural areas.
- Accessibility as an indicator for improvements to regional development opportunities.

Eight different concepts for Switzerland's improved integration with Europe have been evaluated on the basis of the above notions and criteria. Although this evaluation does not live up to stringent expectations, projects have, for the first time, been compared for all possible routes and according to a uniform method, and based on sustainability criteria

... and Conclusions

From this viewpoint, both variants of "Mâcon" and "Sillon alpin" (new link between Geneva and Chambéry) for linking Switzerland to the West prove to be the most promising. A new link between Singen and Aulendorf in connection with the improvement of the existing link between

Aulendorf and Ulm, as well as the new link between Lugano and Magenta, also represent concepts which deserve favourable consideration.

Apart from these findings, the study in general affords a number of interesting conclusions:

- The integration concepts have little impact on a changeover with regard to the total of Switzerland's target/source traffic.
- Optimising border-crossing transport provisions for long-distance travelling through Switzerland should have priority. If possible, InterCity and InterRail transport should be extended to centres at the border.
- International long-distance transport should be extended beyond Switzerland's larger centres to medium-sized centres, and to tourism centres in particular.
- Increasing passenger volumes would justify increased frequencies as improved provision creates higher passenger volumes. In particular direct connections should be developed.
- Contrary to expectations, the ideal integration concepts depend very little on the progress of TEN implementation. The order of the purpose in the different variants hardly changes.

„Soft" measures (provision concepts) and „semi-soft" measures (inclining train technology) could have significant impact, are competitive, and protect resources, although they still do not make rail transport sufficiently competitive in comparison with road transport. In order to achieve this goal, in addition new tracks are required to improve the major connections between Switzerland the European Union by about 15 per cent.