

Nachfrageabschätzung Swissmetro

(Demand Projections for Swissmetro)

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Summary

The Important Points

How many passengers could the magnetic suspension underground railway *Swissmetro* attract on the proposed main line between Geneva and St. Gallen?

This study investigates the potential demand by means of a survey of current rail and road users. A modern market research technique (Stated Preference Method) was employed, which – despite some unavoidable ambiguities as with all prognoses – is gaining increasing international popularity.

The results show that *Swissmetro*, if it were implemented in the year 2015 for example, would attract some 24,000 passengers between Geneva and Lausanne and approx. 34,000 passengers between Bern and Zurich (by direct line) per day and in each direction. Around 60% would transfer from Swiss Rail, 25% from road travel, and approx. 15% would be additional travel. Conventional rail travel would decrease by about half on some relations.

For a track running from Bern to Zurich *via Lucerne*, and analysed with simplified assumptions, the overall demand would be practically unchanged.

The demand for *Swissmetro* will be particularly sensitive to variations in timetables and fares. For example, a reduction of fares by 10% for *Swissmetro* would result in an increase of passenger volume by 3.1%, whereas an increase of travelling time by 10% would lead to a reduction of passenger volume by 3.4%.

If travelling times on the road were to increase by 10% (e.g. because of congestion) the demand for *Swissmetro* would rise by around 2.7%, and a reduction of train frequencies by Swiss Rail from 60 to 120 minutes would result in a further increase of 8.4%.

Task and Methodology

Underlying the project **Swissmetro** is the concept of a new, subterranean mode of transportation for the future that would connect the most important city agglomerations in Switzerland. It would travel underground at over 400 km/h (250 mph) as the vehicles are propelled in a partial vacuum through contact-free magnetic suspension technology. *Swissmetro* involves a new mode of transportation which reduces demand for existing alternatives, but also induces new traffic.

Whether *Swissmetro* can be realized depends primarily on its cost effectiveness. In order to answer the question of economic return, the first question posed is how much traffic it will generate.

In traffic planning, the new techniques of market research known as "stated preference" are increasingly employed in such or similar problems. The word "stated" means in this sense that the traffic behavior is explained on the basis of users' statements about their preferences, rather than observations. These methods are especially practiced in hypothetical situations like that presented by *Swissmetro*.

Goal

The goal of the following study was, with the assistance of these methods, to estimate the effects of demand for Swissmetro in the St.Gallen-Geneva corridor.

To this end a simulation model was developed which can represent the interdependence between the demand, the level of service variables, and the travel costs (fares and car travel costs). That required the acquisition of information about the existing mode share and about the number of travellers in these individual mode markets (train, road, air). In addition, methods had to be developed to be able to predict how the individual markets (mode shares) would react to the introduction of the new transportation mode Swissmetro. And finally the effect of induced traffic had to be estimated.

Actual demand

The **actual demand** was gathered through various sources:

- Statistics of the SBB
- Special interviews of travelers in trains
- Our own surveys of long distance travel on the A1 (Video observations of traffic on the Autobahn)
- Interviews by mail of users of the Autobahn, who could be identified on the basis of the video observations.
- Official statistics of air travel within Switzerland

The development of the transportation mode choice model was based on special interviews, which were conceived as stated preference experiments. For the train and road travellers, two different interview concepts were developed because of the different possibilities for conducting interviews.

The interviews and stated-preference experiments were carried out with train travellers during their actual journeys on the train. In the case of the road users, the sample group was established with the help of video observations in which the license plate number of the vehicle was obtained. The address of the owner could be determined from the license plate number. With these the interviews were conducted via letter by which the subjects were asked in the first contact only if they would be available for a written interview.

The results of these interviews and stated preference experiments form the basis of the model. The corresponding estimation was carried out with the help of a special statistical-econometric software package. The partial models found in this step form the basis for the simulation model with which the interdependencies can be represented.

Given that Swissmetro service is foreseen to begin in 2015, today's demand had to be extrapolated. This was performed on the basis of a former study (Perspectives of Swiss Personal Traffic 1990-2015, GVF-Report No. 218).

The calculations were performed for the so-called planning case in 2015. This means among other things that Bahn 2000 is finished and that the use of Swissmetro costs 20% more than the SBB because of a levied speed charge. The number

of people changing over from SBB and from road travel, as well as the induced traffic, were calculated.

Results

The results of the investigations are presented together in the following table:

*Table K-1:
Demand for Swissmetro, Infrastructure available 2015, Demand 2015, with new traffic*

	<i>Genève</i>	<i>Lausanne</i>	<i>Bern</i>	<i>Zürich</i>	<i>St.Gallen</i>	<i>Total</i>
Genève	0	12'707	6'663	3'966	578	23'914
Lausanne	12'707	0	8'608	5'732	710	27'757
Bern	6'663	8'608	0	20'453	2'415	38'139
Zürich	3'966	5'732	20'453	0	14'078	44'229
St.Gallen	578	710	2'415	14'078	0	17'781
Total	23'914	27'757	38'139	44'229	17'781	151'820

The largest flows occur between Zürich and Bern, Zürich-St. Gallen, and Geneva-Lausanne.

An assignment of these numbers onto the "network" of Swissmetro gives the following results (one direction only):

<i>Genève-Lausanne</i>	<i>Lausanne-Bern</i>	<i>Bern-Zürich</i>	<i>Zürich-St.Gallen</i>
23'914	26'257	33'854	17'781