

Summary:

Lessons Learned from the Combined Public Transport Experiments in Norway

During the period 1996-2000, the Ministry of Transport and Communications granted NOK 86 million to 18 combined public transport experiments both in urban areas and in rural districts. With the addition of local funding the total investment in public transport was NOK 282 million.

Of the 18 experiments, 11 were implemented in urban areas and these are included in a joint evaluation.

This report summarises the main findings and lessons learned from the joint evaluations of the experiments.

Other reports from the joint evaluations are:

- Public transport packages of measures 1996-2000. Passengers' evaluation of service improvements and effect on trip frequency (Norheim and Kjørstad 2004). TØI report 736/2004. English summary
- Public transport packages of measures 1996-2000. Economic evaluations (Fearnley and Nossun 2004). TØI report 738/2004. English summary
- Packages of public transport measures 1996-2000. The effect of information measures (Ruud 2005). TØI report 774/2005. English summary.
- Combined public transport experiments 1996-2000. The citizens' evaluations of the measures and effects on mode choice (Kjørstad and Norheim 2005). TØI report 794/2005. English summary.

Combined public transport experiments – a learning process

The experiments represent a learning process where exchange of experience and the information flow are important elements. Homogenous evaluation makes it possible to compare the effects of the different types of projects and draw general conclusions for different thematic areas through combined evaluations. The Ministry of Transport and Communications commissioned the Institute of Transport Economics

(TØI) to develop a standard evaluation scheme for the local experiments, which ensures a best possible unified basis for benchmarking the main objectives of the different experiments.

The main objective of the majority of the experiments in urban areas was to achieve more efficient public transport services for passengers and companies as well as to increase the number of passengers. The evaluation scheme focussed on methods which can provide answers to these questions.

The standard evaluation scheme, i.e. the minimum requirement of the local evaluations, has been developed primarily for experiments in urban areas. It is a relatively comprehensive evaluation and consists of the following surveys and data collection/registration:

- Travel survey with panel selection
- User survey, before and after
- Travel time, before and after (zone data)
- Passenger counts

Description of the policy packages which are included in the combined evaluations

The policy packages vary with regard to the types of measures which are implemented and the scope of the measures. Some policy packages have achieved little in terms of changes to public transport provision in itself (route and frequency changes), while others have put the main emphasis on this area. Some packages have largely involved measures on the infrastructure side, including improvements to bus stops or improvements to junctions and terminals.

Vestfold county – Tønsberg and surrounding area

The policy package consists largely of extended public transport services in the winter season on stretches with a high proportion of cyclists in the summer months, better provision for combinations of bicycles and public transport, and for interchange between train and bus, renovating bus stops and developing

interchanges. Information and marketing were also used to increase awareness.

Rogaland county – Hundvåg

Hundvåg is a suburb of Stavanger city and is situated on an island. The only access route to the suburb is across a bridge, which suffers from increasing congestion problems. This makes the prioritising of public transport an important measure for Hundvåg. Increases in service frequency were the most dominant element in the "Hundvåg package". The route structure was reorganised on Hundvåg to prioritise main routes, with increased frequency on heavily used roads. The main routes were supplemented with feeder routes. New low-floor buses were introduced on all routes. The package also covered infrastructure measures such as improvements to bus stops, new bus shelters, a terminal for feeder buses, and accessibility measures. Comprehensive information and marketing of the new routes were carried out in the suburb.

Buskerud county – Drammen region

Four municipalities are involved in the policy package for the Drammen region; Drammen, Lier, Nedre Eiker and Øvre Eiker. The policy package consists of coordinating train, bus and taxi provision on one main route, altering a commuter route, extending service bus and express bus provision, accessibility measures, and renovating and maintenance of existing bus stops along a demonstration line (around 160 bus stops). Information and marketing measures were also carried out.

Østfold county – Nedre Glomma

Nedre Glomma covers the cities of Fredrikstad and Sarpsborg. The policy package mostly involves infrastructure and bus stop work, as well as measures to improve accessibility for buses. A new route has also been set up in Sarpsborg which serves shopping centres and residential areas where previously there was no public transport provision. Marketing and information measures have also been implemented, including the upgrading of telephonic route information through the introduction of a designated telephone number, 177.

Vestfold county – Larvik

The policy package for Larvik consists of a new route concept which includes increased service frequency on two corridors, renovating bus stops along new routes, bicycle racks at local interchanges, route information on touch screens in the city terminal area, as well as a

pre-project for planning and developing a shared terminal for train, bus, boat and taxi with bicycle racks and integrated tourist information. In addition, some information and marketing measures have been implemented.

Møre og Romsdal county – Ålesund and Giske

Renovating bus stops was the most comprehensive project in the package of measures. All the bus stops now have a bus shelter. Infrastructure measures have also been implemented to improve accessibility for bus traffic. Fixed route times have been introduced on the routes along the main axis, and one route was given an increase in the number of departures. Some profile-raising and information measures have also been implemented.

Telemark county – Grenland

Grenland comprises a continuous urban area with a typical band structure. The area includes the cities and towns of Skien, Porsgrunn, Brevik, Stathelle and Langesund. The policy package involved re-organising and updating the route system, electronic ticketing, and changes to the fare structures. Over 60 new bus shelters and new information screens at the bus terminals and in the major shopping centres in the area have been set up. Various marketing and information measures were also implemented.

Oppland county – Lillehammer and Gjøvik

The policy package consists of a number of measures of which one of the most important was the introduction of a new, high quality regional bussystem (Mjøspilen) with hourly departures between the cities of Lillehammer and Gjøvik. In Gjøvik, the city bus service was reorganised. Marketing and information measures have also been implemented.

Troms county – Tromsø

The policy package is a continuation of a major re-organisation of the bus and fare systems which was introduced in 1997/98. The package mainly consists of building a public transport terminal in the city centre (public transport street) and in front of the main entrance to the University hospital. Improvements have also been carried out to selected bus stops on some routes by setting up bus shelters financed by advertising. Real time information systems have been introduced on two bus lines.

Sør-Trøndelag county – Trondheim

The major part of the package involves route changes and an increase in frequency along a number of routes. A total of 1200 to 1300 new departures per week have been introduced. A new route across the Cecilienborg bridge resulted in a significantly shorter journey time to the city centre. Two service routes were established. New monitors were installed at Trondheim central station, together with new route maps, route leaflets and route information at the bus stops. Journey guarantees and comprehensive marketing of the new services were implemented. The project also included the purchase of 25 new low-floor buses. Beyond the policy package, accessibility and infrastructure measures were also introduced and some 550 new bus shelters, financed through advertising, were set up in the city.

Vest-Agder county – Kristiansand

The purpose of the policy package in Kristiansand is to develop a land use policy which generates less transport, resulting in comprehensive bus services (bus metro) with higher frequency, shorter journey times and higher comfort standard. The bus metro consists of bus routes which are timed in such a way that the main route has a high frequency and regular departures to many of the city's work places, services and schools. The main route has high quality bus stops, easy access for buses, and real time information.

The variation within and between the test areas reduces the need for "control areas"

The combined public transport experiments have been implemented in a number of areas and within each of these areas there are differences in the number of changes experienced by passengers. On average:

- 1/3 of passengers have not experienced any change in the service
- 1/10 have experienced at least one instance of the service being worse without any improvements
- 1/3 of passengers have experienced at least one improvement without any instances of the service being worse
- 1/5 have experienced both improvements and instances where the service has become worse

This spread provides a good basis for analysing different combinations of improvements and deterioration with a "control sample" of around 1/3,

that is to say, passengers who have not experienced changes.

The quality of the service to passengers has been improved by 6 percent

The changes which have been implemented in the test areas have, on average, given passengers a 6 percent improvement in service, measured in reduced weighted travel times.

In Grenland, public transport users have experienced an improvement of 24 percent in the service level, while in Trondheim and Hundvåg the improvement was 14 percent and in Kristiansand 9 percent. In other areas, the changes are small, with the exception of Tønsberg where the service level was reduced by 7 percent.

There are several other quality improvements that are not included in these figures, but the main improvements and differences between the areas are well described by the figures.

The number of passengers has increased by 9 percent

The urban areas which have implemented the most comprehensive and targeted measures have had the strongest passenger increase. On average the number of passengers has increased by 6 percent. Corrected for the fare changes, the passenger development would be positive in all the urban areas with an average increase of 9 percent. In Grenland, which, despite a major increase in fares, had a positive passenger development, the passenger growth would probably have been 24 percent if prices had not increased simultaneously with the service reorganisation. In Tønsberg and the Drammen area, where there were apparently no effects from the combined public transport experiments, the passenger development would have been 7-9 percent if fares had not increased.

Greatest potential for increase amongst the marginal public transport users

The passenger statistics show an overall increase in use of public transport, but do not tell us anything about the new customers or why they change their use of the bus. The user surveys can reveal more details about the new customers and about differences between the areas.

22 percent of public transport users travel more often, and younger people to a greater extent than others. Working trips have a lesser potential for

increase than others. This user group might have reached an upper ceiling for their trip frequency to and from work, and additional trips must be for other purposes. This represents a challenge for public transport because it would require other types of services than the city-centre-directed service in rush hour.

At the same time, the analyses show that people, who initially, travelled frequently, i.e. daily or 2-4 days a week, stated that they have increased their use of the bus. This indicates that the measures have targeted the frequent users, and allowed them to become even more "regular" passengers.

Increased competition from cars

Analyses of the experiments show that access to a car and a driving licence are of major significance for the effect of the measures. When the potential for growth in the use of public transport is to be evaluated, access to a car is essential. The alternative modes of transport for the public transport users determine the effect of the service improvements.

Half of public transport users with a driving licence and car in their household stated that they could have used the car on the journey in question. The reasons why they did not use the car varied. 35 percent of them say that it is more comfortable, quicker or cheaper to use public transport, while 17 percent used public transport because it is more environmentally friendly. Difficult parking and driving conditions in cities are mentioned by 41 percent. A competitive public transport service and restrictions on parking and driving in the cities thus appear to be of major significance to the public transport passengers with car availability.

Around 30 percent of passengers are more "undetermined passengers". They compete for the household's car/cars, and one of the main reasons for their travelling by public transport is that *'the car was being used by someone else'*. Thus there is reason to assume that a relatively high proportion of these would have used the car if it had been available.

The competition for the family car has been reduced

Competition for the family car has been reduced during the experiment period in all areas. The passengers have, to a greater extent, a car available when they want to, and thus public transport becomes more exposed to competition. The change is

significant in Drammen, Trondheim, Ålesund, Gjøvik and Kristiansand and at the overall level.

On average, for all the experiments, around 80 percent have not experienced any change in the level of competition for the family car, 12.5 percent have experienced reduced competition, and 8.4 percent increased competition.

Satisfied passengers travel more often

There is a significant link between the passengers' valuation of the service improvements and their change in trip frequency. We have calculated a net changed satisfaction index and a net changed trip frequency for each of the experiments. The index is the difference between the proportions that are satisfied and dissatisfied and the proportions that has increased and reduced their use of the public transport. We found a surprisingly strong connection between net satisfaction and journey activity, and a simple rule of thumb"; a 10 percent increase in net satisfaction will result in 3.7 percent increase in net trip activity.

It is more easily done to lose passengers than to attract new ones

The analyses reveal that the number of departures is the most important factor to explain passengers' altered trip frequency, both for increased and reduced number of trips. The isolated effect of reduced number of departures is that 26 percent of the passengers would reduce their use of the bus. And there is a clear asymmetry between improved and deteriorated service level. The effect of a reduced service level is greater for almost all factors, and for frequency and travel time these effects are almost double. The effect of deteriorated service levels are around three times higher than improved service levels. This indicates that losing passengers is more easily done than attracting new ones.

This indicate that a "balanced" restructuring of the service, where equal numbers of passengers experience either improved or deteriorated service level, will result in a significant drop-off in passengers. It is therefore important to emphasise that it is primarily through redistribution and targeting of the measures towards major passenger group that these experiments have been successful. There is therefore reason to assert that "there and back are not the same distance", at least if we measure the effect on user frequency. There can also be an unfortunate secondary effect of an overly harsh "trial and error"-process when developing the service. It is important to develop the

service through trials, but at the same time there must be a certain amount of stability and predictability over time. It is therefore extremely important not to implement a service which will probably be taken away again when the test period is over.

A deeper analysis of this asymmetry reveals that it is not the passengers' *evaluations* of improvements and deterioration that are different. On the contrary, it is their *opportunities* to change their trip frequency which differ, i.e. there are stronger barriers to increase rather than to reduce the trip frequency. This is not caused by different access to car or other barriers to the choice of transport, but will first and foremost be linked with insufficient knowledge of the use of public transport. This will be a major challenge for public transport in the future.

Synergy effects

The analyses of the experiments show how the different changes in the service level have affected passengers' evaluation and their use of the bus. These analyses have provided a basis for deriving forecasts for changes in trip frequency based on different combinations of service improvements and deteriorations.

Experiences from these analyses have also revealed that knowledge of and attitudes towards public transport will influence the effect of the experiments. This implies that an increased emphasis on an improved service which can provide better knowledge about the service and more satisfied passengers, will provide a better basis for further improvements. However, what will dampen this effect is that more

passengers will reach a "ceiling" in their use of the bus. The analyses reveal that those who travel by public transport on a daily basis to and from work will have a limited potential for increase in their bus use, even for significant service improvements. This will contribute to dampening the synergy benefits from extensive service improvements.

This implies that the benefit from combined public transport measures will depend on the level of the measures and on the initial market potential.

Favorable cost-benefit ratio of the experiments

The total costs for the experiments amount to NOK 282 million, with an annual cost of NOK 70 million. On average, the experiments have increased the annual costs by almost NOK 2 per passenger. Hundvåg has clearly had the most concentrated experiments with NOK 5.4 more per passenger, while Drammen and Tromsø lie at the other end of the scale with less than NOK 1 per passenger.

It is important to assess whether this public spending is well used. It is conducted a cost-benefit analysis of the spending of these experiments, to evaluate the use of public money.

The combined public transport experiments in the Drammen region, Grenland, Trondheim, Tromsø and Kristiansand have had a positive cost-benefit ratio, with a benefit of between 1.05 and 2.85 for each krone which has gone into the project. In the other areas, the benefits of the measures have not compensated for the costs. However, in total, both the 1996/97 and 1998/2000 experiments have been profitable.