

Summary:

IBIS Logitrans Users' evaluations of real-time route information in Trondheim

Background to the project

A major research project "IBIS" (Integrated payment and information systems for personal transport) has actuated in Trondheim. IBIS is a "collective term" for two projects: IBIS Logitrans and IBIS Progress. IBIS Logitrans is largely directed at information systems for public transport while IBIS Progress is directed at car traffic and payment systems.

This report deals only with the evaluation of the measures in the IBIS Logitrans project, which is financed by Logitrans/The Research Council of Norway. The project started in 1999 and will end in 2003.

The Public Roads Authority for Sør-Trøndelag county has primary responsibility for the IBIS Logitrans project. A number of other parties are involved, including Sør-Trøndelag County Council, Trondheim Municipality, SINTEF Samferdsel and TØI.

TØI's role in the project has been to identify user needs and preferences and to evaluate the information measures in the project, seen from a user perspective.

Objective of the IBIS project

The main objective of the IBIS project is:

"to study how the use of new technology can contribute to an increase in the use of public transport, both generally and in situations with specific requirements."

The IBIS Logitrans project will test out new forms of road-user information in public transport to see what effect these have on attitudes to, and use of and opinion about public transport, amongst both public transport users and other road user groups. The information will be dynamic, as opposed to static, and give passengers real time route information, which means information about actual arrival time.

Real time route information on route 4 in Trondheim

The test section which was selected is route 4, which runs from Heimdal via Kolstad and Saupstad to the centre (Munkegata). The stretch is 13.7 km long. Route 4 continues from the centre to Lade. The Lade route is not included in the study. Route 4 carries about 4,000 passengers on a normal working day.

The studies began on 9 September 2002. At the same time, a comprehensive marketing campaign targeting public transport users and the population living along route 4, was launched, sending out brochures to households, postcards and folders in buses and bus shelters, newspaper advertisements etc.

The IBIS Logitrans project includes the following measures:

- **Real time route information (via monitors) at selected bus stops along route 4**
In the study, five of the bus stops along the test section were equipped with monitors for showing real time route times. The monitors show line numbers and destinations, route times, and the number of minutes to the next departure. The route time is dropped when the arrival time in real time appears on the screen.
- **Real time route information on the internet for route 4**
IBIS's internet page has been designed by IntraPoint AS. Here you can find information about route times in real times for *all* the bus stops along the test stretch. The internet page gives passengers the opportunity to find out what time the bus will actually arrive at the bus stop. In order to use this page, you first need to register as a user of the SMS message service.
- **Real time route information to mobile telephones (SMS) for route 4**
Real time route information via text messages to mobile telephones is a relatively new service. In the IBIS project, this service has functioned by users registering or ordering warning of the desired departure(s) and the days when such warnings are required. The order is made via the internet. The service applies to all bus stops along the test stretch. The user receives an SMS a selected number of minutes before the actual arrival, for example, 5 minutes before. This applies both to delays and when the bus is in transit.

The real time system requires a positioning system for the buses. In the project period, 20 of Team Trafikk's buses were equipped with technology which makes it possible to report the bus' position to the computer system, which can then establish when the bus will *actually* arrive at the bus stop.

Evaluation methods – use of targeted surveys

The evaluation of the measures in the project should provide answers as to how public transport users have perceived and received the new information services. Amongst other things, we want answers regarding the benefits of different forms of real time route information, whether people have used the new services, and what they think of them, as well as whether they are willing to pay for this type of information service.

It is not realistic to expect traffic-related effects of such a limited information measure. We therefore chose to ignore analyses of changes in travel habits.

The following surveys were carried out:

- **User survey on route 4**
This survey was carried out over the course of one day on route 4. Questionnaires were handed out to bus passengers as they came on board. The survey is directly targeted at the group which has the chance to use the new services. 373 questionnaires were completed. The public transport users on route 4 often use public transport.
- **Web-based survey amongst SMS users**
This study is an internet-based market survey which was sent out to all registered users of the SMS service. In addition to standard questions, we also used a method known as Stated Preference Analysis. The method provides an opportunity to find indirect willingness to pay for different measures or elements of the offer and includes weighting between the measures. The form was sent electronically to 140 registered users and 102 replies were received. The majority of users are under 40 years of age and often use public transport.
- **Web-based survey of selected workplaces along the stretch**
This survey, hereafter called the work-place survey, is also an internet-based survey where the questionnaire is tailor-made for different types of passengers. The survey also includes people who do not use public transport. The survey was sent out electronically to employees at a number of large workplaces along the test stretch (NTNU, SINTEF, the County Council, the Municipality and the Public Roads Authority). 1,411 replies were received. 40% of the respondents were car users and a similar number walk or cycle to work. Only 19% of this group use public transport to get to work.

Public transport users on route 4 have good knowledge of the IBIS Logitrans measures

70% of the public transport users on route 4 (user survey) replied in the affirmative to the question about whether they knew about the new information screens. A similar number stated that they knew about the new SMS message service in the IBIS project. About one third of the public transport users on route 4 would consider using the SMS service.

Less than half of the respondents in the work-place survey knew about the IBIS project. The proportion is slightly higher amongst those who live along line 4 than those who live elsewhere in the Trondheim area. Only 30% of SMS subscribers and respondents in the work-place survey had previously heard about real time route information.

The majority of SMS subscribers became aware of the service through information folders/brochures on buses or posters at the bus stop/in the bus. Curiosity was the reason given by the majority of subscribers for wanting to try the new service.

Public transport users very often experience delays

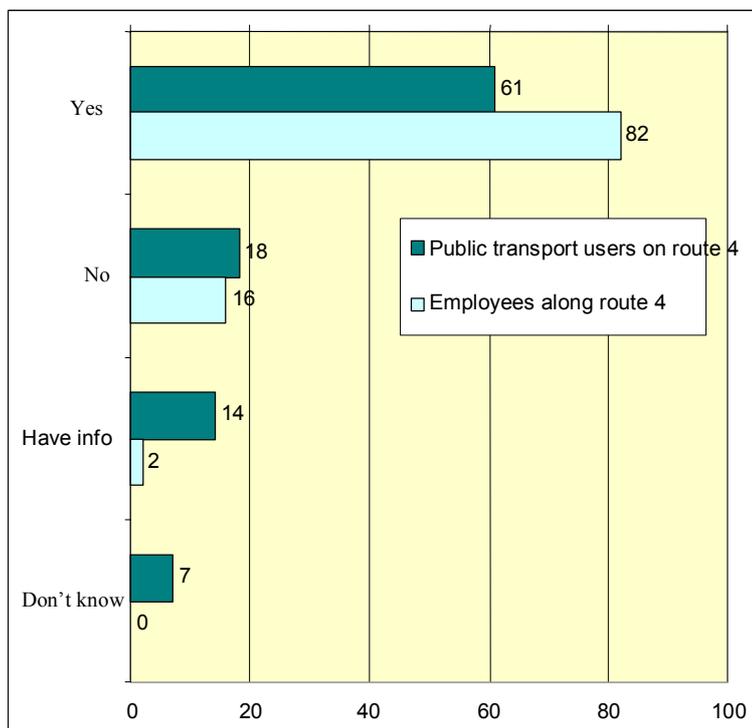
Public transport users in Trondheim experience different degrees of delay when they use public transport. Amongst the public transport users on route 4 (user survey), 33% stated that the buses were delayed very often or extremely often. 52% of the SMS subscribers feel that the bus is often delayed. 43% of employees living along route 4 use public transport.

The question about delay times received varied answers; 13% of the SMS subscribers said that it varied considerably, 52% that it varied somewhat and 26% that it varied little. 9% did not know.

Great need for information about delays

The majority of people using public transport lack information about delays when the bus does not arrive at the given time. In the user survey, 61% answered that they lack such information. In addition, there are the 14% who already have such information (via new monitors) at the bus stop which they use. Amongst those who use public transport at least once a month in the work-place study, 82% said that they lack information about delays, Figure S.1

There is a link between the need for information and how often one experiences delays.



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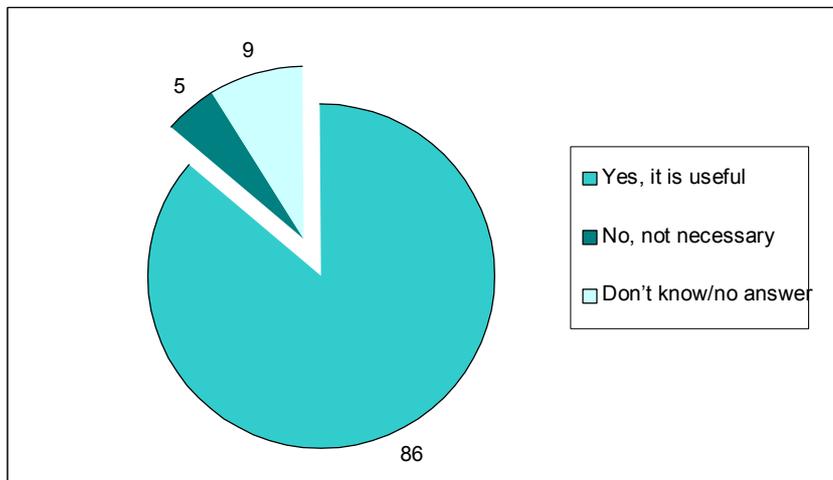
Figure S.1: Proportion who lack information about delays. User survey, N=373. Work place survey, N=774. IBIS project. Trondheim, 2002

Real time route information at bus stops is useful!

Real time route information is regarded as highly useful by the majority of people. It is also clear that screens at the bus stops are the best channel for such information. In the user study of route 4, 86% replied that such information at bus stops is useful and 81% of public transport users agree that such information makes it easier to use public transport, Figure S.1.

In the work-place survey, 92% felt that real-time route information at bus stops is useful and amongst the SMS subscribers, this proportion is 97%.

About 75% of those asked in the user study think that the new information screens are simple to read and that the information is simple to understand.



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Figure S.2: Distribution of answers to the question: "Do you think real time route information at bus stops is useful?". User survey, IBIS -project. Trondheim, 2002. Percentage. N=373

Wait times will always be connected with uncertainty, and information about when the bus will actually arrive will contribute to reducing such uncertainty. 70% of the public transport users who have seen the monitors agree that the wait time appears shorter when one has exact information about when the bus will arrive.

SMS warnings are seen as less useful

Real time route information via SMS warnings are not regarded as being as useful as real time route information at bus stops. However, those who have tried the service regarded it as far more useful than those who had not tried it. Over 90% of SMS subscribers feel that this information is useful, but this proportion is less than 50% of the respondents in the work-place study, Table S.1. Less than 40% of those asked in the work-place study who use public transport at least once a month would consider using such a service.

67% would like a service which makes it possible to find out directly via SMS when the next bus will actually arrive.

Table S.1: How useful are the different forms of real time route information? Work place study, the IBIS project. Trondheim, 2002. Percentage

How useful do you think these forms of real time route information are?	Very useful	Quite useful	Not very useful	Not at all useful	Don't know	Total
Screens at bus stops	61	31	5	2	1	100
Internet	13	31	31	20	5	100
SMS-messages (pre-booked)	14	35	29	16	6	100
Asking via SMS (directly) about next bus	29	38	17	11	5	100

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The internet is seldom used as a source of information

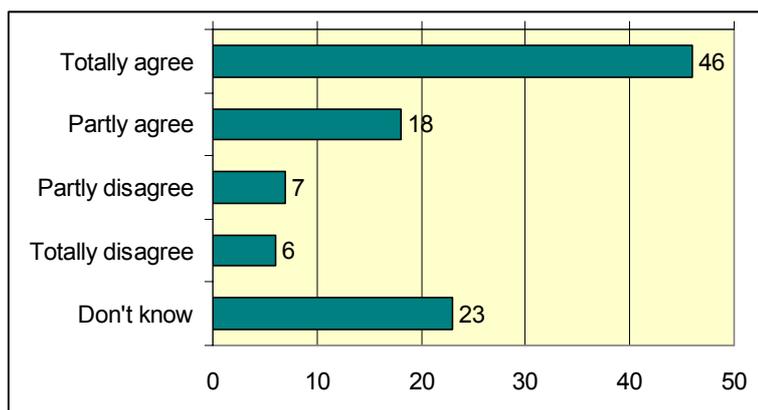
The internet is regarded as a less useful tool for information regarding route times, whether this is static or dynamic route information. Amongst those asked in the user survey, there were very few who use the internet to look up timetables. The proportion who prefer the internet as a source of information for real time route times is much lower than the proportion which prefers screens at the bus stops or SMS messages. However, 36% of the respondents in the work-place study who use public transport say that they would consider using the internet to obtain real time route information.

Young, male passengers use "new" sources of information more often

Young passengers, and particularly young men, are most likely to use the "new" sources of information, such as SMS messages, the internet and WAP. However, young people are also more likely to use the standard printed timetables or to call 177. This result clearly shows that the "new" information channels have not replaced the "old" information channels, but they are an important supplement.

SMS users were often warned that real time route information was not accessible

The real time system has functioned technically as expected during the test period. However, it has not functioned very well for users of the service. This applies first and foremost to the SMS message service. SMS subscribers often received messages which said that real time information was not available, so that they had to stick to the route time, even though the bus might be delayed, Figure S.3. This has caused great irritation amongst the users who have not received the information which they ordered.



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Figure S.3: Proportion who agree/disagree with the statement: "I often get messages which say that real time route information is unavailable". SMS study, IBIS project. Trondheim, 2002

The reason for this is that the real time system has not been installed for the part of route 4 which runs to Lade. The buses first register on the system when they arrive at the centre (Munkegata). This means that warnings of departures from bus stops near the centre cannot function when the warning time needs to be at least five minutes before the actual departure time. Another reason is that some of TT's buses which run along the test stretch are not equipped with the necessary positioning system.

The SMS service is cumbersome to use

Approximately half of the SMS subscribers felt that it was somewhat cumbersome to have to order a warning in advance via the internet. Over 70% feel that it is a disadvantage not to be able to order or alter warnings directly via SMS – Table 2. Over 70% think they would use this service more if this was possible.

Table S.2: Disadvantages in using the SMS-service. SMS-survey, IBIS project. Trondheim, 2002. Percentage

	Disadvantage of having to book over the Internet	Disadvantage of booking/alterations not being available via SMS
No, no disadvantage	46	22
Yes, some disadvantage	35	48
Yes, major disadvantage	13	25
No answer	6	6
Total	100	100
N	102	102

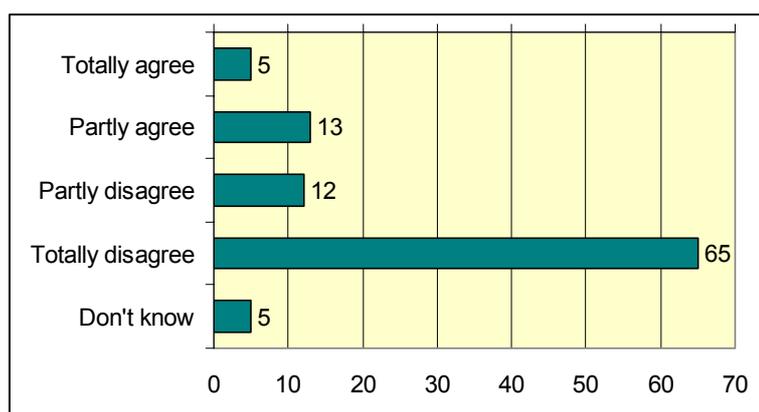
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The respondents, for the most part, feel that the homepage where you enter a message request is simple to use, that it is simple to change and enter new requests, that the messages are clear and comprehensible and the majority believe that the message is correct. However, it is important to emphasise that many respondents only partly agree with these statements, which indicates that the user-friendliness of these pages could be improved.

Views were also expressed that the service is not so useful for those living a long way from the bus stop. Many also felt that this type of service was not really appropriate for those using public transport at different times each day.

The majority of public transport users do not wish to pay for real time route information

The majority of public transport users on route 4 do not agree that it would be reasonable to increase ticket prices if real time route information were to be available in the whole of Trondheim, Figure S.4. This is in spite of the fact that they feel such measures are useful.



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Figure S.4: Proportion which agree/disagree with the statement: "It is reasonable that ticket prices should increase if real time route information is to be available at all bus stops in Trondheim. User study. IBIS-project. Trondheim, 2002. Percentage. N=358

On average, there is a direct willingness to pay amongst both SMS subscribers and employees along route 4, both for real time route information at bus stops and for SMS warnings, Table S.3. The value of this willingness to pay is not necessarily real, but nonetheless, it is an expression that they think this is an important measure.

There is a clear connection between the benefit experienced from this type of information and the willingness to pay. Real time information at bus stops is the information channel which is regarded as the most important.

Table S.3: Willingness to pay for real time route information at bus stops in Trondheim. Willingness to pay for SMS messages given that the bus stops have such information on monitors. SMS study/ Work- place study, IBIS project. Trondheim, 2002.

Willingness to pay for real time route information at bus stops in Trondheim	SMS- subscribers	Employees living along route 4
Yes	59	35
No	41	65
Total	100	100
N	102	774
Average amongst those willing to pay	2.3 kr/trip	2.1 kr/trip
Average willingness to pay	1.5 kr/trip	0.7 kr/trip
Willingness to pay for real time route information via SMS-messages in Trondheim	SMS- subscribers	Employees along route 4
Yes	49	40
No	51	60
Total	100	100
N	102	774
Average amongst those who are willing to pay	2.0 kr/trip	1.6 kr/trip
Average willingness to pay	1.1 kr/trip	0.7 kr/trip

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About half of the SMS users and 60% of the employees along route 4 do not want to pay more for these services. They do not want to pay more to use public transport. They state that it is expensive enough as it is and that they do not want to pay for such information when the buses actually ought to come on time.

This direct evaluation, in kroner, cannot be used to calculate passenger benefits. Indirect evaluation, through stated preference analysis, should be able to weigh up the different types of information and the price of travel. However, this analysis has not functioned satisfactorily. Thus we have no evaluation of the information measures which can be used in a benefit/cost analysis.

Information measures alone are not enough to get car users to use public transport

Through the evaluation of IBIS Logitrans, we want to find out whether, and to what extent, information measures will have any effect on people's choice of transport mode. We therefore asked the respondents in the work-place study who drive to work how important different measures are if they were going to start using public transport for the journey to work.

The results show that the most important measure to get people to use public transport is to reduce ticket prices, Table S.4. 80% think that this is an important factor in starting to use public transport. The actual service is also very important i.e. very many feel that shorter journey times, more direct routes and greater frequency are important. Buses that arrive on time are also important, but not as important as the service provision.

Table S.4: How important are the following conditions, if you were to start using public transport to get to work? Work place study, IBIS project. Trondheim, 2002. Respondents who normally travel as drivers, car passenger or by moped/motorcycle on the journey to work. N=517

How important are the following conditions if you were to start?	Very important	Quite important	Neither/ or	Quite unimportant	Very unimportant	Total
More bus departures	23	36	21	10	10	100
Shorter journey times	37	31	16	6	10	100
More direct routes, fewer changes	39	25	18	5	13	100
Lower ticket prices /better discount systems	52	29	9	5	5	100
More buses arriving on time	16	41	29	8	6	100
Info about delays at bus stops	14	35	30	11	10	100
Better, simpler route information	9	27	35	16	13	100
More comfortable buses/ more seats	6	24	35	19	16	100
Better bus stops and shelters	5	23	38	19	15	100
No free parking at the work place	23	26	22	8	21	100
Parking at least NOK 30 per day	23	26	23	8	20	100
Higher tolls	14	28	25	11	22	100

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Better route information alone would not tempt car users to use public transport. 9 and 14% respectively feel that better route information and information about delays are very important measures, and 27 and 35% respectively feel that these are quite important measures.

Increased costs in connection with driving cars in the form of higher tolls or reduced opportunities for free parking at work are important for half of the car users, but about 30% stated that these factors would not be important when considering whether to continue driving a car or to change to buses.

Use of new IT solutions within passenger information created both opportunities and challenges

The main objective of passenger information ought to be to give passengers the information they need, *when* they need it! Modern information technology within public transport creates a lot of new opportunities to give information, both static and dynamic information, but the new technology also faces challenges with regard to how the information should be given.

A main challenge in the use of new technology within passenger information is that the solutions must correspond to with user requirements. Not all passengers need or want to use "advanced" technical solutions, e.g. route information on WAP, SMS or a point map.

New technology does not replace the "traditional" route information, such as printed timetables. This needs to be prioritised above all over possible technical solutions. The use of IT solutions also increases the demand for up-to-date information. Wrong information is often worse than no information! It is also extremely important that the information which is given out is co-ordinated.

Conclusion: Public transport users want real time route information at bus stops

The main conclusions of the evaluation of the experiments with real time route information in Trondheim are as follows:

- Passengers want information about delays. They want information about when the bus is *actually* going to arrive when they are waiting at the bus stop.
- Real time route information is seen as useful.
- Waiting times are experienced as being shorter when real time route information is available.
- Screens at bus stops are the best channel of information for real time route information.
- Information about actual departure times via pre-ordered SMS messages to mobile telephones or via the internet is not as useful as giving this information on screens at the bus stop.
- Those who travel very regularly will benefit significantly from an SMS warning service, but its current form is somewhat cumbersome to use.
- There is a direct willingness to pay for real time route information amongst SMS subscribers and employees along route 4. The values are not real, but nonetheless - they are an expression that this is an important measure.
- Information measures *alone* will not lead to more people using public transport.
- Young, male passengers use new information sources such as the internet, SMS etc. more than other groups.
- New information channels do not replace timetables and other "traditional" channels of information, but supplement these.

On route 4 in Trondheim, real time route information has been introduced via screens at five bus stops, the opportunity to order SMS warnings to mobile telephones for specific departures and real time route information on the internet. The report gives the results from the evaluation from the users response to the measures.

Real time route information at bus stops is regarded as useful. Waiting times are experienced as shorter when real time route information is available. Real time route information via SMS messages or the internet are not equally useful measures. Those who travel very regularly will benefit significantly from an SMS warning service, but its current form is somewhat cumbersome to use.

Young people are more likely to use the newest sources of information, while at the same time they also use timetables to a greater extent than older people. The new channels of information do not replace traditional sources of information, but are a supplement.