

Common Interest Group:

The relationship between objective quality and customer satisfaction

Final Report, February 2009



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PREFACE

This report summarizes the discussions and findings of the BEST common interest group, devoted to studies of the relationship between objective quality and customer satisfaction. The group members have met on three occasions after the start up meeting in Copenhagen, i.e. in Helsinki, Oslo and Stockholm.

In the group, we have discussed the use of customer satisfaction measures in public transport from a very broad perspective, on the basis of how the concept is actually used by the companies represented in the CIG (HKL in Helsinki, Sporveien/Ruter in Oslo and SL in Stockholm). We have thus not limited ourselves to the problem specified in the title of the CIG, although the relationship between satisfaction and objective conditions has been an underlying theme for most of the discussions.

The report is structured as follows. After a brief introduction, key features of the three companies' work on customer satisfaction are presented. Thereafter some initial findings from a SAMOT research project related to the CIG are briefly presented and the theoretical underpinnings of the customer satisfaction concept are discussed. Then a model of public transport satisfaction, based on the insights of the cities, is developed and some concluding comments are made.

Karlstad, December 2008

Markus Fellesson, group leader

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1 Introduction

Customer satisfaction is key to the future development of public transport, both in theory and in practice. Customer satisfaction has the potential to highlight and explain the link between what a company does (in terms of the products and services it offers) and its customers' reactions to that. For public transport, this link is a key concern.

In many countries, major investments are being made in public transport systems in order to make them more competitive vis-à-vis other means of transport, most notably private cars. New services are being developed and old ones are being improved. However, an increase in supply (qualitatively or quantitatively) will not automatically lead to a corresponding increase in demand and satisfaction. Satisfaction studies provide decision-makers with information about what customers consider important, as well as about how the existing public transport service is perceived to perform in these dimensions.

Satisfaction measures are also important in performance-based contracts which have become increasingly popular in the public transport sector in line with the general trend of market orientation in that sector. Customers' subjective experiences are then used in tandem with objective measures to monitor and evaluate suppliers' performance. The measures are also used to detect problems and take corrective actions. Hence, satisfaction scores are turned into a management control device used in both inter-organizational relations and internally within the organization.

However, satisfaction is a complicated concept, derived as it is from cognitive theory and psychological research. As such, it is an abstraction, something that we can neither see nor touch per se but only through our measures. In order to be managerially meaningful, satisfaction data must therefore be collected, analyzed and interpreted in ways that make it relevant to the realities of public transport. Only then will it be possible to link the perceptions and attitudes of satisfaction to the objective performance of the public transport system. The aim of this report is to highlight how three public transport companies in Helsinki (HKL), Stockholm (SL) and Oslo (Sporveien/Ruter) have tackled this challenge.

2 Experiences from Stockholm, Helsinki and Oslo

2.1 Experiences from Stockholm

AB SL is owned by Stockholm County Council. SL has the overarching responsibility for public transport in the county. Within the SL Group, about 700 co-workers work with comprehensive planning, deciding the extent and quality of transport operations, as well as ordering, administering, developing, and marketing public transport in the county. SL is responsible for the existence of a good system of public travel opportunities in the County of Stockholm. This means that SL is responsible for the entire system functioning. Scheduling and the actual running of the transportation operation are delegated to a number of transportation contractors who are procured via tendering. In total, around 12,000 people are employed in SL's transportation operation.

SL is Sweden's largest PTA and accounts for over half of the country's public transport journeys. Of those travelling in Stockholm and its suburbs during the morning rush hour towards the centre of the city, 73 percent choose to travel with SL.

Comprehensive goal
"More passengers and more satisfied passengers"

SL is working towards travel being on the customer's terms, communication being on the customer's terms, and payment being on the customer's terms. To achieve this, an array of new services and technologies are being developed, including an entirely new payment system and new and improved vehicles. It is also important to get to know the customers better with regard to their needs, requirements, and expectations. In this, customer surveys play an important part.

Via our customer surveys, we know that the most significant part of obtaining new passengers is being able to offer a well-developed range of travel services and simple and easily accessible information about how to travel with us.

Punctuality, above all, has the greatest impact on satisfaction, but also improved service frequencies and reduced crowding. SL's customers also demand safe and environmentally-adapted transportation and assume that we are actively working on measures to improve these areas. Frontline staff who are visible and friendly, as well as customer-adapted commercial service in SL's station environments, will improve the travel experience, strengthen the SL brand, and enhance customer benefit.

2.1.1 *Perceived quality and delivered quality – how does SL work with surveys and contract monitoring?*

Primarily two departments are directly involved in SL's various customer surveys. Market Analysis is responsible for all customer surveys within SL and for measuring the perceived quality among our passengers. Contracting is responsible for monitoring contracts with transportation contractors and measures the level of quality delivered. Market Analysis is a department of the Market Division and Contracting is a department of the Transportation Division.

Market Analysis is tasked with having a holistic view of SL's customers and market. This task includes coordinating all of SL's customer surveys and conveying an image of SL's

customers both internally and externally. Market Analysis also has the task of monitoring and analysing SL's targets and market trend and finding out about new customer requirements and expectations, testing new concepts and ideas, as well as monitoring campaigns, service encounters, travel information etc.

Market Analysis conducts both recurrent and tailored surveys on behalf of Market and other departments of SL. Furthermore, analyses are conducted using existing material in order to provide an entire picture of the customer and the market trend.

The task of Contracting is to have the overarching responsibility for coordinating all of SL's contacts with its contractors, monitoring contracts with them, and holding continuous quality assessment meetings with them. Contracting also has the financial responsibility for the actual deal with the contractor.

The monitoring of contracts with transportation contractors is carried out via SL's customer survey Perceived Quality, MSS surveys, and SL's measurements of punctuality and travel (manual and automatic traffic censuses, MTR and ATR). In addition to this, there are also customer viewpoints from SL's Customer Services and information from ticket checks.

2.1.2 Measurements

Each month, the Perceived Quality survey is conducted by means of questionnaires being handed out and gathered in aboard our vehicles. About 5,000 interviews are conducted each month spread across the various forms of transportation. The survey provides a comprehensive rating of the level of satisfaction as well as ratings of individual factors such as timekeeping, service frequency, information about disruptions, crowding, cleanliness, and staff attitudes. Perceived Quality follows up SL's comprehensive goal for 2010 - "75% satisfied customers and a maximum of 10% dissatisfied". The level of satisfaction is gauged via the question:

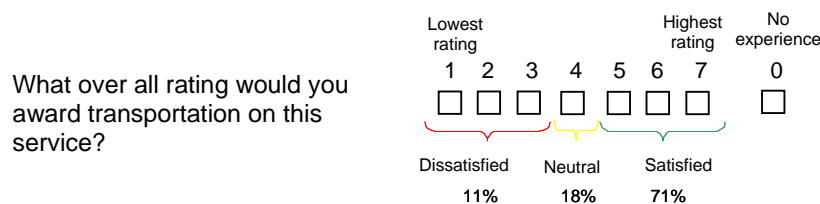


Figure 1 Question and scale in SL's "Perceived Quality" survey

The level of satisfaction among our passengers has increased during the past two years, reaching 71% in the spring of 2008.

Each month, SL also measures the county residents' perceptions of SL and SL Transportation via the Public Transport Barometer survey. This is conducted via phone interviews with county residents. Like the Perceived Quality survey, it provides a comprehensive rating of satisfaction as well as ratings of individual factors such as value for money, info about departure times, proximity to stops, ease of buying tickets, environmental friendliness etc.

Besides the Perceived Quality and Public Transport Barometer surveys, SL also conducts regular sessions of the People's Panel whereby a representative selection of county residents, via a web questionnaire, take a stance on a number of issues of topical interest to SL and evaluate its promotions. The People's Panel has 5 sessions a year.

Over and above the recurrent surveys mentioned above, SL also conducts a range of tailored surveys using both qualitative and quantitative methods, depending on the issue. Areas investigated during 2007 and 2008 include the SL brand, the service encounter, children travelling with SL, the SL website (www.sl.se), travel information, and tourism.

2.1.3 Results form the foundation for strategic development

The results of the surveys conducted are also used, apart from in the continuous work of monitoring quality which we jointly conduct with our operators, as important input into, for example, SL's planning requirements and for special analyses.

SL's planning requirements are largely based on the incentive analyses conducted in the interview material from Perceived Quality. The incentive analyses show which factors have the greatest link with satisfaction. These analyses show, for example, that the single most important factor to work with in order to obtain satisfied customers is timekeeping. Service frequency and crowding are also important factors, especially for buses and the metro system. Functioning information about disruptions is important to passengers who commute. The analysis also shows that, for the passengers who are in contact with our staff, it is important to be dealt with politely and that staff are able to answer questions about SL's services. The actions of staff are of particular importance on buses and local lines where the passengers have a lot of contact with them.

The planning requirements are also based on analyses of what drives travel and those analyses show that the primary driving forces behind increased travel frequencies are access to transportation in the form of line extensions, departure times and the proximity of stops, as well as knowledge, i.e. being aware of the system and knowing what to do when travelling by public transport.

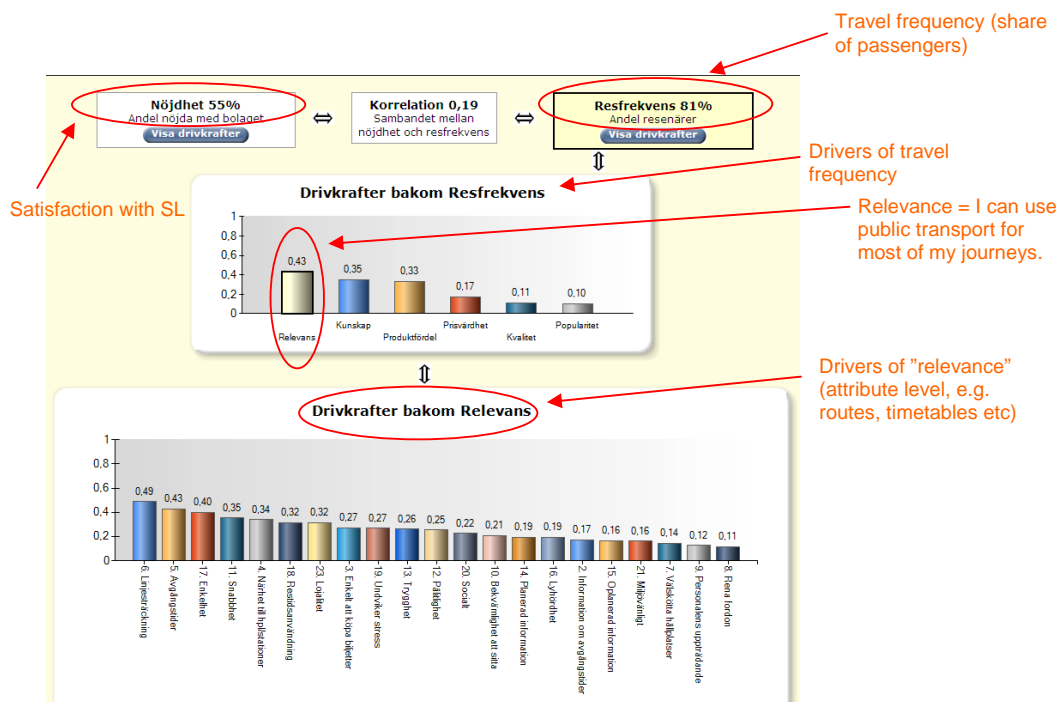


Figure 2 Analysis of drivers of travel frequency (source: Public Transport Barometer)

An example of another endeavour conducted during the spring, based on the results from SL's surveys, is the analysis of travel and satisfaction and which links exist between these two parameters. This analysis shows that the links between travel and satisfaction are relatively weak. It is not necessarily the case that an increased level of satisfaction leads to increased travel and vice versa. Strong links do exist, on the other hand, between travel and crowding. Increased travel leads, hardly surprisingly, to a greater percentage of passengers experiencing crowding on their journeys, something which SL has to take into account when the number of passengers increases over a lengthy period of time.

In the analysis of satisfaction and travel, SL's various types of transportation and contract areas have also been studied. There are a number of good examples where both satisfaction and travel have risen. Examples of such areas include commuter train services in general, but also several metro lines and a couple of contract areas for buses. These areas can be used as good examples. There are also areas where travel has risen but not satisfaction. Here, it can be pointed out that SL is not living up to its customers' expectations. In areas where satisfaction has risen but not travel, one might question the range and whether it is correctly dimensioned on the basis of the number of passengers. Areas where both travel and satisfaction have fallen will, of course, have to be studied extra carefully. Here, measures will have to be taken to change that situation.

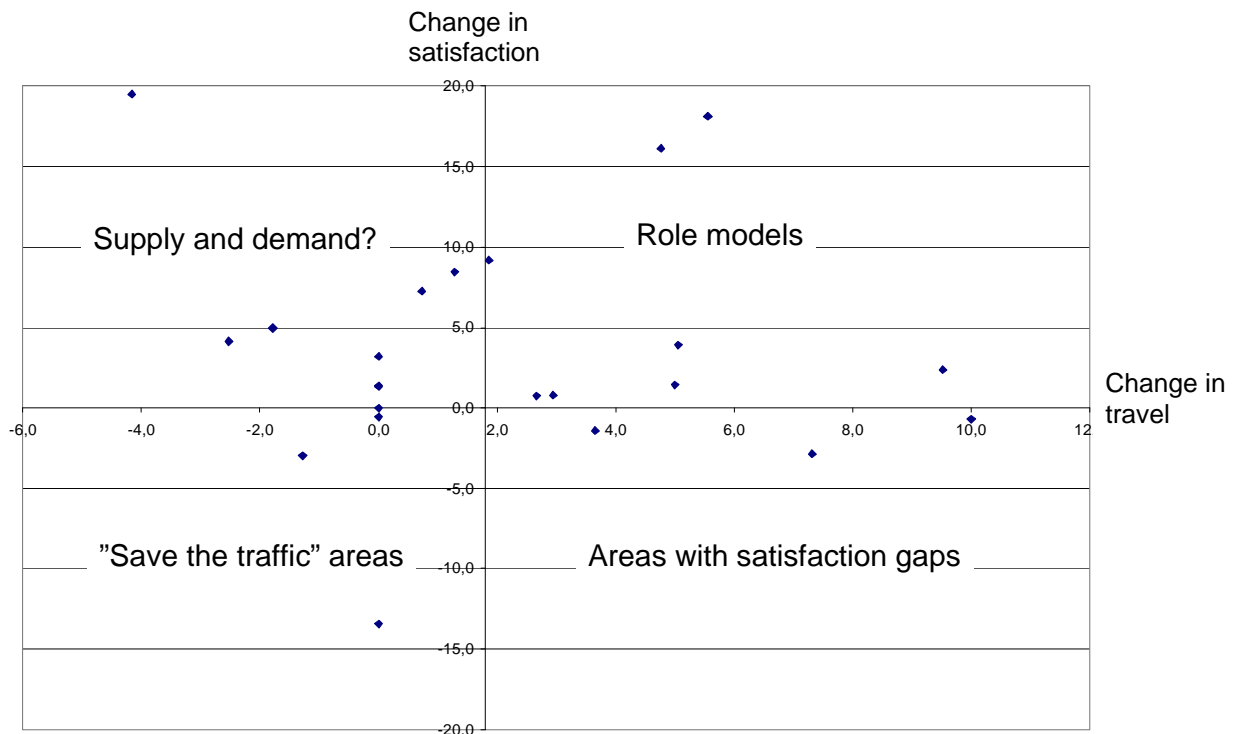


Figure 3 Analysis of satisfaction and travel (Source: Perceived quality and ATR/MTR)

2.2 Experiences from Helsinki

HKL is owned by City of Helsinki. Helsinki City Transport (HKL) provides equal mobility for all and creates the preconditions for a smoothly functioning and vigorous city. HKL is responsible for local public transport services in the City of Helsinki, including planning, tendering of bus services, operating tram and metro services, passenger information, ticket sales and ticket inspection, and ownership of the public transport infrastructure.

City of Helsinki is also responsible for financing public transport in the Greater Helsinki area, but traffic operations in the surrounding cities are currently administered by the YTV (regional council). This will change in the beginning of 2010, however, when HKL and the YTV traffic department will merge and form a joint body responsible for all public transport in the Helsinki region.

HKL is Finland's largest PTA and accounts for almost 40% of the whole country's collective transport journeys. 12 tram lines, 2 metro lines, 100 internal bus lines and 20 service bus lines form a network that covers the entire city. The annual number of vehicle boardings is about 190 million a year. HKL currently holds a 70 % morning rush hour market share of passenger transport towards inner city, aiming for 73 % by 2012. In August 2008 a new tram line has opened, extending the tram network to a total of 93 km. An extension of existing metro line to the western adjacent City of Espoo is also being planned and traffic will begin in 2013–2014. The new line will add 7 new stations to the 17 existing ones. Planning of extending metro towards east will also begin in a few years.

2.2.1 HKL's measuring strategy

Most important things to measure:

- 1) Number of passengers, all modes of transport (monthly).
- 2) Ticket income, all modes of transport (monthly).
- 3) Quality reports, bus operators by tendering (6/year).
- 4) Customer satisfaction via on-board customer satisfaction survey, all modes of transport (continuous; reported quarterly, results published twice a year).
- 5) Passenger satisfaction using BEST survey, all modes of transport (yearly).
- 6) Market share of public transport on certain line surrounding inner Helsinki, all modes of transport (yearly).
- 7) Planned and realized speed of bus and tram traffic.

...and why?

- 1) General figure to describe how passengers behave in traffic and how they appreciate our products
- 2) Important for financial calculations, for example passenger kilometre cost; combination with item 1) is interesting.
- 3) Bus operator and stop services, cleanliness of buses.
- 4) How passengers behave in traffic and how they appreciate our products, is there something we could do better?
- 5) How do residents of Helsinki area appreciate our products, what could we do better?
- 6) Market share compared to private cars.
- 7) Speeding up public transport is HKL's strategic goal.

HKL's management team monitors monthly items 1) and 2); others as soon as the results are ready. Reactions will be taken, if there's something alarming. Items 3) and 4) are closely connected to bus operator bonuses.

2.2.2 The relationship between objective quality and customer satisfaction

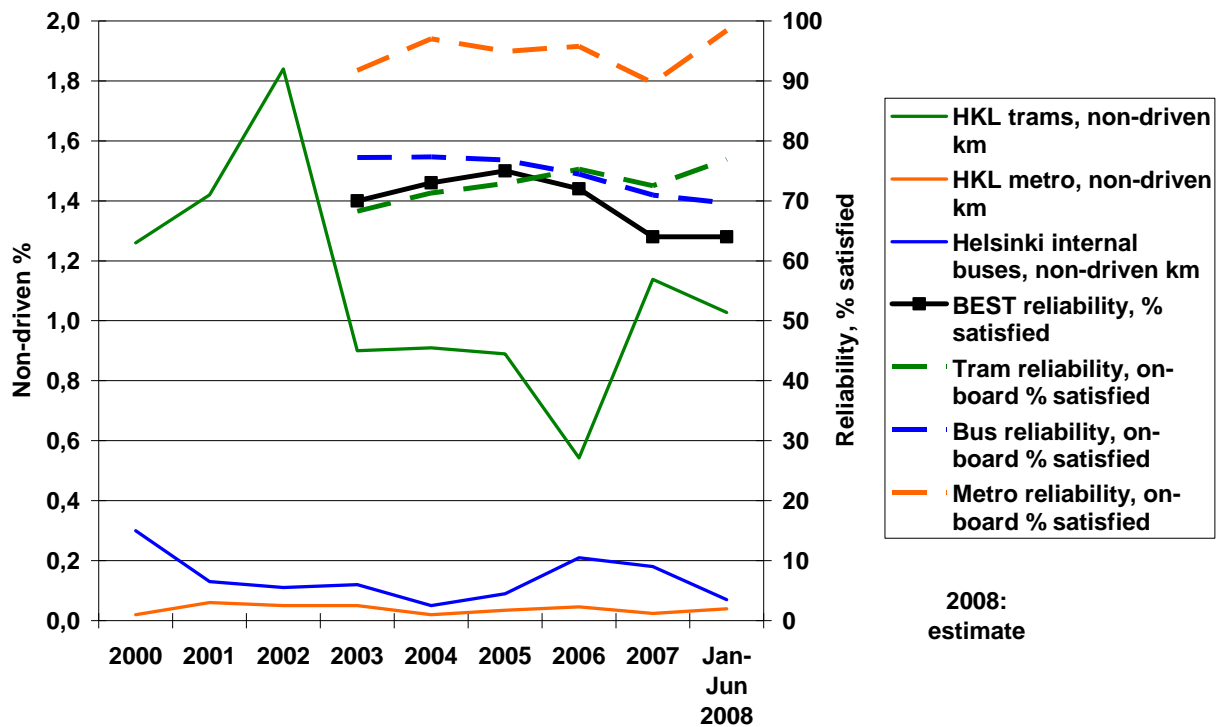


Figure 4 Combination of non-driven departures and passenger satisfaction with reliability using on-board passenger satisfaction survey and BEST survey

If something remarkable happens in survey results, reasons will be found out and actions will be taken. For example, when there were many cancelled departures in tram traffic, the reasons were many broken trams and many sick drivers. Resources were a little too tight, so we hired more tram drivers and tried to keep more trams in traffic. Satisfaction with reliability is the same in the BEST survey as in the on-board passenger satisfaction survey. Metro is most reliable according to the on-board passenger satisfaction survey (figure 1).

There has been a downward trend in bus drivers' ability to advise the passengers. We have increased driver training, but the process is quite slow. One reason for the drastic fall in this rating from 2007 is probably mostly a combination of lots of recent road works and many non-Finnish drivers (now about 50 nationalities of bus drivers). Incomplete knowledge of the city and of other public transport routes combined with language problems is quite a difficult problem. BEST results show a somewhat similar fall in opinions to the on-board passenger satisfaction survey (figure 2).

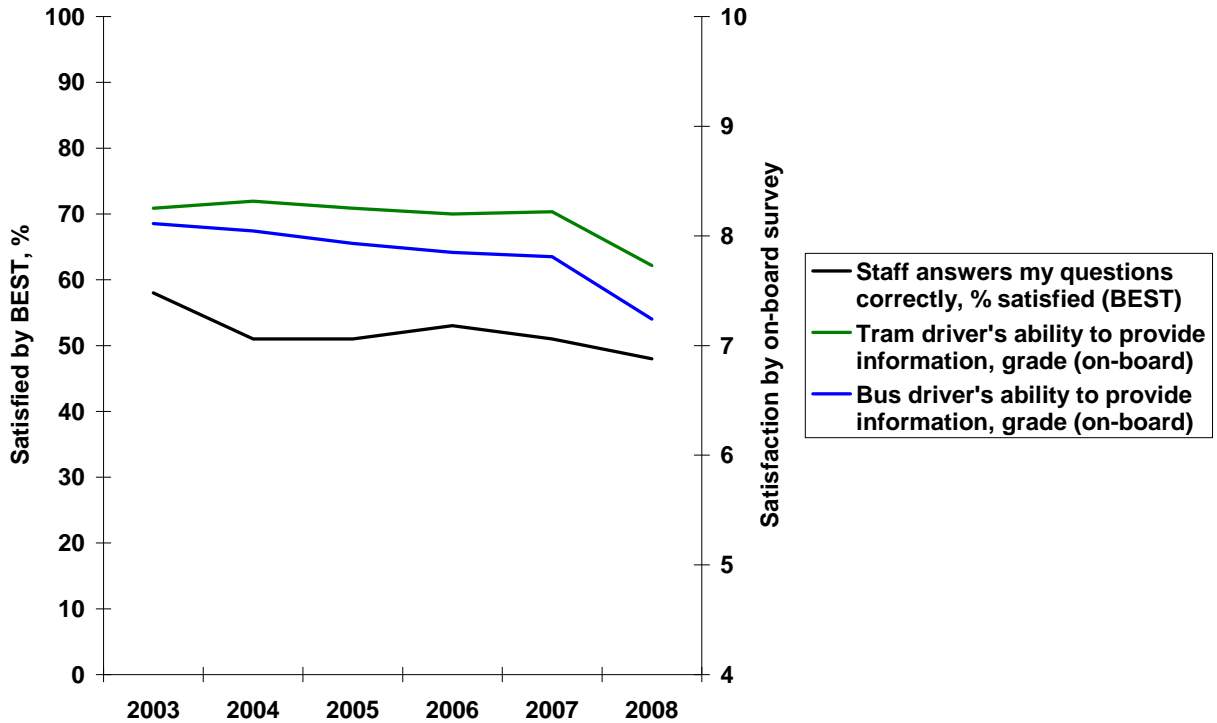


Figure 5 Combination cancelled departures and passenger satisfaction with reliability using on-board passenger satisfaction survey and BEST survey

2.2.3 JOKOLA survey¹

According to the analytic hierarchy process questionnaire (AHP) conducted in the JOKOLA research project, the perceived overall quality of public transport can be divided thematically into three almost equal parts corresponding to different quality factors (see chapter 3). Two of these three parts can be considered "hard" factors while the third consists of "soft" factors, which are especially influenced by people's perceptions and interaction with each other. In the questionnaire, "route network, intervals, reliability and travel time" were ranked as the most important theme affecting perceived overall quality by a clear margin. The most important single quality factor out of the 31 factors studied was reliability and timekeeping. It had a weight of 35 % within its theme and thus had an overall weight of almost 11 % for perceived overall quality.

The effects of clear variations in certain "hard" quality factors, such as the quality of vehicles, and "soft" quality factors, such as the driver's driving style, were studied via the field experiments of the research project. Based on the experiments a good driver can attain better passenger satisfaction scores than a bad driver even when the good driver uses a substandard vehicle and the bad driver uses a new vehicle. The good driver systematically attained better passenger satisfaction scores for those factors which he could influence via his own behaviour.

The weighted overall picture of the perceived overall quality formed by different respondent groups is very uniform regardless of the background of the respondent. This may be affected by the classification of the themes and the way in which the questionnaire was conducted. On the other hand the results show that the availability and reliability of certain core service

¹ Published by Ministry of Transport and Communications, 66B/2007

factors are essential to all public transport users – value adding quality factors are only considered after these core factors.

Weights of experienced quality by JOKOLA-survey

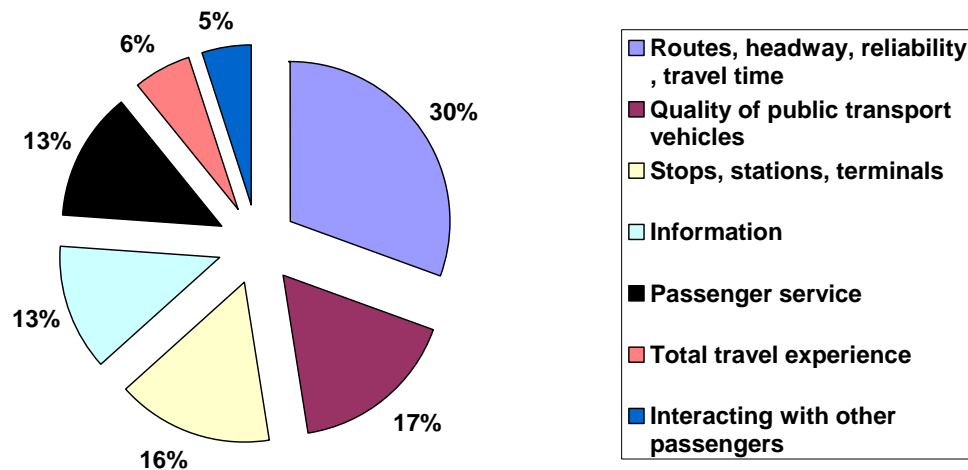


Figure 6 Relative importance of PT attributes

2.3 Experiences from Oslo

Ruter AS offers a coordinated public transport system in the city of Oslo and the county of Akershus. 350 bus lines form a network that covers the entire region, from the city's finely meshed network of major transport arteries and busy rush hour express services for commuters, to local buses in rural areas, services lines and school transport. In the city, the metro system's 6 lines connect the suburbs with the city centre, where the lines connect for the city's main artery. 6 tram lines dominate the streets of the inner city. In the fjord, 8 ferry routes provide transport services for regional commuting and summer excursions. The annual number of passengers on Ruter's public transport networks totals around 230 million boardings.

Ruter is a management company that plans, orders and markets public transport services for Oslo and Akershus. Ruter has around 90 employees with backgrounds in administrative functions at Sporveien and SL, with expertise in planning, marketing, information, finance, contracts, traffic production and quality monitoring. The transport operations are performed by various operators in accordance with their contracts with Ruter. The contracts for the operations of bus routes and ferries are awarded based on competitive tendering.

2.3.1 Oslo Sporveier's Market Information System (MIS)

Oslo Sporveier's market information system is used for operator quality monitoring (fines), monitoring our customers' quality perceptions, operator bonus/malus, and customer satisfaction monitoring.

A comprehensive presentation of the system, its parts, how it is used, what is it used for, and reporting, can be found in the attachment "Oslo, MIS.ppt".

2.3.2 Behind the data from Oslo Sporveier's in-vehicle surveys

Oslo Sporveier is conducting quantitative customer surveys on board buses, trams and metro trains concerning journey satisfaction as part of its Market Information System. The unit of analysis is the journey, i.e., the questions deal with the present journey only. The respondents are typically asked to rate their satisfaction on a scale from 1 (very dissatisfied), via 3 (neither...nor) to 5 (very satisfied).

Based on the in-vehicle surveys in Oslo Sporveier's a qualitative survey has been conducted. The aim was to find out what lays behind the respondents' answers in Oslo Sporveier's customer surveys concerning journey satisfaction. What did they *really* think, *why* did they respond in the way they did etc.

Several findings with particular relevance to our CIG came out of that study. Regarding the scale, it was found that, in general, grades 1-2 are used when the respondent is dissatisfied while 3-5 are used when the customer is satisfied. However, the respondents use the scale subjectively and differently between questions and between respondents. There are also indications that the barrier to answering 1 or 2 instead of 3 is greater than moving from 3 to 4 or 5. Despite this, 3 was found to be a fairly "neutral" answer.

With regard to how the respondents come up with their answers, it turns out that even though they are asked about the present journey only, they tend to include previous experiences with Oslo Sporveier, and their opinions about Oslo Sporveier in general. This influences the answers adversely, not positively. It was also evident that expectations are important for the answers and that the respondents' satisfaction is largely *relative* to their expectations. For instance, Oslo Sporveier has introduced electronic real time information at stops/stations, leading to higher customer expectations, and thus leading to lower satisfaction with stops/stations lacking this electronic real time information. When asked about the relevance of the various factors, punctuality is considered the most important factor influencing total journey satisfaction, but stop/station information is also considered important. It is interesting to compare this answer with what is found in the quantitative surveys

2.3.3 What are the most important (objective) quality factors determining customer satisfaction?

Satisfaction with the public transport system in Oslo

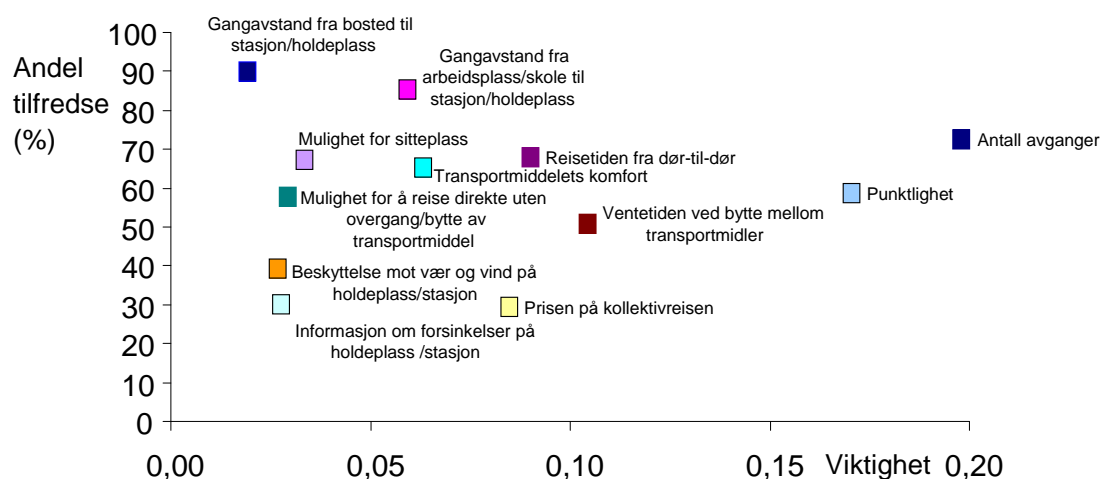


Figure 7 Determinants behind satisfaction with the public transport system in Oslo

In the figure above, the importance is plotted on the x axis, while the share of satisfied travellers is plotted on the y axis. The most important factors are frequency (“antall avganger”) and punctuality (“punktlighet”). An interesting finding is that satisfaction with price levels is low, and that the importance of price is relatively low.

Journey satisfaction

The customers' overall satisfaction with the journey is closely related to their satisfaction with punctuality, which hence is a very important factor. Perhaps more surprisingly; driving is also very important. Cleanliness is the factor causing the most dissatisfaction, but this factor is not as important as punctuality and driving.

In this survey (in-vehicle survey), timetable factors (frequency etc., travel time etc.) are not included. In figure 8, importance and satisfaction are plotted for all transport modes together. The values on the x axis represent the importance of each factor in relation to the overall journey satisfaction, i.e. the importance in the responses to the question "Overall, how satisfied are you with this journey?"

The values on the y axis represent the share of the respondents who are satisfied with the given element.

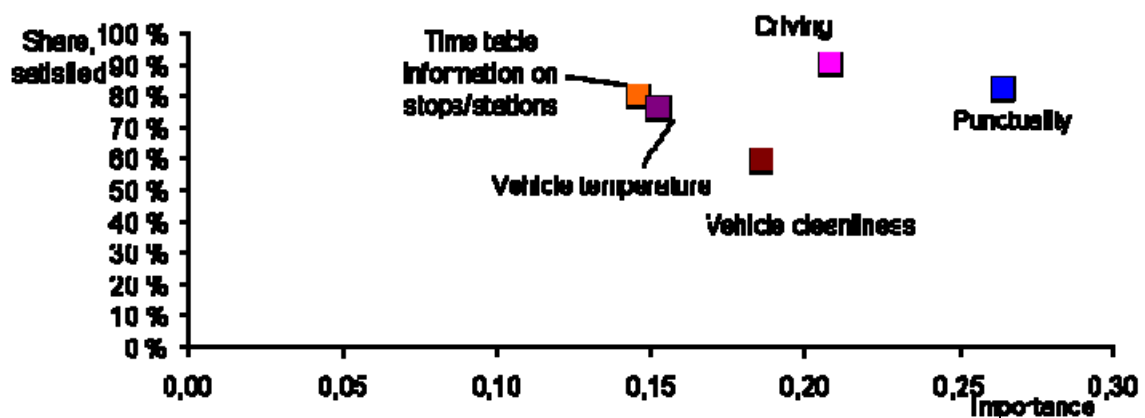


Figure 8 Journey satisfaction determinants

3 Preliminary key findings from SAMOTs in-depth analysis of BEST data

Parallel to the work of the CIG, researchers at the Service and Market Oriented research group (SAMOT) at Karlstad University have analysed the BEST data from the participating cities. Some preliminary results from this analysis are of particular relevance to the CIG discussions and the results presented in this report.

Firstly, factor analyses across the cities indicate that satisfaction with public transport is a fairly stable construct of four basic factors: safety/security, system (with supply and reliability items), comfort, and staff behaviour. That is, people seem to think about public transport in a reasonably similar way with regard to dimensions. However, there are some differences between the cities. For example, in Stockholm, the staff items formed a new factor together with the comfort items. This indicates a somewhat different role regarding both comfort and staff in the public transport system of the Swedish capital, compared to the other cities. A general conclusion from this analysis is that it is possible to compare not only individual variables but also underlying constructs across various public transport systems, and to some degree also with other service industries which show similar patterns. However, care should be taken and local conditions should be taken into account (for more information about this study see Fellesson and Friman, in press).

Secondly, the BEST satisfaction data has been combined with objective measures of various supply side attributes (compiled in the Millennium database). The aim of this analysis was to investigate the frequent assumption that objectively “better” public transport (in terms of for example the number and standards of vehicles, route km, travel times, headways and physical arrangements at intersections etc) is reflected in higher satisfaction scores. However, it was found that the relationship seems to be far more spurious and there are several examples where the correlation actually seems reversed, that is, objectively better public transport companies received lower satisfaction scores than their less ambitious colleagues.

This somewhat counterintuitive finding should not be interpreted as a call to lower quality standards however. Instead they reflect the importance of not looking at satisfaction scores in isolation. A high market share (with the associated increase in the supply of transport production) might for example result in a lower score simply because the last customers to switch to public transport are the ones who are the hardest to satisfy. Another example is the negative association of travel time satisfaction with actual vehicle speed. Interpreting such a finding requires factors such as the ratio between the share of short inner city trips and long distance commuting to be taken into consideration.

In relation to the discussions and findings regarding the CIG cities, the millennium analysis supports the emerging picture of satisfaction as a dynamic phenomenon that is composed of various sources, of which objective quality is an important one, but not the only one. Instead, the value of satisfaction data is that it provides a link between objective conditions and subjective opinion.

A general conclusion is thus that satisfaction data is far more complex than many other operational measures that are used in public transport management. While for example numbers of delayed departures, passengers or vehicle kilometres are facts in themselves, satisfaction measures often gain their main relevance when properly interpreted against a backdrop of system understanding and local conditions. This has to do with satisfaction being a theoretically derived concept, rather than merely empirical data to be collected. In the next section, the theoretical foundations of the satisfaction concept, as used in modern marketing, are outlined.

4 Satisfaction in theory

The Expectancy Disconfirmation with Performance (EDP) framework (Oliver, 1997)² is one of the most common theories of consumer satisfaction. A basic assumption is that satisfaction or dissatisfaction results from a comparison of expectations with actual performance. Imagine a person using public transport in her everyday life. One day, she thinks about whether the service was as good as expected. Initial expectations are confirmed in some cases whereas actual performance is disconfirmed in other cases.

If a person has higher or lower expectations regarding performance than a service provides, disconfirmation beliefs will arise (called the disconfirmation effect). As illustrated in Figure 1, expectations and performance are linked by a curved, double-headed arrow implying a correlation between expectations and performance. Oliver assumes that this correlation varies with the service being investigated. A positive relation between expectations and performance could emerge when perceiving oneself to be in control of performance, no relation when performance is completely outside one's control, and a negative relation when, for instance, high expectations cause moderate performance to be weighted as poor.

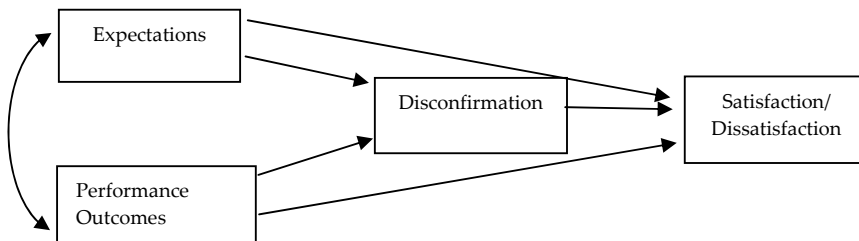


Figure 9 The expectancy disconfirmation with performance model (adapted from Oliver, 1997)

The disconfirmation effect, which is separate to the effect of expectations and performance, has been described as the subjective difference between expectation and performance (Oliver, 1997). Confirmed or disconfirmed expectations affect whether one feels satisfied or dissatisfied with the service and implies an evaluation of better or worse than expected. The direct link between expectations and satisfaction in Figure 1 represents an assimilation effect, whereas the direct link between performance and satisfaction represents a direct effect of performance not mediated by disconfirmation. For example, when a person is unable or does not want to reflect on performance.

Thus, satisfaction often starts with the expectations a person has. Expectations seem to be based on and influenced by personal needs, word-of-mouth communication, and past experiences. Other external and internal sources contributing to the forming of expectations may be product cues, and ease of recall affected by both availability (i.e., a recency effect) and distinctiveness (e.g., negative information appears to be more distinctive than positive information).

It is generally assumed that satisfaction judgments originate in a comparison of the performance perceived by the person using some form of evaluative standard. The standard most often assumed is the person's pre-purchase expectations. Thus, comparison between expectations and, for instance, service performance yields disconfirmation beliefs. Further conditions have been proposed that can give rise to positive (better than expected), no (just as expected), and negative (worse than expected) disconfirmation. This revealed that

² Oliver, Richard L., (1997) *Satisfaction – A behavioral perspective on the consumer*. New York: McGraw-Hill

disconfirmation has three components: the event, its probability of occurrence, and its desirability or undesirability. That is, experiences of negative disconfirmation may occur when high-probability desirable outcomes do not take place and/or low-probability undesirable outcomes do. To illustrate, negative disconfirmation may occur when the bus does not depart as expected and/or when a driver is unexpectedly impolite. In addition, positive disconfirmation may be experienced when low-probability desirable performance outcomes do take place and/or high-probability undesirable results do not. Furthermore, confirmation (no disconfirmation) is experienced when low- and high-probability performance outcomes do or do not occur as expected.

Different studies have investigated whether expectations, disconfirmations or performance are more powerful determinants of satisfaction. Expectations seem to dominate when people are unable to judge performance or when they do not wish to judge it due to ego-defence or for practical reasons. Disconfirmation has been found to dominate when people are more involved, and when they recognize and are willing to accept divergences from expectations. Performance has a strong effect when one has limited prior experiences and is thus unable to reflect on performance. However, it appears as though satisfaction is primarily determined by disconfirmation.

In summary, the EDP model is applicable to explaining why people feel dissatisfied or satisfied with public transport. The satisfaction judgment seems to originate in a comparison of the level of performance perceived by the person using an evaluative standard. Typically, this standard is formed by peoples' expectations. Consequently, disconfirmation may function as a process of change in the overall evaluation processes.

5 Towards a model of customer journey satisfaction determinants

A common ambition among the companies participating in the CIG is to capture the customer's subjective experience of the public transport journey and link it to conditions in the actual transportation system, e.g. to the objective conditions of the service provided. The latter is an implicit prerequisite for using satisfaction scores as a performance indicator and a measure of public transport quality. At the same time, it is obvious that this link is not a one-to-one relationship, but far more complex.

Experience from the three cities shows the value of using customer satisfaction as a managerial device, but also that the link with the objective condition must be interpreted with care as there are several intervening factors present. A conceptual model summarizing these intervening factors and the determinants of journey satisfaction is proposed in the model below.

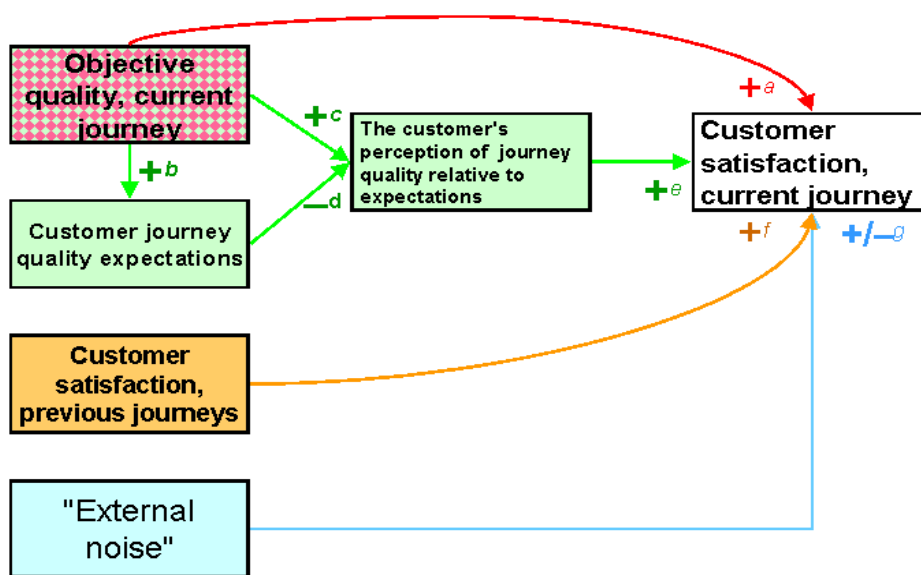


Figure 10 Proposed journey satisfaction model

In the figure, "arrow a" represents the intuitive link between the objective conditions of a journey and customer satisfaction. However, the customer's experience is affected not only by the current journey itself but also by the expectations the customer already has about the journey (as indicated by arrows b, c, d, and e). This makes the customer's perception of the journey somewhat relative: If expectations are extremely high, even a fairly good service quality, objectively speaking, will be perceived as inferior and dissatisfying. A central aspect of the expectations is also what importance the traveller attaches to the different aspects of the objective quality.

In addition, as illustrated in the behind-the-data study in Oslo, the customer's satisfaction with previous journeys might impact on the satisfaction reported for the current one. A positive or negative experience earlier on can thus continue to influence satisfaction measures long after that journey has taken place, ("arrow f" in the figure). This introduces a time-lag. Finally, there is also evidence that external factors impact on how customers rate their satisfaction with a specific public transport journey. For example, in the CIG discussions, there have been examples of how both negative and positive publicity is reflected in the satisfaction scores.

6 Conclusions, where do we go from here?

In our discussions we have arrived at a number of conclusions and insights about the role and functioning of satisfaction in modern public transport

- *Data collection and measurement issues.* The studies in Oslo indicate that a simple answer in a survey could hide quite elaborate customer evaluation processes. Further, all participating companies use several means for generating data. Clearly, no one method is sufficient in itself.
- *Complaint data* is an interesting complement to satisfaction surveys. The discussions in both Helsinki and Stockholm showed the value of integrating the two measures, and how the former could be used as an early indicator of up-coming changes in satisfaction
- With regards to the CIG:s foundational question about the relation between satisfaction and objective service supply, the experiences from the three cities as well as the SAMOT in-depth analysis generate a rather complex picture where several intervening variables and external factors. A first step to capture this complexity is provided in the model in the previous section.

Taken together, our discussions illustrates that satisfaction is the result of a subjective evaluation process, a process where the objective attributes of public transport are interpreted and integrated with individual frames of reference. In comparison with objective measures, such as the number of passengers or travel time statistics, satisfaction scores provide richer, more complex data, but this also requires a more sensitive process of interpretation. The work reported by the companies in this CIG shows how this can be done in practice. Further, it is striking how the richness of the satisfaction data makes it fundamental to the management of modern public transport companies, both as a basis for day-to-day management and strategic decisions. Far from being a peripheral activity of marketing specialists, satisfaction studies of various kinds are now providing input into central business processes, pointing out what is important, what is working well and where are there problems that need to be attended to. This is made possible when satisfaction studies are incorporated into comprehensive *Market Information Systems* (see the extensive presentation of the Oslo/Ruter MIS in appendix A), enabling direct links between satisfaction measures, operational and managerial activities, and corporate missions.

Looking into the future, there are some trends that can be noted in the CIG's discussions that seem particularly relevant to highlight.

- *Customer satisfaction for contractual control.* Satisfaction measures are increasingly being used to keep track of operators' performance. This makes it possible to shift the focus from the mere technical requirements of the service to the value that is actually delivered to the customers. However, this also places high demands on the quality of the data and the transparency of the data generating procedures.
- *Satisfaction and beyond.* As we have seen, there is a strong interest in modelling how satisfaction is related to other aspects of public transport. Satisfaction scores are increasingly being related to both objective performance data and soft measures such as customer expectations and public transport reputations, as well as to customer behaviour. Although this makes interpreting satisfaction scores a more complex task, it also increases the value of the investments spent on the
- *New tools for analysis and presentation.* New software solutions are offering even greater opportunities for linking data from various sources (including real time data from operations, customer complaint systems, and web-surveys and intelligent ticketing systems) and presenting them in an intuitively appealing way.

Appendix, Oslo MIS

Operator monitoring (1): Objective quality aspects

How it is done	<ul style="list-style-type: none"> • Inspections onboard buses, metros and trams, as well as at stops • Recording on PDAs • Quality manuals for each mode define the quality standards • Approximately 12,000 inspections per year.
Quality aspects	<p>Examples:</p> <ul style="list-style-type: none"> • Punctuality • Signs • Information (time tables, travel guarantee information, price tables etc.) • Stop announcements • Maps • Stops: Stop name, line number/destination, maintenance, litter etc.)
Reporting	<ul style="list-style-type: none"> • User friendly web interface • Oslo Sporveier and the operators have access to the web interface • The information is updated twice a week, allowing quick responses from Oslo Sporveier and the operators <p>Breakdowns:</p> <ul style="list-style-type: none"> - Time period - Line - Contract - Operator - Mode - Day type (work day, Saturday, or Sunday) - Time of day

AS Oslo Sporveier

On Oslo Sporveier's Market Information System (MIS)

Andreas Røer
AS Oslo Sporveier

AS Oslo Sporveier

Operator monitoring (2): An important area of application is operator quality monitoring

Quality contracts:
 Compensation for driving
Minus fines for breach of contract (inspections)
 Plus/minus bonus/malus for customer perceived quality (customer interviews)
 = Total operator compensation*

Fines are used when the quality requirements in the contracts are not met.

Examples:

- Failure to report a suspended departure
- Departing too early
- Incorrect signs
- Failure to announce the next stop
- Missing time tables
- Missing travel guarantee information
- Incorrect price tables
- Mobile phone use
- Ticket sales while driving

AS Oslo Sporveier

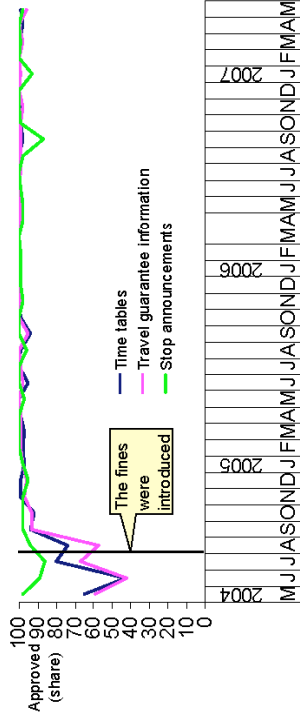
Oslo Sporveier's MIS: Summary

	Oslo Sporveier's Market Information System (MIS)	
What?	In-vehicle quality and satisfaction monitoring	Travel survey and satisfaction survey
How?	Operator interviews In-vehicle interviews	Telephone interviews Telephone interviews
How many?	12,000 inspections per year	20,000 interviews per year 3,200 interviews per year
Use	Operator quality monitoring (fines) Other quality monitoring	The customers' perceived quality → operator bonus/malus Monitoring, e.g. travel behaviour, how often people travel, Oslo Sporveier's reputation, and customer satisfaction
Reporting	Twice a week	Quarterly

AS Oslo Sporveier

Operator monitoring, example: *It works!*

This graph illustrates the results for one operator before and after introducing fines for missing time tables, travel guarantee information and stop announcements.



In-vehicle Customer interviews (2): *An important area of application is operator bonus/malus*

Quality contracts:

Compensation for driving
 Minus fines for breach of contract (inspections)
Plus/minus bonus/malus for customer perceived quality (customer interviews)
 = Total operator compensation*

The contracts all have a "starting point". Results above this level means the operator will get a bonus, results below this level results in a operator malus.

The bonus/malus can amount to 3-6 % of the total contract amount.

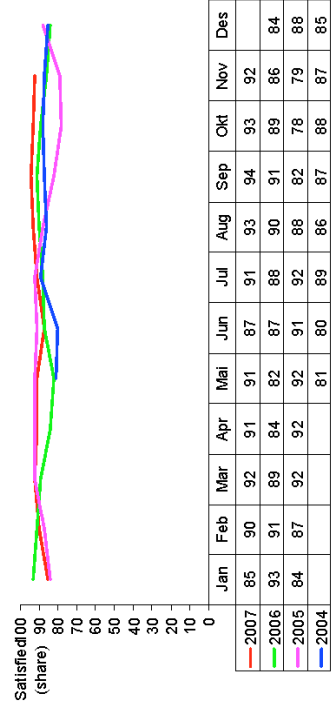
In-vehicle customer interview bonus/malus examples:

- Considering all factors, how satisfied are you with this journey?
- Departing too early
- Punctuality
- Time table information at the stop
- Station cleanliness
- In-vehicle cleanliness
- Number of trams with reduced number of cars
- "Quality index"

In-vehicle customer interviews (1): *Subjective feedback concerning the current journey*

How it is done	<ul style="list-style-type: none"> • In-vehicle interviews in buses, metros, and trams, as well as at stops • Recording on PDAs • Approximately 20,000 inspections per year. • The interview time is 2-3 minutes
Quality aspects	<p>Examples:</p> <ul style="list-style-type: none"> • Considering all factors, how satisfied are you with this journey? • Punctuality • Driving • The driver's customer-orientation • The driver's knowledge about the line • Stop announcements • Time table information at the stop • In-vehicle cleanliness • In-vehicle cleanliness • In-vehicle temperature • Sufficient time to enter any vehicle
Reporting	<ul style="list-style-type: none"> • User friendly web interface • Oslo Sporveier and the operators have access to the web interface • The information is updated twice a week, allowing quick responses from Oslo Sporveier and the operators <p>Breakdowns:</p> <ul style="list-style-type: none"> - Time period - Line - Contract - Operator - M - Day type work day, Saturday, or Sunday - Time of day

In-vehicle customer interview example: *Journey satisfaction figures are high*



Travel survey and satisfaction survey (1): Useful information gathered by telephone interviews

How it is done	<ul style="list-style-type: none"> Telephone interviews created as a representative sample of Oslo's population over the age of 15. Information gathered: <ul style="list-style-type: none"> Call-back telephone numbers: The public transport system in Oslo and Oslo Sporveier Number of calls made: 100 calls per day, 100 calls per week, 100 calls per month, 100 calls per year Approximately 3 000 interviews per year Interview time: Approximately 10 minutes When ad-hoc surveys are needed, included them in the telephone interview is easy and relatively responsive.
Questions posed	<p>In the satisfaction survey, the respondents are asked about Oslo Sporveier and public transport in Oslo in general.</p> <p>General opinion: public transport in Oslo</p> <ul style="list-style-type: none"> Frequency Getting a seat In-vehicle comfort Getting on and off the bus/train Time from door to door Transit time consumption Possibility of travelling without transit Walking distance from home to the stop Walking distance from workplace onto the stop Weather protection at stops Other issues <p>The questions are harmonised with the Institute of Transport Economics' national travel survey.</p>
Reporting	<p>User-friendly web interface, Oslo Sporveier and the operators have access to the web interface.</p> <p>The information is updated twice a week, allowing quick responses from Oslo Sporveier and the operators.</p> <p>Breakdowns: Time period Line Contract Operator</p>

Travel survey and satisfaction survey, example: Improvements in public image and satisfaction with public transport in Oslo

Year	2004	2004	2005	2005	2006	2006	2007	2007
Generelt inntrykk av Sporveien	67	65	75	78	81	85	80	83
Tilfredset med billettbetalingen	51	50	52	57	62	64	69	71

Travel survey and satisfaction survey (2): Used in a number of analyses and reports

Example: This chart illustrates how important each determinant is to the total satisfaction with public transport in Oslo (the X axis) and the level of satisfaction with each factor (the Y axis).

Information from this part of Oslo Sporveier's MIS is also used in Oslo Sporveier's annual report.

Reporting: User-friendly user interface gives Oslo Sporveier and its operators a lot of useful information

- The operators are provided with a user name and password allowing them to access information about their own contracts/lines
- Drill-downs are easily conducted
- Updates are made twice a week, allowing operators to make improvements quickly.

