Measure title: **Improved Security/Safety on Buses**

City: **Malmo** *Project:* **SMILE** *Measure number:* **8.2**

A Introduction

In Malmö problems exist with security and safety on buses. Violence, threats and robberies have become more commonplace in addition to problems associated with vandalism and damage on buses on certain routes. There is a need for a security strategy to make public transport safer, especially for the drivers, but also more attractive to the passengers. One bus route in Malmö (route 18 with 15 vehicles) has been equipped with security cameras since December 2003. The project has received approval by the public transport committee as a two-year pilot. The Regional Government Office has authorised this pilot project. The effect of the cameras was evaluated during autumn of 2005.

As part of the strategy all city buses in Malmö (approx 185 buses) were planned to be equipped with security cameras due to an increased incidence of vandalism, violence, threats, robbery and stone-throwing etc. After political approval all city buses in Malmö were equipped with security cameras; these were activated at the beginning of 2007.

Measure 8.2 thus involves this improved security on buses. Measures 8.1, 8.2, 12.1, 12.3 and 12.7 are, if considered together, all part of the new bus system. The overall goal of a 10% increase in bus travel by the end of 2006 and by 30% by the end of 2010 will be achieved by all of these measures working together.

A1 Objectives

The overall objective for this measure is to increase the attractiveness of city buses in Malmö by developing a security strategy and installing security cameras for increased security and safety in 170 buses (approximately 4 cameras /bus).

The increased security is expected to increase the number of journeys by 1% from 2007 to 2008 when SMILE ends, instead of a previously predicted decrease of 1% in the number of journeys made if nothing is done. In addition maintenance costs associated with the upkeep of vehicles following incidents of vandalism is expected to decrease. The views and opinions of customers and drivers will be sought regarding the installation of cameras and improved security

The measure objectives are:

- **Objective 1**: increase the security on public transport.(indicator 17)
- **Objective 2**: increase the number of journeys by 1% from 2007 to 2008, when SMILE ends (local indicator [1])
- **Objective 3** - lower costs for vandalism (local indicator MSE13)
- **Objective 4** - Increased perception of safety (indicator 17)
- **Objective 5** - Increased attractiveness of city buses (indicator 13, 14, 17 and MSE12)

[1] This was originally proposed as indicator 28 (average occupancy) in the evaluation plan.

A2 Description

A security strategy has been developed to enhance the security and safety on the buses and to lower damage in the buses. As part of the strategy all city buses in Malmö were equipped with security cameras due to an increased incidence of vandalism, violence, threats, robbery and stone-throwing etc. One bus route in Malmö (route 18 with 15 vehicles) has been equipped since December 2003 with security cameras. The project has received approval by the public transport committee as a two-year pilot. The Regional Government Office authorised this pilot project and the effect of the cameras was evaluated at the end of 2005.

Task 1 - Development of security strategy
Task 2 - Approval from public transport politicians
Task 3 - Approval from State officials
Task 4 - Tender of camera equipment
Task 5 - Installation of camera equipment
Task 6 - Education of traffic controllers at the bus operators
Task 7 - Evaluation

B Measure implementation

B1 Innovative aspects

Innovative Aspects:

- New physical infrastructure solutions

The innovative aspects of the measure are:

- **New physical infrastructure solutions, regionally** – There are few examples where security cameras have been tested in this large scale in Sweden before

B2 Situation before CIVITAS

There are problems with security and safety on the buses, while violence, threats and robberies have become more common. There are also problems with damage to the buses on certain routes. There is a need for a security strategy to make public transport safer, especially for the drivers, and thus more attractive to the passengers. One bus route in Malmö (route 18 with 15 vehicles) has been equipped since December 2003 with security cameras. The project has received approval by the public transport committee as a two-year pilot.

The increased security is expected to increase the number of journeys by 1% from 2007 to 2008 when SMILE ends, instead of a previously predicted decrease of 1% if nothing is done.

B3 Actual implementation of the measure

Project planning and preparing consultant assignments 3rd March 2005 – 1st March 2006.
Göran Lundblad, head of the City bus department at Skånetrafiken, was in charge of the security strategy, which is called “Handlingsplan för hot och våld” (Strategy for threats and violence) For a summary, please see “Appendix 8.2 Action plan for an increased safety and security onboard buses in the region of Scania”. Skånetrafiken cooperated in the process of developing the security strategy. The political board of Skånetrafiken accepted and made a formal decision about the security strategy and after that it was sent to the county administrative board in Skåne in order to receive permission. This process took about 6-8 months.

For a view of where the cameras are in the buses, please see "Appendix 8.2 Preliminary drawing cameras buses" and "Appendix 8.2 Drawing cameras articulated buses", respectively.

For the process of handling the information from the cameras there is a routine, please see "Appendix 8.2 Routines for camera surveillance".

Installation of the cameras in the buses took place between 1st April 2006 to 31st Dec 2006, but the technical system (software) was not yet in place.

System implementation started on 1st Jan 2007 and was followed by a running for a period of seven months. The system implementation refers to the implementation for the technical system of the cameras. The evaluation of the system starts during the Autumn in 2007.

This measure was the second to be completed and is in process of being evaluated.
The measure was implemented in the following stages:

Stage 1: Security strategy *(2005.03-2006.03)*

Stage 2: Installation of cameras *(2006.04 - 2006.12)*

Stage 3: System implementation of technical system and running in period (*2007-01 – 2007-07)*

Stage 4: Evaluation (Autumn 2007-Spring 2008)

B4 Deviations from the original plan

The deviations from the original plan comprised:

Deviation 1 delays of buses – many of the cameras were installed in new buses and as the buses were delayed the installation got delayed. Everything was completed in August 2007.

B5 Inter-relationships with other measures

In the original application to CIVITAS II 8.2 is related to other measures as follows:

- **Measures 8.1 (marketing of new bus routes), 12.1 (Use of real time applications for traveller services in Malmo), 12.3 (Mobile internet services in connection to bus information in Malmo) & 12.7 (Bus priority system in Malmo)** – these are all part of the new bus route system and the goal of a 10% increase in travels by the end of 2006 and with 30% until end of 2010 are a result of all these measures working together.

- Therefore for the overall goal of increased patronage by 2010 (outside the SMILE framework) it will be difficult to establish which part of the increase is a result of which measure since for the traveller all the measures together form the new travel opportunity. However, regarding awareness and acceptance of this measure, this could be coordinated with surveys of the general public concerning other measures.

C Evaluation – methodology and results

C1 Measurement methodology

C1.1 Impacts and Indicators

Table of Indicators.

Nr.	Category	Relates to GUARD Nr.	INDICATOR Name	Possible DESCRIPTION	DATA /UNITS
13	Society		Awareness level	Degree to which the general public awareness has changed	Survey
14	Society		Acceptance level	Survey of opinions on part of general public	Survey
17	Society		Perception of PT security	The general public view and experience of safety issues around bus trips and how it affect their travel habits	Survey, telephone interviews
	Transport		Number of passengers	The number of passengers on buses based on on-going ticket registration.	Persons, for different routes over time
MSE12	Economy	14	The value of cameras on buses to customers	What is a customer prepared to pay for having cameras on all buses?	Stated preferences
MSE13	Economy	2	Vandalism costs	Probably a part of indicator 2	collected

Detailed description of the indicator methodologies:

- **Indicator 13** (*Awareness level*) – Questions about the use of public transport and the experience of lacking security on buses and how it affected the travel habits were asked by telephone and in a survey before installation of the cameras. The same questions and more specific questions about their knowledge of the cameras and the security aspects were asked in the main survey conducted after implementation. This corresponds to **objective 1 and 5**
- **Indicator 14** (*Acceptance level*) – The same methodology as for indicator 13 but with specific questions about their view of the cameras.. The answers will show the acceptance level and corresponds to **objective 1 and 5**.
- **Indicator 17** *(Perception of PT security)* The same methodology as for indicator 13 and 14 but with specific questions about how security issues affect their travel habits and how this has changed after the implementation. A Stated Preference study was conducted after implementation to estimate the "willingness to pay" for the cameras on the buses. This corresponds to **objective 1, 4 and 5**
- **Local Indicator**[2] (*Number of passengers)* – all measures concerning public transport have as a common goal an increase in travel. The number of passengers is one indicator that measures this. To see a change in number of passengers as a result of this specific measure (improved security / safety on buses) and to be able to distinguish this from the effect of new bus routes is not possible. Therefore this indicator will be calculated once to assess the impact of all measures about public transport, (8.1, 8.2, 12.1, 12.3 and 12.7) but not for this measure specifically. The base for this indicator is on-going ticket counts done by Skånetrafiken. This indicator corresponds to **objective 2**.
- **Indicator MSE12** (*The value to customer*) – A Stated Preference study was conducted after implementation to estimate the "willingness to pay" for cameras on buses. This corresponds to **objective 5**.
- **Indicator MSE13** (*Vandalism cost*) – corresponds to **objective 3**.

[2] This was originally proposed as indicator 28 (average occupancy) in the evaluation plan

C1.2 Establishing a baseline

The baseline for this measure would be the situation before all buses in Malmö were equipped with cameras and that is the situation before August 2007. Awareness and acceptance of the cameras before they were fully installed, and therefore could be experienced by passengers and potential passengers, is not a relevant factor for a baseline.

The perceptions of public transport accessibility and security as well as vandalism cost are all indicators where a baseline has relevance. For those indicators the situation before August 2007 will be the baseline. Two studies were made to measure the situation before the cameras were installed (table C1.2.1).

The installation of cameras onboard 170 buses (practically every bus) was completed during August2007. A telephone interview as well as a pilot survey were conduced before the implementation of the measure and therefore could be considered as pre-studies.

Time for the study	April 2006	April and May 2007
Sample size	200	159
Respondents	Residents over 15 years in four areas	Bus travellers on board route 32, 4 and 5
Method	Telephone interview	Survey onboard the buses
Aim	Baseline for indicator 13,14 and 17	Pilot study used as a baseline for indicator 17
Comments:	Two of the residential areas are known as "safe and secure" and two as more insecure with incidents on the buses.	The pilot was used to test the method and the questions for the main survey after implementation of all the cameras.

Table C1.2.1 *Data about the different pre-studies conducted for measure 8.2.*

The telephone interviews were made in four residential areas of Malmö. Two areas (Kroksbäck and Kastanjegården) are known for insecurity and vandalism on the buses and two areas (Limhamn and Riseberga) are more secure and peaceful. Of course there are other differences in these areas as well but the main focus of these interviews was safety issues.

The 200 persons asked were not all using public transport on a daily basis, but most of the respondents were using public transport to some extent (38% daily or a few times a week and 49% more seldom). Questions about their experience of and view on safety issues regarding travelling with buses in Malmö were answered according to figure C1.2.2

In total 15% had experience of unsafe situations and 7% had chosen not to travel because of insecurity. In Limhamn, the safest area, the experience of unsafe situations was low, 7%, but the percentage that had chosen not to travel, high, 13%. On the contrary, Kastanjegården and Kroksbäck, two areas with vandalism problems where 20% and 15% respectively, had experience of unsafe situations, a lower percentage had chosen not to travel. This shows that people's reasons to avoid travelling by bus because of insecurity are not automatically linked to personal experience of unsafe situations.

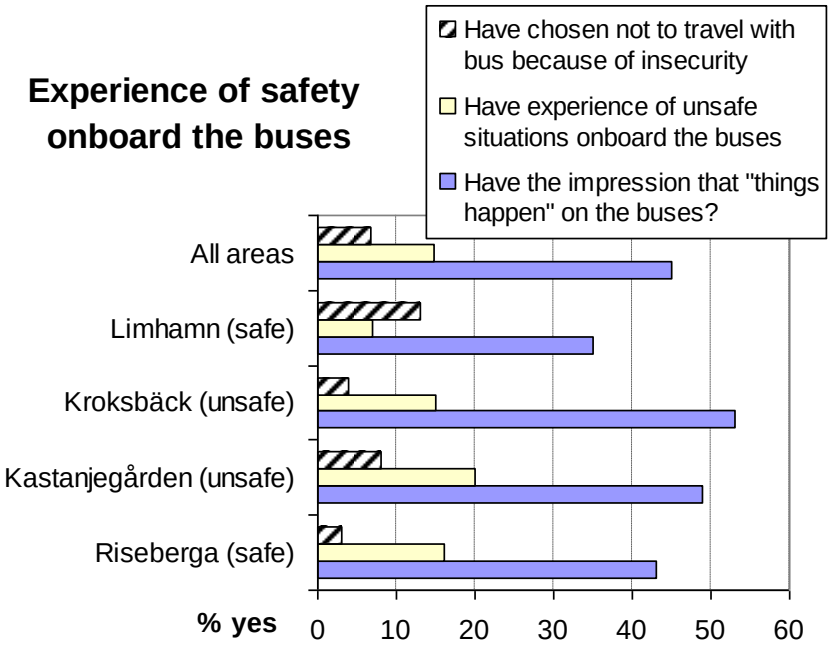

Figure C1.2.2

200 residents over 15 years of age living in four different residential areas, roughly 50 interviews in each area, were asked about their view on and experience of safety and security for public transport. 15% had experience of unsafe situations, 7% had chosen not to travel.

When asked when they have chosen not to travel by bus nearly all said that this was mainly in the evenings. The same group of people was asked to state the importance of different factors when it comes to safety and security on the buses. The results are shown in figure C1.2.3.

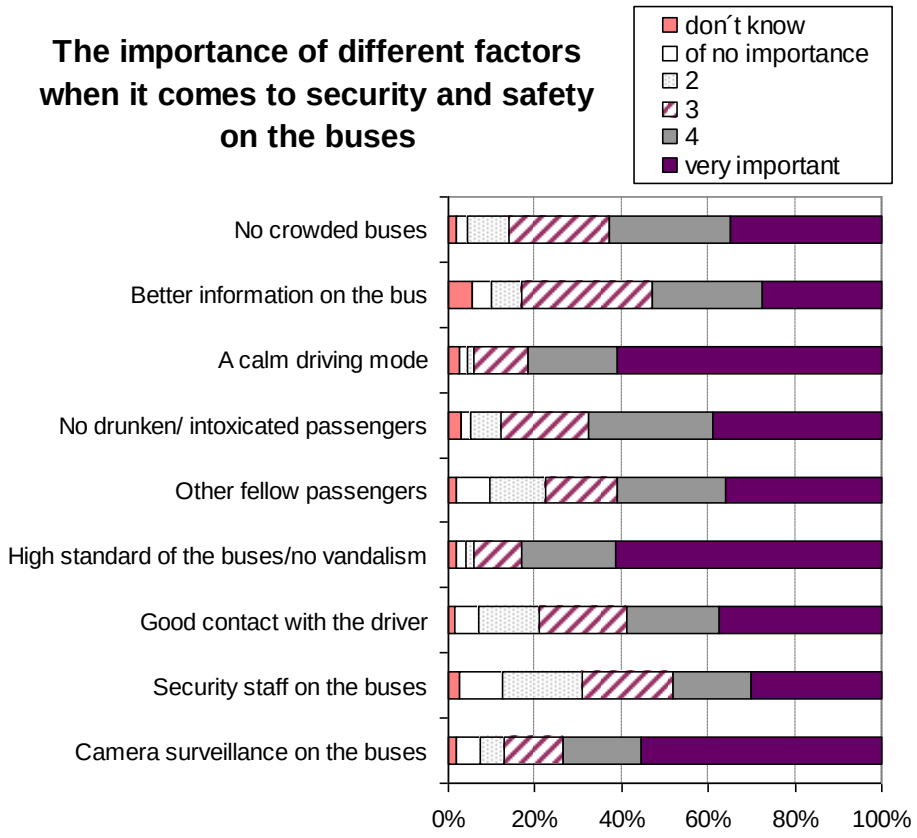

Figure C1.2.3

The factors stated as most important was a calm driving mode, high standard of the buses with no vandalism and camera surveillance on the buses.

From the telephone interview with a sample size of 200 residents

The factors stated as most important was a calm driving mode, high standard of the buses with no vandalism and camera surveillance on the buses. This shows that it is worthwhile for Skånetrafiken to design a measure to increase safety and security on the buses. When presented with nine factors the "top three" included two factors concerning cameras and less vandalism on the buses.

Another pre-study was conducted on-board the buses in Malmö, the respondents were all passengers. This survey was conducted as a pilot study to test the method and the questions for the main survey, so the number of cases (159) is not sufficient to represent all passengers. Some questions were similar to the telephone interview. It is interesting that the percentage of passengers who have experienced disturbing/frightening situations is as high as nearly 40% with the vast majority of the situations being onboard the buses (figure C1.2.4).

6% of the persons said that they had avoided travelling by bus because of safety and security reasons.

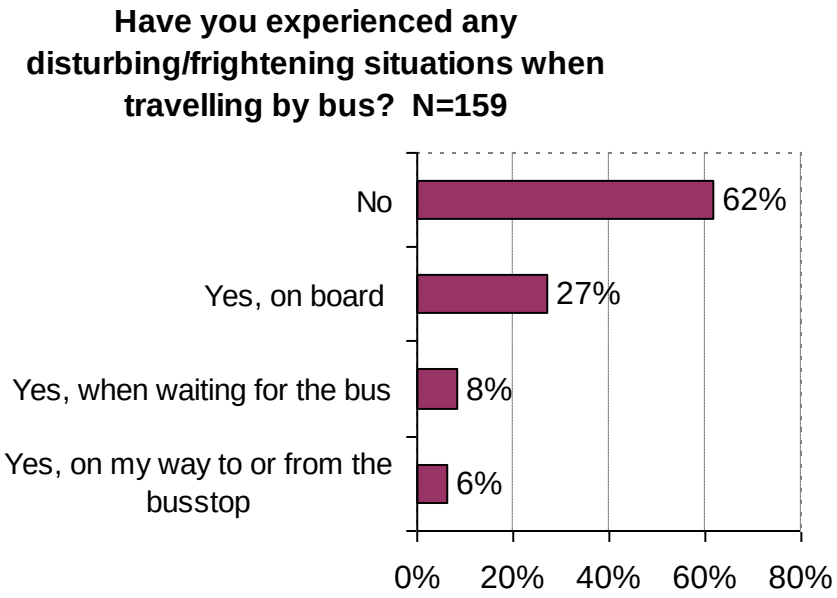

Figure C1.2.4
Results from the onboard survey made in May and April 2007 with a sample of 159 passengers. This survey was primarily a pilot test of the main one but can be used as a pre-study since only a few cameras were installed during this period.

These two studies form the general public perception of public transport security before the installation of cameras on every bus in Malmö.

Since the overall goal for all the measures mentioned under B5 is a travel increase, the number of passengers before and after the introduction of the cameras are important. But since there are a cluster of measures working together it is impossible to state which part of the travel increase is an effect of this measure only.

Figure C1.2.5 shows the change over time of the number of passengers for the whole system, first the old bus system and after June 2005, the new one. In August 2007 all buses running were equipped with cameras. As shown in figure C1.2.5 the number of passengers on a monthly basis varies greatly over a year. Each year has a "summer dip" that is due to holiday periods, especially for the schools, and weather conditions. During spring and summer quite a lot of the potential passengers for public transport choose to go by bicycle instead. The timetables change during summer time as well, with lower frequencies for the buses on all routes.

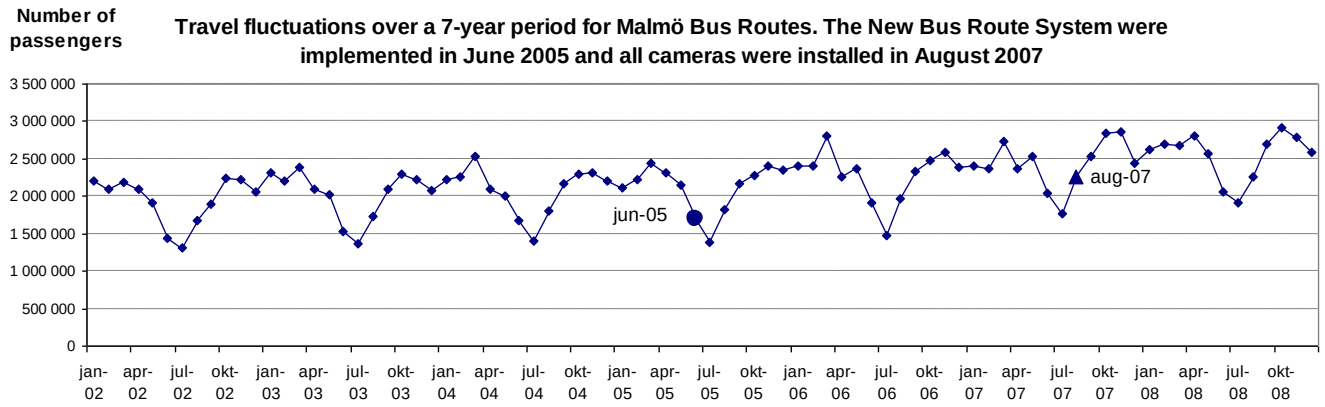

Figure C1.2.5. *Number of passengers on Malmö Bus Routes on a monthly basis. The monthly fluctuations show a strong pattern. The new bus route system was implemented in June 2005 and all cameras were installed in August 2007. (Skånetrafiken)*

The modal split before SMILE and this measure could be relevant information for a baseline even though no indicators are based on this information. During autumn 2003, a survey was made where 10 000 residents between 18-75 years of age were asked to fill in a travel diary. 5181 travel diaries returned .The modal split in Malmö 2003 based on these travel diaries are shown in figure C1.2.6. The survey was conducted during October and November 2003. When compared to the fluctuations in figure C1.2.5, it is more or less during the winter peak.

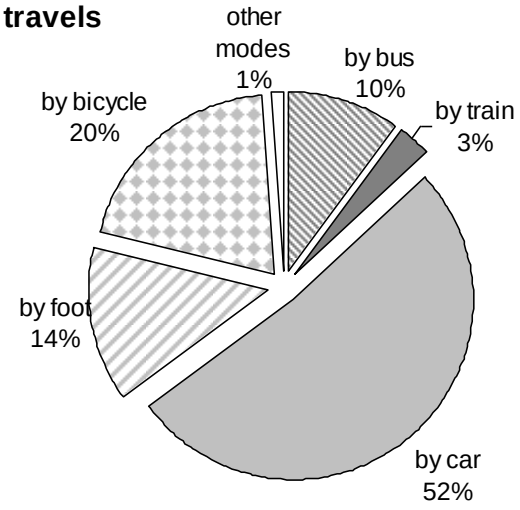

Figure C1.2.6
Results from the travel diary made in October and November 2003 with a sample of 5081 travel diaries.

The respondents are between 18 and 75 years of age and living in the city of Malmö. They have stated the main travel mode for each trip they have made during one day.

The last indicator to have a baseline is Vandalism cost. The operator, Veolia Transport, has a contract with a cleaning company who takes care of the maintenance of the buses and that includes normal cleaning as well as cleaning up after vandalism. They charge for the number of hours this takes. The level of cleaning hours for year 2006 will serve as baseline for vandalism cost.

C1.3 Building the business-as-usual scenario

As discussed in section B5 and C1, the overall goal for all public transport measures, including this one, is to increase the number of passengers by 10% by the end of 2006, with this measure contributing 1% of that growth and by 30 percent by the end of 2010. This goal was formulated in the beginning of SMILE when most of the measures related to 8.2 were planned to be implemented before the end of 2006. In practice, only measure 8.1 was in fact implemented during 2006. Therefore the goal of 10% increase in passengers is no longer valid at the end of 2006.

To establish a "business as usual" scenario for this measure is difficult. A proper "business as usual" scenario would be the trend in passengers without any of the measures, but as Skånetrafiken changed to a new bus route system at the same time, and this of course has a great impact on the number of passengers and is, in itself, not a part of SMILE, the best "business as usual" scenario is the situation with the new bus routes working but with no SMILE-measures in place.

Figure C1.3.1 shows the change in number of passengers based on the same information as figure C1.2.5 but presented as percentages compared with 2005. Year 2005 is the base year since it is the start period for SMILE. The route change (not a part of SMILE) took place in June 2005. Measure 8.1 was running for around 6 month after the change. All cameras on the buses were installed in August 2007. During 2007 measure 12.1 as well as 12.3 were fully installed/implemented. Figure C1.3.1 shows the development of number of passengers for this period. A trend line based on the yearly totals before SMILE and before the change of route system represents "business as usual".

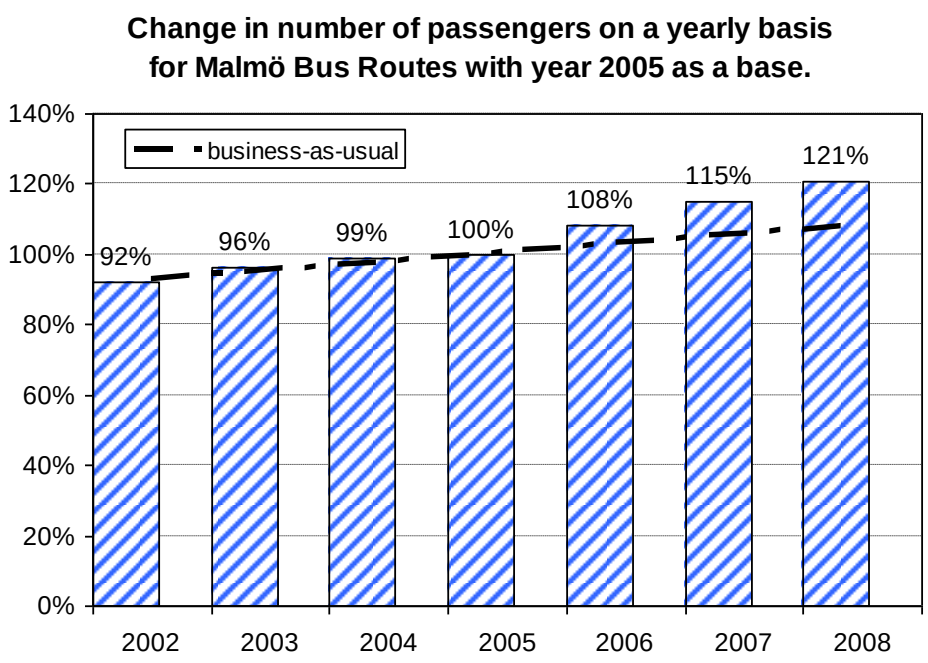

Figure C1.3.1
Number of passengers on Malmö Bus Routes on a yearly basis shown in relation to year 2005, the base year for SMILE.
The trend line "business as usual" is based on the situation before SMILE.
The new bus route system were implemented in June 2005 and all cameras were installed in August 2007. (Skånetrafiken)

Without a thorough investigation of the effect of the route change **alone** it is difficult to build a business as usual-scenario that separates the new bus routes from the effect of other SMILE measures like installing cameras on the buses.

You can clearly see an increase in travel after 2005 that is greater than for the period before 2005. This increase is a result of the new bus routes as well as all SMILE-measures and a part of this is a result of just this individual measure.

Skånetrafiken states that one of the objectives of installing cameras on the buses is to increase the number of travellers by 1% from 2007 to 2008 when SMILE ends, instead of a previously predicted decrease of 1%. That is the best assessment of a "business as usual" scenario when it comes to the impact on number of journeys. (see section A1)

C2 Measure results

The results are presented under sub headings corresponding to the areas used for indicators – economy, energy, environment, society and transport.

C2.1 Economy

Objective 3 - lower costs for vandalism (indicator MSE13)

The cost for the cleaning service of the buses, which includes the cost of repairs due to vandalism, has decreased with 30% between the baseline year 2006 and the first year with cameras, 2007.

In April 2008, 256 Stated Preference interviews were conducted among the travellers in Malmö. The aim of this is to establish the "willingness-to-pay" for cameras on buses. In total, 256 interviews were conducted with travellers, or people with some experience from buses in Malmö where they had to choose between two combinations of fare price, travel time and cameras or no cameras on the buses (and some other choices that had to do with 12.1 and 12.3). (More about this study in Appendix 8.2 SP-study (in Swedish))

Time for the study	April 2008
Sample size	256
Method	Stated Preference-interview
Aim	To estimate the "willingness-to-pay" for cameras on the buses
Comments	Travellers (or people with some experience of buses in Malmö) were interviewed at three major bus stations.

Table C2.1.1 *Data about the Stated Preference-study conducted for the "economy"category for measure 8.2.*

Among those who answered were 58% women and 42% men. 47% were under 30 years old and 21% over 60 years old. The age group between 30 and 60 years comprised 32% of the sample. This is about the same as in the main survey (table C2.5.1) but with more people over 60. Maybe this group had more time to spend on an interview than the busy "middle aged".

Most of these people (58%) travelled by bus every day, and 50% of all who answered said that they travelled after eight o'clock in the evening at least a few times a month or more. The travel time varied between 5 and 90 minutes with mean of 23 minutes for a normal trip with the bus. The "willingness to pay" with a longer travel time should be related to this time.

49% had paid their travel with a single ticket (in Malmö City the price for this is 16 kr) or with a discount card that gives you 20% off this price. The rest of the travellers used some kind of monthly card or school card and paid between 380 and 1000 kr with a mean price of 560 kr. The "willingness to pay" a higher fare should be related to this price.

	Kr/month	**Kr/single price**	**Minutes travel time**
Reference value (mean)	560	16	23
"willingness to pay"	**69**	**7**	**6**
90% confidence interval	26-112	1,50-12,50	3-8
% of reference value (interval)	12 (5 -20)	44 (9 – 78)	26 (13 – 35)
Sample size	270	112	112

Table C2.1.2 *The result from the Stated Preference-study that shows the estimates for the travellers "willingness to pay" for cameras on-board all buses in Malmö (compared with no cameras at all)*

The confidence-intervals are wide and that indicates that the estimates are weak. But they all indicates that this service is highly valued by the travellers and it is obvious that the travellers are willing to pay or for travel times to be extended in return for having security cameras on board. None of the confidence intervals include zero.

C2.2 Energy

No indicator under the indicator category Energy is associated with this measure. The modal shift described under C2.3 from car to other modes leads to less energy consumption, but the modal shift is not mainly a result of this measure.

C 2.3 Environment

No indicator under the indicator category Environment is associated with this measure.

During autumn 2008, a survey was made of the same design and magnitude as the survey in 2003. The modal split in Malmö 2008 based on these travel diaries are shown in figure C2.3.1. The survey was conducted during October and November 2008.

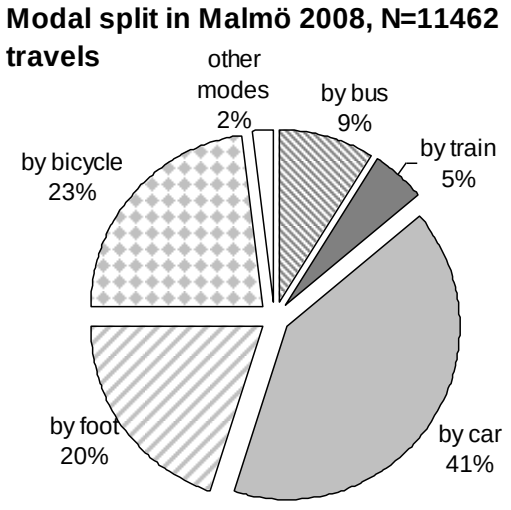

Figure C2.3.1
Results from the travel diary made in October and November 2008 with a sample of 4803 travel diaries.

The respondents are between 18 and 75 years of age and living in the city of Malmö. They have stated the main travel mode for each trip they have made during one day.

The result of the survey 2003 and 2008 shows a change in modal split towards more walking and train travelling and less use of car as travel mode. The percentage that uses bus as the main travel mode has not changed significantly compared to the survey 2003. The small change from 10% 2003 to 9% 2008 is not statistically significant. The shift from car to other modes with less environmental impact will have implications for the environment but not mainly as a result of this measure.

Still, there has been an increase in passengers on board the buses in Malmö by around 25% (figureC1.3.1). This could be a result of

a) The population of Malmö has increased by 6% during this period.

b) The number of travellers (or boardings) have increased as a result of more regional commuting, passengers arrive to Malmö with regional buses or train and changes to the city buses and these travellers are not represented in the survey since they do not live in Malmö.

c) Public transport users are often using bicycle and walking as other travel modes when the weather allows, for shorter journeys. During the summer season, the number of passengers is always lower (figure C1.3.1) than during the winter season partly as a result of that. Both surveys were conducted during October and November but the weather conditions were rather different in autumn 2003 compared to 2008. During October 2003 it rained four times more than during the same period 2008. It was also colder 2003 than 2008. This could mean that the shift from walking and cycling to bus took place some weeks earlier in 2003 than 2008. The weather will affect the local journeys more than the longer journeys made by commuters and therefore have a greater impact on the local (city of Malmö) survey than the statistics showing the number of passengers on board the buses.

C2.4 Transport

Objective 2: increase the number of journeys by 1% from 2007 to 2008 when SMILE ends (local indicator)

The objective is to increase the number of journeys by 1%. Figure C1.3.1 shows an increase of 7% from year 2006 to year 2007. This increase is in theory a combination of various factors including this particular measure (though it was not completely implemented until autumn 2007) as well as measures 12,1, 12.3, the overall trend in passenger numbers in the Skåne region (i.e. shown in the "business as usual" scenario) and the effect of the new bus routes.

Figure C2.5.4 shows that 5% of respondents answered "a lot" and 8% "a bit" when asked: "Do the cameras mean that you travel more?" This indicates that this measure has an effect on the number of journeys.

C2.5 Society

Objective 1 - Increase the security on public transport (indicator 17)

Objective 4 - Increased perception of safety (indicator 17)

Objective 5 - Increased attractiveness of city buses (indicator 13, 14 and 17)

The indicators chosen to measure the effects on society are indicator 13, awareness level and indicator 14, acceptance level. Of special interest is the passenger perception of public transport security, indicator 17. The objective is to see how the installation of cameras onboard the buses affected the travellers sense of security.

One bus route in Malmö (route 18 with 15 vehicles) has been equipped with security cameras since December 2003, so for some travellers the concept was known. The installation of cameras onboard 170 buses (practically every bus) were completed during August 2007.

Time for the study	Oct/Nov 2007
Sample size	3313
Method	Main survey done onboard the buses
Aim	To collect information from the bus travellers for indicator 13, 14 and 17 and change in travel behaviour.
Comments	Distributed and collected at the same time on 11 routes in Malmö, with opportunity to post the surveys if the time was not sufficient.

Table C2.5.1 *Data about the survey conducted for the "society"category for measure 8.2.*

The main survey onboard the buses were conducted during two weeks, one in October and one in November 2007. It was basically the same questions as in the pilot, with some small changes. (Appendix 8.2 Questionnaire) The respondents are described in figure C2.5.2.

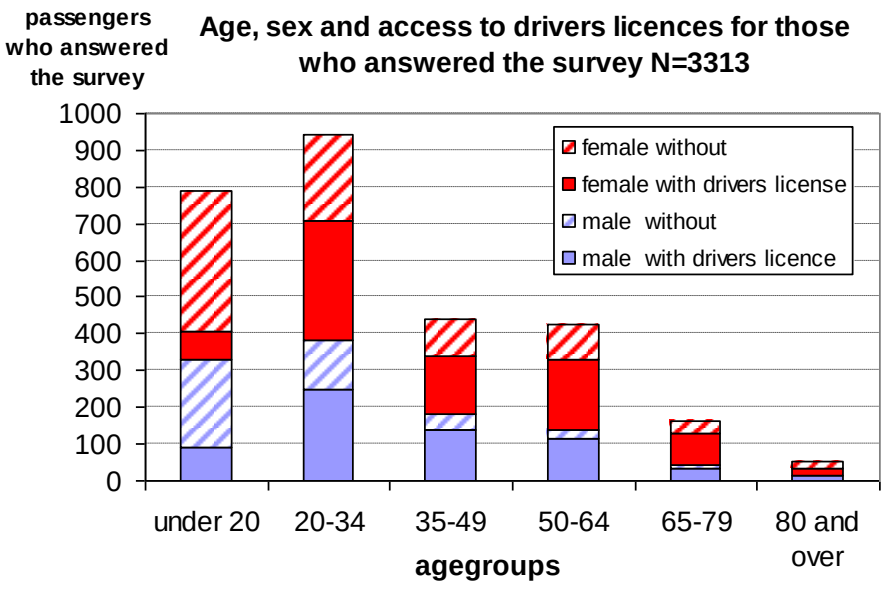

Figure C2.5.2

The respondents of the survey and their distríbution of sex, age and access to drivers licence.

In total, 61% are female and 39% are male. 61% of all respondents are under 35 years and among them 56% have no drivers licence.
Only 8% of respondents are over 65 years old.

In comparison to the travel survey conducted 2003 in Malmö with a sample of 5451 residents between 18 and 75 years of age, (described in C1.2.6) this survey shows about the same distribution of men and women as bus travellers if you take into consideration the difference in age groups. When you distribute a survey on-board you will get a lot of persons under the age of 18 and this group is the one with the least difference between men and women.

When asked about the experience of frightening and disturbing situations when travelling by bus, the answers were distributed as in figure C2.5.3. This shows that in total 38% of the respondents had some experience of frightening situations. Most of the incidents take place on-board the buses but things happen when waiting for the bus and on the way to and from the bus stop as well. Around 70% of those who had experienced frightening situations were women, compared to 61% in total. 8% of the respondents in the bus survey are aged 65 years or older, but for the group with experience of frightening situations, between 21 and 32% of the respondents are over 65 years of age. It seems as a higher proportion of older women have experience of frightening situations than other groups.

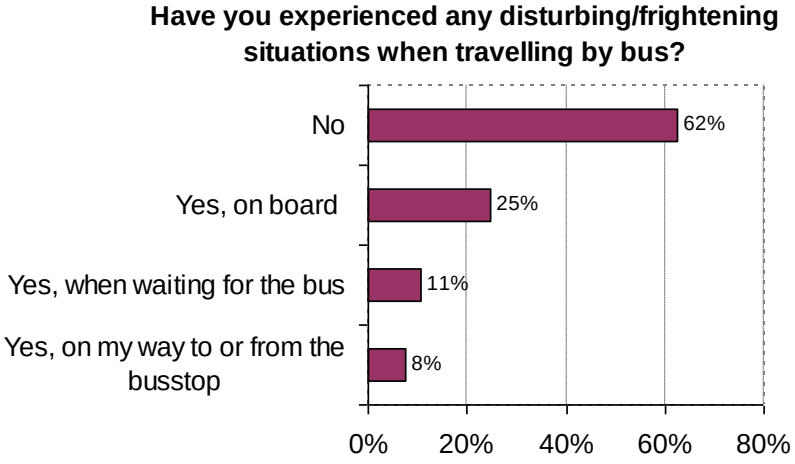

Figure C2.5.3
When asked about the experience of frightening situations when they travelled by bus, the respondents answered like this.
The total sum is 105% because you could give more than one answer.
N=3313

The survey was done when all of the buses in Malmö were equipped with cameras and the respondents were asked on the buses, yet only 72% of the travellers who answered were aware of the fact that all buses in Malmö were equipped with surveillance cameras. The cameras must be discrete when nearly 30% of the passengers do not notice them at all.

Over 60% of the travellers said that the security had been improved with the cameras and 13% said that they travelled more because of this, 5% said that they travelled a lot more and 8% said that they travelled a bit more. The percentages over 65 years for this group were 40% ("a lot more") and 31% ("a bit more").

9% of the respondents said that they had avoided travelling by bus because of security reasons and they also answered that this was mainly at a special time of day and/or a special bus stop. The effect of the cameras could be that these people travel more in the evenings.

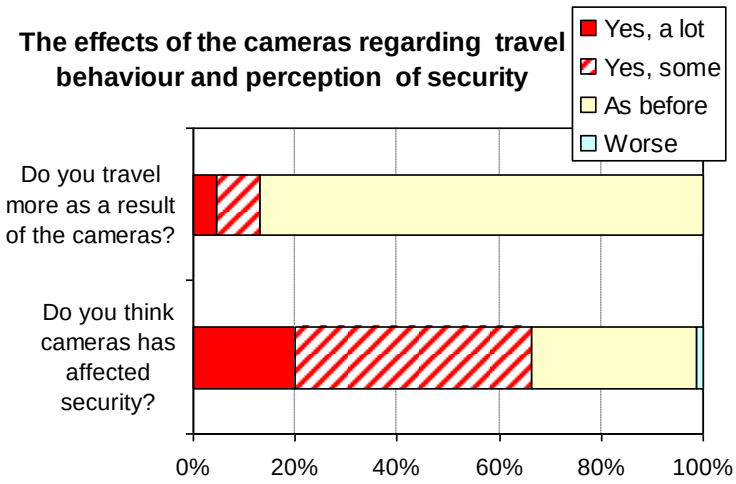

Figure C2.5.4

72% answered "yes" when asked if they knew that the buses in Malmö were equipped with surveillance-cameras. The effect of the cameras on safety is high, more than 60% said it had positive effect and this group includes those who didn´t know about the cameras. The effect on travel behaviour is lesser, 13% stated that they travel more now.

When presented with nine factors to increase the safety and security on the buses and asked to decide if the factor was important or not, the respondents answered as in figure C2.5.5. This is the same question as in the telephone interview but this time put to 3313 public transport users and when all buses in Malmö had been equipped with cameras. The result shows that a calm and safe driving mode and high standard of the buses with no vandalism are the two factors that the respondents rank as most important for increased security. Camera surveillance on the buses are still number three but not as important as the other two. Cameras on the buses are as important as a good contact with the driver and no crowded buses. 72% knew about the cameras and more than 60% stated that the safety had increased with the cameras. Maybe the passengers have already taken the new situation with the cameras as "normal"

Public transport users have experience of frightening/disturbing situations when travelling with bus in Malmö. They still travel for the most part and have increased their travel because of the higher level of security that the cameras have led to. The level of awareness of the cameras and acceptance of this measure to improve security on board the buses are high. The perception of security after the cameras has been installed has increased significantly.

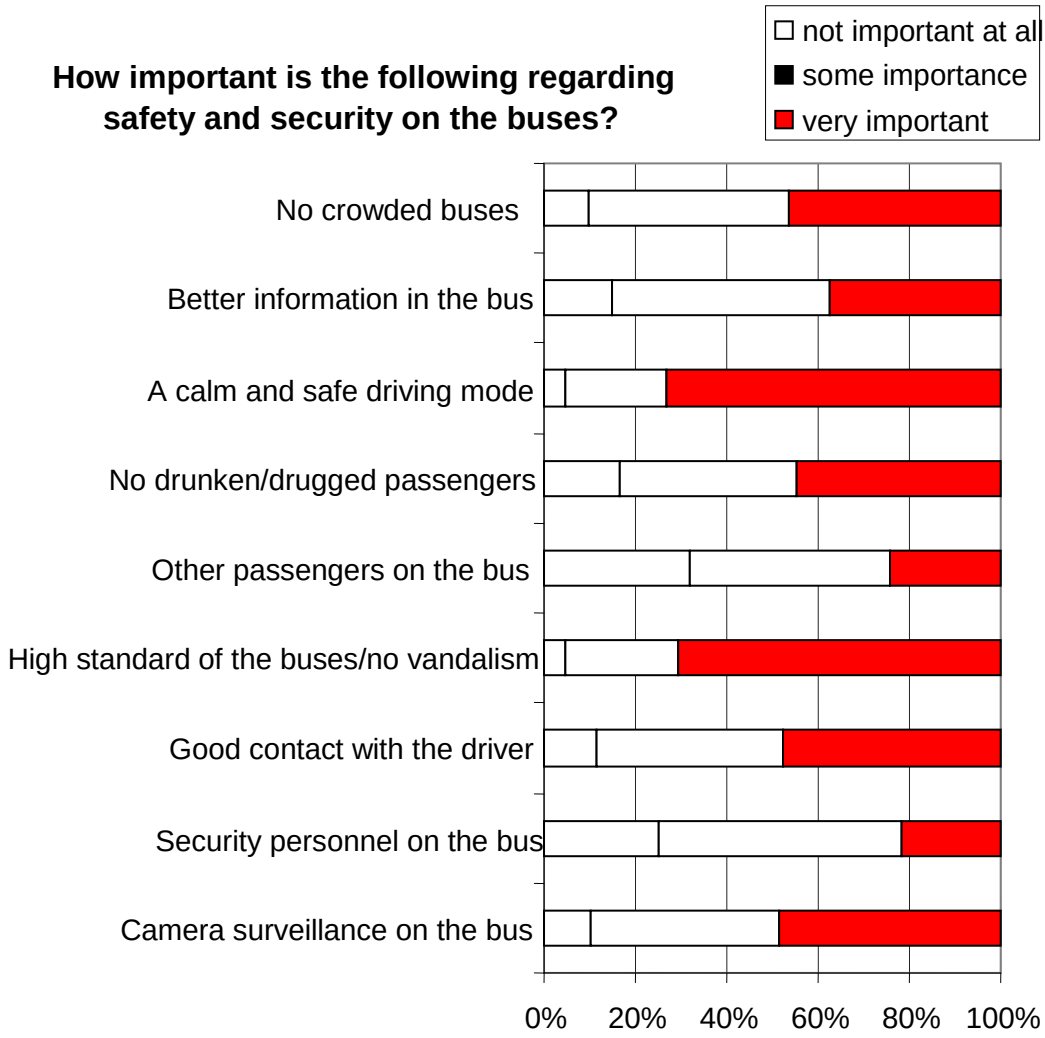

Figure C2.5.5
The factors stated as most important were a calm driving mode, high standard of the buses with no vandalism and camera surveillance on the buses. This is the same "top three" as in the telephone interview but cameras are not as important as the other two. On the other hand, these public transport users have cameras on all buses now.

C3 Achievement of quantifiable targets

No.	Target	Rating
1	increase the number of journeys by 1% from 2007 to 2008 when SMILE ends	★★★
2	lower costs for vandalism	★★

NA = Not Assessed 0 = Not achieved ★ = Substantially achieved (> 50%)
★★= Achieved in full ★★★= Exceeded

C4 Up-scaling of results

Cameras were installed in practically all buses in Malmö, over the whole network. This means that the results cover the whole network as well. This measure, with cameras installed in order to increase safety and security for the driver as well as the travellers have led to an increase in perceived and actual safety and security and less vandalism. This is valued quite highly by the travellers. If cameras were installed on all regional buses as well and on bus-stops for example, the safety and security will increase further and lead to the same effects over a greater network and over a larger part of the public transport journey than this measure, which primarily focus on the situation on board the buses.

C5 Appraisal of evaluation approach

Well balanced evaluation with pre-studies as well as comprehensive "after-studies". It is difficult to present individual baselines as well as "business-as usual" scenario for all measures in the cluster one by one since they are based on the same indicators and work as a package to the "customer".
One weak spot in this evaluation is the estimation of the increase in journeys. More specific questions about how much travelling had increased because of the cameras would have been beneficial. The reason not to do this in the survey was to hold the number of questions down to a minimum.
This evaluation was based on surveys and interviews for most parts. It is difficult to relate the results of these studies to all travellers because the lack of basic information about the travellers in Malmö.

C6 Summary of evaluation results

The key results are as follows:

- **Key result 1** – Security and safety for public transport travellers are of great importance. It keeps people from travelling by bus, mostly in the evenings (after dark presumably). Quite a large group of travellers have experience of frightening/disturbing situations when travelling by bus, as many as 38% in the survey stated this. Most of these situations happened on the bus. Among those 38% were a higher proportion of women and people over 65 years of age.
- **Key result 2** – When asked to rank different factors by their importance on safety and security, the top three were: a calm and safe driving mode, no vandalism on the buses and camera surveillance in the vehicles. It shows that these measures chosen by Skånetrafiken are what the travellers rank the highest when it comes to increased safety and security for public transport.
- **Key result 3**.- after the cameras were installed, more than 60% of the travellers said that this had improved safety on the buses, and 17% said that they travelled more as a result of the cameras. Among those who travelled more were 31-40% over 65 years of age.
- **Key result 4** - the «willingness to pay » for cameras onboard the buses is high when estimated in a Stated Preference study. The 90%-confidence intervals show a positive value for cameras on the buses for fare price as well as travel time. The best estimate shows a value of 12% of the price for a monthly ticket.
- **Key result 5 -** the costs of vandalism decreased when the cameras were installed. The best estimate of this is that the cost of cleaning the buses decreased by 30% after the introduction of cameras.

D Lessons learned

D1 Barriers and drivers

D1.1 Barriers

- **Barrier 1** – A potential barrier exists because of the need for national and local / regional political approval at the start of the process, although this proved not to be an issue in Malmo due to commitment of politicians to this as a long term goal.

- **Barrier 2** – A potential barrier exists because of individual worries about personal privacy and civil liberties, although no evidence of these worries has been found in Malmo and in fact the CCTV coverage appears to be considered a good thing.

- **Barrier 3** – A potential barrier exists because of the need for national up front investment in cameras and monitoring equipment. This proved not to be an issue in Malmo, possibly because of the level of control that Skånetrafiken has over the bus operators, but may be more of an issue where bus services are a purely commercial venture and hence where bus operators will need to be convinced of the commercial payback of the investment before it will be made.

- **Barrier 4** – If the introduction of the security cameras is being carried out as part of a wider investment package, for example in new buses, then it may mean that delays occur that are from outside influences, such as late delivery of the vehicles.

D1.2 Drivers

- **Driver 1** – One of the key drivers is a positive one in that there has been an increase in the number of people that use public transport, but high levels of occupancy can lead to high levels of fear among potential bus users about travelling by bus.

- **Driver 2** – Unfortunately the way that society is developing was leading to an increased incidence of vandalism, violence, threats, robbery and stone-throwing etc. which necessitated this measure.

- **Driver 3** – A trial had already been approved by the public transport committee and the regional Government Office and had subsequently been conducted on one bus route in Malmo that showed positive results.

- **Driver 4** – A case study for the city of Helsingborg showed that after installation of CCTV cameras almost all vandalism, threats and violent situations ended.

D2 Participation of stakeholders

- **Stakeholder 1 –** Skånetrafiken, the regional transport authority, plays the leading role and has funded the cost of the cameras through its traffic contract with the operators Arriva and Connex.

- **Stakeholder 2** – Arriva and Connex are the principal participants as they are the operators of the buses in which the cameras have been installed.

- **Stakeholder 3** – Public authorities who are involved at various levels in the approval process for this sort of activity and who need to be informed about the results of their political decisions using the evaluation results so that their decisions are vindicated.

An issue which will determine the ease with which this type of system can be deployed is the institutional structure and the contractual arrangements that exist between public transport authorities and the bus operators. In particular questions exist about where the financial benefits accrue in relation to the source of the funding for the cameras and the support infrastructure.

D3 Recommendations

- **Recommendation 1 –** The installation of security cameras has been carried out as part of a wider security strategy developed to enhance personal security and safety on the buses and to lower damage in the buses. This is recommended from many perspectives, not least because the evaluation in Malmo and other locations shows that personal security and the perception of safety as judged by the appearance of the vehicles are key barriers for some people that stop them travelling by bus.

- **Recommendation 2** – Ensure that the security strategy is continuously developed to take into account the results of any monitoring and evaluation work conducted as a basis for further developments and validation of the approach taken.

- **Recommendation 3** – Make sure all actors at the local / regional level have an involvement, to include politicians in the initial decision making process to head off any personal privacy issues. This should also include involvement of all institutional actors as the benefits are likely to accrue to all participating organisations, including many from the wider community such as the police and other public services who should benefit from a lower level of calls as a result of incidents on public transport.

- **Recommendation 4** – If political resistance is likely to be a barrier then take a step by step approach to prove the concept on one bus line first.

- **Recommendation 5** – A degree of training will be required for those who need to be involved in the maintenance, monitoring and response to incidents observed, which will require appropriate procedures to be in place, agreed with the police etc.

- **Recommendation 6** – Ensure compliance with national legislation. This type of system has been tested extensively in the UK, but does require signs to be visible informing people that security cameras are in use because of the national law on civil liberty. (The idea being that anybody that doesn't want to be filmed on the bus they have the opportunity of travelling by a different mode, whilst those who consider the security cameras to be a good thing for security will be encouraged to travel.)

D4 Future activities relating to the measure

This measure appears to have been successful and given that it involves an investment in equipment with a relatively long lifetime it would appear that it will continue to operate for a significant length of time.

The cameras are already deployed on all buses operating in Malmo. However, given that Skånetrafiken is a regional transport authority the potential exists for deployment of the cameras in the wider region around Malmo.