



## GUIDANCE NOTE FOR LOCAL AUTHORITIES AND BUS OPERATORS

### The Role of Soft Measures in Influencing Patronage Growth and Modal Split in the Bus Market in England

#### 1: INTRODUCTION

The Department for Transport commissioned AECOM and the Institute of Transport, Leeds University, to undertake research to provide a better understanding of the importance of more qualitative soft measures in determining bus patronage trends in order to improve the delivery and inform the development policies relating to bus patronage and modal shift, particularly from cars, and to expand the Department's evidence base further by enabling robust estimates of the economic value of the most important soft measures to be incorporated into multi-modal transport models and forecasting models of bus patronage.

This guidance note presents the findings of this research into the value of soft measures and their impact on the demand for buses in a non-technical manner for the specific use of Local Authorities and bus operators. It is structured in a way that will allow these organisations to make some first order estimates of the impact of soft measures.

Local Authorities and bus operators will be able to estimate the change in demand for buses as a result of investment in soft measures. Local authorities will also be able to estimate the mode shift from the same investment.

The main results are given in Section 5 below. These show the impact of soft measures on bus demand and, because no package effect has been identified, the effect of soft measures on bus or car demand can be added together<sup>1</sup>. For example, the installation of real time passenger information over the local network would be expected to raise demand for buses by over 2% and lead to a 0.2% shift from cars.

The full report of this research can be accessed via the following weblink <http://www.dft.gov.uk/pgr/regional/buses/busmarketfactors/> and a WebTAG unit will be added to the WebTAG suite in the near future providing details of how the findings can be incorporated into transport and economic forecasting models.

Following on from this introduction:

- Section 2 of this note provides definitions for hard and soft measures.
- Section 3 outlines the study methodology.
- Section 4 summarises the finding of Phase 1 of the study in particular the ranking process in the qualitative research.

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<sup>1</sup> Only one of the car user and bus user impacts can be used for each measure: **these impacts are not to be combined**. See Section 5.



- Section 5 provides estimates of the impact of soft measures based on the qualitative research from the household surveys.
- Section 6 presents the headline conclusions for the study especially in relation to Local Authorities and Bus Operators.

### Study Overview

The key objective was to identify and quantify patronage changes attributable to soft measures. This has been done in five ways:

- Review of other research that has been carried out in this area (Literature Review)
- Asking the bus industry what they think, through structured consultations with key stakeholders;
- Asking people what they think – or more precisely, undertaking detailed research into people's attitudes to soft measures;
- Assessing how people behave, by undertaking detailed modelling and research; and
- Analysing bus patronage data before and after implementation of soft measures.

## 2: DEFINITION OF SOFT MEASURES

'An improved bus experience and patronage growth can arguably best be achieved through implementation of a combination of 'hard' and 'soft' measures,.

'Hard' and 'soft' measures can be defined as follows:

- Hard measures are objective and measureable. They are usually physical engineering measures that impact on the cost of the journey or aspects of journey time (e.g. waiting for the bus and time on the bus). The punctuality of services and variability of journey times are included in this category.
- Soft measures are more subjective and impact upon the experience of the journey. They centre on informing individuals or segments of society about available public transport services and providing a more desirable travel experience.

The term 'Soft Measures' pertains to the variables in bus travel that affect the awareness, accessibility and acceptability of bus services amongst individuals and societal sectors for example in terms of passenger information, driver quality and safety and security. This is in contrast with 'Hard Measures' which affect the availability and accessibility of bus travel through, for example, physical engineering, reliability and journey time.

It can be more useful to consider hard and soft outcomes rather than hard and soft measures. In this case hard outcomes are those that may be measured objectively in terms of time or money saving; whilst soft outcomes are changes in perceptions and perhaps changes in behaviour. **Table 1** provides some definitions of "soft impacts or outcomes" and the measures that could create them.



**Table 1 Soft Impacts/Outcomes: Definitions**

Soft Impact	Measures
Quality of In-Vehicle Experience	Vehicle: age, ease of access, seating quality, cleanliness, entertainment, CCTV. Driver: training to achieve politeness and smooth ride.
Increased Awareness of Service Availability	Conventional and unconventional marketing approaches.
Improved Knowledge Whilst Travelling	RTI, public service announcements on vehicle.
Ease of Use	Smart cards, travel cards, ticket structure, low floor vehicles.
Quality of Waiting and Walking Experience	Shelters, bus stations, ticket machines, seating, information provision, CCTV, staff presence, lighting.
Safety and Security	CCTV, staff presence, lighting.

Further details of each category of soft measure are provided below.

#### ***Quality of In-Vehicle Experience***

A bus user's in-vehicle experience depends upon both the quality of the vehicle and the performance of the driver. Vehicle quality includes aspects such as type of vehicle (including innovative vehicle design), low floor access, age of the vehicle, cleanliness, and comfortable and spacious seating. Other innovative solutions to provide a more pleasant travel environment would be included in this category but not CCTV on vehicle, as this is categorised as a measure impacting on safety and security. Driver performance includes driver politeness and smoothness of ride, which may be influenced by targeted driver training.

#### ***Awareness and Knowledge***

Accurate information provision and marketing of services is necessary to retain users and attract non-users. Information provision relates to details of timetables and routes, paper-based or electronic, available upon demand or at bus stations or stops. This category includes real time information collected using a tracking system and communicated electronically via message boards, SMS and the internet. Marketing includes other promotional material in-vehicle, at bus stations and stops, or distributed more widely to households. Sales promotions such as two for one offers or free tickets for a limited trial period would be included in this category, as would network and route level initiatives such as simplification and branding.



### ***Ease of Use***

This category includes changes in ticketing and fare structures that can make public transport use less complicated, including simplified fare structures, multi-operator ticketing and smartcards.

### ***Quality of the Walking and Waiting Experience***

Waiting for a bus is an integral part of a bus journey, so the quality of the waiting environment will affect user experience and demand. This category includes shelters, bus stations and any other physical facilities such as off-bus ticketing machines. Information provision at stops or facilities such as CCTV and lighting are integral to the roadside experience but are included elsewhere in relation to other categories. The walk experience will be influenced by the quality of the public realm and hence the impact of public realm improvements should be considered under this category.

### ***Safety and Security***

Crime or fear of crime can present an effective barrier to bus use. Issues such as CCTV, lighting and staffing in both the waiting environment and on-vehicle are important, as are initiatives designed to reduce crime.

There are a relatively small number of studies that have sought to value soft aspects of bus quality and fewer have attempted to value a complete 'package' of soft measures. In many cases those studies that have sought to value soft aspects of bus quality use different definitions of soft measures which have led to a lack of genuinely comparable values. Due to the independence of studies in this respect another current common problem in the valuation of soft measures is the availability of a wide range of values leading to potential inconsistencies in the manner in which bus schemes incorporating soft measures are developed and appraised.

## **3: STUDY METHODOLOGY**

The specification for this study was developed with the consideration of the weaknesses in the knowledge of soft measures especially within the policy and academic arenas. A phased approach was developed to first collate a broad understanding of the subject matter before proceeding with very detailed quantitative research.

Phase 1 of the study was focused primarily on the collation of existing evidence on soft measures in relation to the bus industry, the identification of case studies from an initial list of potential prospects and consultation with operators and promoters of the selected case studies as well as qualitative research with users of these schemes.

The literature review was comprehensive covering all data sources from UK experience as well as overseas experience where relevant.

Ten case studies were required as the basis of the study. To enable the identification of suitable case study examples, selection criteria were drawn up by the project team; these included key soft and hard scheme features, data availability, scheme costs, perceptions of success and willingness of scheme promoters and operators to participate in the study.



Consultation was undertaken with a range of stakeholders and relevant databases of schemes owned by DfT and industry organisations were interrogated to produce an initial list of 56 potential schemes. Using the selection criteria this list was reduced to the following final set of ten case study schemes:

- **Warwick Goldline 66** (Stagecoach) – new quality bus initiative comprising new low floor vehicles, specially trained drivers, customer charter, leather seats
- **Leeds FTR (First Bus)**– new quality vehicle with specially trained drivers including ticket machines on the bus and real time information on and off the bus
- **Warrington Interchange** (Warrington Borough Council)– new bus interchange as part of a new shopping development
- **Cambridgeshire Citibus** (Stagecoach) – network simplification, branding of routes and real time information
- **Wiltshire and Dorset MORE** (Go-Ahead) – network simplification and rebranding including new vehicles with different seating types.
- **Kent Fastrack** (Arriva, Kent County Council) – revised network including new infrastructure and quality bus improvements in support of major housing development
- **Hull Interchange** (Kingston upon Hull City Council) – new bus interchange adjacent to the rail station
- **Nottingham Route 30** (Nottingham City Transport) – new clean fuel vehicles and smartcards as part of personalised travel planning programme
- **Go-Ahead North East** (Go-Ahead) – network rebranding including focussed marketing teams for each route
- **Lancashire Witch Way** (Blazefield) – new quality bus for longer distance journeys comprising branding and leather seats

Qualitative research with users was undertaken in each case study area. The key purpose of the qualitative research was to explore how soft measures and hard measures are perceived and interact.

Phase 2 involved Household Surveys in each of the ten case study areas. This was aimed at collecting attitudinal information, trip rates and background socio-demographic information to feed into the stated preference modelling process. In each case study area, 225 Stated Preference (SP)/Revealed Preference (RP) surveys and 250 non-SP/RP surveys were undertaken. The final stage of the study was to test the values produced from the various models on existing transportation models.

#### 4: RESEARCH AND QUALITATIVE APPROACH

The findings from Phase 1 provided the strong basis of the work in Phase 2 especially the approach to developing the questionnaires for the Revealed and Stated Preference surveys. A comprehensive literature review was undertaken which is provided in detail in the Appendix to the main report and in summary in the main body of that report. The broad conclusion was that the gaps in research and knowledge in this area justified the undertaking of this study. In particular there was uncertainty over the 'package effect' – the theory that the combination of a number of interventions will have less of an impact than the sum of the constituent interventions.



### Literature Review Conclusions

- A relatively small number of studies have sought to value aspects of bus quality and even fewer have attempted to value a “complete” set of attributes.
- Comparison across studies is hampered by the use of different definitions and levels of attributes and definitions of cost attributes. Most UK valuation evidence is from London and this is a concern as many public transport studies have shown a significant difference in behaviour between London commuters and those elsewhere in the United Kingdom.
- Most studies assume the presence of a package effect and use a capping exercise to value a package or ideal or optimum service. Nevertheless there remains the possibility that a package effect is valid and that the value may exceed the sum of individual interventions in circumstances where one or two interventions will not lead to behavioural change but when combined into a package an effect is found
- Overall there are a number of valuation studies for a range of quality factors. However, these do not form a sufficient basis to derive values across the range of factors of interest. Some factors such as marketing, route and ticketing simplification appear not to have been the subject of valuation studies, although they may have been examined with respect to their impact on demand.

The consultation with local authorities, bus operators and bus industry stakeholders provided a more up to date appreciation of the understanding of the role of soft measures compared with that identified in the Literature Review.

### Consultation Conclusions

In general, based upon the consultation process, the following conclusions can be drawn:

- Soft factors are perceived by operators and local authorities to have the potential to deliver patronage and revenue increases and modal shift;
- The level of increase to be delivered is uncertain;
- Operators welcome this research into the impacts of soft factors as it will eliminate uncertainty from their future application of soft measures;
- The operators who have deployed soft measures differ in their views of the best environment for their deployment, e.g. inter-urban, urban;
- Operators prefer soft measures where a direct impact can be demonstrated; measures such as RTPI were viewed with a certain amount of scepticism by a large number of operators as they felt the gap between implementation and any impact upon patronage was too great to enable any reasonable estimate to be made; and
- Operators generally felt that network simplification was more important than other soft measures.



One aspect of the qualitative research which is very useful to local authorities and bus operators was identifying the relative importance of hard and soft measures that make up a typical bus journey. All the respondents to this survey were offered 13 soft measures and 7 hard measures.

Respondents were asked whether each measure was important to them and then asked to rank each measure in order of importance. The following scores were allocated:

- 10 = Rank 1 (Most Important);
- 8 = Rank 2;
- 6 = Rank 3;
- 4 = Rank 4;
- 2 = Rank 5; and
- 1 = Considered important but not in the top 5.

**Table 2** below shows the sum and mean score for each measure.

**Table 2 Important Measures (Weighted by Rank)**

Rank		Measure Type	Sum	Mean
1	Reliability of Bus	Hard	276	6
2	Frequency of Bus Service	Hard	164	3
3	Fare Paid	Hard	131	3
4	Safety at Bus Stop	Soft	110	2
5	Walk Time to Bus Stop	Hard	86	2
6	Safety Walking to Bus Stop	Soft	78	2
7	Seat Availability	Soft	77	2
8	Comfort	Soft	77	2
9	Waiting Time at Bus Stop	Hard	73	1
10	Information Provision - Planning	Soft	71	1
11	Bus Type (low floor v non low floor)	Soft	68	1
12	Driver Attitude	Soft	68	1
13	Cleanliness	Soft	61	1





14	Bus Stop/Shelter Features	Soft	58	1
15	Information Provision at Bus Stop	Soft	58	1
16	Walk Time from Bus Stop	Hard	36	1
17	In Vehicle Time	Hard	35	1
18	Safety from Bus Stop	Soft	34	1
19	Ticket Type	Soft	23	0
20	Marketing/Branding	Soft	10	0

Looking at the overall importance scores the top 5 measures are:

- Reliability;
- Frequency;
- Fare Paid;
- Safety at Bus Stop; and
- Walk Time to Bus Stop.

All are hard measures except Safety at Bus Stop.

There seems to be a close relationship between reliability, service frequency and waiting time. Travellers do not want to wait long for their bus. If the service is frequent reliability becomes less of an issue because people do not actually plan using a timetable – they generally turn up and go.

The different measures were also analysed by different market segments. This showed some interesting differences which are presented in the main report.

#### Qualitative Research Conclusions

- Threshold effects exist for non-bus users which have to be overcome before bus is considered a viable option. For example, a high frequency (10 min headways) reliable service. Only after that do soft factors come into play.
- Safety appears to override everything.
- Ease of boarding is a key issue for certain people. However, it's not just boarding but whether there is enough space to store an unfolded pushchair.
- There is an expectation that new buses will be comfortable and clean.
- Car drivers are sensitive to problems related to the car, i.e. congestion, cost of parking and availability of parking. Increases in these are likely to push people to the bus more than soft factors.





## Phase 2 Findings

In the research on the performance of the ten case studies it was clear that the most influential measure in changing patronage was the change in the Concessionary Fares Policy in April 2006. Even so some of the study areas demonstrated significant increases in patronage which can only be due to the softer influences on the route.

The key influential positive measure was the evidence that eight of the schemes were demonstrated to break this trend of downward trend of fare paying (non concessionary) passengers observed outside of London by either increasing or flat lining patronage; consequently these schemes were considered as successes. The two remaining schemes in Nottingham and Tyne and Wear were affected by the lack of information and a final view on their success could not be made.

## 5: RECOMMENDED SENSITIVITY OF DEMAND FOR BUSES FROM THE INTRODUCITON OR EXTENSION OF SOFT MEASURES

The qualitative and quantitative surveys supported by the consultation process confirmed that soft measures do have a material effect on existing users and can be material in causing modal shift. On this basis it was decided that this note should provide guidance to bus operators and Local Authorities on the use of the results of the elasticity model to enable them to make preliminary appraisals of different soft measures.

A series of models were estimated as part of the study based on the primary data collated from the case study areas. The focus of the models was how the introduction of bus soft measures impact on bus demand.

From amongst these models it was the elasticity-based demand models that are recognised as the key forecasting models and that the unpacking models provide the key value inputs used in the predictions. The remaining models provide strong contextual evidence for informing the debate. For example the Route Choice model demonstrated that quality bus was a strongly material variable in determining choice.

The table below is derived from the elasticity-based demand model results. The first column uses a cross-elasticity value and shows the impact on car demand of changes in bus quality, based on car users' valuation of attributes. The second column uses an own-elasticity value and shows the impact on bus demand of changes in bus quality, based on bus users' valuation of attributes.



**Table 3: Impact of Soft Measures**

Attribute	Car Users	Bus Users
Audio Announcements	-0.15%	1.85%
CCTV at Bus Stops	-0.31%	5.71%
CCTV on Buses	-0.39%	2.52%
Climate Control	-0.15%	1.88%
New Bus Shelters	-0.13%	1.63%
New Bus with Low Floor	-0.27%	1.80%
New Interchange Facilities	-0.33%	0.30%
On-Screen Displays	-0.11%	2.89%
RTPI	-0.21%	2.23%
Simplified Ticketing	-0.25%	1.27%
Trained Drivers	-0.34%	3.76%

The valuations in the table are presented as percentage change on the base demand. It is likely that in most cases users will apply the impact to the base bus demand. For example the introduction of RTPI on an hourly service which transports 1000 people per day would increase patronage by 2.23% i.e. about 22 passengers. In the event that car demand is known then that demand would fall by -0.21% and will transfer to bus.

There are two important aspects to using these results:

- Only one of the car user and bus user impacts can be used; **the results are not to be combined**. The results from the car model are a direct transfer to bus whereas the results from the bus model include mode shift from car, cycling, walking and rail (when an option), and generated trips.
- A proper assessment of the base situation needs to be undertaken and, where some element of the soft measure already exists, this needs to be taken into account by reducing the impact. In all the values above it is assumed that there is nothing provided in the Do Minimum (without intervention) situation. In particular with information e.g. RTPI it is assumed that very little information is available; this may not be the actual position.



Additional analysis has been carried out looking into the relative values attributed to different levels of information provision. These are presented in Table 4 as percentages relative to the RTPI values presented in Table 4.

**Table 4: Valuation of Information Provision**

Attribute	Valuation
Real Time Information in City Centre	83%
Real Time Information at Bus Station	85%
Real Time Information at Bus Stops	100%
SMS Real Time Information (Free)	64%
SMS Real Time Information (10p cost)	31%
SMS Timetable Information (Free)	13%
Web Based Information	29%

The table indicates that providing web based information is only 29% as effective as real time information at bus stops. In the example above for the 1000 passenger service, the 22 additional passengers per day would fall to 6 per day if only web based information were provided.

There is significant concern over the package effect of a large number of measures being introduced in combination and part of the research study has been to assess whether the full package produce results that are greater than the sum of individual part (i.e. individual soft measures). The study found very little evidence of this

On average the full package was only 1.3% higher than the sum of the individual effects. This did not support the evidence from the Literature Review.

It is recommended that for information only a maximum of 100% from Table 3 be adopted. An additive approach for say Real Time Information at City Centre and SMS Real Time Information should not be used.

Ideally modelling should only be undertaken on one way trips especially for measures such as Real Time Information. For a home to city centre trip the outbound direction may receive the benefit of real time information at a bus stop (with 100% impact) but on the return journey RTI in the City Centre (with 83% impact). Applying this approach to other measures may result in an unbalanced flow over a day but it is the combined flow which matters.



## 6: SUMMARY OF STUDY CONCLUSIONS

### 6.1 Overall

The study set out to identify whether soft bus measures materially influenced patronage volumes especially in relation to modal shift away from the car. Overall the results have been positive with the values being produced by the models being consistent with some of the studies identified in the comprehensive literature review. It can be concluded from all the sources that soft measures have a positive impact on demand even through the analysis of the patronage data from the case studies and the other study components whilst positive is not overly strong in support.

Most importantly is that overall there appears to be a requirement for good hard quality measures such as frequency and journey time before soft measures can be introduced and have a further positive effect.

The different approaches to identify the materiality of soft measures in influencing modal shift are the strength of this study. The primary and secondary research and the qualitative and quantitative approaches have all demonstrated the significance of soft measures to some extent. The Literature Review showed the weakness and lack of depth in this area and hence justified the reasoning behind the DfT's requirement for this study. The detailed approach in Phase 2 combining stated preference and revealed preference techniques with actual performance data from schemes currently in operation strengthened the case for soft measures beyond that demonstrated in the studies identified in the Literature Review. Safety and personal security came through both the qualitative and quantitative processes as the most important soft issue.

The results from this study are well supported. The highest value soft measures, which also have the higher levels of statistical confidence, are CCTV at bus stops and on bus and driver quality. This reflects a theme identified in the qualitative data collation in the research study which highlights that for a large proportion of travellers, safety and security issues are key to their decisions as to whether to use the bus, alternative modes or not make a trip at all where no alternative mode is available.

The qualitative research is supported by a number of recent studies including the publication 'Routes to Revenue Growth - the message from nine successful bus services'. This report supported the conclusions on a number of soft measures. It reported that the availability of easy to read timetables at bus stops and on internet sites, RTI and SMS was highly valued for existing users but very highly valued in the marketing to prospective users. High quality seating was valued highly by existing users and also in getting prospective users thinking about bus use. Personal security on bus including CCTV was high for users and the same for the sub group of potential users who worried about it, although it could have contrary effect on those who are not. The general thread was supported by the results from this study.

Driver quality was low for users but very high in terms of the value in marketing to perspective users. This was inconsistent with the results of the Soft Measures although this could have been due to the framing of questions.

In 'Smart Choices changing the way we travel' published by the DfT public transport information and marketing was considered. In one of the case studies in Perth it was concluded that a mix of hard and soft measures is highly effective in increasing bus use.

In summary, it seems that soft measures can enhance the bus journey experience however this mainly comes into play when certain hard measures, particularly frequency and reliability, have reached acceptable thresholds. There are exceptions such as travelling with children, in which case low floor buses are essential, and safety. If ever safety becomes an issue it overrides everything else.



## 6.2 Implication for Local Authorities and Bus Operators

The qualitative and quantitative results from this study are very useful as a rule of thumb for identifying the impact of soft measures on bus demand and modal shift in relation to the car. The qualitative ranking gives some indication of the relative importance of hard and soft measures which should assist in working with bus operators in developing Quality Bus Partnerships.

The main study report does present detailed analysis of ranking by market segment e.g. parents with young children, over 65 age group etc, which can be useful in developing a targeted approach. This is important for Local Authorities wishing to consider social inclusion and other non commercial issues and make a trade off with an optimal financial position.

The use of the quantitative analysis, although an initial estimate, will help Local Authorities make an early decision on whether resources should be allocated to develop a more formalised business case using the approach in the WebTAG guidance.

The use of this guide by bus operators is exactly the same as for Local Authorities although they will be aware of the relative success of some of the soft measures in their business sometimes being influenced by type of service and geographic area. The main study report provides a better understanding of the package effect for the 10 case studies and may help enhance the appreciation of soft measures individually and in a package.

The findings of the qualitative research were very informative and considered very useful in guiding local authorities in the effective use of public sector funding to improve bus service standards. The same analysis especially the ranking will help bus operators confirm the relative effectiveness of each measure.

## 6.3 Conclusion

This note has provided non-technical details of:

- The definition of soft measures, such that these can be differentiated from hard measures, with further details provided of different classifications of soft measures;
- Valuations relating to the introduction of different soft measures obtained for both bus users and non-users currently travelling by car, presented as perceived changes in the respective flows; and
- The approximate impact on car and bus demand of introducing different packages of soft measures, estimated using typical commuting mode share figures.

As part of the research study, and with the permission of the Department for Transport and the model owning organisations, values presented above have been assessed in both a multi-modal model and a public transport model. This is discussed in more detail in the WebTAG Guidance.

It is appreciated that in making the decision to use the above values and the suggested modelling approaches more information will be required by the modelling practitioners. For a more detailed understanding of the research that has provided these findings please refer to the Final Report of the Role of Soft Measures in Influencing Patronage Growth and Modal Split in the Bus Market in England.

For direct queries relating to this note or the wider research please contact the Department for Transport, mail to: [david.reams@ntlworld.com](mailto:david.reams@ntlworld.com).