Measuring and Benchmarking User Satisfaction with Transportation

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Word Count: 4993
Figures 10 @ 250 words each = 2500
Total = 7493

TRB 2013 Annual Meeting  Paper revised from original submittal.
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Abstract

Increasing attention is being given to the ability of highway departments and metropolitan planning bodies to demonstrate the value for money of scarce public funds. Over time, this has led to a shift from accounting for the inputs to the system through to what is delivered. Ultimately however, the delivery of transportation improvements is in the eye of the beholder – the public. It is therefore critical to connect the information provided on the performance of the transportation system to the public’s satisfaction with the outcomes of these interventions.

This paper describes an initiative developed independently by local highways authorities in England which covers all aspects of investment except for inter-city motorway routes and rail investment (where they only have an advisory and not a management role). Despite there being no mandate for public satisfaction measures to be collected, a subscription based initiative has now been running for five years with over half of all highways authorities now engaged. This provides a rich time-series data set of satisfaction measures and information on citizen preferences.

The paper presents information about the data collection methods, the findings and how the data is being used in benchmarking. It also extends the discussion into the next phase of the work which is examining the extent to which investment can be linked to system performance and in turn to user satisfaction. If successful this initiative could change the landscape for the incorporation of user preferences in transportation planning and management.
1. INTRODUCTION

"the links between stakeholders’ interests and performance measures are not well developed. Most of the commonly used measures reflect the perspective of transportation planners and engineers and are expressed in terms that are meaningful to those planners and engineers" (2, p27)

The importance of integrating the citizen into the performance measurement and management processes of transportation authorities has been acknowledged for many years (1, 2, 3). This comes as part of a broader move to outcome oriented performance management systems (3, 4, 5). As well as ensuring value for money in the way in which funds are spent on activities such as maintenance, public transportation procurement, road safety enhancements and pedestrian infrastructure there is an acceptance that this investment needs to deliver overarching improvements for a sustainable transportation system (6) such as reduced congestion and improved energy efficiency and air quality. A further, and yet more challenging problem facing decision-makers is how to ensure that the money spent not only tackles key policy goals but that it does so in ways that are noticed, appreciated by and consistent with the sorts of improvements that the travelling public wishes to see. Ultimately it is to the public that transportation agencies are accountable (2). In an era of economic austerity, demonstrating that public funds are well spent is of even greater importance, and this provides a stimulus to make customer oriented planning a reality.

A number of reasons have been identified or could be hypothesised as being important to the limited adoption of measures of user satisfaction in the transportation planning arena:

- The metrics used in performance measurement are those defined and developed by transportation planners and engineers and are too technical to work for citizens (2).
  This was borne out, for example, in research on pavement roughness which concluded that “pavement indices do not explain satisfaction to any great degree,” (7: p19)

- There is insufficient experience in the development of public satisfaction measures and little evidence of how these metrics change over time (4). This leaves transportation planning agencies with a problem of managing through potentially unresponsive or volatile indicators (if true).

- Measures of user satisfaction are typically defined for particular modes or attributes of networks in isolation (e.g. bus user satisfaction separate to road surface satisfaction). This does not permit an integrated oversight of the priorities of the public. However, previous attempts identify this to be a challenging task if linked to specific attributes of the network (such as number of crossing points, street lighting and density of the network) (8, 9).

- There are tensions between the desires of the travelling public, their aspirations for the transportation system and their willingness to fund the spending that would deliver their aspirations. It is also not clear how transportation agencies should reconcile any gaps between citizen demands and broader obligations to long-term asset health or sustainability for example which may not feature prominently in the citizen discourse.

Whatever the reasons for the difficulty in implementing more citizen oriented satisfaction measures, it is suggested that the current state of practice is problematic. It is not sufficiently developed to connect transportation spend to customer oriented outcomes. It seems that it is not possible either to rely on the more technocratic metrics that planners and engineers work to as a basis for communicating the value to the consumer of at least some of what is spent. This paper presents an on-going initiative from England which is seeking to address issues of
public satisfaction in a comprehensive manner across a range of areas of competence. It also introduces the next stages of the work which are to link the changes in measures of satisfaction to measures of network or service quality and the investment decisions of local government.

The National Highways & Transport Public Satisfaction Survey (NHT Survey) is the first standardised public satisfaction survey for Highways and Transport Service in the UK. Initiated in 2008, it collects public perspectives on, and satisfaction with, highway and transportation services in local authority areas. The data is used by local authorities to inform performance management and Local Transport Plans. Because of the organisation of the transportation system in the UK, local governments are typically not responsible for rail services. The data does not capture inter-city journeys or data from those making journeys that cross in to an area from outside of the local authority.

The NHT Survey was developed in a collaboration between the NHT Performance Benchmarking Group and the County Surveyors Society (CSS) South West Highways Service Improvement Group (SWHSIG), and with support and endorsement by the National Highway Efficiency Liaison Group (HELG), the South West Regional Improvement and Efficiency Partnership (SW RIEP) and The Government Office for the South West (GOSW). It has its own Steering Group of participant authorities. The NHT Survey is managed by measure2improve (m2i) on behalf of the National Highways and Transport Network (NHT Network).

The survey is offered as a service, to which Authorities subscribe on an annual basis. It gives the participants a better understanding of how they are performing in the eyes of their public. It provides a consistent datum for setting service levels and a means of measuring the impact of service improvements. It helps to identify the best performers and provides the participants with the opportunity to learn from the good practice of others.

It is run as a postal survey, with questions organised under themes linked to national shared transportation priorities (Local Transport Plans) and other important highway and transportation related topics.

In 2008, the survey’s first year, 33 local councils across England took part. This increased to 76 English authorities in 2009 and 95 authorities from England and Wales in 2010. In 2011 participation remained high in spite of the challenging economic climate and the pressure on budgets with 70 Councils taking part and the participation level has risen to 76 in 2012, more than half the total English Highways Authorities.

101 English Highways Authorities have taken part since the survey started, more than two thirds of the total. 32 of the Authorities not to have taken part to date are in Greater London and Greater Manchester, in other parts of the country coverage is almost universal.

385,500 NHT Survey questionnaires were posted to households across England on 2nd July 2012. The deadline for returning completed questionnaires is 3rd August 2012 and the results will be released publically after the NHT Annual Conference in London on 9th October 2012.

The NHT Survey database now holds the views of 243,845 members of the public (up to 2011), including 60,626 responses in 2011. Based on last year’s response rate we will have another 67,848 responses this year. There are 87,240,187 separate records in the database, using 22 gigabytes of disk space.
The cost for a single authority in 2012 was £7,500, this fee is based on a sample size of 4,500. Individual participants can elect to increase their sample size for an additional charge of £1,000 per 1,000 (£1 each).

2. THE NATIONAL HIGHWAYS AND TRANSPORT SURVEY

The NHT Survey is managed by measure 2 improve who enter into individual contracts with each participating authority to deliver a survey service. The fieldwork is contracted out (currently through Ipsos MORI) including sampling, questionnaire print and despatch, scanning and weighting responses and preparing a data file. m2i process the resultant data file in a performance database, derives key benchmark indicator scores (KBIs) for each authority and prepare an extensive range of reporting and analysis, which are accessible, without restriction via the NHT Survey website, the website is maintained and hosted by m2i.

The survey, which runs to 12 pages, starts with questions asking how important, if at all, members of the public regard different aspects of Roads and Transport Services and how satisfied or dissatisfied they are with each one (see Figure 1).

The next two questions (Figure 2) ask the public to pick ‘the three highways and transport services most important to YOU personally and three areas most in need of improvement in

FIGURE 1: NHT Sample Questions

The next two questions (Figure 2) ask the public to pick ‘the three highways and transport services most important to YOU personally and three areas most in need of improvement in
your local area”. These questions were introduced by the Survey Steering Group in 2011 as part of the annual review of the survey contents.

Q3 Looking again at the same list, which three are most important to YOU personally?

Q4 The Council has to decide what to focus on and how to use its budget to improve transport and highways in the local area. Which three of these do YOU think are most in need of improvement in your local area?

Pavements and pedestrian facilities
Community Transport, e.g. Dial-a-Ride & volunteer car schemes
'Demand Responsive Transport' i.e. flexible bus services
Levels of local traffic pollution
Local bus services
Local taxi (or minicab) services
Pavements & footpaths
Rights of Way network
Safety on roads
Street lighting
The condition of roads
Traffic & congestion levels

FIGURE 2: Questions on Most Important Services and Most in Need of Improvement

The questionnaire then goes on to ask detailed questions on: Pavements and Pedestrian Facilities, Cycling, Rights of Way, Buses, Public Transport Information, Taxis, Minicabs and Community Transport, Road Safety, Road works, Traffic Management, Causes of Congestion (Traffic Queues) and Condition of Roads and Pavements.

It concludes with a classification (‘demographics’) section including questions about age, sex, working status, car ownership, national free bus pass ownership, disability, Blue Badge ownership (allowing parking in disabled bays) and ethnicity.

Survey forms are printed individually for each participating authority, to include their logo and a signed letter by a council representative. The letter includes details of how respondents can call for assistance by phone or email, including requests for a large print version of the questionnaire and how they take part in a language other than English. A pre-paid envelope is provided for recipients to return the questionnaire free of charge. The survey is open to anybody aged 16 or over living at an address which receives the questionnaire.

The same questionnaire is used for all local authority participants. This allows participants to benchmark their performance and take full benefits of the economies of scale. The questionnaire has been graphic-designed to make sure that it is respondent-friendly and to encourage recipients to take part, a prize draw is also used with £400 for the first prize, £200 for the second, £100 for the third.

The questionnaire is sent to a random sample of residents in each local authority area, the sample is generated for each participating Local Authority from the Small Users File which is a sub-file of the Postal Address File. Recipients are given a three week period in which to make their return. No reminders are sent to keep the costs down.
There are no guarantees on number of responses although there is a minimum sample size. In 2008, 4,500 questionnaires were mailed out in each local authority area, since 2009 authorities have been invited to consider their own mail-out sizes and these range from 4,500 to 9,000. An average response rate of 17.6% was achieved across the local authorities who took part in 2011, although there was considerable variation in response rates across the country.

One of the conditions for participating in the survey is agreeing to the full disclosure of aggregate and indicator data for benchmarking purposes (one of the primary purposes of the survey), although respondent data is anonymised. Local authorities can request copies of their own respondents data but this does not include names (if provided) or postcodes of the respondents.

Completed questionnaires are returned to the survey manager who use scanners to capture the data. The use of scanners keeps the costs down, is quicker and removes human errors. Unique barcodes enable the data to be processed as one dataset. A numbering system is used to differentiate between questionnaires particular to specific local authorities.

The survey results are weighted to correct for any imbalances between the survey sample profile and the profile of the ‘universe’. Responses from each individual completing the survey – i.e. each respondent – are given a weight in accordance with several categories: age (in four categories – 16-24, 25-34, 35-54 and 55+); gender (male vs. female); ethnicity (‘white’ vs. BME); and work status (working full-time vs. not working full-time). Full details on the weighting scheme currently in use are available at: http://nhtsurvey.econtrack.co.uk/Documents/Document.ashx?1456. Whilst the data has not been weighted by frequency of use of mode of transportation this would be possible.

The survey manager then pass a data file to m2i who load the results of the survey into a performance database and provide standard reporting and analysis of the data by authority, by region and overall. All this reporting is accessible and runs live via the NHT Survey website (see www.nhtsurvey.org) – see Figure 3.

The Survey results are organised by theme (overall public satisfaction, accessibility, public transportation, walking and cycling, tackling congestion, road safety and highways.
maintenance & enforcement). Within each theme results are summarised using a number of Key Benchmark Indicators (26 in total), these KBI are derived from aggregations of weighted responses to one or more individual survey questions. A series of Benchmark Indicators (BIs) sit beneath each KBI. Summary KBI and BI reporting is provided for each participating authority (example below).

**FIGURE 4: Benchmarking of Indicators**

The NHT Survey website provides access to a wide variety of standard reports including dashboards with graphical and tabular content. Options are provided to allow for users to devise and run their own reports and graphs as and when required.

The reporting of survey results includes an on-line mapping tool, which presents results spatially on a map. The development of the mapping capability was funded by a grant from the SW Regional Improvement and Efficiency Partnership (SW RIEP).

**FIGURE 5: Mapping of public satisfaction**
3. COMPARING SATISFACTION MEASURES

The NHT survey provides a rich and transparent form of data on user satisfaction across the range of transportation issues, excluding rail. It therefore, at its most simple level, provides an opportunity to benchmark performance across different local areas. Benchmarking is a tool which has been applied within the transportation sector more typically to examine issues such as costs and project delivery times (system inputs and outputs) (10). Efforts have also extended to more customer oriented roadway maintenance measures (11). The absence of standardised question sets for issues such as user satisfaction, or clear relationships between operational metrics and satisfaction has served to undermine the potential application of benchmarking in this important area with the exception of specific one-off indicators such as bus user satisfaction (4).

Figure 6 below shows an example comparing the performance of three local government bodies in England.

**FIGURE 6: Benchmarking Importance and Satisfaction**

The Metropolitan Borough and Unitary Authority are largely urban authorities in the north of England whilst the County Council is a mix of urban and rural areas in the commuter hinterland of London in the south east of England. Of particular note in Figure 6 is the broad
mirroring of trends across the different types of indicators in the different areas. The stand out issue in terms of low satisfaction relative to importance is highway condition. Looking more specifically at differences between authorities then in the areas of local buses and highway condition there is a variation of 10% or more between the best and worst responses for satisfaction for the three authorities. Benchmarking can only identify the set of issues that require further investigation and it is then for the authorities concerned to identify which of their peers to talk to in order to identify potential improvements.

Figure 7 shows how important the different components of managing roadworks are deemed to be in the different regions of England. This allows local authorities to focus on those issues which appear of greatest relevance to customer satisfaction. The relativities are interesting if not very well spread. Safer roads and highway condition are deemed most important, followed by pavements (sidewalks) and local buses. Reducing traffic levels is less important than all of these and broadly on a par with street lighting. That is not to say it is not important in some contexts nor that citizens are necessarily clear on some of the wider benefits of less traffic but, on average, it is not at the top of their list of important priorities. It is noteworthy that traffic levels were not seen to be more important in London then elsewhere despite the higher levels of delay in that area (although this is reflected in satisfaction measures below). Cycle routes have lowest importance, which probably reflects a large proportion of the population that does not or rarely cycles. Again, the average statistics may hide some important variations.

![Importance Analysis by Region](image)

**FIGURE 7: Importance of different components of managing roadworks**

Figure 8 shows some comparative public satisfaction measures around traffic management in four urban areas. The variation between individual urban areas appears to be greater which
will be a function of smaller sample sizes (still several hundreds) but also aggregation and averaging effects at the larger scale.

**FIGURE 8: Comparison of public satisfaction with traffic management**

The figure shows the range of levels of satisfaction (this time presented without reference to the relative importance of the issues). Generally, road signage and traffic light positioning have high levels of satisfaction. The more congested areas of the Unitary authority in the South West and the Inner London Borough have lower levels of satisfaction with wait times at traffic signals, suggesting that the public satisfaction measures mirror the types of metric that transportation engineers would use for this measure. The greater levels of satisfaction with tackling illegal parking in Inner London are noteworthy. Parking is more difficult in London and there are many more restrictions on parking than in other areas. Despite high levels of enforcement, public satisfaction is at least 10% points higher than elsewhere reflecting an apparent desire to keep streets moving and to turnover car park spaces. The differences in the park and ride site satisfaction is likely to be a function of the availability of park and ride with the two authorities scoring the highest having more such services.

Figure 9 shows a comparison of performance over time aggregated to the different regions in England and showing one year’s data for neighbouring Wales. Generally speaking, public satisfaction with congestion levels is low at around 50%. It is low across the whole country despite quite different traffic conditions. Whilst this may suggest an unresponsive indicator or one that is poorly correlated with the transportation system metrics there are some signs to suggest that this is indeed robust. The levels of satisfaction in London, where average speeds are lowest are also lowest and the levels of satisfaction have increased from 2009 to 2011 reflecting the economic slow down and lower traffic levels.
4. LINKING SATISFACTION TO INVESTMENT

The examples in Section 3 begin to explore the potential that can be derived from a more comprehensive capture of user satisfaction ratings. As highlighted in Section 1, whilst this can help to focus an organisation on what appears to matter most to the public and on the areas which matter most and with which they have least satisfaction, it does not tell the organisation what types of investments or approaches to delivery will make a difference. There is still a gap between knowledge about investment and implementation and the extent to which it will improve user satisfaction.

Some of this understanding is probably best revealed through detailed exchanges between organizations with differing levels of performance – one of the key principles of useful benchmarking. However, a further element needs to be developed which is to bring the detail of the core network quality and the investment programmes together to see the extent to which satisfaction varies with quality and the extent to which it can be influenced by improvements to the infrastructure or services.

Satisfied Customers, Technical Quality and Cost Effective Delivery are generally considered to be the three key components of all round excellent performance, the ‘three legs’ of the performance stool.

- COST - Getting the most done for every pound (or dollar) of investment
QUALITY - Ensuring the work is the right quality and addresses the challenges

SATISFIED CUSTOMERS

The performance of these three key components are inextricably linked, because the achieved level of performance for any one leg will impact on the performance levels of the other two. The three performance legs place competing demands on each other and so it is only by considering the interaction of all three together that optimum decisions for the future can be made on a measurable and demonstrable basis.

NHT’s CQC evaluation employs a combination of indicators within each performance leg which are carefully balanced to enable the evaluation of performance by themes based on LTP and National Priorities.

The CQC has, where possible, adopted indicators for which data is already available:

- Customers – NHT Public Satisfaction Survey KBI & BI results
- Quality – Transport National indicators and Traffic & Congestion statistics etc
- Cost – Capital & Revenue expenditure returns to government
- Demographic and geographic data is also used.

To date NHT’s CQC model has been based on deriving CQC ratings for each indicators, scores out of 10, where the lowest (worst) value in the sample = 0 and the highest (best) value in the sample = 10 (n.b. for cost measures and for some quality measures the lowest value is best)

The ratings for all other values in the sample are then calculated by comparing their relative position to the lowest and the highest values using the following formula;

\[(\text{Actual} - \text{Worst})/(\text{Best} - \text{Worst}) \times 100.\]

It should not be assumed that in seeking optimum performance that an authority should aspire to 10 out of 10 ratings, average performance or less may well be best suited to local needs. For example, should user satisfaction with cycling facilities be uniform? It seems likely to vary with factors beyond the control of the transportation system such as weather.

An analysis of CQC ratings provides an authority with a composite assessment of their overall performance and of their performance relative to others. CQC reports draw comparisons between Authorities of similar type and operating in similar circumstances.

Standard CQC reporting shows an authority CQC results for each indicator, their ranking compared with its peers. There is also reporting to compare similar authorities showing high, lows and average for each indicator. All results are presented anonymously via the CQC website, although access is restricted to NHT members only on entry of a valid logon and password. An example chart is shown in Figure 10 (where the maximum score would be 30).

The range of results is from 12.5 to 27 suggesting quite wide divergence across all criteria.
NHT Network is documenting the different things Authorities are undertaking to try to improve performance, such as different short-term road repair methods or lighting renewal patterns. Understanding of the different approaches being taken by best performers and the biggest improvers to tackle the same problems can only lead to a spreading of performance improvements at the same or lower costs; true efficiency gains.

Whilst this approach to driving performance efficiencies remains promising, it serves to reinforce the time consuming nature and challenges of ensuring that costs are catalogued in similar ways in different authorities, that comparable outcome or output performance measures are available so that these can be put alongside the enhanced public satisfaction data.

5. WHERE NEXT?

This paper has presented a major initiative from UK transportation authorities to understand and track over time the attributes of the transportation system which users find important and their satisfaction levels with the system. The open access to data is to be commended. This approach is now being expanded to incorporate information on investment over time to explore how the actions of transportation engineers and planners impact on user satisfaction. Whilst the focus of issues and the way in which questions are framed may differ across areas, we see no reason why similar approaches could not be adopted elsewhere.

The data set raises a number of challenges which remain to be explored. Is an aggregate annual survey sufficient to allow an organization to understand how its actions impact on
satisfaction? Would, for example, a new corridor level investment be swamped by the general picture across the administrative area? If it is swamped then does that tell us something or does it hide something? The responses raise questions about the extent to which the public’s tastes vary with setting. So, are users of roads in London more or less concerned with congestion improvements because they are used to generally lower levels of speed? Which aspects of the transportation task have significant taste variation by area and which do not? This is likely to be an important factor in identifying meaningful peer benchmark authorities. The data provides an as yet untapped potential to explore the relative importance of different attributes of the user experience. This is true for within measure comparisons (e.g. do we need six different questions to ask about the way in which roadworks are managed or could this be rationalised to three?) and between measure comparisons (e.g. is it more important to capture information on the street environment than the speed of traffic?).

The challenge of taking the data set one stage further into exploring the relationships between investment and outcomes have been highlighted. These are critical areas to ensure that value for money is achieved in investment choices and represent a significant future goal for the work.

This paper has attempted to open a debate about the value of public opinion in informing transportation engineering planning decisions. There exists great potential to make more of this type of data and to be ‘customer-led’ rather than ‘technocrat-led’. Nonetheless, there also exists a tension between the preferences of the public which may be short-term oriented and the longer-term policy goals set out for transportation agencies to achieve. Where such tensions do exist then this would appear to be fruitful ground for consultation and communication. If these tensions are buried then there is a risk that the public will become disenfranchised as they see transport investments going into areas which don’t match with their expressed needs and preferences.

6. REFERENCES


TRB 2013 Annual Meeting  Paper revised from original submittal.


