

March 2017

# Market research on local buses

## Emerging survey findings

A Knowledge Transfer Partnership between:



David Ligertwood (*company supervisor*)  
Paul Millin (*company chair*)  
Shona Snow (*company facilitator*)  
Tom Pape (*associate*)



Dan Bance (*administrator*)  
James Aitken (*support academic*)  
Jane Hemsley-Brown (*academic supervisor*)  
Wolfgang Garn (*academic supervisor*)



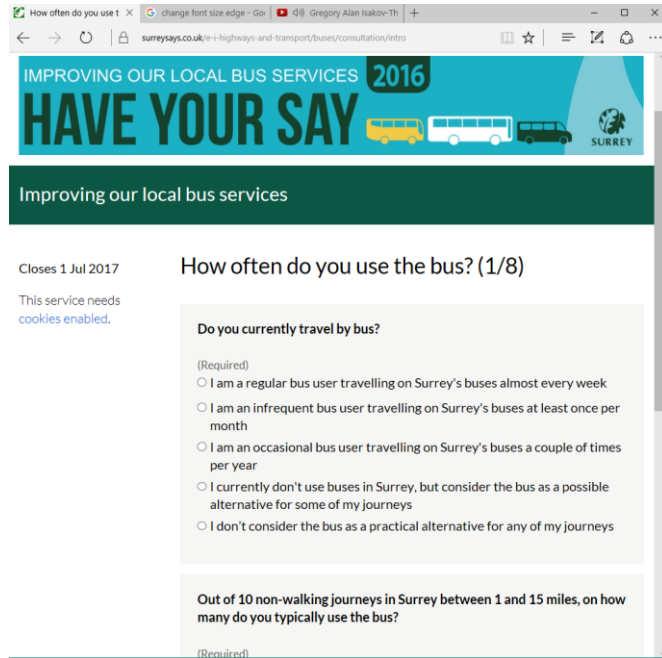
Anne Hartnell (*KTP Advisor*)



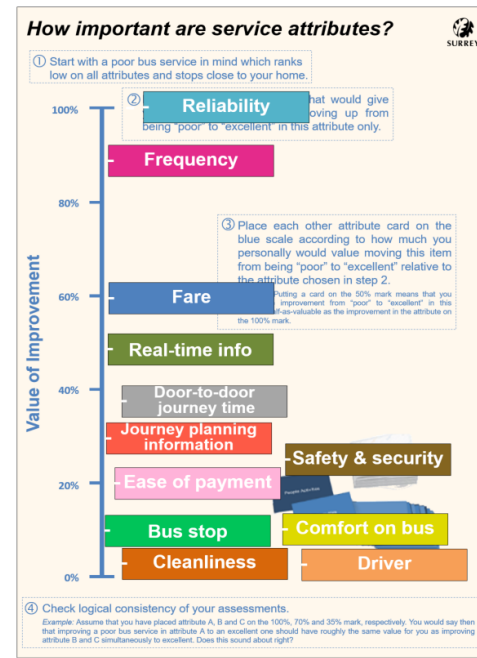
SURREY

# We have carried out our market research in three steps

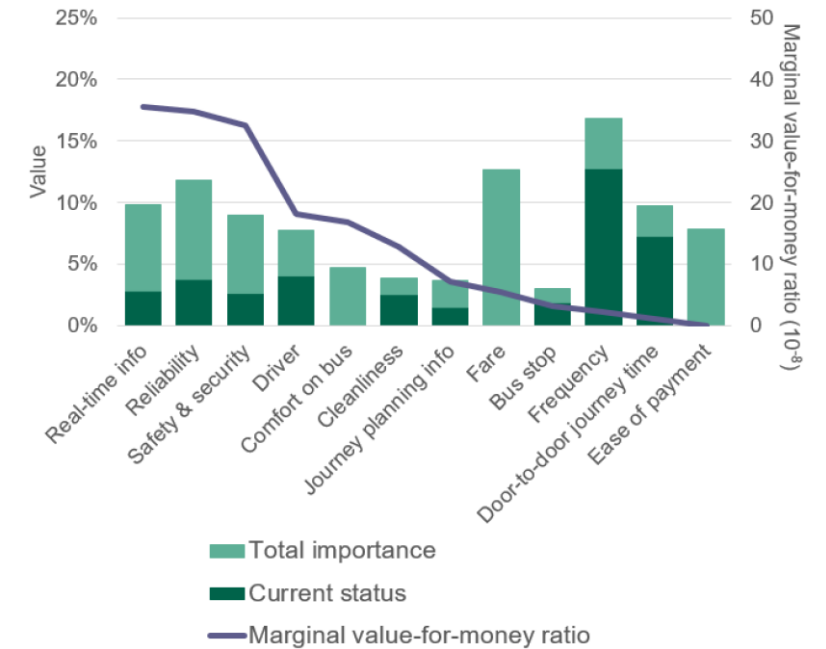
## Step 1 Multiple-choice questionnaire



## Step 2 Swing Weighting



## Step 3 Value-for-money chart



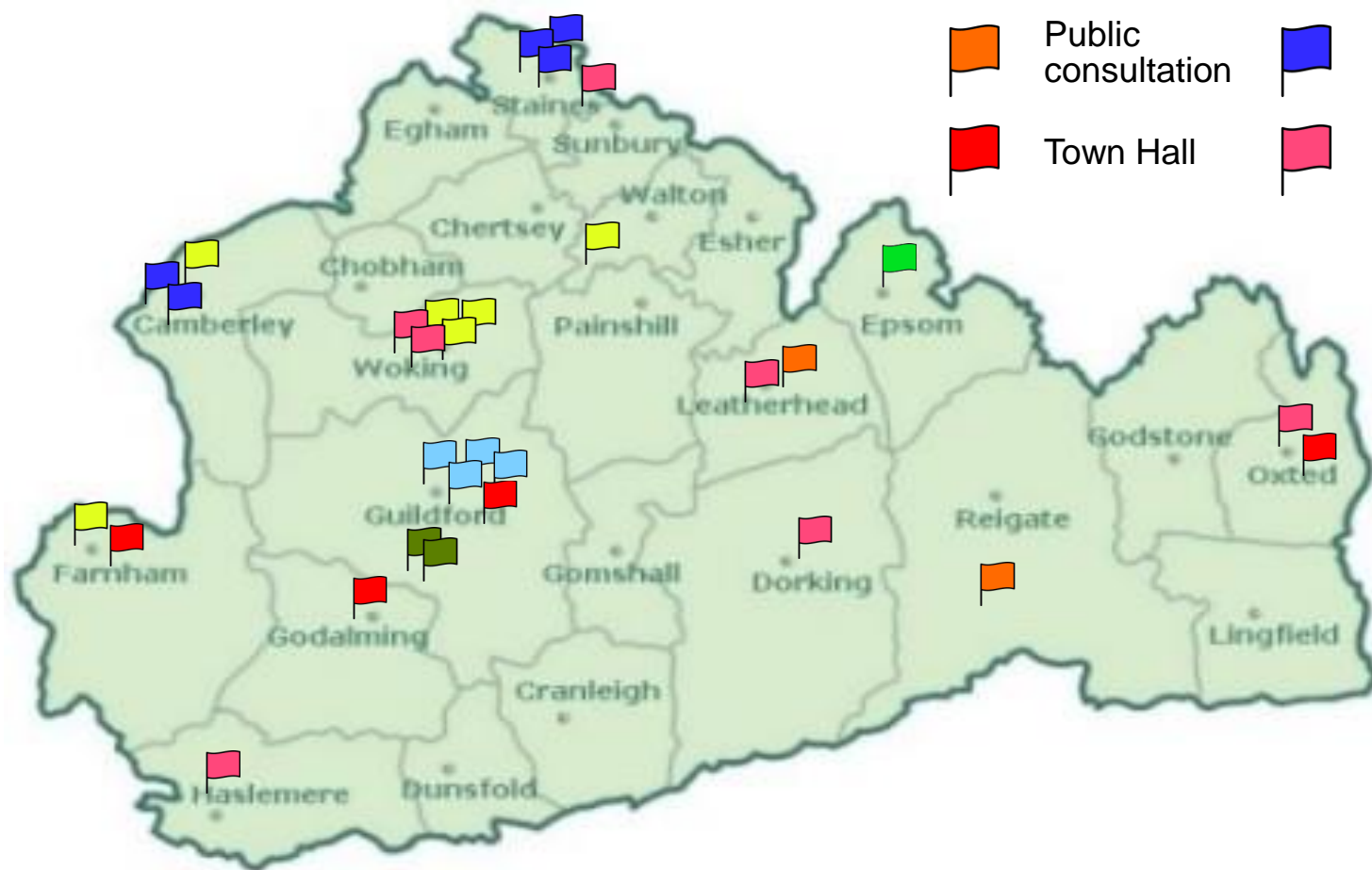
Who are the potential bus users?









What service improvements matter to them?

What are the most cost-effective service improvements?

The goal of our market research is to provide insights into what bus service improvements are most cost effective to increase patronage among working-age residents in Surrey.

# We have gathered the views of 301 residents across the County



-  Public consultation
-  Shopping centre
-  Library
-  University staff
-  Town Hall
-  Leisure centre
-  Park & Ride
-  College



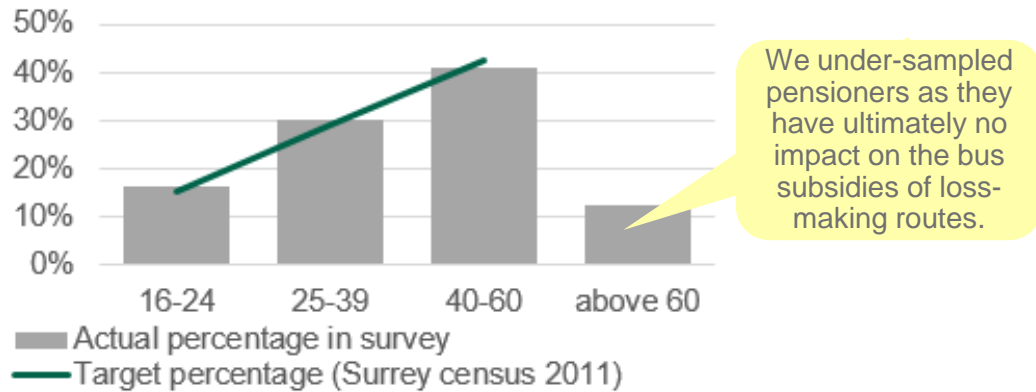
Elmsleigh shopping centre (January 2017)

*[Each flag represents 1 FTE collection day with approx. 10 responses each]*

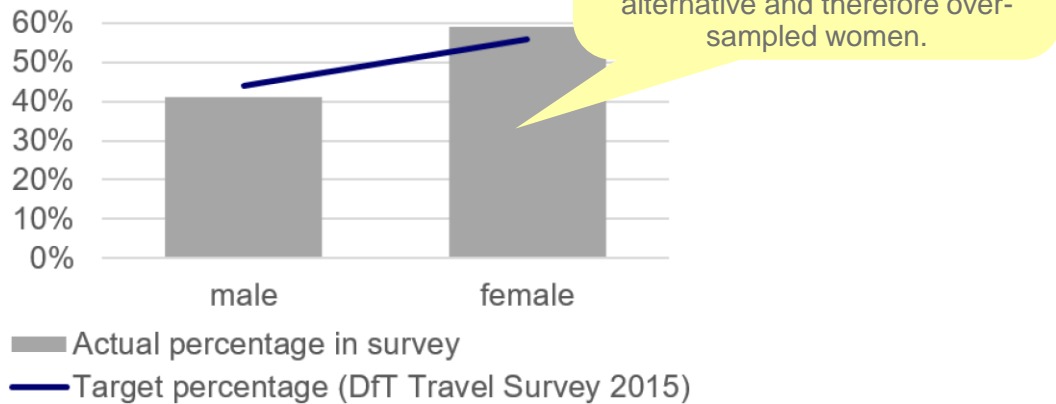
**We believe that our multi-site survey with a generous financial incentive sampled the market of existing and potential bus users in Surrey well.**

# We ensured that the demographics of the survey responses are representative for Surrey

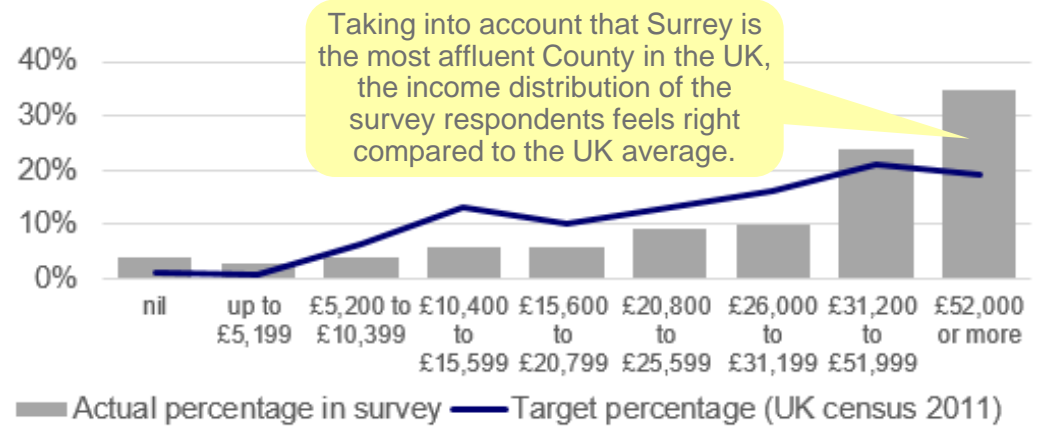
## Age distribution



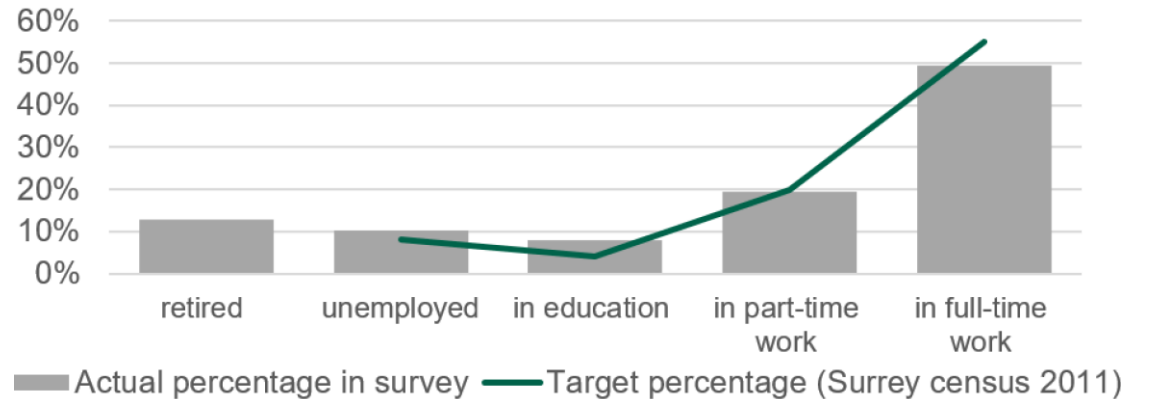
## Gender distribution



## Gross household income distribution



## Employment distribution



# We identified 19 relevant attitude and lifestyle drivers for bus usage

## Factor analysis of responses to multiple-choice questionnaire\*

### Driver A: Using the bus is difficult

- Q10 There are many problems and difficulties with using buses (0.7)
- Q11 I don't feel in control of the situation when using the bus (0.7)
- Q12 That buses don't always arrive according to the timetable tremendously decreases their attractiveness (0.6)

### Driver B: Knowledge about bus services

- Q15 I roughly know the fares of my local bus service (0.7)
- Q17 I know where the buses at my nearest bus stop go to (0.7)

### Driver C: Planning a new bus journey is easy

- Q18 I think it is easy to plan a journey on a bus route that I haven't used previously (1)

### Driver D: Cars are more convenient than buses

- Q24 When in a traffic jam, I prefer to sit in my car rather than on a bus (0.7)
- Q25 I like travelling by car (0.7)
- Q27 Driving by car rather than going by bus saves me a lot of time (0.6)
- Q32 If possible, I try to use public transport instead of driving by car (-0.6)
- Q33 Cars are the most convenient way to get around (0.7)

### Driver E: Dependent on having a car

- Q29 If for some reason I could no longer use my car, I would find this extremely inconvenient (0.8)
- Q30 Without a car I can't handle my daily life (0.9)

### Driver F: Using buses for the environment

- Q14 People who drive a lot should be made to pay more for environmental damages (0.6)
- Q23 I try to use the car less for environmental reasons (0.6)

### Driver G: Using time on the bus

- Q03 Going by bus is good for relaxation (0.7)
- Q04 Travelling by bus is an opportunity for me to get in touch with others (0.5)
- Q05 Going by bus allows me to do other things while travelling (e.g. telephone calls, reading, playing with my phone, eating) (0.3)

### Driver H: Prefer walking/cycling to going by bus

- Q20 If I have a choice, I rather walk 1 mile than taking the bus (0.7)
- Q21 If I have a choice, I rather cycle 2 miles than taking the bus (0.7)

### Driver I: Lack of privacy on bus

- Q06 It bothers me that I am confronted with awkward people on buses (0.5)
- Q07 I feel safe and secure together with other passengers on the bus (-0.6)
- Q08 I don't like it if somebody sits directly next to me on the bus (0.5)

### Driver J: Buses are value for money

- Q16 Bus tickets are value for money (-0.6)
- Q26 I think travelling by car is cheaper than by bus (0.6)

### Driver K: Requires full reliability

- Q09 As long as I know that the bus will come at most a few minutes late, I don't mind waiting for it (1)

### Driver L: Social status of bus users

- Q13 The large majority of bus users are either not able to drive a car or cannot afford buying an own car (1)

### Driver M: Active in the evening

- Q37 I regularly go out in the evening (0.5)
- Q41 I often travel after 7pm (0.7)
- Q42 I often travel after 10pm (0.9)

### Driver N: Travel to more than one location a day

- Q34 I usually travel to more than one location each day (1)

### Driver O: Outdoor activities

- Q35 I regularly do outdoor activities in my free time (leisure walks, cycling, etc) (1)

### Driver P: Cultural activities

- Q 36 I regularly do cultural activities in my free time (theatre, concert, museum, galleries, etc.) (1)

### Driver Q: Travel alone

- Q38 I usually travel alone on my daily journeys (1)

### Driver R: Travel with children

- Q39 I regularly travel with children under 10 years (1)

### Driver S: Must be at work on time

- Q40 On most days, it is not a problem for me if I arrive 10 minutes late to work or for other responsibilities (1)

### Excluded questions

- Q19 I would like to see more road space being converted to bus-only lanes to make bus journeys in Surrey faster and more reliable
- Q28 I am not fixed on a particular mode of transport; my mode choice depends on the situation
- Q31 Most recent cars are too big, fast and heavy

We have facilitated two focus groups with existing and potential bus users to develop the survey questions Q01 till Q40.



The focus groups have been transcribed and analysed using qualitative research methods.

**Factor analysis allowed grouping the multiple-choice survey questions into 19 drivers of people's decisions to join the bus. Factor analysis searches for statistical correlation among the responses for the different survey questions.**

\* Loading factors from factor analysis for each question in brackets. Loading factors close to ±1 mean that question explains driver well.



# We have identified 3 segments of potential bus users based on participants' responses to the 19 drivers of the multiple-choice questionnaire

## Flexible Commuters (28%):

- Tend to know their bus services and find using them only slightly less convenient than going by car
- Tentatively able to make use of their time on the bus (e.g. resting, communicating, reading)
- Might be receptive to promoting the bus as an environment-friendly travel option
- Have often some flexibility on when to show up for work/education
- Typically travel alone and just to one location a day
- Often prefer to cycle or walk instead of using the bus where possible
- Mostly don't have children under 18

## Target group

because Flexible Commuters have the most favourable attitude and lifestyle for growth in patronage

## Working Parents (34%):

- Generally open to use the bus though judging it as a slightly less favourable alternative than the Flexible Commuters
- Able to make use of their time on the bus
- Less open to walking/cycling instead of going by bus
- Less likely to travel alone, often travel to more than one location a day and are usually home in the evening
- Typically caring for one or two children under 18
- Tend to have a lower household income

## Car Lovers (38%):

- See using the car as far more convenient, feel very dependent on owning a car, and are less informed about their local bus options
- Are very concerned about coming to work/education on time
- Usually travel to more than one location a day and are more likely to travel in the evening
- Don't see bus fares as value for money
- Mind lack of privacy on the bus

36 participants above sixty ("**Bus Pass Holders**") and 15 participants older than twenty-four who cannot drive ("**Bus-dependent Users**") are excluded.

Statistical cluster analysis allowed grouping survey participants into 3 market segments by searching for commonalities in participants survey responses.

# Using the Swing Weighting technique enabled us to capture to what extent survey participants value improvements on various bus service attributes

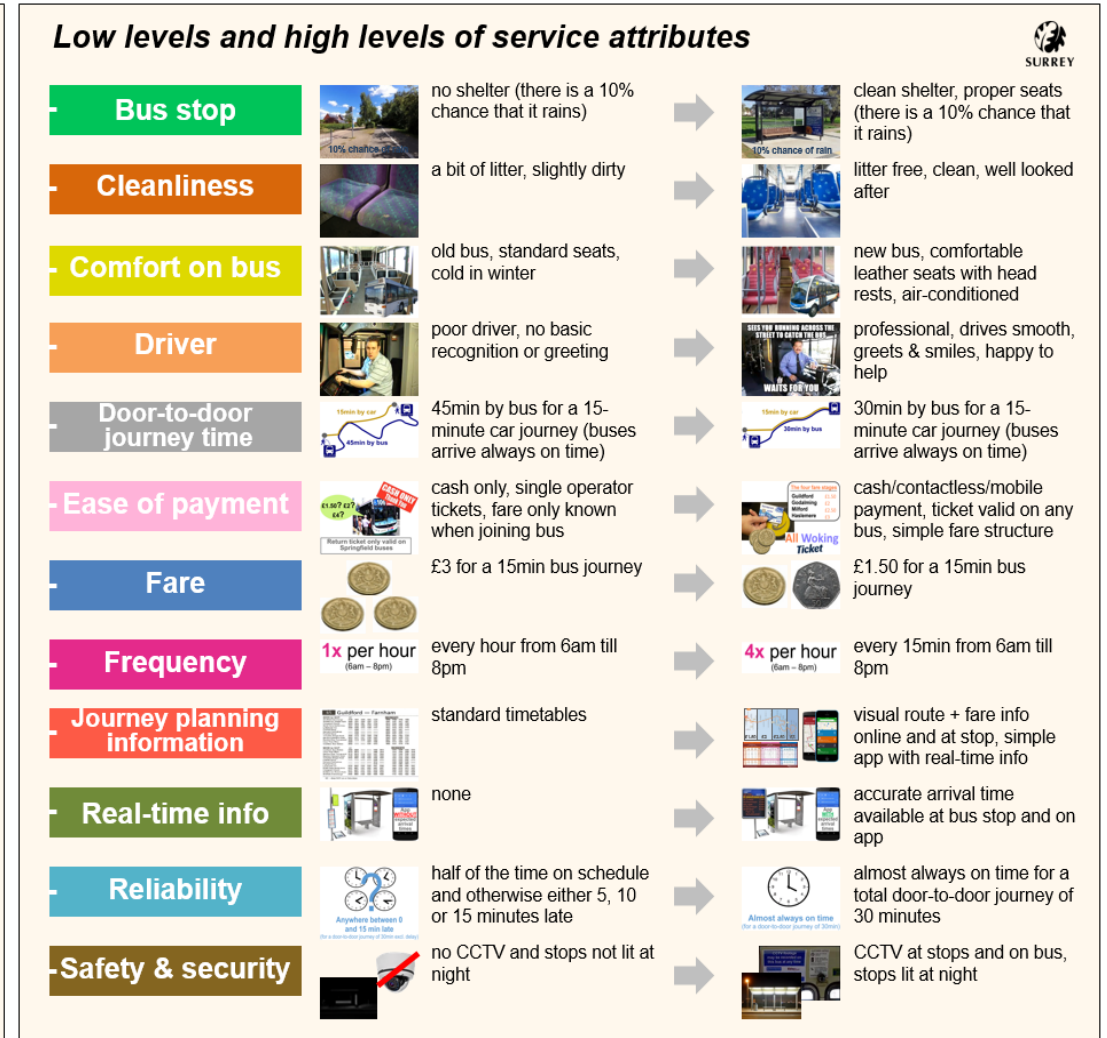
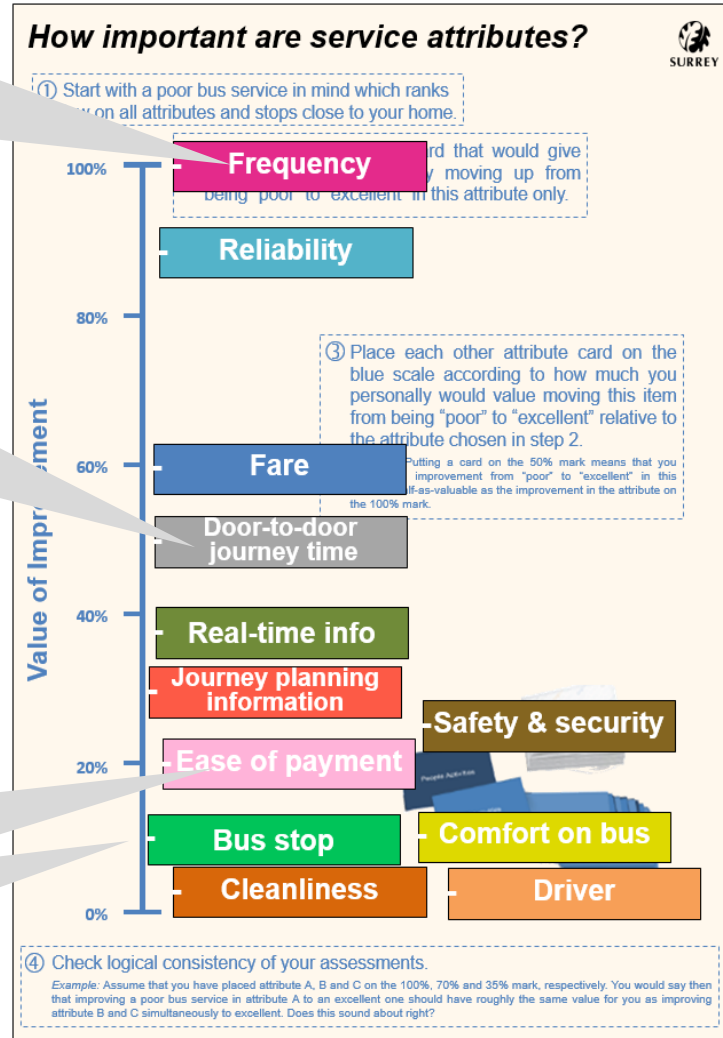
① Place the attribute whose improvement would add the most value to the journey experience at the 100% mark.

② For each other attribute, say how much benefit its improvement would bring relative to the most valued improvement.

Here: Reducing the door-to-door journey time from 45 till 15 minutes is valued about half-as-much as increasing the frequency from once per hour to every 15 minutes.

③ Check consistency of responses.

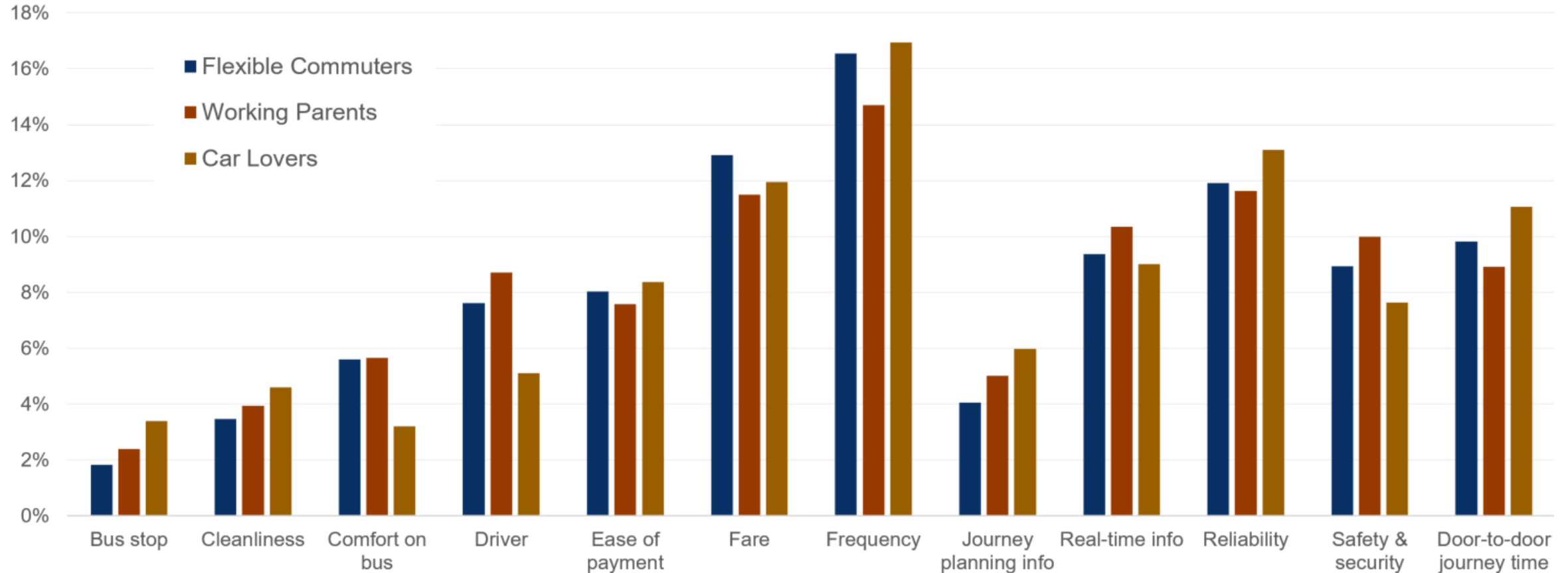
Here: Survey collector could check whether participant values the improvement of the quality of the bus stop (10%) and the comfort on the bus (10%) exactly as much as making it easy to pay the fare (20%) – otherwise ask participant to revise their weights.



Importance weights make only sense if they can be associated with an improvement from a low to a high level. To make participants' responses comparable, we showed everybody the same verbal and visual levels of improvements.

# We have not identified much difference in what bus service improvements matter to different market segments

Results of Swing Weighting survey grouped by market segment\*



**The percentage weights measure the importance survey participants attached to improving each attribute from its specific low level to its specific high level – thus they are a measure for the value of improving the quality of local bus services.**

\* To increase the robustness of the importance weights, half of the participants were asked to take part in a partial-profile Discrete Choice Experiment (DCE) rather than Swing Weighting. The DCE asked participants to make choices from pairs of hypothetical bus services. The importance weights for individual attributes were computed based on these choices using a multinomial logit model in the statistics package R.



# Putting the target group's perceived importance of service improvements in relation to their costs allowed us to prioritise investment decisions

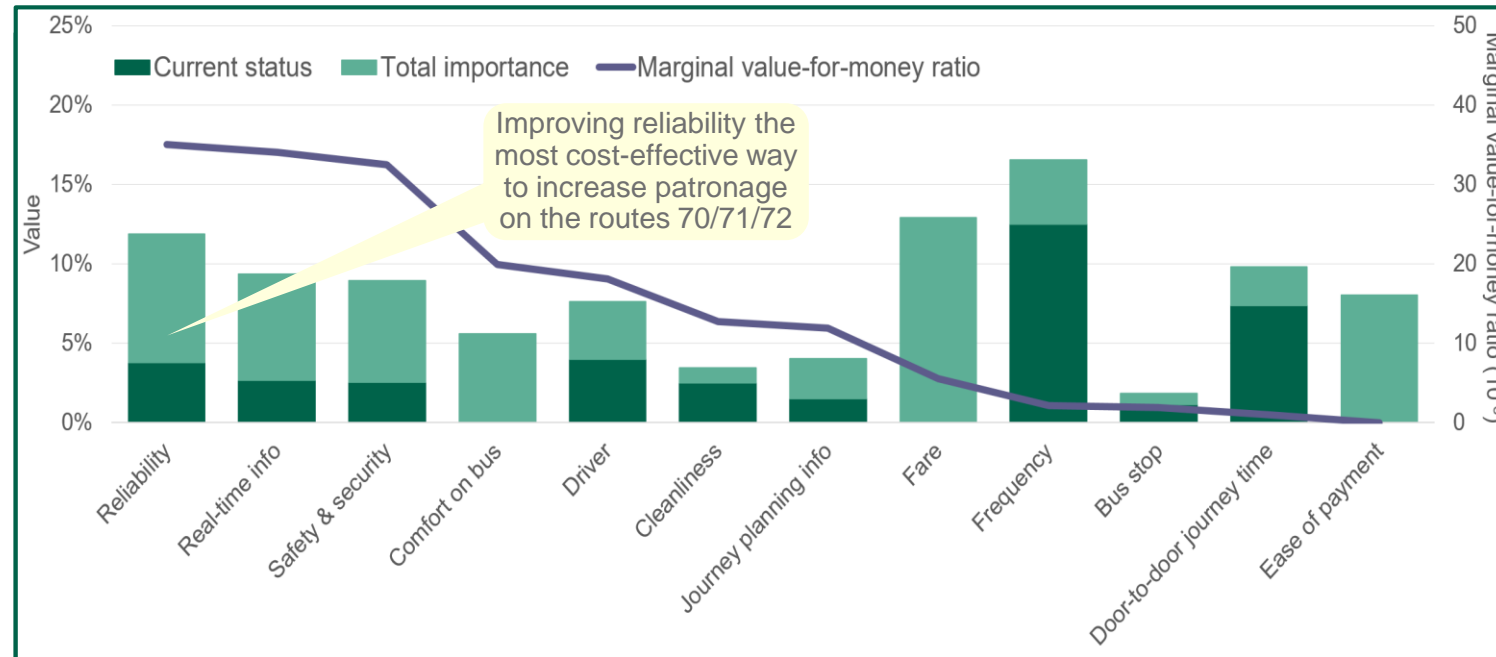
An illustrative example of the value-for-money chart for the Flexible Commuters for the routes 70/71/72

Attribute	Total Importance	Current status	Marginal Improvement	Marginal value	Marginal fix costs	Marginal 5-year maintenance costs	Marginal value-for-money ratio (10 <sup>-8</sup> )	Remarks
Reliability	11.90%	3.80%	Improving the 95% percentile of delays from currently 10.21 to 8 minutes	1.75%	£50,000	£0	35.06	Traffic management measures like parking restriction, traffic light and bus priority settings
Real-time info	9.35%	2.67%	20% more journeys with with real-time displays	1.87%	£50,000	£5,000	34.01	Each display costs £5,000 for installation and £100 per year maintenance. It is assumed that 75% of the value is generated from the display and 25% from the app. 20% more journeys with real-time display at journey start would be best achieved by installing it at: Bridge Street, Borough Hall, Kings Road, Petworth Road Catho and Lion Green
Safety & security	8.93%	2.56%	20% more journeys with CCTV and light	1.79%	£50,000	£5,000	32.47	Equipping one shelter with CCTV costs £3,500 CCTV and the power supply for light and CCTV £1,500. It is assumed that CCTV maintenance costs £500 a year per stop. 20% more journeys with CCTV and light at journey start would be best achieved by installing them at: Bridge Street, Borough Hall, Kings Road, Petworth Road Catho and Lion Green
Comfort on bus	5.58%	0.00%	Standard buses replaced with high-comfort buses	5.58%	£280,000	£0	19.93	A high-comfort bus costs £40k more than a cheap one; route 70 and 71 need 1h from Guildford to Shottermill and route 72 needs 40min from Guildford to Eashing Green; that results in on average 2 buses needed for each route; i.e. 6 in total, plus add one to compensate delays

## How to calculate the marginal value-for-money ratio?

An example for real-time information

- The “Flexible Commuters” gave real-time information a 9.35% importance (total importance).
- It is assumed that 75% of this value is generated from displays at the bus stop and 25% from an app
- Stagecoach’s app currently does not provide real-time information. Friary bus station is the only stop along the three routes with real-time displays. Currently 28.5% of all journeys made on the routes 70/71/72 originate at this bus station. That means the current value of real-time info of this route is  $9.35\% \times (25\% \times 0 + 75\% \times 28.5\%) = 2.67\%$  (current status).
- 20% of the originating journeys on the routes 70/71/72 come from the 2<sup>nd</sup> till 6<sup>th</sup> most frequented bus stops according to the electronic ticket machine data. Installing real-time displays at each of these stops on both sides would lead to an additional value of  $9.35\% \times 75\% \times 20\% = 1.87\%$  (marginal value).
- The fix costs of installing these 10 real-time displays are £5,000 each plus £100 maintenance per year; i.e. £55,000 in total over 5 years (marginal money).
- The marginal value-for-money ratio for installing these 10 additional real-time displays is gauged at  $1.87\% / £55,000 = 0.000003560$  (or  $34.01 \times 10^{-8}$ ).
- Real-time info has the second-highest marginal value-for-money ratio for the routes 70/71/72, and should enjoy therefore priority when making investment decisions on upgrading these routes.



Upgrading bus routes to a high-quality bus corridor should be prioritised according to the Flexible Commuters' value-for-money ratios of the different service attributes.