# Final Report for Publication

# PIRATE

***Contract No : PL 97 - 2041***

**Project Co-ordinator:**

**South Yorkshire Passenger Transport Executive**
**PO Box 801**
**Exchange Street**
**Sheffield**
**S1 5SZ**

**Partners:**

**BB&J Consult S.A. (ES)**
**Consorcio Regional de Transportes de Madrid (ES)**
**V.V.M. De Lijn (BE)**
**Jefferson Sheard Architects (GB)**
**Langzaam Verkeer VZW (BE)**
**Riga City Council (LV)**
**Trivector A.B. (SE)**
**University of Lund (SE)**
**University of Wuppertal (DE)**

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# 1 The Partnership

The PIRATE consortium consisted of ten partners in six European countries. Four partners (SYPTE, CTM, LIJN, and RCC) are public transport authorities, four are transport research organisations (BBJ, LV, LU and WUPP) and two (JSA and TRIV) are SMEs supplying services *inter alia* to public transport.

| Name of Organisation | Org. Code | Role | Type |
|---|---|---|---|
| **South Yorkshire Passenger Transport Executive (GB)**<br>Contacts:<br>Victoria Butterell<br>*Victoriab@sypte.co.uk*<br>David Andrews<br>*Davida@sypte.co.uk*<br>*www.interchanges.co.uk (project website)* | SYPTE | Cordinating Contractor | OTH |
| **Jefferson Sheard Architects (GB)**<br>Contact:<br>Tom Rhys Jones<br>JSA.sheffield@jefferson-sheard.com | JSA | Associate Contractor | IND |
| **Consorcio Regional de Transportes de Madrid (ES)**<br>Contact:<br>Javier Aldecoa<br>Aep1.ctm@tsai.es | CTM | Contractor | OTH |
| **BB&J Consult S.A. (ES)**<br>Contacts:<br>Javier Bustinduy<br>José Jordi<br>Bbj_Consult@compuserve.com | BBJ | Contractor | OTH |
| **Vlaamse Vervoermaatschappij de Lijn (BE)**<br>Contact:<br>Anneliese Meynaerts<br>Marketing.cd@delijn.be | LIJN | Contractor | OTH |
| **Langzaam Verkeer VZW (BE)**<br>Contact:<br>Jan Vanseveren<br>Jan.vanseveren@langzaamverkeer.be | LV | Contractor | ROR |
| **Riga City Council (LV)**<br>Contact:<br>Olita Sproge<br>olita@parks.lv | RCC | Associate Contractor | OTH |
| **Trivector A.B. (SE)**<br>Contact:<br>P.G. Andersson<br>Pg@trivector.se | TRIV | Contractor | IND |
| **Lund University (SE)**<br>Contact:<br>Bengt Holmberg<br>Bengt.Holmberg@tft.lth.se | LU | Contractor | EDU |
| **Wuppertal University (DE)**<br>Contact:<br>Wilfried Echterhoff<br>echterho@uni-wuppertal.de | WU | Contractor | EDU |

## 2 Executive Summary

Interchange between modes of transport is becoming an increasingly necessary and "encouraged" activity as people seek greater mobility and as the need increases to make public transport more efficiently serve their needs. The PIRATE project was established by a group of organisations to whom it was becoming clear that those who plan, design, build and manage Interchanges were "flying blind" when it came to defining the needs of public transport users and others. At an early meeting of the consortium, one partner observed that he received detailed instructions for building a supermarket than for a new Interchange, for which commonly his clients had few ideas of their own except that it had to cater for a given number of vehicles per peak hour. Given the substantial, accessible literature on the location and design of passenger interchanges, this is somewhat surprising, but does perhaps indicate the difficulties inherent in transferring experiences, standards and norms established at one site to another.

The twin research objectives of PIRATE were to analyse a sample of European Interchanges to assess the extent and efficiency with which the needs of the various groups of people (users, workers, non-users) involved are actually being met and then to develop an integrated approach to defining and providing for, these needs.

For the first aim a "gap analysis" was used (the "Evaluation Approach") whilst the second aim required a new technique, termed the "Planning Approach".

The gap analysis revealed very few things to be unimportant at the sample of Interchanges. There was general agreement about the high importance of safety/security, information and car parking. However, the experts emphasised the shortcomings of layout, location and the quality of connections, whilst users concerns were more uniform across the whole range of "characteristics" examined, but with significantly more emphasis on comfort and safety issues than on operations and logistics.

The Planning Approach revealed that divergence between the priorities of the groups was greater in regard to matters of design, location and internal layout of the interchange than for security and operational matters, although the more detailed the issue, the greater the likely divergence of opinion. But the essence of the approach is that it allows this detail to be aired and discussed by the groups in a structured and organised manner, ensuring that the experts are made aware of people's needs and that people are made aware of experts' "solutions."

A Handbook has been produced in hard copy and in CD-ROM format detailing the research approaches and the results, with examples of materials used. A website has been set up (www.interchanges.co.uk) where deliverables and reports can be accessed and from where the project co-ordinator and other members of the consortium can be contacted for further information and guidance.

Partners are continuing to use the research approaches tested and to develop them further, in combination with other methods and tools. The possibility of combining them with work done elsewhere as an input to EU standardisation work is currently being explored.

# 3 Objectives

The twin objectives of the research were to :

1. use an existing market research technique (the “Evaluation Approach”) to evaluate:

   - Whether Interchanges are performing well or not;
   - What people expect from Interchanges;
   - Differences of opinion between stakeholders;
   - What things are performing well in Interchanges and to

2. use and test a new technique (the “Planning Approach”) to involve all stakeholders in the improvement or redevelopment of Interchanges.

# 4 Means Used To Achieve Objectives

Following a review of literature on “interchange”, carried out "in parallel" with work done in sister projects MIMIC and GUIDE, the consortium decided on a list of interchange sites at which to apply the two research approaches

The Evaluation approach has been in use in Europe for some time, and aims at measuring consumer attitudes – specifically gaps between Importance and Satisfaction. The second is new, having been developed from US practice but only applied in a public transport context (and in South Yorkshire) very recently. It combines market research and public consultation, with much freer forms of questioning, feedback of results between groups and emphasis on the need to influence the experts prior to and during the process of development to ensure they build the needs of the market-place into their plans.

Table 4.1 shows the PIRATE workplan and the deliverables and reports produced.

**Table 4-1 Project Plan**

| Work-package | Title | Output |
|---|---|---|
| 1 | Development of Methods | D1: Framework for Study[1] |
| 2 | Walk & Ride | TR1: Walk + Ride (W+R) survey[2] |
| 3 | Park & Ride | TR2: Park + Ride (P+R) survey[3] |
| 4 | Bike & Ride | TR3: Bike + Ride (B+R) survey[4] |
| 5 | Ride & Ride | TR4: Ride + Ride (R+R) survey[5] |
| 6 | Improved Access | D2: Results of Analysis[6] |
| 7 | Handbook, Guidelines and Recommendations | D3: CD-ROM & Hardcopy[7]<br>D4: Final Report & Policy Recommendations |
| 8 | Dissemination | D5: Recommendations for partner cities[8]<br>Final Report for Publication |

Note: All references are at the end of this report. D4 is incorporated in Final Report for Publication (this report.)

# 5 Scientific and Technical Description

## 5.1 Literature Review

The literature on interchange design, planning and location is extensive. PIRATE partners have located and listed over 250 reports published in Britain, Belgium, Scandinavia, France, and Germany in the past 20 years[9]. Over 250 reports were found by the GUIDE project partners[10], with very few overlaps with those found by PIRATE.

Most of the literature is in the nature of design and planning guidance for the various attributes of an Interchange – accessibility, signage, safety, lighting, crime prevention and image being the main ones. Within this literature much has been said, indeed much is purportedly based, on user needs. Most studies in the past decade,[11] [12] [13] [14] [15] have been very location specific, reflecting the piecemeal approach taken to interchange planning in the past. In the last 3 years reports have appeared that start to synthesise the work done[16] and to integrate other disciplines, such as psychology, into transport planning. A number of handbooks have been published by the Federal German Ministries of Transport[17] and Health[18] and are currently in production in Britain which describe in great detail how to plan and design stops and interchanges, with criteria for implementation based on researched user (including disabled) needs. Many examples and pictures of "good practice" are given and general advice is offered on how to involve the target groups in decision-making.

The last point is perhaps the most important, since the rational principles espoused by the authors may not in all places logically lead to the solutions proposed. The specific situation at any one site will differ from that at another as to type of customer, cultural attitudes as reflected in local laws, standards and economic conditions. Thus even the best informed practitioner in terms of what should or does work well elsewhere, needs at very least to convince a majority of local stakeholders that "good practice" will transfer well and at most to involve them in the actual decisions being made. The US DOT has published a report[19] featuring specific instructions on how to establish mechanisms for generating and evaluating alternative designs for Interchanges, locally.

There is nothing in the European literature on how to involve the public outside normal institutional channels in this decision-making process to ensure that Interchanges meet the needs of those who do, or might, use them.

The PIRATE project seeks to fill this gap.

The remainder of this report is arranged as follows:

1. Descriptions of Interchanges at which research was undertaken;
2. Details of the two approaches used to test current and potential levels of agreement;
3. Results and Conclusions.

## 5.2 Description Of Case Study Sites

The sites selected for inclusion in the PIRATE research deliberately ranged from a cluster of bus stops to a number of purpose-built major multi-modal interchanges. Table 5.1 lists them in ascending order of patronage, where known.

**Table 5-1: Case Study Sites**

| | | SUPPLY[1] | | | | | DEMAND |
|---|---|---|---|---|---|---|---|
| **Site Location** | **State** | **Modes** | **Peak hr. deps.** | **No of facilities** | **P+R spaces** | **Bike stands** | **Boardings p.a.** |
| **Antwerp** | **BE** | 2 | 91 | 7 | 300 | 120 | n.a. |
| **Mechelen** | **BE** | 1 | na | 3 | 0 | 0 | n.a. |
| **Adwick** | **GB** | 2 | 6 | 14 | 120 | 0 | 50,000 |
| **Vellinge Ångar** | **SE** | 1 | 12 | 5 | 40 | 0 | 130,000 |
| **Getafe 3** | **ES** | 2 | 19 | 18 | 1000 | 15 | 300,000 |
| **Majadahonda** | **ES** | 2 | 36 | 23 | 1280 | 250 | 900,000 |
| **Doncaster** | **GB** | 4 | 138 | 27 | 1690 | 0 | 1,000,000 |
| **Hasselt** | **BE** | 3 | 135 | 24 | 370 | 350 | 1,500,000 |
| **Aachen** | **DE** | 4 | 123 | 22 | 900 | 500 | 5,000,000 |
| **Riga rail station** | **LV** | 4 | 353 | 18 | 0 | 0 | 5,000,000 |
| **Lund** | **SE** | 4 | 82 | 27 | 400 | 2550 | 5,000,000 |
| **Mendez Alvaro** | **ES** | 4 | 167 | 30 | 350 | 0 | 30,000,000 |
| **Riga bus station** | **LV** | 3 | 117 | 15 | 0 | 0 | 36,000,000 |
| **Moncloa** | **ES** | 2 | 239 | 19 | 0 | 0 | 40,000,000 |

1: Using the definitions in **GUIDE** Deliverable 3(I)

Two sites were selected in **Antwerp**. *Halewijnlaan*, the penultimate tramstop on the left bank of the river Schelde was built to assist interchange between trams and buses, but also directly serves a densely populated residential area within walking distance. The tramline goes to the city centre by a subway beneath the river offering a faster journey (7 minutes) than by car.

The streets near the stop are very wide and (at the time of the survey) there were no traffic signals for pedestrians. It is necessary to walk between tall apartment blocks to access the stop by foot.

*Linkeroever*, the final tramstop, (on the survey day) has a 300-space surface car park, often full on weekdays with spaces close to the stops reserved for people with disabilities. Although there is no congestion on the access roads, there is congestion on the parallel motorway, which is also used for access. There are some shelters but no staffing, shops or specific security measures at either tramstop. However some security at *Halewijnlaan* is provided in that it is visible from Linkeroever where, currently, there is a tram waiting or turning back at all times.

An extension of the line to the further suburbs is planned. A new (larger) P+R facility is planned, with better access from the motorway.

The **Mechelen** site consists of a number of bus stops in the city centre. The stops are situated on the common section served by all urban bus lines, in the central pedestrianised area of the town. Some shelters are present, but not at all stops. No other equipment or services are provided.

Traffic levels and speeds in surrounding streets are low. It is not necessary to cross roads to reach the bus stops from most of the central area.

The station at **Adwick** on the East Coast Mainline railway, just north of Doncaster, was built in 1993 and is intended to attract car users from the parallel arterial road between Wakefield and Doncaster. It is not permanently staffed but is covered by CCTV and a public address system controlled from a central location. About 50,000 trips per annum

are made on the twice-hourly local rail services (in each direction). Walk distances from the nearby village are about 0.8km, across a busy, but single carriageway road. There is free surface parking for 100 cars adjacent to the platforms, a bus turnaround area, bike lockers, ramps for wheelchairs and a footbridge. The bus-stop style shelters are unheated but fully enclosed and glazed with seating. There are timetable displays at entrances and on platforms but no real-time information displays, clocks, shops or catering.

**Vellinge Ångar** is a small rural interchange about 1km west of the town of Vellinge Ångar in southern Sweden. It intended to facilitate interchange between local and long distance buses and comprises a sheltered bus stop situated either side of a motorway between Malmö and Trelleborg. Car and bike parking facilities are provided, but there are no additional services.

The routes for pedestrians and cyclists (who mainly go to/from Vellinge) are direct. The car traffic on the access roads is light.

Access for all connecting modes is via a tunnel under the motorway. The site is lit but there is no surveillance of any kind, any phone booths or mailboxes. There is little protection from strong winds and the shelters are unheated.

There have been no reported incidents of vandalism. There are no special facilities for those with disabilities but there are no stairs that would make access difficult.

**Getafe Sector - 3** is a railway station over the C-5 line on the “Cercanias” (railway) network in the south of Madrid serving a new urban development. The daily demand is about 1,000 passengers per day. There are stands for 15 bikes.

There is a free 1,000-space surface car park at the site with one, not very easy, access point. The car park and the station are unstaffed but there is a random, local police presence. There are ramps to the platforms. There is very little reported theft and vandalism.

**Majadahonda** is a medium sized railway station over the C-7 line on the “Cercanias” (railway) network in the north-western suburbs of Madrid. There are 120 trains per day with a 15-minute frequency and the daily demand is about 3,000.

There is a sheltered 1,280-space car park adjacent to the platforms. Parking costs 1? per day and there is a staffed ticket office. There is one, difficult access point to the car park. There is also a bike park with space for 250 bikes. The site is staffed for 16 hours per day and there are almost no reported occurrences of vandalism and theft. There are no special facilities for those with disabilities. There are no luggage handling facilities.

The historic town of **Doncaster**, South Yorkshire, has a railway station (served by over 120 long distance and local rail services daily) on the East Coast main line. Two bus stations, both on the ground floor of 1960’s-built multi-storey car parks are located a few minutes walk away (north bus station), and about 10 minutes away (south bus station). The latter is reached from the railway station by subway under the adjacent dual carriageway road. In consequence the great majority of station users access by car or taxi. Access to platforms from the concourse is by staircase and subway. An antiquated lift is available for wheelchair users, but is not really suitable for passenger use.

Renovation work to waiting rooms and concourse has taken place piecemeal over many years. Facilities for staff are limited.

It is planned to replace the existing separate bus and rail facilities with a single, integrated Interchange to allow easy movement between transport and non-transport nodes.

**Hasselt** (80 km east of Brussels) has a medium-sized railway station accessible from the town centre by foot, bike, car or bus. It is positioned in a densely populated area at the edge of the historical centre, with entrances to the front and rear. 5000 passengers per day are served by 2 intercity and 4 regional rail services per hour. The adjoining bus station area is part of an extended bus network with both urban and rural services. At the time of the survey, fares within the city were zero. Besides public transport, the bicycle (for which there was on-platform parking at the time of the survey) is an important access mode.

The main access route towards the city centre is an attractive walking route, lined with shops and cafés. Only one major intersection with road traffic exists, which is not dangerous. From the north a congested station square has to be crossed. Walk routes from the south involve passing through a relatively long tunnel.

There are 3 surface car parks, 2 in front with 70 places between them and 1 at the back with 300 places. Payment is made by either a monthly pass that is available to rail pass users or by daily ticket. There are two disabled parking spaces near the platform tunnel entrance. There is no specific drop off/pick up area.

There are few security measures but the lighting is good and although there are no security guards the railway police make random checks. The car parking area is fenced. There have been several thefts reported.

The station is currently (2000) being rebuilt.

The **Aachen** Interchange site consists of a central bus stop (Elisenbrunnen), a central bus station and the main railway station. The central bus stop is in the pedestrian zone, but a busy road has to be crossed to reach it. Busy roads also have to be crossed to reach the central bus and main railway stations. There is no central information point for the three sites and walk distances are quite long. One of the entrances to the bus station is a dark passage. Bus and rail services are frequent (every 5-10 minutes).

**Riga**, the capital city of Latvia, has two very close main interchange points: the central railway station and the bus station. Both were built in 1961 and are located in the historical centre of Riga. 30m passengers per annum board or alight from trains mainly accessing or departing by foot.

The station is now (2000) being re-developed to improve connections to the city and to provide easy interchange with buses and cars. It is also intended to make it more attractive for users by the provision of cafés, shops, cinemas, a health centre, a tourist office, etc.

**Lund** is a city in southern Sweden, about 15 km north of Malmö. It has the largest university in Sweden and is the location for several large industries. The public transport interchange is centred on a railway station built in 1856 and now the fourth busiest in

Sweden. All modes are represented: intercity and local rail services, urban and suburban bus services. Extensive high quality bike parking facilities (space for 2550, much of it undercover and staffed) and easy walk routes to the city centre.

There are 6 entrances to the railway station, the main one accessed from the city centre, through a tree-lined pedestrianised area with cycle-ways, across a traffic-calmed road. Following a major reconstruction in 1997, cyclists can use a staffed, covered bike parking shed (for which there is a small daily charge) via a bike lane marked on a ramped footbridge from either side of the railway.

The local and regional bus facilities are about 750m from the rail station, but road traffic levels and speeds are low and walk routes safe and pleasant. A large new entrance is under construction on the west side of the station, as well as a 400-space multi-storey car park, on-street taxi rank and shops.

**Mendez Alvaro** interchange (built 1990-1996) is one of the key elements of the transport system of Madrid. It is situated near the M-30 (the main ring road) connecting the underground with the metro railway and interurban coaches. Taxi stands and 350 car parking spaces are provided. The main interchange movements are between underground, rail and coaches.

**Riga bus station** is served by many over 400 local and international bus and coach services daily. Pedestrian access from the pedestrianised inner city is via at-grade crossings of heavily trafficked streets or through subways. There is no subway access to the main railway station, however Within the bus station there is a shop, news stand, a pharmacy, café and parcels office.

The intention at Riga Bus Station is to establish a high quality passenger-oriented interchange. It would incorporate easy walk links to the railway station, automated ticket sales and reservation systems, real-time information displays for bus, rail and air, comfortable drop-off/pick up and waiting facilities, improved facilities for bus-drivers and separate parking places for buses, taxis and cars.

**Moncloa Interchange**, situated at the northern edge of Madrid, but in a built-up area, provides a gateway to the city for over 200,000 people per day who interchange there between underground (35%), regional (18%) and urban buses (20%) and foot (25%). No private car parking is provided. Bus services in the peak-hour are every 5 to 10 minutes, and access the underground bus station using an HOV lane.

Some improvements to the waiting and walking environment are planned for Moncloa.

## 5.3 The Evaluation Approach

### 5.3.1 Objective and Methods

The aim of the Evaluation Approach was to identify and to understand problems at existing interchanges, specifically to answer the following questions:

1. ***Are passenger Interchanges performing efficiently?***

2. ***What do users expect in an Interchange and do the experts agree?***

3. ***What are the main differences of opinion between reference groups and among sites as regards the performance of Interchanges?***

4. ***What is performing best and worst at the PIRATE sites?***

Cross-site and cross-group/sub-group comparability is a central requirement of the evaluation approach.

**Qualitative Phase**

Firstly the relevant characteristics (e.g. personal security, accessibility, waiting comfort etc.) in how a transfer point is experienced were identified through focus group discussions supervised by staff of Lund University and Trivector.

The stakeholders were categorised into four separate “reference groups”:

**PG1.** These are people involved in the planning and construction of interchanges. They have a direct influence on the design of the physical structure and the services provided.

**PG2.** These are people who work in or are employed in or manage Interchanges as well as those who provide services such as bus, tram and train drivers, and cleaners, shop workers and security guards.

**UG1.** These are the people who use an interchange for travel, shopping, informational or social purposes. They (as well as the interchange used) may be categorised by main mode of access thus:

W+R (Walk and Ride)
P+R (Park and Ride, including Kiss and Ride)
B+R (Bike and Ride)
R+R (Ride and Ride, or interchange between same or different public transport modes)

**UG2.** These are non-users/potential users who rarely if ever use public transport.

The focus groups established a generic set of 66 “characteristics” of public transport Interchanges. In fig. 5.1 these have been grouped under 5 “aspects” determined from earlier research work.

## Quantitative Phase

Four parallel questionnaires were used (1 for each reference group) starting with a set of background questions on sex, age, frequency of use of the interchange and of public transport in general, access and main mode. The bulk of the questions consisted of the list of 66 Interchange characteristics with a requirement that where relevant the respondent rate each of them with respect to "Importance" and "Satisfaction" on a scale of 1 to 5. (5 indicating a maximum). An example of the questionnaire is shown in fig. 5.2.

**Figure 5-1: Interchange Characteristics**

| TOTAL IMPRESSION | THE INTERCHANGE AND THE CITY | INFORMATION | CONNECTING TRAVEL MODES | EQUIPMENT + SERVICES |
|---|---|---|---|---|
| **Safety/Security**<br>➢ *Traffic*<br>➢ *Personal safety*<br>➢ *Property security* | **Location**<br>➢ *Position and accessibility overall* | **Travel/Traffic**<br>➢ *Travel*<br>➢ *Traffic* | **Taxi Provision**<br>➢ *Overall quality* | **Security Equipment**<br>➢ *Surveillance* |
| **Efficiency** –<br>➢ *Co-ordination*<br>➢ *Efficiency*<br>➢ *Operation* | **Entrance accessibility.**<br>➢ *Location of entrances* | **Time**<br>➢ *Clocks* | **Car parking**<br>➢ *Overall quality*<br>➢ *Property Security*<br>➢ *Personal Safety*<br>➢ *Distance*<br>➢ *Price*<br>➢ *Size* | **Ticketing**<br>➢ *Automatic ticket vending machines* |
| **Information**<br>➢ *Placement*<br>➢ *Legibility*<br>➢ *Relevance* | | **Orientation**<br>➢ *Internal*<br>➢ *External* | | **Commercial services**<br>➢ *Shopping*<br>➢ *Car/bike rentals* |
| **Comfort**<br>➢ *Climate*<br>➢ *Cleanliness*<br>➢ *Attractiveness*<br>➢ *Working :*<br>• *conditions*<br>• *organisation*<br>➢ *Maintenance*<br>➢ *Staff restrooms* | | | **Drop-off / pick-up**<br>➢ *Overall quality*<br>➢ *Distance*<br>➢ *Price*<br>➢ *Size* | **Waiting Facilities**<br>➢ *Waiting rooms*<br>➢ *Toilets etc.*<br>➢ *Catering*<br>➢ *Communication*<br>➢ *Luggage handling*<br>➢ *Special services*<br>➢ *Manned services* |
| **Layout**<br>➢ ***Accessibility*** | | | **Bus/tram stops**<br>➢ *Overall quality*<br>➢ *Location*<br>➢ *Personal safety*<br>➢ *Shelters*<br>➢ *Signs*<br>➢ *Distance* | |
| | | | **Platforms/stops**<br>➢ *Overall quality*<br>➢ *Accessibility* | |
| | | | **Walk environment**<br>➢ *Overall quality*<br>➢ *Automated services*<br>➢ *Adjusted kerbs*<br>➢ *Accessibility*<br>➢ *Safe Crossings* | |
| | | | **Bike Parking**<br>➢ *Overall quality*<br>➢ *Property Security*<br>➢ *Lighting*<br>➢ *Distance*<br>➢ *Price*<br>➢ *Size*<br>➢ *Shelters* | |

It was intended to achieve over 100 responses for groups or subgroups of UGs at each site. This was not achieved everywhere. The PG samples were drawn from very small populations, so were considered to be adequate, in general.

The gender and age balances were a reasonable approximation to the population profile of the reference groups. However, it is likely that males and the over 55s are under-represented in the UG samples.

**Table 5-2**: **Sample Sizes – Valid Numbers of Responses to Evaluation Approach Questionnaire**

| Site | UG1 | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|
| | W+R | B+R | P+R | R+R | UG1 | UG2 | PG1 | PG2 |
| **Antwerp** | 109 | 82 | 27 | 186 | 404 | 96 | 6 | 3 |
| **Hasselt** | 101 | 47 | 82 | 135 | 365 | 130 | 3 | 3 |
| **Mechelen** | 154 | | | | 154 | 161 | 3 | 3 |
| **Aachen** | 42 | 14 | | 46 | 102 | 22 | 10 | 8 |
| **Riga Bus** | 86 | | | 75 | 161 | 121 | 16 | 20 |
| **Riga Rail** | 89 | | | 92 | 181 | 133 | 16 | 9 |
| **Getafe 3** | | 1 | 149 | | 150 | 50 | 10 | 10 |
| **Majadahonda** | | 1 | 151 | | 152 | 50 | 10 | 15 |
| **Mendez Alvaro** | | | | 130 | 130 | 102 | 10 | 25 |
| **Moncloa** | | | | 120 | 120 | 105 | 10 | 25 |
| **Lund** | 272 | 236 | | 262 | 770 | 188 | 16 | 53 |
| **Vellinge Ängar** | 86 | 42 | 33 | 161 | 322 | 210 | 9 | 17 |
| **Adwick** | 74 | 5 | 90 | 11 | 180 | 212 | | |
| **TOTAL** | **1013** | **428** | **532** | **1218** | **3191** | **1580** | **119** | **191** |
| **Of which:-** | | | | | | | | |
| **1. Male** <18 | | | | | 5% | 4% | | 0% |
| 18-24 | | | | | 14% | 9% | | 4% |
| 25-34 | | | | | 8% | 8% | | 23% |
| 35-54 | | | | | 12% | 13% | | 32% |
| 55+ | | | | | 5% | 10% | | 8% |
| ***Sub-total*** | | | | | **43%** | **43%** | | **67%** |
| **2. Female** <18 | | | | | 6% | 8% | | 0% |
| 18-24 | | | | | 17% | 11% | | 5% |
| 25-34 | | | | | 12% | 10% | | 17% |
| 35-54 | | | | | 15% | 17% | | 10% |
| 55+ | | | | | 6% | 12% | | 1% |
| ***Sub-total*** | | | | | **57%** | **57%** | | **33%** |
| **All respondents** | | | | | | | | |
| Walk and Ride | 1013 | | | | 1013 | 1273 | 79 | 116 |
| Bike and Ride | | 428 | | | 428 | 958 | 64 | 109 |
| Park and Ride | | | 532 | | 532 | 748 | 38 | 48 |
| Ride and Ride | | | | 1218 | 1218 | 1319 | 96 | 163 |

Note: UG1 = Users, UG2 = Non-users, PG1 = experts, PG2 = workers

**Figure 5-2 Evaluation Approach Questionnaire**

Sex : ☐ **MALE** ☐ **FEMALE**

Age: *(SHOW CARD 1)*

18-24 ☐ 25-34 ☐ 35-54 ☐ 55+ ☐

***HOW OFTEN DO YOU USE:***

1. ***Adwick?*** *(SHOW CARD 2)*

☐ **6-7 DAYS/WEEK** ☐ **4-5 DAYS/WEEK**

☐ **2-3 DAYS/WEEK** ☐ **1-2 TIMES/MONTH**

☐ **2-3 TIMES/YEAR** ☐ **LESS OFTEN**

2. ***Public transport in general?*** *(SHOW CARD 2)*

☐ **6-7 DAYS/WEEK** ☐ **4-5 DAYS/WEEK**

☐ **2-3 DAYS/WEEK** ☐ **1-2 TIMES/MONTH**

☐ **2-3 TIMES/YEAR** ☐ **LESS OFTEN**

***Between which forms of transport mode do you usually change at Adwick? (CHECK TWO BOXES)*** *(SHOW CARD 3)*

***1st Mode***

☐ **BY FOOT** ☐ **BICYCLE** ☐ **LOCAL BUS** ☐ **REGIONAL BUS**

☐ **TRAIN** ☐ **CAR DRIVER** ☐ **CAR PASSENGER**

☐ **TAXI** ☐ **OTHER MODE, WHICH?** _____

***2nd Mode*** *(SHOW CARD 3)*

☐ **BY FOOT** ☐ **BICYCLE** ☐ **LOCAL BUS** ☐ **REGIONAL BUS**

☐ **TRAIN** ☐ **CAR DRIVER** ☐ **CAR PASSENGER**

☐ **TAXI** ☐ **OTHER MODE, WHICH?** _____

| *(SHOW CARD 4)* | **IMPORTANCE** | | | | | **SATISFACTION** | | | | | *(SHOW CARD 5)* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Totally Unimportant | | | | Very Important | Not Very Pleased | | | | Very Pleased | |
| ***Walk Environment Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Bicycle Parking Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Bus / Train Stop Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Short Distance*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Safety*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Location*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Shelters*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Signs*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Car Parking (****long term****)*** | | | | | | | | | | | |
| ***Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Short Distance*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Size*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Price*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Personal Security*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Protection against Theft & Vandalism*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Drop Off, Pick Up By Car*** *(short term parking)* | | | | | | | | | | | |
| ***Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Short Distance*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Size*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Price*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Taxi Stop*** | | | | | | | | | | | |
| ***Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Train Platforms*** | | | | | | | | | | | |
| ***Accessibility*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Quality*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |

| | **IMPORTANCE** | | | | | **SATISFACTION** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Totally Unimportant | | | | Very Important | Not Very Pleased | | | | Very Pleased | |
| ***The station/terminal & surrounding city/town*** | | | | | | | | | | | |
| ***Location*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Entrances*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Station/Terminal/Bus stop equipment/service*** | | | | | | | | | | | |
| ***Manned Service*** *(tickets/schedules/handicap service/phone service)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Security*** *(guards/personnel/cameras)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Communication*** *(pay phone/mail box/alarm phones)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Waiting Comfort*** *(seats/entertainment/ TV/ radio)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Toilets*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Litter Basket*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Information about :*** | | | | | | | | | | | |
| ***The Terminal*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *(where to find stops / services)* | | | | | | | | | | | |
| ***Travel*** *(time tables / bus lines / fares)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Current Traffic*** *(real time information about departures / arrivals / delays)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***The Surroundings*** *(city centre / main destinations / hotels)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Time*** *(clock)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |

| | **IMPORTANCE** | | | | | **SATISFACTION** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Totally Unimportant | | | | Very Important | Not Very Pleased | | | | Very Pleased | |
| ***Overall Impression*** | | | | | | | | | | | |
| ***Attractiveness*** *(beauty / pleasantness)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Information Availability*** | | | | | | | | | | | |
| ***Readable*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Relevant*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Placement*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Making Connections*** | | | | | | | | | | | |
| ***Transfer Efficiency*** *(easy / quick / comfort)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Traffic Safety*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Personal Security*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Cleanliness*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Good Climate*** *(weather protection / heating / ventilation)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Accessibility*** *(distance and uniform levels/ escalators/stairs/tunnels/foot paths)* | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |
| ***Protection against Theft and Vandalism*** | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | **NO VIEW / NA** q |

**THANK YOU FOR YOUR TIME!**

## 5.3.2 Results and Conclusions

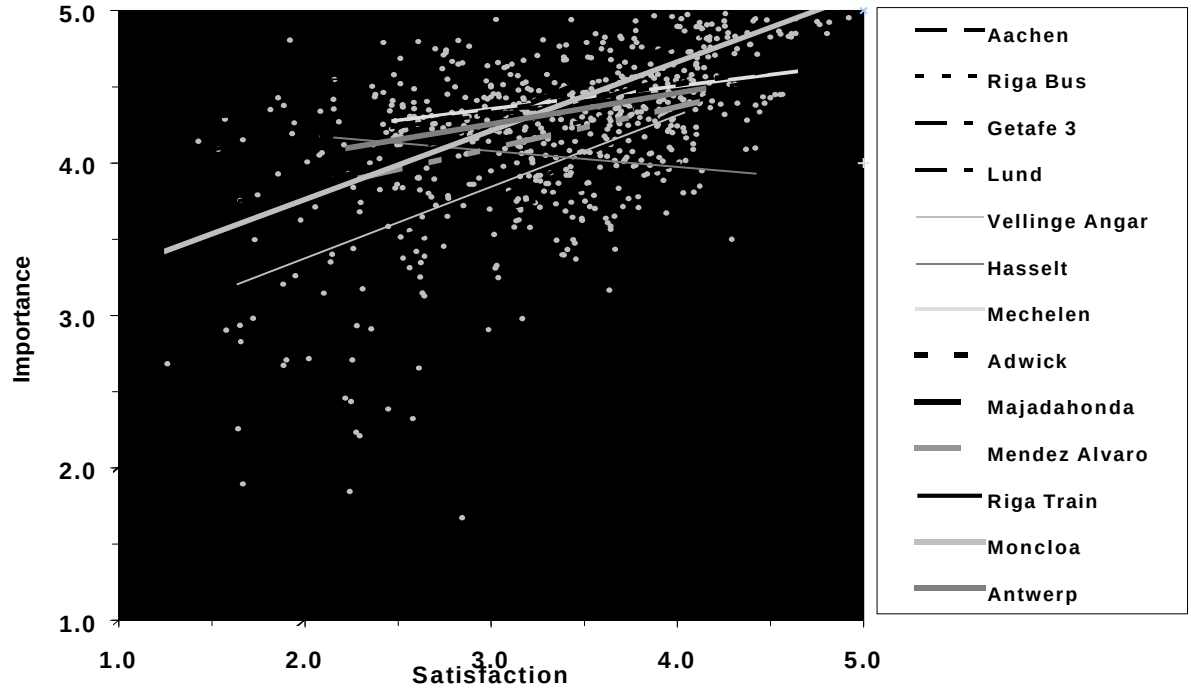
**Question 1.** ***Are Interchanges performing well or not ?***

Ideally, from an efficiency viewpoint, the importance (I, considered to be a measure of need or expectation) that a user attaches to the presence of an interchange characteristic should be proportionate to the satisfaction (S) derived from it. Ideally, measuring *I and S on the same semantic scale*, the same score would be given for both parameters for every characteristic, and, if plotted against each other on a graph, all pairs of observations would lie on a 45º line. In reality there are gaps. Expectations, as reflected in the importance scores, are not realised, causing a positive gap (I>S) or if quality exceeds requirement, a negative gap (I<S).

A gap between the I and S scores of 1 was considered to be a reasonable minimum or boundary point between ideal/poor or ideal/over-provision. In an ideal world, observations of I and S would lie 1 point above or below the central 45º line shown in fig 4.1. (The boundary lines are shown as dashed lines parallel to this line). Above the top dashed 45º line is the poor performance zone, where there is a failure to meet market needs. Below the bottom dashed 45º line is the zone of "over-provision" in relation to need, that is, a misallocation of resources.

The actual results (shown in fig. 5.3) were a scatter of points, about half of them outside the ideal zone. To encapsulate the tendencies, a simple linear regression line was calculated for each site. For all 13 sites except Hasselt and Aachen, positive intercept and slope coefficients were calculated and found statistically significant at the 95% confidence level, although the scatters of point (reflected in $R^2$ values no higher than 0.6) were wide. Only Lund's regression line lay wholly inside the ideal zone as defined above. Most sites' lines lay partially within the area, indicating that in the main, medium-high important characteristics are of poorer than expected quality. Hasselt demonstrated the greatest inefficiency with a line with a statistically significantly negative slope, indicating a tendency for the gap to widen as importance increases – the medium-high importance characteristics performing much better than those of most importance.

**Figure 5-3: Correlation between I and S scores**




**Question 2.** ***What do users expect of an Interchange and do the experts agree?***

The I ratings for each group were averaged across all sites and ranked according to the UG1 scores.

**Differences Overall**

From fig. 5.4 it can be seen that:

1. Most characteristics scored above 3.5 in terms of importance by all reference groups. The characteristics grouped under “Total Impression” (e.g. safety, security, comfort etc.) were found to be of most importance for all groups except for PG1s for whom the “Interchange and the city” (location and accessibility) was more important and

2. PG1s ranked most aspects higher in importance than the other groups, whose rankings were relatively similar to each other.

Fig. 5.5 shows the “top 20” ranking given by UG1s for all 66 characteristics. The scores of the other groups are also shown. There is quite close agreement between the groups on the importance of vehicle and personal security and safety; less so for bus stop safety, accessibility and the size of car parks.

**Figure 5-4: Importance of the 5 aspects to all reference groups**

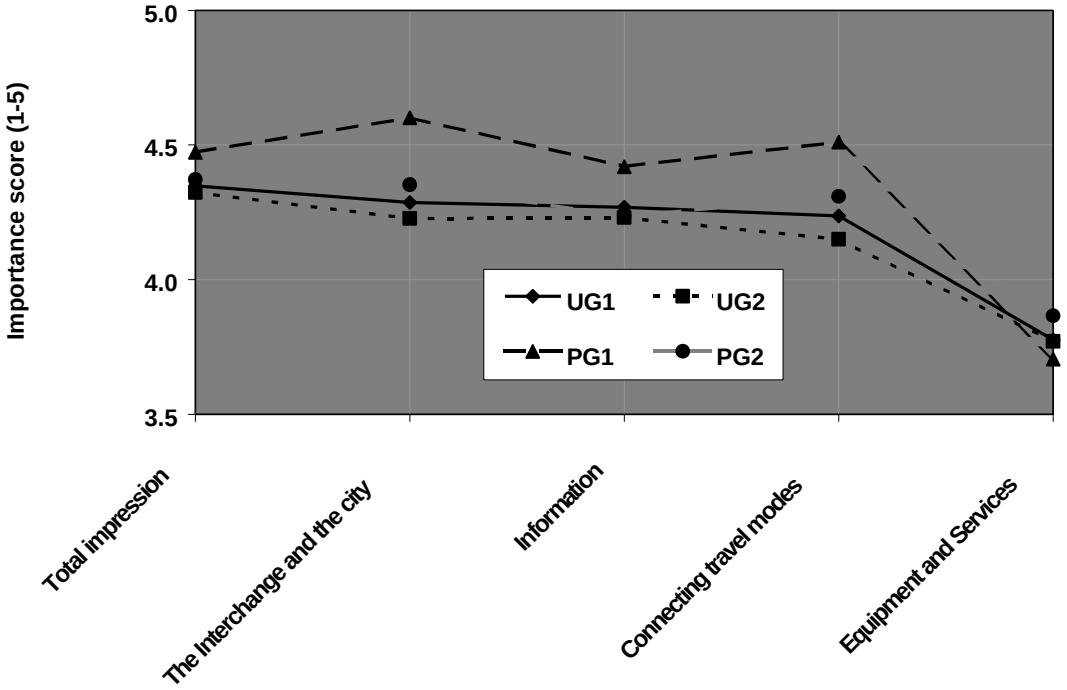



**Figure 5-5**: **The 20 most important characteristics ranked by UG1 score**

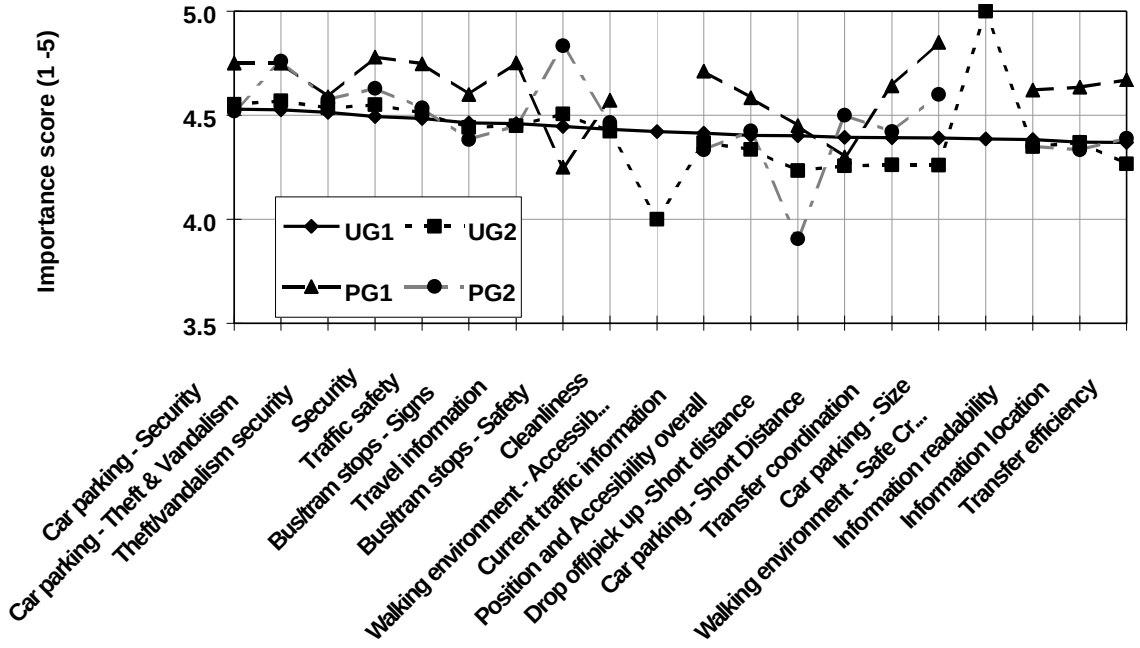
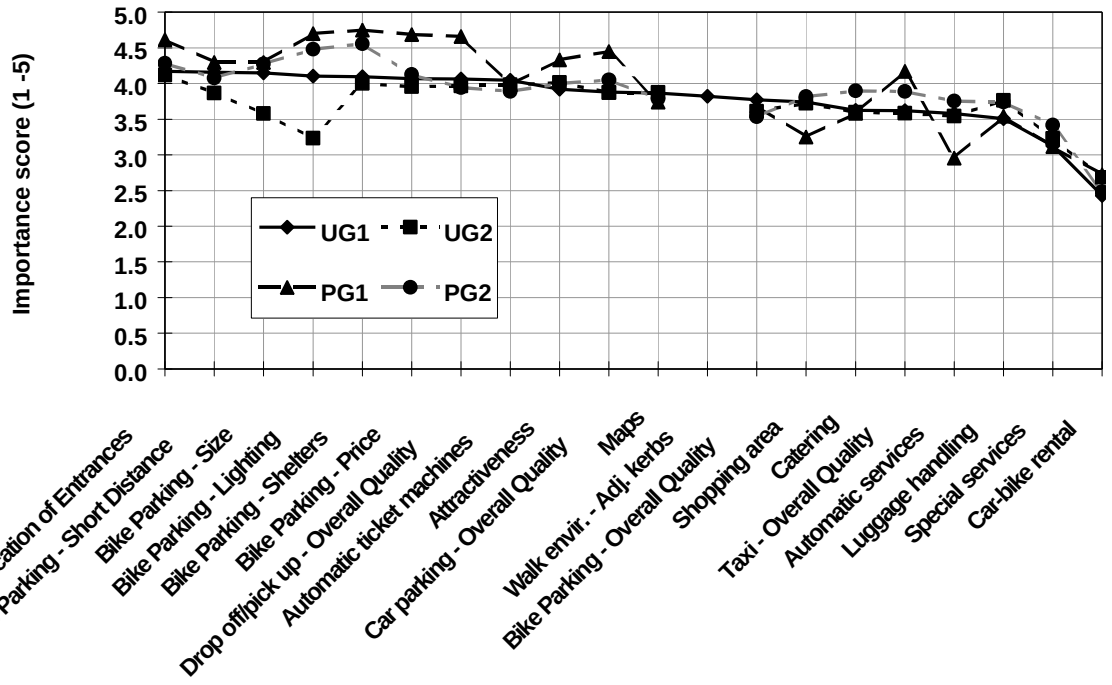


**Figure 5-6: The 20 least important characteristics for UG1s.**




The least important characteristics for all reference groups are shown in fig 5.6 to be taxis, automatic services, luggage handling, special services and car/bike rental services.

With some exceptions, the reference groups agreed closely on what is important. Grouping similar characteristics together, table 5.3. shows that for UGs and PG1, safety, security, travel information and car parking issues are of most importance, whilst for PG2 information is of less priority than efficiency.

For UG1s, the equipment and services present in an Interchange are of less importance than the feeling of safety and security.

**Differences among UGs – Gender and Age**

Female UG1s tended to rate most characteristics of more importance than their male counterparts did. This was especially so for personal safety, which females rated highest and most important. Male UG1s put personal and property security at the top of their list, albeit with lower scores than the female UG1s.

Female UG2s' priorities were very similar to female UG1s' and, again, tended to be higher than males' for most things, focusing on safety and security. Male UG2s put their highest priority on car parking security and price; with older males particularly interested in short walk distances, with the younger males emphasising bike security and price.

**Table 5-3: Interchange characteristics ranked by I score given by UG1s**

| Aspect/Characteristic | | UG1 | UG2 | PG1 | PG2 |
|---|---|---|---|---|---|
| ***1.Total impression*** | | ***4.34*** | ***4.32*** | ***4.62*** | ***4.38*** |
| ➢ Safety/Security | | 4.50 | 4.53 | 4.71 | 4.58 |
| ➢ Efficiency | | 4.38 | 4.26 | 4.66 | 4.41 |
| ➢ Information | | 4.37 | 4.33 | 4.65 | 4.31 |
| ➢ Layout | | 4.26 | 4.30 | 4.69 | 4.36 |
| ➢ Comfort | | 4.19 | 4.16 | 4.40 | 4.25 |
| ***2.The Interchange and the city*** | | ***4.29*** | ***4.23*** | ***4.60*** | ***4.35*** |
| ➢ Location | | 4.40 | 4.34 | 4.58 | 4.42 |
| ➢ Entrance accessibility | | 4.17 | 4.12 | 4.62 | 4.28 |
| ***3. Information*** | | ***4.28*** | ***4.22*** | ***4.41*** | ***4.24*** |
| ➢ Traffic/Travel | | 4.44 | 4.41 | 4.73 | 4.39 |
| ➢ Time | | 4.33 | 4.19 | 4.33 | 4.29 |
| ➢ Orientation | | 4.07 | 4.07 | 4.15 | 4.05 |
| ***4. Connecting travel modes*** | | ***4.20*** | ***4.15*** | ***4.49*** | ***4.30*** |
| ➢ Car parking | (P+R) | 4.44 | 4.42 | 4.71 | 4.59 |
| ➢ Drop off/pick up | (P+R) | 4.37 | 4.26 | 4.59 | 4.33 |
| ➢ Bus/tram stops | (R+R) | 4.36 | 4.38 | 4.26 | 4.36 |
| ➢ Platforms | | 4.27 | 4.10 | 4.63 | 4.28 |
| ➢ Walking environment | (W+R) | 4.21 | 4.50 | | |
| ➢ Bike Parking | (B+R) | 4.15 | 3.81 | 4.59 | 4.34 |
| ➢ Taxi provision | | 3.62 | 3.59 | 4.17 | 3.89 |
| ***5. Equipment and Services*** | | ***3.78*** | ***3.76*** | ***3.71*** | ***3.80*** |
| ➢ Security Equipment | | 4.24 | 4.13 | 4.23 | 4.29 |
| ➢ Ticketing | | 4.05 | 3.98 | 3.98 | 3.89 |
| ➢ Waiting facilities | | 3.73 | 3.74 | 3.64 | 3.89 |
| ➢ Commercial services | | 3.09 | 3.21 | 2.99 | 3.15 |

Note: The 3 most important groups of characteristics are highlighted.

The youngest UG males (18-24) rated most characteristics as less important than all other age and gender groups, giving the price of car parking as their most important characteristic. Female UGs (55-) had the opposite tendency. Male UGs (25-54) gave their greatest priority to theft and vandalism of bikes and the price of bike parking. These, as well as personal security in general, were female UGs' (25-54) highest priorities. The full list of aggregate UG results by gender and age are shown in part 5.3.3.

### Differences between intermodalities

### Walk and Ride

Safety, security and cleanliness were of most importance to UGs who also rated travel Information and its placement and readability very high in importance. For PG1s these were of lesser importance than the quality and accessibility of stops and platforms and locational factors.

### Bike and Ride

Fears about general theft and vandalism, personal security and safety dominated UG priorities. PG1s also rated these issues highly, but gave much more weight to surveillance and the overall quality of parking facilities – perhaps thinking more about solutions than needs. Interestingly enough the PG1s rated the importance of manned services and good communication lower than the UG1s did.

**Park and Ride**

P+R UG1s gave higher importance scores than the UG1s of other intermodalities. They rated vehicle security, protection against theft and vandalism, personal security and the overall quality of the bus/tram stop of most importance. PG1s at P+R sites, whilst scoring these factors even higher, nevertheless (unless they were considering the commercial situation rather than the impact on UGs) over-estimated the importance of car parking charges. Their expectations also greatly exceeded the UGs' in regard to attractive, well-positioned facilities and good information. P+R characteristics received the highest of the aggregated PG2 scores for importance, especially for safety, security, information and car parking.

**Ride and Ride**

Again, security and theft concerns, as well as travel information, traffic safety and cleanliness are at the top of UG priorities for interchange between public transport modes or vehicles. PG1s broadly agreed, but also gave much higher priority to information readability, relevance and placement and overestimated the importance to UG1s of transfer efficiency, traffic information, accessibility to platforms, location, maps, stop quality, and toilets.

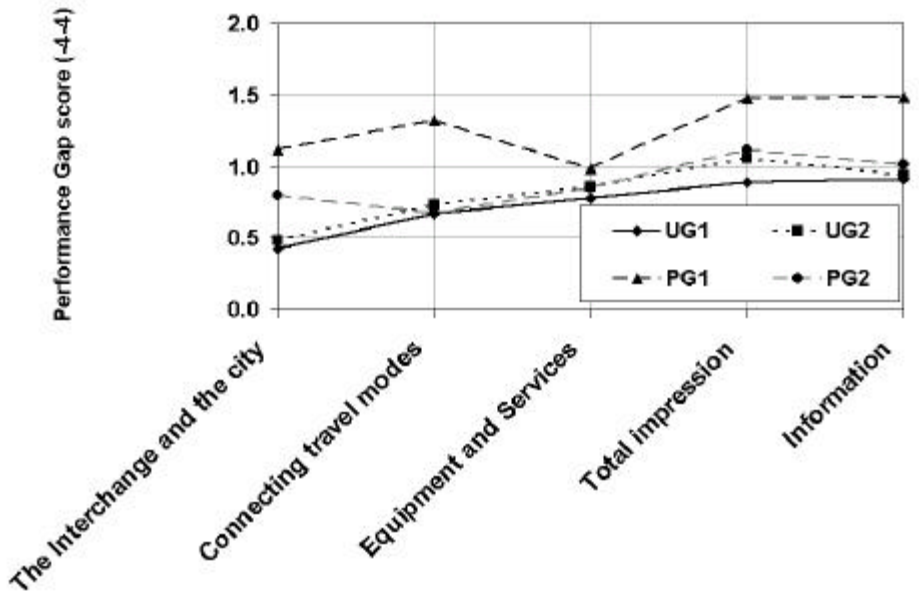
**Question 3.** ***What are the main differences among reference groups and sites as regards the performance of Interchanges?***

Understanding needs is easier than meeting them. Fig 5.3 showed most Interchanges were not very efficiently meeting needs. But which characteristics are not performing?

**Differences Overall**

Figure 5-7 shows the average performance gap for each aspect, with the smallest gaps – the best performers - for UG1s on the left.

**Figure 5-7 : Performance of the 5 aspects – ranked by UG1 score.**



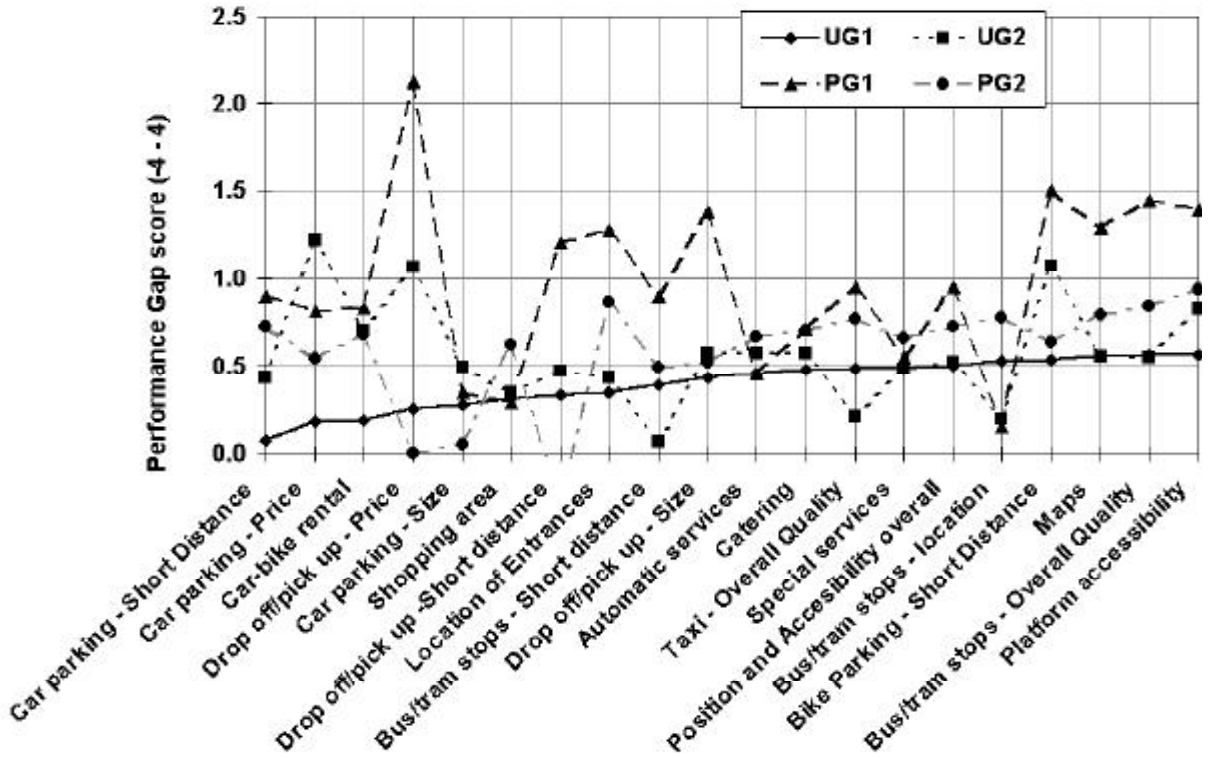
It can be seen that:

1. For UG1s, “the Interchange and the city”, performed best with an average gap of 0.5. “Information” performed worst, with a gap of almost 1.

2. For all aspects PG1s were the most critical group, particularly for the aspects “Connecting modes” and “Information”.

In terms of the ungrouped characteristics, car parking, shopping and walk distances seem to perform almost optimally, for the UG1s, but not so for PG1s. Assessments of performance are clearly more variable than about priorities, between groups. (c.f. fig 5.5 and fig 5.8)

**Figure 5-8 : The 20 best performing characteristics ranked by UG1 “gap” score**




For UG1s the poorest performance is with respect to toilets, theft & vandalism (to bikes and to the building overall) surveillance and current traffic information. Six of these “worst 20” were among the most important characteristics for users shown in fig. 5.5 although all 20 have an importance score for all groups (averaged across all sites) in excess of 4. UG2s expressed similar views to users, if somewhat more variable, regarding performance.

UG1s considered commercial services, drop off/pick up and entrance accessibility to be performing best, whilst UG2s rated taxis, bus/tram stops and entrance accessibility highest. PG1s thought bus/tram stops, commercial services and automatic ticket machines performed best and PG2s rated kiss and ride, car parking and bike parking facilities highest. There was agreement between the groups that comfort, safety, security, travel information and operational efficiency were not performing well.

**Figure 5-9: The 20 worst characteristics for UG1s**

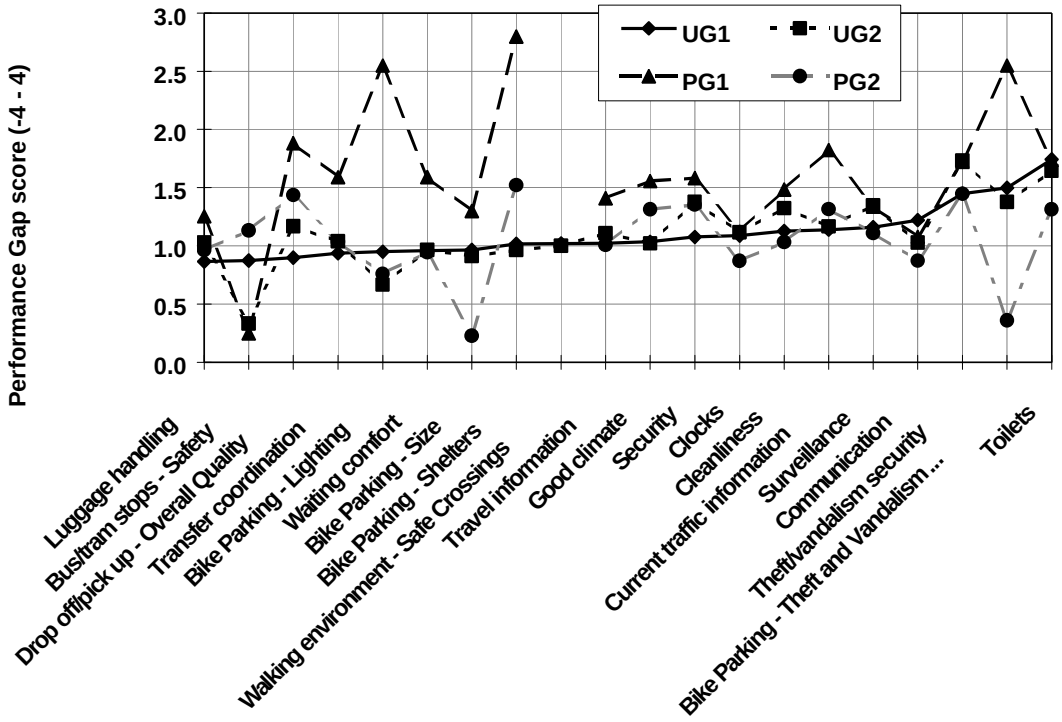



**Table 5-4: Interchange characteristics grouped and ranked by UG1s performance gaps**

| Aspect/Characteristic | | UG1 | UG2 | PG1 | PG2 |
|---|---|---|---|---|---|
| ***1. The Interchange and the city*** | | ***0.42*** | ***0.48*** | ***1.11*** | ***0.80*** |
| ➢ Entrances accessibility | | 0.35 | 0.43 | 1.28 | 0.86 |
| ➢ Location | | 0.50 | 0.52 | 0.95 | 0.73 |
| ***2. Connecting travel modes*** | | ***0.62*** | ***0.63*** | ***1.23*** | ***0.60*** |
| ➢ Drop off/pick up | (P+R) | 0.34 | 0.70 | 1.57 | 0.08 |
| ➢ Car parking | (P+R) | 0.41 | 0.86 | 1.13 | 0.47 |
| ➢ Taxi provision | | 0.48 | 0.21 | 0.95 | 0.77 |
| ➢ Platforms | | 0.63 | 0.79 | 1.33 | 0.86 |
| ➢ Bus/tram stops | (R+R) | 0.69 | 0.33 | 0.57 | 0.75 |
| ➢ Walking environment | (W+R) | 0.85 | 0.50 | n.a | n.a |
| ➢ Bike Parking | (B+R) | 0.93 | 1.03 | 1.84 | 0.63 |
| ***3. Equipment and Services*** | | ***0.71*** | ***0.82*** | ***0.92*** | ***0.88*** |
| ➢ Commercial services | | 0.25 | 0.53 | 0.56 | 0.65 |
| ➢ Ticketing | | 0.76 | 0.84 | 0.93 | 1.14 |
| ➢ Waiting facilities | | 0.83 | 0.88 | 1.05 | 0.88 |
| ➢ Security equipment | | 1.01 | 1.04 | 1.14 | 0.84 |
| ***4. Total impression*** | | ***0.87*** | ***1.02*** | ***1.57*** | ***1.09*** |
| ➢ Information | | 0.65 | 0.80 | 1.41 | 1.04 |
| ➢ Layout | | 0.74 | 0.85 | 1.82 | 0.98 |
| ➢ Efficiency | | 0.86 | 0.96 | 1.63 | 1.16 |
| ➢ Comfort | | 0.94 | 1.08 | 1.52 | 1.36 |
| ➢ Safety/Security | | 1.13 | 1.42 | 1.44 | 0.91 |
| ***5. Information*** | | ***0.94*** | ***0.97*** | ***1.42*** | ***0.99*** |
| ➢ Orientation | | 0.65 | 0.66 | 1.52 | 0.93 |
| ➢ Traffic/Travel | | 1.08 | 1.14 | 1.62 | 1.16 |
| ➢ Time | | 1.09 | 1.12 | 1.12 | 0.87 |

**Differences among UGs – Gender and Age**

The female UG1s were more critical of most characteristics than the males, with the greatest gaps being for adjusted kerbs (for males the gap was 0.44 for females 0.96, with all females over 24 deeming provision as “poor”). A somewhat quirky score (perhaps due to a small sample size) of –0.02 was observed for bus stop shelters for males over 55, compared to gaps of over 0.5 for this characteristic for all other age groups and females.

Overall, however UG1 males and females agreed that car parks and platforms were ideally positioned with regard to walk distance, that car parking and pick up/drop off prices were not a problem and that logistics such as location, size and accessibility were the least of the difficulties faced. The most serious problems related to information, communication, safety, security and toilets.

Older female UG1s were more critical than younger ones especially for station entrance/bus/tram stop location and accessibility (true for males also) walk distances, adjusted kerbs, platform quality, attractiveness (not a problem for the younger females). Older UG1 males also tended to be more critical of facilities than younger males, particularly accessibility, information placement and adjusted kerbs. The latter’s performance was highly negatively correlated to the age of respondent of either gender. Shelter provision at bus/tram stops was apparently worse for youngsters than for males over 55, who were also less critical of bike parking theft and vandalism than males aged 35-54.

**Differences between intermodalities.**

**Walk and Ride**

In general there was close agreement between all groups on the best performing characteristics for walk and ride interchange - the location of entrances, special services, shopping, position and accessibility overall. All groups agreed that toilets, theft and vandalism protection and travel and traffic information performed worst, PG1s being their own sternest critics.

**Bike and Ride**

All groups agreed that car/bike rentals, catering, shopping and special services were the best features (or at least not a problem) at bike and ride sites and that, once again, toilets, theft and vandalism were among the worst. PG1s thought that bike-parking facilities such as shelter and lighting performed worse, perhaps seeing these as the solution to poor security.

**Park and Ride**

Best-performing features for P+R UG1s were car/bike rental facilities, short distances between modes, shopping and charges. UG2s agreed with the first two but also thought the quality of bus/tram stops and special services was good at the P+R sites.

Toilets, communications, conflict with taxis (UG1s only), clocks and general theft and vandalism were the UGs greatest concerns. PG1s were concerned about a wide range

of issues, especially drop off/pick up prices and entrance locations. As with other intermodalities, PG2s were highly critical of restroom provision, maintenance of facilities and working organisation. Interestingly, PG1s concurred with this.

### Ride and Ride

The best performing characteristics for UGs were the location of entrances, taxi provision, overall accessibility and (for UG1s) automated services. Catering and shopping also performed very well for UG1s at least. UG2s considered walking distances safety at stops and signage also to be very good. PG1s thought automated services, shopping, bus/tram stop locations to be close to "ideal" for R+R.

Toilets and protection from general theft and vandalism were the worst performers for the UGs. UG1s also rated information about current traffic (i.e. real time information) very poor. Whilst PG1s also rated these characteristics as poor, they rated car parking and drop off/pick up facilities and traffic information even poorer.

PG2s were very discontent with the provision of restrooms. PG1s agreed with them.

Table 5.5 shows the mean gaps for all characteristics for each intermodality and in ascending order (i.e. W+R performed worst).

**Table 5-5 : Best and Worst performing intermodality for UG1s**

| Intermodality | Mean Gap | Characteristic: Best (gap nearest zero) | Worst (largest gap) |
|---|---|---|---|
| P+R | 0.70 | Car/bike rentals | Toilets |
| **All** | **0.74** | **Car Park distance** | **Toilets** |
| B+R | 0.76 | Car/bike rentals | Toilets |
| R+R | 0.78 | Entrance Location | Toilets |
| W+R | 0.86 | Entrance Location | Toilets |

The results can also be used to identify priorities and performances by site. The dataset of results are presented in 5.3.3. The gaps between the user and expert opinions about performance will now be described.

### Differences between sites

### Adwick

PG1 results could not be obtained for Adwick, but characteristics with a performance score in the "poor" zone in the opinion of users were ATMs, catering services, luggage handling, clocks, climate, cleanliness and traffic safety. UG2s considered that the security of the car park was a real problem for them.

### Aachen

Perhaps reflecting the generally high standards of public transport in Germany, all groups were highly critical of Aachen's arrangements for interchange in the city centre. UG1s considered most of the characteristics to be performing in the "poor" zone in fig 5.3. Generally, although PG1s were of the same opinion as others, there were a number of characteristics that they considered "good" but which the other groups rated

“poor”, namely maps, terminal information and communications, cleanliness and working conditions.

**Hasselt**

In the view of UGs there were very few “poor” characteristics at Hasselt and even some with Satisfaction scores exceeding Importance scores. PG1s were well aware of the few poor (but very important ones) including toilets, amount of bike parking, theft and vandalism and cleanliness.

**Mechelen**

UGs were critical of the lack of shelters and lighting for bikes, lack of clocks, poor quality bus stops, low standards of cleanliness, inadequate toilet facilities and the general lack of security against theft and vandalism.

**Antwerp**

UGs at Antwerp largely agreed on the poor performance of communications, (not a problem according to PG2s), theft and vandalism, traffic and travel information, clocks, shopping, toilets and cleanliness. The PG1s shared these assessments. Only the overall quality of the car parks were deemed better by PG1s than by UG1s - and only by a small margin.

**Majadahonda**

A wide range of characteristics was criticised by UGs especially the quality of taxi facilities, bike parking, car parking, platforms, toilets and the walking environment. PG1s agreed with this and were even more critical than the PG2s about staff restrooms. They were more concerned with issues of location and car parking price than the UG1s themselves were, and less aware of UG1 criticism of bike parking charges.

**Mendez Alvaro**

Misperceptions of UG1 needs were particularly evident at Mendez Alvaro.

Although UG1s were critical of the facilities for bikes and cars and of safety and security, UG2s were more critical of toilets and surveillance. PG1s considered these characteristics to be performing well but gave low scores for drop off/pick up (as did the UG2s) and Information, matters that scarcely worried the UG1s. PG2s were also critical of ATMs and car/bike rental facilities, but these were also not a problem for UG1s.

On the whole PG2 views were closer to those of UG1s than to the PG1s.

**Getafe 3**

Although the quality of bus stops and the location of the Interchange as well as its internal environment for walking was criticised by UG1s, on the whole there were very few problems with car and bike parking, although UG2s perceived a serious lack of security. Unusually (within the sites surveyed) UG1s were critical of taxi facilities.

Inside the Interchange, UG1s were critical of clocks, surveillance, toilets, communication and security systems. PG1s agreed with the criticisms, and, as at most sites, were critical of a wide range of other features, which did not appear of major concern, to UG1s. In general, however, PG1 and UG1 assessments were similar.

**Moncloa**

There was UG criticism (which PG1s were in agreement with) of the lack of bike and car facilities, although the location of the interchange was not criticised at all. PGs were less aware of UGs problems with communications, information, surveillance, toilets and waiting comfort. Information provision, deemed good by PGs, was also criticised by the UGs.

**Lund**

Perhaps aware of the contrast between the shelter and security for bikes in the manned bike shed, UG1s wanted the same quality of provision for bikes parked at other locations around the Interchange. There was also some criticism, supported by PG1s, of the quality of bus stops, traffic information, toilets and cleanliness.

**Vellinge Ängar**

In contrast to Lund, Vellinge Ängar was criticised by UGs for being inaccessible, exposed, uncomfortable, insecure and unsafe. UG2s were even more critical across most things, than UG1s. Mostly the PG1s agreed with this assessment. Unusually for PIRATE sites, the quality of transfer co-ordination and efficiency was severely criticised both by UG2s and PG1s.

**Riga**

All groups considered over 80% of Riga bus station's characteristics "poor". As at other sites, PG1s tended to be more critical than others by at least 0.25 points for most issues, giving their most critical assessments (gap scores of between 2.3 and 3.1) to the issues of most concern to UG1s, namely - safety/security, ATMs, cleanliness, accessibility and comfort. The rail station fared little better with UG1 gap scores of over 2 for surveillance, security, toilets and walking environment. The PG1s, who also heavily criticised several other features that were of comparatively less concern to UGs, such as information and bike parking, mirrored these gaps.

**Question 4.** ***What is performing best and worst at the PIRATE sites?***

The scores given to each Interchange were those of their local stakeholders. If judged by stakeholders elsewhere, those characteristics may perform very differently, since they may be less (or more) relevant in a different environment or culture. Table 5.6 nevertheless shows the sites in rank order of performance in terms of the average gap for all relevant characteristics at each site, together with the characteristic performing best and worst.

**Table 5-6 : Best and Worst performing sites for UG1s**

| Site | Mean Gap | Best Characteristic (gap nearest zero) | Worst Characteristic (largest gap) |
|---|---|---|---|
| Hasselt | 0.53 | Platform quality | Toilets |
| Lund | 0.55 | Entrance location | Bus stop quality |
| Mendez Alvaro | 0.57 | Automatic services | Bike parking quality |
| Getafe 3 | 0.58 | Car/bike rental | Communications |
| Adwick | 0.60 | Drop off/Pick up distance | Catering |
| Mechelen | 0.72 | Bus shelters | Bus stop quality |
| All sites | 0.74 | Car Park distance | Toilets |
| Moncloa | 0.77 | Location | Drop off/pick up quality |
| Vellinge Ängar | 0.88 | Drop off/pick up quality | Bike Parking security |
| Antwerp | 0.93 | Attractiveness | Communication |
| Majadahonda | 0.96 | Car Parking distance | Taxis - quality |
| Riga bus | 1.37 | Taxis | Safety/security |
| Aachen | 1.37 | Shopping area | Bike parks - shelter |
| Riga train | 1.39 | Taxis | Safety/security |

The conclusion from this comparison is that there was great variation around the mean result, in terms of best and worst subjective performance. This variation was probably related to the wide variation in size, function and age of the Interchange as well as to the cultural position and economic situation of the stakeholders. Further refinement to the approach would be required to produce a more standardised comparison of quality achievement.

## 5.3.3 The Data

The accompanying tables give the averaged scores for all characteristics given by each reference group for Importance, Satisfaction and (by subtraction) Performance. They are arranged in the following order

1. All reference groups at all sites aggregated
2. UGs by gender and age at all sites aggregated
3. All reference groups (incl. UG sub-groups) by intermodality
4. All reference groups at each site

Sample sizes given in table 5.2 are repeated at the foot of the page of Importance results. Blanks denote “no view/not applicable” or an absence of respondents.

## 5.4 The Planning Approach

### 5.4.1 Objective and Methods

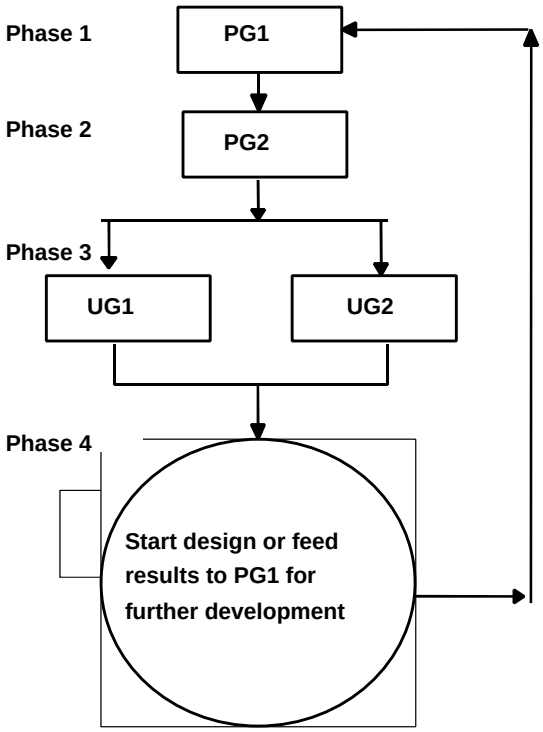
The Planning Approach is an iterative process of discussion, discovery and prioritisation aimed at reducing misunderstanding between the reference groups. It tries to answer a different question, namely - "***How can "good practice" be achieved ?"***

Rather than a parallel sequence of questioning, the four reference groups are approached in linear order, starting with the PG1s. These produce a list of aspects they consider to be important in relation to the desired improvement or re-development of an existing site. The PG2 group may then be consulted and the combined, "filtered" set of priorities sent to the user and non-user groups. Either a straightforward questionnaire or structured interview sessions are then carried out in proximity to (though not necessarily at) the interchange site with a large number of (but not necessarily a randomised sample) of UG1s and UG2s. These groups are allowed to modify and re-prioritise the list of issues, which are then fed back to the PG1 group for further consideration and re-prioritising. The qualitative and quantitative are integrated in all phases.

This approach was tested at 4 of the 13 sites where the Evaluation Approach had been conducted (Riga, Antwerp, Moncloa and Adwick) as well as at Doncaster (GB).

The information and data collected were further distilled (in WP7) to produce a deliverable (D3a) entitled "Handbook and Guidelines". A CD-ROM version (D3b) was also produced as well as conference presentations. Several partners produced their own papers and reports, in their own languages. Some of these are available from the website.

**Figure 5-10: The structure of the Planning Approach**



## 5.4.2 Results and Conclusions

The Planning Approach was undertaken at Antwerp, Riga, Moncloa, Adwick and Doncaster. Figs. 5.11 to 5.14 show the rankings that each group gave (as a group) to the development priorities agreed and listed by the PG1 group in the first round. In addition, the PG1s provided private as well as group held rankings that highlighted the level of internal disagreement amongst PG1s with the consensus result. (See 5.4.3)

Table 5.7 shows the root mean squared differences (RMSD) between each pair of reference groups' consensus responses expressed as a percentage of the maximum possible divergence, scaled between 1 and 5, (5 = maximum.)

**Table 5-7 : Initial differences among reference groups (scale 1-5)**

| | Sites | | | |
|---|---|---|---|---|
| **Groups** | **Adwick** | **Doncaster** | **Riga** | **Moncloa** |
| PG1-UG1 | 3.79 | 3.40 | 3.97 | 1.51 |
| PG1-UG2 | 3.07 | 4.16 | 3.48 | 1.51 |
| UG1-UG2 | 4.13 | 3.98 | 3.90 | 1.32 |
| PG1-PG2 | | | | 1.71 |
| PG2-UG1 | | | | 1.66 |
| PG2-UG2 | | | | 1.66 |

Note: PG2s rankings only available from Moncloa.

The distribution of the divergence among the issues is also of relevance. From previous experience with the approach, it is possible to detect in advance which issues are likely to be resolved and which not, depending on where they lie in each group's rankings. If there is no discord between the PGs' private and group-held views and it is in the top 70% of UG1s rankings, an issue is likely to remain a stable priority for development. Otherwise it may be rejected in the second round, unless it is further explored and developed in further discussions. An appropriate framework for analysing the first round results for purposes of predicting results of later rounds is shown in table 5.8.

**Table 5-8 Classification of Issues raised in round 1**

| **Mean score By** | **Highly Stable** | **Stable** | **Unstable** | | **Explorational** | |
|---|---|---|---|---|---|---|
| | | | **..either..** | **…or…** | **..either..** | **…or…** |
| PG1s privately | On list | On list | Not on list | On list | Not on list | Not on list |
| PG1s consensus | On list | On list | On list | Not on list | On list | On list |
| UG1s privately | > 70% | > 70% | < 30% | < 30% | < 30% | < 30% |
| UG2 privately | > 30% | On list | < 30% | < 30% | > 30% | > 30% |
| PG2 consensus | On list | On list | On list | Not on list | Not on list | Not on list |

Table 5.9 classifies all the issues raised in the first round of the approach at the PIRATE sites according to these criteria.

**Table 5-9 Classification of issues in 1st round of Planning Approach**

| Aspect | Issue | V. Stable | Stable | Unstable | Explorational |
|---|---|---|---|---|---|
| **Security** | Good/Improved Security | A | R | | |
| | Secure Car Parking | A | | | |
| | Interchange will be safe | D | | | |
| | Secure + CCTV + visible staffing | | D | | |
| | No pedestrian/ bus conflicts | | D | | |
| **Operations** | Frequent train service | A | | | |
| | Through-journey options | D | | | |
| | Improve walk links between levels | M | | | |
| | Availability of other transport | | A | | |
| | More linked bus routes | | D | | |
| | Uncongested access | | D | | |
| | Level, easy walking routes | | D | | |
| | Easy interchange buses - trains | | D | | |
| | Ample car parking space | | D | | |
| | Plenty of room for buses to wait | | D | | |
| | An integrated transport system | | R | | |
| | Improved intermodal transfer | | R | | |
| | Sufficient connections elsewhere | | | A | |
| | Regional terminals | | | R | |
| | Close, direct link to airport | | | R | |
| | Access to the bus station for cars | | | R | |
| | Reduced crowding | | | M | |
| **Location** | Easy access to town centre | R | | | |
| **Information** | Easy to find bus services | R | | | |
| | Central Information point | | D | | |
| | More information | | | M | |
| | Reliable inf./announcements | | | | A |
| **Comfort** | Improved environment + comfort | R | | | |
| | Change position of lights | M | | | |
| | Improve ventilation | M | | | |
| | Adequate weather protection | | A | | |
| | Plentiful free toilets | | D | | |
| | Light, Airy, Bright, Clean, no fumes | | D | R | |
| | Rest and Meeting area with cafes | | D | | |
| | Weather protection | | D | | |
| | Noise control/reduction | | | M | |
| | Increase natural light | | | M | |
| **Facilities** | Adequate commercial services | | R | | |
| | Improved services for passengers | | R | | |
| | Availability of tickets elsewhere | | | R | |
| | Create new shops | | | M | |
| | Open 24 hrs a day | | | D | |
| | Enlarge the station | | | M | |
| | Good waiting facilities | | | | A |
| | Public telephones throughout | | | | D |
| | Baby changing facilities | | | | D |
| **Image** | Station to be part of town centre | | | D | |
| | Original architecture | | | D | |
| | Attraction in its own right | | | D | |
| | Better Image | | | A + R | |
| | Moderate advertising | | | M | |
| | Recover the square for citizens | | | M | |
| | Will be part of a new Doncaster | | | | D |

Note: A, D, R and M refer to the first letter of the sites involved (Adwick, Doncaster, Riga and Moncloa)

Two conclusions can be drawn from this:

1. The issues raised by the PG1s and augmented/prioritised by the UGs cannot be distilled into one or two words in a questionnaire without losing their specific meanings, nuances and emphases.
2. The issues are highly site specific, but when grouped by similar type, it can be seen that security, operations and location issues are likely to be less contentious than comfort, facilities and, especially, image. The latter is of course a controversy "waiting to happen" when specific proposals and designs are presented.

Within the timescale of the project it was not possible to carry out a second round of the Planning Approach at any site, but the work done to date is a base on which to carry out further rounds, should the partners so desire.

It is likely that further rounds of the Planning Approach will be conducted at Doncaster and Riga in future.

Following the charts of results generated at the four case study sites, some additional notes are provided on how to carry out the Planning Approach. Then some overall conclusions and inferences are drawn.

**Figure 5-11 : Priorities for improvements at Adwick**

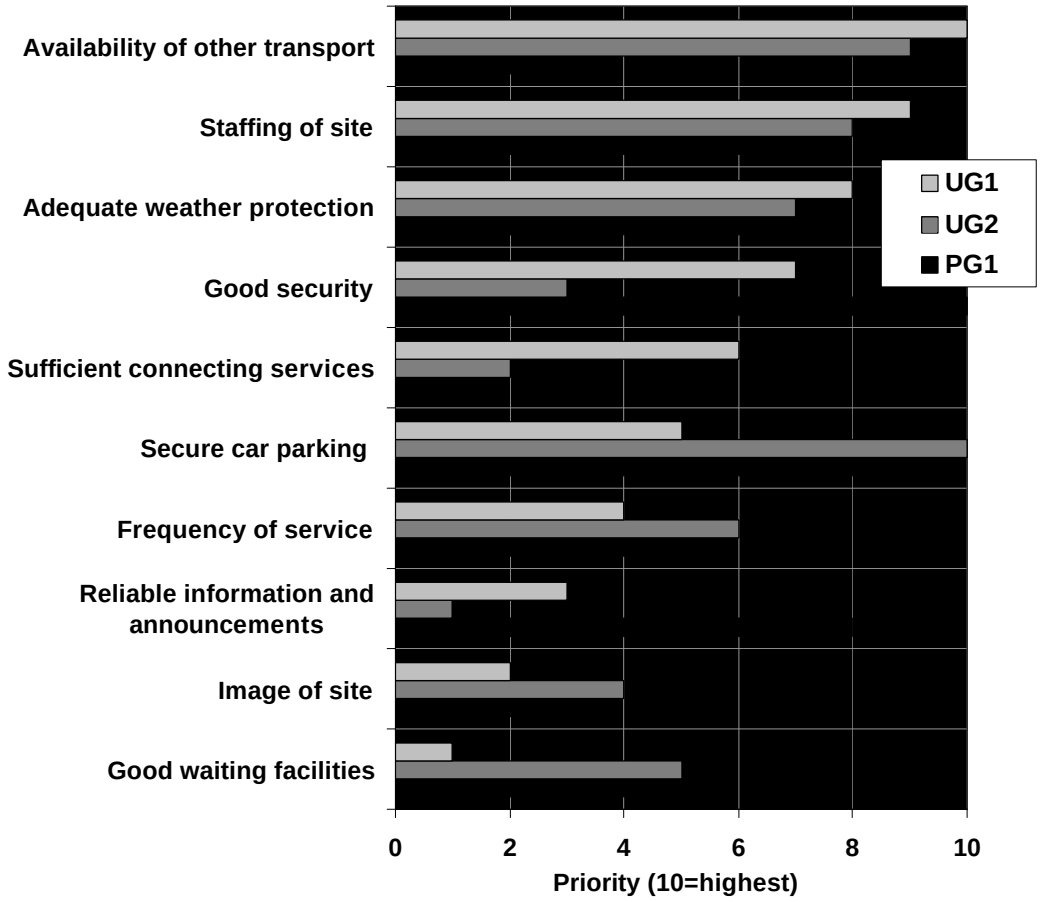


**Figure 5-12 : Priorities for a new Interchange at Doncaster**

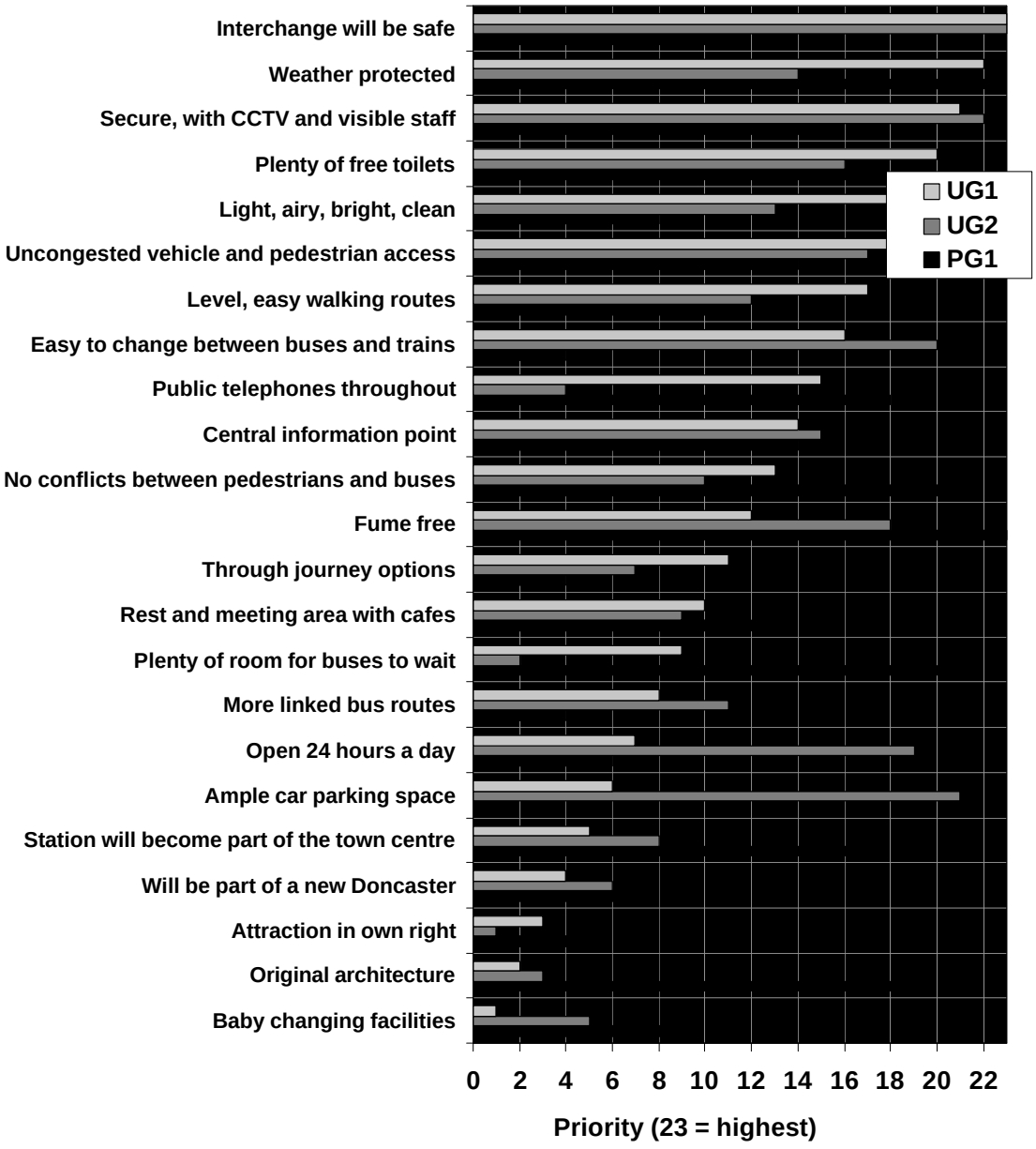


**Figure 5-13 : Priorities for the new Riga Bus station**

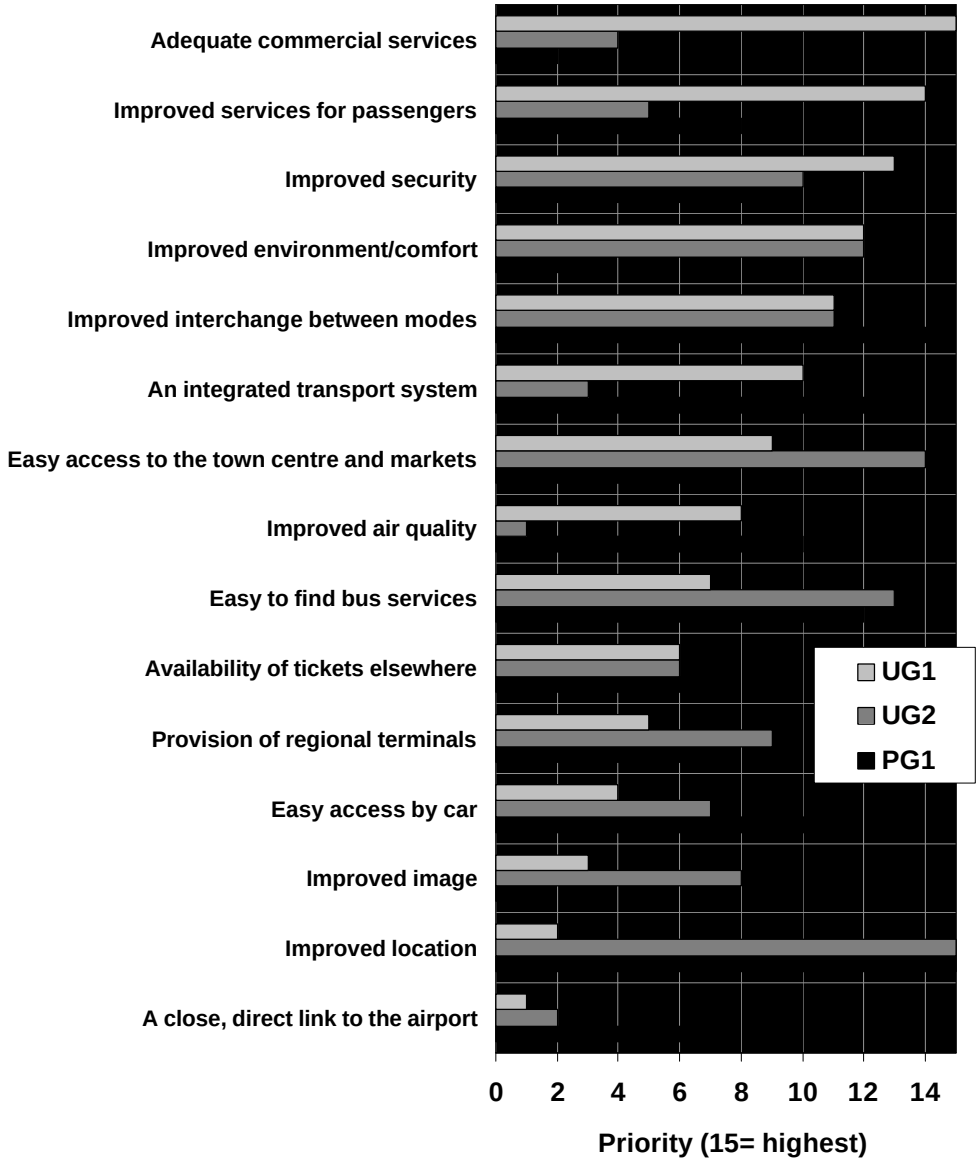
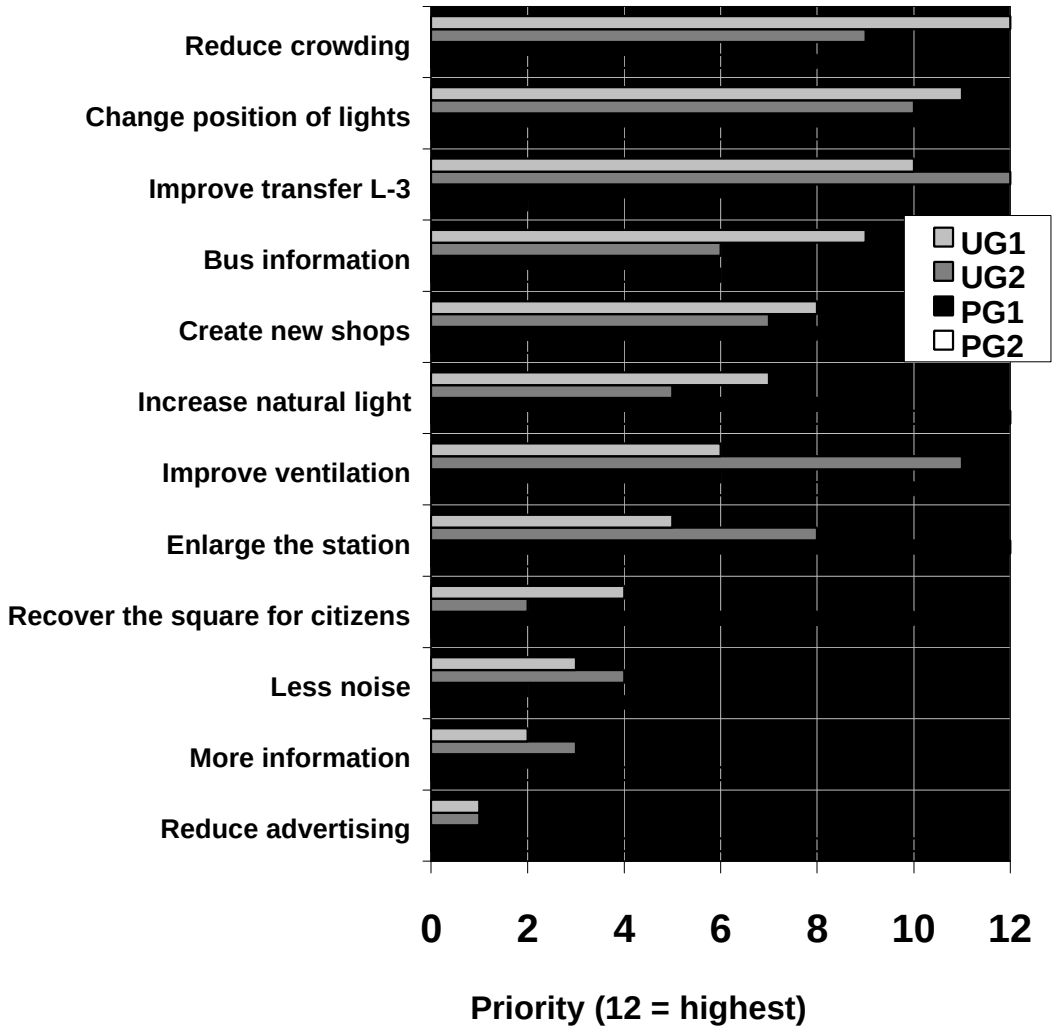


**Figure 5-14 : Priorities for improvements at Moncloa Interchange**



## 5.4.3 Additional Notes

### 1st PHASE: PG1 'EXPERT' GROUP

1. A range of experts and decision-makers are identified (e.g. planners, architects, engineers, local politicians etc.). Ideally 10-12 people. Not less than 5. Consider who is *actually* important, it may not be immediately apparent. People with *real* influence – the ultimate decision-makers.
2. Before the group session, the experts complete a questionnaire.
3. In the group session, the discussion concentrates on a number of specific questions from the questionnaire :

| |
|---|
| **Q16** Now that the interchange has been operating for some time do you have any suggestions for improvement in its operation in relation to customer flows and the management of users? |
| **Q18** Do you have any suggestions for improvement in the overall design of the facility? |
| **Q20** Do you have any suggestions for improvement in the aesthetics of the facility, both its inner and outer environments? |

These questions relate to improvements – i.e. are the creative elements. In the group these areas are extensively probed, resulting in a list of group-agreed statements.

4. The operation of the group requires training. The first task of the group is to consider the answers to the creative questions, and discuss as a group. The results are recorded by the group themselves, on flipcharts, as agreed statements. Sample outputs/results (from Adwick, UK) can be seen below:

***Q16. Now that the interchange has been operating for some time, do you have suggestions for improvement in its operation in relation to customer flow and the management of users? What would those improvements be?***

| P | Statement | Respondent no. | | | | | | MEAN score | RP |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | |
| 5 | Reliable and total information/announcements | 4 | 2 | 1= | 1= | A | 1 | 1.7 | 1st |
| 3 | Staff on site to assist passengers / tell them what's happening | 4 | 1 | 6 | 1= | A | 4 | 2.8 | 2nd |
| 1 | Provision of passenger information (P.A. etc.) | 6 | A | 1= | 1= | A | 8 | 3.0 | 3rd |
| 2 | More frequent rail service | 3 | A | 3 | 5= | NCV | 2 | 3.2 | 4th |
| 10 | Taxi bus shuttle | 7 | 3 | 4 | 1= | NCV | 5 | 4.2 | 5th |
| **6** | Better waiting facilities | 7 | A | 7 | 5= | A | NCV | 4.3 | 6th |
| 4 | Management of customers to/from the site (flexible feeders) | 6 | A | 8= | 8= | NCV | 3 | 5.2 | 7th |
| 8 | More options for journeys | 8 | A | 5 | 5= | NCV | D | 5.8 | 8th |
| 7 | Management of connections (at Doncaster) | D | A | 8= | 8= | A | 7 | 6.0 | 9th= |
| 9 | Long term consistency of services | 9 | 4 | 8= | 8= | A | 6 | 6.0 | 9th= |

**Values ascribed:**

| | | |
|---|---|---|
| A : | Agree | 1 |
| D : | Disagree | 11 |
| NCV : | No confirmed view | 5 |
| = : | equal ranking | |

The statements generated and agreed by the group, together, are shown above in the subject / theme column. The priorities for these statements are agreed as a group, and shown in column P (1=highest priority).

Each member of the group, in this case the 6 respondents shown, then prioritise each statement as an individual, resulting in the priorities shown in respondent columns 1-6. An individual exercise identifies the expert's true positions – where the group statements are individually assessed. A mean score can then be calculated, and a re-ordered priority list, shown above under RP.

Where respondents individually did not wish to rank the statements numerically, they were allowed to "agree", or "disagree" or give a "no confirmed view" (shown as A, D or NCV in the table). Where D's or NCV's appear it further illustrates where respondents individually diverge from the group views previously expressed.

Values can be given to the A, D and NCV responses, to contribute to the mean score.

This process of group and individual filtering shows clearly that differences occur between priorities agreed as a group, and as an individual.
In this example "Reliable and total information/announcements" is only priority 5, as a group, but priority 1, on an individual basis. "Management of customers to/from the site" (flexible feeders), have a lower priority (7) on an individual level, than as a group (4).

The process can also identify consistent themes, in this example, group priority 6 – "Better Waiting Facilities", is also prioritised 6 on an individual basis.

The results can later be compared – what respondents said as a group, and what they said individually, to illuminate differences.

The inconsistencies (divergence), and the consistencies (convergence) are relayed back to the PG1 group in the next iteration, for further exploration.

## 2ND PHASE : PG2 'WORKERS' GROUP

1. PG2 should ideally contain 8-15 people, and include a wide range of representatives across Interchange personnel - managers, cleaners, security personnel, ticket/travel centre staff, retail/kiosk staff – and public transport operators – bus, train, tram crew, etc. Ensure a broad coverage of the whole spectrum. Again, consider everyone, including for example, contract staff.

2. After PG1 (it can practically be the same day), the expert's statements are collated and put to the PG2 group. (i.e. statements from tables as above). This is the filtering process.

3. These statements are considered by PG2 and allocated to four themes – positive features, negative features, working in the Interchange, and the structure. An example is shown below.

**PG2 STATEMENTS**

**ADWICK**
**POSITIVE FEATURES**

My ideas and thoughts set out in priority

IMPROVE SECURITY BY MANNING STATION

PROVISION OF PASSENGER INFORMATION

CUSTOMER SERVICE OFFICERS IN ATTENDANCE

INTEGRATE BUS & RAIL SERVICES

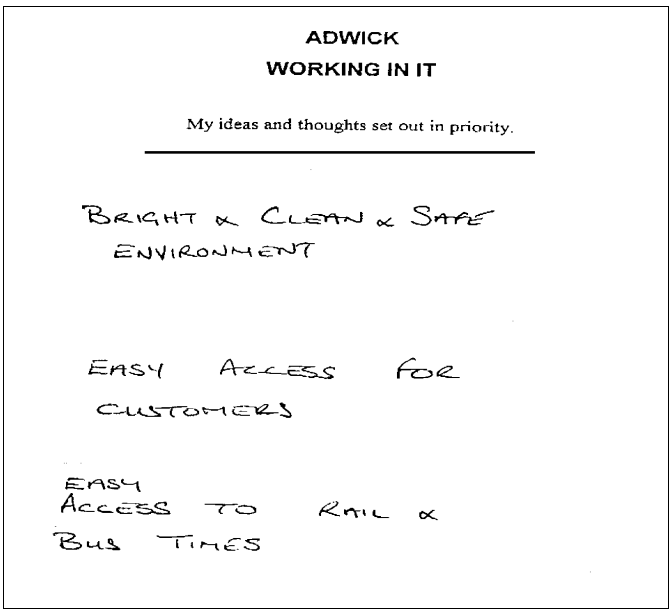
IMPROVED WAITING FACILITIES

**ADWICK**
**NEGATIVE FEATURES**

My ideas and thoughts set out in priority.

LEAVING STATION UN-MANNED

CURRENT LEVEL OF BUS & RAIL SERVICES



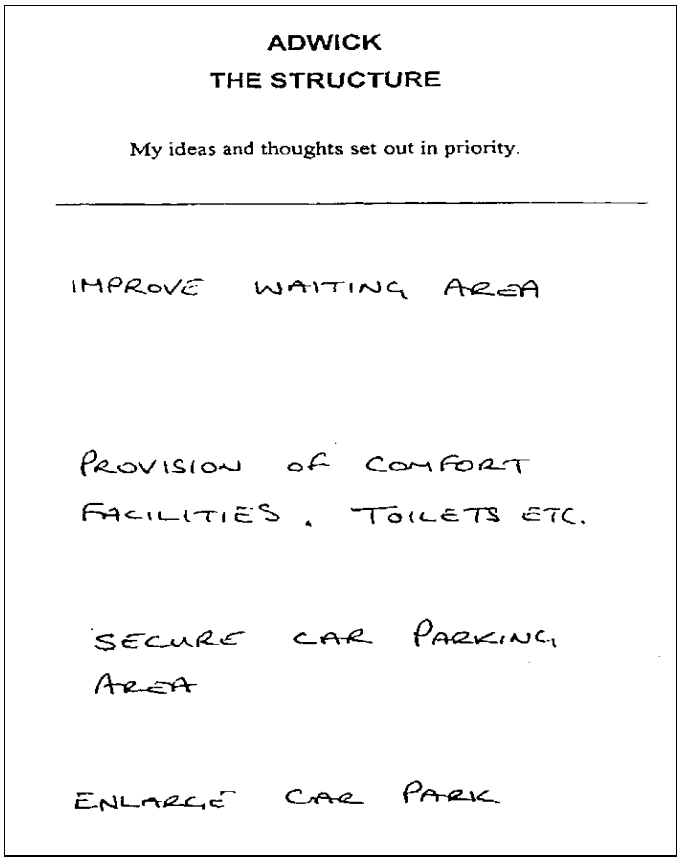
ADWICK
WORKING IN IT

My ideas and thoughts set out in priority.

BRIGHT & CLEAN & SAFE ENVIRONMENT

EASY ACCESS FOR CUSTOMERS

EASY ACCESS TO RAIL & BUS TIMES



ADWICK
THE STRUCTURE

My ideas and thoughts set out in priority.

IMPROVE WAITING AREA

PROVISION of COMFORT FACILITIES, TOILETS ETC.

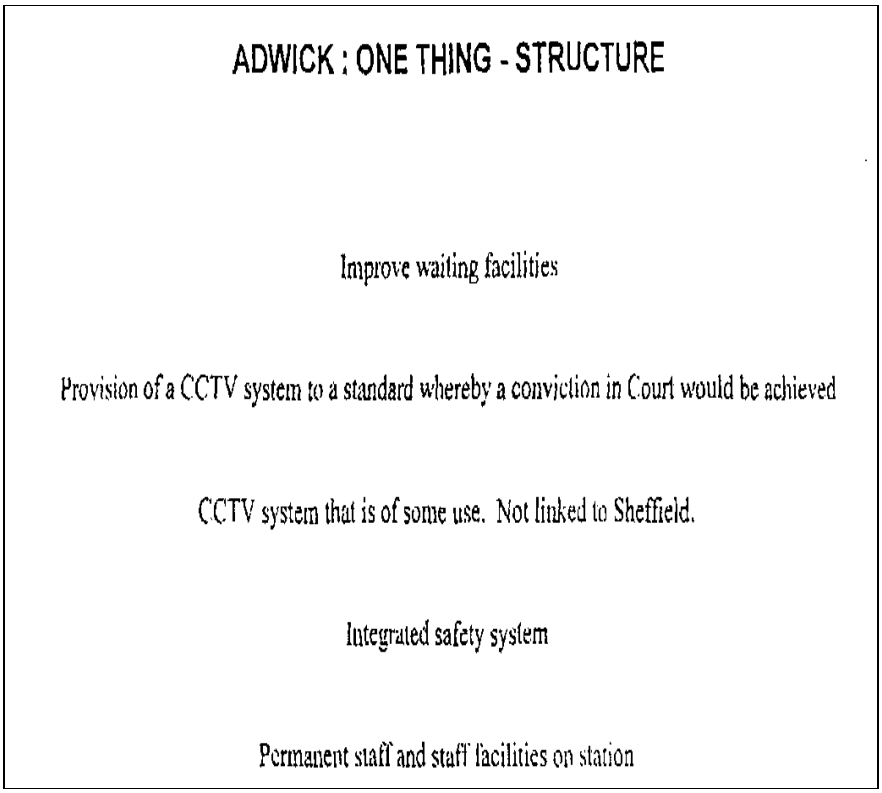
SECURE CAR PARKING AREA

ENLARGE CAR PARK

4. The individuals then prioritise the statements.

5. Finally, the PG2 people have the opportunity to state their own idea if the site could have “one thing”, i.e. their most important feature. A selection of “one things” from a PG2 group is shown below:

**PG2 STATEMENTS**



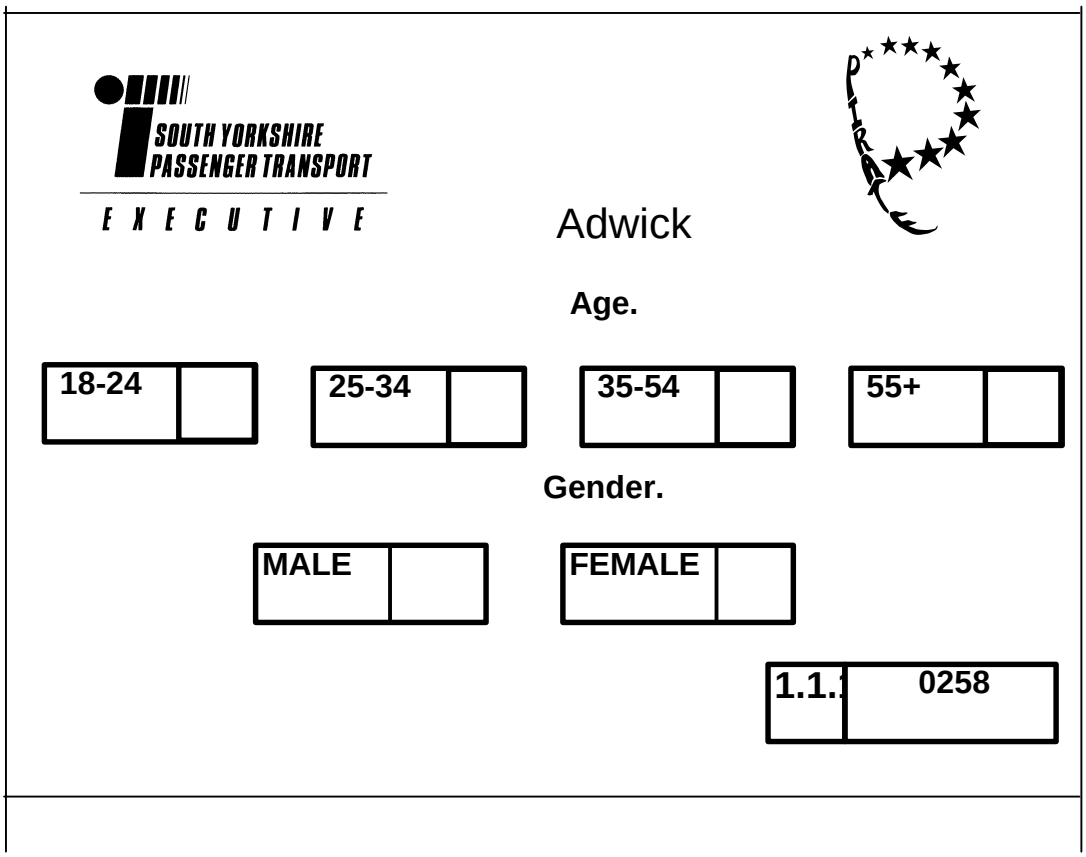

**3rd PHASE - a) : UG1 'USERS'**

1. The statements obtained from PG1 and PG2 are put to the users (in interviews), for their rating.

A. When you use the site do you think there is reliable Information and announcements?

Not at All ---------- Very Much So

Each statement is put on a separate page, with the pages making up a booklet, given to the UG1 respondent to complete. The booklet can have a cover designed to obtain profile information.




The optimum number of statements in a booklet is between 10 and 20, to avoid respondent fatigue and loss of interest.

A final page can be included to ask respondents for any other comments they wish to make, relative to the particular site development.

2. The only criteria for the UG1 sample is that they use public transport. The sample is not stratified.
3. The concept is to aim for a mass surface contact – as many respondents as possible, in the maximum number of research days available. For an average sized site, a week may be optimal. For a large, complex scheme, perhaps longer.
4. The UG1 respondents should be targeted whilst using the site concerned (in the case of an existing site planned for improvement) or in other public transport locations in the catchment area of a proposed new facility.

**3RD PHASE - b) UG2 'NON-USERS'**

1. This involves targeting people who do not use public transport at all, in *their* environment, e.g. in a local supermarket, in a town centre, at a local community centre.
2. Short interviews are conducted to establish their preferred public transport modes, (if they *were* to use it), and to prioritise the statements/features obtained from the PG's.
3. These interviews are conducted in a way which interests the UG2 person, almost making the interview a game, and stimulating them.
4. The sample is the same basis as UG1 – mass surface contact over the maximum number of days available.

## 4TH PHASE : RESULTS - AN ANALYSIS

The results developed from the iterative process can initially be shown in a number of ways:

- The results from PG1, showing generated statements, group and individual priorities
- The ideas and thoughts from PG2, based on the statements from PG1

However, primarily, at the conclusion of the first iteration, the results can be analysed to show an increasingly holistic result:

- Firstly, PG1 and PG2 results can be compared and the extent of convergence/divergence, and validation of statements, identified. An example is shown below:

***Q 20 Do you have any suggestions for improvements in the aesthetics of the facility, both its inner and outer environments?***

| PG1 RANKING | PG1 STATEMENT | PG2 POSITIVE STATEMENTS | PG2 NEGATIVE STATEMENTS |
|---|---|---|---|
| **1st** | Plants and flowers | | No need to provide "plants" etc. - should be functional but friendly<br><br>Do people/users feel any better if plants/public art are displayed? I think not! |
| **2nd** | Public art/community input/positive contribution of people | | Do people/users feel any better if plants/public art are displayed? I think not! Public art |
| **3rd=** | Ownership/education links | | Lack of ownership on the part of operating companies |
| **3rd=** | Locate new community facility at station | Links with the community | No co-operation between businesses |
| **5th=** | Human | | |
| **5th=** | Character : e.g. gateway | | |
| **5th=** | Personalise station image : don't corporate-ise | Personalise image | |
| **8th** | Re-paint it | | Existing structure and colour scheme to remain - looks and is functional |
| **9th** | Not engineering design driven | | |

# 6 Conclusions

The **Evaluation Approach** has shown that there is a very wide range of important factors to consider in designing a successful Interchange. Users' needs are diverse and often surprising; non-user needs are different again. Considerable differences exist between the "expert" and the "worker" views of what is important and what is performing well at existing sites. The Evaluation approach is a useful tool for quantifying these differences, and assessing the importance and performance of the very many relevant characteristics of an Interchange.

In PIRATE the Evaluation Approach was used to identify subjectively "good" and "bad" performance at a number of case study sites. Although the performance gaps tended to narrow as importance increased, at all sites they were often rather high for characteristics of medium to high importance. In particular, toilets performed badly (average UG1 gap 1.74) closely followed by security of bikes and property, communications, surveillance, traffic information, cleanliness and clocks.

PIRATE has analysed a sample of interchanges that overall, do not in the view of the average user, perform poorly, Nevertheless, the needs and assessments of users vary greatly within the sample. Although users, particularly females, at all sites complained about safety, security and comfort levels, at a number of sites there is a complete lack of agreement with the experts as to priorities and solutions.

The **Planning Approach** also revealed high levels of divergence between the reference groups. The differences can be described as reflecting a lack of user understanding of the experts' solutions and related to specific matters of internal design and layout of the Interchange. In contrast to operational and security issues – important but generally stable issues - effective solutions to design are actually more tractable and should be achievable by an iterative process of exploration, discussion, filtering and feedback between the reference groups.

The Planning Approach provides a mechanism for achieving successful interchange by involving the public and all stakeholders in a structured, iterative process involving continual feedback and education not only in the planning phase of any development (which can be lengthy) but also in the build and operating phases. Such an approach is needed if the aim of retaining or increasing public transport patronage is to be achieved.

**Dissemination**

A dissemination plan has been drawn up and actions are being taken by several partners to continue using and building on the research approaches at other sites they are involved in developing.

# 7 Annex

## 7.1 List of presentations (some available to download from : www.interchanges.co.uk

**Pan – European Conference – Amsterdam, 23 – 24 June 1999.**

1. "Finding the Gaps", by Prof. Bengt Holmberg, University of Lund

2. "Finding out what is needed – advice for researchers" by Dr K. Brundell-Freij, University of Lund

3. "How we are planning to improve interchanges -The view from Germany" by Prof. W. Echterhoff, University of Wuppertal,

4. "Interchanges implications for policy" by Jan Vanseveren, Langzaam Verkeer

5. "Integration of transport modes in the Madrid region- the case of metropolitan buses interchange points" by Javier Aldecoa Martínez-Conde, Department of Studies And Planning, Madrid Regional Transport Consortium

6. "Turning PIRATE results into practical advice" by Javier Bustinduy, BB&J Consult, Madrid.

7. "Improving interchanges in Latvia" by Olita Sproge and Dace Jagere , Riga City Council, Latvia

8. Outline of presentation by John Krachai, Counter Context

**The European Transport Research Conference, Lille 8–9 November 1999 and "Passenger Interchange Nodes" MIMIC project Conference, Rome 24 January 2000.**

"To develop and test a new methodology to create successful public transport interchanges" by David Andrews, SYPTE

**"Colloque – plan de déplacements urbains "les pôles d'échanges"", Paris le 28 Mars 2000.**

« Etablir le lien entre les experts et les consommateurs – les expériences et résultats du projet PIRATE » David Andrews, South Yorkshire Passenger Transport Executive

**"Passenger Transport Solutions" Conference organised by Landor Publications 17/10/2000, London.**
"Designing Interchanges to meet real user needs" Tom Rhys Jones, Jefferson Sheard Architects.

# 8 References


[1] PIRATE: Framework for Study, SYPTE, Sheffield, March 1998. (Deliverable 1 - restricted).

[2] PIRATE: Report of workpackage 2 – Walk & Ride, Langzaam Verkeer, Leuven, 1998. (working document – available from co-ordinator)

[3] PIRATE: Report of workpackage 3 – Park & Ride, SYPTE, Sheffield, 1998. (working document– available from co-ordinator)

[4] PIRATE: Report of workpackage 4 – Bike & Ride. Trivector AB Lund, 1998. (working document– available from co-ordinator)

[5] PIRATE: Report of workpackage 5 – Ride & Ride, BB&J Consult, Madrid, 1998. (working document– available from co-ordinator)

[6] PIRATE: Results of Analysis (Deliverable 2 - restricted)

[7] PIRATE: Handbook and Guidelines (Deliverable 3 -public) Hardcopy and CD-ROM format (available to order from www.interchanges.co.uk )

[8] PIRATE: Recommendations for Partner Cities (Deliverable 5 - restricted)

[9] PIRATE: Literature Review, SYPTE 1999 (working document– available from co-ordinator)

[10] GUIDE: Group for Urban Interchanges Development and Evaluation-Deliverable 2: Literature Review (available to order from www.interchanges.co.uk )

[11] Gyukits, H.: “Bike and Ride transport in the Rhine-Ruhr Transport Alliance’s region (RRVV)” (GER) 1997

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[13] Norheim B, Naess Kjoerstad K, Renolen H.: “A new initiative in Public Transport in the Drammen region” (NOR) Oslo 1994

[14] LT : “Taking a Turn for the Better” in London Lines 1992

[15] Harris Research Centre: “Meadowhall Interchange Attitude Survey” 1991

[16] C.Buchanan and Partners: “Transport Interchange, Best Practice: Report to DETR” 1998

[17] Federal Ministry for Transport, Bonn: “Citizen-friendly and Handicapped-impartial design of bus and tram stops”(GER) 1997

[18] Federal Ministry of Health, Bonn: “Improving visual information in public spaces” (GER) 1992

[19] U.S. Department of Transportation: “Evaluation of Intermodal Transfer Facilities” 1994 (ref. DOT-T-95-02)