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EXECUTIVE SUMMARY

This detailed document reports the User Needs Analysis for the SAMPO project; project number TR1046 within the Transport Telematics Programme.

The SAMPO project deals with the provision of flexible and demand-responsive transport services in rural and urban areas. In particular, it deals with creating more effective means of providing an integrated transport offer to market segments (geographic or user type) which are not well supplied with traditional transport services. This can range from rural Demand Responsive Transport Services (DRTS) to Special Transport Services (STS) for Disabled and Elderly in Urban areas.

The SAMPO services work at the intersection of many key issues :

- the provision of collective transport to a large market currently captive to private car
- organisation and management of inter-modal travel
- improvement of quality within public transport to achieve mode shift
- retention of population and employment in rural areas through better facilities
- provision of better mobility/accessibility for marginalised groups
- generating sustainable markets for transport operators

The main goal of SAMPO is to assess the added potential and the effectiveness of telematics technologies to provide demand responsive transport services (DRTS). Test sites within the project are representative firstly, of the use of telematics in DRTS to provide public transport services in urban and rural locations and secondly, for the use of particular groups of users such as the elderly and disabled.

Test sites within SAMPO are located in five European Member States. The sites are Seinajoki and Tuusula (Finland); Hasselt (Belgium); Kilkenny (Ireland); Florence and Campi (Italy); and Gothenburg (Sweden).

A wide range of telematics applications will be used to support the DRTS, and this is one of the key innovative features of the project. These include reservations management, operations management, communications, and passenger support applications. SAMPO will evaluate the business case for both the DRTS and the use of telematics, as well as the user response and travel impacts.

The first two chapters of this deliverable address the objectives of the SAMPO project and the policy /market context. The third chapter provides a review of the characteristics of current DRTS systems around the world.

A central aspect is to identify the relevant users within a DRTS system, and to understand their needs. This ensures that the commercial opportunities are better understood, that the services are designed to meet the actual needs of the users, and that critical factors are not overlooked. Within the project, the user needs are a key input to the design of the functional specifications of the demonstrator.

Based on the collective expertise of the project participants of the five sites (which includes authorities, operators, communities, industry and research institutions) the ‘users’ have been categorised. Four main ‘User Groupings’ have been established : End-users, Operators, Authorities and Active Destinations. In turn, these User Groupings have been broken down to a further level of ‘User Categories’, and it is at this level that the SAMPO project reports user needs.

Chapter 4 identifies the different User Categories, and provides an assessment of the importance of each to DRTS. Chapter 5 describes the methodologies used to establish the actual user needs at each site. The main methods were surveys of end-users, discussion and focus groups based on Local Reference Groups, and interviews with organisations and representatives of the key user categories.

Chapter 6 presents the user needs analysis from the five countries, whilst Chapter 7 considers the overview layer in terms of transport policy, core user needs, potential conflicts and critical factors.

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1.0 OBJECTIVES AND ACTIVITIES OF THE SAMPO PROJECT

1.1 Principle users and needs identified within SAMPO

The SAMPO project aims to determine and meet the user requirements for demand to travel which involves several types of services (many origins-many destinations, one origin-many destinations or many origins-one destination). These requirements will form the basis when applying telematic solutions for demand responsive collective public transport and other intermediate systems. This will help in filling the gap between individual transport and scheduled conventional public transport especially in the low demand areas or periods.

To be able to meet the user needs, the users have to be identified, and a clear understanding of their requirements developed. In the formation of the SAMPO project, the transport-related requirements of the users were summarised as :

User Group	Requirements
National/Regional Authorities	Maintain the economic and cultural status of rural and suburban communities Ensure a coherent transportation service within the country/region Achieve access for citizens within available financial support budgets Facilitate Special User Groups
Local communities	Retain importance of the community Ensure sufficient mobility to meet citizen and commercial needs Facilitate Special User Groups
Citizens	Information concerning available transport services Access to basic and higher order service locations Adequate frequency of service Ability to make journeys both on planned and spontaneous basis Transport service suitable for use by Disabled and Elderly (D&E), and those with reduced or impaired mobility
Transport operators	Increase demand for public transport services Improve economic viability of existing and new services Develop new and innovative services
Traders	Access to their services and shops Ability to compete with large centralised shopping complexes
Employers/ industry	Adequate mobility for their employees to workplaces

These user needs were based on the collective knowledge of the SAMPO consortium which includes National/Regional authorities, municipalities, operators, industry representatives, universities and consultancies. All of the project actors have been involved in the industry of transport provision and are familiar with both the policy-level and operational-level requirements. Nonetheless, all the actors also recognise that this set of needs has to be validated, that there is always value in considering again the needs of the users. This is especially true when innovative services are being considered, and when dealing with specialised markets.

Within the SAMPO project there will be field trials and demonstrations in **real** transport environments. Test-sites in several member states will establish the feasibility and impacts of the theoretical and technological studies based on the user needs. The diversity of sites, cultures, services and community types within SAMPO allows a truly pan-European perspective and market position to be obtained.

Within this framework lies a unique opportunity to identify all the relevant users, examine their needs, develop solutions in response, and establish whether these truly meet the expressed needs.

SAMPO not only covers the demand responsive transport needs of the general community, but also the needs of the Disabled and Elderly. This is considered in three ways :

- Improvement of the accessibility of general public transport services through reduced walking times etc.
- Provision of designated vehicles and services adapted for special needs, for access to diverse locations
- Services to special locations such as hospitals, day care centres etc.

It is a hypothesis used in several of the SAMPO sites that DRTS is particularly well suited to fulfil the needs of these users.

1.2 Objectives of the Project

The goals of the sites within the SAMPO project are :

- To improve the mobility for citizens in rural and urban areas
- To improve the participation of elderly and disabled citizens within their community
- To improve the business and viability of public transport operators
- To improve the environment of the rural and urban communities

The SAMPO project will make a significant contribution to the achievement of these goals. The specific objectives of the SAMPO project are :

- To identify the relevant user groups and to express their transport-related needs
- To design and develop Demand Responsive Transport Services (DRTS)
- To develop functional specifications for ATT products to support DRTS
- To validate the DRTS and the ATT products through verification and demonstration
- To evaluate the user behaviour, travel impacts and social impacts
- To determine the business case for DRTS, and the added value of using ATT within DRTS
- To disseminate the SAMPO results to the transport industry and the R&TD community

The SAMPO project will offer the organisations and authorities involved new business plan ideas to be further developed:

Organisation	Opportunities
Operators	new multimodal public transport services for areas of relatively low demand integrated public transport and information services for citizens and for special groups

	new modes of service to increase attractiveness of public transport operations interoperability and co-operation between different kind of operators new services for special groups to increase their mobility new multimodal DRTS dispatch centres
Industry and Suppliers	integrated DRTS dispatch centre applications personal home and public terminals and terminals for elderly & disabled route optimisation and tracking & tracing applications GIS systems for DRTS and new user interfaces with advanced technologies user friendly booking and payment systems adaptation of generic tools and applications to meet the needs of DRTS developing applications for SAMPO "application and solution bank"
Municipalities and Authorities	cost-effective public transport services (also for special groups) new transportation related services for visitors and tourists
Universities	scientific R&TD in the areas of DRTS and related telematic applications validation and evaluation of new transport services for the low demand areas and their influence on the development of these areas simulation studies of DRTS relating to Common European Transport Policy

1.3 Market situation and prospects

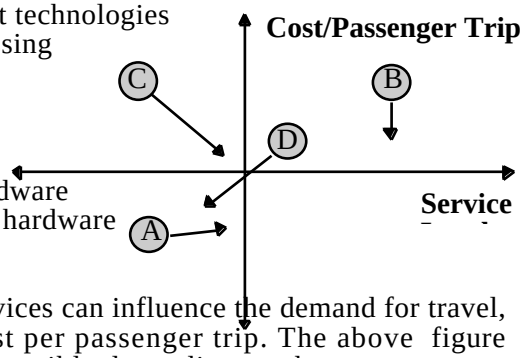
The main user objectives, identified above, illustrate the growing need for the provision of public transport services, which are adaptive to community needs. Increasingly, small communities are demanding adequate mobility levels as they see their ability to attract, or even retain, their members being reduced. The growing numbers of elderly, disabled people and other special groups, who demand full integration within the activities of their communities, have created a strong set of travel needs. Traffic congestion, environmental problems and the pressure to develop better services for rural and low density areas are now strong political issues. These pressures have created extensive potential markets not yet met by the transport service providers. The greatest barriers to exploiting these markets are the ability to satisfy the customers needs quickly, and to find a cost-effective means of scheduling and routing the vehicles. Operators and communities increasingly believe that if these technical barriers can be overcome, the transport market will accelerate.

To date, new technical innovations and solutions (both hardware and software) have been developed to make it easier to introduce applications to support the demand responsive multimodal public transport services (e.g. buses, taxis, invataxis, and feeder transport for train services). These are in the domain of application independent technologies such as vehicle-location systems, communications, and networking facilities. Although some products have been developed specifically for managing the DRTS, they are few, and have not been tested widely. They have generally been developed for specific operators and typically have not been designed for integration within the multiple functions of these operators.

There is, therefore, a very strong potential market for the technology and methodology products to support DRTS. The main customers for such products will be the public transport operators, regional authorities and system integrators. The mix of technologies they seek will depend on the operational and financial strategies that they wish to implement.

The set of demand responsive transport telematics applications includes several applications that have prospects to emerge into the markets:

- customer interfaces and support technologies
- booking and reservation processing
- information services
- dispatching applications
- route optimisation technology
- payment systems
- control centre software and hardware
- on-board mobile terminals and hardware
- telecommunications



The impact of implementing the services can influence the demand for travel, and this can in turn reduce the cost per passenger trip. The above figure shows that different scenarios are possible depending on the current status and operator's or the supporting administration's policies. The SAMPO project addresses the scenarios A, B and C where service providers seek to maintain or improve the quality and level of service to the passenger, whilst reducing the cost per passenger trip.

Situation A is typical for a country or city where the service level (e.g. for the D&E group) is very low, while situation B represents a site where a very high service level (e.g. door to door taxi) is provided, at a correspondingly high cost. This, may from a political view, be hard to justify, in the long run and the site objective is to reduce costs while trying to maintain the service level.

1.4 The SAMPO test-sites

Within the SAMPO project, five test-sites in five EU countries have been brought together. In practice, there are actually additional sites as some of the countries have twinned sites with different characteristics. This enhances even further the range of inputs and outputs of the SAMPO project.

The sites, their characteristics, objectives and service types are described in detail in Deliverable D8.1, the SAMPO Evaluation Plan. The demonstrators will be described in close detail in Deliverable D6, scheduled for early 1997. A summary of the test sites is given here to inform the reader.

Country	Site	Nature	Modality	Key target market
Belgium	Hasselt, Limburg (Sint-Truiden, Tongeren)	Rural	Single Mode	General public
Finland	Tuusula, Seinajoki	Rural and peri-rural	Integrated / Multimodal	General public with special reference to Disabled and Elderly
Ireland	Kilkenny region	Rural and peri-rural	Single Mode	General public with special reference to Disabled and Elderly
Italy	Firenze	Urban	Single Mode	Disabled and Elderly
Sweden	Gothenburg	Urban	Integrated / Multimodal	Disabled and Elderly

It should be noted that in all the sites, the DRTS services are expected to complement the existing travel services, and therefore address specific market

needs. They can then be integrated with other service types such as inter-urban routes, regional/local fixed-route services etc.

1.5 Social and Economic Impacts for the sites

The impacts on the rural and urban areas of the SAMPO Demand Responsive Transport Services is expected to be quite significant at all the sites. Both the rural and the suburban areas suffer from structural disadvantages in terms of their economy and quality of life. The lack of access to services and to proper transportation facilities reduces the ability of communities to develop in a proper manner. In particular, citizens who are disabled, elderly, or whose mobility is otherwise restricted have the greatest potential to benefit from the SAMPO initiatives.

The SAMPO project develops and enhances a wide range of transport. This allows greater mobility and ease of access to services. The main impacts which are likely to be experienced are :

- Integration of services into a network will provide greater transport cohesion in districts
- Flexible routing services will allow access throughout an area rather than on specific corridors
- Improved access to local services will reduce the need to travel to larger centres
- Increases in the level of economic activity in the locality, either rural or suburban, and to improve their sense of identity
- Improved mobility for disabled and elderly will allow them to participate more fully in their communities and reduce barriers to being treated on an equal basis with other citizens
- Improved mobility and access to services will help retain people, especially young people and families, in areas of declining population
- An increase in the cost-effectiveness of the services will encourage increased service level provision, increased usage, and create a sustainable "virtuous circle" of improvements
- Benefits to locations with a strong tourist dimension due to improved and flexible public transport which will encourage tourism without cars, assisting tourism growth in a sustainable fashion.

1.6 Economic Impacts for Operators and Industry

Operators will experience significant improvements in the quality and cost-effectiveness of their services through the implementation of the SAMPO modules and approach. The costs of identifying and handling their potential customers and of providing them with the desired service will be reduced as they can expand their customer base. This will allow operators to expand their service range, invest in new or modified vehicles, and engage in new service types. The impact will be to provide growth in both the bus, taxi and trunk rail service industries and the suppliers of products to the operators (buses, taxis, services, telematics equipment, etc.). Further, the demonstration by SAMPO of the viability and market impact of DRTS will encourage operators both in their own countries and elsewhere to use such an approach, and it will stimulate the market for Telematics products and services throughout Europe.

SAMPO provides support in particular to SMEs in the transport sector (operators and system suppliers) through demonstrators to assess their requirements and demonstrate the products. The grand-scale economic and social impacts of the project to the SMEs will be more evident when the varied companies and associations are networked through SAMPO services and their marketing, their promotion and their distribution of the products in Europe is performed at a more timely and cost efficient fashion. With this approach, a network of SMEs, their associations and communities, can easily

communicate with a wider audience, finding more partners and products all over Europe and provide new markets to their business activities.

The main contribution of the SAMPO project is the networking of the SMEs and the availability of the various needed information. SMEs can be provided with information for transport availability, efficient distribution, marketing and promotion, new markets and partners, availability of parts and raw materials, etc. Therefore, their core products and services are reaching a wider audience with a global focus, which results in better competitiveness and increased productivity.

2.0 CONTEXT OF TRAVEL MARKET AND THE TRANSPORT INDUSTRY

2.1 Public Transport Services

Public transport is the basic form of mobility and access for many sectors within European societies. These societies, and their spatial form, have developed in a manner that require people to travel significant distances. The location relative to the home of workplaces, shops, leisure facilities, social and cultural centres, and support services all dictate the need for motorised travel for most activities. In addition, there is a high level of activity between communities and regions for work, leisure and cultural reasons.

Many sectors of society are dependent on the available public transport as their sole means of access to the various destinations. If the service is inadequate, they must either persist in their travel in sub-optimal conditions, or they must forego the trip altogether. In practice, many will eventually gain access to a car and will use it for all journeys, even those which had been reasonably achievable by public transport. This means that the industry loses both direct and future business.

Public transport operations need to be able to significantly improve their ability to meet customer expectations in terms of the range of services and the support provided to the user.

Scheduled public transport services provided by buses, minibuses and taxis can generally be considered in three broad categories :

Inter-urban services provide links between cities, towns and regions by coaches and trains
Rural and local services provide basic transport services in the countryside and small towns by buses, minibuses and even taxis
Urban and suburban services provide the transport services in cities and their conurbation's by buses and minibuses

Special Transport Services address the same operational environment, but are usually provided by taxis and especially equipped vehicles (InvaTaxi's) to accommodate wheelchair passengers.

Rural, local, urban and suburban services also provide feeder and distribution services for long-distance trains and coaches.

The SAMPO project considers rural services as well as flexible services in urban areas, and the issues arising in relation to using support systems to improve the offered service.

The transport market is now considered from two viewpoints :
i) The market for the travel services provided, and the considerations of transport policy

ii) The development of the market for telematics products to support the travel services

2.2 Policy aspects in Transport

Policy aspects in relation to personal transportation have come under close attention in recent years from many Directorates of the European Commission. The Directorates-General dealing with industry (DGIII), transport (DGVII), environment (DGXI), innovation and technical research (DGXIII), regional development (DGXVI) and energy (DGXVII) all have significant programs and/or actions related to personal transportation.

It is well known to the research community and to the general public, that traffic, particularly that associated with personal transportation, has very significant impacts on mobility, safety, environmental condition, energy consumption and congestion delays. At the same time, the importance of the transport industry, as both an employer and as a market for goods and services, is highly significant in all communities within the European Union.

2.2.1 Sustainable transport

Policy in relation to transport attempts to achieve a balance between free movement of people and goods, and the impacts of the collective movement (congestion, safety, pollution, marginalisation). Because of the freedom of mobility within Europe, it is necessary to consider policy at the European level rather than just at the national or local level.

There has been a major shift in transportation policy to achieve what is known as 'sustainable transport' - in other words, to maximise the travel opportunities and mobility of people and goods in a way that can be sustained indefinitely in economic, social and environmental terms.

The key to achieving sustainable mobility lies in maximising the use of collective travel, and thus achieving the highest possible mobility for citizens and goods with the least amount of vehicle travel. Of course, in practice, this means getting a good balance between what is the personal preference of the individual and what is considered good for the community.

2.2.2 Improved public transport

'Sustainable transport' will in itself only be sustainable, if the travel choices are made willingly by users. Modal shift achieved through coercive methods need to have strong and permanent political support, and need to quickly bring a visible improvement that leads to social acceptance.
The alternative approach is to improve the public transport or collective transport offer, and to make it a realistic option for both captive and choice customers. The needed elements are well understood, and include elements such as :

- Wide range of destinations
- Easy access to collective transport
- Reliable services with acceptable *end-to-end* journey speed
- Acceptable waiting times and waiting conditions
- Sufficient information for planning and using the services
- Ease-of-use of systems, and support from staff/organisations
- Perception of comfort and safety
- Reasonable and flexible pricing and payment methods
- Facilities for baggage, shopping and other items
- Facilities and ease-of-use for people with special needs (elderly, disabled, parents)

Many initiatives are currently being taken to address problems in these areas, and to change the image of public transport from a 'mode of last resort' to a more user-responsive option.

2.2.3 Inter-modality

It is recognised that door-to-door travel is a key attraction of the private car. Since public transport can normally only operate along particular lines of higher demand, it is not possible to have routes between every possible origin and destination set.

Further, there are many areas such as low density urban settlements, rural areas, and peripheral urban travel where public transport services are either of low quality or non-existent. So how are the people wishing to travel in these areas going to avail of public transport, even if they were willing to make the choice ? It appears that when people feel compelled to use private transport for some of their journeys, they are less willing to then use public transport even where there are adequate choices available.

It is therefore necessary to maximise the possibilities for travel by public transport. These can be achieved through an *inter-modal* or *multi-modal* approach. In such an approach, the collective of the transport supply is made available to the potential user. In this way, many new options are opened to the potential user and public transport can then be used for some, or all of the journey.

The potential of inter-modal transport has been recognised in the high priority given to it in both the workplan of the Telematics for Transport work program of DGXIII, and the Task Force 'Transport Intermodality' of DGVII of the European Commission.
To achieve inter-modality requires a high degree of co-ordination and co-operation among the different transport suppliers. Already it is clear that users find barriers in a single mode - how can they then be expected to overcome the multiplier effect across many modes ?

The user needs to be offered a combined, and preferably 'seamless' transport offer in terms of :

- information
- booking
- pricing and payment
- ticketing
- accessibility
- transfer
- customer support
- baggage handling
- quality

The Transport for Telematics program and the Transport Intermodality Task Force are expected to contribute to this process.

The Citizens' Network document of DGVII of the European Commission gives a high priority to both the improvement of the quality of the public transport modes, and the creation of a multi-modal environment to provide the needed travel choices.

2.2.5 Role of SAMPO

SAMPO plays a very important role in the development of inter-modal solutions. It has already been identified that there are multiple transport markets, with the urban and inter-urban markets being traditionally well served.

By contrast, the local market in rural and sub-urban markets often have very poor levels of transport supply. This is due to a combination of reasons, mostly based on the diversity of user travel patterns and the difficulty in achieving an economic return for the operator.

Very large numbers of European citizens are denied collective transport opportunities either in their area of residence, or at the destination end of their desired journey. They are then forced into use of the car, abandoning the journey, or choice of a sub-optimal solution. In practice, this results in large numbers of people who live in the suburbs or adjacent towns/regions driving in to the cities where they work and contributing to traffic congestion there, even though the local transportation of the city is of high quality. Visitors to an area (for work, family visit or leisure) drive perhaps in excess of 300 kilometres through corridors and urban areas because a particular section of the journey has an inadequate collective transport link. Disabled and Elderly people may have to restrict their movements or get lifts from neighbours or relatives because very good transport services are just beyond their walking range.

The SAMPO project specifically addresses these transportation issues and many others. It has become clear in the transport industry that a very large number of journeys currently made by car (or suppressed) could actually be made by public transport if the available services were more responsive to their actual needs. The services offered in the SAMPO sites in the five participant countries provide many of the missing pieces in the public transport 'puzzle', with the greatest emphasis being on :

- local transport services
- access to, and distribution from other modes
- services for Disabled and Elderly
- services at times or locations of lower demand

When the SAMPO services are offered alongside the conventional transport services, and especially when they are integrated with them, the public transport network available to the citizen becomes more complete. This helps to achieve a true 'Citizens' Network'.

2.3 Telematics for Transport in SAMPO Framework

Telematics play a major role in the provision of the SAMPO services.

Telematics can be broadly defined as the integration of telecommunications and informatics systems. In other words, a communication platform is established (either by wire or by air) and intelligent systems are overlaid. This allows control, management or service functions to be provided as added-value. As this is achieved through generic technologies, telematics can be applied to many different sectors. In particular, transport, healthcare, distance learning, teleservices, and libraries are all making increasing use of telematics.

Telematics applied to transport allows major improvements in access by potential users to information, in service provision, operational efficiency, and in the ability to better manage the business. Telematics applications for transport can be categorised in two main groupings :

End-user interface technologies which are experienced directly by the customer, such as information systems, ticketing or booking and reservation systems, and
Operational technologies which are experienced by the operator, such as location systems, network management tools, scheduling and optimisation systems.

Typically, a platform of applications is established and over time, additional features are integrated to enhance the service level provided.

2.3.1 Current level of ATT in the European industry generally

The total bus fleet in Europe is in excess of 500,000 units with over one million direct employees. Of this bus fleet, some 300,000 are estimated to be deployed in extra-urban (inter-urban, regional, local and rural) bus services. Because urban bus fleets are generally conspicuous due to their scale and location, the scale and diversity of the extra-urban activities is generally grossly underestimated, either as a market place or as a means of achieving transport policy and objectives.

The nature and culture of the market and the operations often results in significant differences between urban and extra-urban services. This is especially evident in deployment of telematic applications in the industry.

There has been a long tradition of using advanced technical solutions to support the efficient provision of transport services in urban areas, and this has continued through to the deployment of transport telematics. The principal bus operators in most major European cities will have radio communications for their buses, automatic vehicle location and control systems, computer-based scheduling and rostering, and some form of electronic ticket issuing or validation. This is often facilitated by the desire of the city authority to integrate the available transport modes and to use the public transport systems as a means of managing the overall transportation demand.

By contrast, there is virtually no use of technology to support inter-urban and rural bus services throughout Europe. Direct communication to vehicles is rarely available, passenger information is fragmented, ticketing is mostly based on printed and hand-written paper documents, services are planned by conventional methods and the level of integration tends to be low. Vehicle location systems are not used, and there is no application of regional or national dynamic network management systems. Of course, there are individual cases, but these are exceptional rather than representative of the industry. For example, already within the SAMPO project there has been use of telematics-based DRTS at the Belgian site in Hasselt within the PHOEBUS project of the DRIVE2/ATT program.

It is considered that this low level of use of telematics applications reflects the fragmentation of the industry, the independence of the operators, and the general lack of higher-order management and support services at national or regional level. The inter-urban and rural public transport industry is typically characterised by high numbers of operators of varying fleet sizes, independent, deregulated, and serving both traditional and niche markets.

It is interesting to note that even in regions with low *per capita* incomes, many inter-urban operators will invest in high-quality, high-specification coaches. They have perceived that there is a direct market benefit from such investments, and generally understand the value of new bus technology.

To date, the industry has not made such investments in telematics applications for a combination of reasons :

- relevant applications have not been made available
- the provider of higher-order or co-ordinating services have not been available

- technologies (such as communication) have not been available throughout the area of coverage
- the business case has not been clearly established

The SAMPO project tests a wide range of technological solutions in different environments, and allows a detailed evaluation of the impacts. This will assist in generating both the business case and operational experience concerning relevant telematics options, and providing demonstration sites to the industry.

2.4 European Added Value of SAMPO

SAMPO is a European demonstration of the validity and cost effectiveness of transport telematics technologies to operate DRTS. It is elaborated on sites in five EU member states and represents a cross-section of potential DRTS implementation environments in terms of organisational context, network density, demand profiles and mode combinations. The SAMPO evaluation provides European added value from its combined effort and from the open DRTS European architecture, common functional specifications and decision support it offers. This will provide benefits to users and operators and identify telematics markets for European industry to exploit.

Utilisation of DRTS systems using telematics technologies to better meet user needs in Europe will have a positive impact in achieving European Community policy goals and contribute to the expansion of the information society in Europe. This will be achieved by bringing telematics and informatic applications to transport operators and communities that have previously not used technology for these purposes. European added value will be achieved in several ways:

- SAMPO addresses policy issues relating to the marginal areas of the European Community, providing enhanced accessibility to citizens living in peripheral and disadvantaged areas, and dealing with costs and benefits for transport operators. This directly addresses the aims of the Common Transport Policy and Policies of Social Cohesion.
- SAMPO addresses European policy objectives relating to social marginalisation and groups with special transport needs such as the elderly and the disabled; or to provide better mobility management for large facility sites or workplaces.
- By addressing the areas where DRTS using telematic technologies may be exploited in the member states, SAMPO offers European operators more cost effective, energy saving, and environmentally friendly transport to meet user requirements.
- The creation of an open architecture approach based on common functional specifications, which will be made publicly available by the SAMPO Consortium, will assist SMEs in providing products to meet the requirements of the operators. This will make entry to the market easier and stimulate the growth of SMEs.

3.0 POTENTIAL OF DEMAND RESPONSIVE TRANSPORT SYSTEMS

3.1 Options for Demand Responsive Transport Systems

Demand responsive transport systems are flexible services which can be used in areas of low to moderate demand or to facilitate special user groups. The service concept was originally developed in the U.K. and the U.S., among other places, during the early 70's to provide an immediate response local transportation mode for the general public or in some cases for the Disabled and Elderly. Such a system would only operate when the demand for transportation was articulated, allowing a greater degree of freedom in the definition of routes, timing and stopping points. Services can therefore be provided which are tailor made for the customer, using the most finite of resources, within a well-defined geographical area. This enables a balance to be struck between the economics of transport organisation and the desired service quality.

Today land use and lifestyle changes have developed in such a way that often lessen the relevance of traditional mass transit systems. People's movements have become far more varied in terms of origins, destinations and trip departure times. If public transport is to continue to play an important role in transportation, then the efficiencies of mass movement must be compromised to a degree so as to provide services that match the heterogeneity of individuals' travel needs. Factors such as cost, convenience, reliability and comfort need to be juggled so as to facilitate the travelling public in an effective and economical manner. The addition of telematics has the potential to make these services viable by combining more dynamic forms of passenger reservation with software optimisation of the route, vehicle and passenger allocation.

Demand responsive transport systems will provide an infrastructure and form of public transport that can compete with the private car for flexibility while optimising energy efficiency and minimising environmental damage. In summary DRTS will allow flexibility in the route or timing of a service in response to the current demand. It may involve multiple modes or vehicles. Certain route sections may only be operated on request as a diversion from the core route, or there may be complete flexibility in certain areas. The important task is to identify the need of the user, to plan an effective response, and to communicate this to the service vehicle. This places the operations of DRTS between ordinary fixed-route transport and taxi services.

The challenge is to make these operations so effective that the unit cost (per passenger trip) comes closer to that of fixed-route services rather than to that of taxi services.

3.2 Types of Demand Responsive Services

Depending on specific geographic and social circumstances, the level of investment, desired service quality and political support, DRTS can take many different forms. Some key issues which delineate the various service types are the route, the schedule, the method of collection and the quality factors.

Route types can be classified according to the flexibility and density of linkages between origins and destinations. A service may have a route and stopping points which are fixed or there may be the flexibility to divert over one or more predetermined route deviations. There may even be no set route. The density of such linkages will define a range of service types that can vary from a service which connects a single origin to a single destination (referred to as a one-to-one connectivity), to services that connect all origins in a region to one (many-to-one) all origins to several (many-to-few), or all to all (many-to-many) destinations and vice versa.

The schedule concerns the timing of services and the scope to respond to passenger requirements. These can vary from having a fixed timetable to those which are flexible upon booking and finally the most complicated to control being those which are flexible in real time.

The method of collection concerns the way that demand for the service is expressed and the manner in which passengers are collected. This could include for example a telephone call, hailing or permanent booking.

The quality of service provided is also an important characteristic. Some key elements which can contribute to passenger comfort would be reliability, frequency, security, privacy and the certainty of being seated. Vehicle size must also be considered very carefully as it should represent the market demand as well as being cost effective. The quality may also include the level of "guarantee" to the user, that the service will be provided as expected, and may take the dependency of the user of the service into account.

DRTS can therefore be seen to fall into three broad categories as follows :

Corridor Services which operate along a fixed route but which have some flexibility in space and in time through minor route deviations.

Zonal Services which operate over a restricted region but offer flexible and responsive services with many-to-many or many-to-few coverage and semi-fixed timetables or no timetables at all. Scheduled transfers at a focal point such as a feeder to a train service are often common features of this form of operation.

Area-wide Services which operate with total flexibility over a large area with a service quality similar to that of taxis.

Combinations of these categories are also possible e.g. the demand responsive Service Route (FlexRoute) which has characteristics of both corridor and zonal services. This is in fact a mixture of two common D&E transport concepts in Scandinavia, the Special Transport Service (door to door shared ride taxi) and the fixed timetable Service Route.

3.3 Case Studies

Annex 1 documents several existing examples of demand responsive services from Europe, Australia and America. Its emphasises is on a review of DRTS experience, old and new, and the lessons thus available. It also considers the type of emerging technologies which can be incorporated and a brief

description of the functional requirements which should be specified for advanced DRTS Systems.

The following matrices compare the main characteristics of the different services as well as the key problems encountered, results obtained and the level of telematics used within each.

It will be seen that the majority of the case studies contain very limited applications of advanced technology to support their respective DRTS systems. Operations are generally conducted without communication to the vehicles (at least not in real-time), with control only taking place at terminal points, and with historic data to passengers. This reduces the coherence and quality of services offered to the potential end user.

In general, the automated features that have been incorporated within DRTS systems, have been quite unsophisticated in comparison to what was originally envisaged by the pioneers of such services. This was primarily due to the cost-effectiveness of many of the supporting technologies during the 70's and early 80's, where the cost of many components outweighed any advantages to be gained. The typical operator had no access to computing or communication facilities, so the platform to support new technologies was not available within the industry. However recent technological developments and the widespread availability of an IT platform offer promise that DRTS may be able to return to its advanced technological roots and restore its potential as a service for the general public, as opposed to those services which rely on advance scheduling of trips and which are restricted to particular classes of user.

Matrix 1 Comparison of Service Characteristics	Population Served	Operation Area	Service Type	Operating Period	Operating Characteristi
Dial-a-Bus Adelaide Australia	623,000	260 sq. km	many-to-many	7a.m. to 9 p.m. except Sunday	14x12seat m no route or t
Translink Shellharbour Australia	47,000	24 sq. km	flexible route, corridor service	weekdays no night service	full-sized p buses
Transit Taxi Hallett Cove Australia	12,343	7 sq. km	one-to-many, zonal service	evening off-peak Mon. to Sat.	taxi; fixed points and ti
PPT Perth Australia	No data available	Large City	No data available	No data available	No data avai
Ozark N.W. Arkansas USA		N.W. Arkansas	many-to-many	weekdays	minibus plus
Ruf-Bus Wunstorf Germany	40,000	120 sq. km	flexible route, corridor service		regular bus R-Bus (25 s buses (8 seat
Hailed-Shared Taxi Dortmund\Osnabruck Germany	50,000	Mid . sized town	stop-to-door	evenings and weekends	taxi
Borgerbussen Fasterholt\Kolkaer Denmark	2,600	30 sq. km + Traffic Area	many-to-many in service area; else many-to-one	60 hours\week	minibus (14

Matrix 1 Comparison of Service Characteristics	Population Served	Operation Area	Service Type	Operating Period	Op Ch
STS Gothenburg Sweden	27,000	Large City	many-to-many	around the clock	sha
FlexRoute Gothenburg Sweden		Urban District within Large City	corridor service; fixed end points; DR in-between	8am to 4pm Mon. to Fri.	mi pe
DRTS Varmland Sweden	40,000	Health Service District	many-to-many	weekdays	cal
DRTS De Lijn Belgium	14,100	Mid-Sized Town	fixed route corridor service	8.30am to 4.30pm, hourly	sup ex lin
Taxistop Belgium	Total Population	No Boundaries	one-to-many	anytime	pri - e
DRTS Finland	Several schemes	All Provinces	Route Deviations, Pre-routed taxi for PT provision, Airport Taxi, ExpressBus Taxi, Train Taxi, combined passenger & goods distribution	Anytime	Ta

Matrix 2 Comparison of Service Operations	**Key Results and Problems**	**Level of ATT**
Dial-a-Ride Adelaide Australia	displayed limitations of DRTS using large vehicles over a big area	very basic level of technology. Information recorded manually and then radioed to the operator
Translink Shellharbour Australia	technical problems and a lack of marketing resulted in disappointing patronage over reliance on foreign technology lack of planning fixed but demand determined route deviations off a base route can provide a more convenient service with no loss of overall journey time	exercise was designed to test state of the art technology technical problems encountered, resulted in scaled down operation with regards to ATT
Transit Taxi Hallett Cove Australia	the service was considerably cheaper to run than that using conventional line and route practical limits to the size of vehicle used demand cannot be pre-empted operating hours very limited one-way service	one-to-many operation. Relatively simple service in operational and technological terms. Requires little or no communications infrastructure
PPT Perth Australia	aims to provide the travelling public with real-time information, introduce a multi-hire public transport system and integrate all modes of transport hoped to address many of the deficiencies of current services	pilot to test integration of several components of transit telematics no results to date
Ozark NW. Arkansas USA	improvement on previous system with less duplication of services, fewer vehicles and larger coverage	scheduling program which produces driver manifests and allows tracking of trip histories, client data and management information real-time capabilities minimal
Ruf-Bus Wunstorf Germany	coverage area has increased by 40 % patronage increase of 70 % cheaper than conventional service	route optimisation software
Hailed-Shared Taxi Dortmund\Osnabruck Germany	25 % of patrons are new PT customers close co-operation between the local authority and the transport operators needed in the development of these services opposition by taxi firms	very basic telematics
Borgerbussen Fasterholt\Kolkaer Denmark	more efficient service human touch has helped increase patronage	route planning system which was originally designed for the distribution sector no real-time scheduling mobile communication links
Matrix 2 Comparison of Service Operations	Key Results and Problems	Level of ATT
STS Gothenburg Sweden	high standard of mobilisation at high cost services not integrated services do not cover all the elderly	PLANET, which is a booking, planning and dispatching system capable of responding virtually in real-time to 7,000 individual demands per day

FlexRoute Gothenburg Sweden	to be implemented	modified version of the PLANET system so as to accommodate a more structured route-oriented service approach
DRTS Varmland Sweden	limiting opening hours of the control centre caused some problems dissatisfaction with time-displacing policy	automated route planning and transport system
DRTS De Lijn Belgium	carrying 3 times more passengers	automated financial monitoring system automated reservation system being developed route optimisation software
Taxistop Belgium	drivers attitude to accepting fare uncertainty of obtaining suitable transport social acceptance	low cost initiative with no technological involvement
DRTS Finland	several schemes within Finland increased level of integration of modes savings in public sector funding manual management & operations	taxi dispatch centres manage the taxis communication over private networks vehicles equipped with GSM \ NMT mobile phones and in-vehicle terminals

3.4 Discussion

Before implementation of any service there is a need to conduct an exact analysis of the demand in the proposed service area, with identification of the origins and destinations. Determined support of the public transport authority is also very important, as experience has shown that funding for some types of DRTS cannot come from the undertakings alone. When introduced as a cost reduction scheme these systems are generally very successful. This is due to the fact that DRTS can provide a similar if not improved transport service to that of conventional line and route systems, in particular areas. However within regions where inadequate services exist it is often a political decision as to what priority the mobility of citizens are afforded and to what extent a particular government is prepared to carry the deficits of any higher quality services. There is also a need to carefully match the service characteristics of a DRTS system to respective user needs. Four distinctive market segments can be identified (namely commuters, young people, the elderly & disabled and adults without access to a car) each of which have distinctive needs with regards to provision of mobility.

The practical advantages of a DRTS system can vary from system to system but some of the most commonly found attributes can be summarised as follows :

- A balance can be struck between the economics of transport organisation and desired service quality, particularly in regions with low population density, large numbers of small scattered centres and diffuse journey patterns.

- A human touch is introduced to services resulting in improved service quality.
- DRTS can reach further than a fixed route transit system. Any number of vehicles can be used to cover an entire region, where more vehicles mean a better service while less vehicles mean a poorer service. But the quality of service will be the same for all citizens. Fixed routes services, on the other hand, are much harder to schedule in a highly equitable manner. If service must be reduced, often some area or district will suffer more than others, simply because of the nature of the service.
- DRTS can be made very accessible to people with disabilities who are after all the group of citizens who really depend upon public transportation.

Depending on the degree of sophistication involved, a DRTS service could incorporate any of the following characteristics :

- Operations can lie anywhere between ordinary fixed route transport and shared ride taxi services.
- The route can be totally fixed, fixed with the option of demand responsive stops, or be a totally variable route.
- The service can be operated according to a totally fixed schedule, a partly fixed schedule or a completely demand based schedule.
- Demand could be informed by phone or from specially installed equipment at bus-stops or other significant sites such as hospitals or shopping centres.
- Ordinary key-pad systems could be used to inform the operator of the intention to travel or smart-card based systems could be incorporated.
- Route optimisation can be conducted manually or via specialised software packages.

Most of the technologies which have been discussed in the introductory chapters are contained within several implemented or proposed transport systems around the world. Such developments are an indication that advanced DRTS systems are not merely a technological possibility but are increasingly becoming an attractive option to relevant agencies responsible for organising and funding transport services. Transit planners are beginning to discover that the technologies for a new generation of DRTS systems are both available and affordable, and that technologically simplistic DRTS is not necessarily more cost-effective than technologically sophisticated DRTS.

4.0 USER CATEGORIES AND RELATIONSHIP TO DRTS

4.1 The need to identify the different users

Transport services are an integral part of the community which they serve. There are many interested actors in the community with different, and sometimes conflicting needs. The success of a transport service will be related to its ability to meet the needs of at least some of the users in its area of coverage. Obviously, if the transport services are designed with the user needs in mind, they will have a higher chance of attracting more passengers and new passenger categories, of generating business and becoming economically sustainable.

Generally, the service provider will base decisions on a historic knowledge of the target area. This will be based on the demand for existing or former transport services, supplemented by some understanding of expressed travel needs. For demand responsive transport services, this approach is not really satisfactory. As the services are innovative, they will be capable of generating new business and their impact is more difficult to predict.

If the provider of the service wishes to understand the market, there is a clear need to first define who are the users, or the potential users, in the area of coverage of the transport service. When the users are known, then their needs can be more clearly identified and this will feed into the network, schedule and pricing design.

From the European perspective, there is a need to identify the potential users associated with DRTS for three core reasons, and this is a key contribution of the SAMPO project to the European objectives :

1) DRTS will contribute significantly to the improvement of mobility in rural areas, in areas of low demand, and for people with special needs. There are many gaps in the current global public transport offer, and DRTS has the potential to complement the existing services. This will facilitate the implementation of Transport Policy at local and European levels as described in Chapter 2 earlier.

2) Technologies to support DRTS need to be suitable for widespread use. The provision of DRTS is likely to be cost-sensitive, so many service providers will not be willing to purchase expensive systems that have been designed specifically for their needs. The use of generic technologies for communication and location functions will help. Of even greater importance is the development of a range of tools specifically for DRTS. These need to be "generic" as far as DRTS is concerned, but with user configurable aspects for the nature of the services or customer-support features offered. Suppliers need a global understanding of DRTS possibilities so that they can develop the needed technologies for the market.

3) Operators and transport authorities throughout the European Community (and indeed world-wide) will become interested in implementing DRTS, and in employing supporting technologies. Each community or target area has its own characteristics, and the availability of a "check-list" of users and their associated needs will assist them in designing services.

4.2 Identifying the User Categories

A structured, iterative approach has been taken to identify the different potential users of a DRTS system. The structured approach can be summarised in the following steps :

1) Identification of four main User Groupings who have an interest in DRTS in either urban or rural areas.

2) Identification of the different User Categories within the User Groupings. These User Categories are the *potential* interested users, and only some are relevant at any given site.

3) Rating of the relevance of each User Category to the provision of DRTS, as viewed by the sites within SAMPO.

4) Selection of the User Categories to be investigated in-depth by the SAMPO project, and the methodology to be used to determine their user needs in relation to transport services.

The results have been achieved in an iterative manner. A workshop was held on 1-2 December 1995 in Helsinki, in which the main actors from all five SAMPO demonstration sites developed the User Groupings and User Categories. The output from the workshop was then considered in detail by each of the sites, taking into account their prior work, their plans for user needs assessment, and their local context. During January 1996 the sites provided inputs to a revision and consolidation of User Types and Categories.

The SAMPO level output is presented to the Transport for Telematics program through the Concertation process, both as a dissemination activity and to seek responses from other projects. This will ensure a broader platform on which the User Needs Analysis is based, and a greater degree of harmonisation with the other activities of the program.

4.3 Four User Groupings

A two-level approach has been taken in the categorisation of users. This has been done both for reasons of classification, and for clarity in the process.

Normally when the term "users" is employed, consideration is only given to the "end-users" of the service - in other words, the people who travel on the services. In fact, there are many other categories of users in the sense of actors who have a direct interest in the commercial, social, infrastructural or transport impacts of the services. The SAMPO project uses the concept of User Groupings to make clear that these different actors exist, and that they have validity within the design and assessment processes.

In addition, it was also found that the different sites each have a different focus which reflects the political, business and social demands of their environment. This suggests that there is a different balance among the User Categories, and probably the User Groupings in each site. It is therefore needed to develop an appropriate framework in which all of these possibilities can be represented, as well as other schemes from sites outside the SAMPO project.

Following the iterative process described above, four User Groupings were determined :

1) End Users : The End-User is a direct customer, or potential customer of the provided transport service. (S)he can also be described as the "passenger" or "consumer".

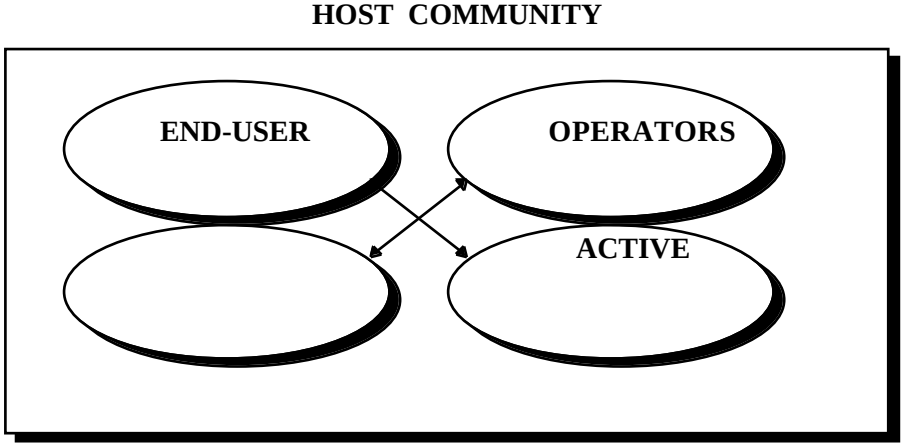
2) Operators : The Operator is directly involved in the provision of the transport service to the End-User by providing some or all of the elements of the vehicle, driver and support services.

3) Authorities : The Authority has statutory or delegated responsibility for the provision or regulation of transport services in the target area.

4) Active Destinations : Certain destinations may play an active role in the organisation of transport. For example, they may supply information to the operator about trips to the destination, they may act as a travel broker, they may assist the operator in planning the services, or they may co-operate with the operator to provide an inclusive price for the travel and the destination activity.

Two other possible groupings were considered - Time of Travel and Community type (scale, urban/rural). After discussion, it was considered that these were relevant to market and pricing segmentation, but that they were not good discriminators in terms of users. The associated needs would be adequately described in the consideration of the main four User Groupings.

It can be considered that the host community for these services consists of many different actors, some which are individuals, others which are organisations or entities. The are interlinked for many purposes within their community, transportation being one of those needs. The key feature to be remembered about the transportation need is that it is always linked to another functional need of the individual.



4.4 User Categories

Within each of the identified User Groupings, there is a range of User Categories. Each Category has a set of distinguishing features which allows the users within that category to be defined and to be treated as a set with common characteristics. This does not imply that the users within that set are homogeneous - in fact, they may also be capable of a further layer of classification. It does, however, provide a sufficiently detailed set of entities for carrying out the analysis of user needs and for market segmentation. It also provides a basis for comparing and contrasting the opinions and activities of the five SAMPO sites, and of other sites outside the SAMPO project. This latter activity, the comparison with sites outside the SAMPO project should be achieved through an industry User Group or other such mechanism.

The iterative process described in section 4.2 above was also followed for the definition of the User Categories. After some iterations, it has been possible to provide a listing of the categories considered relevant to DRTS within the four User Groupings. This is based on an aggregation of the opinions of the sites. It should be recognised that the perspective of DRTS in urban areas is, in many ways, different from that in rural areas. This framework aims to be inclusive.

The ranking system used in the tables in this section are established as follows :

Relevance to DRTS Generally : The partners and experts involved in the sites were asked to give their opinion on the relevance of the different User Categories to DRTS in general - i.e. to the conceptual services. A collective rating of the relevance of the User Category to a ‘typical’ European DRTS system is formed based on the different responses received.

Relevance to the SAMPO sites : The partners and experts involved in the sites were then asked to describe the extent to which the User Categories were relevant to the DRTS application(s) being introduced in their specific site. A score of ‘2’ was attributed for each site which considers the User Category as a core target for the proposed service of the site. A score of ‘1’ was attributed where the User Category was considered as significant, but not core. Summing the scores over the five sites provides a 0-10 scale.

It is recognised that these ratings are not based on a scientific method, but they do allow a sense of perceived relevance and importance to be communicated to other interested operators and authorities. The SAMPO project considers that a high priority should be given to creating a broader base of sites and users for a more rigorous version of the work described in this User Needs Analysis report. The value of such work would be to provide a benchmark for the industry.

4.4.1 User Categories for the End-User grouping

The categories within the End-User Grouping have been ranked by relevance to SAMPO sites and by relevance to DRTS generally as follows :

Category	Relevance to DRTS generally	Relevance to SAMPO sites
School children	Moderate	6
Students	Moderate	6
Disabled	High	8
Elderly	High	8
Healthcare *patients*	Very high	10
Accompanied adult	Low	2
Workers	Moderate	6
Shift workers	Low	4
Leisure/Cultural	Moderate	4
Shoppers	High	8
Groups	Low	4
Tourists	Moderate	6
Sports trips	Moderate	5
No-car/non-driver	High	6
Car-driver (choice user)	Low	3
Administration	Low	2

4.4.2 User Categories for the Operator grouping

The categories within the Operator Grouping have been ranked by relevance to SAMPO sites and by relevance to DRTS generally as follows :

Category	Relevance to DRTS generally	Relevance to the SAMPO sites
Association	High	6
Co-operative	Moderate	5
Municipality	High	5
Company	Very high	9
Sole Operator	High	3
Foreign Operator	Low	1
Drivers/personnel	High	8
Dispatch centre	Very High	10
Administration/owner	Moderate	4
PT Planning/Management	Moderate	1

4.4.3 User Categories for the Authority grouping

The categories within the Authority Grouping have been ranked by relevance to SAMPO sites and by relevance to DRTS generally as follows :

Category	Relevance to DRTS generally	Relevance to the SAMPO sites
European	Moderate	3
National	High	5
Regional	High	5

Local	Very High	9
Community Groups	High	7
Politicians	Moderate	2
Legislature	High	6
Police	Low	3
Traffic Authorities	Moderate	5
Funding Agencies	High	5
Manufacturers	Moderate	1

4.4.4 User Categories for the Active Destination grouping

The categories within the Active Destination Grouping have been ranked by relevance to SAMPO sites and by relevance to DRTS generally as follows :

Category	Relevance to DRTS generally	Relevance to the SAMPO sites
Healthcare	Very High	9
Education	High	5
Day-care	High	6
Shopping Centre	Very High	7
Leisure/cultural	High	6
Administrations	Moderate	3
Other transport modes	Very High	8
Workplace	Moderate	4
Tourist Centre	Moderate	5

The categories "Mass events", "Religious" and "Communities" had been considered initially, but were not considered relevant by any site and have been removed from the current listing.

4.5 Institutional frameworks in SAMPO sites

The institutional framework is relevant to the establishment of the DRTS systems in both the SAMPO sites and in general. The ‘institutional framework’ describes the relationships between the different authorities, agencies and operators within the system. This will certainly determine the regulatory framework and it may determine who is permitted to offer services. If there are financial dependencies provided, then it will determine also where the funds are generated and who are the beneficiaries.

It is considered relevant to provide examples from the SAMPO sites as it may assist the reader to understand why, for example, certain User Categories are accorded a higher priority than some of the End-Users. It will also help the reader to interpret why needs are expressed as critical factors by users in one site which are not even mentioned at another site.

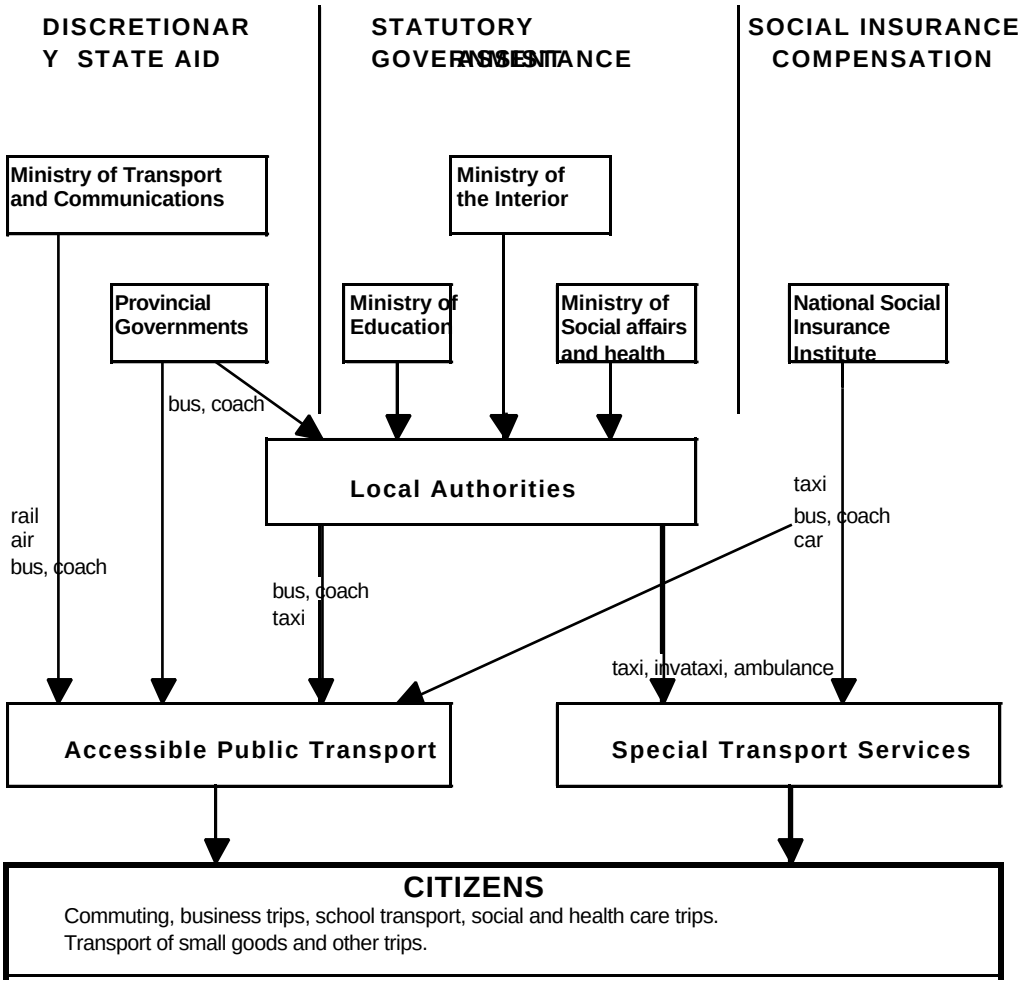
The SAMPO project strongly recommends that further investigation is carried out into the relationship between the institutional framework, the users’ needs, and the willingness of operators to offer services.

The institutional framework for all of the sites - Finland, Belgium, Ireland, Italy and Sweden are represented in this section.

4.5.1 Institutional framework in Finland

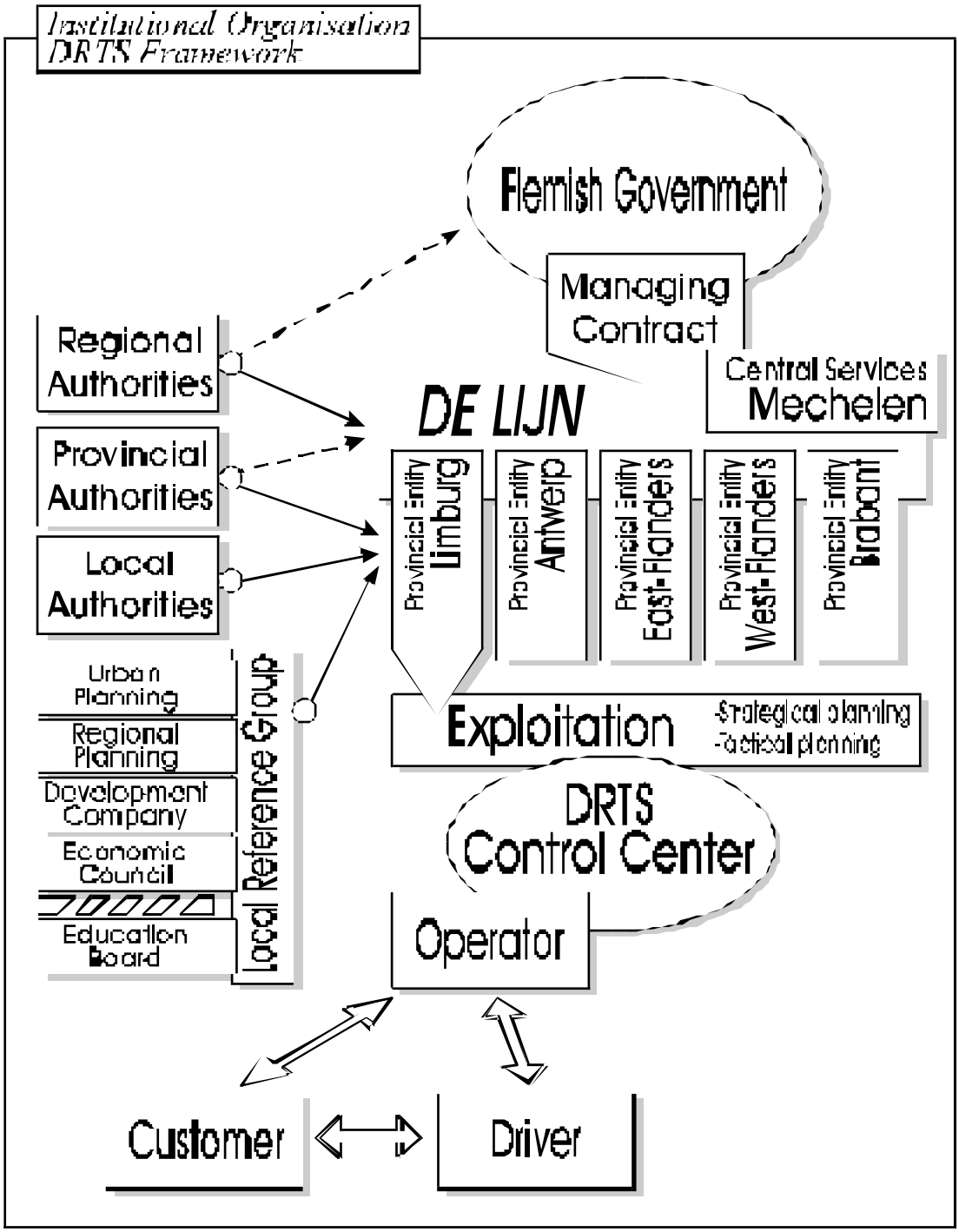
FINLAND

PUBLIC FUNDING FOR PASSENGER TRANSPORT SERVICES



Public sector buys bus and coach transport service some 35% of the industry turnover and taxi transport services some 47% of the industry turnover.
The ambulance services are over 90% bought by public sector.
Rest of the costs are paid by the passengers.

4.5.2 Institutional framework on DRTS in Belgium

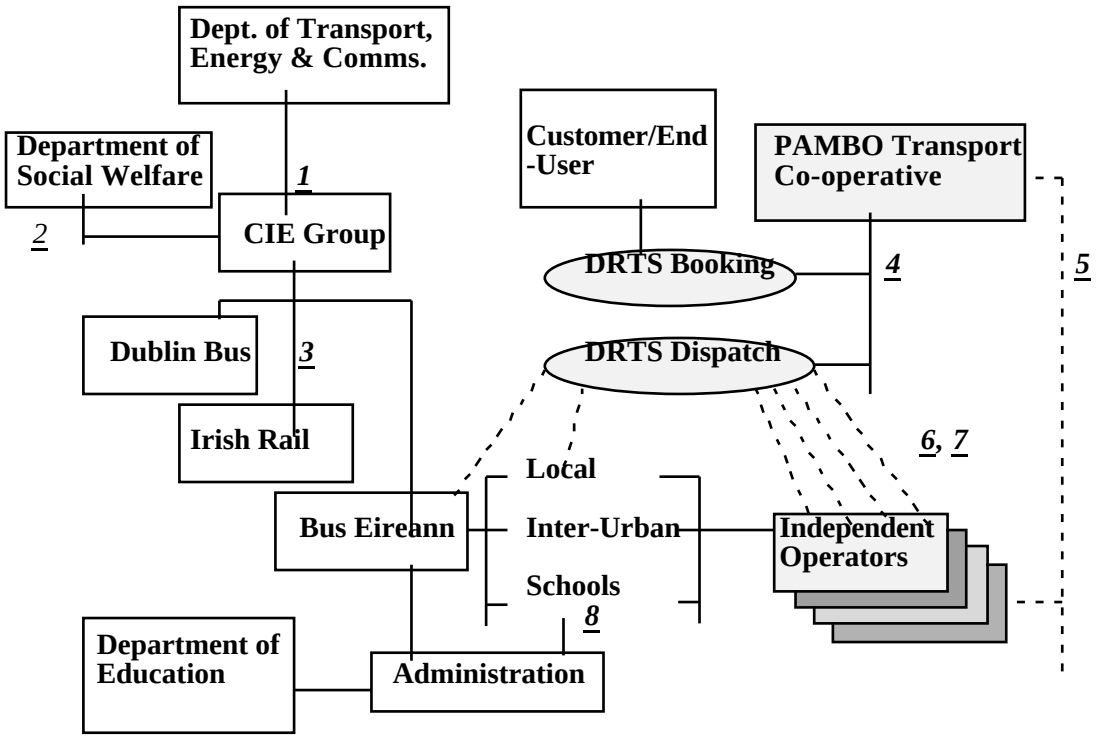


4.5.3 Institutional Framework in Ireland

The institutional framework in Ireland is quite different from that in the other SAMPO countries for two main reasons :

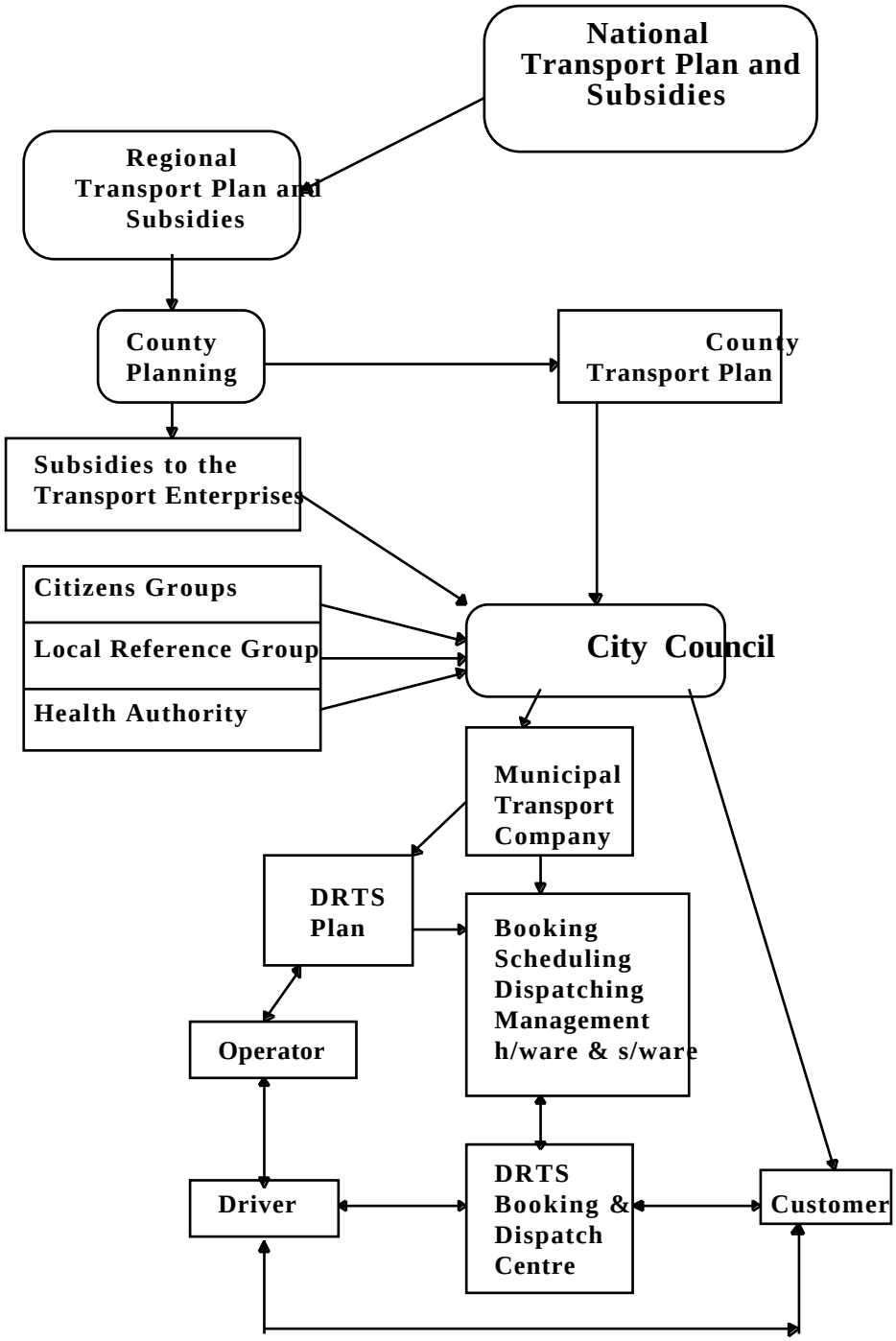
a) There is no mechanism for involvement of **any local agency**, from the public representative, agency or local community side.

b) The regulatory authority, the Department of Transport, Energy and Communications concerns itself only with the publicly-owned transport providers in terms of policy, funding, support and licence provision.

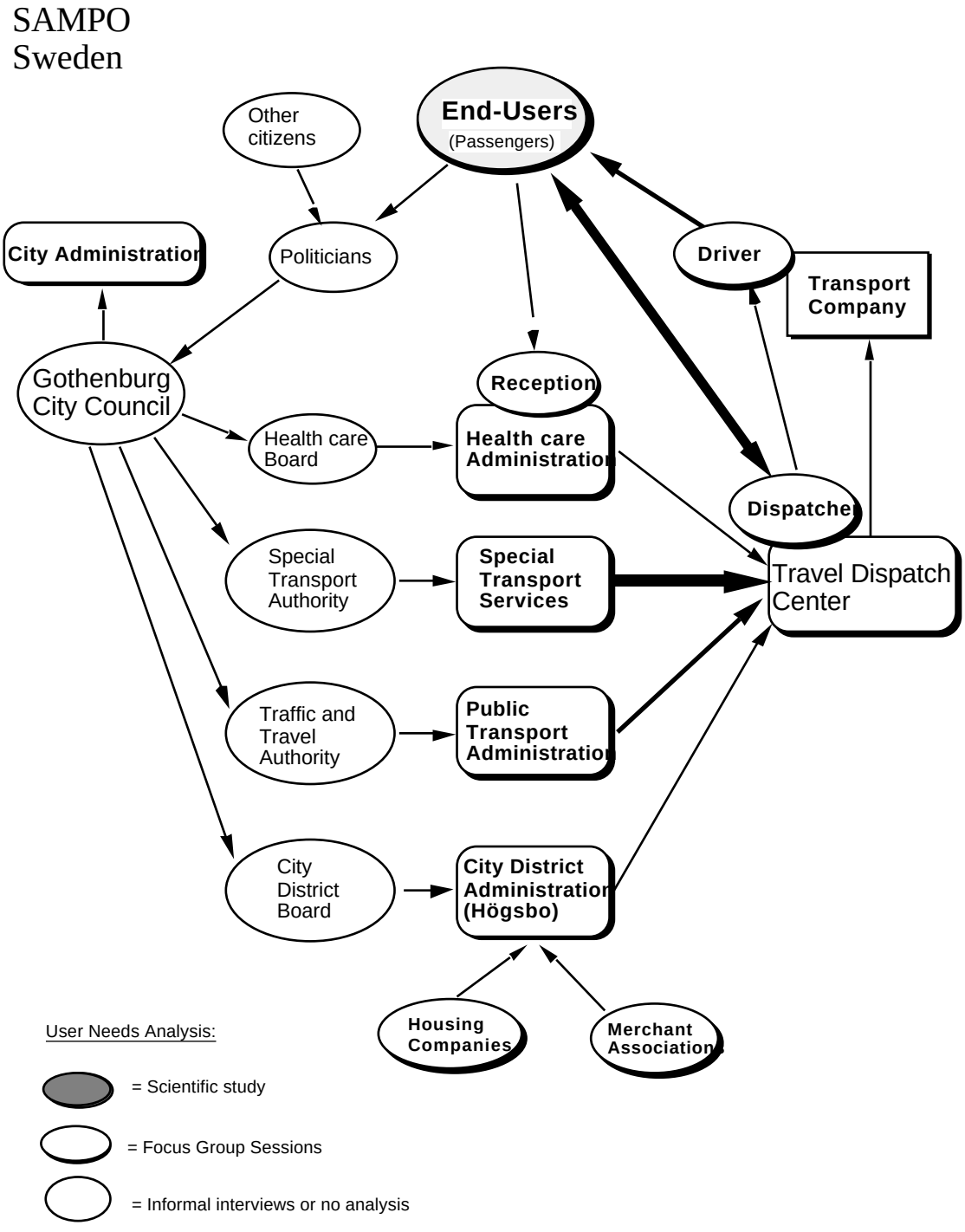


Notes
1) Department of Transport, Energy and Communications owns CIE Group, state transport provider
2) Department of Social Welfare provides funding for carriage of elderly, disabled and other categories of persons. This funding is effectively only given to the public sector operators.
3) CIE Group has three operating subsidiaries, which it controls and channels public support funding
4) PAMBO Transport Co-operative provides the higher order services and manages the DRTS
5) PAMBO Transport Co-operative is owned collectively by the bus industry
6) DRTS supply is offered by the operators and utilised by the Dispatch Centre to meet the demand
7) DRTS manager handles the compensation for the provided service
8) Bus Eireann handles administration, funding management and contracts for schools services, about 70% of the services provided by private operators and 30% by its own fleet

4.5.4 Institutional Framework for Italy SAMPO site (Firenze)



4.5.5 Institutional Framework at the Swedish site (Gothenburg)



5.0 METHODOLOGY FOR ESTABLISHING USER NEEDS ANALYSIS

5.1 Overview of methodology

The SAMPO project has taken a structured approach to the determination of user needs. In the previous sections there has been a clear definition of the transport context, the nature of demand responsive services, and the user categories to whom DRTS services may be relevant in different environments.

The user categories are now examined in greater detail to establish their individual needs. In order to carry out the User Needs Analysis, a range of methods are employed. These are tailored to the nature of the user category, and the practicality of obtaining information from them.

Generally within the SAMPO project, the aim has been to establish a set of needs which are related to the individual user category. In most cases these are not determined in a statistically precise manner since the resources required to do so would have been excessive in the context of the current project. Where sites have been able to carry out statistically relevant analysis, this is reported. The core objective, however, has been to establish the *nature* of the user needs. It is then a matter for the promoter of DRTS systems to carry out an in-depth market analysis to quantify and segment the users, and to obtain precise values for the relevant parameters. Within SAMPO, data collection is carried out within the Evaluation process rather than in the User Needs Analysis.

The methods employed within the SAMPO project have been very much oriented towards using the experiences of the user categories. A high reliance is placed on representatives of the User Categories, and on prior studies in relation to transport needs where available. The main methods employed have been :

- Structured one-to-one *Interviews* with representative organisations or individuals from the target User Category
- Structured *Discussion Groups* to elicit the needs from a sector of users
- *Local Reference Groups* (see below) to facilitate user needs from multiple user categories
- *Surveys*

The detailed activities are described in the following sections and in Annexes 3 to 7.

5.2 Local Reference Groups

Local Reference Groups (LRG) have been established at all five demonstration sites. These groups consist of interested and relevant actors in the area of the demonstration site. The Local Reference Group is intended to last for at least the duration of the SAMPO project, and meets on a basis agreed locally. The majority of the members of the LRG are not members of the SAMPO project, but are in some way interested in the nature of the services and their impacts.

The Local Reference Groups have been established to achieve some or all of the following objectives at the five SAMPO demonstration sites :

- To provide a platform of relevant local actors who can help express the various needs of the area
- To act as a "sounding-board" (i.e. from their experience within the local community provide opinions and comments on developments and proposed activities) throughout the project.
- To provide support to the project as the services are being established or enhanced, and to participate in the evaluation and impact assessment activities.
- To act as one layer of the local dissemination activities
- To provide a platform of actors who, if the evaluation validates the benefits of the ATT-supported DRTS, can promote and influence the widespread deployment of such services

The membership of the Local Reference Groups for each site, their objectives and their work methods are detailed in Annex 2.

5.3 Methods for establishing user needs at the individual sites

The methodology used at each site is described here in brief. It should be noted that this provides a concise summary of the actions taken specifically for the SAMPO project purposes. In addition to the actions described here, each site has its own ongoing market analysis for either commercial or social purposes (depending on the basis for service provision).

Each site has described the more particular features of its work, so that there is a useful description of the range of methodologies which can be studied by other sites as examples. Some additional detail is provided in the annexes. Each site has already, or will publish in its own country and language more detailed reports to be considered by the authorities and/or operators at the site.

5.3.1 Methodology employed at the Belgian test-site

DRTS has been integrated in smaller areas in South-Limburg since June 1995. Therefore, one needs to make a distinction between the DRTS-experienced end-user on the one hand, and the potential future user in other areas.

To address the current DRTS user, an elaborate survey was performed on the current services, by handing out an inquiry-form to the passengers by the driver. Besides data on personal characteristics, this inquiry resumed a small evaluation part on DRTS as an introduction towards the further specified user need analysis. On the vehicles, no specific support by an interviewer is offered except for some help by the driver if needed. This interviewing support was estimated as unnecessary as the customers are being addressed with a survey for the third time in about one year, and have consequently build up some inquiry-experience.

Supplementary interviews by phone were taken in order to enlarge the sample size. This procedure was triggered by the DRTS-operator when taking a reservation-call; customers willing to co-operate were called again by an extra interviewer at the dispatching centre.

Potential future users were addressed at a municipality where DRTS is scheduled to be introduced in June 1996. As the specific attention goes out towards the trip purpose of Administration, Healthcare and Commercial trips, a survey was focused on the weekly market, as well as at the townhall and a hospital in the concerned area.

These surveys were performed by experienced interviewers from the marketing department of De Lijn. Again, a first part of the survey informed on the customers' personal characteristics and mobility-patterns. User needs were analysed via an inquiry on the users' expectations and requirements on DRTS.

All surveys on the current as well as potential end-user are based on a part with simple straight-forward questions on DRTS commercial qualities on the one hand, and a more qualitative analysis via a subjective evaluation of different propositions on DRTS. This evaluation is measured via a subjective ranking of qualities by the interviewed person. This gives more reliable information on the specific accents on and importance of different DRTS qualities. Examples are enclosed in the annexes.

A Local Reference Group was assembled based on an existing Council of Advice, integrating the most relevant user-groupings and DRTS-concerned people. One of their regular meetings was focused on the DRTS aspects in order to assess their specific user needs. The marketing department introduced a short presentation on DRTS and the objectives of the user needs analysis in the SAMPO-Project. An elaborate discussion was set up and conducted via some specific points of interest on DRTS. In addition to the mere commercial and external qualities of DRTS, further aspects were treated, such as the role and importance of DRTS within the framework of De Lijn.

Again, a qualitative analysis was conducted via the ranking proceedings of specific propositions. A list of included members as well as the main discussion points and propositions follows in the annexes.

DRTS and regular PT drivers as well as the current DRTS operators were addressed via specific group-sessions. As these people have already gained some experience with the DRTS services, global and more practical results and comments were easy to filter throughout these sessions, which were lead by the marketing department.

The concerned persons within the company, being the departments of exploitation, planning and marketing as well as the management level, were gathered in an extended workshop and parallel brainstorming session.

Four major and important issues were treated :

- Opportunities and role of DRTS within the PT offer of De Lijn
- User-friendliness, external quality
- DRT System functionality's and handling-ease, internal quality
- System efficiency, cost efficiency

This workshop was guided via important key-issues, guaranteeing the useful outcome of the brainstorm.

5.3.2 Methodology employed at the Finnish test-site

The survey for the User Needs Analysis also acts as the "before" survey at the Finnish test-site. This was mostly carried out before Easter 1996. The basic survey was postal, with 2 000 letters to families (household), 1500 in the Tuusula area and 500 in Seinäjoki. The sample size was chosen based on an expected 35 % return of accepted (good quality) answers. The sample in the Tuusula area was directed so that central areas (City and municipality central) had 231 (approx. 59 000 inhabitants), semi-rural areas 754 (24 000) and sparsely populated areas 515 (8 000). In Seinäjoki the sample was evenly spread. The survey included a travel diary and questions of families, persons and opinions. The survey was carried out by Suomen Gallup Oy.

The second part consisted of interviews of pre-structured user category groups, and this involved about 10 groups. With them, a real interview (panel) was made in groups. The interview consisted of a discussion and the completion of a questionnaire. The questionnaire aimed to get the opinions from the potential users (passengers or persons who are making the travel booking) and operators of DRTS. Each group was between 8 ... 15 persons. The number of groups was relatively large compared to other SAMPO sites, because of the distance between the two geographical areas within the Finnish test site (nearly 300km). The two local groups do not meet.

A very important question for user groupings is the economic viability of the DRTS. Here it is easy to find two different views: The price of a single trip for an individual and the price of transport services for that purpose (or the total amount of services to be bought) for those who are paying but possibly not travelling. The second view is for those who are providing the transport service. It is a question of the costs and income of a single trip and the economy of transport as a whole. Special questions at least for discussion purposes should be in the discussions.

The second survey will be made during the demonstration time with some post demonstration extensions. It will be included in the Evaluation Process. It may include in-vehicle study and the sample will be smaller than in the User Needs Analysis. The post-demonstration post survey will preferably include the same families.

The aims of the survey have been defined in following manner :

‘In the SAMPO project the survey will identify the user groups :

- to identify the needs of user groups
- to get a right and suitable product in demonstration and
- to find right ways for information’

The Finnish user groupings are:

1. "Alternative for a car". These are the ‘common end users’. They are extremely important, because of the lack of ordinary public transport service over wide geographical areas. Especially, this group includes the feeder traffic to trunk lines, full tariff (paying for self) passengers on SAMPO buses, shopping trips, work-base trips and hobby (sport, theatre, music etc.) and escort trips. This group is possible to access through a random sample questionnaire.

2. Private firms and public authorities/communities. This will be divided into two categories for the purposes of the analysis is so far as some bodies are interested in optimising the desired service, whereas other bodies simply pay the bill for the services.

3. Disabled and elderly. A lot of the members of this group are the members in groups 1 and 4. It is important to examine them separately because their transport-related costs are rapidly growing in the budgets of municipalities. All members can be found from the registers of social services, and a sample is taken.

4. Health care trips (A part of the groups "end users", "operators" and "authorities"). Most passengers of this group are in other groups, but in Finland the usage of public money is so great for this travel, that special attention is needed. This group will be handled through group interview. The second target group is those users who pay some (or most) of their travel costs.

5. Active Destinations (shopping centres, sport halls, theatres) added with transfer points (park and ride, bus stations, railway stations.

6. Operators. The biggest need is for information and evaluation purposes. Some rail and bus operators are chosen, as well as a sample of taxi operators.

5.3.3 Methodology for establishing user needs at the Irish test site

The Irish User Needs Analysis was primarily based on group discussions and interviews with both organisations and representatives of the different User Categories.

A Local Reference Group (LRG) was established in early 1996 in the general test site area of Kilkenny. The composition of this group is shown in Annex 2, and it included representatives of end-users, the main authorities and agencies in the region, operators, industry and social/leisure organisations. The objective was to ensure that the LRG was representative of the region, that it could provide the needed input to the project and could offer a mechanism for discussing the concepts of DRTS and SAMPO within the community in which it will be implemented. This approach has been considered very successful and will be replicated in other regions where DRTS services are planned.

Two full meetings of the LRG took place during the User Needs Analysis process and these took the form of Discussion Groups. The LRG was subsequently briefed on the outputs of this exercise. In addition, numerous meetings took place of sub-groups of the LRG to discuss the needs for specific sectors (e.g. operators, regional development, end-users). The methodology for the Discussion Groups is provided in Annex 5.

It was decided at an early stage that all data collection for User Needs Analysis would be gathered on the basis of such discussions. The reason for this being the time and cost factors involved in pursuing other avenues of data collection which may in the end prove to be quite limited and statistically unreliable. The derived needs are therefore ‘subjective’ as they are the result of dialogue. There is however a structured basis to the selection of the user category, of the representative, and to the discussion. However, the results are not ‘scientific’ in that the LRGs have not been selected using procedures which would avoid unbiased representation. The Project Team and the LRG have undertaken to consider doing statistically valid work in the future.

In most cases, the user needs were obtained through discussions with representative bodies or organisations which were in a position to express the needs of the appropriate category. There is a certain risk that the outcome of this analysis may result in the needs of the *administration* being prioritised rather than those of the *user*. The structure of the discussion groups is designed to balance this by ensuring that there is broad community representation. Everyone within the group is a user in a way other than what

they formally represent, and this allows enhancement of the view of the individual representative.

In addition, a large number of one-on-one interviews were held with organisations, with representative users, and with targets whose needs were not fully explored in the Discussion Groups. (It was recognised after running the Discussion Groups that some individuals did not participate fully, some for personality reasons and some due to their relationship with other group members).

One message coming from the feedback from the local community is that the overall level of involvement, the openness of process, the provision of consultation and the perceived accuracy of the analysis are not typical of the transport or many other sectors. Because of this positive experience with the local agencies and politicians it is a process which is worth replicating elsewhere.

5.3.4 Methodology for establishing user needs at the Italian test site

The following methods for establishing user need have been determined:

- informal interviews with city administration and healthcare authorities representatives (before and after; Florence, Campi);
- informal interviews with city administration representatives (before and after; Siena);
- informal interviews with tourists (Siena);
- survey of all disabled people requirements, from application forms filed by applicants (Florence);
- questionnaire surveys (before, current users of scheduled service in Campi; after, in Florence and Campi);
- O/D matrix from 1991 Census (Campi);
- interviews with operators (before and after, Florence, Campi, Siena);
- car and coach parking statistics (Siena);
- passenger counts (after, Florence, Campi, Siena);
- interviews with drivers, dispatchers (before, after; Florence, Campi, Siena).

5.3.5 Methodology for establishing user needs at the Swedish test-site

The Swedish test site has established a significant effort for the definition of the User Needs Analysis. The diagram of in section 4.5.4 shows the Swedish institutional framework, and the key within this diagram identifies the level of analysis which is carried out.

The greatest effort has been made for the scientific determination of the needs of the End-Users - i.e. the passengers. This has focused on the users of the Special Transport Services and the potential users of the new service, FlexRoute. These are mostly Elderly people, although there are some persons under the age of 65 who are also entitled to these services.

A market analysis was carried out with a postal survey in Högsbo (activity district in Gothenburg) in December 1995 covering 100% of the eligible STS users and other elderly people (a total of about 5 300 persons). The response rate was 60%. From this survey, a further sample of 300 persons (which had shown an interest in the FlexRoute service) will be selected for a more detailed analysis in September 1996 as a part of the pre-demonstration data collection for evaluation purposes. This will later be used for updating and strengthening the UNA as it is presented in this report.

A similar survey (as the one to be done in Hogsbo in September) was carried out in February 1996 in another in another district, Biskopsgården, with a postal survey to a 300 person panel which are assumed to have the same basic needs as the residents of Högsbo. About half of the sample was current STS users and half were other potential users of the new FlexRoute service. The response rate was 80% although some individuals did not complete all questions.

Special exercises with group discussions and testing of an early prototype end-user interface for automated bookings of trips was carried out with three groups of end-users (a total of 18 people).

The results of the user needs analysis are reported in summary in section 6.5.2 and 6.5.3 and in Annex 7 of this report.

In addition to the scientific study of the end-users, Group sessions have been held with all the relevant actors within the total system :

- at the 'political' end : the Special Transport Authority, Travel and Traffic Authority and City District Board
- at the 'executive' end : Health Care Administration, Special Transport Services, Public Transport Administration, City District Administration, Housing companies and merchant associations
- at the 'operational' end : Transport Company, Travel Dispatch Centre, Dispatchers and Drivers.

The summary outputs of these efforts are reported in Section 6.5.1.

6.0 RESULTS OF THE USER NEEDS ANALYSIS BY COUNTRY

6.1 General Description of the Approach

User needs analysis has been carried out in the five countries within the SAMPO project. The overall target User Groupings and User Categories have been described in Section 4, and the methodology is described in Section 5.

Within SAMPO a general framework methodology and design of target groups were created. Each country has built its own detailed approach based on this SAMPO framework in assessing the User Needs, as the target market for the services in the different countries has been quite specific. The intention has been to gain in-depth outputs from a vast range of different user groupings and categories in several operational and cultural environments. However, by adopting this approach we have not been able to achieve directly comparable user needs analysis results across the five participating countries. There has, although, been interaction among the countries in exchange of experience and results, as well as co-operation in development and application of methodology.

The detailed interaction will take place within the Work Package 8, Evaluation, and will be reported in the Deliverable D8.2 during 1997.

The results of the User Need Analysis from each country is reported in its own style, reflecting the priorities and target markets of that country. It should be noted that the primary objective from each country is to examine its own user needs to assist in the development of the functional specifications and in the design of the demonstration, whilst considering the issues from the partner sites as complementary market information.

The advantages of this approach, and the main reason for doing so are :

1) It allows the work to proceed immediately, and feed into the design process by the end of Month 4 of the project. SAMPO is a two-year project including the demonstration period, so there is not the time for a totally co-ordinated approach across the sites.

2) It should not be forgotten that User Needs analysis work is ongoing in all of the five sites for the market and business purposes of the operator and authority partners. The structure of the Local Reference Groups has been established to assure the continuous dialogue between the project partners and the test site community.

3) This allows the first phase work (which is reported in this Deliverable) to act as the focus point for the local system design, but the LRG and the site partners will continue to explore and refine the user needs analysis.

4) The diversity of the approach allows external readers (other projects, independent operators or authorities) to examine the users from different viewpoints. One will be interested in the general market - “how does the collective of users view the service?”, whilst another is more interested in a specific user group which he wishes to target.

5) The rapid and on schedule production of this Deliverable facilitates the other relevant projects within the Telematics for Transport (and indeed Telematics for Urban and Rural Areas, Transport Research of DGVII and THERMIE of DGXVII) by giving them an immediate starting point, thus avoiding duplication of effort.

6) The SAMPO project has committed to providing a second version of this Deliverable at the end of the project. It will take into account the experience gained through the demonstration and evaluation phases, and will have greater consistency in the reporting style. SAMPO also proposes to establish a Users Group on Demand Responsive and Flexible Transport, and the inputs from that group will be included in the second version of this deliverable.

6.2 Results of User Needs Analysis in the Belgian site

The Belgian User Needs Analysis considers six specific categories as follows :

Category	Description
1	Current DRTS users
2	Potential DRTS users
3	Local Reference Group
4	Drivers of public transport vehicles
5	Public transport operators
6	Public transport company De Lijn

It is recalled that there are established DRTS services in operation in the Belgian test site, and prior market studies suggested that there could be significant differences in the perception between the users and non-users of those services.

6.2.1 Current DRTS-User

It is interesting to first examine some characteristics of the existing DRTS users as it identifies the type of person who uses the current services :

a. Main user categories

- Housewives (23%)
- Students (21%)
- Elderly (17%)
- Workmen (14%)
- Clerks (12%)

b. Main trip purpose

- Work (31%)
- Commercial (23%)
- Administration/Healthcare (13%)

Surprisingly, the trip purpose of work gets very high figures. This is explained by the large amount of people with irregular working hours in the current DRTS areas.

c. DRTS Requirements

- No car available (77%)
- Frequent use of 2 or 3 times a week (59%)
- Prefers VAV (name of DRTS service) to the former regular PT lines (56%)
- Wishes more destinations reachable without transfer (68%)
- Demands improvements on sheltering facilities at major transfer points
- Demands possibility to book outside the office hours

· Walking distance to nearest stop less than 5 minutes
· Immediate connection with operator when booking
· Deviation time from direct route as short as possible
· Possibility to make multiple reservations
· Possibility to make reservation only 30 minutes in advance
· Not willing to pay more for improved service (52%)
· Demands priority for person with bookings (51%)

However, analysis detailed to the frequent users shows :

· Willing to pay more for improved service (73%)
· Demands priority for person with bookings (70%)

6.2.2 Potential DRTS User

The potential DRTS consist of people in a locality where DRTS is about to be introduced. The needs were identified through a combination of interviews and Local Reference Group. The sample is not truly random as it was directed mainly towards particular market groups who are considered to have higher potential for using the services.

The identified DRTS Requirements of this group are :

· Needs direct connection with DRTS, no required (i.e. enforced) transfers.
· Wishes to make telephone calls for free
· Immediate connection with operator when booking
· Demands sheltering facilities at major transfer points
· Possibility to make reservation only 30 minutes in advance
· No deviations from direct route
· Walking distance to nearest stop less than 5 minutes

6.2.3. Local Reference Group

The Local Reference Group in Belgium considered the DRTS requirements from four main viewpoints :

a. Towards the user
· More stress on obligation to make reservations in advance
· No deviations from direct route
· Walking distance to the nearest stop should be less than 5 minutes

b. Reservation ease
· Immediate connection with operator when booking
· Possibility to make reservation only 30 minutes in advance
· Multiple reservations at once
· Reservation call duration maximum 30 seconds

c. Role of the DRTS
· Extension of DRTS to more urbanised areas
· Accessibility for disabled
· Differentiated fare collection system and rates
· There should be less stress on replacement of all PT lines with DRTS

d. Efficiency - DRTS Concept
· Guaranteeing minimal deviation from passengers' direct route

- Reduction of required connections
- Reduction of dead running
- Efficient use of vehicle capacity

6.2.4. Drivers

The drivers are considered an important element as they must operate the services. Discussions with drivers' groups identified key needs as follows :

- There should be larger DRTS areas
- Modification of the data-layout on vehicle-display
- Easy and efficient procedures for boarding of passengers without reservation
- Improved notification of cancellations and occasional last-minute bookings

6.2.5. Operators

The specific group session with the Operators' Group identified the following needs for Operators. It should be remembered that they generally have experience already of DRTS systems, and these may be considered as *additional* requirements over the basic system.

- Improved graphical environment - possibility for vehicle tracking, stop selection, etc.
- Flexible data entering : current data-sequence is not adapted to all types of different reservation-calls
- Easy and efficient procedures for boarding passengers without reservation
- DRTS-area as large as possible to meet all users' transport requests
- Extended customer database, recognition of regular user and trip
- Headphones
- Monitoring of connections DRTS-regular fast PT lines
- System support on region information, PT line information, etc.
- Unique naming of different stops
- Further improvement of systems - processing and reaction time
- Extended facilities to cope with system failures
- Extended familiarisation of the general operating and dispatching crew with the DRTS

6.2.6. PT Company De Lijn

The transport company De Lijn identified the following needs :

- Efficient use of resources in order to maintain and extend the current PT market with less costs. Free up resources to integrate in stronger and more lucrative PT lines.
- Guaranteeing minimal deviation from passengers' direct route
- Larger DRTS-areas with less equipment
- Easy and efficient procedures for boarding passengers without reservation
- Development of modular and easy-to-integrate DRTS-concept for further implementation in other regions
- Improve information-campaign on DRTS
- Accessibility for disabled
- Differentiated fare collection system and rates
- Introduction of zonal and cheapest tariff for reservation calls

- Shelter facilities at most important transfer points
- Multiple operating facilities - automated call handling via telephone-mail
- Restricted right of initiative for driver
- Limited pool of DRTS drivers
- Improved identifiability of DRTS vehicles - improved DRTS image
- Adaptation of vehicles to road infrastructure and PT network
- More on-board facilities to board with goods, baggage, luggage, etc.
- Extended familiarisation of whole operating and dispatching crew with the DRT System

The most relevant information is summarised below :

Current user	**XX**	**XX**	**x**		**x**		**X**	**X**		**X**
Potential user	**X**		**XX**			**x**	**x**	**x**		**XX**
LRF	**x**			**X**	**XX**	**X**	**x**	**XX**	**X**	**XX**
Operator		**XX**			**XX**					**XX**
Driver	**x**	**XX**			**XX**			**XX**		
PT company	**X**	**x**		**XX**	**XX**	**X**	**x**	**X**	**XX**	**x**

XX = very significant **X** = significant **x** = of interest

6.3 Result of the User Needs Analysis of the Finnish site

The user needs analysis at the Finnish test site consists of three separate methods:

- a postal survey, where 2000 questionnaires were sent
- discussions and interviews of special user categories,
- discussions with the local reference groups; two groups

There were in total 10 group discussions. The average number of user categories representatives in each discussion group was seven.

All Finnish special user categories were represented within group discussions, except persons who have the right to subsidized health care trips. These got the standard postal survey form from hospitals and from other destinations for those type of trips.

The Tuusula, Kerava, Järvenpää (TSL-area) Local Reference Group (LRG) had two meetings where the questions and forms was one item. The LRG made the test fill of the postal survey questionnaire.

All discussions had the same concept of events in the same order.

- A general description of the SAMPO project and its environment,
- A guided discussion, where all questions and answers were recorded
- The dealing of interview sheets and filling
- A final discussion with the new ideas raised with the help, or from the questionnaire.

The time spent for discussions varied from 2 to 3 hours.

Within the following section the results of the discussions and interviews with special groups and LRGs are reported. The postal survey will be reported separately in section 6.3.3.

6.3.1 Summary of User Needs within SAMPO

1. A very positive atmosphere towards SAMPO was found in all special categories. The general *willingness to change* to the SAMPO system was 68%, no change 23% and no opinion 9%.

2. The *time limit for advance* booking was found to be approx. 1 hour. Over one hour the interest went down rapidly.

3. The special categories accepted the *uncertainty of arrival time until* 15 minutes. The times over this threshold were unacceptable for many groups.

4. *Walking distance* was a very important factor in the SAMPO system acceptance. The distance 500 m was accepted by only half the population within the study.

5. The *influence of fare* was not great and in general lower as expected. The reason may be that the most persons in special user groups do not pay the normal fare, but heavily reduced.

6. The most important factor for special groups in *choosing the transport mode* was the ease of selection. The other factors have much lower weight.

7. Excessive transfers have the estimated lowering effect on the willingness to use SAMPO.

8. The objectives and tasks for *site preparation* should be completed well in advance

- The authority should purchase the regular line service well in advance of the test period
- The cooperation across the municipality borders
- The boarding and alighting locations should be marked

9. The *operating principles of the Travel Dispatch Centres (TDC)* in the multi operators environment.

- *It is important* to maintain the equality of operators and their economic performance. This needs at least rules for the following cases:
- The *assignment* of transport work to operators and vehicles.
- How to use returning empty vehicles.
- When and how it is possible to choose a new route for a new passenger
- *One should get the answer on the question*, how much a person in a hurry is allowed to delay other passenger's journey.
- The acceptable deviation for a person on a journey (to pick-up or leave another passenger/s) *should be found*.
- Fixed points for passenger transfers from a vehicle to vehicle, if transfer is necessary.
- To avoid the waiting of several passengers on the transfer of one person.
- How to be sure that a new vehicle is coming and picks the waiting passenger.
- For certain services it is important that the driver is consistent on most of the trips, for example with the old mental and disabled or for certain special schools.
- The information of the passengers and of the route should be transmitted directly to the driver and the driver should have a facility to react to this information and be able to communicate this to the TDC.
- The road network should be investigated and mapped in order to get information of possible routes for several public transport vehicle types.
- A method should be established to get passengers with fixed arrival time to the destination in time when there are other demands on the route?
- Transfer to a fixed line and specially from a fixed line. The communication method with a fixed line vehicle and DRTS vehicle should be as direct as possible.
- Does the TDC have a monopoly for the subsidised trips?
- The queuing may be a problem on rush hours. The system should have reserves.
- The order for the return trip. Is it possible to make it in the vehicle during the customer’s journey?
- How it is possible to solve the capacity problem during rush hours.
- The purchase of a return trip. Is it possible to arrange it in the vehicle during a trip to the preliminary destination?
- Who makes the reimbursement to the operators and bills to the customers? Is it the TDC directly or is it based on the data received from TDC and vehicles?
- What length of waiting time is accepted by the customers.
- The technique to transmit the data to the drivers.
- How is it possible to avoid competition conflicts with regular line based services?
- The data from the TDC should be sufficient to avoid misuse of subsidised trips.

10. The *economy of TDC*. The operators must avoid extra set-up costs.

11. The *financing of the test period*.

12. *Fares*

- The fare of a trip with transfers. The principle to collect the fare, and divide the revenue.
- The fares when there are changes in route and patronage.
- The fare level, what should it cover. In the long run the fares should cover all system costs.
- The extra charge of special services and the question of separate price levels depending on the time of day?

13. *Ticket system*

- The customers should be included in the process
- The differences between the Finnish Nation wide public transport smart card payment system and the Helsinki Metropolitan area smart card project produces difficulties especially in the TSL-area.
- All participants had a desire for a single smart card.
- It should always be possible to pay with cash.
- A receipt with sufficient information is needed in many official purposes.

14. The number of *potential passengers* and passenger groups *and their needs*.

15. Are there some *special needs for vehicles* in SAMPO traffic?
- New equipment should be easy to handle and be within a reasonable price level.

16. The role and regulations concerning *invataxis*. There are doubts that the invataxis have a tendency to encroach into the market of ordinary taxis.

17. *Extra service demands* by the customers
- Extra service needs time, which affects other passengers.
- There are quite alot of regulations concerning special groups - a list of these is required
- An individual service, like taxis to day, is not possible.

18. The *quality demands* of passengers concerning personnel, vehicles and other environment.

19. How big are the *changes in the transport mode*, when the access traffic is cheaper due to the reduced transfer price.

20. *The information*

- It should be wide and effective, because the test period is short and public transport changes take time in the minds of the public.
- The information is the same for all participants.
- The information to the passenger must be right, how can this be assured ?

21. *The reimbursement system* should be fast. The time, from 1 to 7 weeks as it is today, is too long for the small operators.

22. The customers are concerned about the *collision of the interest between operators*, because it would ruin the good idea.

23. The *limited service area* during test time generates problems.

24. The *transport of small parcels, luggage and shopping bags* is very important for some special groups.

25. *Operating hours*

- Most operators hope for a limited or a very limited operating time.
- The passenger groups have a desire for a longer operating time, generally between 0600 to 2400 hours.

26. Who makes the *order for transport* in special cases?
- in hospitals
- for a subsidized trip
- for a visitor

Does the TDC undertake the planning for school transport?
Does the TDC make the planning of social sectors subsidized disabled and elderly transports.
How it is possible to get a competition in the last two cases.

27. The *authorities* are *bound* to the existing legal system. There are, however, high expectations of economies in the new system. The changes should be on the way well in advance so that it is possible for the authorities to understand the possibilities of the new system.

28. The *emergency transport* is separate to SAMPO and is run by ambulances. Some competition may occur between specially equipped invataxis and ambulances, when it is a question of patient transfer from hospital to hospital.

29. The *contracts* during test time should be *flexible*.

30. The SAMPO system may influence on the *land use*. New areas and directions for development may open.

31. The SAMPO concept makes *higher demands on customers*. For many people it is more difficult to phone, than to walk to a bus stop. How is it possible to make it as low as possible.

32. How it is possible to *protect the privacy of customers*. In a general transport it is possible to guess the illness of a passenger, if he/she will go to a hospital etc.

33. The bus operators are a lot more *ready for investments and costs* than the taxi operators, and the level of bus operator's covers the estimated expenses.

6.3.2. Functional Conclusions from the Finnish site

All answers had a very positive opinion on the new SAMPO public transport concept. Of all answers in groups 68% were positive, 23% negative and uncertain 9%.

Operational environment and information

The operational environment should be prepared and predefined. i.e. the passengers and the operators should know the structure of line and timetable based public transport. It is mostly a question of information. The object of public information is to ensure that the passengers know how to make an order, how to reach the vehicles in the system and that the drivers can produce right service. The information work should begin with the drivers in the existing operators service before the new system starts.

Financing

The financing of the system was the concern of all groups. The ticket price is one part of financing, but was not as important as expected beforehand. One reason may be that many important groups in public transport (disabled, elderly, school children etc.) do not pay the full fare. This needs further investigation. The bus operators had a realistic opinion of the level of costs, but the private taxi operators, driving and owning a single car in general, had some difficulties to accept realistic costs.

The fare should cover the costs, at least in long run. The price of a single trip should be reasonable, but the revenue to the operators must be fair, depending on the actual work in an environment of many operators. An intelligent guess was not found to be sufficient, at least not at the beginning. This may result in an internal complex fare system, but for the passenger the fare system should be simple, easy to understand and accept, even so with the fare level.

Internal functions of the Travel Dispatch Centre

This is at the non-significant level in the single operators' functions or in the taxi business. The mapping of the road conditions on the operational area is an important task for TDC, because without it, the TDC would send a wrong vehicle type to collect the passenger.

External functions of TDC

The TDC must produce right information to a passenger of the desired trip's duration, costs and services. Receiving information, the TDC should be capable of providing alternatives. In this case, the question of reliable and fast information links between vehicles and TDC is essential. The needs of drivers were quite high on this.

The customers set the following goals for the systems general performance:

- The uncertainty of actual collect time could not exceed 15 min.
- Walking distance exceeding 500 m was entirely too much. The collect points should locate much nearer, if the collect from the door is not possible.
- The fare, if it is quite near the existing bus fares was not important. The more important question is whether there exists any public transport at all.
- The ease of selection in transport acquisition was the most important factor in the transport mode selection. The best of the other factors got only half of the votes of the ease of selections in questionnaires.
- Transfers are hard to accept for half the respondents.

Operational services

The SAMPO system must not be bound to the predefined stops. However, the predefined stops are however important to find and agree a right collecting point for the passenger.

The question to be solved is the extra service needed for a certain passenger. The service is not a problem. The problem lies how the driver or TDC can be sure that the vehicle is on time on the destination.
Too flexible timetables result that the passengers with a fixed timetable, on a journey to a trunk-line or to work, will avoid the system.
The fare of extra services must be solved before the service begins. There are two opinions, both on the operators and the passengers side. It should or should not be an extra charge for extra services.

The transport of small parcels is important for some groups, but in general it was not important.

Payment System

All groups were waiting for the smart card system.

Operation time

The operators expected short operation times per day. The passengers expected much longer, in general between 6am....12pm.

Special remarks

All authorities expected some changes from the legislation. The highest expectations of cost reductions were from some slight changes in the laws concerning the person's right of a private journey on certain cases in subsidized trips.

6.3.3 Preliminary results from the random sample questionnaires

- Interest in the SAMPO public transport was found to be great. The share of public transport of all trips was 10%. The willingness to change to SAMPO traffic (answers 'surely' and 'probably' together) would double the public transport share.

- The SAMPO users are shifting the mode in wintertime from walk and bicycle (18%), from public transport (24%) and from car users (40%). Willingness to change to SAMPO traffic is nearly double in wintertime compared to summertime, except in the health care trips, where there is nearly no difference between seasons.

- This means, that the scheduled public transport loses some passengers, but the increase of public transport passengers number would be 120% greater on the study area, if the answers would come true. One reason to remember is, however, that the sample was heavily directed to areas where the public transports level of service is low or poor.

- The mode shifters are the mostly on the work trip (Work, school, day-care), 42 % in summer and 46 % in Winter. Shopping and business trips have 24%/25% share of shifters and nearly equal with leisure trips (free time travel), 29%/26%. The first figure is summer, the last winter.

- Answers from the Tuusula and Kerava show greater interest on SAMPO traffic than in other test site municipalities, towns of Järvenpää and Seinäjoki (17%/11%). The reason may be the lower service level of public transport on the sample area.

- There are no significant differences between municipalities, if the fare is quite near taxi fare.

- The most significant age group is persons between 50-64 years old, who have the greatest share of sure answers eager to change to SAMPO as the other age groups.

- The biggest share of "I surely would change" is in the age group over 65.
- The difference between gender seems to be significant. Women are more eager to change as men. The reason may be the availability of a car and profession. In trip types the difference is small in work and school trips. In other trip types the willingness to change of women is 6-8%-digits greater than men in wintertime.

- Among the professions, the most eager to change are the ordinary workers, pupils and students.

- Among trip types the biggest willingness to change was in health care trips, in winter 18%, in summer 15%. Second was the leisure trips, winter 19%, summer 13%, and nearly equal with work and school trips, winter 21% and summer 11%. Last was shopping and business trips, winter 16% and summer 9%.

- Most eager to change were those whose work time is normal day time work. There were however big differences depending on the season and trip type.

- On work trips the biggest willingness to change was by the bus users and second biggest by the train users. In summer there is no big difference on willingness to change between car users and walkers. In winter there is no big difference between bicycle and car users.

-The biggest change on shopping and business trips is from buses.

- There is no growth in the general willingness to change when the distance from the centre is longer.

- The brutto income of the family had effect only in the income class less than 8000 mk (approx. 1400 ECU/month).

- The availability of car had no significant effect on work- and school trips on the willingness to change. On the shopping and business trips in winter and always on the health care trips the willingness of the non-car class was approx. 10% greater as with those classes where there is a car available on the whole or on a part of day.

- The origin and destination of trips have some effect, but need more detailed study.

- Door-to-door transport has greatest effect in the health care trips, the share of surely drops from 17% to zero and probably from 46% to 42% when the distance to pick-up point grows from the door to 500 m:s.

- Shift workers and people with irregular work time expect special services as carry heavy things or personal help twice as much as day time workers (9%/19%).

6.4 Irish User Needs analysis

The Irish User Needs analysis has been carried out according to the methodology described in Section 5. This has resulted in a comprehensive identification and analysis of the different User Categories within the community.

Two notes are made :

a) All interviews and discussion groups (except the Central Remedial Clinic) have been carried out in the general test site area. Therefore, no claim is made that these user needs are transferable either within Ireland or to other countries. However, the general findings have been discussed informally with groups (communities, operators, politicians) in other parts of Ireland and the feedback is, that these are universal characteristics. This is recommended to be the subject of further investigations outside the current scope of the SAMPO project.

b) No specific effort has been made to quantify either the market for each User Category or the specific parameters of the identified needs. This will be done within the Evaluation phase of the project and supplemented by additional work outside the scope of the SAMPO project.

The User Needs are reported according to the Groupings and Categories determined in Section 4 above.

6.4.1 End-users

User Category	Identified Needs
General citizens - discussion group and interviews	* Flexible transport services * Predictable arrival times * Access/short walk to a wide range of destinations * Fares should be cheaper than a comparable taxi-ride * Access to inter-urban and regional transport services * Information about the services, prices, connections etc. * Ability to book services
Disabled - interview with Central Remedial Clinic	Person-related Needs * Space for a wheelchair (occupied during trip) or storage * Appropriately designed seats with restraints * Gentle step height * Wheelchair lift or trained person to assist access * Good driving quality (safe, no rapid cornering etc.) Trip-related needs - restricted mobility * Services which are able to accept their travel needs * Access to clinics, workshops, other facilities * Bus must come close to both pick-up point and destination * Access to phone or other means to book service * Notification of cancellation - arrangement of alternative Trip-related needs - mobility impaired * Accessibility throughout the entire trip * Ability to arrange assistance at inaccessible points * Choice of destinations * Access to information on options and accessibility rating * Access to phone

	Note that a distinction is made between people whose disability severely restricts their travel to specific destinations, and those who are mobility impaired but otherwise participate as fully as possible within their community. CRC believes that guidelines are needed for both vehicle quality and driver training, especially if the quantity of service increases
Elderly - discussion group, interview with ICA (Irish Country-Womans Association)	* Flexible transport services (timing, routing) * Short walking distances to pick-up point * Safe, sheltered waiting places * Predictable waiting times/bus arrival times * Bring the user close to the destination point * Accept concessionary/free travel passes on all services
Schoolchildren - interview with parents group	* Adequate regular school services * Proper supervision on these services * Ability to organise transport for extra-curricular activities * Safe boarding/alighting places
Shoppers - discussion group, interview with ICA	* Flexible transport services (timing, routing) * Ability to book the service * Space for shopping, luggage * Distribution at the town-side (not just in main street)
Teenagers/children - interview with parents group, discussion group	* Adequate services to/from school * Services to/from extra-curricular activities * Access to leisure/sports activities in other locations * Access to inter-urban and regional transport services
Workers - discussion group	* Access to flexible transport services (timing, routing) * Ability to book the service * Ability to modify/cancel regular booking * Guaranteed arrival time at workplace

6.4.2 Operators

User Category	Identified Needs
Bus Association PAMBO transport co-operative - interview	* Co-ordination of the private operators in a target area * Co-operation with the public operators * Integration of modes and transport providers * Need transport operators to provide the transport services * Development of the transport market and exploitation of the potential which is undoubtedly there * Understanding of the user needs and business case for DRTS, ATT * Provision of higher order services to the transport user * Provision of higher order and ancillary services to the operator * Ability to generate a revenue/income stream to fund the services and to create capital for investment * Ability to expand coverage area and range of services provided * Appropriate technology platform to support the higher order services * Clear public road passenger transport policy from the Government * Support for infrastructure (termini, stops, parking, priority)
Large operating company Dedicated discussion group	* There must be a profit margin arising from the service to recover costs * Adequate funds must be generated for investment and re-investment * There is a need to integrate the services into a coherent network * The administration of the current transport legislation has to be changed to allow operators to enter the market with the services they are interested to provide

	* There is a market for local services, but new approaches are needed * Support is needed in the start-up phase for innovative services - for example, feasibility study grants and/or employment support for the first 6-12 months as in the case of other industries * Bus terminals and interchanges points are needed * Operators need to be able to access the set-down and pick-up points which the customers want - they are happy with the level of co-operation of the Kilkenny authorities, but feel it is not as good in other urban areas * Operators need good mechanisms to get information about both new and existing services to potential customers * Good training courses (including customer care) for drivers are needed * Operators need access to the reimbursement schemes for elderly and other special needs categories
Small operating company Dedicated discussion group	* There must be a profit margin arising from the service to recover costs * Adequate funds must be generated for investment and re-investment * There is a need for a centralised control/dispatch centre, and third party provision of information, promoting, booking and payment for transport services. * There is a need to integrate the services into a coherent network * A clear Transport Policy is needed which should concentrate on maximising travel opportunities for users and represent all organisations involved in the provision of services * The administration of the current transport legislation has to be changed to allow operators to enter the market with the services they are interested to provide * There is a market for local services, but new approaches are needed * Support is needed in the start-up phase for innovative services - for example, feasibility study grants and/or employment support for the first 6-12 months as in the case of other industries. * Small operator companies cannot carry start-up losses for as long as the larger companies who have the investment reserves - they also have less access to credit and working capital * Payment for providing schools transport needs to be increased and stability of contracts should be incorporated

6.4.3 Authorities/agencies

User Category	Identified Needs
Department of Transport, Energy and Communications Interview	* Reversal of the trend of decline of public transport usage * Information on how to develop the market for public transport * Definition and implementation of opportunities * Bringing operators together and provide integrated services * Build up a critical mass of transport facilities and provision * Provide feeder/distribution to long-distance travel infrastructure, especially rail which receives EU funds

	* There needs to be an evolution of the licensing situation, but there is perceived to be a difficulty if dealing with multiple organisations * Information is needed to assist in transport policy formation
South Eastern Enterprise Board Interview	* SEEB is concerned with investments to improve employment and business * Most investments are small scale * Transport is an issue in most of their projects for access for either customers/users or employees
Local Authority Kilkenny County Council - discussion group	* Needs reduction in the level of car use * Considers that services are only required on the main roads * Local authority has no role in the planning or provision of public transport services
South Eastern Health Board Interview	* Healthboard relinquished responsibility for transport of patients to clinics in 1987 (financial reasons) and do not want to get involved again * SEHB continues to operates two vehicles for moving special patients on specific runs * Staff no longer expect either assistance for travel or residential facilities - they expect to have to provide own transport * SEHB expects that any transport services for either their patients or staff should be general public services * The SEHB would be willing to provide information to patients who are potential users of transport services
Tourism Agency Bord Fáilte - discussion group	* Need increased transportation services to market and develop additional tourism business in the Kilkenny region * Need information on public transport services directly accessible to the tourism offices and other service providers * Connections are needed to the main ports and airports * New services are needed to connect Kilkenny with tourist locations on adjoining counties so that tourists can use Kilkenny as the base for their stay * Local services are needed to link the hotels, guest-houses to both the town and the locations used by tourists * A better general transport service for Kilkenny is also needed to improve mobility of tourists * Some minor roads which would be of interest to tourists/tours cannot be used by buses because of overhanging trees or road conditions
Kilkenny Chamber of Commerce Interview	* Public transport must not worsen the general traffic conditions * Siting of bus facilities is an issue of concern * The KCoC would like to see decentralisation of shopping facilities, and additional public transport services may help * Kilkenny needs better access to ports and airports

6.4.4 Destinations

User Category	Identified Needs
Employer Interview with SFL	* Employees need additional transport services for access to the workplaces, although it is considered to be the employee's responsibility * Many employees car-pool, or junior employees get lifts - if overtime is needed, then the company may have to organise the transport for the involved employee * Poor transport services result in the need for multiple car-

	ownership within households * Poor transport links make it difficult for rural areas to attract new business
School administration Interview with Kilkenny Project School administration	* The current schools transport system is considered to work well in practice * An improved administration structure is needed to reduce the amount of time required of the school administration * Services are needed outside of school hours for extra-curricular activities * There is a need for greater supervision and safety of children on board buses * Training of drivers dealing with children is considered to be an extremely important; although it is not considered a problem at present, it might be in the future if children are carried on general services
Third level education Interview with administration of Regional Technical College, Carlow	* Approximately 40% of their 2 500 students commute from a radius of some 50 km. There is no organised service available. * The students from outside the area normally travel at weekends - they need both local feeder/distribution services to the longer distance travel services, and a better network of inter-urban links * The RTC has sub-colleges in Carlow and Kilkenny, with a movement need among the main college and the sub-colleges * Current services are based only on large buses - there needs to be a mix of bus sizes to encourage new routes * Traffic and pedestrian/passenger safety at the entrance to college is a significant concern * The RTC administration are interested to work with the operators to help with the service design
Publicans/vintners Discussion group	* Owners of pubs/bars in the rural areas are concerned that their customers will use the new services to go to more fashionable places in the towns

6.5 Results of the User Needs Analysis of the Italian Site

The following results have been determined to date. Other results will become available from time to time as the relevant user need activities will be performed and completed.

Disabled people (Florence) and Healthcare patients (disabled, Florence)

- a number of disabled people in Florence have no transportation available at the moment;
- many disabled people in Florence, whose healthcare and school or work transport needs are catered for, would enjoy transportation to social and recreational events;

City Councils (All) and Health Authorities (Florence, Campi)

- local authorities feel that transportation to social and recreational activities should be made available to disable people, funding being the only problem;
- use of existing resources should be optimised in order to ensure adequate transport for the disabled in Florence, and its expansion to include social and recreational trips;

Inhabitants at large (Campi)

- inhabitants in a low-demand ribbon-development area near Campi have no transportation available at the moment, or it is inadequate;

City Council (Campi)

· use of existing resources should be optimised to meet the needs of the largest possible population of Campi;

Tourists (Siena)

· there is an apparent need for low-cost public transport for the elderly segment of the tourist population alighting their vehicles in the parking areas around Siena historical city centre;

Municipal Company (Florence, Campi, Siena); Sole Operators (Florence)

· all new transportation should be efficient and cost-effective.

Drivers/personnel (Florence, Campi, Siena); Dispatch centre (Florence, Campi, Siena); Other transport operators

· Interfaces, communication procedures must be simple and easy to operate.

Healthcare (Florence, Campi); School (Florence, Campi); Workplace (Florence, Campi); Tourist Centre (Siena)

· adequate accessibility should be provided to their facilities and locations, with special attention to the disabled and elderly.

Category and needs matrix

Category	Availability of transport	Accessibility	Cost of operation	Ease of operation
Disabled People	x			x
Healthcare Patients	x			x
Inhabitants at large	x		x	
Tourists	x		x	x
Municipal Company			x	x
Sole Operators			x	x
Drivers/Personnel			x	
Dispatch centre				x
City Councils		x	x	
Health Authorities		x	x	
Health care facilities		x		
Schools		x		
Workplace		x		
Tourist Centre		x		

6.6 Results of the User Needs Analysis of the Swedish Site

6.6.1 Summary results of Interviews and Group Discussions

A. End Users (passengers)

Two group sessions were held with the target group (disabled persons and elderly, 65+) in order to focus on End-Users view of automated booking concepts (incl. a test of preliminary prototypes).

Comments on service concept (FlexRoute):

- The service must be well explained and easy to comprehend.

· Concern is raised over the return portion of the trip which always is the weak link in demand-responsive transport services (including taxi). Currently only some 10% of all STS users book the return trip at the same time as the outbound trip. The issues raised are access to a phone at the destination, possibility to be reached with notification of pick-up time etc.

· System reliability is an issue. E g, there must be a procedure for what to do if the user misses the notification call (e.g. if he is in the bath-room).

Comments on the booking procedures:

· Users would prefer not to have to pre-book the trip, but if it is required the user interface must be simple and consistent.

· Group sessions show that automated booking would be possible for the 'standard' trips (e.g. from home and same day) while more complex bookings still must be done manually.

· Test of the prototype dialogue showed that the concept is feasible but it needs to be modified to be more user friendly and simple. E g there should never be more than two choices in each task in the dialogue.

· There shall always be a confirmation of the information which has been input by the user.

B. Special Transport Services Authority

· The City administration has obliged the Authority to save 12 MSEK (c. 1.5 MECU) annually . One of several measures is to find more efficient means of providing local STS trips (e.g. within the users own city district and to adjacent destinations).

· The total number of STS permits in Gothenburg is about 27,000, corresponding to 6% of the total population. The Authority has taken a policy direction to reduce this number by some 1,000 per year. The introduction of the new service (FlexRoute) is assumed to make it possible to delay the need for certain individual's STS-licence by at least a few years, thus contributing to the above reduction.

- Staffing costs for STS Travel Dispatch Centre is about 10 MSEK/year (c. 1.2 MECU). The travel volume is about 1.9 million trips/year which translates to a processing cost of about 0.6 ECU per trip.

- Current STS booking procedures are based on the premise that the passenger immediately receives a 'promised pick-up time'. The system is later only allowed to displace (delay) this with a maximum of 10 minutes to allow for ride-sharing optimisation.

- The possibility of automated trip notification (to forewarn the passenger of actual pick-up time) would permit an initial optimisation window of up to 30 minutes and thus contribute to higher vehicle occupancy rates.

- Current STS system does not provide adequate statistical support for policy or operational changes. An improved Decision Support System is needed.

- A better Quality Control system is needed. 'Today we measure quantity, not quality'. Only planned displacement of trips (up to 10 minutes permitted delays) are measured, not the actual delays as experienced by the customer. Reporting by the driver of actual pick-up time and possibly a data message with explanations of the delay would be an improvement.

- Improved quality control should make it possible to distinguish between service levels experienced in various parts of the city (e.g. city centre vs. suburban districts), and to make better informed decisions on service levels to be offered.

C. Traffic and Travel Authority

- Since existing buses and trams have only limited accessibility for D&E persons the Authority is regularly approached by various City District Boards and local administrations and special interest groups to provide more accessible service.

- Only one such new service , the traditional Service Route 'Trygga Rundan' with 5 low-floor buses, has been implemented and is in operation since 1991. High operating and capital costs and perceived inefficient use (all buses visit all stops along a winding route even if there are no passengers) in combination with a worsening economic situation for the city has forced the Authority to reject all other proposals for duplication in other districts.

- The Authority is seeking new operating and technical solutions which could serve the special mobility needs for those elderly who do not enjoy the benefits of an STS-licence. If new cost-effective solutions are found in combination with reduction of the needs for some of the local STS-travel, the Authority could be in a position to better respond to the local needs as they are raised.

- There is a need to reduce the dependency of automobile driving for some of the elderly who today constitutes a traffic safety hazard.

D. City District Board/Administration

- The Board has an obligation to facilitate highest possible quality of living for all residents within its district - this includes the mobility issue, to enable people to actively participate in society. Representatives frequently state that 'transportation is not our responsibility', however they realise that this is an integral part of other services and that they cannot fully trust other authorities to provide an adequate level of transport service.

Therefore they have been willing to co-finance some of the demonstration operating costs and to take a very active part in the planning work.

· Adequate mobility for D&E persons will allow them to continue to live in their homes for a longer period of their final years, thus reducing the needs for other costly social and health care services.

• Provision for elderly to visit the day-care centres for meal services could reduce the needs to transport meals to their homes, thus being a cost displacement.

E. Health Care Authority

· The Authority needs to reduce cost for publicly paid health care trips through better co-ordination and higher transport efficiency. The number of health care trips is about 400 000 per year and cost some 30 MSEK/year. Many of these trips are made with special vehicles.

· At the Sahlgrenska Hospital there are traffic problems and related environmental concerns. The Authority would like to reduce the taxi traffic by use of more efficient services

· Integration of reservations procedure for doctors' appointments and related transportation should be possible in many cases, but the Authority would not guarantee this.

• Need to reduce efforts to assist patients/passengers to book or change return trips. This is almost a full time job at some busy medical centres. Installation of some automated booking function (simple to use) would be a great improvement.

· The approximate "frequency of service" for return trips from hospitals and medical centres should be 30 minutes. Currently the average waiting for a taxi is about 20-30 min since the Planet-system is seeking to arrange ride-sharing. One hour frequency (as is the case for the pre-SAMPO project would be unacceptable.

F. Housing Companies/Landlords

· The elderly are good tenants, thus the landlords desire them to be able to stay as long as possible in their neighbourhood. Landlords are very favourable to new services.

• Good transportation provides a good image for the district. Some landlords may consider to sponsor new services or be willing to provide benches and other physical measures to improve accessibility for D&E.

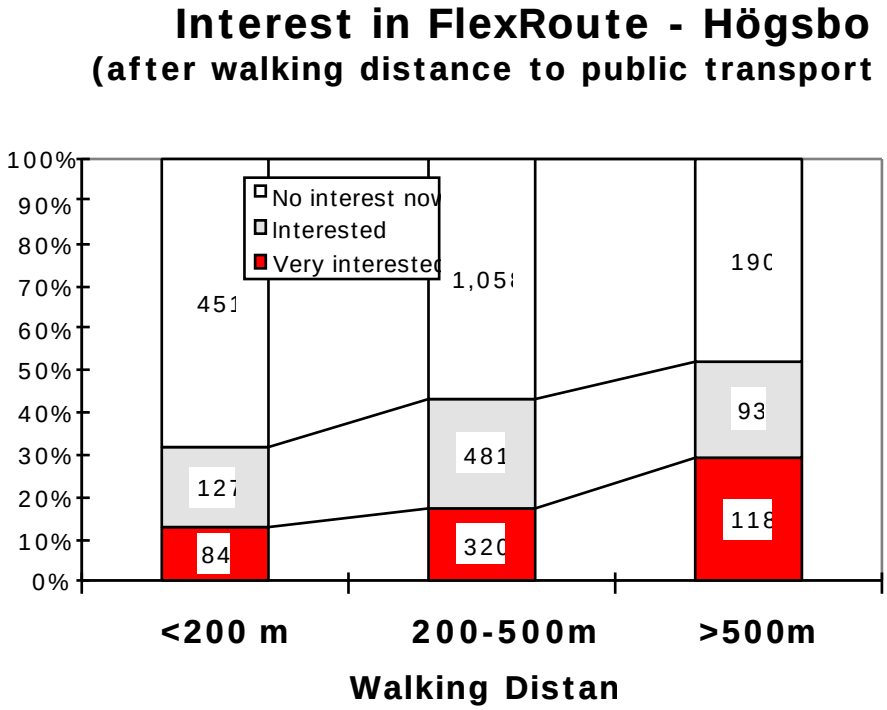
G. Merchants (destinations)

· Need to capture or hold on to the market created by the D&E community. Group sessions indicate an interest from local merchants to provide facilities for booking of return trips (and comfortable waiting areas) on their premises as a customer service.

6.6.2 Summary results of Market Survey (in the Högsbo District)

A postal survey was sent to a 100% sample of the 5 200 elderly (65 years and older) persons in the Högsbo district and to 112 younger disabled STS-users also in the district which will be the test site for the FlexRoute services. The response rate was 60%. The survey had the dual aim of gaining a greater understanding of the market, and of identifying the target sample for a future more focused survey described in section 6.5.3 below. This survey will be done in connection with the before-study of the evaluation.

- 24% of all persons in the sample are 'interested' or 'very interested' in using the new travel opportunity which was briefly described in the cover letter. This corresponds to 1306 persons which are automatically entered into the FlexRoute customer file.
- Of these potential users 391 (30%) are already licensed STS-users.
- Another 3-4% of all persons in the sample indicate an interest but they currently don't have such needs, but they are grateful for further opportunities.
- Based on a brief analysis of 10% of those not responding to the survey, it is concluded that there is an additional potential of about 4% of all the persons in the sample, however it is also realised that some interested persons may have answered positively to be 'good citizens'.
- Long walking distance to public transport stops and lack of access to a car in the household are rather important factors explaining the interest level.



- Many current users of Special Transport Services (STS) indicated hesitation to the new service which could be perceived as a threat against their existing taxi-privileges (this issue had not been addressed in information given with the survey.)
- The survey shows a great disparity between the mobility afforded in the different sub-groups of the D&E community. Some are very active and travel daily with own car or with STS, whilst some are very isolated and only do occasional trips to downtown, etc.
- The number of trips done by the respondents to local and external destinations indicate that the preliminary 'route' is an appropriate one.
- The invitation to write comments on the back of the form has been used by many persons. Health problems, heavy grocery bags in combination

with steep hills are also important factors. Other problem is the perceived inaccessibility of existing buses and trams.

- Some of the more illustrative comments are :

"Since it is a rather long walk to the tram and also quite hilly, this service would make it possible to continue living in a very pleasant residential area"

"It's very heavy to carry grocery bags, but necessary. I don't get any younger (unfortunately)."

"I would rather see that you started with Trygga Rundan (a fixed service route)."

"With 350m to the stop and with angina, it frequently happens that I stay at home instead. Therefore I look very positively to this new opportunity."

"I should go out more often if I could travel by bus instead of STS, which I need anyway for longer transport."

"According to my doctor I am not quite ready for STS. Can't understand that since some people even get STS to go to dance."

"I have lived in the area for 30 years. I'm getting more and more isolated."

"I am 90 years of age, that is an answer in itself. So far I purchase the monthly pass for public transport. But many thanks for your consideration. Things could change rapidly."

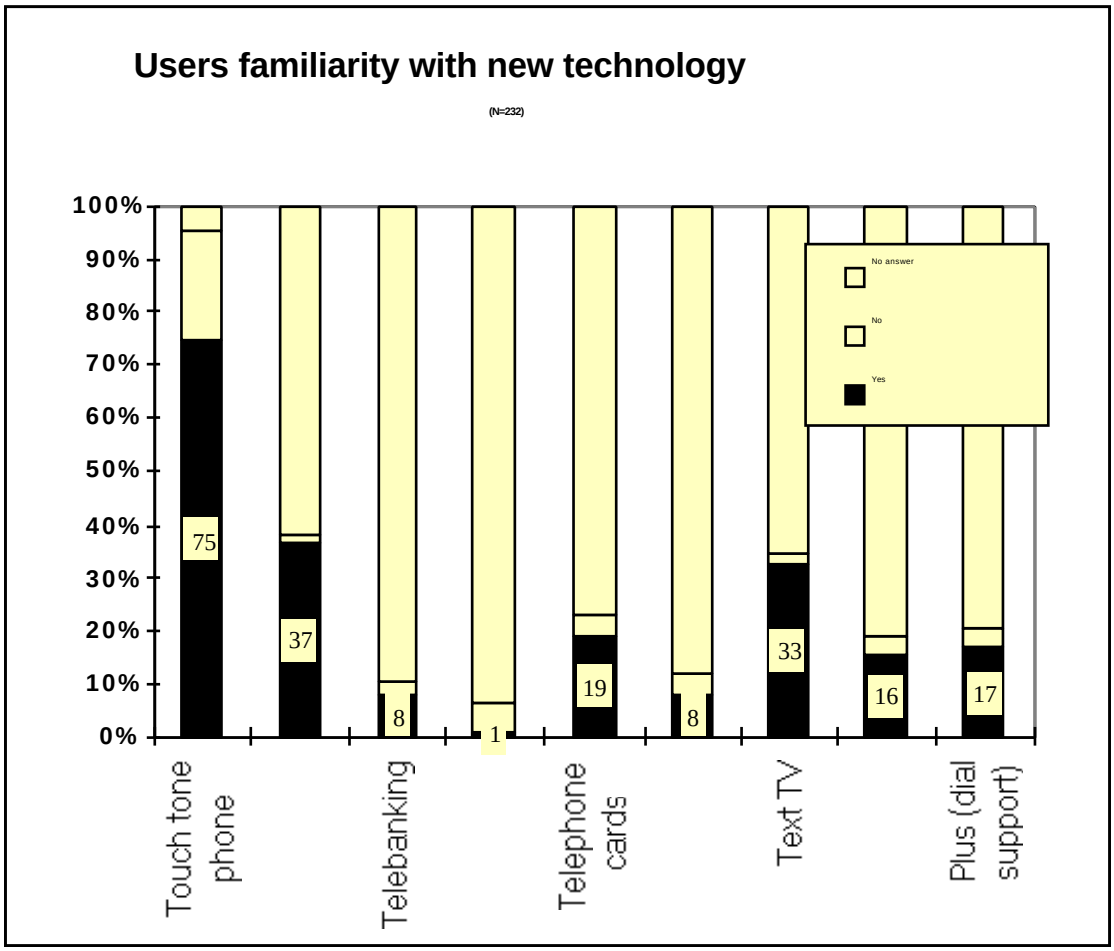
"Here live so many elderly in the area who use STS for short errands which seems unnecessary, such as leaving a prescription and later in the day pick up the medicine with a new run with the taxi."

"We don't know how long we can keep the car. We are 80 and 83 years of age."

"The proposal seems very good. I may surely have to use the described travel opportunity sooner than I imagine."

"I think this service has a great mission. Myself, I prefer ride-sharing, you get more social contact than in the single car ride. Good luck with the project."

"The minibus is a chance to get out. Before, I lived in Majorna. Trygga Rundan (fixed route service) was excellent; it took time but you could manage most things."



6.6.3 Summary results of Postal Survey concerning FlexRoute

A postal survey with telephone follow-up was carried out on a sample of 300 persons who had indicated an interest in FlexRoute during the previous market survey at the pre-SAMPO project site. The survey was carried out during February 1996.

About half the sample was STS-users and half was elderly living in the district of Biskopsgården in the Northern part Gothenburg. The response rate was 80%, although some individuals did not complete all the questions.

- About 10% of the STS-users in the sample expressed great difficulty in using current STS. Entering and exiting the vehicle (mostly taxis) is the largest problem (45% expressed at least some difficulty). Booking the transport is considered 'very difficult' by 8% and 'difficult' by another 7%.
- 57 % of the STS-users find it very difficult and another 29 % find it difficult to get to the stop if they have to travel with regular public transport (tram). Similar figures were given for entering and exiting such vehicles
- The planning horizon for trip making by the respondents within the district is rather long. 30% plan their travel at least 5 hours in advance. Another 45% plan within 1-5 hours in advance.
- The preferred pre-booking time is longer than 30 minutes for 80% of the respondents.

- More than half of the respondents would be satisfied with service only in the mid-day period 9-14. Very few (12 %) need service before 8.00 and after 18.00.
- In Sweden, the fixed timetable service routes are very popular with the elderly. Thus it is surprisingly few respondents (8%) who find it 'totally unacceptable' to have to book the trip in advance.
- Most respondents find it 'fully acceptable' if they only get a preliminary time-window and that they be notified of the exact pick-up time in a later call from the dispatch centre.
- The preferred trip notification time is 15-20 minutes. Only 20% of respondents would accept a shorter forewarning.
- About half of the respondents would prefer to book the return trip at the same time as booking the outward trip. The other half like more flexibility and would like to book the home trip separately.
- The familiarity with new technology and IT services was assessed in a series of questions about the respondents use of new technologies and services.
- 75% of the total number of respondents to the survey use touch phones, but whether they can manage the procedures of automated booking remains to be demonstrated.
- More than a third of the respondents use bank-machines and text-TV, but only 10% use telebanking services which is closest to the proposed automated booking scenario.

7.0 PRIMARY USER NEEDS FOR DRTS

This section examines some of the primary user needs which have arisen from the work in the individual sites. As explained in the earlier part of this Deliverable, each site has adopted its own methodology, within the general SAMPO framework, so the outputs from each are not directly comparable. It requires a further exercise to synthesise a global set of user needs. Part of this further work will take place through the Evaluation process within SAMPO, and additional work will be done through interaction between the SAMPO project and other projects and Users within the public transport industry.

The user needs are considered under four main topics :

- transportation policy
- core needs of the users
- potential conflicts
- critical factors for DRTS

7.1 Transportation policy

Transportation policy is relevant to three main groupings :

a) At **European and national level** there is a need to develop and implement effective measures to achieve modal shift as part of the effort to reduce the impacts of private car travel. This relates to needs for energy saving, emission reduction, congestion reduction, and economies. Flexible transport service are seen as providing a further element in the transport supply.

b) At **national and regional level,** citizen issues such as mobility, quality of service, the required level of public service involvement in provision of transport services and funding and local development become most relevant as there is the direct political accountability for the offered transport supply.

c) At **local level** ensuring the provision of transport services to citizen groups such as the elderly, disabled and people in low-demand areas becomes the priority transport policy issue. At this level, the main actors are the municipalities or county councils, and the functional agencies.

7.2 Core needs of users

The core needs of the users focuses on the two main user categories involved :

- the ‘end-user’ or customer : the main motivation for the end-user is to have adequate access to a range of activities and locations to which (s)he chooses to travel. This means having suitable transportation of acceptable quality.
.

· the operator : the main motivation of the operator is to generate business which covers the operating costs and provides surpluses for either profits or reinvestment.

The main needs consistently expressed across the sites for these two groups are shown in the following table :

End-Users	Operators
* Wide range of destinations/coverage	* Viable, sustainable services
* Easy access to services (walk, wait)	* Maximise patronage
* Responsive to personal needs	* Develop new markets
* Accessibility of complete, reliable information	* Cost efficiencies in service provision
* Ease and speed of booking	* Maximise occupancy/minimise dead running
* Last-minute booking	* Quick start-up period for new services
* Reliability of service and arrival time	* Suitable/improved technical support systems
* Assurance of the return journey	* Integration with other modes/routes
* Minimum deviations/delays on the route	* Effective/efficient Travel Dispatch Centre
* Ease of boarding and space for luggage, shopping	* Fair allocation of work, costs and revenues
* Access to other modes, but minimise transfers	* Freedom to continue to develop own business
* Maximum operating hours	* Ability to expand coverage area
* Reasonable pricing structure	* Ability to accept non-booked passengers

7.3 Conflicts

Generally speaking, the responses from the User Needs Analysis exercises at the different sites has been very positive all round. In most cases, the different user categories can all see benefits from the proposed means of implementing the DRTS. This suggests that the actual response in practice will also be very positive.

In a few cases, however, potential conflicts have been identified. Some of these may be a matter of perception, or may be reduced by fine-tuning after implementation. It is still worthwhile to list these issues and the concerns that the different groups appear to have.

· Regular passengers of the previously fixed-route service may now experience delays and uncertainty about arrival times of the service, although the new users may be very happy about the changes.

· Users who have become familiar with an existing system are faced with either a new task, or a modified task in having to book the service. They may perceive that there is no new benefit for them in the change of the system.

· The providers of the DRTS require the user to make a telephone call. There can be conflict about who should pay for the call, either having it toll-free, user-pays, or included in the service price.

· Ideally the service-provider would like the end-user to make fully automated bookings. The end-user however still prefer to speak to the call-taker / dispatcher.

· DRTS services will give people in rural areas and villages better access to shopping, leisure and other facilities over a wider range of destinations. Owners of local shops, pubs, etc. fear that they will lose their core ‘local’ business, and that they will finally have to close. This may actually leave villages without any facilities. On the other hand especially in rural areas,

the scattered local business are accessible with marginal effort and at very reasonable fare.

- Service providers seek to achieve economic efficiencies through using DRTS. It is expected that this will allow a greater quantity of service for the same resources. Drivers and contracted operators fear that in fact the same amount of service will be provided using less resource. This would impact on the number of jobs on the sector, and perhaps also on the salaries.

- Users of the high quality Special Transport Services (shared-ride taxi in Sweden) may see the introduction of a more route oriented concept (FlexRoute) as an unacceptable service drop. This raises the policy question if a parallel STS option should still be available when FlexRoute is introduced in a district / region.

7.4 Critical factors for DRTS

It is only possible to speculate at this stage which are the critical factors for success of DRTS. The limited experience of the existing services in Belgium, Italy and Sweden give some practical indications, and the expressed user needs from the five sites give further suggestions. It will be a key element in the evaluation process of the demonstrations to determine which are the critical factors involved.

The experiences to date suggest that the critical factors include :

Preparatory

- accurate understanding of the market, the users and their needs in the implementation site
- good local groundwork, planning and preparatory actions
- development of the right product according to the user needs (see above)
- provision of suitable image and customer communication
- awareness and ease-of-use for customers of information about the services
- provision of acceptable booking and notification procedures for the return trip
- support/interest of the relevant transport operators and framework for co-operation

Implementation

- assurance of finance over the start-up period
- development of sustainable market within a reasonable time period
- establishment of user acceptance for the new product
- ability and willingness to adapt and fine-tune the service
- retention of most users of existing services while generating the new business
- efficient communications and optimising technologies
- support services for the user
- personal marketing concepts

Although pricing has been mentioned by the users, it does not appear to rank as a critical factor in the success of the services. This needs to be examined in the demonstrations.

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9.0 GLOSSARY OF TERMS & ABBREVIATIONS

ATT	Advanced Transport Telematics
AVL	Automatic Vehicle Location (system)
CBD	Central Business District
D&E	Disabled and Elderly

DRIVE	EU program of R&TD concerning transport telematics
DRTS	Demand Responsive Transport Service
FlexRoute	Name of flexible transport service provided in Gothenburg
GIS	Graphical Information System
GPS	Global Positioning System
GSM	Global System for Mobile Communications
InvaTaxi	Taxi or minibus suitable for or adapted for transport of disabled persons
LRG	Local Reference Group
PHOEBUS	Project from DRIVE 2 program, 1992-5
PT	Public Transport
R&TD	Research and Technical Development
SME	Small and Medium Enterprises
STS	Special Transport Services - system of services for D&E in Gothenburg
TDC	Travel Dispatch Centre, normally for demand responsive transport services

Annex 1

Functional Requirements, Technologies and Case Studies for DRTS

ANNEX 1 FUNCTIONAL REQUIREMENTS, TECHNOLOGIES AND CASE STUDIES FOR DRTS

1.1 Functional Requirements for Advanced DRTS Systems

Three major type of trip request can be identified within an advanced DRTS system. These are :

Immediate Response, Standing Orders (Subscription) and Advance Reservation.

Any system should also be capable of supporting a reasonably complex fare structure, with all information being obtained in real-time and then stored within relational databases, which can be accessed with relative ease and speed any time in the future. Other features would include automated assignment of vehicles to trip requests and digital transmission via radio of dispatch messages and other information to in-vehicle data terminals. The general functional requirements which help support such a system will be treated in Deliverable D4. A brief list of such requirements will be given here to inform the reader:

- Real-time scheduling and dispatching of trips
- Ability to also accommodate advance reservation and subscription trips
- Real-time digital data communication between vehicle and control centre
- Voice capability for non-routine circumstances
- Route optimisation software which communicates directly with the driver
- Computer monitoring of driver and activities (which provides automated determination of approximate location of any vehicle within the system)
- Automated data collection
- Automation of all analysis activities (i.e. fare collection, billing and financial accounting)
- Automated generation of reports
- On-line access by administrators to system operations

1.2 Technologies available for Implementation within a DRTS Framework

The vast majority of DRTS systems, currently in operation, tend towards advance scheduling of trips, restricted to particular classes of user. Some reasons for the low penetration of transport telematics to date can be attributed to previous difficulties in providing coverage of operational areas, lack of higher-order service providers and fragmentation of the transport industry. However with the emergence of modern technologies, which are now more affordable and powerful, the potential for major improvements in these operations is quite substantial. We now have the opportunity more than ever before to provide the travelling public with a fully responsive real time public transportation service.

The predominant technologies which constitute the main components of an advanced demand responsive system include the following :

- **Computer Hardware Systems**
  The cost of computer hardware is no longer a serious constraint when considering the automation and improved functionality of a DRTS system. Major enhancement of performance and ease of connectivity have occurred, with the cost-effectiveness of computer hardware improving some 10 to 100 times since the mid-1970's. Also, even small organisations and operators with one or two vehicles will now typically have at least a PC for accounts and other administrative functions. Therefore, a platform for systems is gradually emerging.

- **Relational Database Systems**
  Relational Databases, which were virtually unused ten years ago, have now become the industries standard, due to their technological superiority over competing types of database systems. With such systems, its possible to provide complex applications that are relatively inexpensive, provide impressive functionality, and which can be readily modified if need be. DRTS software which is constructed using these systems (i.e. scheduling/dispatching software) is therefore much more user-friendly, powerful and cost-effective, than was the case several years ago.

- **Communication Systems**
  Major developments have occurred within the field of data communications, stemming from the introduction of wireless networks. These are data communication systems which rely on local transmission via radio frequency channels rather than physical telephone lines. Today the Global System for Mobile communications (GSM) is an international mobile communications standard with over 90 network operators in some 60 countries, having signed an agreement to introduce it. Europe is already equipped with a complete GSM network featuring voice and data channels, bi-directional and broadcast communications. GSM units can be integrated with on-vehicle or personal devices, allowing voice and/or data communication between vehicles and service centres without need for additional infrastructure. Particularly for rural areas, this overcomes problems of radio coverage, and the need for operators to establish their own private communication system. The advantage of digital transmission for DRTS is that it makes much more efficient use, than voice transmission, of what is now a limited resource (i.e. the capacity of the radio channel), when passing dispatch messages from the control centre to the driver in the vehicle. In addition, if real-time data is to be efficiently returned from the vehicle to the control centre, digital data communication is essential. These developments complement other advancements in the areas of mobile computers and data terminals, as it is these in-vehicle devices which serve as terminals to generate and receive data which is transmitted via wireless means. Together they make possible the development of much more cost-effective digital communications systems for DRTS than was the case a few years ago.

- **Mobile Computers and Data Terminals**
  In-vehicle computers generally comprise of a keypad, a display terminal, possibly a printer and will have some sort of on-line real-time communications link to the central computer. It will be integrated with other transportation devices such as automatic vehicle location units and smart card reader/writers. When used in a DRTS application, in vehicle computers collect data generated in the course of operations, process data, display messages to drivers and communicate digitally with a host computer system. The advantage of placing computing power directly in the vehicle, is that it becomes possible to create more robust and flexible applications as well as supporting automation of functions without being in continuous communication with a central computer. Mobile data terminals on the other hand are less powerful and versatile than in-vehicle computers. However they are cheaper and can be quite adequate for certain types of DRTS applications. They can hold several dispatching

messages and can usually transfer a small amount of data from the vehicle to the main computer.

- **Vehicle Locator Devices**
  By knowing the exact location of vehicles at the time a passenger trip is assigned, the DRTS systems' productivity is much improved, as the proximity of a new trip request to a vehicle's current actual location can be better exploited. AVL technology has now become markedly more cost effective as a result of the development of GPS systems and the decrease in cost of receiver units. The Global Positioning System (GPS) is a navigation technology developed by the U.S. military, which can now be used by the civilian population. A system of 24 satellites are configured in orbit to allow between six and 10 satellites to be in view from most points of the earth at any one time. The resulting information received from the satellites can be manipulated to calculate the targeted vehicles' exact location. Such information can be used for tracking and tracing vehicles for operational control purposes, for dynamic route guidance and for response to emergency situations.

- **Mapping Software**
  An AVL (Automatic Vehicle Location) system is only as good as its mapping interface. Recent developments have fundamentally altered the cost-effectiveness and ease of development of these mapping interface systems to the pronounced advantage of DRTS operations. A relatively robust mapping application can now be developed in a few weeks by a single programmer. Mapping software and applications can now also be run off a standard personal computer which makes them more cost effective as well as ensuring their availability to virtually any organisation. Consequently, cost-effective technology is now available for DRTS dispatchers to visually observe on a computer terminal precisely where vehicles are located at the time when a trip request is assigned to a specific vehicle.

- **Card-Based data Storage and Transfer Technologies (Smart Cards)**
  These are devices which are similar in shape and size to a credit-card but which contain a microprocessor embedded within them. These cards can be used to store information, exchange information (read/write), or execute programs which will manipulate data stored within the card. Communication takes place either through a contact pad, or by short-distance radio communication. Applications can be loaded onto these cards and personalised to the user. Within a DRTS domain they will prove to be very useful for fare collection, customer identification/authorisation and compiling patronage specific management reports. Increasingly, use is made of multi-sector and multi-function cards so that the transport application may be added to an existing card infrastructure. Also, the arrival of the electronic purse provides a general payment instrument which can be accepted by the transport sector. An electronic purse being an underwritten payment instrument based on prepaid credits stored in an electronic device, with the value transferring to the acceptor at the point of payment.

- **Travel Dispatch Centre**
  These exist as the hub of any DRTS system. They are responsible for the operation of all vehicle-scheduling and dispatching systems which are used to monitor and control the various fleets of on-demand vehicles. They also provide passenger and booking systems, connecting with passengers through various communication mediums. They also organise the billing systems which can simplify payment arrangements and encourage passengers to become account patrons. All necessary hardware and software required is now available off-the-shelf (such as communication equipment, computer hardware, standard database

software etc.) or as a software which has been developed for other applications and which can be easily modified (e.g. despatching software, passenger information systems, location and mapping systems etc.).

1.3 Case Studies

Dial-a-Bus, Adelaide, Australia

This incorporated a many-to-many system over the Adelaide metropolitan area. It was intended that such a system would compensate for the lack of public transport on cross-suburban services. The system was subject to the conditions that the CBD was not served and that hailing was not permitted. Fares were set on a straight line distance basis. The population to be served was approximately 623,000 and the service operated from 7 a.m. to 9 p.m., except Sundays. The fleet consisted of 14x12-seat mini-buses and the operating characteristics were such that there was no route or timetable.

The technology installed was relatively crude with information recorded manually and radioed to the operator. Patrons booked a service via the telephone and within 30 minutes would be provided with a service to any destination within the defined area.

In conclusion, the following comments can be made about the service :

- Considering the type of operation, service area, population served and fleet size, the service could not cope with the demand. As a result the service only lasted for six days by which time it had become obvious that the productivity of each bus could never provide a realistic service.

- Public transport can only achieve the effectiveness it does by grouping people's travel needs. If you remove the constraints of timetables and routes you also remove the efficiency of the transport mode.

Translink, Shellharbour, New South Wales, Australia

This service operated on a fixed base route with deviations on request. The scheme serviced a population of 47,000 with both full-sized and 29 seat buses. Service was provided on week-days with no night service. The operating parameters required that 95% of the population be within 200 metres of a bus-stop.

The exercise was designed to test state of the art technology. This included automated traffic light activation, real-time information, digital stop announcement systems and guaranteed transfers between services. A phoned request for a bus to take deviation routes could be made up to ten minutes before the bus reached the deviation point. A window of five minutes was then allowed for arrival.

The following points should be noted :

- Technical problems and a lack of marketing resulted in disappointing patronage.

- The technical difficulties could be attributed to two things. First an over reliance on foreign technology and secondly the lack of planning due to the haste in which the scheme was implemented. This led to disenchantment of local operators resulting in many features not being incorporated.

- It was displayed that fixed but demand-determined route deviations off a base route can provide a more convenient service with no loss of overall journey time. It was also displayed that DRTS systems could be operated successfully with relatively modest technology.

Transit Taxi, Hallett Cove, Adelaide, S.A., Australia

This scheme provides a demand responsive solution to the problem of dispersing commuters from a mass transit terminal. Hallett Cove lies in the southern suburbs of Adelaide and is connected via an arterial train link to the CBD. However the area has no local bus service. Hence the implementation of this scheme which consists of contracted taxi's which will meet every evening train, arriving at the station hourly , from the city. Service is provided during the evening off-peak, Monday to Saturday.

In operational and technical terms this service is a simple operation which requires little or no communications infrastructure and minimal start-up cost. The trip requirements of individuals can be conveyed to the driver at the time of boarding the vehicle, the route can be determined by the driver on the basis of personal experience and the arrival time at the destination is flexible.

The following points should be noted :

- This DRTS system exists instead of a more expensive conventional public transport service, so some element of subsidy is justified.
- There are practical limits to the size of vehicle used as the service begins to take too long if there are more than six destinations.
- Demand cannot be established before arrival of a particular train. This can lead to shortfalls in service, on isolated occasions, due to the logistics involved in this particular case study, with the location of the nearest taxi rank quite a distance from the station. Large buses would cope with this problem by allowing standees which obviously cannot be accommodated within a taxi situation. Therefore long wait times may ensue if demand is substantially greater than normal on any particular day.
- A major limitation to the service are its hours of operation and the fact that passengers still have to find their own way to the station for their journey to the city i.e. no many-to-one service.

Personal Public Transport, Perth, Australia (To be implemented)

PPT has three aims - to provide the public with real time information; to widen the range of transport services by introducing new multi-hire modes, between networks of electronic bus-stops and finally to integrate all modes of transport. It is hoped this will make public transport more accessible, flexible and affordable.

The scheme will consist of improved access systems, the introduction of a control centre and the provision of real-time radio links between the control centre and the various vehicle fleets (which are to be composed of small people movers such as taxis and mini-buses).

Control of vehicles is to be co-ordinated through a GPS system, a multi-hire computer dispatching system and a mobile data link. A grid of electronic bus-stops will be provided every three to four hundred metres throughout the urban area. These stops shall display real-time information on when the scheduled bus is due as well as providing a specialised facility to allow potential passengers call a multi-hire service. The dispatching software will continuously instruct the service vehicle to pick up and deliver commuters, not sequentially but in accordance with the vehicles current position and the origin and destination addresses.
In conclusion it can be said that the PPT concept will involve upgrading information and communication links between customers and the PT system, as well as introducing a new computer controlled multi-hire mode. These measures are hoped to generate new customers, enhance existing services and create a better balance between public and private transport.

A full feasibility study has been undertaken which concluded that the concept has market appeal and would address many of the deficiencies of current services. There are indications that compared with single hire taxis, multi-hiring can achieve increase in efficiencies of the order of 100 to 120 % in terms of overall occupancies, and of the order of 67 % after taking account of route deviations. Capital costs in particular will be low compared with conventional busway, light-rail or heavy rail systems or major road enhancement.

Ozark, N.W. Arkansas, U.S.A.

A transport company named Ozark operates 45 vehicles to provide about 275,000 rides per year within the counties of Benton, Carroll, Madison and Washington in N.W. Arkansas. The service is operated as a zone-assigned demand responsive system where vehicles are scheduled to be in specific one square mile zones at specific times of the day, for passenger boarding and unloading. Each vehicle progresses through the community on a schedule, in spite of the fact that all passengers are picked up at home and dropped at their destination. Each zone has service at least once per hour with an allowable 15 minute window standard on either side of the scheduled zone assignment time.

Most trips are scheduled on a routine basis, so the patron does not need to phone in daily. Same-day service is accommodated but the service is largely scheduled in advance. This allows pick-ups and drop-offs to be grouped in a logical sequence, which makes the service more efficient but as a consequence diminishes the flexibility of the system.

Technological aspects to the system include a computer system and scheduling program which produce driver manifests and allows tracking of trip histories, client data and management information.

A specialised medical transportation service is also provided. By co-ordinating several human service agencies, a system has been implemented where there is less duplication of service, larger geographic areas being served by community agencies and a higher quality of service provide.

Ruf-Bus, Wunstorf, Germany

Wunstorf is an area of 40,000 inhabitants situated near Hanover in Germany. It was the site for the first DR bus system in Europe, with its main aim being to adjust the PT service to the actual demand and to make better use of the transport capacity available. The system consists of several service zones, each with route deviation options. According to the time-table a certain trip may be either fixed or flexible, depending on the time of day. Patrons must notify their transport demand 30 minutes in advance to the operations centre, if they wish to utilise a scheduled demand responsive service. Each bus route is then optimised by means of electronic data processing. Depending on demand, different types of buses are utilised. These include a regular bus (50 seats), an R-Bus (25 seats), and mini-buses (8 seats). The fare for DRS and regular services are the same. Also the arrival and departure times at Wunstorf Train Station (which has an express rail link to Hanover) are optimally correlated with the timetable of the express rail traffic.

This flexible operation has increased the coverage of PT by 40 % with an increase in patronage of some 75 %. It has also been shown that a similar conventional system would be more expensive with less satisfactory service.

The communication links incorporated are provided via ordinary telephone systems.

Hailed-Shared taxi, Dortmund/Osnabruck, Germany

These supplement conventional line operations and have been incorporated to enhance area coverage by providing local inner-urban transport connections, during evenings and at weekends. Currently 10 different services are in operation in small to medium sized towns within the region between Dortmund and Osnabruck and incorporate the following features :

- Fixed route operations, but only in response to advance telephone requests from one of the dedicated hailed shared-taxi call-points.
- Boarding allowed at any bus stop to enhance further the exploitation of hailed shared-taxi points.
- Alighting at any desired journey destination within the service region area (stop-to-door service).
- A special hailed shared-taxi fare.
- Operation conducted using rented taxis or hire vehicles with seating for 4 to 8 passengers.

In conclusion the following points should be noted :

- Some 25 % of the service's patrons are new PT customers.
- A close co-operation between the local authority and the transport operator is a prerequisite for developing such services.
- Only a very basic level of telematics have been incorporated within the system.

Borgerbussen, Fasterholt/Kolkaer, Denmark

This region is characterised by small towns, traditional farmland scattered by forest and moorland. It is situated between the towns of Herning (40,000) and Brande (10,000) on the peninsula of Jutland. The service principle of the project is derived from making a distinction between a so-called service area and a traffic area. The service area is 30 sq. kms and contains 2,600 people. The traffic area consists of the service area and the towns of Brande, Herning and Hammerum. During operating hours one can either be taken from any address to another within the service area or to an address in the traffic area. Bookings must be made a day in advance and no later than 4 p.m. Transport is provided by mini-buses which carry up to 14 people.

The scheme utilises a modified route planning system which was originally designed for the distribution sector. Communication is via telephone systems with mobile phones incorporated within the bus fleets. This gives inhabitants of the area the possibility of ordering an express call at triple the normal price. The fare system is zone-based in order to make it compatible with the rest of the country.
Some points to note :

- The system has emerged as a more efficient form of people mover to that of traditional services offered by large buses, resulting in a higher degree of service to the population and a better overall economy.
- The personal service provided has helped increase patronage in the area especially among children and teenagers due to the fact that the drivers are well known to both the population at large and parents, combined with the possibilities of having door-to-door transport.

Telebus, Bastogne, Luxembourg

This is a scheduled transportation system with door-to-door service. The service area is located in the N.E. of Luxembourg which covers about 110 sq. kms and has a population of 4,600. Service is provided everyday, except Sundays, from 9a.m. to 6 p.m. with 5 trips in each direction. Booking can be made up to two hours before the service via a free-phone number. There are nom fixed stops (apart from 8 within the city of Bastogne). The service vehicles are mid-sized buses capable of carrying 36 passengers. The fare structure is simple with one fixed fee. The dispatch centre and driver communicate via mobile phone.

Some points to note are :

- The operating region is too big (too long and too large). This makes trips excessively long and expensive.
- Now that the system is up and running, the free-phone number cannot be justified considering its expense.
- The vehicle sizes are too big.
- A modulated fee should be incorporated based on zones.
- Additional services should be incorporated such as freight transport or postal delivery so as to generate additional revenues.

Special Transport Services, Gothenburg, Sweden

The city of Gothenburg provides one of the most elaborate and expensive transport services which is totally dedicated to the provision of mobility to the disabled and elderly. The city has the largest port in Scandinavia and with a population of 500,000 is the second largest city in Sweden and home to industrial giants Volvo and SKF.

The current Special Transport Service is a demand responsive system which operates on a many-to-many shared ride basis. Transport is provided by taxis or special wheel-chair mini-buses. The system is based on advance booking where patrons can order a service from between 2 weeks and 15 minutes before desired pick-up time. The Travel Dispatch Centre operates via a booking, planning and dispatch system named PLANET which is capable of responding virtually in real-time to 7,000 individual demands per day. The centre co-ordinates approximately 2 million trips per year and serves a D&E population of about 27,000.

However, this service needs to be radically changed so as to maintain a high standard of mobilisation for the D&E bit at an economical rate. It is therefore necessary to find a more efficient solution which provides an integrated service and covers a wider selection of the population, especially those elderly which have similar needs, but for different reasons have not applied for or been granted an STS licence.

FlexRoute, Biskopsgarden, Gothenburg, Sweden (To be implemented)

This is a project which has a planned implementation date for March 1996. It shall utilise a modified version of the PLANET system so as to accommodate a more structured route-oriented service approach.

The system shall be demand responsive between two fixed end nodes. Transport shall be provided by mini-buses with capacities for 10-12 passengers and shall leave every hour between 8 a.m. and 4 p.m., Monday to Friday, in each direction. Curbside pickup will be accepted for licensed STS users whereas the general public will be required to wait at designated meeting points. The Travel Dispatch Centre will again provide co-ordination with a special phone number being allocated to the FlexRoute services. Maximum journey time shall be 55 minutes and the pilot area shall still retain the full backup service of the STS system.

Varmland, Sweden

The service area is situated along the Norwegian border, south-east of OSLO and consists of the districts Arvika, Eda and Arjang. These regions form one health service district with a population of 40,000. The region is characterised by a low population density with 75 % of the area covered in forest. The principal industries are farming, forestry and timber production. The main purpose of this project is to combine transportation of people, goods and official journeys so as to achieve the best co-ordination and flexibility possible.

Transportation is provided via taxis and mini-buses with bookings being reserved through a control centre or directly through the operator. However arrival and departure times can be displaced in order to optimise co-ordination. The fare is fixed according to a zone system.

The project has now been extended to include the whole of Varmland, with an automatic route planning and transport system being implemented so as to obtain larger co-ordination savings. Results to date are encouraging, with public paid transportation's being made more effective through the use of more rational vehicle types and co-ordination of different journey types. In general users experience have been positive. However requests for pre-ordering and time displacing of transportation has resulted in some dissatisfaction.

De Lijn, Belgium

Currently there are 3 demand responsive services centred on Flanders in the towns of Westhoek, Gingelom and Landen. De Lijn, which is the Flemish transport company, is endeavouring to halt its share of the transport market from slipping any further by introducing and experimenting with DRTS systems. The company has therefore introduced Dial-a-Ride services in the above areas, so as to provide highly individualised services for particular segments of the transport market. Each area has its own control centre which operates on a fully autonomous basis. Agreements have also been created between De Lijn and the Local Authorities so as to ensure co-operation between the two, which in turn aids service provision.

The scheme incorporates a fully automated financial monitoring system and an automatic reservation system is currently being developed, based on the framework of the PHOEBUS Project. All trips must be booked at least 60 minutes before departure, which facilitates the generation of the trip order based on the shortest journey route in line with the reservations made. The operations centre is to be equipped with a GPS and mapping system which will be used to indicate any late running of services so as to enable any initiation of catch-up services if necessary.

Currently De Lijn are transporting 3 times more passengers in these areas than before the systems introduction. In Landen some 85 % of scheduled trips are actually being made with occupancy rates of 3 passengers per trip.

Taxistop, Belgium

This was a project where private vehicles were used to promote a semi-public transportation system, as a complement to public transport for non-urban trips. A significant fleet of private vehicles traverse roads around Belgium, with the majority containing at least 2 to 3 empty seats. This project aimed at harnessing this resource and utilising it to provide a service to a significant market in low density urban areas. Potential passengers act like cost-sharing hitch-hikers and can be clearly identified by a special sign \ case which they are provided with or by waiting at specified ride stops which were installed in some 50 communities. Passengers then pay the driver a minimum fare per kilometre.

Despite all the media attention which the project received, the idea itself was never fully social accepted. Some reasons for this were :

- as most drivers refused the proposed kilometre reimbursement, the payment was often dropped which that the system quickly decreased in people's minds to a form of ordinary hitch-hiking.

- there was no guarantee of getting a lift (even though most users experienced very little difficulties in this area).

- the project wasn't socially accepted by the vast majority of people.

However, some successful services which have sprung from the taxistop project include the Eurostop which organises passage abroad via private vehicles and the idea of car-pooling. The taxistop centre is currently concentrating on organising the commuting traffic of the personnel of larger companies or industrial sites as rationally as possible. Certain software has been developed to aid such a service. AS far as the Taxistop project itself was concerned it was a low cost initiative with no technological involvement.

PHOEBUS, Belgium

The PHOEBUS project was launched with the main objective of validating a Vehicle Schedule Control System concept for an urban, inter-urban and rural environment. The concept of DRS was added for sites lying within rural areas.

The selected rural test-site is to be found south of Hasselt, which is the capitol of the province Limburg. This area is triangular in shape with Hasselt, Tongeren and Sint-Truiden forming the three corners. The total area is about 180 sq. km and is sparsely populated.

The provision of PT in this area is quite difficult, due to its social and demographic situation. De Lijn, the PT operator, has incorporated certain schemes within the area in an attempt to make services more cost-efficient.

One of these schemes involved the introduction of six new DRS service lines. It was these services that the PHOEBUS project concentrated on.

The level of technology involved was quite high and the system seems to have met the requirements and demands of the various commuter groups both commercially as well as on a technical level.

DRTS, Finland

Many examples of demand responsive services can be found within the 11 provinces which together form Finland. The most prominent type are pre-routed taxis which are subsidised by the government. Such schemes often replace conventional transit lines and run from sparsely populated areas to municipality centres.

Taxi companies also facilitate the transfer of passengers from many airports to either their final destination within the particular city or to a PT main-line route. These services are provided at standard fixed rates and also replace the more expensive alternative of conventional line and route systems.

Certain bus routes also contain some relatively small scale flexible route deviations. Vantraa City for example operates a system where patients at Peijas Hospital can request the local bus to make a small detour into the hospital grounds so as to pickup waiting patients. This demand is communicated via an electronic keypad located at the hospital bus-stop.

Other DRS schemes are operated to cater for the disabled and elderly within the cities of Kerava, Tuusula and Turku. Some district social departments also utilise special taxi services to distribute food and medical supplies.

A car-pooling service is provided by Kuopio Central Hospital to take patients home. The scheme is co-ordinated by the local taxi dispatch centre and again is operated along the lines of a DRS system.

In Porvoo a flexible DRS is being operated on a pilot basis. A mini-bus provides the transport medium. Within Kyme province in the city of Kuusankoski a transport service, consisting of two buses and several taxis, is provided by the town to carry passengers, small goods and parcels. The system is open to all and it complements the public transport supply within the city.

Annex 2

Local Reference Groups

ANNEX 2 LOCAL REFERENCE GROUPS

Local Reference Groups have been established in all of the SAMPO sites. The purpose of the Local Reference Groups is to provide inputs to the User Needs Analysis and the Design phases of the project, to act as a 'sounding-board' throughout the life of the project, and to create a bridge between the promoters of the project and the local actors who must deal with the implementation and the consequences.

In this Annex, a brief description of the composition of the Local Reference Groups is provided. This may be useful to the reader of this report for at least two purposes :

a) to help explain the user needs expressed by the Local Reference Groups at the different sites

b) to provide an example for follower regions or operators who may wish to follow the SAMPO approach.

The following examples are provided :

- Belgium
- Finland
- Ireland
- Italy

Belgian Local Reference Group

The Belgian Local Reference Group consists of members from the following organisations :

- ✓ Entity Limburg, De Lijn
- ✓ Administration of Urban Planning, Town Planning
- ✓ Administration of Environment and Nature
- ✓ Administration of Internal Affairs, Economics and Employment
- ✓ Regional Company for Development
- ✓ Institute of Flemish Cities and Towns
- ✓ Socio-Economic Council of Belgium
- ✓ Board of Employers
- ✓ Board of Employees
- ✓ Board of Household Affairs
- ✓ Board of Representatives of the Disabled
- ✓ Representatives of Educational Transport
- ✓ Board of Education
- ✓ Board of Public Transport Company Personnel

Finnish Local Reference Group

Two Local Reference Groups were established in Finland as the test sites at Tuusula and Seinäjoki are some 300 kilometres apart. Although the analysis has considered the combined results of the two groups, the groups themselves have not met with each other.

	End-user	Healthcare	Social Services	Elderly	Disabled	Education	Traffic nodes	Firms	Administration	Operators	Military	Day care	ADP
TUUSULA													
Heinonen							X				X		
Helakallio	X												
Juhani Petaja	X							X		X			
Kokkonen-Isola	X		X		X								
Korkiavuori	X					X							
Koski	X		X	X									
Laaksonen	X				X								
Lappalainen	X												
Lindell			X	X								X	
Norema		X							X	X			
Pekuri	X							X					
Petri Stenroos										X			
Pylkkä						X			X				
Siltanen			X						X				
Siren	X						X	X		X			
SEINAJOKI													
Ahopelto					X								
Ala-Riihimäki								X		X			
Haapoja								X		X			
Hakala			X						X				X
Kyykkä	X								X				
Näsi									X				X
Ojala						X			X				
Pöyry		X							X				
Rinta-Kanto								X		X			
Vatanen	X												

Irish Local Reference Group

The Irish Local Reference Group consists of members of the following organisations :

Organisation	Category	Organisation	Category
Kilkenny County Enterprise Board	Authority	Bus operators (four operators - different sizes)	Operators
Kilkenny Chamber of Commerce	Business	Passengers (minimum four end-users)	End-users
Kilkenny County Council	Authority	Forbairt	Industry
South Eastern Health Board	Healthcare	Industrial Development Authority	Industry
Irish Countrywomen's	Community	Avonmore	Business

Association	association		
South East Regional Tourism Organisation	Tourism	Vintners Federation of Ireland	Leisure
Kilkenny VEC	Education Authority	Macra na Feirme	Agriculture
Carlow RTC	Education Authority	Garda Siochana (Police)	Authority
Kilkenny Social Welfare Office	Social Welfare	Gaelic Athletic Association	Leisure

Italian Local Reference Group

A permanent Local Reference Group has been advising ATAF for a few years on general matters related to service quality, perception of quality by passengers and the public, etc. (see Annex 6). For the purposes of SAMPO project, the following Local Reference Groups have been established or determined.

- Florence DR disabled transport: the group is composed by representative of the city administration and of the healthcare authorities.

- Campi low-demand area DR transport: city administrators and officials act as an informal Local Reference Group.

- Siena tourist parking DR link: the existing advisory committee on transportation, established by the City Council, will act as Local Reference Group. It is chaired by the City Alderman for Traffic and Transportation, and among its members are: the City Engineer, the Chief of City Police, the Traffic Engineer, a Planning Board representative, and representatives of the health authorities, of business, of the Tourist Board, etc.

Annex 3

Belgian User Needs Analysis

ANNEX 3 BELGIAN USER NEEDS ANALYSIS

1. Structure of the Survey Inquiries

a. Current users.

1. What is your current profession ?
2. What is your age ?
3. Do you have a car available ?
4. Why do you use the DRT Service ?
5. What time of the day do you make your reservations ?
6. Do you obtain an immediate connection with the operator ?
7. How frequently do you use the DRT Service ?
8. Do you feel people with reservations should be given priority to others ?
9. Are there enough stops ?
10. Do you feel that your current trip length is shorter than with the regular PT lines before?
11. Do you prefer the DRT Service to the regular PT lines ?
12. How do you feel about the transfers and connections ?
13. Do you currently make PT trips you did not before ?
14. Do you think that all regular lines should be replaced with DRT Services ?
15. Are you willing to pay more for this kind of improved service ?
16. Proposition ranking concerning DRTS concept
17. Proposition ranking concerning reservation procedures

b. Potential users.

1. Where do you come from ?
2. How did you come here ?
3. Why have you come here ?
4. What is your current profession ?
5. What is your age ?
6. Would you come here by a DRT Service if it were introduced ?
7. Are you willing to pay more for this kind of improved service ?
8. Would you wish to make more than one reservation at once ?
9. Proposition ranking concerning DRTS concept
10. Proposition ranking concerning reservation procedures

c. Local Reference Group.

Ranking of PT attitudes 1

I should reach a DRTS stop within a five-minutes walk
I demand shelter-facilities at the most important stops
I always want a seat on the vehicle
I feel that people who do not make any reservations should not be allowed on the vehicle
DRTS should not make any deviations from my route

Ranking of PT attitudes 2

When I call the operator, I want an immediate response
A reservation call shouldn't take more than 1 minute
I want to call at no cost
I want to make more than 1 reservation at a time
I want to make reservation until 30 minutes in advance

Ranking of PT attitudes 3

I prefer the regular PT lines to the DRTS
I wouldn't mind paying more for a more flexible service
I don't mind the operator logging my personal data
I feel that all PT lines should be replaced with DRTS
I do not want to make any connections; DRTS should bring me directly to my destination

Ranking of PT attitudes 4

The authorities and responsibilities form De Lijn as a PT-provider should be transferred to more concerned authorities.
DRT Services need to be broadened to replace the local functional services currently performed by regular PT lines
DRTS needs to guarantee the accessibility for disabled
Payment and fare collection of DRTS should be worked out in a different way than fare collection on regular PT lines
DRTS should have a more important role during peak hours within the urban environments instead of the current rural serving function
DRTS should have a more important role during peak hours within the urban environments, this in addition with the current rural serving function

Ranking of PT attitudes 5

Concept on processing trip journey and routes : minimising deviation time for passengers
Concept on processing trip journey and routes : minimising the total of dead-running
Concept on processing trip journey and routes : assuring and ameliorating connections
Concept on processing trip journey and routes : minimising the amount of necessary connections
Concept on processing trip journey and routes : optimising vehicle load factor

Some Findings and implications

The acclaimed requirements on larger DRTS-areas, more destination stops and less necessary connections and transfers, as well as a more cost-efficient DRTS use are translated in the first objective of the SAMPO-Project development plan, being the implementation of DRTS on a larger scale. Research and system development starts with a revision of the current used DRTS-concept, where one vehicle by definition is linked with one small DRTS-area. Possibilities of enlarging these areas and a more flexible use or adequate co-operating of the vehicles are analysed. These developments will take the minimal deviation as a limiting condition.

The demands for free-charged telephone reservations cannot be met within the current policy of the company, however, special efforts will be put forward to operate on a charged rate as low as possible.

The requirements from the operators for support on information is translated into the research on the links and possible interactions of the DRT System with the HASTUS-application, used by De Lijn.

As former experiences show, some 10 to 35 percent, depending on the DRTS-area, of the passengers are boarding without making their reservation in advance. It is clear that a DRT System with finely tuned vehicle optimisation algorithms cannot perform in an efficient way with this lack of discipline. Specific information and the fact of a revised DRTS concept should discourage the customer into hailing the vehicle without booking. Furthermore, specific procedures will be worked out for the occasional customer without reservation, this on the level of the concept as well as on the more technical level concerning real-time journey processing.

The existing DRT System will be revised, modified and updated according to all the specific demands :

- extended graphical user-interface
- flexible data input modules, offering several booking proceedings
- possibility of multiple operating, meeting the needs for immediate response at rush moments
- improvement on customer database
- integration of the vehicle positioning application within the connection monitoring and user-interface
- analysis of possibilities to implement an automated telephone handling system
- streamlining the software to obtain higher performances
- further development of backup systems and procedures
- further analysis and upgrading of data communication system, in order to obtain a two-way data transmission system required for real-time on-board journey processing

The requirements for extended shelter facilities are not directly related to the DRT Services. However, revision of the concept will analyse possibilities to co-ordinate transfers and high-quality connection points providing a wide scale of services.

The aspect of accessibility for disabled and elderly fits in the new-fashioned policy of De Lijn, providing as much support as affordable. Gradually, the PT fleet is upgraded and will thus foresee in these systems.

Finally, the claims for differentiated fare ratings, as well as the lack of unanimous rejection of these higher tariffs, will be analysed on the management level of the company. As such, there will be no direct influence on the demonstrator or the system developments.

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Inquiry potential end-users DRTS
(performed in Bilzen where DRTS will be implemented as a test-site)

Amount of inquiries : 120

1. Origin analysis

Origin	Number of persons	Percentage
Alt Hoeselt	3	2.50
As	1	0.85
Beverst	11	9.17
Bilzen	37	30.84
Bilzen Eik	1	0.85
Diepenbeek	2	1.67
Eigenbilzen	5	4.17
Gellik	1	0.85
Genk	1	0.85
Grote Spouwen	2	1.67
Hasselt	2	1.67
Hees	3	2.50
Hoelbeek	2	1.67
Hoeselt	3	2.50
Kleine Spouwen	3	2.50
Martenslinde	3	2.50
Meershoven	1	0.85
Mopertingen	4	3.34
Munsterbilzen	6	5.00
Nerem	2	1.67
Riemst	1	0.85
Rijkhoven	4	3.34
Rosmeer	3	2.50
Schoonbeek	3	2.50
St. Jozef	1	0.85
Spurk	3	2.50
Tongeren	2	1.67
Vlijtingen	1	0.85
Vroenhoven	1	0.85
Waltwilder	5	4.17
Wellen	1	0.85

Grey cells indicate de municipalities or quarters where the Demand responsive Transport services will be introduced by May 1, 1996. This means that 54.27 % of the inquired persons can be addresses as an potential customer.

2. Current Transportation

Transportation mode	Number	Percentage
Car	80	66.67
Bus	7	5.84
Train	1	0.85

Bike / motorcycle	13	10.84
By foot	18	15.00
Other	1	0.85

3. Trip Purpose

Trip Purpose	Number	Percentage
Work	21	17.50
Education	0	0
Commercial	35	29.17
Administrative / Healthcare	46	38.34
Recreation	16	13.34
Social visit	2	1.67

4. Profession

Profession	Number	Percentage
Housewife	22	18.34
Student-Pupil	5	4.17
Retired	25	20.84
Blue-collar	18	15.00
White-collar	33	27.50
Unemployed	11	9.17
Other	4	3.34
Self-employed	2	1.67

5. Age distribution

Age	Number	Percentage
0-10	1	0.85
11-20	4	3.34
21-30	18	15.00
31-40	29	24.17
41-50	29	24.17
51-60	20	16.67
61-70	18	15.00
71-80	1	0.85
81-90	-	-

6. Would you use the DRT Services if it were introduced ?

DRTS Use	Number	Percentage
Yes	86	71.67
No	28	23.34
Don't know	6	4.17

7. Why wouldn't you use the DRTS ?

Reason no-DRTS use	Number	Percentage
Use a car	7	29.17
Multiple destination trip	2	8.34
Use a bike	1	4.17
Use a regular PT Line	2	8.34
Constraint in Time	3	12.50
PT is not appealing	2	8.34
PT is too expensive	2	8.34
Trip distance too short	5	20.84

8. Would you be willing to pay more for a DRT Service meeting your needs ?

Pay more	Number	Percentage
Yes	75	54.17
No	26	21.67
Don't know	19	15.84

9. Why not ?

Reason not paying more	Number	Percentage
PT is too expensive already	11	64.71
Existing poor PT quality	6	35.30

10. Do you wish to make a multiple reservation with one call ?

Multiple reservation	Number	Percentage
Yes	63	52.50
No	38	31.67
Don't know	19	15.84

11. PT Attitudes

0: No answer
1: Very important
5: Completely unimportant

Proposition	0	1	2	3	4	5
I should reach a DRTS stop within a five-minutes walk	33.34	15.84	13.34	20.84	11.67	5.00
I demand shelter-facilities at the most important stops	32.50	17.50	20.84	15.00	10.00	4.17
I do not want to make any connections; DRTS should bring me directly to my destination	10.00	45.00	12.50	13.34	11.67	7.50
I feel that people who do not make any reservations should not be allowed on the vehicle	34.17	1.67	4.17	6.67	14.17	39.17
DRTS should not make any deviations from my route	31.67	15.00	15.00	10.00	18.34	10.00

Ranking	Proposition
1 - 30 %	I do not want to make any connections; DRTS should bring me directly to my destination
2 - 21 %	I demand shelter-facilities at the most important stops
3 - 20 %	should reach a DRTS stop within a five-minutes walk
4 - 19 %	DRTS should not make any deviations from my route
5 - 10 %	I feel that people who do not make any reservations should not be allowed on the vehicle

12. PT Attitudes

Proposition	0	1	2	3	4	5
When I call the operator, I want an immediate response	25.00	30.00	9.17	10.00	10.00	15.84
A reservation call shouldn't take more than 1 minute	32.50	4.17	15.84	10.84	22.50	14.17
I want to call at no cost	17.50	34.17	10.84	15.00	9.17	13.34
I want to make more than 1 reservation at a time	32.50	10.84	11.67	18.34	12.50	14.17
I want to make reservation until 30 minutes in advance	28.34	15.84	20.84	13.34	13.34	10.00

Ranking	Proposition
1 - 25	I want to call at no cost
2 - 22	When I call the operator, I want an immediate response
3 - 21	I want to make reservation until 30 minutes in advance
4 - 17	I want to make more than 1 reservation at a time
5 - 15	A reservation call shouldn't take more than 1 minute

13. Cross-link between transportation mode and shift to DRTS

Transportation mode	Number	Percentage
Car	54	45
Bus	7	8.14
Train	1	1.17
Bike - Motorcycle	11	12.79
By foot	13	15.12
Other		

14. Cross-link between profession and shift to DRTS

Profession	Number	Percentage
Housewife	15	17.45
Student-Pupil	3	3.49
Retired	22	25.59
Blue-collar	3	3.49
White-collar	24	27.91
Unemployed	8	9.31
Other	4	4.66
Self-employed	1	1.17

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Local Reference Group

0: No response
1: Very important - completely agreed
2: Important - agreed
3: No specific importance
4: Unimportant - not agreed
5: Very unimportant - completely disagreed

1. PT Attitudes

Proposition	1	2	3	4	5
I should reach a DRTS stop within a five-minutes walk	42.86	28.58	7.15	21.43	0
I demand shelter-facilities at the most important stops	35.72	14.29	35.72	7.15	7.15
I always want a seat on the vehicle	64.29	7.15	14.29	7.15	7.15
I feel that people who do not make any reservations should not be allowed on the vehicle	71.43	7.15	21.43	0	0
DRTS should not make any deviations from my route	71.43	14.29	14.29	0	0

Ranking	Proposition
1 - 22	DRTS should not make any deviations from my route
2 - 22	I feel that people who do not make any reservations should not be allowed on the vehicle
3 - 20	I always want a seat on the vehicle
4 - 19	I should reach a DRTS stop within a five-minutes walk
5 - 18	I demand shelter-facilities at the most important stops

2. PT Attitudes

Proposition	1	2	3	4	5
When I call the operator, I want an immediate response	71.34	21.43	7.15	0	0
A reservation call shouldn't take more than 1 minute	28.58	28.58	14.29	0	21.43
I want to call at no cost	28.58	14.29	42.86	7.15	7.15
I want to make more than 1 reservation at a time	35.72	35.72	21.43	0	7.15
I want to make reservation until 30 minutes in advance	42.86	14.29	28.58	7.15	7.15

Ranking	**Proposition**
1 - 24	When I call the operator, I want an immediate response
2 - 21	I want to make more than 1 reservation at a time
3 - 20	I want to make reservation until 30 minutes in advance
4 - 18	I want to call at no cost
5 - 17	A reservation call shouldn't take more than 1 minute

3. PT Attitudes

Proposition	1	2	3	4	5
I prefer the regular PT lines to the DRTS	28.58	14.29	28.58	7.15	21.43

I wouldn't mind paying more for a more flexible service	28.58	14.29	28.58	7.15	21.43
I don't mind the operator logging my personal data	35.72	14.29	35.72	0	14.29
I feel that all PT lines should be replaced with DRTS	14.29	14.29	42.86	7.15	21.43
I do not want to make any connections; DRTS should bring me directly to my destination	42.86	28.58	21.43	0	7.15

Ranking	Proposition
1 - 24	I do not want to make any connections; DRTS should bring me directly to my destination
2 - 21	I don't mind the operator logging my personal data
3 - 19	I prefer the regular PT lines to the DRTS
	I wouldn't mind paying more for a more flexible service
5 - 17	I feel that all PT lines should be replaced with DRTS

4. PT Attitudes

Proposition	**1**	**2**	**3**	**4**	**5**
The authorities and responsibilities form De Lijn as a PT-provider should be transferred to more concerned authorities.	28.58	14.29	42.86	0	14.29
DRT Services need to be broadened to replace the local functional services currently performed by regular PT lines	35.72	28.58	28.58	0	7.15
DRTS needs to guarantee the accessibility for disabled	42.86	28.58	21.43	0	7.15
Payment and fare collection of DRTS should be worked out in a different way than fare collection on regular PT lines	42.86	28.58	21.43	0	7.15
DRTS should have a more important role during peak hours within the urban environments instead of the current rural serving function	14.29	0	21.43	0	57.15
DRTS should have a more important role during peak hours within the urban environments, this in addition with the current rural serving function	57.15	14.29	21.43	0	0

Ranking	Proposition
1 - 19	DRTS should have a more important role during peak hours within the urban environments, this in addition with the current rural serving function
2 - 19	DRTS needs to guarantee the accessibility for disabled
	Payment and fare collection of DRTS should be worked out in a different way than fare collection on regular PT lines
4 - 18	DRT Services need to be broadened to replace the local functional services currently performed by regular PT lines
5 - 16	The authorities and responsibilities form De Lijn as a PT-provider should be transferred to more concerned authorities.
6 - 9	DRTS should have a more important role during peak hours within the urban environments instead of the current rural serving function

4. PT Attitudes

Proposition	1	2	3	4	5
Concept on processing trip journey and routes : minimising deviation time for passengers	64.29	21.43	14.29	0	0
Concept on processing trip journey and routes : minimising the total of dead-running	50.00	28.58	14.29	7.15	0
Concept on processing trip journey and routes : assuring and ameliorating connections	50.00	35.72	14.29	0	0
Concept on processing trip journey and routes : minimising the amount of necessary connections	57.15	14.29	28.58	0	0
Concept on processing trip journey and routes : optimising vehicle load factor	42.86	21.43	14.29	0	14.29

Ranking	Proposition
1 - 22	Concept on processing trip journey and routes : minimising deviation time for passengers
2 - 21	Concept on processing trip journey and routes : assuring and ameliorating connections
3 - 20	Concept on processing trip journey and routes : minimising the amount of necessary connections
4 - 20	Concept on processing trip journey and routes : minimising the total of dead-running
5 - 17	Concept on processing trip journey and routes : optimising vehicle load factor

DE LIJN LIMBURG
February 1996

Inquiry current end-users DRTS
(performed in the area currently served by DRTS)

Amount of inquiries : 180

1. Profession

Profession	Number	Percentage
Housewife	41	22.7
Student-Pupil	38	21
Retired	31	17.2
Blue-collar	25	13.8
White-collar	22	12.2
Unemployed	12	6.6
Other	7	3.8
Self-employed	3	1.6

2. Age distribution

Age	Number	Percentage
0-10	3	1.6
11-20	34	18.8
21-30	24	13.3
31-40	29	16.1
41-50	36	20
51-60	19	10.3
61-70	22	12.2
71-80	11	6.1
81-90	2	1.1

3. Car ownership

Car available	Number	Percentage
Yes	41	22.7
No	139	77.2

4. Trip purpose

Trip purpose	Number	Percentage
Work	55	31.4
Education	23	13.1
Commercial	41	23.4
Administrative / Healthcare	23	13.1
Recreation	19	10.8
Social visit	14	8

5. Reservation time

Time	Number	Percentage
Morning	106	58.8
Midday	40	22.2
Afternoon	17	9.4
No particular time	17	9.4

6. Immediate connection with operator

Immediate connection	Number	Percentage
Yes	162	90
No	10	5.5
Didn't pay any attention	8	4.4

7. Calls before connection

Calls	Number	Percentage
Immediate connection	170	94.4
1 extra call	3	1.6
2 extra calls	3	1.6
3 extra calls	3	1.6
5 extra calls	1	0.5

8. Ease of reservation

Reservation	Number	Percentage
Easy	158	87.7
Moderate	21	11.6
Difficult	1	0.5

9. Reservation duration

Duration	Number	Percentage
< 2 minutes	110	61.1
2 -3 minutes	55	29.4
3 -4 minutes	10	5.5
4 -5 minutes	5	2.7
> 5 minutes	2	1.1

10. Frequency of DRTS-use

Times a week	Number	Percentage
1	53	29.4
2	42	23.3
3	39	21.6
4	21	11.6

5	14	7.7
6	5	2.7
8	1	0.5
10	3	1.6
12	1	0.5

11. Time accuracy - does the vehicle arrive on the time agreed upon ?

Accuracy	Number	Percentage
Yes	163	90.5
No	7	3.8
Didn't pay any attention	9	5

12. Evaluation of accuracy

Evaluation	Number	Percentage
Good	162	90
Moderate	18	10
Poor	0	0

13. Do you feel people making a reservation should be given priority ?

Priority	Number	Percentage
Yes	93	51
No	35	19.4
No answer	52	28.8

14. Number of available stops

Number of stops	Number	Percentage
Sufficient	146	81.1
Insufficient	17	9.4
No answer	17	9.4

15. Does the DRTS vehicle take less time than the former regular lines

Less time	Number	Percentage
Yes	90	50
No	48	26.6
No answer	42	23.3

16. Do you prefer the DRT Services to the regular PT lines ?

Prefer DRTS	Number	Percentage
Yes	101	56.1
No	43	23.8
No answer	36	20

17. Evaluation of connection quality

Connections	Number	Percentage
Perfect	149	82.7
DRTS arrives too late	8	4.4
DRTS arrives too soon	23	12.7

18. Does the DRTS vehicle bring you to your destination without any necessary transfer ?

No transfer required	Number	Percentage
Yes	122	67.7
No	24	13.3
No answer	34	18.8

19. Does the DRTS offer you any transport to destinations formerly unreachable ?

New destinations	Number	Percentage
Yes	90	50
No	90	50

20. Should all regular PT lines be replaced by DRT Services ?

Only DRTS	Number	Percentage
Yes	53	29.4
No	80	44.4
No answer	47	26.1

21. Would you be willing to pay more for a DRT Service meeting your needs ?

Pay more	Number	Percentage
Yes	26	14.4
No	93	51.6
No answer	61	33.8

Cross-references :

1. No relation age and frequency of use

2. Relation car-availability and frequency of use

Average use per week	Car available	No car available
1 maal	27.3	36.5
2 maal	20.8	31.7
3 maal	23	17
4 maal	11.5	12.1
5 maal	10	
6 maal	3.5	
8 maal	0.7	
10 maal	1.4	2.4
12 maal	1.4	

3. Relation frequency of use and willingness to pay more for improved DRTS

About 73 percent of the people willing to pay more are using the current DRT Services more than once a week

4. No relation frequency of use and contentment of reservation-ease

5. No relation reservation-duration and evaluation of reservation

6 Relation frequency of use and replacement of all regular PT lines with DRTS

Average use per week	Percentage
1	32.5
2 or more	67.4

7. Relation frequency of use and preferation of DRTS to regular PT lines

Average use per week	Percentage
1	27.7
2 or more	72.3

8. Relation frequency of use and priority of customers making reservations

Average use per week	Percentage
1	30.1
2 or more	69.9

Annex 4

Finnish User Needs Analysis

ANNEX 4 FINNISH USER NEEDS ANALYSIS

Finnish USER NEEDS ANALYSIS

RANDOM SAMPLE SURVEY

Sample was sent to 2000 families on the survey area. The sample was directed on the areas which are sparsely populated and have poor level of public transport service. In the questionnaire there was a section for families for general background, a section for persons with questions of detailed personal information and a travel diary.
The Finnish test site consists of two separate parts and of four municipalities with different nature. The TSL area consists of the towns Kerava and Järvenpää, and the major geographical part is the municipality of Tuusula. The other part is the town of Seinäjoki. Therefore, many of the results are given by municipalities.

Before the survey there were estimated answers from 2500 persons with the travel diary.

The field work was carried out by Suomen Gallup Oy, Finnish Gallup Ltd.

1. GENERAL RESULTS

Accepted answers I, number of families, persons and gender

Families	Persons	Man	Woman
412	2766	1318	1441

Accepted answers II, geographical area

Tuusula	Kerava	Järvenpää	Seinäjoki
887	440	549	690

No trips on survey day had 138 persons.

Survey weekday: Monday 1%, Tuesday 38%, Wednesday 31%, Thursday 30% and Friday 1%.

Distance from the municipal/town centre, persons

	Test Site	Tuusula	Kerava	Järvenpää	Seinäjoki
< 500 m	2 %	2%	7%	0%	1%
0,5 - 1 km	6 %	6%	12%	4%	4%
1 - 2 km	16 %	8%	22%	27%	15%
2 - 3 km	25 %	9%	41%	34%	28%
> 3 km	51 %	75%	19%	35%	52%

The share is interesting, because in fact the persons are nearer the municipal/town centre, as given in the answers, where the people themselves estimated the distance. The reason may be that because of poor public transport connections the distance is overestimated.

Family size, persons

one person	2 persons	3 persons	4 or more persons
8 %	25 %	14 %	52%

In the family size there is no significant differences between municipalities.

Family car ownership, persons

	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
no car	17%	14%	19%	4%	5%
1 car	55%	48%	60%	68%	66%
2 cars	27%	36%	19%	28%	27%
more	1%	2%	2%	0%	1%

Family income, ECU/month, persons

1000 ECU	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
< 1,4	8%	10%	9%	4%	11%
1,4 - 2,5	24%	30%	31%	21%	21%
2,5 - 3,4	22%	22%	11%	25%	32%
over 3,4	38%	37%	49%	50%	33%

Typical to the Finnish test site is that the lowest income class consists of two separate groups, elderly living alone on pension and young single students.

Profession, persons

Employee	Own business, farmers	Mother or father keeping care of little babies	Student, pupil
49%	6%	3%	23%
Child < 7 years old	On pension	Unemployed	Other, army etc.
6%	8%	5%	1%

Between municipalities there is no significant difference.

Location of working place, persons

	Test Site	Tuusula	Kerava	Järvenpää	Seinäjoki
On one address, in Single location	52%	48%	58%	55%	51%
Moving work place	11%	8%	10%	13%	15%
At home	2%	4%	2%	1%	0%
Not at work	34%	39%	31%	31%	34%

Driving licence, of all persons

Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
67%	63%	62%	68%	76%

Availability of a car if the driving licence, persons

	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
Always	76%	75%	65%	79%	79%
Now and then	16%	17%	17%	14%	17%
Never or very seldom	8%	8%	18%	6%	4%

Did you have access on a car on the survey day, persons with driving licence

	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
All day	65%	72%	51%	60%	70%
A part of the day		13%	23%	24%	18%
No		16%	25%	16%	11%

How many trips in a day, persons

	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
0	5%	6%	3%	4%	5%
1 to 2	25%	30%	20%	23%	24%
3 to 4	34%	34%	33%	32%	34%
5 to 6	21%	15%	23%	29%	20%
7 or more	15%	15%	22%	13%	17%

Short walking and bicycle trip excluded.

Who pays the trip

	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
Self	61%	65%	53%	60%	60%
Municipal	1%	2%	1%	1%	1%
NSI	0%	0%	..	0%	..
Else	5%	6%	4%	7%	5%
Free	28%	23%	33%	29%	31%
Don’t know	4%	3%	10%	3%	3%

Self=pays him/herself, Municipal=part or all by municipal authority, NSI=National Social Security Institution, Free=the trip was free of charge.

The trips that are payed by municipalities and other authority (NSI) have a very small share of all trips, but will be the basic load for future SAMPO traffic.

Main mode on the journey

	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
Walk	8%	7%	15%	9%	5%
Bicycle	19%	16%	20%	19%	27%
Buss or coach	4%	6%	5%	2%	2%
Train	5%	6%	10%	5%	1%
Tram or underground	0%	0%	0%	-	-
Taxi	1%(0,6)	1%	0%	1%	-
Car driver	41%	43%	32%	45%	50%
Car passenger	15%	17%	14%	18%	12%
Other	1%	2%	0%	1%	1%
cannot say	1%	1%	4%	0%	1%

The share of the tram, underground and taxi trips is so low that the statistical significance is extremly low and therefore they commonly are not separetely in the following tables. Depending on the case, this trips are totally out of the tables or included in the public transport.

2 WILLINGNESS TO CHANGE THE MODE TO SAMPO TRAFFIC

The "do not know" share is not included in the next tables.

By municipalities.

I would change	Test site	Tuusula	Kerava	Järvenpää	Seinäjoki
Surely	4%	5%	4%	3%	2%
Probably	11%	12%	12%	8%	9%
Not probably	28%	24%	26%	31%	34%
Surely not	48%	48%	49%	55%	44%

By the distance to the municipality centre

I would change	< 1km	1-3km	3-km
Surely	3%	3%	4%
Probably	12%	8%	12%
Not probably	14%	33%	28%
Surely not	66%	49%	46%

The behviour of the fringe area is remarkable compared to the centres and rural areas.

By the family size

I would change	1pers	2pers	3pers	4+
Surely	6%	6%	5%	2%
Probably	8%	10%	15%	10%
Not probably	28%	31%	33%	26%
Surely not	47%	48%	33%	53%

By the car mileage

I would change	no car	< 25	=> 25
Surely	13%	4%	1%
Probably	10%	9%	13%

Not probably	22%	32%	26%
Surely not	47%	63%	50%

<25=driving car less than 25 000 km/year,

=>25 =driving car equal or more than 25 000 km/year.

By the family income (Ecu/month)

I would change	< 1400 ECU	1400 - 2500	2500 - 3900	over 3900
Surely	4%	6%	4%	2%
Probably	3%	8%	12%	12%
Not probably	22%	25%	28%	33%
Surely not	63%	50%	49%	45%

By the age (15 years olds and over)

I would change	15-24	25-34	35-49	50-64	65 and over
Surely	4%	3%	3%	8%	5%
Probably	10%	13%	12%	9%	11%
Not probably	23%	28%	34%	28%	27%
Surely not	52%	50%	45%	45%	43%

By the gender

I would change	man	woman
Surely	3%	6%
Probably	9%	12%
Not probably	26%	30%
Surely not	52%	44%

By the profession

I would change	Empl.	Own B.	Stdts.	HW,HM	Pens.	Other
Surely	4%	1%	5%	2%	4%	8%
Probably	11%	7%	10%	6%	12%	13%
Not probably	33%	15%	22%	22%	32%	25%
Surely not	44%	68%	52%	56%	39%	46%

Empl = Employee, Own B. = Own business or farmer, Stdts.=Pupils and students, Pens. = On pension, Other= all other groups and do not know.

By the working time

I would change	Daytime	Shift or evening	Irregular times	Not working
Surely	4%	3%	3%	5%
Probably	13%	9%	2%	11%
Not probably	31%	40%	26%	24%
Surely not	45%	40%	62%	49%

Daytime= normar daytime working hours. Shift or evening= Shift workers or working time on the evening. Irregular times= working times have no regular scheme.

By the number of trips/day

I would change	1-2	3-4	5-6	7+
Surely	4%	6%	4%	1%
Probably	12%	11%	11%	8%
Not probably	30%	28%	28%	27%
Surely not	45%	46%	49%	55%

By the car availability

I would change	All the day	Part of day	Not at all
Surely	3%	3%	5%
Probably	9%	16%	11%
Not probably	33%	29%	27%
Surely not	50%	41%	48%

By the origin of the journey

I would change	Home	Workplace, School	Work based	Visit	Shops
Surely	4%	4%	4%	1%	3%
Probably	11%	13%	3%	5%	10%
Not probably	30%	29%	17%	22%	28%
Surely not	47%	45%	71%	63%	49%
I would change	Business and offices	Health care locations	Café, hotel restaurant	Cultural, hobby	Other
Surely	3%	11%	..	5%	7%
Probably	7%	14%	..	12%	17%
Not probably	30%	23%	26%	26%	22%
Surely not	56%	37%	68%	50%	45%

By the destination of the journey

I would change	Home	Workplace	Work based	Visit	Shops
Surely	5%	5%	2%	1%	3%
Probably	12%	12%	8%	4%	9%
Not probably	28%	30%	24%	24%	31%
Surely not	48%	45%	64%	58%	50%

I would change	Business and offices	Health care locations	Café, hotel restaurant	Cultural, hobby	Other
Surely	1%	10%	..	4%	7%
Probably	12%	20%	4%	8%	13%
Not probably	34%	24%	22%	29%	22%
Surely not	48%	33%	70%	50%	48%

By the fare

I would change	n.Eq Buss	B < F < Tx	n. Eq Tx
Surely	11%	1%	1%
Probably	28%	13%	4%
Not probably	26%	37%	31%
Surely not	18%	30%	48%

n.Eq Buss = nearly as cheap as in ordinary public transport.

B < F < Tx= in the middle of public transport and taxi fares
n. Eq Tx = nearly equal taxi fares
The question of fare is interesting. The general willingness to change to SAMPO traffic (surely and probably together) was 15%. The same level in this question is in the middle of previous public transport fares and taxi fares. The price seems not to be the crucial question.

By the willingness to walk

I would change	No walk, door to door	Should walk to collecting point, max. 500 m.
Surely	14%	6%
Probably	32%	25%
Not probably	21%	29%
Surely not	13%	20%

Compared to the general willingness to change to SAMPO traffic, the influence of the walking distance is not very important.

By the advance order time

I would change	30 min	1 hour	2 hours
Surely	12%	7%	5%
Probably	29%	21%	12%
Not probably	23%	28%	29%
Surely not	16%	25%	34%

30 min = at least 30 minutes before departure

1 h = at least one hour before departure
2 h = at least two hours before departure
Compared to the general willingness to change to SAMPO traffic, the people accept quite long advance order times.

The exactness of collecting time

I would change	5 min	15 min	30 min
Surely	17%	6%	2%
Probably	33%	23%	6%
Not probably	20%	29%	33%
Surely not	13%	22%	39%

The exactness of collecting time is the from TDC given time window for the collecting time.

The break time is somewhere between 15 and 30 minutes. After the break time the willingness to change is less than the general willingness.

By the main mode of a journey

I would change	Surely	Probably	Both (surely and probably)
Walk	4%	5%	**5%**
Bicycle	9%	15%	**13%**
Buss or coach	32%	7%	**14%**
Train	11%	7%	**8%**
Taxi	3%	2%	**2%**
Car driver	30%	46%	**41%**
Car passenger	10%	16%	**14%**
Other	2%	2%	**2%**
	100%	100%	**100%**

In the public transport the buss and coach traffic lose to SAMPO-traffic. The mode change potential of walk, bicycle, car drivers and car passengers is so great that all potential passengers are not possible to serve with, for the test reserved vehicles, during the test time on the whole Finnish test area.

The biggest groups, who do not want to use SAMPO services are car drivers and passengers (60%).

On the work and school trips

I would change	Test Site Summer/Winter	Tuusula Summer/ Winter	Kerava Summer/ Winter	Järvenpää Summer/Winter	Seinäjoki Summer/ Winter
Surely	3/6%	3/8%	6/7%	1/3%	0/2%
Probably	8/15%	11/15%	5/13%	8/21%	6/10%
Not probably	26/26%	28/22%	14/28%	28/22%	29/35%
Surely not	43/32%	35/31%	60/37%	42/34%	46/28%

On the business and shopping trips

I would change	Test Site Summer/Winter	Tuusula Summer/ Winter	Kerava Summer/ Winter	Järvenpää Summer/Winter	Seinäjoki Summer/ Winter
Surely	1/4%	2/6%	1/1%	1/2%	0/3%
Probably	8/12%	10/13%	11/15%	9/12%	3/7%
Not probably	28/30%	31/31%	14/24%	27/27%	34/34%
Surely not	48/38%	41/33%	62/43%	46/40%	51/41%

On the health care trips

I would change	Test Site Summer/Winter	Tuusula Summer/ Winter	Kerava Summer/ Winter	Järvenpää Summer/Winter	Seinäjoki Summer/ Winter
Surely	3/4%	4/8%	3/5%	2/2%	0/1%
Probably	12/14%	15/15%	16/20%	12/14%	9/11%
Not probably	28/27%	31/29%	25/25%	30/29%	26/26%
Surely not	42/38%	37/35%	42/36%	39/35%	47/42%

On the local leisure and other free time trips

I would change	Test Site Summer/Winter	Tuusula Summer/ Winter	Kerava Summer/ Winter	Järvenpää Summer/Winter	Seinäjoki Summer/ Winter
Surely	2/5%	1/4%	0/5%	3/5%	2/4%
Probably	11/14%	10/16%	13/10%	13/10%	9/14%
Not probably	28/27%	34/30%	16/30%	26/30%	30/30%
Surely not	44/37%	40/33%	55/38%	41/38%	46/37%

3. BY THE TYPES OF TRIPS ORIGIN AND DESTINATION

The types of origin and destinations are centres (typical high houses, shopping areas, administrative buildings), fringe areas (around centres and areas with some local services) and rural areas.

All trips

origin/ destination	centre		fringe		rural	
centre	surely	7%	surely	2%	surely	7%
	probably	10%	Probably	12%	Probably	18%
	no prop.	24%	no prop.	27%	no prop.	30%
	no surely	52%	no surely	52%	no surely	39%
fringe	surely	4%	surely	3%	surely	8%
	Probably	9%	Probably	6%	Probably	12%
	no prop.	29%	no prop.	24%	no prop.	27%
	no surely	53%	no surely	58%	no surely	47%
rural	surely	4%	surely	8%	surely	3%
	Probably	17%	Probably	11%	Probably	10%
	no prop.	35%	no prop.	30%	no prop.	27%
	no surely	40%	no surely	42%	no surely	52%

The willingness grows in the wintertime and after the distance from the centres. The work and school trips as an example.

origin / destination	centre Summer / Winter %		fringe Summer / Winter %		rural Summer / Winter %	
centre	surely	5/5	surely	0/2	surely	5/7
	Probably	7/17	Probably	8/17	Probably	7/17
	no prop.	21/21	no prop.	25/29	no prop.	31/25
	no surely	43/33	no surely	44/30	no surely	38/28
fringe	surely	1/2	surely	2/5	surely	6 /13
	Probably	7/14	Probably	8/19	Probably	10/19
	no prop.	22/25	no prop.	25/20	no prop.	36/27
	no surely	48/43	no surely	52/40	no surely	31/22
rural	surely	4/9	surely	6/11	surely	3/7
	Probably	9/13	Probably	10/19	Probably	10/19
	no prop.	24/22	no prop.	29/26	no prop.	29/26
	no surely	42/31	no surely	30/18	no surely	40/31

4. SPECIAL NEEDS

Fare pay method
Most common people prefer bare money (55%). Cards, as banking, smart and money cards, are the next (46%), then prepaid ticket (18%) and taxi bill (5%). Many selections were possible in this question.
The evident phenomen is that a new method without any real experience gains smaller share than a method familiar by the experience. A good example of this is the favor of money card, which is double in Seinäjoki, where it is in use, compared to the rest of test area, where the money card is a theoretical question.
The income level influences very much on the desired pay method. For example from the lowest income class 72% wants pay with bare money, compared with the 45% in the highest income class.
The common peoples opinions differ from the special groups, where the smart card was commonly wanted.

Special services
As helping the transport of passengers small parcels and helping the passenger out of vehicle and in.
This kind of services were needed by 14% and not needed by 60%. The greatest need was by the taxi passengers (47%). Second was over 65-years old peoples (26%) and next (single) mothers or fathers with babies. The irregular workers had quite high need (19%), too.

5. The change of travel mode after survey

From which mode will come the potential SAMPO passengers. The row sum equals 100%.

	walk	bicycle	buss coach	train	taxi	car driver	car pass.	other
group surely	4%	9%	32%	11%	3%	30%	10%	1%
group probably	5%	15%	7%	7%	2%	46%	16%	2%

Potential SAMPO passengers, groups "would surely and probably change the mode" together

	walk	bicycle	buss coach	train	taxi	car driver	car pass.	other
I would change	5%	13%	14%	8%	2%	41%	14%	2%

The share of travel modes after introducing SAMPO and all positive opinions coming true to change to the SAMPO traffic.

SAMPO in use	walk & bicycle	public transport	car driver and passenger	other
no (to day)	28%	10%	59%	3%
yes, test time	26%	22%	50%	2%

The optimistic opinions are evident, but show a great and general goodwill to the SAMPO type public transport.

Annex 5

Irish User Needs Analysis

ANNEX 5 IRELAND USER NEEDS ANALYSIS

The Irish User Needs Analysis is based on interviews and group discussions on the expressed needs of the different User Categories. The Local Reference Group has been established to provide the key set of contacts within the community (see Annex 2) and the individuals involved were selected as those who could communicate their needs and who were sufficiently interested to work with SAMPO during and beyond the life of the project.

It was decided at an early stage that all data collection for User Needs Analysis would be gathered on the basis of such discussions. The decision factors were the cost and time involved, and the concern that the additional information and reliability may not be worth the input of resource. The derived needs are therefore "subjective" as they are the result of a dialogue. There is a structured basis to the selection of the user category, of the representative, and to the discussion. However, the results are not "scientific" in that there are not significant samples of the different users to ensure unbiased representation.

In most cases, the user needs are obtained through discussion with a representative body or an organisation which is considered to be able to express the needs of the user category. There is a certain risk that this could result in the needs of *administration* rather than *users* being the outcome of the analysis. The structure of the discussion groups are designed to balance this by ensuring that there is broad community representation. Everyone in the group (or their family) is a user in a way other than what they formally represent, and this allows enhancement of the view of the individual.

The User Needs Analysis has been carried out in the following manner :

1) Following the Helsinki meeting on 1/2 December, the Irish partners considered the possible User Categories, determining which were most relevant to DRTS and to the Irish site.

2) The Local Reference Group was established, and a set of target users was drawn up for the detailed assessment of user needs. The methodology to be used for each category was selected. The schedule and planning for the activities was drawn up and agreed.

3) The reporting and analysis formats were agreed, following which the structure and guidelines for the discussion sessions were developed.

4) One-on-one interviews were held with certain user categories or their representatives, where greater depth to the discussion was needed. This include groups such as the police, the representative bodies for disabled and elderly people, national government departments.

5) One-on-one interviews were also held with user categories that may not have been suitable for the discussion groups. This particularly includes the operators who may become defensive as user needs are being discussed , or who may use the group as an opportunity to argue competitive issues.

6) A pre-meeting was held with four selected organisations who represent the key actors in the region, and who had expressed a strong interest in the SAMPO work. These are :

- Department of Social Welfare : representative of all marginalised groups (low income, elderly, disabled, unemployed, unskilled, disrupted families) who may have special travel needs, but who may have difficulty in achieving the needed travel.

- Irish Countrywomen's Association *[nation-wide community association network]* : representative of the needs of rural communities, the activities which take place there, and the human level challenges and responses involved in transportation (as just one of many domains).
- South Eastern Health Board : representative of the needs of healthcare patients such as outpatients, the visitors to hospitalised patients, and the travel needs of those who work at the health facilities.
- Kilkenny County Council : representative of the statutory authority for the demonstration site, and which is answerable to the political representatives.

The pre-meeting has three main objectives :

- to identify the user needs of these key actors
- to explain the purpose of the discussion groups and to demonstrate the interaction between user types
- to recruit two of the four representatives as facilitators for the discussion group session

It is considered that using local people as the discussion group facilitators would reduce the barriers to open discussion, and would minimise the interference caused by the project team member's participation.

7) The discussion group meetings were held on a single evening at the test site. A short plenary session opened the activity in which a brief overview was given of the SAMPO project and its purpose, the Local Reference Group, and the purpose of the discussion groups. This was deemed necessary to assure the participants accepted that the activity had a valid purpose, and that it would serve their community.

The group was then subdivided into two sub-groups of eight to ten participants. Each group included a facilitator and a SAMPO project team member to take notes. The groups were structured as follows :

Group 1 *Agencies and Authorities*

Bord Failte (Tourism Board)
Forbairt (national agency for promotion and development of indigenous industry) Garda Siochana (police)
Industrial Development Association (national agency for external trade and industry)
Kilkenny Chamber of Commerce
Kilkenny City Enterprise Board
Kilkenny County Council
South Eastern Regional Authority

Group 2 *Users and Active Destinations*

Avonmore Ltd. (major employer in the region)
Hospital administration
Kilkenny Vocational Education Committee representative
Macra na Feirme representative (local activity organisation for farming communities)
Schoolchildren (represented by schoolteacher)
Sports Club (team manager)
Sports Facility (leisure centre)
Vintners and licensed trade representative
Youth hostel

Tape recorders are used throughout the sessions to record the discussions. The note-taking function is primarily to assist the discussion during the evening.

8) The individual sessions were conducted to the following structure :

- the facilitator leads the discussion for the opening minutes to identify the purpose, specific objectives, and the broad work method to be followed
- the session lasts approximately one hour and is in two distinct parts

- the first part deals specifically with problems or issues relating to travel for the different user categories
- the facilitator politely (but firmly) closes off any discussion about solutions and redirects the discussion
- the facilitator and/or the SAMPO team member *occasionally* intervenes if one of the target User Categories is not being addressed ("and what do you think, John, in relation to the people your organisation deals with ?")
- this first session should last about 30 minutes, but if all the matters are already well covered after twenty minutes, then proceed to the second part
- if little progress is being made, then proceed to the second part to generate momentum, returning to needs and issues at a later stage

- the second part of the discussion should introduce possible solutions in a structured manner
- the objective is not to find ideal solutions, but to use possible solutions as a stimulus to examining the needs in greater detail, and to gain a first impression of whether these solutions are deemed relevant
- as much as possible, the participants should come up with their own solutions
- the facilitator or SAMPO team member should *occasionally* intervene with a suggestion in the form of "how do you think we could solve/overcome this problem?" or "what if you could ring a central number in advance to book your trip?"
- the SAMPO team member should keep his/her own inputs to a minimum

- the core purpose is to obtain a set of specific user needs for each of the represented user categories in the session group
- at different points, the SAMPO team member or the facilitator should *briefly* review the user needs for a particular user category in the format "well, let's just review the needs as viewed by the City Council - you're saying that A, B, C, D, and E are the needs - have I understood that correctly ? *[allow some discussion to amend if necessary]* Now can we just say which are the most important of these ?"
- the review allows other people to participate, and gives an important feedback to the group about the conclusions being drawn

- after one hour, the session should be formally stopped and the participants thanked
- refreshments should be served at, or near, the discussion table, and the tape recorder allowed to run on

9) Follow-up interviews will be held with any targeted user category representatives that were unable to attend the discussion groups.

10) The information is analysed according to the agreed format. User needs are presented in bullet/list format, with accompanying comments and observation in explanatory text. Matrices are developed for the different user categories against common and critical needs to identify either overlap or specific needs.

Annex 6

Italian User Needs Analysis

ANNEX 6 ITALIAN USER NEEDS ANALYSIS

DRTS in Florence

The DRTS operated in Florence (which is described in more detail in Deliverable D8.1) supports two different kinds of services :

a) urban transport service for disabled people, and
b) public transport service for low demand areas, operated during specific time periods

The service for disabled is jointly managed with the local agency of the National Health Service (USL). Operated across the entire urban network, it is a many-to-many service for a user group of about 600 people. Actually, the DRTS is managed by ATAF with a fleet of 16 vehicles (6 of which are supplied by the public transport company while the remaining 10 are supplied by small private companies).

The DRTS is based on both telephone booking and subscription of services. It is managed by an operator sitting in a central control room getting the requests from the users and deciding upon trip assignment manually, based on the whole set of request. Overall, the management of the service is analogous to that of a conventional taxi system.

A second kind of service is operated in the area of Porta Romana, a low demand area with a users group mostly characterised by elderly people. the DRTS is managed according to a one-to-many scheme where the journeys can have a variety of final destinations and hence variable routes.

The major characteristics of the DRTS routes are as follows :

- it is based on service booking
- the routing is decided manually by the operators in the control room, based on the destinations requested
- no route deviation is made during the operation of any travel
- two vehicles are used during the morning peak hours (until 0900) and one vehicle for the rest of the day
- sets of travel are decided and prefixed with respect to the different time periods of the day

The access to the DRTS as well as the interaction among the users and the control room can be outlined as follows :

1. The users access the service booking/management room by dialling a free-toll phone number. Based on the kind of journey requested, the operator decides whether or not the user request can be accepted. Requests of the service can be accepted until 15 minutes before the assigned bus leaves the terminus station for a scheduled service. The operators can accept service requests for both the current day and the following period.

2. Besides the access method outlined in 1., the users can report directly to the bus drivers at the terminal station, requesting the service for a given destination. The bus driver then calls (by radio) the control room in order to check the feasibility of the service requested with respect to the services already scheduled. The control room either issues a confirmation for the requested ride or informs the driver (and hence the user) about the next feasible service for the requested destination.

3. At the start of any shift, bus drivers are equipped with a service schedule with information about the journeys to be operated. These were previously scheduled based on :

- the requests received the day before

- the level of demand

The Porta Romana DRTS summer experiment in 1994 and 1995

Area and routes involved

The hilly, sparsely populated area around Porta Romana, at the southern gate of the historical city centre is served by 1 to 2 small buses which branch out of Porta Romana Square with four different itineraries resembling the spokes of a wheel. Return travel time on each spoke is approximately 10-15 minutes, and only two spokes have a direct link besides Porta Romana Square.

The routes are patronised by young inhabitants going to school, university students going to Astronomy School on one of the hills, a limited number of general public, and several elderly people. In the summer, the schools and university are on vacation and the ridership declines. In off-peak hours passenger can be very scarce with a number of zero-passenger runs reported by drivers.

DRTS transit experiment

In the summer of 1994 and 1995 a DRTS service was experimented. Passengers could call a toll-free phone number connecting them to the radio room, or apply directly to the driver (the majority, which occurred especially at Porta Romana hub terminal), and would be told when they could be carried to the desired destination. Along the routes, any waiting passenger would be picked up at bus stops regardless of reservation.

The route lay-out (four spokes out of a hub) limited demand-responsiveness to time-scheduling of the runs to the four possible destinations, with one exception related to the two routes linked by a road away from the hub. The whole situation made the operation quite simple, requiring only two-way radio link with the driver.

Evaluation of results

Statistical results have been generated and are available. The key issues arising are :

- less mileage was operated
- more passengers and passenger-kilometres
- more expensive (because not all additional radio-room work could be handled by standard staff)
- a majority of satisfied customers
- most old-time passengers unsatisfied

Final ridership was made up of 8% new riders, 17% habitual riders and 75% occasional ones. A part of the previous habitual ridership, 11% of total was quite unsatisfied by the added complication of having to make phone calls, and not being able to plan in advance the trip timing. They had adjusted perfectly through the years to the fixed schedule, and therefore saw no improvement in the experiment.

Annex 7

Swedish User Needs Analysis

ANNEX 7 SWEDISH USER NEEDS ANALYSIS

Experiences from a Group Discussion with End-Users

Method

On February 27th 1996 we held a first focus group discussion in Högsbo for the SAMPO-project. Seven persons participated, five females and two men. All participants were retired persons. Two were qualified to use the Special Transport Service.

The aim with the group discussion was:

* to present a first version of the dialogue that will be used for booking the trip
  within the SAMPO-project

* to get feed-back from the end-user group on details on interface and dialogue

* to get ideas on how to set up further focus groups and how to evaluate user needs
  regarding the new telematic applications.

Experiences

The group

The people that participated must be regarded as above average for the group that are supposed to use the new FlexRoute service. A majority of them was familiar with automatic interactive telephone-systems. This fact turned out to be very beneficial to this first discussion. The participants were able to give comments and ideas which surely will be dealt with in design of the booking-system ..

On User-Interface

* Even if most of the participants were used to interactive systems, a lot of hesitation were obvious when the booking-dialogue was presented to them.

* When asked questions about each step in the dialogue, mistakes were made from a majority of the group

* The importance of uniformity was obvious. For example the group expressed a wish that every activity from the user in the booking-dialogue should be followed by pressing the #. Another example, when the number of passengers who want to travel is asked, the users wanted to press 1 and then # and not just # (as a default for 1).

* The importance of simplicity was also expressed. The attitude from the group was that the question they shall answer must be very simple and only contain one message at a time. It is better to have more tasks to carry out as long as they are easy to respond to. This makes automatically the dialogue

longer, but it was preferred by the group. To much or to long information complicates the situation.

* All information that the system can provide automatically shall not be asked at all.
An example; if the system "knows" who is calling (so called A-identity), there is no need to enter a personal-code.

* The number of buttons to press should be as few as possible for each task. An example, the numbers of the "Meeting-points" should consists of as few figures as possible. Two were agreed to be the maximum. Another example, the date of the day you would like to make the trip, if not the same day, should preferably only consists of two figures.

* The need of confirmation is obvious. The group strongly urged the need of confirmation after each task carried out.

* Simple language in information given. An example, the confirmation of the date for required trip should be something like: " You have booked a trip for the 2nd of March".

The need for information about the booking procedure as well as the transport service itself is essential. Many questions were raised about both issues. An example: if more than one qualified person are at the same event somewhere and they want to go back with the same route, can one person book for all?. How will all personal codes be given to the system? Or must every individual call to be properly registered?

On Service

Many of the questions raised during the presentation of the dialogue and the discussion concerned the service itself, not really the interface or the technique.

* What time for the trip will be required from the user? Is the user going to give the time he/she wants to travel or is it the time the bus is scheduled to leave the end stop?

* What estimated time for pick up will be given to the user? Will the user be given an interval or an "exact" estimated time?

* If the user misses the notification call, what happens then? If the user for one reason or another misses the phone-call back when the exact time for pick up at the "Meeting-point" will be given, what happens then? Will the user receive a second call? Shall the user then consider the preliminary booked time as the departure time or what? If the preliminary time is given in an interval, which time is then regarded as the preliminary time? Will the bus come at all? Is the bus automatically rescheduled?

* Who is allowed to travel? Can a user that is qualified for the transport bring another traveller even if that person is not qualified?

* Is it possible to make spontaneous trips? If a qualified user wants to go back home and he/she knows when the bus is leaving the end-terminal, is possible to just go to that "Meeting-point" and take the bus? (such issues must be clearly addressed to the users).

* How is the return-trip going to be managed? A lot of issues remains to be solved regarding the return-trip, and almost everyone was raised at the meeting.

Some examples: From which phones can the user call? Does the user have to wait at the phone for notification 15 minutes in advance? Or how can he be reached? Can one person book a trip for other qualified people, etc.

Comments

All comments from the group seem to be very relevant and adequate. It is obvious from the discussions that there are still many issues which have to be looked into regarding both the transport service and the booking system. The discussion in the group was indeed useful and gave a lot of input for everyone present.

Experiences from a test of a prototype for Automated Voice Response-system

Introduction

A very first prototype of the Automated Voice Response System for trip-booking developed for the SAMPO-project, was tested during one day in Gothenburg. Two groups of individuals were selected for the test, altogether 12 persons. Eight of these were elderly (65+) and four were qualified to use the Special Transport Service (STS). All twelve had responded positively in the FlexRoute market survey in Högsbo and were registered for using the new transport service .

The aim of the test was to get feedback on the system for furtherance the usability of the system.

Method

The test-situation was as follows;

- General information was given about the new transport service.

- General information was given about Automated Voice Response Systems.

- Brief information was given about the automated dialogue for trip booking and notification to be used in the SAMPO-project, the FlexRoute service.

- Individual test of the system.
The task was to book a two-way trip. Each individual was asked to follow the instructions given by the system. The behaviour and acting in accordance with the given instructions were registered by an observer. The observer noted on a form if the respondent managed to act in accordance to the instructions, given by the system.

- Interview.
After the test each person was interviewed about his/her experiences when using the system. Problems and measures were highlighted.

Results

The results from the interviews and the observations are shortly presented below.

Interview
The interview consisted of three parts. Questions about their impression of "the given instructions", the "telephone" and their personal opinion about the trust and reliability to the system were asked. All questions were graded on a scale from 1-5 where 1 meant "very easy" and 5 "very difficult".

- Regarding the first part, the given instructions, it is notably how positive the respondents were regarding the understanding of the instructions given by the Automated Voice Response System. In this part of the interview the questions concerned the ”booking procedure”, "the understanding and catching of the instructions", and "the acting in accordance to the given instructions".

The average-feeling about the given instructions were positive. Half the group thought that it was very easy to order the trip, to act according to

the instructions as well as understanding it. Two people answered, however, that they felt the instructions to be neither easy nor difficult. The average score was 1,4. To act from the given instructions were experienced to be the easiest task with the average score of 1,2.

-The second set of questions focused on the telephone, especially on the understanding and use of the buttons. Negative response occurred as a consequence of the telephone's physical instability and as a result of too small buttons when using the telephone. Even so, a vast majority thought that it was "very easy" to use the tele-phone and understand when to use the different buttons. The average score was 1,3.

-The third phase of the questionnaire focused on personal opinions. Questions were raised on, "reliability", "trust to the system", "complicity" and the "understanding" of the dialogue. Finally the respondents had the possibility to give their opinion about the Automated Voice Response System and if they believed such a system would suit them. They were also able to comment on their earlier responses. The trust and reliability questions showed the lowest scores with an average of 2,3. The questions on complicity, the understanding of the dialogue and suitability had an average of 1,4. Here the scaling was 1 "very high" and 5 "very low".

The questions about reliability and trust of the system seemed thus to be the questions where a more negative feedback occurred. Even if a majority expressed "high" or "very high" reliability, two persons had no opinion at all and two persons expressed that their trust to the system was low. It is worth mentioning, that even if a majority expressed a high trust to the system, only one person expressed a very high trust.

According to the answers given in the interview, the system seems to be easily understood and suitable for the respondents preferences. Comments on the system mainly concerned problems using the telephone, even if a big majority said that they were used to technical products and especially "button"-telephones.

Observation
The observations of the behaviour and acting of the respondents show a similar result as the interviews. In all, the task consisted of 25 situations. The person's task was to act in accordance with the instructions given by the system. In 21 situations all respondents made the requested act in the first try. In four cases (situations) one or two persons failed to do the requested act while the other succeeded even if they had to try more than one time (average 1,1-1,4 times). The problems occurred when the task was to choose between more than two alternatives. Two such examples are presented below.

Example 1
- The system: If you plan to go alone, press one. If you are more than one, press two. To continue, press square (#).

Here some problems occurred when, for instance three persons were planning to travel. Then the person pressed three instead of two. This task must therefore be changed to

- The system: If you plan to go alone, press one. If not press two. To continue, press square (#).

Example 2
- The system: If you want to take the next tour today, press one.
If you want to take another tour today, press two.
If you want to travel another day, press three.

To continue, press square (#).

This task was too complicated. The problem was to understand and differentiate between the three options. This task needs to be completely changed as follows, thus allowing automated bookings only for the same day:

The system: Please enter the time when you want to travel.
Use four digits.
To continue, press square (#)

Apart from the difficulties in understanding the instructions, showed above, some other problems were observed, related to technical questions such as finding the right button (#), Hesitations were also observed. In the end of the act seemingly more persons started to hesitate even if the results were positive throughout the test. This might primarily be the result of the obvious difficulties in booking a return trip. The system was, at the time for the focus-group, not quite developed for this procedure.

Those persons who failed completely in the test did not understand what to do when the instruction started. One person did not understand that she should use the buttons on the telephone. She acted according to her earlier experiences and started to ”talk” to the system.

Discussion

Even if the feedback to the system was positive in many ways, the result of the focus group showed that it was necessary to do some changes in the dialogue. The changes were necessary to make the system more user friendly and not allow each task to consist of more than two choices. This means a lengthening of the dialogue, which is another problem to consider. This is of particular relevance regarding the booking of the return trip. The problems with the trip back home were mentioned by many of the respondents. This is not only a question of the length of the procedure, but also of access to a phone and a possibility to receive notification (confirmation of pick-up time) for the requested trip. These issues are probably the biggest problems to solve with the automated booking and notification system.

FLEXROUTE - Högsbo District

SUMMARY RESULTS FROM MARKET SURVEY DECEMBER 1995

Method

A one page postal survey was sent to a 100 % sample of the 5 200 elderly (65 and older) in the Högsbo district in Gothenburg and to the 112 younger disabled STS-users, also living in the same district.

• The response rate was 60 % and rather similar for all age groups but those over 80 years of age (only 50%).

Interest in the new travel service

• 24 % of all persons in the sample are interested or very interested in using the new travel opportunity which was briefly described in the cover letter. This corresponds to 1306 persons which are automatically entered into the FlexRoute customer file.

• Of these potential users 391 (30 %) are already licensed STS-users.

• Another 3-4 % of all persons in the sample indicate an interest but that they currently don't have such needs, but they are greatful for future opportunities.

• Based on a brief analys of 10 % of those not responding to the survey we conclude that there is an additional potential of about 4 % of all persons in the sample, however we also realize that some 'interested' persons may have answered positively to be 'good citizens'.

Problems with current bus and tram services

• Walking distance to public transport stops and lack of access to a car in the household are rather important factors explaining the interest level.

• The invitation to write comments on the back of the form has been used by many. Health problems, heavy grocery bags in combination with steep hills are also important factors.

Major destinations

The respondents were asked to indicate the number of trips per month which were made to important destinations inside and outside the district.

• The number of trips as indicated by the respondents confirms that the preliminary 'route' for the new service is rather fitting.

Some comments from the market survey:

" Since it is a rather long walk to the tram and also quite hilly, this service would make it possible to continue living in a very pleasant residential area"

*

" I am 90 years of age, that is an answer in itself. So far I purchase the monthly pass for public transport. But many thanks for your consideration. Things could change rapidly!"

*

"It's heavy to carry grocery bags, but necessary. I don't get any younger (unfortunately)"

*

" I would rather see that you started with Trygga Rundan (a fixed service route)"

*

"With 350 m to the stop and with angina, it frequently happens that I stay home instead. Therefore I look very positively to this new opportunity."

* *

"According to my doctor I am not quite ready for STS. Can't understand that since some people even get STS to go to dance."

*

"I have lived in the area for 30 years. I'm getting more and more isolated"

*

" Here live so many elderly in the area who use STS for short errands which seems rather unnecessary, such as leaving a prescription and later in the day pick up the medicine with a new run with the taxi"

*

” We don’t know how long we can keep the car. We are 80 and 83 years of age.”

*

” The proposal seems very good. I may surely have to use the described travel opportunity sooner than I can imagine.”

*

” I think this service has a great mission. Myself I prefer ride-sharing, you get more social contact than in the single car ride. Good luck with the project”.

*

” The minibus is a chance to get out. .. Before I used to live in Majorna. Trygga Rundan (fixed service route) was excellent, it took time but you could manage the most important things.”

*

” I have problems walking! My vision is lousy in dusk and bad weather!
My balance is gone in the left side. Thanks in advance for the slightest improvement!”

*

” When slippery out it is really of necessity to get a travel service as close to my residence as possible. At this high age I get more and more in need of safe travel opportunities.”

*

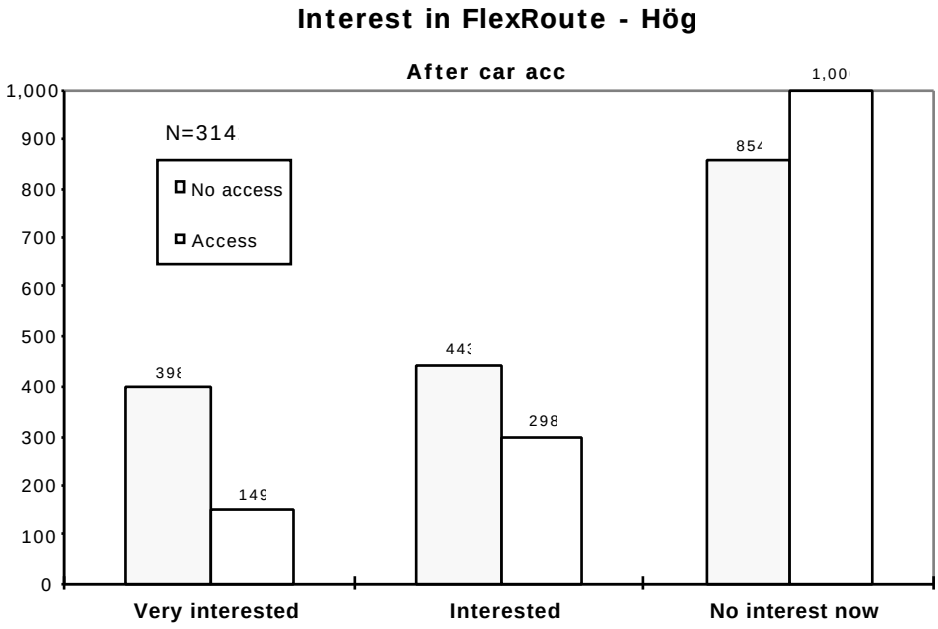
” If I should at all consider to travel by bus or other means it has to be a vehicle which is easy to walk in to. Have tried everything but can’t make it”

*

” I think I would go out more often if I could use bus instead of STS, which I need anyway for longer transports”

*

” I still want to be able to use the STS some times”


Interest in FlexRoute - Hög
After car acc
N=314
No access
Access
1,000
900
800
700
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500
400
300
200
100
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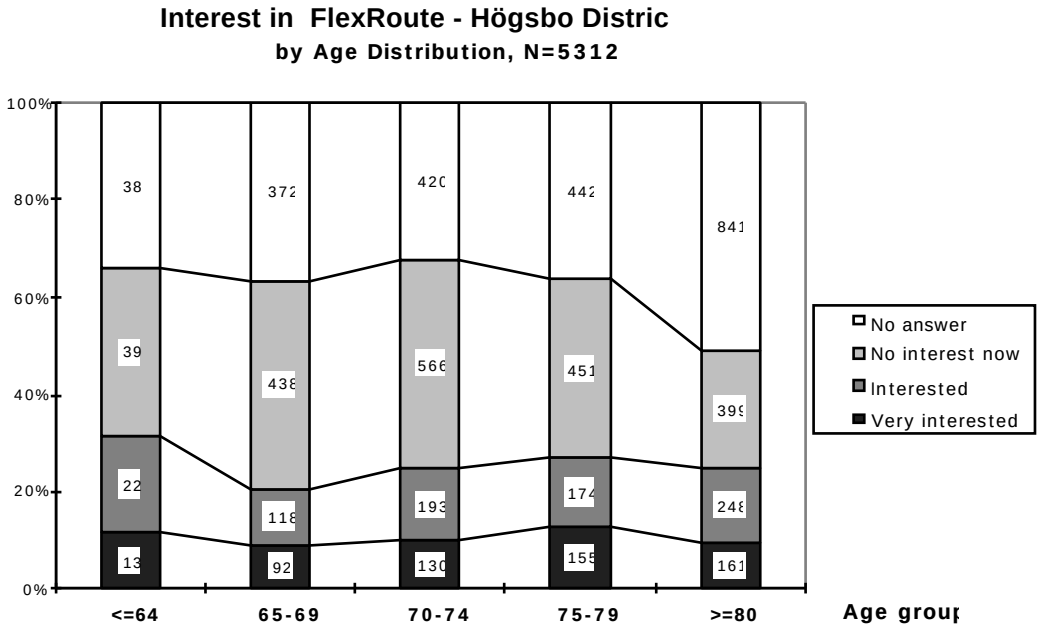
Very interested
Interested
No interest now


Interest in FlexRoute - Högsbo Distric
by Age Distribution, N=5312
100%
80%
60%
40%
20%
0%
No answer
No interest now
Interested
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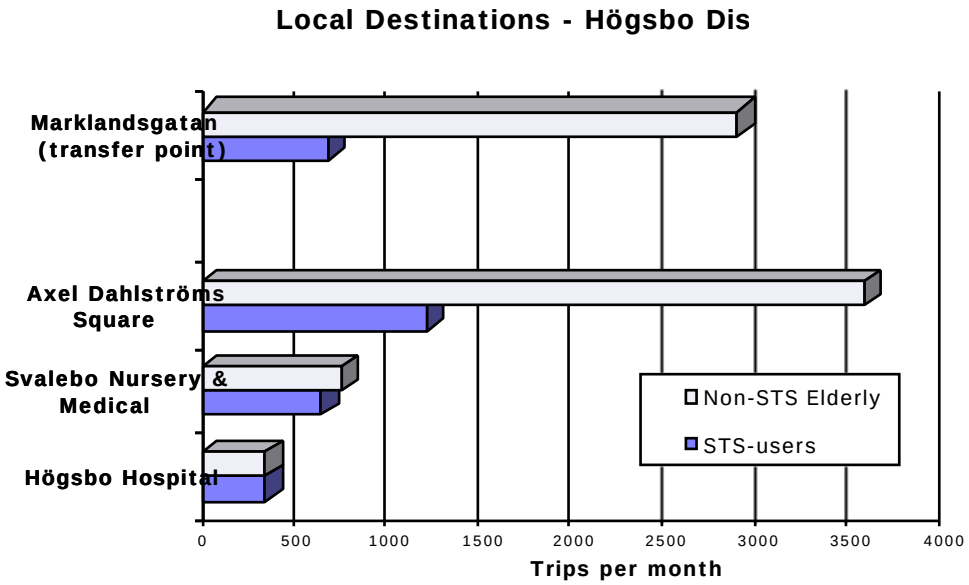
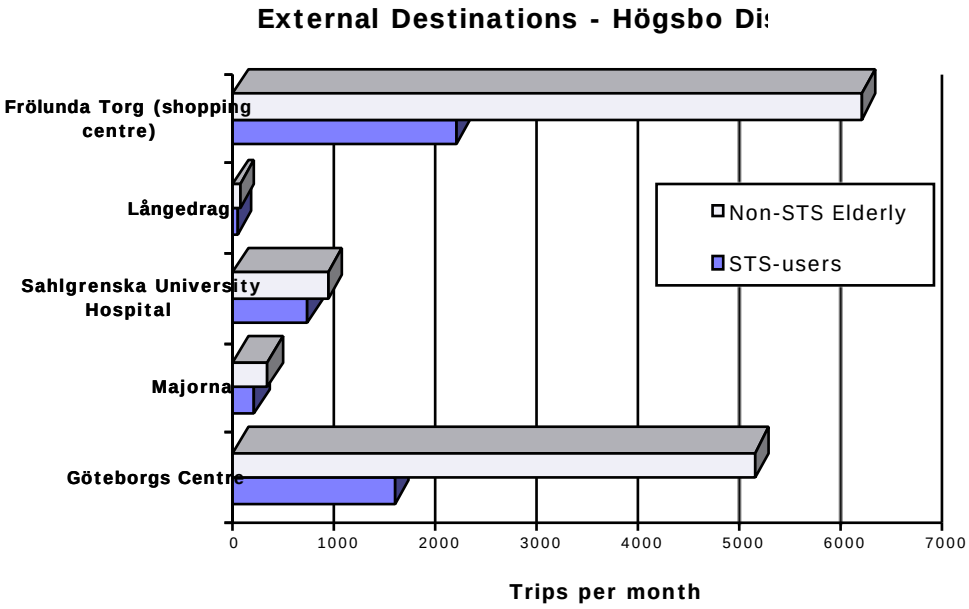
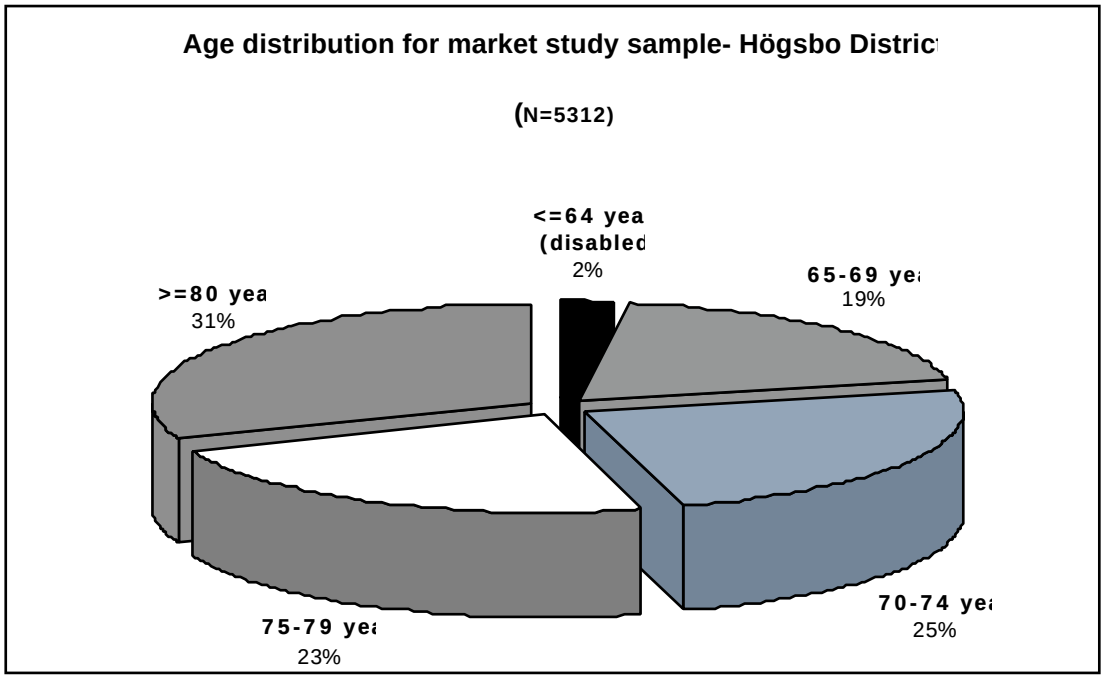
70-74
75-79
>=80
Age group


Local Destinations - Högsbo Dis
Marklandsgatan (transfer point)
Axel Dahlströms Square
Svalebo Nursery & Medical
Högsbo Hospital
Non-STS Elderly
STS-users
0
500
1000
1500
2000
2500
3000
3500
4000
Trips per month


External Destinations - Högsbo Di
Frölunda Torg (shopping centre)
Långedrag
Sahlgrenska University Hospital
Majorna
Göteborgs Centre
Non-STS Elderly
STS-users
0
1000
2000
3000
4000
5000
6000
7000
Trips per month



FLEXROUTE: END-USER NEEDS

SUMMARY RESULTS FROM POSTAL SURVEY FEBRUARY 1996

Method

This part of the UNA was carried out as a postal survey with telephone follow up to a sample of 300 persons who had indicated an interest in FlexRoute during the previous market survey at the pre-SAMPO project site.

• About half of the sample was STS-users and half was elderly (65+) living in the district of Biskopsgarden in Gothenburg.

• The response rate was 80 %, although some individuals did not complete all questions.

Problems with current transport services:

• About 10 % of the STS-users in the sample expressed great difficulty in using current STS. Entering and exiting the vehicle (mostly taxis) is the largest problem (45 % expressed at least some difficulty). Booking the transport is considered very difficult by 8 % and difficult by another 7 %

• 57 % of the STS-users find it very difficult and another 29 % find it difficult to get to the stop if they have to travel with regular public transport (tram).

Similar figures were given for entering and exiting such vehicles.

• For the Non-STS Elderly getting to the tram stop is the difficult part. 24 % find it very difficult and 44 % somewhat difficult to get to the stop.

Trip planning and booking concepts:

• More than half of the respondents would be satisfied with service only in the mid-day period 9-14. Very few (12 %) need service before 8.00 and after 18.00.

• The planning horizon for trip making by the respondents within the district is rather long. 30 % plan their travel at least 5 hours in advance. Another 45 % plan within 1-5 hours in advance.

• In Sweden the fixed timetable service routes are very popular with the elderly. Thus it is surprisingly few respondents (8%) who find it totally unacceptable to have to book the trip in advance (i e they request a scheduled service).

• The preferred pre-booking time is longer than 30 min before the desired pick-up time for 74 % of the respondents.

• Most respondents find it fully acceptable if they only get a preliminary time (window) and that they be notified of the exact pick-up time in a later call from the dispatch center.

• The preferred trip notification time is 15-20 min. Only 20 % of respondents would accept a shorter forewarning.

• About half of the respondents would prefer to book the return trip at the same time as booking the forward trip. The other half like more flexibility and would like to book the home trip separately.

• The respondents value of travel time is difficult to assess, but the survey support the hypothesis that D&E persons can endure some extra travel time if the fare is reasonable.

Telematic experiences:

The familiarity with new technology and IT services was assessed in a series of questions about the respondents use of different new technologies and services.

• 75% of the total number of respondents to the survey use touch tone phones .
If they can manage the procedures of automated booking is another issue.

• More than a third of the respondents use bank-machines and text-TV. But only 10 % use telebanking services which is closest to the proposed automated booking scenario.