SEVENTH FRAMEWORK PROGRAMME
COOPERATION – THEME 7 TRANSPORT (INCLUDING AERONAUTICS)
HORIZONTAL ACTIVITIES FOR IMPLEMENTATION OF THE TRANSPORT PROGRAMME

i-Travel

The Connected Traveller brought to life
WP2 D2.1 deliverable

D2.1: Requirements Documentation
Issue: Use cases, traveller & supplier requirements

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DISSEMINATION LEVEL		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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AMENDMENT POLICY

This document shall be amended by releasing a new edition of the document in its entirety. The Amendment Record Sheet below records the history and issue status of this document.

AMENDMENT RECORD SHEET

ISSUE	DATE	DCI No	REASON
0.1	04/07/08	N/A	-Release for review and approval of the WP2 participants -Peer review by the associated partners of **i-Travel**
0.2	16/07/08	N/A	- Inserted all the review comments
0.3	24/07/08	N/A	- Inserted new user requirements with more emphasis on the supplier side
1.0	01/08/08	N/A	- Inserted further comments from Management Team and associated partners

1 Introduction

1.1 Purpose of this document

This document is the Deliverable "2.1 Requirements Documentation" of the **i-Travel** project aimed at the definition of a "service Platform for the Connected Traveller". The document describes the research work developed, within Work Package 2 "Use cases, traveller & supplier requirements" in the **i-Travel** project, and identifies:

- *User (travel) scenarios* describing how travellers will use the **i-Travel** services before, during and after travel,
- *Use cases* describing in detail how travellers and suppliers make use of the **i-Travel** services, and finally
- *User (travellers and suppliers) requirements* to an **i-Travel** solution

The results presented in this document will also be delivered as input to further Work packages of the **i-Travel** project, namely WP3 and WP4.

1.2 Intended audience of this document

This **i-Travel** Deliverable "2.1 Requirements Documentation" is aimed at the following audiences and at the achievements of the following objectives:

- European Commission: present the work developed and results achieved within the Work Package 2 "Use cases, traveller & supplier requirements" inside **i-Travel**
- **i-Travel** Consortium partners: provide input for further Work packages, namely WP 3 and WP4.

1.3 Structure of the document

After this introduction, Chapter 2 presents an executive summary of the document. The **i-Travel** project is described in chapter 3. The description of the methodology used in this work package can be found in chapter 4. In chapter 5 the results of the desk research, which was built upon the research and output from Work Package 1, are discussed. In chapter 6, the field research is described and the scenarios are listed in chapter 7. The information from the desk research, field research and scenarios is aggregated to user needs (chapter 8), supplier needs (chapter 9), detailed use cases (chapter 10) and user requirements (chapter 11). In annex extended information on the different themes of research follows.

1.4 Definition of terms

The following terms have been used in this report.

Term	**Definition**
Barriers	Criterions which avoid the use of **i-Travel** for travellers and suppliers.
Communication provider	A provider needed for the communication between the e-marketplace and the travelling user as well as for the communication between information providers and service provider.
Drivers	Criterions which encourage the use of **i-Travel** for travellers and suppliers;
eMarketplace	The integration of e-commerce and internet technologies in the traffic and travel information services sector.

Information provider	Provider of information such as traffic information and schedules.
i-Travel agent	The provider/supplier for an **i-Travel** service.
Scenarios	Cases that describe how travellers will use the **i-Travel** services before, during and after travel.
Service operator	Operator of the technical infrastructure.
Service provider	Provider which offers the service to the user.
Stakeholders	Travellers, suppliers and public authorities which are having an interest in i-Travel.
Supplier needs	All the prerequisites and requisites of the supplier before and during the travel of an end-user.
Transport system operator	Operator of the technical infrastructure and related services.
Travel types	A classification for the travel trips (e.g. regular, familiar and unfamiliar travel).
Use cases	The combination of the user, supplier needs and the offered services from the different scenarios in cases.
User characteristics	User characteristics are 'psychological' features of the traveller which are 'fixed'.
User needs	All the prerequisites and requisites of the user before and during his travel.
User requirements	A condition or capability needed by a user or supplier to solve a problem or achieve an objective.
User types	Variable physical manifestations which depend on the context the traveller is in.

2 Executive summary

This document presents the results of Work Package 2 aimed at "Use cases, traveller & supplier requirements" in the **i-Travel** project, and identifies:

- *User (travel) scenarios* describing how travellers will use the **i-Travel** services before, during and after travel,
- *Use cases* describing in detail how travellers and suppliers make use of the **i-Travel** services, and finally
- *User (travellers and suppliers) requirements* to an **i-Travel** solution

The research work of WP2 was based on a thorough desk research activity, a two days workshop with key experts of the WP participants and field research within a comprehensive group of **i-Travel** European stakeholders. The results presented in this document will serve as input to further Work packages of the **i-Travel** project, namely WP3 and WP4.

The investigation work showed that travelers have different needs for information depending on e.g. the frequency of trips, the purpose of the trip, the trip character (regular or special trip), the availability of transport modes, the particular socio-demography etc. With this in mind user and travel types are identified and classified. The user types have the following classification; **special needs (**this is an individual with special needs)**, a group** (this can be a family, a tourist group, a student group etc.) and an **individual;** the individual travels alone and has no special needs. This might be a business traveller, a tourist, or any other person travelling.

The travel types have two dimensions: familiarity with the route and familiarity with the travel time (or itinerary). Combining these dimensions we get three travel types: **regular travel** (the route and travel times or itinerary are known, this might be a commuter), **Familiar travel** (the route is known, but the travel times or itinerary is unknown, this might be a business traveller on his way to a known client which he visits a few times a year) and **Unfamiliar travel** (the route and travel times or itinerary are unknown, this is a person on a trip for the first time).

The research continued with the identification of the problems, drivers and barriers (political, economic, social) for travellers and suppliers when using (existing) information services. For travelers one of the most important drivers of the **i-Travel** service is the assistance, navigation and recommendations before, during and after the trip. A major barrier for travellers is that the **i-Travel** service could give to much information needed for a traveller. The information should therefore be personalized. For the suppliers **i-Travel** brings up new businesses and a better promotion of the provided services. A barrier can be that the **i-Travel** service is new and those suppliers thereby have an uncertain business model.

Concerning the economic aspects from the end-user point of view, a detailed analysis current practices identified potential user buying motives and to determine value of the services to the different user groups: **Basic services** comprise general information useful for trip planning; **Advanced services** comprise information on more complex travel scenarios in city / region / national / international areas and provide additional comfort to the traveller; **Value-added services** are distributed through a conditional access channel and are hence only available to subscribing users.

A group of scenarios were developed to clarify and define the usage of the **i-Travel** system and the needs of the users and suppliers. In these scenarios fictitious characters called personas are used to represent the different user types and facilitate the **i-Travel** platform to be designed from a user centred perspective. The scenario's make it easier to form a common view within a design team of user wishes and demands. In total eleven scenarios were written.

In order to identify market and system requirements of an **i-Travel** service, interviews were held with representatives from different European (**i-Travel**) suppliers, service providers, information providers and public authorities. Highlights from the interviews are:

- Commercial, high-end **i-Travel** services probably bought by professional travellers, not the general public;

- Open Standards are seen as most important to encourage stakeholders to participate in **i-Travel**;
- How much an end-user wishes to pay for a commercial service still remains to be seen;
- Different mobile hardware on the market today poses an obstacle to a large deployment of an **i-Travel** service.

The specific user needs were re-collected from the different scenarios and offered services. By clustering these user needs, five different clusters of needs were defined: Information & Planning; Reservation & Booking; Navigation; Notification & Alerts; Payment

Based on the user needs, the **i-Travel** agent needs and the supplier needs were formulated. The general need of the supplier is that there is enough demand for his product; otherwise it is not attractive to produce the product. It is also possible that a supplier is supported by subsidies, or the use of advertisements on websites which can help him to make a profit.

By combining the user and supplier needs with offered services from the different scenarios, a limited number of detailed use cases were formulated. They offer extended information on needs to enable the development of user requirements. The resulting set of detailed use cases will be input for further research work in WP3 and WP4.

Based on the detailed use cases, desk research, workshops and field research in total eight requirements are aggregated; **functionality, accessibility, user interface, context awareness, personalisation, financial aspects, reliability** and **secure environment.** For all the aggregated aspects, traveller and suppliers user requirements are formed based on the clustering of the user needs and detailed use cases. Some important requirements for the travellers are that **i-Travel** should provide the ability to choose context and preferences (e.g. business/commuter/tourist/special needs) and that **i-Travel** should provide a clear and efficient structured user interface. For the supplier **i-Travel** should provide a stabile environment of platform systems and distribution channels with common content quality and availability level between the service suppliers.

3 i-Travel project

3.1 Project abstract

While a growing number of online services for travellers are available, these are mostly poorly integrated and not personalised. Furthermore, almost all are inaccessible to the traveller during the journey itself. None of these services detect and proactively inform the user of disruptive events relevant to the traveller's specific journey, let alone propose appropriate trip options.

Content providers have difficulty to reach out to more than a small number of potential end users, while ensuring that their commercial and licensing terms are enforced. Service providers need to find and negotiate separately with a huge number of potential content providers in order to offer a comprehensive end-to-end service towards travellers.

"**i-Travel**" is an original concept for "the connected traveller" that combines three key innovations:

1. a "virtual travel assistant" service that accompanies a traveller before and throughout each journey, providing personalised, context-aware information and support whenever, wherever and however needed, based on:
2. the integration of e-commerce and internet technologies to create the first B2B "eMarketplace" in the traffic and travel information services sector, through which:
3. a wide-ranging community of content and service suppliers connects to customers through **i-Travel** to serve new markets of travellers needing instant delivery of content and trip support.

For the travellers, **i-Travel** puts the right information and the right services in the travellers' hand, just when they need it. For the suppliers, being a member of the **i-Travel** community gives direct access to the one and only secure, dynamic marketplace where agents representing all the world's "connected travellers" gather to buy real-time content and value-added travel services on behalf of their customers.

The **i-Travel** project is organised into the following work packages

- WP 1 State of the art and value chain analysis
- WP 2 Use cases, traveller and supplier requirements
- WP 3 Processes and services
- WP 4 Architecture
- WP 5 Content and Service Suppliers Community
- WP 6 Feasibility and development roadmap
- WP 7 Virtual demonstrator and demonstration strategy
- WP 8 Project coordination and dissemination

The consortium partners of the current **i-Travel** project (phase 1) are: Altea, CERTH - Centre for Research and Technology Hellas, DLR – German Aerospace Center, Ertico, ISMB – Istituto Superiore Mario Boella, LogicaCMG, Mizar Automazione SpA, Navteq, Oracle, PTV Planung Transport und Verkehr AG, Tele Atlas, TNO, Vialis, Flemish Government - Department Mobility & Public Works and Ygomi Europe Kft. The consortium leader is Ertico.

3.2 Work package 2 Use cases, traveller & supplier requirements

The objective of WP2 is to define scenarios, use cases and traveller & supplier requirements for an **i-Travel** solution. The work package leader of WP2 is Vialis (NL). The other WP2 partners are: DLR – German Aerospace Center, Mizar Automazione SpA, Flemish Government - Department Mobility & Public Works, PTV Planung Transport und Verkehr AG, TNO, Ygomi Europe Kft and Amadeus.

The work within the WP is delivered through the combined efforts and input from research institutes, suppliers and local authorities and parties related to them in order to reflect the relevant **i-Travel** users. This WP will deliver the following tasks;

- Task 2.1: User requirements design framework and methodology (users: travellers and suppliers)
- Task 2.2: Identify drivers / barriers for travellers (political, economic, social) and for suppliers
- Task 2.3: Develop traveller scenarios and needs, supplier scenarios and needs, and use cases
- Task 2.4: Identify traveller / supplier requirements

4 Framework & Methodology

The research work performed within WP2 followed a step by step process linking tasks inputs and outputs in a logical and comprehensive way, supported by a group of main activities and milestones. In the development of the WP2 framework and methodology, attention was also given to the interface with other WPs' of the project: WP1 as input feeder and WPs' 3, 4 and 7 as receivers. These dependencies were included and are also described in this chapter.

4.1 WP2 Framework

The framework, as presented in the figure below, is designed to structure the work process of generating use cases, traveller and supplier requirements.

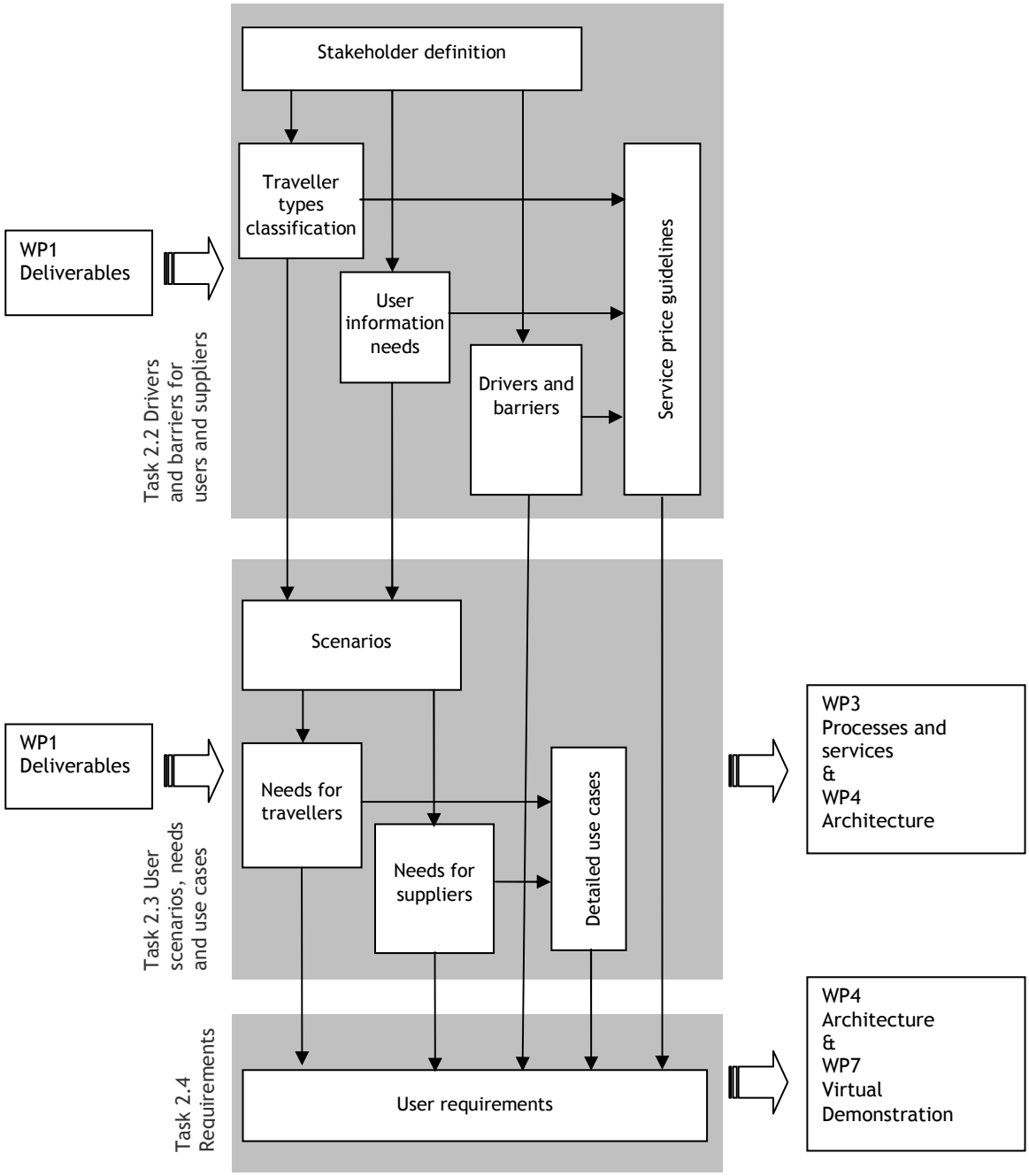


Figure 1: Framework of WP2

- Stakeholder definition

WP1 ("**i-Travel** Methodology" PTV, 2008) provides input for the stakeholders definition in the **i-Travel** project and to WP2. Stakeholder group include travellers, suppliers and public authorities.

- User information needs & traveller types classification

Travellers have different needs for information depending on e.g. the frequency of trips, the purpose of the trip, the trip character (regular or special trip), the availability of transport modes, the particular socio-demography etc. With this in mind different traveller types are identified and classified. WP1 ("Workbook Value Engineering" Booiman, 2008) provided a supportive classification structure that is followed.

- Drivers and barriers

In a next step the problems, drivers and barriers (political, economic, social) for travellers when using (existing) information services are identified. In particular suppliers make specific needs on a service platform for the connected traveller. Similar as for the traveller, problems, drivers and barriers for suppliers and government / local authorities are also identified.

- Service price guidelines

Concerning the economic aspects from the end-user point of view, a detailed analysis is performed in order to identify potential user buying motives and to determine the value of the services to the different user groups.

- Scenarios

Scenarios are written to clarify and define the usage of the **i-Travel** system and the needs of the users. In these scenarios fictitious characters called personas are used to represent the different user types that might use a product. The "personas" are used in the scenarios to facilitate the **i-Travel** platform to be designed from a user centered perspective. They make it easier to form a common view within a design team of user wishes and demands. The "personas" used in the scenarios represent a user group with characteristics which are derived from the desk research activity (see chapter 5). WP1 ("**i-Travel** Methodology" PTV, 2008) provides input for scenarios and use cases.

- User and **i-Travel** agent needs

The specific user needs are deduced from the different scenarios, and summarized in a more general way. Based on these user needs, the **i-Travel** agent needs and the supplier needs are formulated. The user and supplier needs are input for both the use cases and task 2.4.

- Detailed generic use cases

By combining the user and supplier needs with offered services from the different scenarios, a number of detailed use cases is formulated. These use cases are not directly linked to existing services to prevent the use cases to be too limitative, the use cases are therefore generic by nature. They do however offer detailed information on needs to enable task 2.4 to generate user requirements. The resulting set of detailed use cases will be input for further research work in WP3 and WP4.

- User requirements

It is important to focus on what travellers expect from **i-Travel** and what suppliers require from **i-Travel**. For formulating a cluster of requirements it is necessary to know what the different needs for users (travellers and suppliers) are. Also drivers and barriers for users are very important. The detailed use cases from task 2.3 are used to define the user requirements.

4.2 Methodology and main activities

The research and development work of WP2 was based on a thorough desk research activity, a two days workshop with key experts of the WP participants and field research with a group of **i-Travel** European stakeholders. The WP2 results and conclusions are derived from the findings from each main activity, together with specific results received from WP1.

Desk research
To gain background information and enrich the knowledge to the **i-Travel** subject, a desk research of user types, travel types, user needs and service prices was performed. This desk research consisted of a literature study and interviews with experts on ICT, human behaviour, public transport and mobility and logistics. Furthermore the input from Work Package 1 was used to complete the desk research.

Workshop
A two day workshop that was held in Berlin (at DLR offices) gathered key experts from the WP2 participants for fine-tuning and to exchange knowledge on **i-Travel** WP2 concepts. Specifically the workshop discussions contributed to a) generate a common feeling about what a "scenario" should be like, b) generate an idea about how traveller and supplier types should be looked at in **i-Travel** and c) to receive input for the scenarios.

For the workshop the Metaplan method (Schuman, 2005) was chosen. This interactive method allows a group to generate large amounts of information and cluster this input in a visual way. Furthermore it allows prioritising the gathered information while discussing the delivered input and the formed clusters.

Field research
In order to identify market and system requirements of an **i-Travel** service, representatives from different European (**i-Travel**) suppliers, service providers, information providers and public authorities.

The information collected and developed during the workshop, together with the results of the desk research and the field research, was processed and aggregated into each WP2 research theme. The next chapters describe the analysis work and the findings from each of these activities, followed by the research results and conclusions.

5 Desk research

5.1 Introduction

In this chapter an overview is given of desk research findings on the main research themes and definitions for each proposed task, namely:

- user characteristics,
- user types,
- drivers and barriers for users and suppliers,
- user needs,
- travel types,
- supplier types,
- supplier needs, and
- user requirements

Reviewed literature and references are listed further in the document.

User characteristics, user types, user needs and use cases
User characteristics differ from user types because the first are 'psychological' features of the traveller which are 'fixed' whereas the latter are variable and depend on the context the traveller is in. The user needs develop from a combination of these user characteristics and user types. For the use cases (see chapter 10) we have chosen a classification for user and travel types and user characteristics. This choice is explained throughout this chapter.

5.2 User Characteristics

Classifications for user characteristics are based on psychological characteristics including behaviour or mood of the user. The psychological 'part' is 'fixed' where mood and behaviour change. In the literature a couple of classifications were found. We do not go into detail about these classifications, but mention three interesting ones, two of them were adopted for the use cases.

Specifically for the behaviour aspect, a classification is made for car drivers (Tertoolen et al., 'De automobilist op de divan'). This classification can also be extended to travellers in general.

- **Well-considered behaviour**: this user considers alternatives carefully. This behaviour is sensitive to changes based on user evaluation before and after the use.
- **Behaviour as usual**: the user behaves as he usually does when finding himself in the same situation (or within a certain range of this situation). Afterwards he evaluates if this behaviour was satisfying. Only after a couple of negative evaluations will the user adjust his behaviour.
- **Behaviour by reflex**: the user behaves with reflexes: instinctive reactions on (changing) situations. To get out of this behaviour the user has to recondition, there is no evaluation of the level of satisfaction of the behaviour. Changes are very hard for this type of behaviour.

In the Workbook Value Engineering (Booiman, 2008), the following consumer archetypes are defined:

- **Ares / Life fulfiller**: flexibility, fascination & challenging
  Ares symbolism is strong and bold, full of power and energy. Everything feels fast and furious, pushing the limits to express Ares confidence and independence. This is not about conformity or following the crowd - here the individual is king. In some markets there's even a sense of adventure and daring. Brands in Ares often lead the way, breakings new ground in a market.
- **Zeus / Individualist**: status, exclusivity, attention, rest, personal care
  Zeus is all-powerful. There's a self-assured confidence here backed by a sense of force that's not to be trifled with. In many markets this comes with a touch of glamour and sophistication. Brands here often set the gold standard, making this high value territory - but fiercely contested.
- **Apollo / Functional planner**: efficiency, speed, control

Apollo brings refinement and intelligence with a sense of composure. Efficiency and understatement ensure nothing is out of place and the feeling is quietly restrained. To reach the Apollo archetype brands need more than glamour and glitz - substance and solid credentials are essential.

- **Demeter / Security seeker**: security, thoughtful, safety, protection
  Demeter is caring and gentle in nature which means reassurance and security. There is a feeling for contentment and harmony which rarely pushes out of the comfort zone. Brands in this territory do well to offer absolute authenticity - whether it's the product, the packaging or the service delivery.
- **Hera / Company seeker**: fun, conviviality, warm, open, friendly, easy going
  Hera is down to earth and practical. There's no room for pretension here but rather a sense of sharing and togetherness which is warm and welcoming. Brands that express the Hera archetype are mainstream and unpretentious so they feel accessible to everyone.
- **Aphrodite / Leisure seeker**: leisure, uncomplicated, no worries
  Aphrodite is bursting with energy and life. Fun and freedom rule. With this comes sense of letting go, making Aphrodite the most indulgent and pleasure seeking territory. To play in Aphrodite a brand can't take itself too seriously.

These archetypes describe general characteristics of users and focuses on their marketing needs.

The Dutch Highway Agency (Rijkswaterstaat) also made a classification (AVV, 2003), (Rijkswaterstaat, 2005). It addresses psychological characteristics users have. This classification is based on the fact that for example some people have a relaxed state of mind, whether they are on a business trip or on a holiday. Other people want to travel as efficient as possible, regardless of their budget or the time available. The next text describes the characteristics, and the percentage of travellers belonging to each category (a person belongs to one category).

- **Result and function oriented (planner) (18%)**
  Result oriented travellers consider mobility as a functional means to get from A to B. They have little pleasure from being mobile, because it is a waste of time. They try to reduce the number of trips and travelling has to take place in the most efficient way. The result oriented traveller frequently investigates the best route in advance to reach the destination as soon as possible. Their strong need for certainty influences the choice for the transport mode. Result oriented people want to be sure they arrive on time at their destination.
- **Conscious choice of trip (17%)**
  Mobility is more than only the required travel time to get from A to B. Mobility is an aim in itself, it is important for the mental and physical health and thus the quality of life of these people. The Conscious travels now and then just to relax. Being on the road is a component of the travel aim. They choose a transport modality which suits the circumstances best, such as destination, travelling company and available time. Other important criteria are the environment, physical movement and the possibility for entertainment.
- **Image oriented (21%)**
  For the image oriented people mobility is a symbol for independence, the possibility of going where and when the person wants. They want to go their own way. Mobility is for the image oriented an expression of their social position. Being more mobile than others or having busier lives then others, gives the image oriented an image of how successful someone is. The image oriented hope to find in mobility a way of being “busy”. By their manner of travelling they can confirm their expertise, for example by taking smart routes or being able to work during travelling.
- **Company and leisure seeker (18%)**
  For company and leisure seekers mobility gives possibilities to maintain social contacts. For this group mobility has especially a social function. They experience the trip as pleasant and enjoy it if they can make a chat with people. Time is not important for them. They can put negative aspects of mobility, such as traffic-jams, in perspective. If they are delayed, they do not really care. For the choice of transport, the absence of stress is an important criterion.
- **Acquiescent and security seeker (26%)**
  The acquiescent travellers do not like mobility but consider it as necessary. They are quiet and will not worry about mobility. They experience travelling often as unpleasant, but finding possibilities to make travelling more pleasant is too much effort. The acquiescent take the situation such as it is. Being part of a traffic jam is not nice, but getting angry about the

situation has little usefulness. The choice for a transport mode is made based on practical considerations.

The final classification below, used for the use cases, is mostly based on the above classification. Some consumer characteristics are added to this classification from the characterizations in the Workbook Value Engineering.

- **Result and function oriented (planner)**

Efficiency, speed and control. Result oriented travellers consider mobility as functional means to get from A to B. They have little pleasure on being mobile, because it is a waste of time. They try to reduce the number of trips and travelling has to take place in the most efficient way. The result oriented frequently investigates the best route in advance to drive so that they are as soon as possible at the place of destination. Their strong need for certainty influences the choice for the transport mode. Result oriented wants to be sure that they arrive on time on their destination. As a consumer the Result oriented brings refinement and intelligence with a sense of composure.

- **Conscious choice of trip**

Mobility is more than only the required travel time to get from A to B. Mobility is an aim in itself, it is important for their mental and physical health and thus the quality of life. The Conscious travels now and then just to relax. Being on the road is a component of the travel aim. They choose a transport modality which suits the circumstances best, such as destination, travelling company and available time. Other important criteria are the environment, physical movement and the possibility for entertainment.

- **Image oriented**

Status, attention, rest and personal care. For the image oriented people mobility is a symbol for independence, the possibility of going where and when the person wants. They want to go their own way. Mobility is for the image oriented an expression of their social position. Being more mobile than others or having busier lives then others, gives the image oriented an image of how successful someone is. The image oriented hope to find in mobility a way of being “busy”. By their manner of travelling they can confirm their expertise, for example by taking smart routes or being able to work during travelling.

- **Company and leisure seeker**

Fun, open, friendly, easy going and full of energy. For company and leisure seekers mobility gives possibilities to maintain social contacts. For this group mobility has especially a social function. They experience the trip as pleasant and enjoy it if they can make a chat with people. Time is not important for them. They can put negative aspects of mobility, such as traffic-jams, in perspective. If they are delayed, they do not really care. For the choice of transport, the absence of stress is an important criterion.

- **Acquiescent and security seeker**

The acquiescent do not like mobility but consider it as necessary. They are quiet and will not worry about mobility. They experience travelling often as unpleasant, but finding possibilities to make travelling more pleasant is too much effort. The acquiescent take the situation such as it is. Being part of a traffic jam is not nice, but getting angry about the situation has little usefulness. The choice for a transport mode is made based on practical considerations. The traveller doesn’t seek adventure; on the contrary, contentment, harmony and reassurance are important.

5.3 User types

For user types we consider the physical manifestations of the traveller. This manifestation may change depending on the user’s context.

A classification often used in the literature (for example (Tertoolen, 2004) and (Tertoolen, 2002)) is the following:

- **Car captive**: has access to a car, public transport is not an option.
- **Potential public transport traveller**: owns a car and does not use public transport, but is not unsympathetic towards it.

- **'Choice' traveller**: has access to a car and uses both car and public transport.
- **Public transport captive**: does not own a car and is fully dependent on public transport.

Another classification is based on the users' willingness to change modality based on former behaviour and intentions for the future (Jong, de, et al., 2005):

- **Pre-contemplation**: no tendency to change behaviour (for example a car driver that doesn't consider public transport).
- **Contemplation**: a planned change of behaviour, between 1 and 6 months.
- **Preparation**: indicates that the car driver will use public transport within 1 month.
- **Action**: the user has used public transport successfully for a period between 1 day and 6 months.
- **Maintenance phase**: this phase is reached when public transport is successfully used for a minimum of 6 months.

These two classifications aim especially on the contrast between travelling with public transport and travelling by car. In **i-Travel** we consider multimodal travel and we do not want to make such a distinction. Also, travelling by bike or boat is not mentioned in those classifications. Especially the combination of public transport and cycling is used a lot. For **i-Travel**, using a (rental) bike in an unfamiliar city after travelling by public transport is very interesting.

The classification in the Workbook Value Engineering (Booiman, 2008) consists of two types of users: business customers and individual customers. This classification is too limited for the usages of **i-Travel**.

Another often mentioned differentiation is between businesses or work travel versus leisure time travel. This classification often implies two things: importance of the travel (work being more important than leisure) and budget (higher budget for work / business than for leisure). The differentiation is relevant not so much to user needs as well to the business case of the **i-Travel** concept.

Other classifications that can be made are based on age of the user, special needs of the user, frequency (experience) of travel, budget of the user, number of people that travel together, etcetera.

The arrangement that we have chosen for the use cases combines parts of the above classifications, resulting in three distinct user types.

- **Special needs**
  This is an individual with special needs, which have to be taken into account when planning and travelling. This could for example be a disabled person, an elderly person, a pregnant women, someone with a broken leg or someone with diabetes.
- **Group**
  The traveller can travel as part of a group. This can be a family, a tourist group, a student group etc. The effect is that things have to be organised to facilitate more than one person. We define a group as more than five people.
- **Individual**
  The individual travels alone and has no special needs. This might be a business traveller, a tourist, or any other person travelling.

Further specification to come to the personas used in the scenarios is made by combining this user types with user characteristics and travel types.

5.4 Drivers and barriers of end users

The use of an **i-Travel** service for end users is linked to specific drivers and barriers, criterions which encourage or avoid the use. These factors differ from user type, trip type and miscellaneous socioeconomic characteristics. The following enumeration represents a summary of the most significant influences. For a complete examination please refer to Annex III.

Drivers	Barriers
▪ Time saving ▪ Real-time traffic information ▪ Assistance on unfamiliar trips ▪ Mobile navigation ▪ Translation of information and services ▪ eTicketing ▪ 24/7 access to services ▪ Reliable post-trip data ▪ Personalized automatic recommendations and booking ▪ Travel guide ▪ First hand recommendations ▪ Logbook of trips ▪ Provision of prevailing emergency information ▪ Costs	▪ Limitations in amount and quality of provided on-trip information ▪ Possibility of losing the device ▪ Necessity of a suitable handheld device ▪ Limited number of participating suppliers ▪ Loss of physical contact with service personnel ▪ Limited service out of Europe ▪ Reliability of information ▪ Service costs ▪ Roaming costs ▪ Costs of mobile data services ▪ Limited bandwidth in the phone network ▪ Familiarity with IT and nomadic devices ▪ Quality of provided information ▪ Lack of trust in electronic payment systems ▪ Lack of standardized pan-European payment system ▪ Concerns about privacy

Concerning the economic aspects from the end-user point of view, a detailed analysis was performed in order to identify potential user buying motives and to determine value of the services to the different user groups. As a result Services prices guidelines in relation to the end user view are provided in Annex V. The main results are that end users will choose the appropriate level of service according to their needs and willingness to pay;

A. Basic services comprise general information useful for trip planning. The Basic services are aired free of charge and provide social benefit to the general public. These services could be financed through investments of public bodies and institutions and through advertisement. Example of Basic services are:

- Route planner
- Static Timetables of public transport modes
- Weather information
- General Tourist Information

B. Advanced services comprise information on more complex travel scenarios in city / region / national / international areas and provide additional comfort to the traveller. These services are expected to be free of charge or financed through a one-off payment under different suitable hypotheses. Example of Advanced service functionalities are:

- Map based real time traffic information
- Dynamic Travel Times
- Single and Multimodal route planning taking into account service disruption and events (e.g. traffic jams)
- Information on free parking spaces and reservation in a parking area

C. Value-added services: on the above mentioned Basic and Advanced services it is possible to build customised and personalised services. These services are distributed through a conditional access channel and are hence only available to subscribing users. The Value-added services provide personalised comfort and are financed through subscription fees. Examples of Value-added services:

- Personalised on-trip information
- Context aware traffic alerts and alternative multimodal route suggestions

- Delays and service interruptions of public transport modes and alternative transport suggestions

5.5 User needs

User needs are all the prerequisites and requisites of the user before and during his travel. The user needs depend on the type of user, his characteristics, his type of travel, his mood, the day of the week, his fellow travellers, and so on. In this paragraph we do not try to make a complete list of user needs. However, the most important user needs found in the literature are listed here.

The user needs are divided into information needs and general needs. Information needs say something about the kind of information that the traveller needs. General needs say something about how this information should be presented, what requirements the information should meet or how the user reacts to the information.

Information needs (TNO, 2005):

- Time of departure and arrival
- Alternative routes in case of disruptions
- Do I catch my connection/transfer?
- Give information when something goes wrong
- Is my trip going as planned?
- Points of interest (hotel, museum, restaurant)
- Directions (navigation)

Navigation, time of departure and alternative routes in case of disruptions are the most important information needs.

General needs (TNO, 2005), (AVV, 2003), (De Jong et al., 2005):

- The service should
    - Have a low price
    - Be fast
    - Give no stress while using
    - Be user-friendly / easy to use
    - Be available on several devices
    - Be available 24 hours/7 days
    - Be standardised (content and user interface)
    - Be flexible
- The information the service offers should
    - Be reliable (the most important general need!)
    - Be user-friendly / easy to understand
    - Be interactive
    - Offer solutions (not only a message when something goes wrong)
    - Be specific
    - Be personalised
    - Anticipate on the situation
    - Be multilingual (in the language of the end-user)
    - Be standardised (in a uniform visual format and layout regardless of for instance location or modality)
    - Be complete but concise (not only a small part of the information and a reference to a website)
    - Take the traveller serious
    - Relate to what the traveller experiences

People within the 'special needs type' have **additional information needs**. These needs have to be considered when developing services. Examples of such information needs are (Oxley, 1997):

- Accessibility to a certain location or vehicle for wheelchair users.
- Availability of staff for assistance on a location or vehicle.
- Regarding stations and termini
    - Accessible toilets, refreshment facilities, information, telephone and help points

    - Accessible waiting rooms with information (visual and audible) on transport services
    - Induction loops for people with hearing aids at ticket/information offices
    - Guidance through the terminal for visually impaired people
    - Audible as well as visual announcements
- Costs including availability of reduced fares for disabled people and/or their companion
- Information on how to book a ticket/reserve a seat (particularly for wheelchair users and blind travellers) and method(s) of payment (ticket purchase, smart card etc.)
- Information on types of wheelchair that are accepted on the mode of transport
- Procedures to be followed at terminals which are only used occasionally (air, sea)
- Means for speech impaired people to book service and to request information at ticket/information offices
- Availability and location of parking spaces reserved for disabled travellers.

Besides information needs, disabled people have special general needs regarding the accessibility of information. Information has to be readable, audible, visible or noticeable. This means that the information has to be accessible in several ways, for example as oral text, written text, pictures or braille. More information on how travel information on devices can be used to help disabled people be more mobile can be found in (Pijl, van der, et al., 2005) and (Cremers et al., 2005).

5.6 Travel types

In the literature different classifications can be found. We decided to make use of the following one and to adapt it in the following to suite the **i-Travel** needs. (Infopolis 2, 1999):

- **Significant trip**: trip where information is needed. These trips are mostly occasional travel, but also regular travel with a great importance to the traveller (for instance, an important professional meeting can lead someone to check their travel planning, even if it is a daily travel).
- **Regular trip**: this is a trip with no significance on information needed by the traveller. Normally a regular trip can also be an occasional trip where time is of little concern (for instance a holiday departure with no time limit).

The classification we choose to use for the use cases can be found in for example (TNO, 2005) and (AVV, 2003). The travel types have two dimensions: familiarity with the route and familiarity with the travel time (or itinerary). Combining these dimensions we get three travel types:

- **Regular travel**
  The route and travel times or itinerary are known. This might be a commuter.
- **Familiar travel**
  The route is known, but the travel times or itinerary is unknown. This might be a business traveller on his way to a known client which he visits a few times a year.
- **Unfamiliar travel**
  The route and travel times or itinerary are unknown. This is a person on a trip for the first time.

We use this classification for the travel types because the travel types are directly related to the information needs of the user and it does not, as the classification in two groups above, mix user characteristics with travel types.

5.7 Supplier types

For a classification of supplier types, we use the research done in WP1, **i-Travel** Methodology (PTV, 2008):

- Service operator: operation of the technical infrastructure (for example route planning, airline portal)
- Communication provider: needed for the communication between the e-marketplace (service provider) and the travelling user as well as for the communication between information providers and service provider (those who manage communication, navigate and locate such as Orange and Vodafone).
- Manufacturer of mobile devices: they define the technical standards for mobile phones, handhelds, PDA's, navigation systems.

- Transport system operator: operation of the technical infrastructure and related services. Often established in the same company as information providers, maybe different departments within the companies (airlines, car rentals, etc).
- Advertiser: using portals or vehicles as a marketing platform (for example agencies selling ads).
- Service provider: offers the service to the user (for example portals like www.expedia.com or route planners like www.routenet.nl).
- Information provider: provides information such as traffic information, schedules (for example airlines, Deutsche Bahn).

5.8 Drivers and barriers of suppliers and public authorities

For suppliers and public authorities the benefit of providing additional services is even more essential compared to the end user. For businesses there is a financial interest, for local authorities the services help in their traffic management / planning role but also in environmental and social goals they have. The following enumeration represents a summary of the most significant influences. For a complete examination please refer to Annex IV.

Drivers	Barriers
▪ New business from new services* ▪ More revenue ▪ Cut in cost (e.g. advertising) ▪ Advertising (of products, services, but also City marketing and tourist information) ▪ Promotion of provided services ▪ Higher customer satisfaction ▪ Better (statistical) information for planning and marketing ▪ Increased possibilities of interventions in traffic management ▪ Marketing instrument to get more off peak travellers in public transportation ▪ Increased efficiency of public transport ▪ Improved accessibility of public transport ▪ Cleaner environment by increased use of public transportation	▪ Investments ▪ Operating costs ▪ Uncertain business model ▪ Starting a new service from scratch ▪ Fear of loss of power by sharing data ▪ Losing the possibility of marketing on the suppliers own website ▪ Sharing of identity sensitive information ▪ Fear of competition of public transport companies

- * New services e.g. “pay as you go” for health, car and travel insurances; Easy payment for buying tickets (in public transport); cross selling and up selling possibilities

5.9 Supplier needs

There are several types of supplier needs depending on the type of supplier. The general need of the supplier is that there is enough demand for his product; otherwise it is not attractive to produce the product. It is also possible that a supplier is supported by subsidies, or the use of advertisements on websites which can help him to make a profit
Research within the IRIS project (2000) showed that 55% of the respondents indicated that they would pay for certain information services for public transport.

In the next table an overview of supplier needs is given, extracted from a definition of use and users of **i-Travel** (task 2.2).

Supplier	Use of i-Travel	Supplier needs
Service provider[1]	▪ Customize services according to the traveller’s profile. ▪ Offer customized services like	▪ Needs to have access to the traveller’s profile. ▪ Needs to have standardized access to

[1] This ‘service provider’ is renamed ‘**i-Travel** service provider or travel agent’ in the rest of the document to emphasize this to be the supplier to the end user of the **i-Travel** platform.

	air-, train- or ferry ticketing, hotel finder and booking to the user. ▪ Provide a complete door to door travel across Europe. ▪ Provide changes during the trip to the customer and replan the trip (if necessary).	information about all services (such as airlines, trains, hotels) in Europe: timetables, schedules, availability, prices, maps etc. ▪ Needs to be able to match the traveller's profile to the information about the services. ▪ Needs to have the knowledge and skills to establish new profitable services.
Service operator	Enable information providers to manage all incoming information	Needs to have a well-equipped infrastructure to enable information providers to manage all incoming information.
Communication provider	▪ Bring mobile data services to the mass market. ▪ Possibility to establish a new profitable service. ▪ New payment plans – more flat plans.	▪ Needs to have access to the mass market. ▪ Needs to have the knowledge and skills to establish new profitable services. ▪ Needs to have the knowledge to create new payment plans.
Manufacturers of mobile devices	▪ Establish new technologies of mobile user end devices. ▪ Enhance location based services and value added service capabilities of devices. ▪ Bring high end technology to the market.	▪ Needs to be informed about new technologies on mobile user end devices. ▪ Needs to have the knowledge and skills to enhance location based services and value added service capabilities of devices. ▪ Needs to be able to have access to the market. ▪ Need for versatile and easy to program open software Platforms and development frameworks (e.g. .NET, J2ME, OSGi, Symbian, BREW, GST) to drop costs in companies and be more innovative.
Transport system operator	▪ Provide traffic related information to the information provider (schedules, delays…). ▪ Optimize transport through multimodal route planning. ▪ Enhance attractiveness of public transport regarding to completely informed passengers. ▪ Improve image and public awareness. ▪ Increase number of passengers. ▪ Enhance cost efficiency.	▪ Needs to have access to (real-time) travel information of the related transport. ▪ Needs to be able to provide his information to the user through an information provider and a service provider. ▪ Needs to inform the public (through an information provider and a service provider) about the transport and promote it. ▪ Needs to optimize the costs. ▪ Needs to have access (by means of standardized interfaces) to all information needed to optimize multimodal transport.
Advertiser	▪ Sell ads. ▪ **i-Travel** gives the possibility to offer personalized ads according to the traveller's profile.	▪ Needs to have access to marketing platforms. ▪ Needs to be able to couple a travellers profile to a product the advertiser sells.
Traffic Information provider	Provide actual traffic information, schedules, and delays to the service provider just in time to reach a wide number of travellers.	Needs to have access (by means of standardized interfaces) to (real-time) traffic information such as schedules, platform numbers, delays and congestion.

5.10 User requirements

A requirement is a condition or capability needed by a user or supplier to solve a problem or achieve an objective. In addition to the work done in this project, we have considered some findings from recent traveller focussed research to be relevant for specifying the user requirements from the traveller's (and thereby also the supplier) perspective:

- **Users need to feel in control**
  People need to feel confident in the way they move in unknown areas. Travellers need to feel in control. Providing travel information is an import tool giving travellers confidence, it takes away uneasiness and anxiety. (From: 'InSight – Experiencing public safety at train stations', A. Slegers, Vialis/TU Delft, March 2008);
- **Multimodality**
  Users experience a lot of difficulty combining different modes of transport, not only for the information of trains, public transport, flights and traffic but also of the unlinked infrastructures themselves. (From: 'Exploring New Possibilities: New Strategic Positioning of the VTF', E.J. Escano, Vialis/TU Delft, September 2007);
- **User context**
  Different user types/characteristics have similar but also differentiation of needs. On a higher level, the context of user is relevant to the **i-Travel** services. (From: '*The traveller's experience of public transport*', E. Fleskens, Vialis/TU Delft, August 2007 and 'Exploring New Possibilities: New Strategic Positioning of the VTF', E.J. Escano, Vialis/TU Delft, September 2007);
- **Connecting the real world**
  Travellers need to be explained what kind of information they are being offered. They need to be explained where information or transfer connections can be physically found. Travellers need to be able to connect travel information to the real world. (From: '*Informatievoorziening op een dynamisch busstation*', S. v. Wayenburg, Vialis/TU Delft, 2002 and '*The traveller's experience of public transport*', E. Fleskens, Vialis/TU Delft, August 2007).

Annex XI reflect an abstract from 'Exploring New Possibilities: New Strategic Positioning of the VTF', E.J. Escano, Vialis/TU Delft, September 2007 and '*The traveller's experience of public transport*', E. Fleskens, Vialis/TU Delft, August 2007.

6 Field research

In order to identify market and system requirements of an **i-Travel** service, interviews were held with representatives from different European (**i-Travel**) suppliers, service providers, information providers and public authorities. The transcript of the interviews can be found in Annex IX[2].

The interviewed organizations were chosen within the network of the **i-Travel** partners, with the concern to have at least one representative from each group of suppliers and authorities

6.1 Interviewed organizations

The interviewed companies/institutions are by name in alphabetical order:

- 9292ov.nl: service provider on multimodal travel information;
- Amadeus: service provider and operator on airline booking and travel information;
- Flemish Government -Department Mobility & Public Works; public authority;
- Dutch Rail (NS): transport system operator;
- POLIS – European Cities and Regions Networking for Innovative Transport Solution;
- Public Transport Bologna (ATC): transport system operator;
- Routenet.nl: service provider on route guidance and traffic information;
- Telematic Technologies for Transport and Traffic in Turin (5T): service operator on multimodal travel information;
- Transport for London (TfL): Transport system operator.

Due to the need to protect their business interest, answers are not linked to the interviewed company or institution.

The questionnaire consisted of six question groups:

Question 1 – market analysis:
Do you think there is a market for a service that provides multi modal traffic information with dynamic rerouting (e.g. in case of traffic congestion, table delay or other travel interrupting impacts) and which traveller types do you think will make use of it?

Question 2 – supplier community:
The main target of the project **i-Travel** is to design interfaces and to connect existing services to a service platform. Would service and information provider be interested in this development? Which possibilities do you see in covering a whole travel chain and how to attract service and information provider to allocate these interfaces?

Question 3 – HMI (Human Machine Interface):
What kind of difficulties do you see in designing an appropriate HMI to facilitate multi modal traffic information and what are possible approaches?

Question 4 – Design of user profiles:
What types of information are needed for the provider to design user profiles which allow offering adaptive services to the user?

Question 5 – Service price guidelines:
What are people willing to pay for personalized traffic information (monthly rate, on demand, percentage of mobility budget …)?

Question 6 – Payment system:
What are the main obstacles to implement a pan-European trusted payment system for travel service on nomadic devices?

[2] Due to the limited number of interviewed people no hard conclusions can be drawn from these interviews. The information is however useful to illustrate first of all that different partners have different views on the opportunities **i-Travel** would offer.

6.2 Interview summary

All interviewed partners predict a positive market potential for **i-Travel**. Minor differences can be found when focusing on users utilizing different **i-Travel** services, especially advanced services found in the marketplace. As stated in the interviews, **i-Travel** will be more attractive for travellers in short of time for planning and travelling (like business travellers). For those travellers accurate planning and providing alternatives generate the highest benefits. The willingness of this user group to pay for these service is therefore expected to be higher compared to private users. The interviewees assume private users won't pay for the advanced services. This because they say the majority of people see traffic information as an ubiquity service of transport operators or the government.

The interest of the supplier community to participate in **i-Travel** is rated as high. But obstacles are seen in quality and standards of provided data as well as the management of ownership of data. This should change to a more open system. Some people see benefits for all stakeholders and possibilities for profitable business models. In some countries negative experiences concerning the collaboration with PTO's (Public Transport Operators) which try to bring their information to market exclusively are reported.

Equal standards were mentioned again when it comes to the challenge of designing an appropriate HMI (Human Machine Interface) for nomadic devices. Almost all interview partners mentioned the need of an easy adoptable application for different devices. Furthermore difficulties of the adaptation of multilingual interfaces are reported while others accentuated especially the technical approach which emerges from diversity of devices on the market.

Customized user profiles according their preferences should be one of the central features of **i-Travel**. In a next step this information should become enriched with personal preferences e.g. according routes for ordinary repeatedly performed trips, modes of transport and preferred hotels and suited to the travel schedule of the user. The required user information to generate these profiles is very personal and might be socioeconomic sensitive. Customer rights management (CRM) therefore is an important issue to tackle.

As already mentioned before all interview partners see the service price as the most crucial issue. So far traffic information services are regarded as free and it will be difficult to convince an adequate amount of people to pay for these services. Test runs have to be accomplished to figure out how much people are willing to spend. This could lead to different payment models like pay on demand, monthly rates or the provision of different service levels where main services like retrieving traffic information is meant to be free to the end user.

However there is no shortage of ideas of payment models, problems are seen in solving different security issues in payment. People do not trust their mobile devices for payment at the moment. This has been reported in several surveys in the past. Further issues are the roaming costs, inflexible billing systems and the lack of national and international standards.

The following chart outlines the most important statements of the interview partners from the interviews arranged by question.

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5
Market analysis - Service potential - Potential users	Yes – but limited Traveller short in time for planning and transfers	Yes – but limited Traveller short in time for planning and transfers	Yes – but limited	Yes – but limited	Yes – but limited Traveller short in time for planning and transfers
Supplier Community	Service and information provider are very interested	Interested supplier community – but comparable system already in the works	No comment	The existing model of providing information to selected partners will change to a more open system.	Information provider prefer exclusiveness of information
HMI	Main conditions are equal standards of allocated data	No issue	No issue	Lack of proper input device is a critical issue.	No issue
Design of user profiles	Length of trip determines needed information. User preferences of modes of transport should be provided.	User picks from a range of offered services by the service operator.	No comment	Personalized destinations	A travel schedule and preferred modes of transport are necessary.
Service price guidelines	On demand – Pay per use	Unknown – only marginal awareness to pay for ITS services.	No comment	Very little – nothing	Very little – nothing
Payment System	Providing a certified pan-European payment system	Common standards needed and cross border roaming	Limited willingness of the customer to pay	Very complex issue	No issue
Obstacles			Difficulties in gathering qualified data		

Interview summary scheme

	Expert 6	Expert 7	Expert 8	Expert 9
Market analysis - Service potential - Potential users	Yes – but limited Traveller short in time for planning and transfers	Yes	Yes Local and long distance traveller with different needs encouraging intermodality.	Yes Different target groups with an encouragement of intermodal trips.
Supplier Community	Benefit for information and service providers. Involvement of public transport providers is essential. Commercial service providers could increase their earnings.	Encouraging the connection of existing services while proposing attractive business models.	Diverse quality and ownership of provided data	Information provider should form an consortium – agreement on equal standards and data exchange
HMI	Solution has to be easy adoptable for different devices. The optimal solution is a customized web based client application.	Several software solutions have to be designed to fit different devices.	Difficulties are multilingualism, amount of information presented and diversity of devices	Comfortable desktop interface and mobile interface considering restricted user input, screen size and communication costs
Design of user profiles	Different socioeconomic data and trip type	Preferred modes of transport, trip type, type of mobile device used, , language and preferred interaction	A travel schedule and preferred modes of transport are necessary considering also flexible and non flexible elements of the trip chain	Pre-recorded Customer Relationship Management (CRM) and payment information
Service price guidelines	Information should be delivered for free to the end user and paid by public entities and service providers.	The amount of costs has to be levelled within the first implementations.	Crucial issue – depending on quality of information and trip nature.	Basic information should be free-to-use. Different models suggested for Advanced Travel Information Services (ATIS)
Payment System	Payment modality is unclear at this moment	People do not trust their mobile phones for online payment.	Inflexible billing systems prevalent in the transport sector. Insecurity that required performance and security is supported.	Lack of non-proprietary standards on nomadic devices. Closer investigation on security, authentication and authorization needed
Obstacles		Organization of information provider is insufficient.	Psychology of intermodality – inflexibility of travellers. Concerning availability of road traffic data – especially suburban areas. Inflexibility of ticketing and reservation policies	Mobile devices feature only a reduced memory and display size, lower processor performance and battery life. Mobile requirements ask for high end devices.

7 Scenarios

The concept of "Scenarios" is here applied to clarify and define the usage of the **i-Travel** system and the needs of the users. Based on the information collected from the workshop with project members, the stakeholders' interviews and the desk research a set of scenarios was developed. These are described in the following chapter.

7.1 Personas

The available information from the workshop, interviews and desk research was aggregated into a format for partners to use for the scenario and services generation (see Annex VI). To facilitate the **i-Travel** platform to be designed from a user centred perspective, personas were created in the scenarios. These personas and the specific characteristics are listed below.

Nr.	Persona	User characteristic	User type	Travel type
1	Psychoanalyst Madeleine	Acquiescent and security seeker	Individual	Unfamiliar
2	Ingrid	Company seeking traveller	Individual	Unfamiliar
3	Mother Martha	Result and function oriented traveller	Individual	Familiar
4	Accountant Dick	Conscious traveller	Individual	Regular
5	Helen	Young, leisure seeking woman	Individual	Regular
6	Henk, a blind tourist	Result oriented traveller with special needs	Special need	Unfamiliar
7	Project manager James	Conscious traveller with special needs	Special need	Familiar
8	Financial director Sam	Image oriented person with special needs	Special need	Regular
9	Pensioners in their sixties	Group of six notable, image oriented travellers	Group	Unfamiliar
10	Italian women association	A group of social and leisure oriented travellers	Group	Familiar
11	Colleagues from municipality	Group of five, conscious travellers	Group	Regular

Overview of scenarios for different combinations of user and travel types.

7.2 Scenarios and services

In total, eleven scenarios have been written to cover all combinations of user and travel types. The different scenarios and offered services can be found below. An overview of all offered services is given in Annex VII.

1 MADELEINE visits her son's B&B in RURAL SPAIN

Madeleine is a single and recently retired Dutch psychoanalyst with a tight budget. Her son has moved to Spain and is converting a Castilian Farmhouse into a B&B in a rural setting, in the midst of a natural park. Madeleine has visited her son once by car with relatives but now has decided to take a low-budget flight herself (unfamiliar trip), taking with her a set of new curtains for her son. Her daughter has offered to make the arrangements through internet. She lives in Wageningen, in the centre/east of the Netherlands. Madeleine is accepting, she doesn't like mobility but considers it as necessary. She experiences travelling often as unpleasant and seeks reassurance.

Madeleine and her daughter are sitting one evening together for an internet orientation: Google search and browsing websites for low-fare flights and relevant airports based on their own knowledge and friends' advice. They are considering several possible departure and destinations for various airlines, comparing the offers, time and dates, and the possibility of direct flights or transfer options. While exploring the options, additional considerations are public transport options and getting by car to and from the airports and preference for daytime travel hours.
Madeleine takes with her by air a new set of curtains for her son to be put up in his new Bed & Breakfast before the new season opens. As for reasons of her luggage, public transport in addition to

flying is no option. Apart from her special luggage, to her this is too difficult, tiring and stressful to consider. Madeleine has very limited understanding of Castilian language. But above all she likes to be taken by car by her son. Her son is very busy in order to get the B&B ready: to get to and from the airports of Bilbao or Burgos, will take him at least half a day's travel meanwhile leaving the construction works unattended. However, having heard all his mothers' arguments and sentiments, Madeleine's son has agreed to pick her up at the airport of her choice.
Having considered a range of options, Madeleine chooses to fly from the German airport of Düsseldorf to Bilbao Airport. Although this is an unknown airport to her, the price difference with her well-known Amsterdam Schiphol airport is a critical decision factor. Her English is good and her German speech has proven to be adequate for travel. Also to her daughter who has offered to drive her to Düsseldorf this is an unfamiliar airport, but she had learned before from friends that it has good car access.
After consulting with her son on an alternative date with an economic fare, the decision finally is being made. On her request, her daughter books Madeleine's flight through internet by credit card. The booking succeeds on the 3rd attempt after 2 booking requests fail due to internet time-outs without motivation, which makes them both feel very uneasy. But finally Madeleine's booking is confirmed and she receives her electronic ticket number, which she writes down in her agenda. Being non-German this eTicket has to be validated at check-in with her credit card instead of the expected passport ID.
As her departure date approaches, Madeleine starts to worry over the curtains which she thinks may cause problems at the check-in at Düsseldorf Airport. Madeleine checks her travel insurance and her daughter informs her on the special baggage conditions, physical limitations and related costs through the airlines' website. Her daughter checks her highly appreciated personal navigation device for Düsseldorf Airport and looks on internet for the predicted traffic situation on the day of travel (Monday morning in German industrial zone).
On returning from her journey after one week, Madeleine intends to take the train from Düsseldorf Airport back home in the Netherlands as for her daughters' absence then being on holiday herself. She and her daughter look on internet at the details of the return journey by train from Düsseldorf Airport to Ede-Wageningen and finally from there by bus to her home in Wageningen. It is not possible to purchase the relevant train tickets through internet, but she feels confident on the public transport offered in Germany by the information supplied through internet and decides to buy the train ticket in Düsseldorf.
On the day of travel Madeleine is taken for an hours drive by car with her daughter to Düsseldorf Airport using her personal navigation device. After parking she reassures herself at the entrance of the airport on the expected departure of her flight and the location of her check-in desk. Madeleine checks in with her eTicket and luggage. Her packed curtains are taken by a steward into a separate luggage carriage. She says good-bye to her daughter and goes through customs and her departure gate. She is seated in the waiting area facing the display with flight departure details and the entrance door to the gate. Madeleine has a flight which she considers not to be very pleasing due to the fact that after taking-off the German flight attendants could not assign her with another seat on her request. After arriving at Bilbao Airport she has to wait for her package to finally arrive on the luggage-belt and put it on a pushcart. Madeleine has no mobile phone. She finds her son waiting for her after customs and they drive off in his car.
After one week the return journey has arrived. As for the absence of internet and even television-text at her son's place, there is no possibility for Madeleine to check the actual return flight status. Her daughter is not at home to help her now. So on returning to Bilbao International Airport, she and her son arrive by car early. The flight turns out to be operational according to schedule.
At Düsseldorf Airport, Madeleine finds her way to the train terminal following the signs. She queues to buy a ticket at the international tickets desk, takes her printed timetable to identify the correct train and finds her departure platform. Her train pulls in and later in the evening she arrives at the station of Ede-Wageningen after a transfer at the station of Duisburg in Germany. Madeleine takes the local bus to Wageningen which she knows well, walks to her house and calls her son. At her son's place there is very limited mobile phone coverage requiring a specific location to be able to connect, however a traditional fixed line is also available. His mobile phone is out of reach but his wife answers on the fixed line. She lets her know she has arrived. Finally, Madeleine is back home and able to relax.

OFFERED SERVICES

- Geographically based international flight information (all flights, prices and airports)
- Graphic overview of regional public transport: main destinations and timetables
- Flight information, booking a flight and airline travel conditions
- Route planning (offline with navigation system) and route planning online
- Information about departure time and platform (timetable trains)
- Information about up to date flight departures at airport on displays
- Buy international train ticket at service desk and receive printout with travel details

2 INGRID goes to the BELGIAN COAST

Ingrid is 58 years old and lives in The Hague. She does not travel a lot (unfamiliar trip). For Ingrid, mobility has a social function; she likes to chat with other people during trips. For her, travelling has to be relaxing, time doesn't really matter.

Ingrid is going to Oostende for the weekend together with her daughter, who lives in Brussels. They travel separately and stay in a hotel. Her daughter is travelling by car from Brussels to Oostende, but Ingrid doesn't want to drive there by car because she doesn't like travelling alone that far. She has looked on the internet which train she should take.

Ingrid books the hotel on the internet some weeks before the trip and a couple of days before the trip, she orders a taxi at the call centre to take her from her house to the station.

On the day of the trip, the taxi arrives and takes Ingrid to the station. At the station, the taxi driver helps Ingrid with her suitcase and walks with her to the ticket office. At the ticket office, Ingrid buys her ticket to Oostende and goes to the platform.

At the platform she meets an elderly couple who is travelling to Antwerp. They get on the train together and chat away all the way to Antwerp. Ingrid has her mobile phone with her so she can call her daughter when she arrives at Oostende to pick her up at the station.

Before arriving at Antwerp station, the train halts. They have to wait some time before the train moves again and drives into the station. Meanwhile, Ingrid gets a message on her mobile phone that she missed her connection to Oostende. There is a train leaving for Oostende on a far away platform in four minutes. Ingrid hates to run and stress, so she decides to take the train to Oostende half an hour later. In the meantime she has a sandwich at the cafeteria, where she eats together with another traveller. After eating, Ingrid has to leave for her train. When Ingrid almost reaches Oostende, she calls her daughter so she can pick her up. When the train arrives, they meet and drive to the hotel.

OFFERED SERVICES

- Reservation for hotel
- Information about public transport itinerary (train)
- Reservation for taxi
- Purchasing (international) public transport ticket (train)
- Delay notification on connecting service

3 MARTHA to MAASTRICHT

Martha is a fifty-five year old woman living in Soesterberg. She has three children and here youngest son is still in college. He is living in a dormitory in Maastricht. She visits him a least twice a year. This time her one year old grandson is joining her, since his parents are on a trip to Paris. Martha is good organised.

Martha is visiting her son in Maastricht again. She does not like to drive such long distances, so she decides to go by public transport, but Soesterberg has no train station. After checking her options on the Internet, she decides to take the car to Bilthoven, and take the train from there. She trusts her real-time navigation system in the car to guide her to the station in Bilthoven. Fortunately there are no problems on the way to the station.

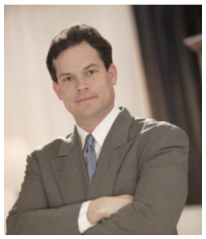
The system suggests her to park in the centre, were there are still enough free parking places. It's only a five minute walk to the station.
Martha buys the train tickets for her and her grandson at the kiosk, because she isn't sure about the prices for little children and would like a trip without too many changes. The service employee suggests taking the sprinter to Utrecht and changing there to the direct train to Maastricht.

During the trip she suddenly realises she packed a lot of food and bottles for the baby, but she forgot something for herself. She uses her mobile devices to order a sandwich at the changing station Utrecht. On arriving at that station she can just pick up the ready-to-go sandwich and change trains.
She already paid for the sandwich in the train. In Maastricht she arrives on platform 2 were her son is waiting for them.

OFFERED SERVICES

- Navigation system
- Kiosk for train tickets
- Pre order sandwich on train
- Mobile payment

4 DICK the ACCOUNTANT



Dick is 46 years old. He works as an accountant for a large company in Amsterdam and lives in the town Alphen aan de Rijn. Five times a week he drives to his work, most of the time alone. Dick has a conscious choice of trip, which means that mobility is an aim in itself for him.

Today Dick has to go to his work again. Dick loves his work, but he also loves to drive in his car. Everyday he has to make the same trip from his home in Alphen aan de Rijn to his work in Amsterdam.
That is not a problem for Dick. He drives the first part of his trip on rural roads; that is faster than using the highway. After that he uses the highway for a few kilometres and the final part of his daily trip he uses the light rail to get into the city centre. He parks his car at a transferium. Using the public transport is not an option in the first part of his trip because this will take too much time.
Every morning Dick checks the traffic jam information for the small part of the trip he has to drive on the highway near Amsterdam. He also checks the travel time forecast on the internet. Driving on the rural roads is a time to relax for Dick. Today he sees a beautiful sunrise and lots of birds. Driving on the highway is a complete different story for Dick, but driving in the city centre he hates even more; it's too crowded for him. That is why he uses the light rail from the transferium to his work. He has to arrive early at the transferium otherwise it's full. He automatically gets a message on his mobile phone if the transferium is full. Today he is on time and he parks his car near the exit, the walking distance towards the light rail stop is now only a few meters. Dick knows the departure times of the light rail but he checks the dynamic travel information screen near the entrance of the transferium to know if he has to hurry or not and to check which platform he has to take. He also buys a ticket for the light rail with his mobile device.
Once he is in the light rail Dick can relax again. He reads the newspaper, watches the LCD screen in the light rail and waits until he arrives at his destination. His mobile beeps to warn Dick to leave the light rail. Dick walks 50 meters to his office and can start a new day a work.

OFFERED SERVICES

- Information about congestion
- Information about travel time

5 A disrupted JOURNEY to the MUSEUM of National Science and History

Helen is a young dynamic woman living in the city of Gent. She's got a part-time job in the museum of national science and history in the centre of Brussels near the European Commission parliament. She enjoys working in the city centre and prefers the public transport instead of a car (regular trip).

The day is still very young when Helen waits for the bus which will bring her from the suburban village she lives in to the Gent main train station. From thereon an inter city train will bring her to the Brussels South station. The final leg of the journey is covered by tramway ride and a small walk unto the museum. Helen knows the itinerary by heart and always takes the same bus, train and tramway rides. Over time she got befriended with fellow travellers and enjoys chitchatting to kill the time. Helen uses an on-line ticketing service operated by the public transport company. This service allows her to order a monthly pass on-line and get the confirmation information via SMS. The NFC micropayment system integrated in the mobile phone allows her to swiftly hop on busses, trams, trains, subways in Flanders and Brussels. The service is pretty state of the art and prevents her from having to visit the public sales office once a month.
The trip to the Gent station as always went smooth. She had a good chat with one of her neighbours who also travels to his office this early in the morning. On the train she had a nice talk with fellow travellers about everything and nothing and soon the train arrived to the Brussels South station. At the tramway stop a rather large crowd was already waiting which was not really normal this early in the morning. It looked like no tramway did pass for some time. Luckily the Brussels public transport operator offers a mobile service via SMS which informs travellers about tramway, bus and subway arrival and wait times. She only has to send the name of the tramway stop and the tram number to the service SMS number and swiftly she receives a return SMS with real-time travel information. The SMS is rather disturbing, the short message said: "Service disrupted due to accident". Apparently an accident occurred so she will have to find an alternative to get to the museum. The public transport company operates an electronic kiosk service inside the station, helping travellers out with their public transport issues. The kiosk service indeed mentions the problem with the tramway service. She enters her destination station to find an alternative bus or tramway service. Unfortunately the problem seems to be rather large and for the moment being no real alternative is available except… A few meters north to the station a brand new bike rental station has been made available. The bike station allows travellers to pick a bike and drop it off at another station elsewhere in the city. The kiosk also indicates a bike station near the museum so this indeed could be a nice alternative. The museum is only a few kilometres away and the idea of having a nice early morning bike ride through the city seems very appealing. The kiosk also indicates that the system accepts smartphone micropayment and her public transport pass is also good for bike renting. Helen always leaves early to work since she really enjoys the daily commute and has more than enough time to spare. Without much thinking she pays at the bike station with her micropayment enabled smartphone and takes a bike from the rack. Because she does not know exactly how to get to the museum by bike, she types her place of departure and arrival in her smartphone and it displays the cycle route to the museum. Swiftly she manoeuvres through the streets of Brussels and arrives well in time at the national science and history museum. Helen found the experience very pleasing and decides to use the bike rental service every day. Well, at least if the weather permits that is.

OFFERED SERVICES

- On-line payment for public transport passes
- Scheduled public transport services
- Micropayment via smartphone
- SMS time schedule information
- Electronic kiosk information system
- Bike renting
- Cycle route navigation on smartphone

6 HENK and FLUFFY on the EIFFEL TOWER

Henk is a special needs traveller on an unfamiliar (tourist) trip. Henk is 27 years old and works at the city hall in Haarlem. He is a result oriented traveller, so he likes to travel efficiently. Henk has a strong need for certainty. He is blind and has a guide dog.

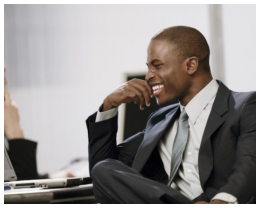
Henk is going on a trip to Paris to finally visit the Eiffel Tower. He will be accompanied by his dog Fluffy. Fluffy guides and helps his blind boss in daily life. Henk has never been to France and is unfamiliar with the route, travel times, accessibility issues and the language. The week before, he made reservations for the international train to Paris. This train leaves from Schiphol airport at 11:00 in the morning. He told the reservation office that he has a dog with him and needs special help to find the train and for getting on and off the train. In preparation of his trip he also orders a taxi at the call centre the day before he leaves to take him from Haarlem to Schiphol.
He told the call centre he needed to catch the 11:00 train. They advised him to leave at 10:00. Henk wants to be sure and needs some extra time at Schiphol due to his special needs, so he orders the taxi at 9.30. The day of the trip Henk asks his neighbours to check for traffic jams on internet and he calls the call centre 15 minutes before to confirm the reservation.
The taxi arrives and Henk and Fluffy are helped in the taxi. At Schiphol Fluffy guides Henk immediately to a service man. Henk asks for the platform number and he is guided to the right platform. He goes to the platform and meets the platform assistant. She helps him to get on the train.
The Thalys arrives at Paris with a delay of 15 minutes. Henk worries that the French platform assistant has left already. But the assistant is notified about the delay and Henk is informed that he will wait to help Henk off the train.
Henk now needs a taxi to bring him to the Eiffel Tower. The platform assistant guides him in the right direction. The different sounds of the French streets make Henk realize that he is in another country. At the Taxi stop a taxi is available and Henk and Fluffy are on their way to the Eiffel Tower.

OFFERED SERVICES

- Reservations for public transport (train and taxi) and related services (platform services)
- Information about congestion (and routes)
- Information about departure time and platform (timetable trains)
- Delay notification to connecting or related services
- Ordering taxi

7 A troubled JOURNEY to GOTHENBURG

James is a project manager working for a European Commission related organization. James needs to travel a lot inside of Europe. He enjoys travelling and prefers travelling by air or train depending on the destination (conscious traveller). Since meetings in general start early in the morning James likes to arrive the evening before (familiar travel). James had a car accident some weeks ago and still needs crutches to move around; he is not able to walk long distances.



James needs to preside a meeting in Gothenburg, Sweden. It's a bit difficult for James to travel at the moment since he is still recovering form a rather nasty car accident some weeks ago. The surgeons did a nice job but he still needs crutches to move around and is not able to walk long distances. Getting in and out of a car is also not easy so for the time being he's allowed to carry a disabled person sticker on the windscreen of his car.
Since the meeting in Gothenburg starts very early in the morning he needs to fly in the night before and book a hotel room. Unfortunately due to some other meeting arrangements he can only leave after five o' clock in the evening. James normally books his journeys on-line and selects the website of Brussels Airlines. This company has no flights to Gothenburg anymore after five o' clock so he decides to move to the alternative carrier for Sweden, Scandinavian airlines. The best possible flight will bring him first to Copenhagen, Denmark with a transfer to Gothenburg. He also flags the need for a wheelchair and assistance in Brussels and Copenhagen airport since the distances to cover in the

terminal are rather large. From the Scandinavian airlines website he also books a hotel near the meeting site. The site allows him to check-in via the website and print out or store the boarding card on a PDA.
At the day of departure the traffic conditions to the airport are far from optimal. James uses a traffic warning system which synchronizes with his scheduler. Just before the end of the meeting James receives a warning message via SMS warning hem about an increasing travel time to the airport. The SMS message advices James to leave towards the airport immediately.
Indeed the trip to the airport moves on very slowly. The situation even got worse since he received the warning message. The embedded navigation system receives an RDS-TMC from the public government which indicates a major traffic jam ahead. The navigation system proposes to reroute the current itinerary. James accepts the reroute and leaves the highway to circumvent the traffic jam. Thanks to the early warning system and the traffic information provided by the Flemish Traffic Centre, James arrives at the airport in time. During the trip to the airport James uses his on-line parking booking system allowing him to make a parking lot reservation. This service is offered by the parking lot operator and is a service which is downloadable to the in-vehicle computer system. The application allows James to check for available parking space and make reservations for a disabled parking spot. This is very handy as parking space is sometimes very difficult to get at Brussels International Airport and it is not always clear where to find disabled parking spots. Once arrived at the airport James parks his car and carefully climbs out of the car. At the airports information desks he shows his ticket which indicates the need for a wheelchair and assistance. A friendly hostess swiftly moves James through the security check and to the terminal gate. Thanks to the on-line check procedure he also has his boarding passes available and loses no time waiting in the check-in line. The flight is on-time and after a short but pleasant stay in the departure terminal he boards the plane for the first leg to Copenhagen. The trip to Copenhagen works out perfect and in less than an hour the plane touches Copenhagen airport. At the airport a Danish hostess is already waiting for James with a suitable wheelchair. James has still some time to take a small meal in Copenhagen airport before boarding the plane to Gothenburg.
Finally James arrives in Gothenburg, asks a porter to pick up his bags and hails a taxi at the taxi line. The taxi swiftly brings him to the hotel in the centre of Gothenburg. James pays the cab driver with his credit card and enters the hotel. The friendly hotel servants bring this bags right to his room. James is tired but very happy. Even with the unfortunate mishap he had he's still able to fulfil his job and meet his meeting deadlines.

OFFERED SERVICES
- On-line airline booking service with on-line check-in
- On-line hotel booking service via airline web-portal
- Airport assistance service
- Private traffic alert service
- Public traffic information via RDS-TMC
- Parking lot reservation system

8 SAM is going TO WORK

Sam is a special needs traveller on his way to work. He takes the same route day in day out (regular). Sam is 34 years old and works as a financial director for a big newspaper in Brussels. Sam is very image oriented, for him mobility is a (status) symbol, what results in his need to always travel first class. Besides al this, Sam has a very high blood pressure and he always needs his medicines!

Monday morning 7:00 AM. Sam is going to work. Sam is living in Brasschaat, Belgium. Due to his personal experiences in road traffic (travel times by car from Antwerp to Brussels are way to long), he is always travelling by train between Antwerp and Brussels. From Brasschaat to Antwerp Sam is going by car as he knows that this connection is always congestion free. Every morning Sam is checking the website from the Belgium railroads (NMBS) for the up to date departure time of the train from Antwerp to Brussels, normal departure time 07:45 AM. Unfortunately his train is delayed by 15 minutes due to a technical jam. Therefore Sam can leave 15 minutes later from home or he can take one train earlier at 07:30 AM. He decides to take a train earlier. In his hurry he forgets the medicines for his high blood pressure. On the way from Brasschaat to Antwerp he realizes this and

makes a hands free phone call to the pharmacy at the train station and orders some of his medicines. Sam arrives, as usual, without any traffic jams at the train station in Antwerp and parks his SUV in his pre-ordered parking space. The medicines are ready to take at the pharmacy and Sam is getting the train with his medicines on time. After one minute Sam is seated in his first class lounge the train is leaving, what a perfect timing, Sam thinks. Sam is very comfortable in the first class and during the half hour trip he checks his email on his laptop thanks to the free WIFI network on the train. With a cup of coffee, which is paid by his e-card, Sam is entering Brussels central station. Another day at work…

OFFERED SERVICES

- Information about up to date departure times in public transport
- Pre order of goods on the train station (medicines)
- Pre ordered parking space
- Seat in the first class
- WIFI network on train

9 JOURNEY to a Caribbean CRUISE SHIP

The group of six notable travellers consist of well to do pensioners in their early sixties. After a long working career the three befriended couples decided to offer themselves a luxurious cruise on the Caribbean (unfamiliar trip). Everything has been planned and arranged consciously without leaving room for improvisation or at least that's what they thought when starting their journey. The group is image oriented, for them mobility is a (status) symbol.

Making a luxurious cruise on the Caribbean seas certainly is an exiting journey. The idea popped up during the traditional New-Years dinner the three befriended Belgian couples shared together that year. Edgar, the computer savvy member of the group organized everything on-line via a the portal site of a renown travel agency. Airline tickets were booked, transport to the airport arranged, cabins on a luxurious cruise ship reserved and so forth. The trip would bring them from Brussels International Airport to London Gatwick and from thereon over the ocean to Miami. The first leg of the journey was ordered from a local airport shuttle operator. A luxurious van would bring them from the Miami airport to the cruise ship. Edgar also downloaded a "personal travel organizer" offered by the travel agency on its smartphone. That day everybody of the group was really exiting when the van of the airport shuttle service arrived at their doors. By that time Edgar had all airline tickets downloaded on his smartphone but just to be sure also had them in print in his bag. Early in the morning, sun in the sky, the group left happy and cheerful on a trip that would bring them thousands kilometres way to the Caribbean shores.
Halfway the trip to the airport, the personal travel organizer or PTO issued a warning sound. Something is wrong with the plane to London, technical problem which cannot be solved in time. The PTO already looked into an alternative itinerary but unfortunately could not find an option to London Gatwick. A flight with another carrier via Paris however could be an alternative. The PTO prompts Edgar for this solution. Of course, this influences the itinerary quite a lot. The leg to Paris needs to be covered by means of the high speed Thalys train and not via plane. The train will bring the group directly to Charles De Gaulle airport which would allow them to board a plane to Miami not much later than originally planned. Edgar briefly explains the situation to the group and asks their opinion. Not taking this alternative will bring the departure from Brussels to London to the next day and influences the date and place where they could board the cruise ship. The decision is quickly made but the time frame is rather tight as the train leaves on rather short notice. The driver of the van reroutes the navigation system and asks for the traffic situation on the newly calculated route. Luckily the hour of departure was rather early before rush-hour. No current traffic jams and events are reported. In the mean time Edgar confirmed the option offered by the PTO and in the back-office system of the travel agency all necessary arrangements are made. The original tickets to London and from London to Miami are cancelled without additional costs and new tickets are arranged for the Thalys high speed trains and the journey from Paris to Miami.
As the van gets closer to Brussels city, the navigation system reports traffic problems ahead, a turned over lorry blocks three lanes resulting in the closure of the highway. The navigation system reroutes the van but this again increases the travel time to Brussels South Station dramatically. The PTO also

picks up this delay and proposes a later train which still would fit the airplane time constraints. Edgar acknowledges this option and the PTO backend system re-orders tickets for this later train.
Finally they arrive at Brussels South station, well in time for their train. Thanks to the **i-Travel** machinery behind the scenes all tickets are set and ordered and the group is happy to continue its journey to Miami.

OFFERED SERVICES

- Extended travel reservation and ordering service offered by the Travel agency
- Multi-modal Personal Travel Organizer (PTO) which uses state of the art **i-Travel** functionality to alert the traveller of any possible event and assists the end-user in re-routing the itinerary.
- Travel information offered via a connected traffic service provider. This service allows the traveller to get a list of events and travel times on the selected route.
- Traffic alert service operated by the Government and broadcasted by means of RDS-TMC or TPEG over DAB
- Ordering of taxi's and vans to the airport or train station
- On-line ticketing (e-Ticket) for planes and trains

10 GROUP on a trip TO ROME

The Italian women association for art & architecture is going on a half yearly trip from Torino to Rome (familiar trip). This association exists from 6 ladies who often go to Rome for sightseeing the city. This women association is very social and leisure orientated. For this group mobility has especially a social function. They experience the trip as pleasant and enjoy it if they can make a chat with people. Time is not important.

It is summer time again. The Art and Architecture association is planning a half yearly trip to Rome again. The group is familiar with their journey, every half year they are going to Rome by train, so they think it is not necessary to book their train tickets on forehand. Because they want to go visit a lot of museums in Rome, they decide to plan some sort of museum tour of their own. Therefore they check some museum internet sites at home and book a total of 5 musea. Because they are booking via the internet and because they are a group they get a 15% discount for their museum tickets. They also decide to book their hotel before they leave. They find a nice hotel in the middle of the city, perfect for the sightseeing ladies.

On the day that the Italian women association is going to Rome, they want to check the actual travel times for the trains. Unfortunately the internet site is crashed so the ladies don't know anything about departure and arriving times, except which train they have to take. Because of this they decide to leave very early and order a taxi. Within a half hour the taxi van is arriving and the ladies are on there way to the Torino train station. Normally there are many traffic jams on the way to the train station, but because of the summer time the highway is congestion free. The group arrives around 10:15AM at Torino train station and buy their train tickets. The first train to Rome leaves at 12:00AM. Because the ladies are die hard museum seekers, they plan a short visit to a museum nearby the train station, as it happens they have more than 1 hour to spend. One of the 'high tech' ladies takes her PDA and look for a nice architecture museum about the train station's history. They take a nice tour of one hour and are back right on time when the train is leaving. The ladies have a nice train trip to Rome, during their trip time is not important and they make a lot of chats with each other about art. With more than one hour delay, none of the ladies has notice it, the train is entering Rome central station at 21:00. Museums, here we come, the ladies think!

OFFERED SERVICES

- Booking hotel
- Booking visits to museums
- Check the train times
- Order a taxi
- Visit of a POI (train museum) nearby the Torino train station

11 Off TO WORK we go!

Five colleagues who work for the municipality of Amsterdam carpool daily from Almere to their office in the centre of Amsterdam. They carpool to work because of environmental reasons and to save money.

Every morning a small group of civil servants from the municipality of Amsterdam carpool to their office in the centre of Amsterdam from their city Almere, 30 kilometres from Amsterdam. They gather at a parking space located close to the highway and transfer to one car for their journey to Amsterdam. To divide the cost of fuel, they take turns on who drives. To plan this they use a website. They also use a service to alert them of expected traffic jams on their route.
One morning four out of the five are at the parking space ready to go. They use an online agenda to check if their missing colleague will come. While they are doing this their colleague arrives and they set off. As they carpool they are allowed to use the carpool lane. When they reach the city border, the parking space reservation service at their office detects their approach and makes a reservation.
During the day the driver of the group is called back home to pick up his ill child from the day-care centre. He signs off as the driver on the carpool website and leaves. His four colleagues receive a message from the website alerting them of this situation. The message also suggests to take the train and to book as a group, this way they will receive a discount. The four colleagues confirm they want to take the train. The system registers them as a group and sends them their e-tickets for which they pay via their mobile service provider.

OFFERED SERVICES

- Carpool planning website
- Traffic jam forecaster and alert service
- Online agenda
- Automatic sign on and reservation for parking space
- E-ticket for train

8 User needs

User needs were previously defined as the prerequisites and requisites of the user before and during his travel. The user needs depend on the type of user, his characteristics, his type of travel, his mood, the day of the week, his fellow travellers, and so on.

The specific user needs have been gathered from the different scenarios and offered services. By clustering these user needs (see Annex VIII), five different clusters of needs were defined. These needs-clusters are:

1. Information & Planning
2. Reservation & Booking
3. Navigation
4. Notification & Alerts
5. Payment

This division matches the breakdown from 'Workbook value engineering' (Booiman, 2008). Only 'Travel administration' is not explicitly mentioned in the above division. This is because it is incorporated in the user profile and user dossier which is needed in all of the above services.

A summary of the specific user needs follows below.

Information & Planning needs
▪ The user needs an (online) portal available for real-time (multi modal) travel planning. This portal needs to include present and expected departure and arrival times (taking congestion and delays into account), real-time platform information and alternative routes and modes.
▪ The user needs to have access to his information (e.g. travel plan, e-tickets) from different devices such as mobile phone and PC.
▪ The user needs an overview of (regional) transport with different modalities with destinations, timetables, prices, itineraries, maps etc.
▪ The user needs an overview of related features of the stations and services transport operators provide e.g. accessibility of the station and rolling stock, toilet services, baggage services, places to eat etc.
▪ The user needs information about congestion and delays.
▪ The user needs information on points of interest (POI).
▪ The user needs information about the number of available parking spaces (e.g. for a Park and Ride)
▪ The user needs information about other services such as a car pool planner, entertainment and interesting trips.
▪ The user needs information about accommodation (hotel) information.
Reservations & Booking needs
▪ The user needs to be able to find and book/make a reservation online for transport (flight, train, tram, coach, taxi, boat, …) including the option to choose conditions (such as class, check-in, special needs, …).
▪ The user needs to be able to book / make a reservation online for additional services (parking space, hotels, conference rooms, goods, cultural events,…)
▪ The user wishes to make all reservations/bookings through one portal.
▪ The user needs the possibility to automatically order parking space when approaching the parking space.
Navigation needs
▪ The user needs to get route information during his trip for all modes (like car, bike and walking). ▪ The user needs to get information on modality shifts (navigation instructions).
Notifications & Alerts needs
▪ The user needs to get personalised traffic information (for public and private travel), including early warning in case of an increasing travel time to a specific location and possible alternative routes and/or modes. (For example: a notice based on predictive traffic information or a travel time forecast).
▪ The user wants to be notified when reaching an important step in his travel (e.g. a change/transfer or when reaching his final destination).

▪ The user needs to be informed when a reserved service is no longer available (or altered).
Payment needs
▪ The user has an easy way to pay on trip and pre trip for tickets, passes, goods etc. (e.g. using mobile payment via NFC and a mobile phone)
▪ The user wishes to buy goods, tickets and passes online. The ticket itself can be downloaded on any mobile device.
▪ The user needs to be able to buy goods, tickets and passes offline (e.g. at a ticket office). The ticket itself may or may not be downloaded on any mobile device.

9 Supplier needs

There are several types of supplier needs depending on the type of supplier. The general need of the supplier is that there is enough demand for his product; otherwise it is not attractive to produce the product.

In the table below we have summarised the supplier needs, deduced from the user needs mentioned from chapter 8. The same breakdown structure is used.

Information & Planning
▪ The **i-Travel** agent needs to have access to all (real-time) travel related information, e.g.: o (regional) transport options and related services (e.g. destinations, timetables, prices); o information on services provided by the public transport operator en-route; o information about travel time forecasts (congestions and alternative routes); o real-time and up to date platform information and times for public transport; o information about the number of free parking spaces in a specific area; o information about other services, such as alternative travelling, entertainment and trips.
▪ The **i-Travel** agent needs to have an online portal for users.
▪ The **i-Travel** agent needs to be able to answer telephone enquiries (e.g. a call centre).
▪ The **i-Travel** agent needs to have a planning system to plan the trip and related services.
▪ The **i-Travel** agent needs to have a system to deal with missing or double information.
Reservations & Booking
▪ The **i-Travel** agent needs to be able to book and reserve all relevant travel services e.g.: o Seats for transport (flight, rail, coach, boat, etc.); including the option to choose conditions (such as class, check-in, special needs, …). o Additional services e.g. parking spaces, hotels, conference rooms, goods, hotels, cultural events;
▪ The **i-Travel** agent needs to be able to match the users wishes with available services, offers, etc.
▪ The **i-Travel** agent needs to have an online portal for users.
▪ The **i-Travel** agent needs to have be able to answer telephone enquiries (e.g. a call centre) .
▪ The **i-Travel** agent needs to be able to store a user dossier containing a user profile and (copies of) his tickets.
Navigation
▪ The **i-Travel** agent needs to be able to notify the traveller on trip.
▪ The **i-Travel** agent needs to be able to locate the traveller in case of a possible alteration on the route.
▪ The **i-Travel** agent needs to have access to all relevant travel information (for planning and navigation).
▪ The **i-Travel** agent needs to have (access to) the travellers dossier (profile and itinerary).
Notifications & Alerts
▪ The **i-Travel** agent needs to have access to all relevant travel information.
▪ The **i-Travel** agent needs to be able to notify the user pre and on trip.
▪ The **i-Travel** agent needs to be able to track and trace the user (for additional services/to increase the accuracy of the information provided to the user/profile updates).
▪ The **i-Travel** agent needs to have (access to) the users dossier (profile and itinerary).
Payment
▪ The **i-Travel** agent needs to enable the user to pay for all reserved or ordered services before and during the trip.
▪ The **i-Travel** agent must be able to cancel a booked (and paid) service in order to replan a route.

10 Detailed Use Cases

By combining the user and supplier needs with offered services from the different scenarios, a number of detailed use cases were formulated. These use cases are not directly linked to existing services to prevent the use cases to be too limitative. The detailed use cases are therefore generic by nature. They do however offer extended information on needs to enable the development of user requirements. The resulting set of detailed use cases will be input for further research work in WP3 and WP4.

The detailed use cases are clustered in the same five groups used for the user and supplier needs:

1. Information & Planning
2. Reservation & Booking
3. Navigation
4. Notification & Alerts
5. Payment

To make sure that all needs are represented in the use cases, this division is used to formulate the final five use cases. Therefore more general user and **i-Travel** supplier needs are formulated and worked out into the detailed use cases below. The needs of other suppliers relevant to the **i-Travel** platform are stated in chapter 5.9.

The template for use cases laid out the WP1 Methodology (PTV, 2008) is also added to this detailed description.

Some services related to the use cases already exist. Examples of those existing services are given in Annex X.

Information & Planning	
Description user needs	▪ The user needs to be able to gather real-time information (or prediction as potential delays under chosen conditions) on services provided (POI's, location, weather, opening hours, event dates, transport time schedule, transport delays, departure location, platform, route, accommodation, …). ▪ The user needs to be able to access his information (e.g. travel plan, e-tickets, reservations) on different devices such as mobile phone and PC. ▪ The user wants to be able to get this information via his **i-Travel** service provider or travel agent. He is able to do so via one point of entry, online and/or offline (using internet, GSM, call centre, information desk, et cetera). ▪ The user wants his personal preferences being considered.
Description supplier needs	▪ The **i-Travel** agent needs to have access to all the travel related data and needs to be able to generate useful information to be accessed by the user (online and offline e.g. via telephone).
Stakeholder & Actors	▪ Internet service provider ▪ Telecommunication provider ▪ Service- / goods-provider (travel agency, bike and car rental, weather service, museum, …) ▪ Information provider ▪ Transport system operator (rail, taxi, airline) ▪ Local authority (parking reservation)
Preconditions	▪ The user has to have access to the **i-Travel** agent. ▪ The **i-Travel** agent has access to the real-time information of the information suppliers via the **i-Travel** platform. ▪ The information suppliers provide access to their information via the **i-Travel** platform to **i-Travel** agents.
Trigger	▪ The user searches for information.
Input	▪ The user provides a query. ▪ The information suppliers provide information to the **i-Travel** agent.

Output	▪ The information is provided to the user. ▪ A user profile is stored / updated at the **i-Travel** agent.
Main Steps	▪ The user wants to get information and contacts his **i-Travel** agent to do so. ▪ The **i-Travel** agent consults the **i-Travel** platform to find a match between services and the user request for information. ▪ The information provider provides the information. ▪ The **i-Travel** agent keeps the user profile. ▪ The **i-Travel** agent relates this information to the user.

Reservation & Booking service	
Description user needs	▪ The user needs to make reservations (or bookings) for different services, such as: public transport, airline, hotel, parking space, museum, platform assistance for disabled, taxi and specific goods such as snacks and medication. ▪ The user wants to be able to make these reservations via his **i-Travel** service provider or travel agent. He is able to do so via one point of entry, online and/or offline (using internet, mobile, call centre, information desk, etc.).
Description supplier needs	▪ The stakeholders and actors have access to the **i-Travel** platform for posting availability, for matching a user request and to book / make a reservation.
Stakeholder & Actors	▪ Internet service provider ▪ Telecommunication provider ▪ Service- / goods-provider (travel agency, bike and car rental, …) ▪ Transport system operator (rail, taxi, airline) ▪ Local authority (parking reservation)
Preconditions	▪ The user has to have access to the online portal (or offline call centre). ▪ The **i-Travel** agent has access to the **i-Travel** platform. ▪ The stakeholders and actors have access to the **i-Travel** platform.
Trigger	▪ The user wants to make a reservation or booking.
Input	▪ The user provides relevant information (starting point, destination, time and date preferences and other user preferences). The stakeholders provide availability and prices.
Output	▪ The reservation is made and communicated to the user. A user profile is stored or updated at the **i-Travel** agent.
Main Steps	▪ The user wants to make a reservation or booking and contacts his **i-Travel** agent to do so. ▪ The **i-Travel** agent consults the **i-Travel** platform to find a match between services and the user needs. ▪ The **i-Travel** platform provides information about the services. ▪ The **i-Travel** agent makes the reservations on the **i-Travel** platform (thereby confirming the reservation to the supplier). ▪ The **i-Travel** agent keeps the user profile (to be able to make alterations to the request, to offer additional services to the user and to be able to provide notifications and alerts) ▪ The **i-Travel** agent relates this information to the user.

Navigation	
Description user needs	▪ The user needs to get route information during his trip. The user is notified of changes in his original travel plan and is provided with alternatives. ▪ The user needs to get information about modality shifts with instructions/maps.
Description supplier needs	▪ The **i-Travel** agent needs to be able to notify a user on trip. Therefore the **i-Travel** agent needs to know where the user is in case of a possible alteration on the route and he has to have access to relevant information for planning and navigation including the users' dossier (profile and travel plan).

Stakeholder & Actors	▪ Telecommunication provider ▪ Service provider (travel agency, navigation provider, etc) ▪ Transport system operator (rail, airline) ▪ Local authority (traffic jam)
Precondition	▪ The **i-Travel** agent can contact the user. ▪ The **i-Travel** agent has access to the user profile and his booked and planned service. ▪ The **i-Travel** agent has to have status information (location, modality and context) of the user. ▪ The **i-Travel** agent has access to the real-time information of the information suppliers via the **i-Travel** platform. ▪ The information suppliers provide access to their real-time information via the **i-Travel** platform to **i-Travel** agents. ▪ The user has to have an **i-Travel** profile which states if he wants to receive notifications and whether **i-Travel** is allowed to contact him. ▪ The user has to have an **i-Travel** planned (booked) trip. ▪ The user needs to have a device on which he can receive navigation instructions and that can receive alterations in the route from the **i-Travel** agent.
Trigger	▪ The user has to be directed along a route.
Input	▪ The user has to provide the system with: o planned (booked) trip; o user profile; o status information (e.g. location information from a GPS device). ▪ The information suppliers provide real-time information about changes and alternatives to the **i-Travel** agent.
Output	▪ Navigation information is given to the user. ▪ The information about changes and alternatives is provided to the user. ▪ The travel plan is updated at the **i-Travel** agent.
Main Steps	▪ A route is planned by the user. ▪ The system provides the user with navigation directions. ▪ A change is made public by the service provider (e.g. transport service provider) ▪ The **i-Travel** agent notifies the user about the change and if necessary provides the user with an alternative route. ▪ The **i-Travel** agent updates the travel plan.

Notifications & Alerts	
Description user needs	▪ The user needs to get the latest, up to date, information on his booked or planned services. The user needs to get this information pre and on trip. The user is notified of changes in his original travel plan and is provided with alternatives.
Description supplier needs	▪ The **i-Travel** agent needs to be able to guide and notify the user pre and on trip. ▪ The **i-Travel** agent therefore needs to be able to track and trace the user and has to have access to the user's dossier (profile and travel plan).
Stakeholder & Actors	▪ Internet service provider ▪ Telecommunication provider ▪ Service provider (travel agency, navigation provider, etc) ▪ Transport system operator (rail, taxi, airline) ▪ Local authority (traffic jam)
Preconditions	▪ The **i-Travel** agent can contact the user. ▪ The **i-Travel** agent has access the user profile and his booked and planned service. ▪ The **i-Travel** agent has to have status information (location, modality and context) of the user. ▪ The **i-Travel** agent has access to the real-time information of the information

	suppliers via the **i-Travel** platform. ▪ The information suppliers provide access to their real-time information via the **i-Travel** platform to **i-Travel** service providers / travel agents. ▪ The user has to have an **i-Travel** profile which states if he wants to receive notifications and whether **i-Travel** is allowed to track and trace him. ▪ The user has to have an **i-Travel** planned (booked) trip. ▪ The user needs to have a device on which he can receive information, notifications and alerts from the **i-Travel** agent.
Trigger	▪ The user has to be notified about changes in his travel plan.
Input	▪ The user has to provide the system with: o planned (booked) trip; o user profile; o status information. ▪ The information suppliers provide real-time information about changes and alternatives to the **i-Travel** service provider or travel agent.
Output	▪ The information about changes and alternatives is provided to the user. ▪ The travel plan is updated at the **i-Travel** agent.
Main Steps	▪ A change is made public by the service provider (e.g. transport service provider). ▪ The **i-Travel** agent notifies the user about the change and if necessary provides the user with alternatives. ▪ The **i-Travel** agent updates the travel plan.

Payment	
Description user needs	▪ The user needs to be able to pay for all (booked and reserved) services before and during his trip via the **i-Travel** agent.
Description supplier needs	▪ The **i-Travel** agent needs to enable the user to pay for all (booked and reserved) services before and during the trip. The supplier should also provide a secure environment for performing on-line payments. ▪ The **i-Travel** agent should be able to cancel certain payments (due to problems).
Stakeholder & Actors	▪ Internet service provider ▪ Telecommunication provider ▪ Service provider (e.g. travel agency, bank, etc) ▪ Transport system operator (rail, taxi, airline) ▪ Local authority (regulations)
Precondition	▪ The user needs to be able to pay (online, mobile, offline..). ▪ The **i-Travel** agent needs to be able to forward payments to the service or transport provider for the booked and planned services. ▪ There are secure billing systems in place.
Trigger	▪ The user has to pay for a booked or reserved service.
Input	▪ The service provider has to provide the **i-Travel** agent with the price and payment details. ▪ The user has to confirm/agree on the financial transaction.
Output	▪ The service is paid for by the user and both actors receive a confirmation of the transaction (in the form of an (electronic) ticket or receipt which is added to the user dossier).
Main Steps	▪ Price and payment information is exchanged between service provider and user. ▪ The user chooses the form of payment ▪ User agrees on financial transaction. ▪ Transaction is carried out by third party (e.g. bank, telecom service provider..) ▪ A confirmation of transaction is send to involved actors (user and **i-Travel** service provider/travel agent) in the form of an (electronic) ticket or receipt. ▪ The ticket or receipt is added to the user dossier.

11 User requirements

11.1 User requirements Framework

In the context of **i-Travel** concept, user requirements are conditions or capabilities needed by a user or supplier to solve a problem or achieve an objective. User requirements focus on what travellers expect from **i-Travel** and what suppliers require from **i-Travel**. In WP4 these user requirements will be transformed and consolidated into functions and *system* requirements.

In total eight requirements are aggregated from the desk research, workshops, field research and detailed use cases, see figure below.

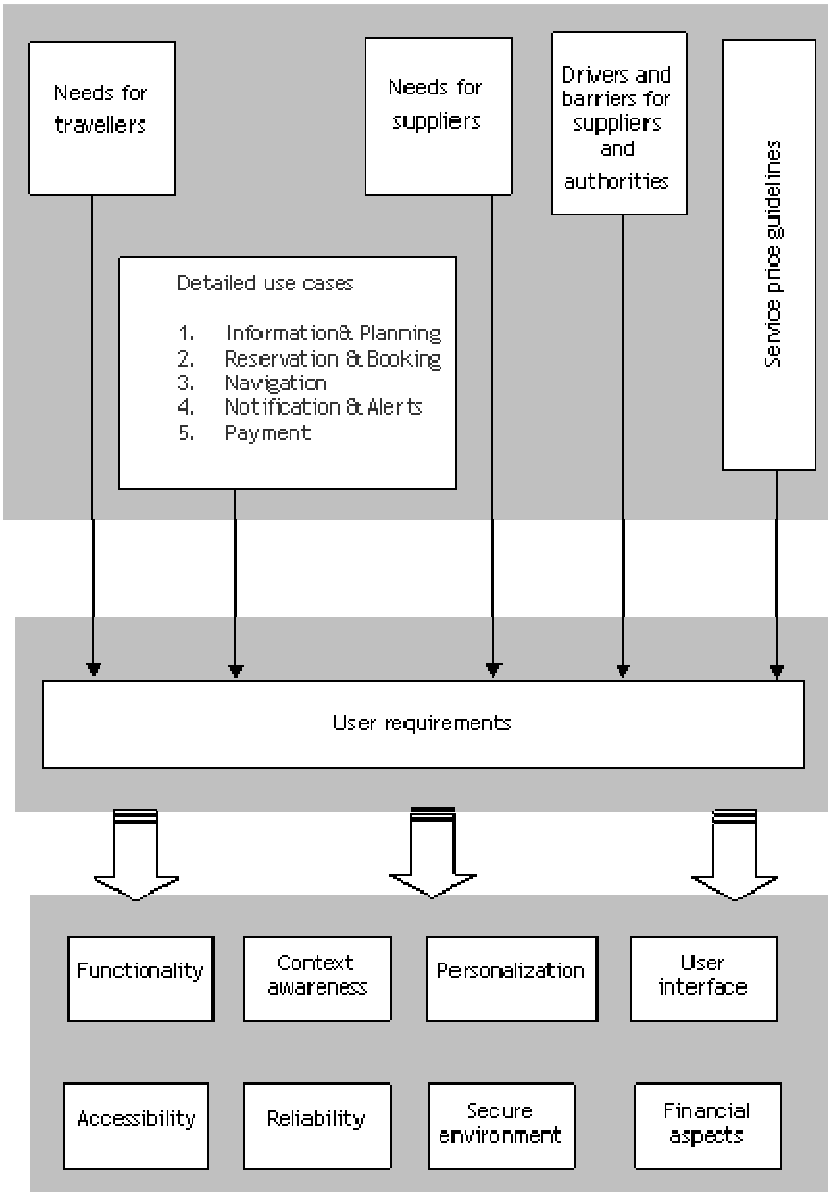


Figure 2: The development of user requirements

1. **Functionality**

The most important requirement for **i-Travel** is the functionality of the services. All conditions and capabilities, needed by travellers and suppliers to solve a problem or achieve an objective, have to be met.

2. **Accessibility**

The **i-Travel** services have to be accessible 24/7, both pre- and on-trip. The level of distribution will become more and more important. Current information already fulfils user needs although real-time information can be improved. However the accessibility of information at different locations plays an important role.

3. **User interface**

People are very capable of using different applications for information during travelling. Although navigation systems and handhelds has taken a significant part in people's travel behaviour and there are great benefits when using them (e.g. increase of safety, useful when unforeseen events occur), traditional applications (e.g. city maps) still play an important part when it comes to planning, orientation and creative travelling. Main difference between those products is the discussion whether people want to get directions versus people who want to know where they are. But in every situation the user interface should be *clear, simple* and *easy to understand*. Suppliers expect to have open and standardized applications which their own applications can easily plug in.

4. **Context awareness**

There is a strong need for different information in different situations. To what extent information is important depends on the situation and the type of traveller (e.g. regular, familiar and unfamiliar, see also chapter 5.6). Especially when going on holiday with family or friends a social value is much more important. Other example is the different context of a indoor/outdoor trip: a pedestrian inside a transport terminal in a leisure or commuter travel type. This means the information should be flexible and to some extent individual based; the type of information needed highly depends on the situation. Therefore content as well as the distribution channel of information has to be flexible.

5. **Personalization**

People like to have personalized and specific information based on the individual preferences. Personalization should be an important aspect in mobility information, but not for the cost of quality and easiness. Personalization of information is attractive, but needs to be properly balanced.

6. **Financial aspects**

At present, many travel information services are provided free of charge (see also Annex V). Information services, however, are diversifying and becoming more sophisticated thus requiring more resources. This has put service providers in a difficult position, because users are not very keen on paying for the services. However, new innovations are needed to fulfil the user needs and to maximize the profitability of the service activity.

7. **Reliability**

The information provided should be reliable. Reliability can be assured by consistent and up-to-date information. There also has to be an explanation of the value of e.g. traffic predictions and travel times. The branding and sources are very important for travellers to confide in the services provided.

8. **Secure environment**

Travellers require a trusted environment in order to provide personal profile data to start with, apart from the incentive to provide this kind of details. In case of theft or losing a mobile device, their services should be backed-up and easy to block if necessary. Transactions need to be handled in a secured environment with transaction verification, authentication and insurance facilities. E-tickets also should be stored securely. The service would ideally provide for emergency calls.

11.2 User requirements for the i-Travel detailed use cases

The user requirements are clustered in the five groups for the detailed use cases:

1. Information & Planning
2. Reservation & Booking
3. Navigation
4. Notification & Alerts
5. Payment

Next, the traveller and supplier requirements towards the **i-Travel** platform are given for each of the five detailed use cases.

Information & Planning		
	Traveller	**Supplier**
Functionality	▪ **i-Travel** should provide real-time multimodal information from the different available services (location, weather, opening hours, transfer details, event dates, transport time schedule, transport delays, departure location, platform, route, …). ▪ **i-Travel** should provide the information via his **i-Travel** service provider or travel agent. ▪ **i-Travel** should provide the information via one point of entry, online and/or offline (using internet, GSM, call centre, information desk, et cetera).	▪ **i-Travel** should have a strict membership registration system ▪ **i-Travel** should provide access to all the travel related data from the different available services ▪ **i-Travel** should provide services for download and upload of data from suppliers ▪ **i-Travel** should facilitate the generation of added value information by the supplier and to be accessed by the user (online and offline e.g. via telephone). ▪ **i-Travel** should provide common guidelines for data and information content quality, availability level and exchange methods/protocols between all suppliers. ▪ The **i-Travel** network will not be used for commercial information of specific suppliers. ▪ **i-Travel** should keep accountability of "accesses" and "hits" to be used for business model
Context awareness	▪ **i-Travel** should provide the ability to choose context/preferences (business/commuter/tourist/special needs). ▪ **i-Travel** should facilitate the recognition of travel status: planning/travelling. Linking to events/concerts/sports. ▪ **i-Travel** should provide real-time positioning capability and linking to the real world (landmarks/platforms/signing/ticket machines). ▪ **i-Travel** should provide an emergency mode option.	▪ **i-Travel** should provide capability to configure services and filter relevant data to context including location based service (e.g. GPS). ▪ **i-Travel** should provide access to (standardized) context information with a minimum set of requirements: current and historical.
Personalization	▪ **i-Travel** should provide capability to express individual preferences (lifestyle/ specific travel preferences).	▪ **i-Travel** should provide access to standardized user profiles and specific user preferences cleared of privacy issues (information pull + push). ▪ Suppliers should be able to create specific target/user groups based on the user profiles.

User interface	▪ **i-Travel** should provide a clear and efficient structured user interface ▪ **i-Travel** should provide and manage dynamic information hierarchy. ▪ **i-Travel** should make strong use of graphics. ▪ **i-Travel** should provide link to the real world (infrastructures/signing/landmarks). ▪ **i-Travel** should provide linked multimodal information. ▪ **i-Travel** should supply local details available when relevant. ▪ **i-Travel** should provide support of places and names. ▪ **i-Travel** should operate with limited number of actions required. ▪ **i-Travel** should preserve road safety while driving.	▪ **i-Travel** should support graphic mode of travel information. ▪ **i-Travel** should be able to provide active traveller support (e.g. postal code presets, destination/POI name recognition, and international harmonization). ▪ **i-Travel** should make use of standard (open platform based) service application for all device types ▪ **i-Travel** should provide easy access and interface to relevant available services without many steps and easily to plug in to existing systems and services. ▪ Suppliers should be allowed to define their own user interface for their clients
Accessibility	▪ **i-Travel** should provide Pre- and on-trip access to relevant services.	▪ **i-Travel** should have service applications available for all common distribution channels, with emphasis on international continuity.
Reliability	▪ **i-Travel** should provide up-to-date information (understanding refreshing rate), understanding of predictions and limitations of service; real-time positioning feedback.	▪ **i-Travel** should provide a stabile environment of platform systems and distribution channels with common content quality and availability level between the service suppliers. ▪ **i-Travel** should provide access to data with common accuracy and periodicity levels between all suppliers. ▪ **i-Travel** should be able to cope with systems and service failure, providing back up scenarios for data provision (e.g. statistic, historical data predictions + notification to users). ▪ **i-Travel** should make use of clearly pre-defined indicators for quality, accuracy and reliability of the data ▪ **i-Travel** should provide branding information: source, provider, marketing.
Financial aspects	▪ **i-Travel** should provide a price structure related to different service levels of information: Basic services, Advanced services, Value-added services.	▪ **i-Travel** should provide guidelines for service charging related to price structure ▪ **i-Travel** should allow suppliers to define their own pricing structure based on the guidelines.
Secure environment	▪ **i-Travel** should provide a trusted environment for personal profile data. ▪ **i-Travel** should provide back up and blocking service in case of theft/lost of mobile device/ticket. ▪ **i-Travel** should provide emergency call service function.	▪ **i-Travel** should have available a 24/7 helpdesk support environment. ▪ Data should not be accessible for non-**i-Travel** members ▪ **i-Travel** should have available a tracking and tracing environment. ▪ **i-Travel** should provide security implementations for Digital Rights Management, user management and secure communication

Reservation & Booking		
	Traveller	**Supplier**
Functionality	▪ **i-Travel** should provide ability to make reservations (or bookings) for different services, such as: public transport, airline, hotel, parking space, museum, platform assistance for disabled, taxi and specific goods such as snacks and medication. ▪ **i-Travel** should provide the capability to make these reservations via his **i-Travel** service provider or travel agent. ▪ **i-Travel** should provide capability to do reservations via one point of entry, online and/or offline (using internet, mobile, call centre, information desk, etc.).	▪ **i-Travel** should provide easy, standardized access to service providers willing to supply data to the **i-Travel** platform of services. ▪ **i-Travel** should provide easy, standardized access to existing distribution platforms willing to complement their services with additional data for their own users: the iTravel data in that case will be pulled ▪ **i-Travel** should provide protocols and data formats based on standards
Context awareness	▪ **i-Travel** should provide capability to describe the user's preferences, language spoken, habits (window seat preferred to aisle seat in planes), current location, current device used for the booking : the device capability will determine the type and the format of the information to be displayed. ▪ **i-Travel** should provide information on history of previous travel booked could be used to book recurring travels.	• **i-Travel** should provide the availability of services (suggestion for booking) consistent with already booked services and schedule flexibility decided by the user. For instance if the user just stops one hour in an airport, the information about a theatre play in this airport town will be displayed only if the user has indicated that he's ready to take the next plane in case of such an event could be attended.
Personalization	▪ **i-Travel** should provide the ability to leave to the user to configure the display layout to be used each time the user connects to **i-Travel**. For instance, the flight availabilities could be displayed by price order as default order. ▪ **i-Travel** should be able to store the user's privilege (fidelity program) when using **i-Travel**.	• **i-Travel** should make available the user's known privileges (preferences & profile) in order to offer "the right price and the right service to the right customer". • **i-Travel** should allow the logo of the service provider to be displayed during the booking (use of service) process.
User interface	▪ **i-Travel** should provide user interface based on ergonomic best practices when available.	▪ **i-Travel** should provide contents with internationalization feature. ▪ Pop-ups will not be allowed.
Accessibility	▪ **i-Travel** should comply with the latest recommendations/standard including accessibility for	▪ **i-Travel** should inform the suppliers of any impact latest recommendations or standards could have on the platform, and plan upgrades to be as smooth as possible for all the users.

	disabled people.	
Reliability	▪ **i-Travel** should provide clear booking information details (dates, hours, specific areas such as gates in airports, who to contact in case of emergency) ▪ **i-Travel** should provide guarantee of the bookings made with confirmation references. ▪ **i-Travel** should provide accurate total amount to pay with clear break down of each service price, taxes.	• **i-Travel** should provide accurate, trusted when applicable, data • **i-Travel** should strive to get accepted quality certifications (ISO 9001:2000, etc)
Financial aspects	▪ **i-Travel** should provide combined services, privileged, fidelity related reductions should be available. ▪ **i-Travel** should provide a price structure with: basic service, Advanced and Value-added services.	• **i-Travel** should define combined services, privileged and fidelity related reductions should be available, with related guidelines for charging and payment of services: Basic services, advanced service and Value-added services.
Secure environment	▪ **i-Travel** should provide at least the level of security in particular for payment provided by some e-commerce trusted providers. ▪ **i-Travel** should not share the user's data (preferences, history) outside **i-Travel** without clear user's authorization.	• **i-Travel** should provide a secured, robust and efficient service and systems with 99.9% uptime. • **i-Travel** should be secured with latest security technologies for critical (payment, etc) transactions • **i-Travel** should use of international standard transaction clearing and settlement service. Trusted 3rd party environment.

Navigation		
	Traveller	**Supplier**
Functionality	▪ **i-Travel** should provide as basic services the planning of multimodal trips and necessary on-trip information including routing and navigation (also indoor navigation e.g. in stations) ▪ **i-Travel** should provide detailed information concerning the transfer between modes of transport. ▪ **i-Travel** should provide notification of changes in user original travel plan and is provided with alternatives.	▪ **i-Travel** should to be able to notify a traveller on trip. ▪ **i-Travel** should provide the service provider or travel agent with real time user location (location detection) in case of a possible alteration on the route ▪ **i-Travel** should provide access to relevant information for planning and navigation including the travellers' preferences (profile and travel plan). ▪ **i-Travel** should have integrated all information on traffic systems for a multi modal approach in routing and navigation ▪ **i-Travel** should provide a common multimodal geographical reference system (including PT stops and navigation on stations - in door navigation). ▪ **i-Travel** should provide search engines with the knowledge of the actual position to narrow query results.

		▪ **i-Travel** should provide consumers with more comprehensive types of services like 3D-Maps with real objects' view, sightseeing city guides, locating friends etc. ▪ **i-Travel**'s navigation functionalities should be able to allow indicating the direction the person is heading. ▪ **i-Travel** should monitor the users' route and send location-specific forecast, road condition and e.g. fuel prices.
Context awareness	▪ **i-Travel** should provide maps information adapted regarding the used mode of transport. ▪ **i-Travel** should provide information filtered and displayed differential and filtered according different trip parameters and personal preferences. ▪ **i-Travel** should provide signs and important landmarks for better orientation fro pedestrian navigation and navigation using PT.	▪ **i-Travel** should provide high quality, reliable, digital maps and navigation functionalities. ▪ **i-Travel** should meet the special needs of walking navigation with as many POI's as possible. Maps, and localized voice guides are expected to be more detailed delivering a richer content. ▪ **i-Travel** should have maps optimized correspondent to the mode of transport. In particular proper map material for pedestrian, bicycle and PT-navigation is needed. ▪ **i-Travel** should provide adapted featured information situation aware for the user. ▪ **i-Travel** should provide context situation defined by parameter like time, position, mode of transport, next used mode of transport, trip type, end user device type, user profile and time. Entrances, connections, elevators and so on have to be displayed to the user. ▪ **i-Travel** should provide automatic detection of the context situation or chosen by the user. ▪ **i-Travel** should provide personalized information to be delivered where content quality and appropriateness play an essential role. This implies real time information, dynamic updates to the content and maps, local venues' offers etc.
Personalization	▪ **i-Travel** should provide capability for management of personalized routes. ▪ **i-Travel** should provide personalized information (showing relevant information, blank out unnecessary layers or) regarding trip type. ▪ **i-Travel** should provide options for possible mode of transport.	▪ **i-Travel** should provide information on personal user preferences or preferences of the user group. E.g. handicapped persons always get routing information including elevators while others would avoid elevators to save time when transferring. ▪ **i-Travel** should be enable advertisers to send personalized commercials according the users position.
User interface	▪ **i-Travel** should provide internet based interface to support of a wide range of devices (nomadic or not). ▪ **i-Travel** should encourage the use of different HMI's and multilingual presentation of information.	▪ **i-Travel** should comply to different requirements of mobile applications regarding limited hardware resources and limited possibilities to display information and usability. ▪ **i-Travel** should meet the users need on the go which implies less concentration and more desire for an easy interface

Accessibility	▪ **i-Travel** should be accessible 24/7 which is no problem for most of its predicted services except location detection which is essential when using PT.	▪ **i-Travel** should consider the heterogeneity of user-end devices. ▪ **i-Travel** should provide interaction with established information systems. ▪ **i-Travel** should provide continuous navigation which includes alternative modes of detection besides GPS (e.g. GSM cell based, WLAN, Bluetooth). ▪ **i-Travel** should support of a wide range of different mobile devices including "less intelligent" devices. ▪ **i-Travel** should be open and interoperable to guarantee connectivity between all systems and services ▪ **i-Travel** should provide instant positioning decreasing Tim To First Fix (TTFF). ▪ **i-Travel** should be able to locate the user even in places with low GPS signal propagation and high noise level.
Reliability	▪ **i-Travel** should provide up-to-date traffic and routing information in most recent maps.	▪ **i-Travel** should provide high quality of information in respect of currency, reliability and update frequency. ▪ **i-Travel** should provide comprehension of dynamic traffic information to respond in re-routing.
Financial aspects	▪ **i-Travel** should provide basic information (e.g. traffic information and routing) free of charge.	▪ **i-Travel** should provide at low cost: standardized interfaces, enhancing standards of provided data and the implementation of dynamic traffic information. ▪ **i-Travel** should assure low roaming costs and mobile data transfer. ▪ **i-Travel** should offer certain payment options depending on your location, local taxes, and available banks etc.
Secure environment	▪ **i-Travel** should generate pre trip a detailed printed travel itinerary including maps in case of loosing connection to the service provider or lost of the device. ▪ Problems have to be faced related to the functionality of location detection which makes the traveller fully traceable.	▪ **i-Travel** should assure “Anonymity” of the user. ▪ **i-Travel** should meet the requirements for the carriers of different countries to be able to instantly locate emergency callers.

Notification & Alerts		
	Traveller	**Supplier**
Functionality	▪ **i-Travel** should provide the latest, up to date, information on his booked or planned services. ▪ **i-Travel** should provide this information pre and on trip. ▪ **i-Travel** should notify changes in users original travel plan and provide with alternatives.	▪ **i-Travel** should support different dissemination platforms for notifications & alert (e.g. SMS/MMS alerts) to contact the traveller pre and on trip. ▪ **i-Travel** should facilitate the supplier with track and trace of the user and has to have access to the user’s preferences (profile and travel plan).

Context awareness	▪ **i-Travel** should provide relevant (with a real impact of the user's travel, not general information) notification & alert on the most relevant device at that time or on all device in case of high emergency.	▪ **i-Travel** should collect centrally last up to date notification from the involved suppliers and should then distribute it according to **i-Travel** business processes (WP3).
Personalization	▪ **i-Travel** should provide choices on how the notification & alerts are sent to the user, such as a picture, an icon, a sound followed by the clear and concise message.	▪ **i-Travel** should facilitate the supplier the ability to propose customized alternatives, up sell services (specific hotel in case of last flight of the day, cancelled). ▪ **i-Travel** should facilitate the suppliers to the provision of contents with internationalization feature.
User interface	▪ **i-Travel** should provide clear, precise and concise notification. ▪ **i-Travel** should provide a user interface based on ergonomic best practices when available.	▪ **i-Travel** should facilitate the suppliers to the provision of contents with internationalization feature.
Accessibility	▪ **i-Travel** should comply with the latest recommendations/standard including accessibility for disabled people.	▪ **i-Travel** should inform the suppliers of any impact latest recommendations or standards could have on the platform, and plan upgrades to be as smooth as possible for all the users.
Reliability	▪ **i-Travel** should provide clear re-booking information details (dates, hours, specific areas such gates at airports, who to contact in case of emergency). ▪ **i-Travel** should provide guarantee of the bookings made and with confirmation references. ▪ **i-Travel** should provide the accurate total amount to pay with clear decomposition of each service price, taxes.	• **i-Travel** should provide accurate, trusted when applicable, data • **i-Travel** should strive to get accepted quality certifications (ISO 9001:2000, etc) • **i-Travel** should provide all booking alternatives details needed to be recognized as reliable by the customer
Financial aspects	▪ **i-Travel** should provide combined services, privileged, fidelity related reductions should be available. ▪ **i-Travel** should provide a price structure with: basic service, Advanced and Value-added services.	• **i-Travel** should define combined services, privileged, fidelity related reductions should be available, with related guidelines for charging and payment of services: Basic services, Advanced service and Value-added services.
Secure	▪ **i-Travel** should provide	• **i-Travel** should provide a robust and efficient

environment	relevant and not resemble to spam notification & alert. ▪ **i-Travel** should provide at least the level of security in particular for payment provided by some e-commerce trusted providers. ▪ **i-Travel** should not share the user's data (preferences, history) outside **i-Travel** without clear user's authorization.	service and systems with 99.9% uptime.

Payment		
	Traveller	**Supplier**
Functionality	▪ **i-Travel** should provide the user capability to see progress/status: is there a reservation, has the service been used, and is the service paid for. ▪ The **i-Travel** service provider or travel agent should provide a capability to pay for all (booked and reserved) services (and products) before and during the traveller's trip. (These capabilities do not have to be provided by i-travel! Current payment methods can also be used).	▪ **i-Travel** should provide an administrative system to register the status of services reserved, used or paid for by the traveller. ▪ **i-Travel** should inform all parties involved about this status. ▪ **i-Travel** should be able to be linked to the booking or payment systems from the different suppliers involved. These functions enable for instance: - the travel agent to check if the traveller has received the service as ordered from the supplier. - the supplier to check if the service operators (e.g. travel agent) has paid for the services the supplier has delivered to the traveller. - the travel agent to check if the trip is paid for. - automatic payment by the suppliers' systems at the moment these system receive a signal from iTravel when a service is delivered (or booked depending on the deals made between the parties involved).
Context awareness	▪ **i-Travel** should register if services are used. ▪ **i-Travel** should provide option to choose the user account (private/work). ▪ **i-Travel** should provide capability to use different devices (depending on the situation). ▪ **i-Travel** should provide capability to use services on and off trip.	▪ **i-Travel** should register if services have been used and if services have been delivered according to the agreed terms. ▪ **i-Travel** should facilitate the supplier in providing a service which fits the device of the user (in format, data bandwidth and in security capabilities).
Personalization	▪ **i-Travel** should provide the user capability to express individual paying preferences (e.g. account, guarantee). ▪ **i-Travel** should provide the user capability to save individual paying preferences (a user profile). ▪ **i-Travel** should provide the user capability to use different devices.	▪ **i-Travel** should provide the supplier capability to provide progress/status of payment. ▪ **i-Travel** should provide the supplier capability to offer individualized services based on preferences. ▪ **i-Travel** should provide the supplier capability to provide the user profile to different devices.
User interface	▪ **i-Travel** should provide easy	▪ **i-Travel** should provide the supplier the

	to use (good instructions) services. ▪ **i-Travel** should provide service with limited number of actions required. ▪ **i-Travel** should provide a limit to the amount of information that has to be entered and read (simple actions). ▪ **i-Travel** should provide a confirmation of secure connection. ▪ **i-Travel** should provide different language options. ▪ **i-Travel** should provide capability to change the interface according to personal preferences.	capability to support all kind of payment services. ▪ **i-Travel** should provide the supplier the capability to use the system. ▪ **i-Travel** should provide the supplier the capability to support confirmation (secure connection, successful payment).
Accessibility	▪ **i-Travel** should facilitate the use of different devices. ▪ **i-Travel** should provide simple/fast (not time consuming) processes. ▪ **i-Travel** should comply with the latest recommendations/standard including accessibility for disabled people.	▪ **i-Travel** should provide common applications available on all common channels (Internet, counter, mobile). ▪ **i-Travel** should provide status communication via either an open standard or via standards used by the suppliers.
Reliability	▪ **i-Travel** service should be accessible on- and off trip. ▪ **i-Travel** service should be easy and clear in order the user to be able to get a first time right (on trip it is less easy to try again + roaming cost). ▪ **i-Travel** should provide a secure and trustworthy environment. ▪ **i-Travel** should have a limited down time.	▪ **i-Travel** should provide a stabile environment of platform systems and distribution channels with common content quality and availability level between the service suppliers. ▪ **i-Travel** should provide the supplier with capability to refresh data (accurate and real time) according to agreed levels. ▪ **i-Travel** should facilitate the supplier in coping with (system) failure. ▪ **i-Travel** should facilitate the supplier in storing and secure information (back-up). ▪ **i-Travel** should facilitate the supplier in providing a status history.
Financial aspects	▪ **i-Travel** should provide the user a capability to check payments.	▪ **i-Travel** should provide the supplier the capability to check the payment history.
Secure environment	▪ **i-Travel** should provide a secure and resistant to fraud service. ▪ **i-Travel** should provide a standard that is internationally recognized by consumers (so users know they can rely on this supplier).	▪ **i-Travel** should provide a system resistant to fraud.

References

Documents

- AVV (2003), Gebruikersbehoeften reisinformatie: state-of-the-art (Dutch).
- Booiman, H.J. (EMFC CC LogicaCMG) (2008), **i-Travel** Workbook Value Engineering.
- Cremers, A.H.M., Kranenborg, K., Bierman, E.P.B., Pijl D.J. van der (2005). Individuele reisinformatie voor personen met een verstandelijke beperking: eindverslag, (Dutch),TNO.
- Infopolis 2 (1999), Needs of Travellers: an Analysis Based on the Study of their Tasks and Activities, Deliverable 3.
- Jong, C., de, Brookhuis, K.A. (2005), De haalbaarheid van betrouwbare reisinformatie (Dutch), Rijksuniversiteit Groningen.
- OC Mobility Coaching (2003), Business model actuele reisinformatie openbaar vervoer (Dutch).
- Oxley, Philip R. (1997), Preliminary planning and organisation of TELSCAN Pilots.
- Pijl, D.J. van der, Cremers, A.H.M. & Soede, M. (2005). Personalized PDA, accessibility for intellectually disabled persons: concept guidelines based on the development of an electronic travel companion. HCI International 2005, 22-27 July, Las Vegas.
- PTV (2008), **i-Travel** Methodology.
- Rijkswaterstaat (2005), Mensen over de weg (Dutch).
- Schuman, Sandy (editor) (2005), The IAF Handbook of Group Facilitation: Best Practices from the Leading Organization in Facilitation (J-B International Association of Facilitators), IAF.
- Tertoolen, Gerard (2004), Drijfveren voor verandering (Dutch), presentatie Vereniging Mobiliteitsmanagement VM2.
- Tertoolen, Gerard (TNO), Hof, Tineke (TNO), Veling, Ipe (V&V Netwerk), Psychologie en mobiliteit; de automobilist op de divan (Dutch).
- Tertoolen, Gerard and Weggemans, Tony (2002), Reizigers onderscheiden. Een gedifferentieerde benadering van (openbaar vervoer)reizigers (Dutch), CVS.
- TNO (2005), IRIS: Functioneel ontwerp pilot Syntus (Dutch).
- Vialis/ TU Delft (2008), A. Slegers, InSight – Experiencing public safety at train stations'.
- Vialis/TU Delft (2002), S. v. Wayenburg, Informatievoorziening op een dynamisch busstation' (Dutch)
- Vialis/TU Delft (2007) , E. Fleskens, The traveller's experience of public transport'.
- Vialis/TU Delft (2007), E.J. Escano, 'Exploring New Possibilities: New Strategic Positioning of the VTF'.
- Khurri, Andrey (2008), What Mobile Navigation can do for you? Helsinki University of Technology

Documents used in the Annex

- BITKOM (Bundesverband Informationswirtschaft Telekommunikation und neue Medien e.V.) (2007): 3 Millionen Deutsche besitzen bereits ein Navigationsgerät, http://www.bitkom.org/de/presse/49914_45415.aspx
- Booz Allen Hamilton GmbH (2007): Next Generation eTicketing, http://www.boozallen.com/capabilities/Industries/industries_article/31127910
- Boston Consulting Group (2000): Mobile Commerce: Winning the On-Air Customer, www.bcg.com/publications/files/M-Commerce_Nov_2000_Summary.pdf
- Breidert (2006) - Estimation of Willingness-to-Pay: Theory, Measurement, Application, DUV July 1, 2006
- Emmerink et al. 1996. Impact of traveller advisory systems on driving speed: some new evidence, Department of Mechanical and Industrial Engineering, University of Iowa, Iowa City, IA 52242, USA
- European Union (2007): Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007.
- FTA (Federal Transit Administration) (2003): Customer Preferences for Transit ATIS: Research Report, U.S. Department of Transportation, Washington, DC.
- Hagen, M. van (2002) Stations als groeibriljanten. NS Groep Commercie, afd. Productman. MarketingOnderzoek en Advies.
- Khattak et al. (2000) - Investigation of Traveller Information and Related Travel Behavior in the San Francisco Bay Area, California PATH Working Paper UCB-ITS-PWP-2000-6

- Khattak et al. 2003 - Willingness to pay for travel information, Transportation Research-Part C,Vol. 11, No. 2, Pergamon Press, pp. 137-159, 2003.
- Kitamura et al. 1995 - Generation of Synthetic Daily Activity-Travel Patterns: Outline of the Approach, October 1995, Technical Report Number 39 October, 1995 National Institute of Statistical Sciences.
- Lee & Hatcher 2001 - Willingness to Pay for Information: An Analyst's Guide.(a consumer's willingness to pay for a particular attribute of a good or service), Journal of Consumer Affairs June 22, 2001
- Leitinger, S. (2004): Digitale Helfershelfer – Geographische Informationssysteme als Hilfsmittel in Notfallsituationen, NOEO 3/2004.
- Marti, E. (2002): Electronic Commerce im Reisemarkt: Handlungsempfehlungen für den Reisemittler. Köln.
- Ojala et al. (January 1999) - Tommi Ojala, Final Evaluation Report of PROMISE Demonstrations, PROMISE Personal Mobile Traveller and Traffic Information Service TR1043, Jan. 1999, pp. 1-142, Deliverable D7.4, Telematics Application Programme A2, Transport.
- Polydoropoulou et al. (1997) - Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies, Volume 1588 / 1997
- Raub (2003): Towards a Better Understanding of Needs for Travel Information – Analysis of a Commuter Survey, TRB 2003 Annual Meeting CD-ROM.
- Rehrl, K. et al (2005): Navigationsunterstützung für intermodal Reisende in komplexen Umsteigebauwerken, AGIT 2005, Salzburg.
- Vialis/TU Delft (2007) , E. Fleskens, The traveller's experience of public transport'.
- Vialis/TU Delft (2007), E.J. Escano, 'Exploring New Possibilities: New Strategic Positioning of the VTF'.
- Wolinetz 2001 - California Partners for Advanced Transit and Highways (PATH), Year 2001 Paper UCB-ITS-PWP-2001-05, (University of California, Berkeley)

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The interviewed companies/institutions are by name in alphabetical order:

- 9292ov.nl: service provider on multimodal travel information;
- Amadeus: service provider and operator on airline booking and travel information;
- Flemish Government -Department Mobility & Public Works: public authority;
- Dutch Rail (NS): transport system operator;
- POLIS – European Cities and Regions Networking for Innovative Transport Solution;
- Public Transport Bologna (ATC): transport system operator;
- Routenet.nl: service provider on route guidance and traffic information;
- Telematic Technologies for Transport and Traffic in Turin (5T): service operator on multimodal travel information;
- Transport for London (TfL): Transport system operator.

Annex

I. Breakdown Work Package 2

II. User Characteristics

III. Drivers and barriers of end users

IV. Drivers and barriers of suppliers

V. Service price guidelines

VI. Format Scenarios & Services

VII. Offered Services

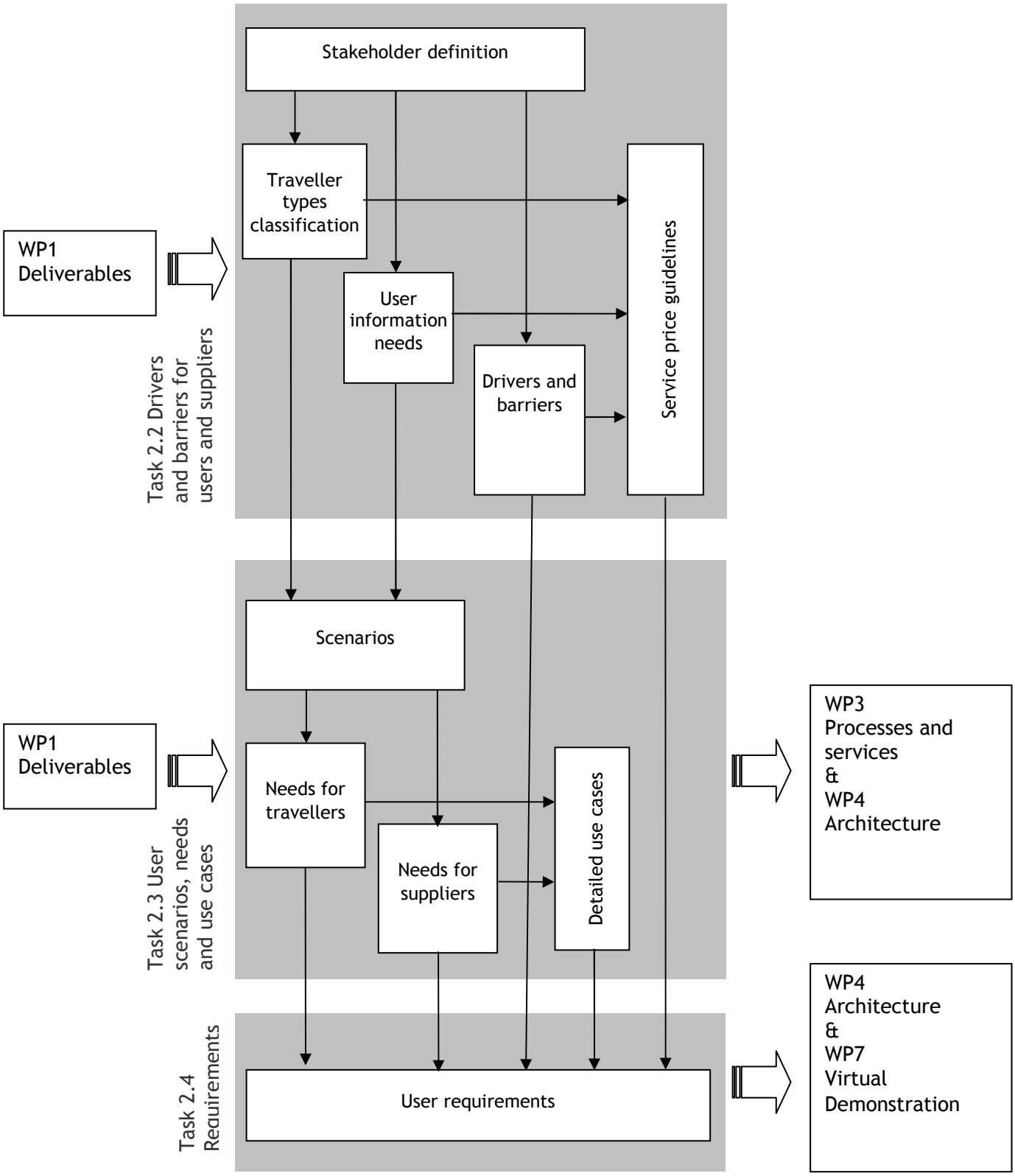
VIII. User Needs

IX. Transcriptions of the expert interviews

X. Existing Services

XI. Research information regarding end-user's perspectives

Annex I: Breakdown Work Package 2



Annex II: User Characteristics

Users have psychological characteristics. Some people have a relaxed state of mind, whether the are on a business trip or on a holiday. Other people want to travel as efficient as possible, regardless of their budget or the time available. The next text describes five known user characteristics:

- **Result and function oriented (planner)**

Efficiency, speed and control. Result oriented travellers consider mobility as functional means to get from A to B. They have little pleasure on being mobile, because it is a waste of time. They try to reduce the number of trips and travelling has to take place in the most efficient way. The result oriented frequently investigates the best route in advance to drive so that they are as soon as possible at the place of destination. Their strong need for certainty influences the choice for the transport mode. Result oriented wants to be sure that they arrive on time on their destination. As a consumer the Result oriented brings refinement and intelligence with a sense of composure.

- **Conscious choice of trip**

Mobility is more than only the required travel time to get from A to B. Mobility is an aim in itself, it is important for their mental and physical health and thus the quality of life. The Conscious travels now and then just to relax. Being on the road is a component of the travel aim. They choose a transport modality which suits the circumstances best, such as destination, travelling company and available time. Other important criteria are the environment, physical movement and the possibility for entertainment.

- **Image oriented**

Status, attention, rest and personal care. For the image oriented people mobility is a symbol for independence, the possibility of going where and when the person wants. They want to go their own way. Mobility is for the image oriented an expression of their social position. Being more mobile than others or having busier lives then others, gives the image oriented an image of how successful someone is. The image oriented hope to find in mobility a way of being “busy”. By their manner of travelling they can confirm their expertise, for example by taking smart routes or being able to work during travelling.

- **Company and leisure seeker**

Fun, open, friendly, easy going and full of energy. For company and leisure seekers mobility gives possibilities to maintain social contacts. For this group mobility has especially a social function. They experience the trip as pleasant and enjoy it if they can make a chat with people. Time is not important for them. They can put negative aspects of mobility, such as traffic-jams, in perspective. If they are delayed, they do not really care. For the choice of transport, the absence of stress is an important criterion.

- **Acquiescent and security seeker**

The acquiescent do not like mobility but consider it as necessary. They are quiet and will not worry about mobility. They experience travelling often as unpleasant, but finding possibilities to make travelling more pleasant is too much effort. The acquiescent take the situation such as it is. Being part of a traffic jam is not nice, but getting angry about the situation has little usefulness. The choice for a transport mode is made based on practical considerations. The traveller doesn’t seek adventure; on the contrary, contentment, harmony and reassurance are important.

Annex III: Drivers and barriers of end users

a) Drivers of end users

- **Time saving**

Rating drivers of travellers to use multi-modal traffic information services the effort to save time is most important. This includes both perspectives, saving time when planning a trip and the possibility to optimize the duration itself. Collecting pre-trip information can be very time consuming especially in a foreign environment. It implies that the user has the knowledge where to get the right information and in case of a multi-modal trip often to combine this information by themselves. Furthermore people are often habitually captives to a mode of transport regarding different trip purposes. **I-Travel** can raise the awareness of public transport when planning a trip due to showing the user potential savings in travel time (Boston Consulting Group, 2001).
A large amount of people e.g. see their commute as negatively affecting their work and home life. Travel information by itself will not eliminate congestion and delays; improved capacity and reduced single-person automobile trips to work are also required. However, with reliable information about travel times and delays, trip makers can have more control over their travel (FTA, 2003, P. 69).

- **Real-time traffic information**

The quality of traffic information is strongly affiliated with its topicality. Thereby the user is particularly interested in real-time on-trip information which is pushed to the mobile terminal when his trip is affected by changes in the traffic systems. These can be affected by e.g. disturbances and interruptions like delays or cancellations of flights and trains as well as congestion or road works. The needed information will be initialised by transport system operators or special entities like traffic centres. That way the travel agent can modify the route or mode of transport or even change a flight or train for the traveller.

- **Assistance on unfamiliar trips**

While most of peoples trips regarding route, travel time and speed are familiar to them and repeatedly reoccur (e.g. commuter trips) in the majority of cases they are calculable. The potential of saving travel time on those trips is marginal. Unlike when planning and performing unfamiliar trips. The need for dynamic on-trip information is somewhat greater compared to familiar trips where people are please with some basic static information. Travellers feel a higher need to reassure themselves in terms of actual location, travel distance, delays and disturbances. This applies especially to people using public transport and marginally less for motorists (BITKOM, 2007).

- **Mobile navigation**

The market of mobile navigation devices in Europe grew with triple-digit percentages in the last couple of years. While fixed in car solutions in the last two decades found its way largely in the premium car sector and only in limited quantity the availability of inexpensive mobile devices generated a new mass market (Rehrl, K. et al, 2005, P. 19f.). Conclusions can be drawn from this development and lead to the assumption that the market isn't saturated yet. Especially solutions for navigation of pedestrians, users of public transport and bicycle riders. **I-Travel** intends to support the traveller during the whole journey encouraging multi-modal trips. But the multi-modal approach induces different requirements to a navigation system. Besides displaying the appropriate information for the user group the scale of view needs to be enlarged and in-house navigation (e.g. to support the user in complex buildings like train stations and airports) is an essential attribute. By including these features connected with displaying location based services and information **i-Travel** will markedly ease travelling in unfamiliar environments, lowering constraints using public transport and therefore providing the use of other modes besides individual motor car traffic.

- **Translation of information and services**

A traveller in a foreign country is limited in its mobility depending on its language skills and the locally available information. With displaying all necessary information in its first language its knowledge is not shortened compared to resident people. The additional functionality of the eMarketplace relieves the user e.g. when buying tickets.

- **ETicketing**

Today only a few possibilities exist to make use of eTicketing (e.g. flight or train tickets) and these affect primarily mid- or long distance trips. A potential adoption in everyday use like public transport using smart cards (e.g. seen in London and Hong Kong) can cause a huge investments and operating costs. An alternative represents NFC (Near Field Communication) via mobile phone or handheld. The benefit for the user is enormous. A nation wide eTicketing scheme in Europe could be the result which eases access and payment to public transport services even on pan European trips. Detailed tariff knowledge and pre-trip ticket purchase becomes obsolete. No additional device is required generating a significant increase in customer convenience seen e.g. in several test runs in Hanau/Germany (Booz Allen Hamilton GmbH, 2007). But eTicketing in the case of **i-Travel** services also means to buy e.g. parking tickets or book hotel rooms and therefore feature all services and billing associated to the trip which will make it easier for the traveller that typically would require a longer research or on-site travel information.

- **24/7 access to services**

i-Travel is round the clock and seven days a week reachable delivering reliable information and allowing access to services on the eMarketplace. So far people were bound to business hours of ticket counters, service hotlines or assigned to a stationary internet computer with internet connection.

- **Reliable post-trip data**

All data accumulated during a trip should be available post-trip. These data could include the different stages, departure and arrival times, travel duration time, modes used and travel expenses (itemised by trip section and mode). With supporting these functionalities **i-Travel** provides reliable post-trip travel analyses and eases especially the accounting of business trips.

- **Personalized automatic recommendations and booking**

The deposited profile which is enriched with standard requirements and preferences of the user establishes the possibility to design trips automatically according to the traveller's profile. This is time saving in the pre-trip phase and is in particularly interesting for repeatedly travelling the same route. Besides the ease of booking for e.g. business traveller **i-Travel** can contain and prefer commercial partners of their company when arranging the trip.

- **Travel guide**

Most people using printed travel guides when on a journey. An electronic travel guide combined with a GPS module makes especially city trips easier. Among the possibility of continuous navigation and supporting the traveller in an unfamiliar traffic system **I-Travel** can facilitate detailed information to POI (Points of Interest) and location based services.

- **First hand recommendations**

The functionalities of **i-Travel**'s eMarketplace should enable the user to find out and optionally follow suggestions of e.g. places, accommodations and routes expressed by positive experiences of other users. At the same time the traveller can avoid experiences stated as negative. These functionalities are already facilitated in different internet threads and supported by travel service providers like opodo or expedia.
Users rate first hand suggestions as high and often base their decisions on commendations, providing the number and source of reviews is trustworthy and allows an objective decision making (Marti, 2002, P. 37f.).

- **Logbook of trips**

People share their travel experiences more and more with friends, family and beyond using online services and adding e.g. digital photographs to their sites and bogs. Applications like Google earth can be enriched with photographs and stories to POI all over the world. New digital cameras even feature GPS modules which add information of the geographic position where the picture was taken to ease the process of generate complete travel chains. People using these applications/services can follow travel routes and e.g. collect impressions when planning their own trips. Data collected in **i-Travel** could be used to form the basis of such a travel diary and form an attractive additional specification for leisure travellers.

- **Provision of prevailing emergency information**

Travellers in a foreign environment feel safer if the possibility is given to get reliable information about the nearest hospitals, physicians and first aid facilities just in time. This resolves language barriers and location illiteracy. This service is especially relevant for pregnant woman, handicapped people or people with chronic illnesses and special needs and combinable with a “pay as you go” travel insurance offer easing trip planning and saving costs. A further use-case is the possibility to make distress calls which automatically forwards the exact geographic position of the traveller to the nearest emergency communication department (Leitinger, 2004, P. 36.).

b) Barriers of end users

- **Limitations in the amount and quality of provided on-trip information**

The size of information is strictly related to the type of content provided to the end-user. As long as the information is in a textual format there aren’t problems, even on low bandwidth networks like GPRS (2.5G). Multimedia information which obviously are more immediate (maps, voices etc.) requires at least 3G networks and 3” screen size which currently is the upper bound of mobile devices. Regarding the band occupancy of multimedia information just few numbers. Small/Medium multimedia file 40kBytes (jpeg image for mobile devices) would be downloaded in about 1 sec on 3G networks and in 7-8 sec on 2.5G networks. While real-time streaming (e.g. Digital Audio Broadcast) needs an average bit rate of 192kbits/sec which is realizable only on 3G networks.
For the above mentioned issues an information filtering strategy would be implemented. Providing only that information the user requires.

- **Possibility of losing the device**

With loosing the device or assuming it is stolen the traveller would loose its whole trip information. All necessary information is stored in the device and/or online at the service provider. The possibility should be given to prepare a printed copy as backup solution. The traveller on trip is fully dependent on the device. A second aspect is the loss of personal data stored in the device.

- **Necessity of a suitable handheld device**

The mobile device market is highly heterogeneous. Each device has its own OS (proprietary), hardware configuration and performances. Developing a client application for every single device is sheer utopianism. There are different runtime frameworks which varying in their usability. The Java environment as proposed by SUN is one of the runtime frameworks available on the market. Also the Microsoft compact .NET framework is most suitable for developing rich mobile applications while companies like Nokia still promote native (C/C++) application development as the best way forward. Qualcomm BREW for instance offers a framework specifically targeted to mobile devices, phones and smartphones.
Another way is to provide an internet portal designed to be as suitable as possible for small screens and low bandwidth to be accessed through browsers. But for others it is also seen as too heavy for mobile applications with less than optimal, limited, connectivity available. Distributing applications to different tiers, part running on the server and part on the mobile device might be a better option. This kind of Service Oriented Applications (SOA) typically use well defined and specified web services and/or standardized message formats. Using SOA abstracts the technologies used to implement the server and client tiers while still supporting an open interface between tiers. In essence when using SOA the barrier might rather become a driver.

- **Limited number of participating suppliers**

The quality of service provided to the traveller is fully dependent on the number and completeness of service and information provider. If the number is limited essential services might not be covered and lacks in the travel chain could be the consequence.

- **Loose of physical contact to service personnel**

User interface must accommodate future needs and wants arising from developments in society, such as the needs of different user groups, the special needs of elderly people, disabled people and those with learning or languages difficulties.

- **Limited service out of Europe**

Given the fact that service and information provider have to prepare interfaces to connect to **i-Travel** services it is a complex issue to integrate an adequate number of services. This leads to the assumption that a full coverage in Europe is a great challenge. Nevertheless a limited number of essential services should be guaranteed at all times even outside Europe.

- **Reliability of information**

The current coverage and quality of network monitoring is, in general, very poor. To favour such activities by operators, a number of technical and organisational barriers need to be broken down. A useful start would be an agreement at the European level on a suitable common standard for the monitoring of all major transport networks, allowing time for all countries to reach the agreed level. Such arrangements are especially necessary in the case of deregulated systems. Where transport services run under license or franchise, operators should be asked to publish certain information as part of their service contract. This could include not only timetables and network conditions, but also real-time traffic data and information on disruptions, such as road works and closures. Good practice should be promoted. The work of the European ITS Framework Architecture could help in this activity.

- **Service costs**

General traffic information is expected to be free of charge. People will not be willing to pay for basic services as they are available as pre trip information for free at the moment. The benefit has to exceed this level. Useful on-trip services could generate this impact. For more information see the Annex Service price guidelines.

- **Roaming costs**

The high level of the prices payable by users of public mobile telephone networks, such as students, business travellers and tourists, when using their mobile telephones when travelling abroad within the Community is a matter of concern for national regulatory authorities, as well as for consumers and the Community institutions. The excessive retail charges are resulting from high wholesale charges levied by the foreign host network operator and also, in many cases, from high retail mark-ups charged by the customer's own network operator. Reductions in wholesale charges are often not passed on to the retail customer. Although some operators have recently introduced tariff schemes that offer customers more favourable conditions and lower prices, there is still evidence that the relationship between costs and prices is not such as would prevail in fully competitive markets. The EU Commission through the EU regulation on roaming brings a new era in mobile communication. The regulation entered in force since 30/06/2007 aims to provide to citizens travelling within the EU affordable and transparent prices.

What does the regulation mean for consumers?

Prices paid for international roaming when travelling within the EU will be capped by a Euro tariff unless the customer opts for a special package offered by an operator.

The prices of the Euro tariff cannot exceed 49 cents for making calls and 24 cents for receiving calls for the next year (excluding VAT). Consumers will benefit from these lower prices for making calls in the visited country, back home or to another EU Member State. Consumers will also make considerable savings when receiving calls. Prices that operators charge each other (wholesale charges) are also being capped over the next three years. This ensures that all operators will be in a position to offer lower retail tariffs. Transparency of roaming charges for consumers will be enhanced. Customers will be able to receive an SMS when they are roaming informing them of the price they are expected to pay for making and receiving calls. Customers can opt out from the service if they wish. Customers are able to request more detailed information by means of a voice call or SMS. National regulators must monitor and supervise compliance with the regulation. They will monitor developments in wholesale and retail charges for the provision to roaming customers of voice and data communications services, including SMS and MMS. The Commission shall review the functioning of the Regulation and report to the European Parliament and the Council no later than 18 months after the date of its entry into force.

The regulation expires three years after entry into force (European Union, 2007).

- **Costs of data services**

If you would ask somebody on the street why he does not access online information and services more on his mobile device, one of the top reasons will be the cost of using such services. Even if a layman uses mobile services actively, it is likely that he cannot show you any other way to control the costs

of data traffic than use it less often and in shorter sessions. Only few advanced users are able to explain you how to control the costs when, for example, browsing the Web on a mobile device.
There are several mobile devices today with a Web browser that allows users to access the very same Web pages as on a PC, and the number of users connecting their laptops to cellular networks is increasing. As data traffic in mobile networks will quickly increase, the cost per byte must come down dramatically. Mobile phone billing models are fairly complex and vary from carrier to carrier. Typically, wireless data traffic (e.g. browsing) is separated from wireless voice (phone calls over the cellular network). The criteria for data traffic billing may be the duration of connection, amount of data downloaded and uploaded, connection speed, number of downloads, or a combination of these. Typically, billing is based either on time that the connection is open or bytes transferred (Table 8.1). We can roughly say that user experience of cost is the worst on the top left part of the table, and the best on the bottom right, so billing models tend to develop to that direction. As long as the fees are too high at bottom right, customers will prefer to stay at the earlier phases.

Data → Time ↓	By Byte	Data Block	Unlimited
By second	Pay per times*bytes	N/A	2G
Time Block	Monthly pay*byte	Monthly fixed data block	Monthly flat rate by/Charged WiFi time
Unlimited	Prepaid	Prepaid	No fee / 1-time subscription fee

Billing possibilities

The best solution for customers would be a very simple billing model for mobile data traffic, e.g. a reasonable fixed monthly fee. Mobile carriers are not eager to provide a flat rate, however, because the current cellular networks do not have the capacity to handle the increased traffic that VoIP calls, music sharing, and other heavy content downloading would generate in a flat rate system. We believe that reasonably priced flat rate systems without upper limits for data will be a major challenge in the next years.

- **Limited bandwidth in the phone network**

The coverage of 2G and 3G networks in Europe and more out of Europe is still lacking in efficiency. The current coverage maps provided by gsmworld (see figures below) up to date to January of the current year are self explaining. Taking into consideration West European countries for example which are entered in EU in the last 2-3 years we can see that 3G is far from being the standard situation.

- **Lack of trust in electronic payment systems**

Electronic payment systems can bee seen as less trustworthy compared to other payment methods. Trust influences the customers activities and thereby the success of e-commerce solutions. Especially mobile payment strongly has to taken the customers concern into account.

- **Familiarity with IT and nomadic devices**

The deployment of IT depends strongly from the way in which humans are involved. From this point of view the internet has done a great deal to increase people's confidence in getting information out of ICT, but there are great strides still to be made before this is universal and before it extends to confidence in information terminals on street and at transport nodes, and for other applications.

- **Quality of provided information**

There is enormous variability in the quality and availability of the data itself. Services offering high quality information and easily accessible appear to be used more intensively, but reliable statistics on actual use are seldom available. With the exception of special services offered to car drivers, evidence exists in only a few cases of willingness to pay for information (e.g. the 5T service in Turin reports that around 40,000 users a month send - and hence pay a small fee for - SMS requesting real-time information on bus and tram arrivals at city stops). A look at such TTI services currently offered in Europe shows that:

Very few are paid for directly by the final customers (either they are sponsored, or revenues are obtained from advertising or by selling information to other operators)
At present, most TTI services operate within a single country (and more often a particular city or region)
The majority of services cover a single mode; real 'multimodal' services are still rare
The transfer of information from transport operators to service providers is based on bilateral agreements; there is no standard framework.

- **Lack of standardized pan-European payment system**

Applications in the transport sector in Europe are growing, and focus on the areas of payment and ticketing. A device used for payment will handle information concerning the identification of the paying person and/or the account to be debited. For ticketing, the device must also include the identification of the travel paid as evidence of the contract between the transport service provider and its client. The use of smart cards (integrated in mobile devices) could be a good solution. The need is now for standardisation at application level and for the exchange of data. Work has started, but needs to be finalised in terms of technology as well as for the implementation of interoperable services, which might lead to necessary contractual agreements between service providers. Smart cards have proven to be an active part of our daily life.

- **Concerns about privacy**

Frequent reports of violations of private data induce restraints on the customer to use special services that could raise this issue. The use of **i-Travel** includes different services like location detection that fall into that category. It has to be guaranteed that these data are handled anonymously.

World GSM – 3G Coverage Map

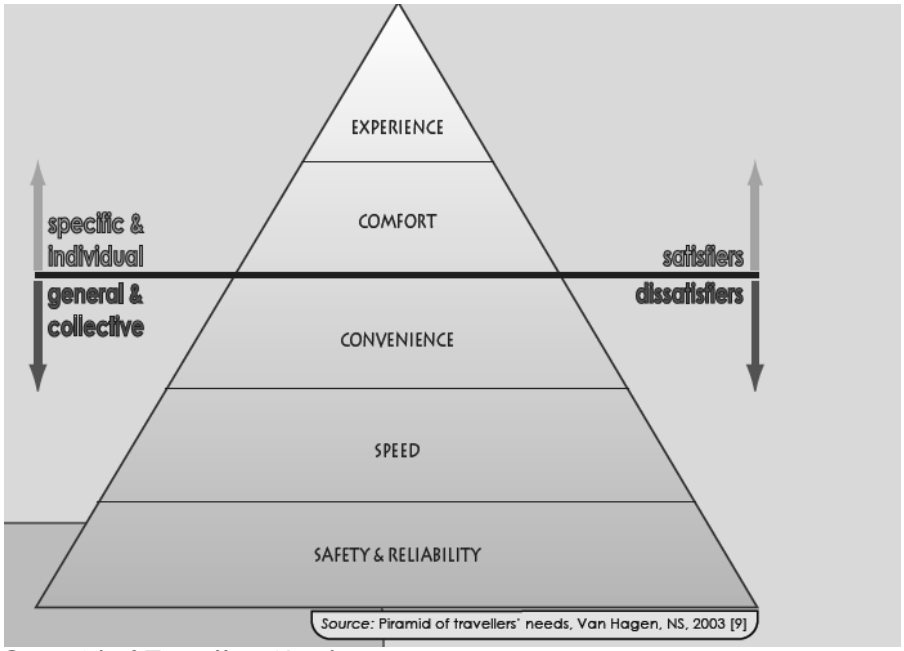
Annex IV: Drivers and barriers of suppliers

a) Drivers of suppliers

- **Customer satisfaction**

It is important for suppliers of information and/including public authorities to satisfy their customers in such a way that the supplied information is accurate, valid and representative for the planned or real time situation on roads or in public transport. This should give travellers confidence in the availability to move through their desired road or chose an alternative route. In the case of public transport, travellers should be informed on the availability of suitable public transport before, during and after a trip. This is a prerequisite for the growth of public transport.

When all the services of **i-Travel** are operational, the customer gets a personal context aware travel assistant. According to the Pyramid of travellers (Van Hagen, NS, 2003), these specific and individual satisfiers will rise the attractiveness of public transport. The customer's satisfaction will rise due to a better experience and comfort feeling. These factors will result in a driver for public transport operators and local authorities to join **i-Travel** (because of more quality of public transport and thereby more passengers, growth).



Pyramid of Travellers Needs

- **Statistical information for planning and marketing**

Suppliers get a better understanding of their customers' travel patterns which new information is representing a value for marketing purposes for building new services.
For local authorities this information is valuable for statistic traffic issues. For public transport authorities this generates valuable information for the importance of relevant destinations and the demand for capacity in public transport.

- **Cross marketing between suppliers**

Traffic/transport information is the result of the demand of a traveller/driver to understand his route/travel to a destination in order to do something. This may cover events, shopping, entertainment, cultural visits. The combination of travel & admission and/or fidelity/membership cards is an interesting cross marketing concept for suppliers of transport, increasing the marketing value of travel/traffic information and increasing the value of transport and the destinations itself. New business models will be defined between suppliers.

For local authorities the purchase of public transport tickets as part of an information service is favourable as the threshold for the use of public transport is reduced for e.g. customers who are not known with public transport facilities and who normally would not consider this to be an option.

- **Easy payment for buying tickets in public transport**

The availability of payment methods (locations and mobile) increases the attractiveness of Public Transport: it lowers the threshold when in doubt to use public transport, raises the awareness with the unknown or occasional travellers and offers a better service to travellers. This will attribute to growth of public transport and to transactions.

- **Concept of "pay as you go" for health, car and travel insurances**

There is a new market for insurance companies to provide a concept like 'pay as you go' and 'insure as you go'. As in now more and more details of a customers trip are known, insurance companies can adjust their policies to it.

- **Marketing instrument to get more off peak travellers in public transportation**

For suppliers of traffic and travel information, it will often be a policy for local authorities to inform travellers on off peak situations in order to relieve pressure during peak hours for travellers who are able to choose an alternative time. Public transport operators, will have a similar motivation, for an improved coverage of overall operational cost.

- **Promotion of provided services**

It is important for all suppliers of information to build awareness of their existence and their services offered. Sometimes public authorities have a policy to create visibility of their activities in the field of traffic management and/or public transport

- **Risk sharing for special markets**

Normally niches have a very high risk profile. Within the **i-Travel** project suppliers of special markets can share their risk with other suppliers in this market.

- **Increased possibilities of interventions in traffic management**

Public authorities get a more complete grip on all the modalities of transport. Not only traffic, but also modal shift/ split to public transport can now be used for better traffic management.

- **Providing an unique service as early adopters**

The integration of information on public transport, traffic and airlines is a unique service. There are a lot of initiatives, for which a lot of suppliers are preparing to participate. Being an early adaptor, this creates value for suppliers in order to take a competitive advantage.

- **Increased efficiency of public transport**

A better cost cover degree for operators may be a medium term incentive when local authorities start to take a more demand-driven approach instead of the existing models.

- **Selling more data services**

New data services arise from **i-Travel**. Al of the gathered information and data can be stored and used for new services.

- **City marketing**

Local authorities are prepared to invest in accurate information of getting to and from their city centres in order to receive as much visitors as long as possible in their economic zone.

- **Local Political Organizations Visions**

Local political organizations often offer their citizens a local portal for getting actual traffic information, route planning and cross modal route planning. As local travel portals also have to limit the costs they may cooperate for getting additional users (and getting more attractive for advertisers).

- **Marketing and promotion for all providers and suppliers involved**

A new information channel for travel and traffic information is promotion in itself for all providers and suppliers involved. This accelerates opportunities for all stakeholders. This applies also to local authorities with a focus on city marketing

- **Improved accessibility of public transport**

The combination of traffic and public transport information is valuable to public transport operators, as car drivers are confronted with alternatives which sometimes may lead to not take their car.

- **Possible new partnerships between suppliers**

The combination of different information suppliers through service providers will be valuable for some suppliers involved to partner for relevant initiatives as they have a mutual benefit.

- **Cleaner environment by increased use of public transport**

Depending on the availability of data, it is possible to inform on environmental issues of the specific choices in traffic and transport by travellers. This is relevant to local authorities with an environmental focus in their policy.

- **Improved quality of life**

Better insight in traffic situations and public transport offered, will improve the quality of life, being a valuable issue for local authorities. The accessibility of locations is becoming an important issue for economic growth.

b) Barriers of Suppliers and Public Authorities

- **Investments**

Investments have to be made at the start by the service operator, but financing has also to be assured during operating the service.

- **Uncertain business model**

Suppliers need to be sure that joining the **i-Travel** community is bringing new revenue opportunities. This will generate additional costs to them involving uncertainty about the end-user's willingness to pay for the information.

- **Operating costs**

Value analysis will show who will pay for the service. Looking at existing services, transport service operators will supply information (schedules, prices, delays …) but may not pay for getting customers. Hotels and holiday dwellings will pay a commission for each booking. Advertisers will pay for getting advertising space – but only, if the page is used by many users. Today it is not sure, if users will pay for the service. There are some ideas: One is to supply basic services for free and others have to be paid. These could be received by subscription or per use.

- **Starting a new service from the scratch**

Looking at very successful portals (eBay, Amazon, Google …) one can see, that all of them concentrated on developing a useful service in the beginning and then concentrate all available funds in getting users for the service. Some of them had strong financial backers allowing them to operate aggressive marketing. Almost all of them went public after only few years. We can see, that:
Creating a useful and easy to use service concentrate all available funds in getting users are the most important steps to get a successful portal.

- **Fear of loss of power by sharing data**

Locatienet in Netherlands experienced that public transport operators did only give away their data (schedules, prices, etc.) after getting under the governments pressure. In Germany, a huge online route planner (falk.de) got money from Deutsche Bahn for implementing them into their service. It seems, that there is no common attitude throughout Europe.

- **Losing the possibility of marketing on the suppliers own website**

Looking at service providers like expedia.de, opodo.de and even Deutsche Bahn travel services one can see, that the user gets information about who is the transport service operator. Unlike this existing service providers like expedia may resist against such a new service or trying to cooperate, because **i-Travel** would be a competitor to them.

- **Sharing of identity sensitive information**

So far laws prohibit sharing of identity sensitive information. In 1995 the European policy of data protection was issued. This policy describes the minimum requirements each EU-country has to implement in their national data protection acts.

- **Fear of Competition of public transport companies**

Public transport companies are – historically caused – not very competitive and often internal focused. They might fear a competition to other modes of transport or competitors when the user gets a total multi modal view of all possibilities he can choose for his trip. Therefore transport companies could decline sharing interfaces with **i-Travel**.

Annex V: Service price guidelines

At present, many travel information services are provided free of charge (see Table below). Information services, however, are diversifying and becoming more sophisticated thus requiring more resources. This has put service providers in difficult position, because users are not very keen on paying for the services, but new innovations are needed to fulfil user's needs and to maximize the profitability of the service activity.

Existing Services			
Information and Planning			
Name of service	URL	Description	Price
Expedia	www.expedia.com	It provides the user with the opportunity to book online flights and hotels, rent a car, plan a cruise or a ski trip	Free of charge
Opodo	www.opodo.com.uk	Opodo is a Pan-European travel service created to facilitate the needs of today's traveller. It offers access to over 500 airlines, 65,000 hotel properties and more than 7,000 car rental locations worldwide - as well as travel insurance	Free of charge
9292 System - Nederland's	www.9292ov.nl	It is a travel guidance service, which is based on phone transactions, called 9292 system	Call 0.40€/min Free of charge over the Internet
Free Trip	www.freetrip.com	Free trip is an online trip planner. It assists in trip planning by creating detailed itineraries with accurate and easy-to-read directions in itinerary "time-table" format.	Free of Charge
Ruhr Pilot	www.ruhrpilot.nrw.de	Multimodal Trip Planner limited to the Ruhr Area in Germany	Free of charge
HaCon	www.hacon.de	HAFAS is the leading timetable information system for cross-transport application in the traffic sector. It computes more than 1 billion connections per month, and can be accessed on a wide variety of platforms, from call centres to printed media, on the Internet or on the	N.A.

		move via PDA or mobile phone.	
Reservations & Booking			
Sms - Parking	N.A. more info on www.4411.be	Send an SMS to book a parking space, once you have arrived at that parking space. You can pay the corresponding parking fee via your mobile phone invoice or via a separate parking invoice.	Only SMS costs
HotelBooking	www.hotelbooking.com/	On hotelbooking.com, with a few clicks, you will be able to to search, find and book on line more than 30.000 hotels in the world: you will have the opportunity to choose among a wide range of destinations in many Countries with all the hotel categories, from the cheapest to the most luxurious	Free of charge
Airtickets.gr	www.airtickets.gr	Airtickets is a Greek site that offers to the user the capability of planning a whole trip, from start to end and to more than 200 destinations across the world, given that this trip is done by airplane	Free of charge
Expedia	See above	See above	See above
Opodo	See above	See above	See above
Navigation			
TomTom NAVIGATOR 6	www.tomtom.com	Mobile On-noard navigation system	On average 150€ (Software + Map)
amAze	www.amazegps.com	Mobile Off-board navigation	Free of charge
Garmin Mobile	www.garmin.com/	Mobile On-board navigation	On average 100€ (Software + Map)
Notification & Alerts			
Traffic	www.traffic.com	The ability to deliver real-time, highly personalized, on-demand traffic information to drivers when, where and how they want it allows us to offer advertisers unique opportunities to tie their brand to valuable, local content.	Free of charge

TomTom Traffic	www.tomtom.com	The TomTom Traffic service provides you with updated traffic information anywhere you need it, in your home country and also when travelling abroad	TomTom Official site: 49.95€
Traffic Information of Flanders	www.verkeerscentrum.be/	Traffic information can be obtained for all highways and some regional roads in Flanders.	Free of charge
SMS Real Time Public Transport Info	www.5t.torino.it	The Service provides real time information on arriving times of public transport modes.	SMS cost

Providing Service Price Guidelines for the **i-Travel** offered services means measuring and determining the willingness to pay (WTP) for such kind of services and the related information content.
One method for evaluating Willingness to pay is presented by Breidert (2006) under the name Estimation of Willingness to Pay. This method resembles stated preference analysis, but one major difference exists: price is not included as an attribute. The study is made by presenting users a set of different product profiles with assigned prices and asking if they would be willing to buy the presented product. By changing the price attached to a product profile it is possible to find a maximum amount (upper bound for price) and minimum amount (lower bound for price) a user is willing to pay for a product set with the given utility level.

It is easier for customers to choose from assigned prices than assign prices themselves. WTP can also be determined from different viewpoints and by several different attributes. For example, WTP for advanced traveller information service is affected by uncertainty, information awareness, information content and information use in addition to situational, contextual and socio-economical factors (Wolinetz 2001).

Considering an example service, we first have to measure the consumers WTP for the service, then compare it to providers expected costs, and determine if providing the service is profitable. (Lee & Hatcher 2001.) It is also important to notice that the WTP for a product or a service needs to be specified in the marketplace. The users WTP needs to be asked from the real customers in the real marketplace to get realistic and valid results. Several studies of WTP for travel information have been made with similar results. Customized information, longer journeys, business trips and listening to radio traffic reports increase the willingness to pay for information (Khattak et al. 2003). Studies (e.g. Khattak et al. 2003, Kitamura et al. 1995) suggest that longer journeys and travel times have a positive effect on the WTP for information. This is mainly due to the fact that in these situations there is higher chance of congestion and delays and more alternative route choices. Travel frequency and the reason for travelling affect also WTP, partly because travellers know the route to inquire when travelling on it daily and travel time to work is usually more valuable than time used for personal travel. The travellers income, travel mode, and, for example, owning a cellular phone might have small effect on the willingness to acquire and pay for travel information (see Wolinetz 2001).

For example, male drivers on business trips are more willing to pay for having in-vehicle dynamic traffic information than other travellers (Emmerink et al. 1996). Individuals are also more willing to pay for information if the travel uncertainty is high, information is available only to selected individuals who can choose relatively uncongested routes, and if the perceived benefits of the information exceed the cost of information acquisition. (Khattak et al. 2003.) WTP also depends on the possible pricing techniques.

Users might be more willing to pay monthly fees instead of single payments, or vice versa. This should be noticed when making defining user WTP. Some user groups might prefer single payments, because they do not use the information so often, whereas other groups might prefer monthly fees with a

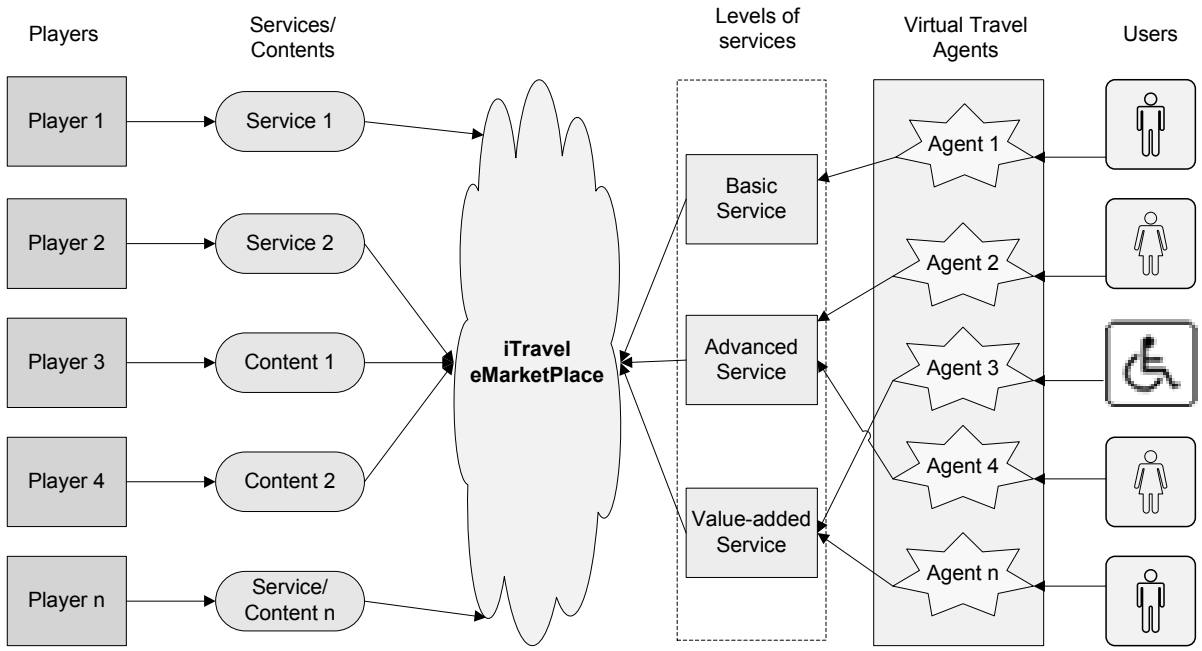
price reduction compared to single payments. All groups and payment methods should be defined as careful as possible to get the most reliable results.

Different studies have yielded different results. Polydoropoulou et al. (1997) reported on two studies done for *SmarTraveller* in Boston; one study focused on *SmarTraveller* users, the other on non-users introduced to *SmarTraveller*. The service was free at the time of the study, and participants were asked their willingness to pay for the service under two different pricing scenarios: a per-call service charge and a monthly service charge. The survey arrived at mixed but fairly positive results. Of the non-users, 32 percent said they would make 1 to 4 calls per week at a rate of $0.10 a call; 20 percent would make the same number of calls at $0.25 per call; and 24 percent would call at a rate of $0.50 per call. The perceived usage dropped off severely at a higher number of calls per week: only 6 percent said they would make 10 or more calls a week at a rate of $0.10 per call. The users had higher percentages, with 42 percent stating they would call 1 to 4 times weekly at a charge of $0.10 per call. As the service charge rose, the percentages dipped somewhat: 36 percent said they would call with a $0.25 per call charge, 28 percent would call with a $0.35 per call charge, and 21 percent would call with a $0.50 per call charge. The percentage of people who believed they would make 10 or more calls per week at $0.10 were actually less than nonusers, at 5 percent. For a monthly charge, 40 percent of non-users said they were very unlikely to use *SmarTraveller* with a monthly service charge of $2.50. However, 24 percent said they were somewhat likely to use the service with a monthly charge of $2.50, and 17 percent said they were very likely. At a service charge of $15.00 per month 80 percent said they were very unlikely to use *SmarTraveller*, with only 7 percent saying they were somewhat or very likely to use the service. Users were slightly more willing to pay. At a rate of $2.50 per month, 20 percent were somewhat likely to use the service, and 23 percent were very likely. At a rate of $15.00 per month, a huge 93 percent said they were very unlikely to use the service, which is 13 percent more than non-users.

Ojala et al. (January 1999) put together results from studies of the European PROMISE Advanced Traveller Information Service. Five test sites were reported on: Finland, France, the Netherlands, Sweden, and The United Kingdom, with different amounts of traveller information being provided within the different countries. The results showed that despite these varying levels of service, customers were still willing to pay for the service. The amounts varied, however. In Finland the average amount participants were willing to pay monthly was 5.00 (~$6.14 U.S.). In France the average amount was lower, at 2.50 a month (~$3.07 U.S.). The Netherlands had a higher rate, but most participants preferred a different payment plan, with a monthly average rate of 11.20 (~$13.76 U.S.) plus a pay-per-use fee of 0.18 (~$0.22 U.S.). The average monthly fee Swedish participants were willing to pay was 7.60 (~$9.34 U.S.), and in the U.K., 68 percent would pay a maximum of 7.50 per month (~$9.21 U.S.).

A study conducted by Khattak et al. (2000) in the San Francisco area looked at the free Traveller Advisory Telephone System. The average number of calls a typical user placed to the system was 4.8 times a month, with 30 percent of the population being cell phone users who were charged for using a cell phone. On the basis of participants' stated preference, if customized service was available at $0.25 per call, average use of the service would increase to 7.09 times per month, a rise of over two calls per month per user from the existing system. However, if the charge were increased to $0.50 or $0.75, average use would decrease to 4.36 times per month or 1.75 times per month, respectively. While WTP studies do offer insight into how much people potentially value the system, often what a person thinks he will do and what he actually does are two different things. This makes it hard to measure benefit through WTP research.

Taking into consideration the above mentioned theoretical aspects we could define an overall pricing strategy based on a three level of services model (see figure below).



End users will choose the appropriate level of service according to their needs and willingness to pay.

A. Basic services comprise general information useful for trip planning. The Basic services are aired free of charge and provide social benefit to the general public. These services could be financed through investments of public bodies and institutions and through advertisement. Examples of Basic services are:

- Route planner
- Static Timetables of public transport modes
- Weather information
- General Tourist Information

B. Advanced services comprise information on more complex travel scenarios in city / region / national / international areas and provide additional comfort to the traveller. These services are expected to be free of charge or financed through a one-off payment under different suitable hypothesis. Examples of Advanced service functionalities are:

- Map based real time traffic information
- Dynamic Travel Times
- Single and Multimodal route planning taking into account service disruption and events (e.g. traffic jams)
- Information on free parking spaces and reservation in a parking area

C. Value-added services: on the above mentioned Basic and Advanced services it is possible to build customised and personalised services. These services are distributed through a conditional access channel and are hence only available to subscribing users. The Value-added services provide personalised comfort and are financed through the subscription fees. Examples of Value-added services:

- Personalised on-trip information
- Context aware traffic alerts and alternative multimodal route suggestions
- Delays and service interruptions of public transport modes and alternative transport suggestions

Summarising:

Level	Payment	Revenue	QoS
Basic services	Free	Public investment Advertisement	Public standard
Advanced services	Free / Once	One-off payment	Additional comfort
Value-added services	Pay per month Pay per Use	Subscription (B2B, B2C)	Individual comfort

The bundling of these services gives progressive advantages to the users and the service providers themselves who can make their products more attractive and better known with progressive market strategies.

It is also possible that the same **i-Travel** service can be initially offered as a free service and enhanced subsequently to additional levels as a part of a marketing strategy.

Annex VI: Format Scenarios & Services

1. SCENARIO INGREDIENTS
<Describe the ingredients for your scenario >

<Mark, in the tables below, the user type, travel type and characteristics>

USER TYPE	
Special needs	
Group	
Individual	

TRAVEL TYPE	
Regular	
Familiar	
Unfamiliar	

USER CHARACTERISTICS	
Result and function oriented	
Conscious choice of trip	
Image oriented	
Company and leisure seeker	
Acquiescent and security seeker	

2. SCENARIO
<Describe the scenario, including: the ingredients above, the travel, services and problems>

<Describe your traveller or group in approximately 3 lines>

<Write a short story based on the ingredients. Describe travel services, a route and perhaps an event or two to show extra services. Use approximately 20 lines>

3. OFFERED SERVICES
<Make a list of different services mentioned in your scenario>

<Mark, in the tables below, the suppliers and services you mentioned in your scenario>

SUPPLIER TYPES	
Advertisers	
Information Providers	
Service Providers	
Service Operators	
Communication Providers	
Manufacturers of Mobile Devices	
Transport System Operators	
Local Authorities	
Other	

SERVICE TYPES	
Commercial travel information	
Non-commercial travel information	
Travel planning	
Travel booking	
Travel payment	
Controlled assistance (travel office)	
Route guidance (navigation)	
Travel steward (navigation)	
Travel reporting (administration)	

4. DETAILED SERVICES
<Describe use cases for every relevant service in paragraph 3 (Offered services)>

SERVICE 1	…
Description (needs)	…
Stakeholder & Actors	…
Precondition	…
Trigger	…
Input	…
Output	…
Main Steps	…

SERVICE 2	…
Description (needs)	…
Stakeholder & Actors	…
Precondition	…
Trigger	…
Input	…
Output	…
Main steps	…

<Copy table to describe all services>

5. EXISTING SERVICES

<Describe the relevant existing services>

PROVIDER	…
URL	…
Business Model	…
Similar Services	…
Remarks	…

Annex VII: Offered Services

SERVICES	SCENARIO
Pre-Trip	
• Booking or reservation for hotel (via Internet, telephone or airline web-portal)	2 - 7 - 10
• Booking or reservation for taxi (via Internet, telephone or the airport or train station)	2 – 6 - 9 - 10
• Booking or purchasing a public transport ticket or related services (at service desk or on-line ticketing)	2 – 3 – 4 – 6 - 8 - 9 - 11
• Booking visit to museums	10
• Booking a flight and airline travel conditions (on-line)	7 – 9
• Booking or (automatic) reservation for parking space	7 – 8 - 11
• Extended travel reservation and ordering service offered by the Travel agency	7 - 9
• Information about itinerary or time schedule information (via Internet or SMS)	2 - 5 – 10
• Information or overview of transport options (all flights, trips, prices, destinations, timetables and airports and stations)	1
• Carpool planning	11
• Online agenda	11
• On-line payment for public transport passes	5
On-Trip	
• Delay notification or alert on connecting service (and alternatives)	2 – 6 - 7 – 9
• (Public) information about congestion (and routes)	4 – 6 - 7- 9 – 11
• Route planning (offline with navigation system and online) (for all modes)	1 – 3 - 5
• Information about travel time (possible via a connected traffic service provider)	4
• Information about departure time and platform/gate	6 – 8
• Information about museums, alternative transport etc.	5 – 10
• Information about the number of free places in the transferium	4
• Kiosk information system	5
• Pre order of goods on the train station (medicines, food)	3 – 8
• Micropayment via mobile device/smartphone	3 – 5
• Notification when reaching final destination	1 – 4
• WIFI network on train	8

Annex VIII: User Needs

SERVICE	NEEDS	Nr.
Reservations & Booking		
On-line airline booking service with on-line check-in	The traveller wishes to book a trip to a familiar location but is not aware about the availability of flights. He consults an on-line booking portal operated by the airline operator. The traveller also travels light and wishes to check-in on-line	7
On-line hotel booking service via airline web-portal	Together with the booking of a flight, the traveller wishes to make a hotel reservation. In most cases the on-line web-portal of the airline operator offers a possibility to order hotel accommodation as well.	7
Parking lot reservation system	The traveller needs to leave his car at the airport but has not time for a time consuming search for a free parking spot. To avoid loss of time the traveller needs the possibility to order a parking spot on-line.	7
Extended travel reservation and ordering service offered by the Travel agency	The travel agency offers an on-line portal allowing the traveller to order a pre-defined package such as a Cruise on the Caribbean. The back-end system arranges the flights, hotel bookings and finally the cabin bookings on the cruise ship (including foods, drinks, event participation etc.)	9
Airport assistance service	Due to the large distances to be covered from check counter to the gates, a traveller with special needs wishes assistance on the airport premises (wheel chair, medication etc.)	7
Geographically based int. flight info and booking	There is an online service giving all flight information about an airport or region of airports: all scheduled flights to all destinations from all airlines with prices	1
Booking Hotel	There is a portal available for making reservations for hotels (in Rome).	10
Booking museum	There is a portal available for making reservations for museums (in Rome).	10
Order a taxi	-	10
Pre order sandwich on train	There must be a possibility to pre order a sandwich on the train (and to pick up at the next station)	3
Pre order of goods on the train station (medicines)	There must be a possibility to order medicines on the train station, e.g. there has to be a pharmacy. (for this example medicines are taken, but of course all kind of goods are possible)	8
Pre ordered parking space	There must be a possibility to pre order a parking space nearby the train station. This can be daily, weekly or yearly (subscription). For this example a daily subscription is taken.	8
Seat in the first class	There must be free places in first class compartments (The railway company provides first class seats and the user can make use of this comfortable way of travelling, because of subscription)	8
Reservations for public transport and related platform services	There is one portal available for making reservations for public transport, taxi and the related services for special needs. Personal contact is provided for people in need of reassurance by means of a call centre.	6
Reservation for hotel	There is an online portal available for making reservations for hotels.	2
Automatic sign-on and reservation for parking space	The traveller needs to have a parking space on arrival and he doesn't want to search for it.	11
Information & Planning		
Kiosk information system	The traveller needs information on the services provided by the public transport operator en-route	5
Bike renting	In some circumstances the traveller needs an alternative to travelling by car and public transport. Authorities need to promote ecological friendly transport in the inner city to reduce damaging exhausts and traffic jams (bike renting).	5
Graphic overview of reg. public transport	There is a service giving a graphic overview of regional public transport with main lines/destinations and timetables	1
Check the train	There must be an online portal available for real-time and up to date departure	10

times	and arriving times for trains	
Up to date departure times in public transport	There must be an online portal available for real-time and up to date departure and arriving times for trains	8
Find and visit of a POI nearby	The user must have a handheld/ PDA with internet access to look up a nearby museum	10
Information about congestion (and routes)	There is an online portal available for information about real-time and expected congestions and (alternative) routes.	6
Information about free places in the transferium	There is a portal available for information about the number of places in the transferium	4
Dynamic information about departure time and platform	There is a portal available for dynamic information about departure times and platforms.	4
Information about travel time	There is an online portal available for information about travel time forecasts.	4
Information about public transport itinerary (train)	There is an online portal available for information about public transport (train) itineraries.	2
Carpool planning website	Traveller needs insight in an agenda / planning system to see if he will have a ride to his destination	11
Navigation		
Route planning online en offline (navigation system)		1 - 5
Navigation system	Travellers must be able to use a (online) navigation system for all routes and all modes (car, bike, walking, …)	3 - 5
Notifications & Alerts		
SMS time schedule information	The traveller needs real-time information on public transport schedule deviations	2
Private traffic alert service	A private traffic information provider offers an early warning system which combined with the scheduler of the traveller is able to warn in case of an increasing travel time to a specific location. Warnings can be given by means of an SMS system. The traveller needs to meet hard deadlines and therefore needs to be warned if traffic conditions get worse.	7
Travel information offered via a connected traffic service provider	During the trip the itinerary might be influenced by occurring traffic events. Before starting the trip connected traffic information service providers in conjunction with the navigation service providers may offer a list of traffic events and alerts, including travel times specific to the selected route.	9
Broadcasted traffic information	During the trip the itinerary might be influenced by occurring traffic events. Broadcasted traffic events via TMC or TPEG I general allow navigation systems to reroute the itinerary	9
Public traffic information via RDS-TMC	During the trip the itinerary might be influenced by occurring traffic events. Broadcasted traffic events via TMC or TPEG I general allow navigation systems to reroute the itinerary	7
Delay notification to connecting or related services	The links between the different reserved services are preserved (e.g. the platform assistant and user are informed on time about the delay of the train, and are retuned).	6
Notification when reaching final destination	The link between user and his final destination is preserved (e.g. the user is informed when he reaches his final destination).	4
Traffic jam forecaster and alert system	The traveller needs to be alerted if his normal travel time will increase due to a traffic jam.	11
Multi-modal Personal Travel Organizer (PTO)	Included in the offering by the Travel agency, a Personal Travel Organizer is provisioned to the mobile device of the end-user (Smartphone) This application supports the traveller in case of problems .	9

Payment		
Micropayment via smartphone	Travellers on the road need to have an easy way to pay for tickets, passes etc.	5
On-line payment for public transport	The public transport user wishes to buy tickets and passes online to avoid losing time at the public transport operator sales office. The pass itself is downloaded via SMS or on any other mobile device.	5
Buying light rail ticket	There is an online portal available for buying light rail tickets. The user receives an electronic ticket on his mobile device.	4
Buying train tickets at kiosk	The traveller can buy train tickets at a kiosk	3
Mobile payment	The user can pay for ordered goods in the train via his mobile device	3
Purchasing public transport ticket	There is an office available where you can buy international train tickets.	2
E-ticket for train	The user needs the option to buy his train ticket online / mobile.	11
Other / Miscellaneous		
Scheduled public transport services	The traveller needs a scheduled public transport service offering deterministic transport facilities	5
WIFI network on train	There must be an WIFI connection in the trains (only in first class compartments) and the user must have access to a e.g. a laptop or PDA	8

Annex IX: Transcriptions of the expert interviews

The following segment comprehends the responses of the interview partners arranged by questions.

Question 1 – market analysis:
Do you think there is a market for a service that provides multi modal traffic information with dynamic rerouting (e.g. in case of traffic congestion, table delay or other travel interrupting impacts) and which traveller types do you think will make use of it?

Expert 1:
Yes, I think that people will be interested in paying for this information in particular for dynamic rerouting: maybe the more interested travellers could be the ones that travel a lot for work. This kind of user needs to spend as less time as possible during transfers between the different destinations: information on traffic, table delays and so on are very useful for them.

Expert 2:
There is a market but it has to be clear what the traveller will get. We have identified that there is a proportion of the travelling public who are willing to pay for the service of certainty, as they need to arrive at a given point at a given time e.g. collecting their children from kindergarten.

Expert 3:
It all depends how you define the market.

Expert 4:
There is a need and there are possible solutions. However people are not massively prepared to pay for it and due to a lack of sufficient standardization there may not be the necessary economies of scale for third parties (besides transporters) to offer solutions in a cost effective way.

Expert 5:
Depends on how you define the market. From our experience we see that people are not really willing to pay for traffic/travel information, so in that sense there is no market. If you can get it paid / sponsored by an airline there should be some opportunities. Probably the more 'experienced' travellers who know that it is possible to gain some time advantages would make use of it by taking a different route or modality.

Expert 6:
Surely there's a market for such kind of services. The travellers who are more interested in receiving this information are business traveller and also several kinds of workers (taxi driver, goods transport, sales representatives and commuters). The integration of Public Transport information is surely of interest for those who makes every day trips.

Expert 7:
I think that there could be a market as soon as reliable and exhaustive information would be delivered to the end-user. The problem is that today actors able to provide that information are not organized enough and so there is no homogeneous mean to get and compare the traffic information.

Expert 8:
It would be an asset for the European intermodal traveller if this service would be available. The establishment of the platform should happen on the basis of a clear insight in the targeted end users. One could suspect that the local traveller is maybe more to make on-trip intermodal decisions. The question is how flexible the intermodal long distance traveller actually is. Once a trip is prepared, tickets are purchased; there might not be that much room for flexibility, unless the ticketing and reservation policies become more flexible. It will be interesting how a service like **i-Travel** will influence the actual transport services delivered.
Many local authorities consider pre-trip information to be more influential on modal choice than on-trip info. However, if the pre-trip info shows that a car journey is quicker than a trip involving three or four different PT links, then this will encourage more drivers on the road (therefore counter productive to local policy). Dynamic rerouting of car drivers is fine provided the road authority has some influence on the routing provided. The problem today is that drivers are diverted to roads that

simply are not suitable for heavy traffic throughput (residential areas, country lanes, HDV's on lanes with low bridges, etc). More and more satellite navigation providers are gathering traffic data (based mainly GSM) and routing vehicles accordingly.

Expert 9:
Most likely for the majority of the travellers a well established information system, even without the need for dynamic rerouting would already be a very big step forward. Especially combining public transport scheduling information with route planning and traffic information could bring the day to day traveller already a lot of benefits. These systems should be made available either on portable devices such as smart phones and connected PDA's or on kiosk type of systems located at crucial points along the travellers' itinerary. In this way, the traveller, even without the need for sophisticated and expensive systems would be able to make decisions about the best mode of transport suitable to solve his or her transportation problem. When looking at the Use Cases introduced by the VVC, scenario 3 reflects best this type of "daily commute" traveller. As complete as possible information systems are extended with basic (SMS based) alert and real time information provisioning. From a business perspective these kind of systems are mainly free-to-use and government driven.
Occasional holiday travellers might have even more reduced needs for these kinds of systems as the type of voyages made by this type of traveller is mostly well organized and situated in the holiday sphere. However high end travel arrangements might include a system which in the first VVC scenario was called the "Personal Travel Organizer" or PTO. This system would prevent the traveller to miss airplanes, boats, trains etc. A system like this could monitor the travel situation and look into alternatives if necessary. This kind of situation is reflected by the first VVC scenario. Depending on the penetration of smart phones on the market these kinds of services might become very common and not only reserved for the high end, better to-do traveller.
The story will become completely different for the business traveller bound to tight schedules and meeting arrangements. Here a "standardized" personal travel organizer might be very useful and might even prevent economical damage to the traveller. Every business traveller sooner or later will run into problems due to accidents, planes being delayed or cancelled, traffic congestions resulting in missed connections etc. For these kinds of traveller a well established and functional PTO is economical of interest and has a direct impact on their work conditions.
In summary the answer to these questions is less straightforward. Mainly for professional travellers in the sense of business travellers such a service is certainly of interest but there exists also a big need for more basic informational systems without dynamic rerouting. When looking at a possible product range the same basic informational service might in the high end be completed with dynamic rerouting services target to the more business or high end traveller.

Question 2 – supplier community:
The main target of the project **i-Travel** is to design interfaces and to connect existing services to a service platform. Would service and information provider be interested in this development? Which possibilities do you see in covering a whole travel chain and how to attract service and information provider to allocate these interfaces?

Expert 1:
The connection between services and service platform is usually a main topic: I believe that service and information providers would be very interested in this development. There are many possibilities; it depends on how many different kinds of information you would like to integrate: maybe a graphical interface with colour codes for the information could summarize all of them. The best way to attract providers is to show them a demo of the result of this integration.

Expert 2:
I would see this as an area of interest, but the project needs to be aware that this is being developed already, and will be commercially available soon. The service is called XXX, it is being developed by XXX and will provide information via mobile and other mediums.

Expert 3:
We already provide the major part of the travel chain in XXX on our own platform. We can not speak for other service- and information providers.

Expert 4:
We are the owner of crucial parts of information and choose to orchestrate the process of making this available to user applications. Until now this has resulted in selecting commercial partners for the design and implementation of applications. In the future this may be changed into a more open model where the information would be made available to the market in the form of one or more API's but there are no plans for this yet.

Expert 5:
The main problem will probably be of a commercial nature. Travel and traffic information providers are in most cases interested in serving information from their own portal. If this information is provided on a different platform providers probably want to be compensated so all kinds of licensing issues will arise. We have this situation in XXX where it is very difficult to get hold of information about public transport. The public transport companies operate as if they where private companies.

Expert 6:
The project could be of interest for both information providers and service providers concerning mobility. The most important thing is the involvement of local authorities and Transport operators who are currently the owners of the information concerning traffic and transport services. Surely these entities are interested in creating an information system able to promote Public transport and to improve mobility within the area of jurisdiction. The commercial service providers could improve their earnings. Possible stakeholders are hotel, trading centres, restaurants.

Expert 7:
Some services platforms already exist today with web services interfaces. Then service and information provider are always happy to distribute their content while securing revenues. So as a first step, one possibility would be to encourage the connection of complementary existing services platforms while proposing attractive business models for each platform owner.

Expert 8:
Local and national intermodal platforms have proven that there is an interest from transport service providers to link in to service platform. Of course several issues play: ownership and quality of data, parameters to "weigh" or assign best offers and best solutions (in this case, not biased to a specific mode). It cannot be expected from local authorities that they would interact directly with an EU service platform that would also make it difficult for **i-Travel** to establish itself. A multilevel or modal approach would facilitate the process. Liability (quality of data) is a big issue for road authorities and one of the reasons why some are 'reluctant' to market their own data directly to customers.

Expert 9:
Today a huge amount of information is stored into non-connected and proprietary databases. Parking occupation data is indeed available but in most cases only used in a closed loop parking operator system. Public transport schedules are nowadays available from websites, on-site kiosks, information signs etc. but are not combined with road traffic information for instance. As a first step, those different information sources should be disclosed and integrated into one "information service". Such an aggregated travel information system would certainly make sense for governmental operators who have a wish to promote public transport service above car travel for instance. In this first step public operators should bundle their forces and agree on open standards to share data. Even in this phase private operators might be interested to join. The benefits for them translate into increased sales of their core service(s). Traffic information service providers might for instance be interested in sharing data with promotional activities for their core services in return. This first step corresponds with the effort to implement a first basic rather informational system without the need for innovative but complex dynamic rerouting systems.
In a next phase this platform could be extended with basic alert and information systems service via mobile devices. Examples of such services are the SMS oriented push or pull services. E-Mail could also serve as a possible communication means for transferring data in a push or pull model. Finally a more extended "personal travel organizer" could complete the product range. In this case the model becomes very much a commercial viable one where the different content providers are financially rewarded for providing a specific service either directly or indirectly by an increase of product or service sales. This stepwise approach offers the following advantages:

The definition of open standards will lower the threshold for a wide range of content providers to add their content to the aggregated information portal. The availability of commercial or open source implementations of these standards will make it cost effective to provide this once proprietary stored information.
The service providers get a change to increase the offering of services in a stepwise fashion without the need to invest in complicated and expensive systems. The end-user already has access to improved high valuable travel information and gets used to the more extended services. The end to end value chain remains manageable with clearly defined profit and risks defined for each stakeholder.
To summarize this answer, service and information providers would certainly be interested if such an **i-Travel** system is applied in an evolutional fashion allowing each of the stakeholders, Content Providers, Service Aggregators, Service Providers and end-users to asses its benefits for each step in the implementation process.

Question 3 – HMI (Human Machine Interface):
What kind of difficulties do you see in designing an appropriate HMI to facilitate multi modal traffic information and what are possible approaches?

Expert 1:
The main difficulty is to find a standard format for the data coming form the different providers: once the standard has been decided it is not so difficult to integrate all the data and to present them to users with a simple HMI. As already said, the right approach depends on the kind of information you want to give.

Expert 2:
I would not see the HMI interface as so much of an issue as the device used to provide the information. It should be in general use now and has an expandable service (GSM and next generation).

Expert 3:
The design of an appropriate HMI will not be the most difficult part. It is all about finding a solid business case and reliable data.

Expert 4:
We are currently experimenting with this, focussing on the creation of a truly low-threshold and intuitive HMI to compensate for the lack of proper input devices on a mobile phone. In our view this aspect is critical in the adaptation of any mobile application.

Expert 5:
There are no real obstacles for this. The relevant technologies are in place. (Web, mobile internet, SMS, GPS enabled phones etc.)

Expert 6:
The HMI must be transparent for the tool/device used. Therefore currently the optimal solution is a web based interface which can be customized for the different user interactions. (Smart-phone, touch-screen, info points etc.)

Expert 7:
Even in the case of HMI based on browser for mobile devices, there is no unique solution to fit all devices. Several applications will have to be tested according to the range of mobile devices targeted.

Expert 8:
We refer to the ASK-IT project's work on HMI. Difficulties are multilingualism and amount of information. There is also the issue of diversity of devices that will have to visualize the service.

Expert 9:
In general the system should be divided into two collaborating sub-systems. A first system allows an end-user to prepare his trip by means of a web portal. Such a web portal is highly comparable with

existing journey and route planning systems already available today. Compared to these existing systems an **i-Travel** information and planning system is extended with multi-modal planning and routing facilities. As an example, a typical journey could include a first leg by car, next two trips by airplane and finally a subway ride to the final destination. The result of the planning process via such a web portal could be a map or a list of transport means with their respective start and end arrival times and specific information such as ticket numbers, reservation numbers etc. The list can be rendered as a printed document or downloaded to a portal device such as a smart phone or PDA. In general this access point is rather common and is typically implemented by means of Web 2.0 development technology in a Service Oriented Environment (SOA).
A second entry point is implemented by means of a portable device. This will be the agent type application or portable travel organizer as it was called earlier in this document. So far as HMI is concerned this (client) system offers some interesting challenges. Most of the portable, nomadic devices available today when compared with a desktop system have still some important limitations which an agent implementation should take care of. Some of these restrictions are:
Reduced memory size – compared to the giga sized memory space available to desktop and server systems, mobile devices have far less working memory available, typical around 128Mb. Especially complex, multi-threaded and communicating applications should be developed with these reduced memory resources in mind.
Reduced processor performance – compared to desktop systems, CPU performance is still rather reduced. A typical smart phone system runs on a 400 MHz ARM type processor which compared to even a minimalist desktop system, for instance an Intel Celeron running at a 3GHz clock speed, is still rather reduced.
Battery storage – complex applications using a lot of communication and system resources will put a heavy load on the battery. Since some travel journeys might take some time an empty battery somewhere in the middle of the itinerary is not exactly what a traveller is expecting from such a sophisticated system.
Communication costs – during the journey the **i-Travel** agent needs to check the status of the different transport facilities part of the end-to-end transport chain. The communication with the back-end system in general is done by means of 3G telecommunication technologies. In most cases roaming will be involved which further pushes the communication costs upwards.

The mobile client application itself should offer an easy and intuitive user interface. Especially since the system will, in most cases, not be used frequently but consulted at specific moments during the journey. This imposes some requirements on the HMI such as:
The user should be warned with an audible and visible enunciator in case of problems the user should be offered with a concise and easy to read journey overview. Communication with the back-end system should work “behind the scene”, so without the need for a user intervention.
To reduce communication costs, the system should preferably use a push model where disruption events are forwarded to the client application. Some of the technologies which could be used in this context are SMS, in-band modem, E-Mail and push web services. From the overview list it should be easy for the user to enquire for status updates regarding a specific travel situation. For instance, if part of the itinerary is covered by a train journey, the user should be able to call a form with real time status information on the train’s schedule.
High end systems should provide an easy way to organize an alternative route or transport means. This should be done by means of a secure and tamper proof ordering and payment system.
It should be possible for users to prepare a voyage by means of a web portal and convey in an easy fashion the completed trajectory information to the mobile application. The mobile system should be able to accept E-Tickets. This needs to be done in a tamper-free fashion as not to compromise the value of the ticket. The system may support a micro payment system by means of SMS, RFID technologies etc.
From the above discussion it becomes clear that an HMI suitable for the monitoring and organization of an end-to-end travel journey combines quit a lot of technologies both innovative but also proven systems such as SMS and E-Mail. At the same time a portal travel organizer should be very simple to operate but still support a wide range of features such as event notifications, on-line rerouting and ticket ordering/payment, “where am I” evaluation etc. This asks for a rather high-end portable device which includes a state of the art communication system, GPS location infrastructure, programmable user interface etc. A virtual demonstrator should help in determining the right requirements for such a system.

Question 4 – Design of user profiles:
What types of information are needed for the provider to design user profiles which allow offering adaptive services to the user?

Expert 1:
First of all, important information is the length of the travel routes followed by travellers (you can decide what kind of information you have to give them and with what frequency you have to update it). Then, you must know the preferences of the single user: for a better usage of multi modal traffic information you must know if the user likes to change means of transport during the whole travel and how many times he can accept to change them. It could be useful also to know what the means of transport are that the traveller would like to use and what means he wouldn't use.

Expert 2:
It should be for the service provider to offer a range of services that the user can pick from.

Expert 3:
Because of the confidentiality, we are not able to give an answer.

Expert 4:
A person's goal, context (including location), role etc.

Expert 5:
A (daily) travel schedule including the preferred mode of transport.

Expert 6:
Personal Data (age, job, address, hobbies...) Aim of use of the requested service: for work, for free time etc. Transport modes usually used for short trips and transport modes usually used for long trips

Expert 7:
For multi modal traffic information, are needed in priority:
- The transportation means usually taken,
- The other ones that the user would be ready to take
- The departure, if not geo-located, and the destination addresses
- Any handicap, temporary or permanent
- The type of travel: leisure or business
- The type of device (basic or high-range mobile, ultra light laptop,…)
- The language spoken, with or without audio, vocal interaction

Expert 8:
It is important not to enter into the regular marketing parameters, but to "think transport". The system needs to know willingness to pay for transport, preferred modes, and daily destinations. In managing specific trips, it is also important to offer the possibility to insert non-flexible sections of the chain (e.g. booked flights).

Expert 9:
The set of data necessary to design user profiles can be divided into two type of information:
Pre-recorded Customer Relationship Management (CRM) information such as person (name, address, phone …) and payment (Credit card, invoice…) information. This information might include some preferences such as preferred transport modes and operators, type of route (shortest, scenic, fastest etc.) and other preferences which may help in finding the optimal travel scenario for the user. Dynamical obtained data during each usage of the system. This data may include preferred routes, recurring routes, post travel evaluations, preferred hotels etc.
The last type of information should also offer the possibility to block specific routes, transport modes etc. As an example, a traveller might prefer renting a bicycle when moving around in Brussels instead of a car due to a previous experience with bad traffic situations along the route in Brussels. These kinds of remarks might be covered by an evaluation process allowing travellers to modify their preferences depending on the travel experience they had.

Question 5 – Service price guidelines:
What are people willing to pay for personalized traffic information (monthly rate, on demand, percentage of mobility budget …)?

Expert 1:
Maybe the preferred solution could be a "on demand" payment: everyone only pays for what he really needs and what he really uses.

Expert 2:
Unknown at this time, this is a developing market, but most new ITS based services have not shown a great deal of return.

Expert 3:
Please look into all recent available studies regarding this issue.

Expert 4:
We are currently testing this. So far it seems like the old adagium uis confirmed: people are not willing to pay for travel information. Making them pay for the costs for data traffic is challenging.

Expert 5:
Very little to nothing. It should be a service of the airline/railway company etc.

Expert 6:
In my opinion these services must not be paid by the end-user, but by public entities and private service providers (hotel, restaurant etc.) eventually sustained by local authorities.

Expert 7:
Personalized traffic information will more and more be integrated in devices having navigation software (Personal Navigation Devices or GPS enabled cell phones). This article dated February 2008 (http://www.eetasia.com/ART_8800503455_499488_NT_ecb8a800.HTM) introduces navigation software monthly subscription including at no extra cost real-time traffic information. Several business models will be tried for personalized information traffic till finding the right cost.

Expert 8:
This is a crucial issue. The experience with the service XXX in XXX is that people do not want to pay. It will also depend on the type of service people get. If travellers receive proactive text message with helpful information, they might be more willing to pay than in a situation where they have to compile there own advice by browsing through web services. Multiple payment structures should be investigated including public and private partnerships. Public funding might be more easily accessible if the system can prove a sustainability plus (e.g. through a modal shift).

Expert 9:
The answer to this question again is not straightforward. Basic informational systems such as those provided by public authorities and transport operators will remain free-to-use and find their sponsoring either from tax-payers money or advertising. Some of the systems are operated as a "sales" channel for a variety of transport, traffic information and travel operators. Here again the information is offered to support direct sales of products and services and as such is free-to-use. The assisted travel services and the low end will be implemented as SMS, mail and Interactive Voice Response (IVR) services. In these cases fees to use the system are included into the communication costs. These fees are on-demand and probably could be in the range of 0.30€ for SMS and 0.90€ for IVR type of systems.
The high end systems involve a piece of software which needs to be installed on the client smart phone or connected PDA. Here the story looks a bit different. These kind of system solve a problem for the end-user, namely make travelling more deterministic and reliable. Not having a portable travel organizer available might inflict some economical damage for the traveller. The complete cost of ownership for such an application should be divided into three parts:
The cost for the application itself – here a cost of 20 to 40€ seems to be reasonable. To operate the system the traveller needs to open an account with the service provider. The operation of this

account will be covered by a monthly rate. Here a monthly amount between 5 and 12€ seems to be acceptable. Eventually the usage of the system could also be charged on a per usage basis. This might be an interesting formula for occasional users. The amount per usage might be around 3 or 4€. Using the system three times per month on a regular basis might defend a monthly subscription. Finally the system might also operate according to a credit system as used by companies like Skype, SMSBox.be etc. Depending on the usage the end-user buys a certain amount of credits valid during a 1 year period. Here the system should make it easy to buy additional credits by means of the PTO itself. Typical credit values range from a monthly subscription rate until a three of four months coverage.
At last but not least costs are the actual communication costs. These may be very important especially if roaming is involved. In general these costs today are far too high to operate any mobile system in a cost effective way. A solution could come from the WiFi and Wimax hotspot operators who will offer flat fees without volume and roaming restrictions. These kinds of technologies pose a very big threat to the telecom operators and hopefully will bring down those 3G communication costs. Compared to the other costs mentioned in this paragraph being 20 to 40€ for the application, 9€ for a monthly fee, paying the telecom operator an additional 200€ per trip abroad is ridiculous. Unfortunately this is still reality today.

Question 6 – Payment system:
What are the main obstacles to implement a pan-European trusted payment system for travel service on nomadic devices?

Expert 1:
Maybe to find a procedure certified for all the current laws of the different nations involved.

Expert 2:
Common standards and cross border roaming.

Expert 3:
The willingness of the customer to pay for the service.

Expert 4:
That's a very complex subject and to hard to answer here.

Expert 5:
None, esp. travellers are used to paying with a (low trust) credit card.

Expert 6:
In the case that the end-user must pay for the services, one big issue could be the payment modality. Usually people will pay only when it is necessary with any subscriptions. Currently it is not possible to pay using the SIM and people don't like to use Credit cards on the phone.

Expert 7:
A survey made in 2008 by Unisys security index (http://www.activehome.co.uk/vnunet/news/2219518/mobiles-trusted-commerce-unisys) in 14 countries (Australia, Belgium, Brazil, France, Germany, Holland, Hong Kong, Italy, New Zealand, Malaysia, Singapore, Spain, the United Kingdom and United States) shows that more than 2/3 of mobile users are not trusting their mobile for online payment. Moreover, how a service provider could have its brand recognized and how to handle the relationship with the end-user in case of problem (Service Level Agreement related)

Expert 8:
The insecurity that a large scale system will have an almost completely accurate performance in linking in real time to local transport services. One other issue that has not been considered concerns the availability of road traffic data. We know that city centres and highways are reasonably well monitored but this is not the case for suburban areas. Roadside monitoring equipment is just too expensive to roll out everywhere. There have been some pilots of other data sources (GSM, GPS, etc) but these need further development.

Expert 9:

The lack of open non-proprietary standards for payment and billing applications, running on nomadic devices poses the biggest challenge to implement a pan European payment and billing system. The Global System for Telematics (GST) project, an EU funded FP6 project, investigated this subject in the context of an open framework for Telematics applications. The S-Pay sub-project of GST provided some guidelines and basic ideas for a payment and billing system which could be endorsed by a wide range of stakeholders in Europe. The system proposed by the S-Pay sub-project identified a Trusted Runtime Environment (TRE) as a platform for running high risk applications such a payment systems. On top of this TRE the project defined the following entities and processes:

- A Trusted Runtime Environment
- A Billing Agent
- A Billing Centre
- Business Logic
- A Payment Agent
- A Payment Centre
- A Pricing module

The complete set of deliverables from the S-Pay project can be found on this location: http://www.gstforum.org/en/downloads . The results of S-Pay translated a possible payment and billing architecture into some technological concepts mainly directed towards a specific software platform. To establish an open payment and billing framework the endorsement and participation of European payment and billing operators is indispensable. Operators such as Swift, Paypal, Ogone etc. but also banks have to be involved into this standardization process.

Security, authentication and authorization are another set of topics which need some closer investigation. The security sub-project of GST investigated security, authentication and authorization issues in an open Telematics framework. Especially distributed authentication and authorization was the subject of this sub-project. Nomadic devices are vulnerable to tampering and malicious use by strangers. It is therefore imperative to implement mechanisms which prevent unauthorized use of the device. Biometric security enforcement might be a possible technology which could solve some of these issues.

Annex X: Existing Services

PROVIDER 1	Travel agency
URL	http://www.neckermann.be
Business Model	All-in sales of holiday packages
Similar services	Carnival Cruises, Thomas Cook, Jetair, eVakanties
Remarks	The concept of a "PTO" is not available yet

PROVIDER 2	Public Traffic information provider
URL	http://www.verkeerscentrum.be
Business Model	Public available traffic information
Similar services	http://www.highways.gov.uk/traffic/, http://www.traffic-wales.com/, http://www.trafficscotland.org/, http://trafficinfo.lacity.org/

PROVIDER 3	Private Traffic information provider
URL	http://www.be-mobile.be
Business Model	Private, commercial operated traffic information
Similar services	http://www.anwb.nl, www.trafficnet.nl, http://www.keepmoving.co.uk/
Remarks	Offers a wide range of services directed towards all kinds of users

PROVIDER 4	Public or Private RDS-TMC broadcast services
URL	http://www.vrt.be
Business Model	Offering of free-to-air or conditional access (commercial) traffic information via RDS-TMC
Similar services	http://www.4fm.be, http://www.bbc.co.uk/travelnews/, http://www.rtbf.be
Remarks	Provide an RDS-TMC service either encrypted or free to air

PROVIDER 5	Airline operators
URL	http://www.brusselsairlines.be
Business Model	Organizes travel by air
Similar services	http://www.klm.nl, http://www.lufthansa.de, http://www.flysas.com

PROVIDER 6	Railway operators
URL	http://www.thalys.be
Business Model	Commercial or public railway operators
Similar services	http://www.db.de, http://www.sncf.de, http://www.b-rail.be/main/N/, http://www.ns.nl
Remarks	With NMBS (railway operator in Belgium) it is possible to get timetables on your mobile/pocket pc. Also the website provides a service called MY NMBS. A first approach for personal context aware information and payment.

PROVIDER 7	Booking operator (hotels, museums, planes, trains, etc.)
URL	http://www.expedia.be
Business Model	Commercial booking operator
Similar services	http://www.booking.com, http://www.mmarte.it/index.english.html, http://www.reservationitaly.com/it/index.php, http://www.trenitalia.com/en/index.html, http://www.edreams.com, http://www.hellohotello.com
Remarks	Sometimes these providers operate in partnerships (for example hotel operator with airline operator)

PROVIDER 8	Parking lot reservation system
URL	http://www.park3311.be
Business Model	Offers reservation and payment of parking space via SMS
Similar services	https://emservices.tsu.edu/parking/form/fsparking.asp, http://www.qpark.be, http://www.parkingsdeparis.com/v2/reserver-eng.php

PROVIDER 9	Public transport operator
URL	http://www.delijn.be
Business Model	Purely public bus, tram and subway operator. Also offers the possibility of e-Ticketing
Similar services	http://www.ratp.fr, http://www.mivb.be, http://www.tfl.gov.uk
Remarks	Most of these service providers offer on-line ticket sales and door to door route planning

PROVIDER 10	Micropayment Service Provider
URL	http://www.123ticket.com
Business Model	Operates a micropayment service via SMS.
Similar services	http://www.targetpay.nl/
Remarks	Micropayment by means of enabled Smartphone is still very much in its infancy. A study of these payment mechanisms has been made by the EC funded Global Systems for Telematics (GST) S-Pay sub-project (http://www.gstforum.org)

PROVIDER 11	SMS time schedule information
URL	http://www.mivb.be
Business Model	Public transport operator in Brussels offering an SMS wait time information service
Similar services	http://www.tfl.gov.uk (mobile travel alerts), http://www.ratp.fr (Ma RATP dans la poche)
Remarks	RATP offers a full featured mobile internet application which allows users to find information on time schedules, travel and traffic information etc.

PROVIDER 12	Kiosk information system
URL	http://www.railplanner.co.uk/
Business Model	Hardware and software manufacturer of railway kiosk solutions
Similar services	http://www.netshift.com/ , http://www.softwarelogic.co.uk
Remarks	These are producers of Kiosk systems which are used by public or private transport operators.

PROVIDER 13	Bike rental
URL	http://www.cyclocity.be
Business Model	Bike rental service commercialized by JCDecaux in the centre of Brussels. Prices are in the range of 0.5€ per for the first 30 minutes, thereafter 0.5€ per hour
Similar services	http://www.provelo.org,
Remarks	The Brussels public transport operator MIVB also offers a Car share formula

PROVIDER 14	Airport
URL	www.airport-weeze.de
Business Model	Airport Weeze is a location which contracts airline operators for the usage of the facilities. The website is a means to facilitate travellers looking for (budget) flights from their location. The airport portal is supported through the airline portals. It is not possible to book directly, without linking through the homepage of a specific airline portal, unaware of the 'Weeze' context.
Similar services	Airport websites and airline portals
Remarks	Low-fare ticket portals cover only a selection of possible flights. There is no direct viewing option for availability of suggested flights.

PROVIDER 15	Door-to-door trip planning
URL	www.transportdirect.info
Business Model	Transport Direct offers information for door-to-door travel for both public transport and car journeys around Britain. Transport Direct works together with both public and private travel operators and local/national government. Transport Direct is operated by a consortium, led by Atos Origin. The non-profit service is funded by the UK Department for Transport, the Welsh Assembly Government and the Scottish Government. The Highways Agency, Traffic Wales, Transport Scotland and the rail, coach and bus operators provide information to Transport Direct either directly or through partners, "Traveline" who operate a public transport telephone service.
Similar services	www.9292ov.nl
Remarks	Geographic information on predefined choice of route. Although there is an overall map with roads, there is no 'overall view' map with public transport information like London Underground or Metro de Paris.

PROVIDER 16	(Special) interest group
URL	http://www.anwb.nl/

Business Model	ANWB is an organisation that represents its members on mobility and holidays by lobbying and services, such as information and traffic services (some of them are provided to the general public in the Netherlands, not only to members). The ANWB also provides specific roadside assistance to their members. Members pay a prescription fee.
Similar services	Similar service providers.

PROVIDER 17	Navigation system
URL	http://www.tomtom.nl
Business Model	TomTom is a company that sells navigation systems and software. This software can also be used on mobile devices. People pay for the software and updates of it.
Similar services	Similar service providers.
Remarks	This system is at the moment only used for transport by car or motor. With small adjustments it can also be used for the described case.

PROVIDER 18	Congestion predictions
URL	www.anwb.nl
Business Model	Ad driven
Similar services	http://scottishexecutive.itisholdings.com/

Annex XI: Research information regarding end-user's perspectives

Abstract from '*Exploring New Possibilities: New Strategic Positioning of the VTF*', final Master Thesis by E.J. Escano, Vialis/TU Delft, September 2007. This research provides some information background to support the WP2 tasks regarding end-users and user requirements.

Background research

The end-user research objective was to understand the end-user concerns about mobility information in public transport and traffic in the Netherlands. The project included several research tasks such as:

- A small literature study on end-users in traffic and public transport;
- A webpage to share people's thoughts and minds about their travel experiences with the help of travel information (30 respondents);
- interviews with travellers at public stations (22 respondents);
- Focus groups with end-users (15 participants);

Outcome of the research

User requirements for delivery of context-aware traveller information and services

According to the participants and respondents the following elements should be taken into consideration about the content of travel information. These are:

- Flexible; information should be available in any form (static, dynamic and real-time)
- Specific; information should be individual-based and warn people if something occurs (e.g. how does this traffic diversion affect my journey?)
- Consistent; information should always be presented in the same manner even at different locations.
- Clear; information should be straightforward
- Simple; information should be understandable by everyone
- Up-to-date; information needs to be up-to-date
- Reliable; risk of error, malfunction or availability of information should be minimized as much as possible.
- Multimodal; information should allow people to decide which transport would be more attractive or in case unforeseen events occur provided with alternatives.

The user processes (activities and needed information) related to a traveller's specific location, context and circumstances

Examples given by focus groups participants suggest that travel information is most important when the destination or location is unknown. Most people would prepare themselves more thoroughly addressing several applications for travel information. In familiar destinations it is more important to have traffic information and possible diversion as people don't need route information.

During car holidays sightseeing information is appreciated by the participants in the focus groups. Especially in another country where they don't come to that place very often, information about what to do or what to see is interesting. In addition geographic information such as heights differences was also suggested as some participants travel with a trailer or caravan to their destination.

If unforeseen events occur people would like to be informed and would like to know how it will affect their current travel behaviour. For example one participant explained that he needs to pick up his children at six. If his 30 minutes travel time would take longer due to traffic jams or another event he would like to be informed as quick as possible in order to take measures (e.g. leave earlier from the office). The information would provide him with alternatives (e.g. routes) or the extra required travel time.

A cross-modal use cases from a user perspective

People are very capable of using different applications for information before and during travelling. Although navigation systems have taken a significant part in people's travel behaviour and there are great benefits when using them (e.g. increase of safety, useful when unforeseen events occur) during travelling, traditional applications (e.g. city & road maps) still play an important part when it comes

to planning, orientation and creative travelling. Main decision factor when to use which application depends whether people want to receive directions versus people who want to know where they are.
In a case were people need to travel to an unknown location the necessity of travel information is very high. People will use more travel information and applications (e.g. a navigation system combined with city maps), but before making the journey several websites with travel information are addressed as well.
In general people who are travelling by car manage to find their way through the main roads easily. Detailed information is especially needed about the last couple of minutes before arriving at the desired location. This information includes all the necessary information when travelling into an unknown area (e.g. parking spaces, real-time information, closed roads and its effect on the journey). This also accounts for people travelling with other means of transport then the car.
In other cases especially in an emergency (e.g. accident) there is no time in planning the journey. Travel information about the fastest route and nearest hospital is very important. One participant in the focus group session experienced the value of travel information provided by his navigation system when he needed a medical aid in France.

Personalization needs
People like to have personal information, especially when it is individually based. Personalization should be an important aspect when providing travel information, but not for the cost of quality and easiness. For example one participant suggested that after a long day he would like to visit a decent restaurant near the highway instead of a "simple" one. In his experience this would make the journey more pleasant and enjoyable. Several participants also commented about public space information especially when travelling with family or small children. To what extent personal information is important depends on the situation (e.g. hurry, holiday). Especially when going on holiday with family or friends a social value is found much more important. Sightseeing information should make the journey more interesting. This means the information should be flexible and to some extent individual based.

Type of situation	**Preferred travel information**
Hurry / Emergency	Fastest route, nearest hospital, expected time of arrival, traffic jams, traffic diversions, parking space.
Holiday	Sightseeing (during travelling) information, local information traffic jams, public spaces information
Events (e.g. concert)	Time of arrival, parking location,

Type of information needed in different situations

Barriers and drivers public transport versus car
Besides the most common aspects such as cost and time of transport other factors were identified as well. According to the participants in the focus group sessions own transportation is highly preferred in cases when unforeseen events occur. This could be when an appointment is scheduled earlier then expected or in case of an emergency.

Drivers for Own transportation (car)	**Drivers for Public transport**
Flexibility, Independency	No-hurry, freedom to focus on other things

Car vs. Public Transport drivers

Barriers for Own transportation (car)	**Barriers for Public transport**
▪ Traffic Jams ▪ Travel costs (fuel expenditure) ▪ Parking costs ▪ Parking spaces ▪ Geographic location ▪ Time required to find a suitable parking space	▪ Amount of Luggage, ▪ group versus individual ▪ Physical effort ▪ geographic location ▪ Travel time next transfer-area ▪ Waiting time between transfer-area and after-transport-time ▪ Image (e.g. delays, transport failure)

Car vs. Public transport barriers

Pros and cons for using travel information with current applications

Travel information is used in various ways. For some a simple city map will do while others require more information. In the three focus group sessions with end-users (students, drivers and combination users) several issues were discussed about travel information. Main goal of the focus groups was to discuss how current sources, applications and devices of travel information fulfilled the needs. Table 4 gives an overview of the pros and cons of several applications of travel information discussed with participants during the focus groups.

Application	Type of information	+	-
Navigation systems	Travel information and guidance	Reliable, easy, dynamical ability, "safe" feeling	Technology dependency, feeling "dumb", purchase costs, theft sensitive (Bluetooth)
City maps	Travel information	Creative planning, sightseeing information	Up2date, hard to handle during travelling,
Smart phones	Similar to navigation systems	Always available	Battery, complexity, (often) needs a external antenna
SMS services	Travel & reservation information	Ability to pay for facilitations (e.g. parking, cinema)	Restrictions and usefulness during travelling (car), costs
Websites	Travel information and guidance	Free, up-to-date	Availability during travelling, More than 3-clicks-effort, registration requirements, poor quality printed (paper)

pros and cons of current travel information applications

User comments on current paid information services
In some of the research activities (interviews and focus groups) paid information services were discussed. There is not much interest in paid services in traffic or in public transport. The current paying services (e.g. SMS) are not attractive enough as many people explained that the current 'free' services (e.g. internet, information at stations) are sufficient enough. When travelling by car, route information was the most requested type of travel information.

The traveller's experience of public transport

Abstract from '*The traveller's experience of public transport*', Graduation Report by E. Fleskens, Vialis/TU Delft, August 2007. This research provides some information background to support the WP2 tasks regarding end-users and user requirements.

Conclusions
The literature research and the context mapping study replenished each other well. Both analyses made clear that it is very important to put the traveller in a central position. For product development in the field of public transport different traveller target groups can be the starting point for product development, but the context that influences that target group should be taken into account first (see figure). Of course it is not always possible for stakeholders to do that through such a time- (and money) consuming research like context mapping, but the awareness for the importance of gaining empathy for travellers to understand how it perceives travelling is a step forward. Always asking the Who, What, Where, When, Why and How questions helps. Examples of contextual factors of high influence on the perception of travellers that came forward from research:

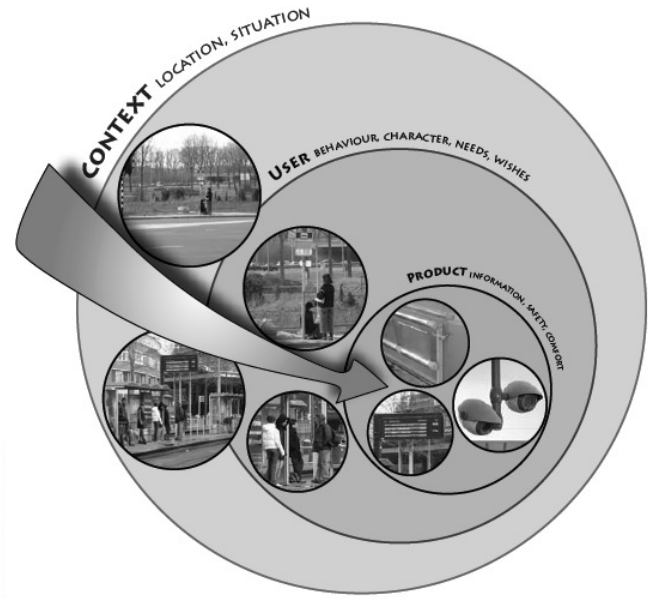
Situation (external; not compliant):
- Delays and changes: train crash, detours etc.
- Weather influences: rain/cold or sunny/warm
- Other people: deserted stop in the polder or very crowded
- Bad information; information displays that are not working

Situation (personal; compliant):

- Hurry: left home too late, heavy traffic etc.
- Travel motive: going to school, to the market etc.
- Routine: commuting to work every day etc.

Location:

- At home/at work/in the city
- NS Station/metro
- Bus/tram stop in the city/in the suburb/*polder*
- In the vehicle



First focus on the context, than on the user for product development