eCO-friendly urban Multi-modal route PlAnning Services for mobile uSers

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Summary

This document contains the public version of exploitation plans for the results on partner level and exemplary business plans for the eCOMPASS services which were demonstrated in the project.

Table of Contents

Tables

Figures

1 Executive Summary

The eCOMPASS project resulted in innovative approaches for solutions in the consumer navigation, logistics planning and tourist and public transport information fields.

As stated by the exploitation plans on partner level (see chapter 5), the results are attractive for further use in terms of future research and also product development, depending on the nature of the specific partner.

Also, the services demonstrated within the eCOMPASS project were evaluated to have a positive economic outlook if implemented as a service in the free marked as detailed on in the form of high level business cases (see chapter 6).

Never the less, the specific ancillary conditions related to a concrete implementation should be heeded as different options for implementation might, depending on the service, be open or the conditions demand specific design decisions to name just two influencing factors. In other words, the business plans contained in this document can act as guideline but must be refined and reflected in front of the specific situation at hand.

2 Scope and Structure of the Document

This document focusses on the exploitation plans of the technologies and concepts developed in the eCOMPASS project as well as on exemplary business plans for the related services having potential to be offered on the market.

Chapter 0 provides the executive summary and chapter 3 details on the concept followed during the elaboration of this document.

Chapter 4 holds an overview about the project results and related use case fields defined in the project.

Chapter 5 the exploitation plans for the per project partner illustrating the future utilisation of the results in their fields of business.

Chapter 6 holds high level exemplary descriptions of the business cases for the consumer navigation, logistics planning and tourist information with public transport information services. Business cases related to the provision of components are highly specific and were not investigated.

Finally, chapter 7 provides the summary of the findings and conclusions based on them.

2.1 Related documents

As basis of this document, the cost benefit analysis (D7.3) is the most important eCOMPASS document providing input to the business plans for the eCOMPASS services.
Detailed information on the services developed and demonstrated within the project is contained in deliverable D5.3.

The specification documents of the project provide further information on the details of the results developed.

3 Introduction and Concept

The broad objective of eCOMPASS is to address high-demand urban mobility aspects, aiming at reducing the environmental footprint of the mobility of people and goods in urban areas. The project primarily investigates two mobility scenarios with significant contribution to urban CO_2 emissions and energy consumption:

- Mobility of private car drivers;
- Mobility of goods through fleets of vehicles carrying light or heavy cargo.
- Urban mobility of humans

The first point is addressed through intelligent on-board navigation systems that seamlessly provide 'green' route recommendations, i.e., those routes with minimal environmental footprint and fuel consumption. The second point is dealt with by the development of a logistics and fleet management system used by back-office staff and on-board systems used by the drivers. In parallel, eCOMPASS aims at developing advanced web and mobile services that will facilitate the use of complex urban public transportation networks, thereby making 'green' passenger transport more appealing. These services aim at city dwellers requesting door-to-door route planning and tourists who receive personalized recommendations for daily sightseeing itineraries (using public transport) guiding their visit to a subset of city points of interest.

Based on the developments in the eCOMPASS project, the results are to be exploited by the project partners to compensate the financing required during the development process. To this purpose, the every project partner defined an exploitation strategy tailored to his specific business strategy and ancillary conditions at hand which are detailed on in chapter 4. These exploitation strategies outline the utilisation of the outcomes in the respective product ranges, within future and current research activities and business development strategies. These high level strategies act as guideline for the exploitation in each partner organisation after the project.

Also, the report concept foresees the elaboration of high level exemplary business cases for each of the major service clusters elaborated and demonstrated within the eCOMPASS project to understand the potential economic viability in the free market.

These services are:

- Consumer navigation services elaborated implemented by TOMTOM
- Logistics planning services elaborated implemented by PTV
- Tourist information and public transport information services implemented by PTV and CTI

As business cases are, depending on the business case, highly specific to the ancillary conditions at hand and detailed technical and management decisions taken when implementing a service, among other time and location are potential factors, the information herein is not providing the same highly detailed level as in traditional business plans but shall act as guideline which can for a basis for the real world implementation.

As example, the tourist information and public transport information service demonstrated by PTV was utilising HTML5 and could be used by any applicable browser on any mobile device regardless of make. Also, the service did intentionally not provide departure times but solely the public transport stops and lines for the itineraries between the touristic sightseeing sports represented on hands of touristic points of interest. This was done in order to avoid stress on side of the tourists by giving the impression that a certain public transport vehicle was to be taken and only was an option due to the high service frequency in the area of effect (Berlin).

Alternatively, the implementation of the same service by CTI featured tailored applications for specific mobile operating systems such as Goole Android and provided the exact departure times of the public transport vehicles which can help to increase the trust value on side of the user and is imperative for areas with lower-than-high-frequency services.

These specific design decisions have the potential to generate a major impact on the concrete business planning and hence the related business plans can only be described on a high level.

This especially counts for the financial plans and time plans. For the logistics planning and the tourist information and public transport information services the financial plans detail on the typically required external investment (external invest), the spending (overall spending) including the split between marketing, business development and technical development costs as well as the resulting cumulative balance (balance sheet) on a monthly basis. For the consumer navigation service, the financial plan is also considering the integration of the service with the respective hardware devices and hence is structured somewhat differently.

For each service, also a time plan is provided which covers the entire period from the first setup of a given service also comprising business development and marketing activities until the roughly end of the first year of operation.

Before detailing on the business cases and exploitation plans, the reader should be reminded on the core results and how they refer to the use cases defined in eCOMPASS.

4 Core results of eCOMPASS

4.1 Collected eCOMPASS project results

The following table presents the project results of the eCOMPASS project clustered by item.

	Single service	Integrated solution	Depends on	Depends on	Depends on	Partner
CGM	service		Data sourcing			CERTH
CGM Data service 1) POIs	service		Data sourcing			CERTH
CGM Data service 2) Weather	service		Data sourcing			CERTH
CGM Data service 3) LO services data	service		Data sourcing			CERTH
Traffic prediction techniques	service		Data model			CERTH
Multimodal passenger routing service	service		Data sourcing			KIT
Tourist trip designer service	service		Data sourcing	Multimodal passenger routing service		CTI
OS independent Tourist Trip Planner		application	Tourist trip designer service	Multimodal passenger routing service	CGM Data service 1 and 2	CTI, KIT, PTV
Dedicated Android Tourist Trip application		application	Tourist trip designer service	Multimodal passenger routing service	CGM Data service 1 and 2	CTI, KIT
Multimodal passenger route planner		application	Multimodal passenger routing service	CGM Data service 1) POIs		KIT, PTV
Fleet planning		application	VRP algorithm	PTV planning framework		CTI, PTV
Dedicated Fleet planning		application	VRP algorithm	PTV planning framework		PTV
Telematics for fleet planning	service	application	TomTom Telematics interface	PTV planning framework		PTV, TomTom
Timetable based fleet planning	service	application	CGM Data service 3)	PTV planning framework		PTV, CERTH

			LO services data			
Private & commercial navigation		application				TomTom
Business navigation	service	application				

Table 1: eCOMPASS results

4.2 Relation of project results and aggregated eCOMPASS use case fields

	Use Case Tourists	Use Case Residents	Use Case Logistics Company	Use Case Private vehicles	Partner involved
CGM					CERTH
CGM Data service 1) POIs					CERTH
CGM Data service 2) Weather					CERTH
CGM Data service 3) LO services data					CERTH
Traffic prediction techniques					CERTH
Multimodal passenger routing service					KIT
Tourist trip designer service					CTI
OS independent Tourist Trip Planner					CTI, KIT, PTV
Dedicated Android Tourist Trip application					CTI, KIT
Multimodal passenger route planner					KIT, PTV
Fleet planning					CTI, PTV
Dedicated Fleet planning					PTV
Telematics for fleet planning					PTV, TomTom
Timetable based fleet planning					PTV, CERTH
Private navigation					TomTom
Business navigation					TomTom

Table 2: clustered eCOMPASS results and use cases

5 Exploitation of Project Results

This chapter contains the exploitation plans for each partner focussing on the utilisation of the results elaborated within eCOMPASS in the future after the end of the project.

5.1 Computer Technology Institute & Press "Diophantus" - CTI

The tourist tour planning algorithm developed in the framework of WP3 will be integrated in the architecture of the CIP7-621133 HoPE ("Holistic Personal public Eco-mobility") project[1]. HoPE's main purpose is to advance the role of public transportation systems through an open platform which integrates mature systems and services developed in the context of EU-funded research projects. Along this line, the functionality of the eCOMPASS tourist tour planning module will be extended and customized to allow coupling and integration with other HoPE modules. The mobile tourist tour planning application will be piloted for over 12 months in the greater urban area of Athens, Greece. The number of targeted users will approximately be 500-1000 users.

The exploitation plans of CTI will also focus in publishing the research results derived from WP2 and WP3 in prestigious international conferences' proceedings and journals as well as to specialized conferences and magazines on multi-modal mobility of passenger and freight transport. The latter includes publications and announces in special industrial groups and associations, and their related events.

CTI will also plans to migrate the project's results and technological expertise to university education, and especially in transferring this knowledge in the practical education of students.

5.2 Centre for Research and Technology Hellas – CERTH

As CERTH is a research organisation, its primary focus resides on basically exploiting the eCOMPASS project results from a research-oriented point of view. Research on traffic prediction techniques based on urban traffic data, as well as automatic semantic interoperability for info-mobility services (e.g. for travel planning or fleet management and planning applications), fit perfectly into the general research orientation of the research group of CERTH. These orientations are strictly related to the role and achievements of CERTH within eCOMPASS, namely

[1] http://hope-eu-project.eu/

the development of traffic prediction techniques, as well as the Content Management Module (CGM) in the context of WP2 and WP5, respectively. These achievements will primary contribute to help CERTH further deepen its scientific excellence on those areas. Hence, the main exploitation of the project results in this respect will be in terms of new findings and publications thus increasing the critical mass of research outcome produced within the organisation. Moreover, it will strengthen links to the international research community and relevant networks, such as the ITS community.
However, in parallel with its research-oriented exploitation, CERTH shows a great interest on promoting the eCOMPASS outcomes from a business-oriented perspective. In particular, CERTH actively collaborates with national and European industrial partners for investigating opportunities for the establishment of startups, in the form of spin-offs or spin-outs based on the achievements and developments of the project.
Specific plans of CERTH in this respect include the expansion of the web services developed as part of the CGM by supporting more service providers (e.g. public transport data) and meet more real information interoperability needs by potential customers, e.g. companies that support fleet management services. To this end, CERTH started a bilateral collaboration with PTV in order to integrate the CGM into the PTV planning system component. This is expected to provide appropriate proof-of-concept for the potential commercialisation of the CGM services, in the form of a start-up. Moreover, CERTH will seek to promote the results their current traffic prediction engine by showcasing them in appropriate exhibition events with the goal to attract interest from the industry and potential investors.

5.3 Eidgenössische Technische Hochschule Zürich - ETHZ

In the eCOMPASS project, ETHZ has focused on developing algorithms for finding good robust routes in both the private-car route network, and in public transportation networks, and also in assessing what a good and robust route is.

While the results for the private-car routing are promising (with respect to the quality of the delivered results), they are not ready for an industrial exploitation. Especially, the running time of the algorithms are far from the needs of the industry. Further research on the topic is already ongoing and will continue in the future. It is of great interest for the ETHZ to improve the efficiency of these algorithms to meet the practical requirements imposed by real-world applications."

On the other hand, our results on computing robust routes in public transportation networks are of immediate interest to be exploited in real-world situations.

Concretely, our experimental evaluation has been done in cooperation with a local public transport operator, the Verkehrsbetriebe Zurich (VBZ). VBZ provided real delays of the public-transportation network in the city of Zurich and seem very interested in the experimental outcomes. We have scheduled further meetings (also as a participant in the annual meeting of local transportation companies and research institutes) to explore possibilities of making our developed solutions capable of being of practical use. In particular, we want to discuss the feasibility of the developed solutions for daily use by every-day users, and explore the possibility of extending the existing products and applications that are already available.

5.4 Karlsruher Institut fuer Technologie - KIT

The results concerning the Multimodal Passenger Transport Routing Server obtained in the eCOMPASS project will be carried over by KIT to the EU CIP-ICT-PSP project HoPE ("Holistic Personal public Eco-mobility", grant agreement no. 621133), together with the Tourist Trip Planning Server, the Dedicated Android Tourist Trip Application and relevant CGM service results of eCOMPASS in cooperation with CERTH and CTI.

For the project HoPE, these services resulting from eCOMPASS will be integrated with services obtained from the EU project MODUM ("Models for Optimising Dynamic Urban Mobility", grant agreement no. 288205) as well as a mobile payment system in order to offer interoperable fare management (IFM) between transport modes, cities, and regions, making public transport more user friendly.

Based on the previous project experiences and results, the main goal of HoPE is to address problems connected with smart mobility and fare management in a unified way and proposing a holistic framework.

HoPE will feature three pilots in Athens, Greece, in Coventry and the West Midlands, UK, covering the cities Coventry, Birmingham, Dudley, Sandwell, Solihull, Walsall, and Wolverhampton as well as in the Basque Country, Spain, comprising the cities Bilbao, Vitoria and San Sebastian. The three pilots in the project intend to demonstrate how a holistic approach and the smart combination of related, interactive information services can significantly enhance the user experience and foster the adoption of public transportation means as well as the cooperation between different transport operators.

HoPE offers a much larger budget for piloting and includes relevant public transit operators for all three sites as major project partners. This will allow KIT to showcase the Multimodal Passenger Transport Routing Server on a much larger scale and to better integrate detailed information obtained from the transit operators that we could not acquire for the Berlin pilot within eCOMPASS (such as complete and

identifiable delay data). Furthermore, two of the pilot sites in HoPE, Athens and Basque Country, currently do not operate their own passenger timetable information and routing services, instead relying on Google Transit. This may offer very good business and exploitation opportunities in the near future.

5.5 TomTom International BV - TOMTOM

The eCOMPASS project addressed a number of topics which fall into areas considered key competencies of TomTom:

- Dynamic Alternative Route Networks
- Fast Time-Dependent Routing
- Traffic Prediction

Exploitation plans and timelines differ by topic, depending on

- how each topic fits into TomTom's long-term strategic product roadmap,
- how market-relevant the increment achieved by eCOMPASS is for each topic,
- the level of investment required for each topic to make new functionality product-ready.

5.6 PTV Planung Transport Verkehr AG - PTV

Within the eCOMPASS project, PTV elaborated two of the core services, namely the tourist trip planner based on HTML5 technology for ubiquitous applicability based on widely available standard technology and the fleet planning service for logistics operators. As these services are assigned to two different product categories, the exploitation of the results is significantly different for the past project phase. Also, other ancillary conditions feed into this future exploitation.

PTV itself is – for the majority of her products – not a service provider for end users but for business customers such as logistics companies, consultancies and other planning institutions and, last but not least, public authorities on all levels. However, in the past PTV also partnered with large organisations and public authorities in the past to provide, for example, large scale intermodal route planning and traffic information services to the public, as task including the operation of the websites and web service interfaces. Due to its focus on road traffic analysis based on agile management strategies, PTV is today providing the backbone services but lays no specific focus on end user portal technology, although portals can be provided, if needed. The HTML 5 technology elaborated within the eCOMPASS project allows PTV utilise top-notch standardised technology if her clients are requesting any of those services.

Concerning the logistics planner, ecological transport routing becomes ever more important, not only because of the (somewhat altruistic) support to minimise CO_2 emissions to which PTV avows itself to, but also because this is becoming a major

sales factor for the services PTV offers rendering PTV products future proof and sustainable, especially in the face of a volatile and heavily competed markets.

6 Business plans

One business plan each is to be set up for each service demonstrated and assessed in WP6. This comprises the consumer navigation service, the logistics planning service as well as the tourist tour planning service with integrated public transport planning service.
Each service is covered by a separate chapter detailing on the content of the business case, the business environment in which it is typically located in, an analysis of typical strengths, weaknesses, opportunities and threats towards a typical service of that kind and high level time and financial plans based on common experiences of the project partners.

It should be noted that the services are considered as abstract representatives of their kind and the information in the business case chapters are considered as guideline only which illustrate a possible line of thought which could be taken as first basis to assess, if a service should be implemented under specific conditions. Also it should be noted, that the services are of radically different kinds and feature different approaches in marketing and business strategy which is why the figures cannot be directly compared between the business cases.

6.1 Consumer Navigation

The eCOMPASS project contributed some significant scientific advancements in the areas of Dynamic Alternative Networks, Fast Time-Dependent Routing, and Traffic Prediction. Some of these advancements yield a clear business case, particularly for partner TomTom who is very active in the area of private vehicle navigation. For obvious reasons, the details of these business cases are not disclosed in this public version D7.4.2 of deliverable D7.4.1, and we refer to the restricted version D7.4.1 for details.

6.2 Logistics Planning

6.2.1 Description of the Business Case

In case of logistics companies, economic company targets correlate in many cases with environmental goals. As a result of increasing operational costs, especially in consequence of increasing fuel costs for fleets and growing competition among service providers (LSP), most LSP`s aim to optimize the fleet planning and operation by various measures. Undertaken measures depend to a large extend on the activity fields of the LSP`s. Often LSP`s introduce IT based logistics planning and support to their operations.

In general we can underline, that logistics planning is a stiff process with or without IT support. The planer works systematically towards certain objectives. In addition to e.g. an automatic planning the planner performs manual operations such as

insertions, relocations of customers, assigning a certain vehicle to a trip or vice versa assigning trips to a vehicle. While performing this operation the planner has to often deal with modifications or cancellations of orders, e.g. trips may have different states; special states can limit the degrees of freedom for modifications or if the loading for a trip has already started it might be wished that this trips shall keep its vehicle.

IT supported fleet management and trip planning allows for the optimization of different objectives, e.g. to minimize cost or to maximize revenue. Other aspects that are interesting in this area are minimization of CO_2-Emissions, travel time or distance and maximization of vehicle load. Of course these objectives are subject to some constraints which are given by vehicles, cargo, time frames or for example restrictions in the transportation network. Objectives can also be contrary in their impact on the solution, therefore a tour planning system needs means to deal with these interdependencies.

With trip planning and monitoring users can receive more information about the current status of their order. Transportation companies can employ vehicle tracking in order to supply the relevant information about orders to their customers and re-optimize or update their tours. The incorporation of mid-term traffic information can be useful at this point.

Fleet management and trip planning also adds comparability to the solutions. Vehicle and or driver restrictions can be incorporated into the optimization process and therefore it can be proven if or that these restrictions are met. This can be especially useful when dealing with laws and their limitations to the day-to-day business.

All in all, certain goals of the planner can be met (or at least be sufficiently satisfied) by using a planning system that is capable of being adjusted to the needs of its user.

6.2.2 Business Environment Analysis

Fleet Management Solutions are offered in various complexities. The solution range is wide; some solutions address only visibility; some others add significant logistics planning intelligence to the process. The solution depends to a very large extend on the user needs.

Standard products (out of the box and internet services)	A typical standard product can be purchased and installed with limited effort. The customer can select from a limited number of versions. The market for standard solutions can be scaled up to Europe and beyond.
Complex standard products which need to be rolled out within a project	A complex standard product mostly has to pass a call for proposal process. Consulting is needed to identify user needs. Customizations are to a

	limited extend possible. The customer has to roll-out the software package with help of professional support as part of a standard project, e.g. to interface the pre-systems, database servers, etc.
Developer components (integrated by customers)	A developer component provides a single, specific functionality (e.g. locate, distance calculation, route with way points, map) which can be combined with other developer components. These components are being integrated into the user`s system framework. The customers using developer components often use these components as part of their own products or as part of their existing legacy system. The market can be seen as Europe and beyond.
Complex individual solutions, using components rolled out by a software integrator or software provider	This type represents the most complex characteristic of the solution spectrum. Complex individual solutions are most often developed as part of a larger project to fit specific customer needs.

Table 3: Possible solutions concerning logistics planning services

6.3 Tourist info service in combination with public transport information

6.3.1 Description of the Business Case

The business case comprises two different components, namely the

- Tourist information service and
- The public transport information service

The tourist information service is mainly aimed at tourists visiting a city or other touristic region and informing them about the optimum selection of touristic sites (or Points of Interest – POI) according to their personal likings. Additionally, the service will also provide the succession in which the sites should be visited based on the optimum accessibility and minimal time loss to commute between the sites.

The public transport information service complements the tourist information service by providing information on the public transport means which are suitable to support the commuting between the sites. This includes also non-motorised personal transport means such as walking if it provides the best option between two POIs.

In detail, the tourist information service allows users to state their preferences concerning touristic sites as well as to exclude specific sites, the time window (usually the time of stay and the daily start/end time of sightseeing trips) and the location of their accommodation (such as a hotel) and provides a succession of POIs suggested to be visited within the time window. If the time window would comprise

several days with specified departure and arrival times at the accommodation for each of them, the service will tell the user which POIs / sites to visit during his first and which to visit during his second day of stay (and so on), each with a suggested succession. At the same time, the public transport information service, which is integrated into the HTML5 based user interface, will provide information on the public transport means which are suggested for each itinerary.

Being a fully dynamic service, the tourist information service, combined with the public transport service, provides an automated and, compared to similar existing services, highly convenient way for tourists to get a plan for their visits and information on how to get from one touristic spot to another and back to the accommodation by the right means of transport.

The unique selling proposition of the business case described herein is the easiness experienced by the user to attain the complete information for her/his touristic stay which comprises the POIs and the means of transport to get there in one common, easy to use service.

The depth of information level is adaptable regarding the description of the touristic POIs and also the public transport information. With public transport information, aiming at a low stress level on side of the user is realised by naming only the public transport lines and means but not specific departure time avoiding initiating a feeling of haste (see the example of the html5 based service built in eCOMPASS). Alternatively, the specific departure times can be provided which increases the trust level on side of the user due to more detailed information. The exact implementation scheme, however, depends on the specific location as e.g. the first approach requires high frequencies in the public transport lines used to avoid disappointment on side of the user generated by long waiting times. Apart of other considerations, PT lines with low frequency services would rather be suitable for the second approach to avoid these longer waiting times.

6.3.2 Business Environment Analysis

Tourist information services are already on the marked in various shapes and sizes. From traditional tourist information services which require users to personally apply for information booths or call telephone services, traditional books and web sites complete the environment.

The effort required from the user to attain this information is highly dependent on the nature of the service and the support it offers. Everyone knows how nice, but sometimes also how unnerving it is to select an own route from a paper travel guide, let alone the public transport services to use. The tourist info service provides both sets of information very conveniently.

The service can be paired with traditional means like tourist guides and live tourist on-site guide tours or used stand-alone provided sufficient information sources are provided for each POI. By using HTML 5 the service can be used by anyone with a compatible browser, regardless of end device, implementation schemes providing specific applications for the major mobile operating systems (e.g. iOS and Android) allow for a more tailored user experience which makes the business case flexible and adaptable to the specific business environment.

Hence, the expected market penetration is rather high provided user expectations are considered with special attention to ease of use and quality of information as well as local peculiarities. Depending on the specific local competitor range, which may already include similar services, local unique selling propositions in terms of usability and content should be considered.

6.3.3 SWOT Analysis

Strengths	• Innovative approach significantly reduces planning stress for tourists • Flexible content design allows for different levels of information for touristic POIs due to external linking • Multi-level financial revenue model provides grounds for stable revenue scheme • Integrated public transport information eases access to PT schemes • Can easily be combined with offline tourist information (such as guide books) and other existing services • Integration of output into external systems possible • Implementations based on standardised internet browser technology (HTML 5) and on OS specific mobile application technology were trialed successfully

Weaknesses	• Public transport data may be difficult to access • Public transport data quality may be an issue • Living standards might require frequent updating (HTML5) • High investment in content development depending on information depth provided

Opportunities	• Mobile segment constantly increasing in volume

	• Standard technologies (HTML5) well received • Limited set of major mobile operating systems prevails limiting development costs for tailored implementations • New markets open up to standard technology in information service • Users expect ever increasing accessibility and ease of use
Threats	• World economy impedes tourist numbers • HTML 5 as common standard is still under development • Required public transport data not available in sufficient quality • Similar services might show up if concept proves successful

Table 4: SWOT analysis of tourist info and public transport information service

Key risk mitigation strategies include:

- Strong USP must be made visible through high marketing activities and kept by maintaining high levels of marketing and business development activities.
- Marketing must comprise all applicable target groups regardless of technology used
- Strong business development and marketing activities are key to partnering with new locations.
- Quality control of services is key to positive service perception.
- Advancement in browser and operating system versions must be closely monitored and supported.
- Collection of input data from more sources and merging. This requires attention from business development and also system development focusing on merging potential data sources with high quality in mind.
- Support of open data initiatives to ease access especially to public transport data.

6.3.4 Organisation

The organisation of the service comprises a management entity, the technical IT department implementing the service and providing further features over time, an IT operations department which handles day-to-day operations of the backbone computing centre, a customer feedback and communications department, financial services and PR as well as HR units.

Depending on the specific ancillary conditions, e.g. that the service is born by a start-up or by an existing organisation, the specific organisational setup needs to be adapted and specifically defined. Also, specific persons for key positions need to be selected and communicated to potential investors (also in-house in case the service organisation is incorporated into an existing organisation).

6.3.5 Approach to Market and Marketing strategy

The marketing will basically be utilising the usual tools to implement online services in markets already partially or fully occupied by competitors. This normally involves a specific marketing budget to make the newly implemented service known to the broad public and/or a specific clientele emphasizing the USPs of the service but should be specifically complemented by measures in media relevant to the target group of users utilising traditional means (e.g. paper books) for their travels.

Additional features developed in cooperation with strategic partners, for example embedded links to ticket sales or special retail offers, should be used to strengthen the quality perception and perception of usefulness on side of the user as well as extend the potential user range.

6.3.6 Business strategy

The business strategy follows the following sequence for the first year:

The first year focusses on the implementation in one region with extension to others in the second year.
The first two months after the financing round are occupied solely by business development efforts which include the strategic cooperation building with partners such as travel agencies and travel guide providers as well as potential locations.
Technical work starts in month three with the majority of budget allocated until mid of the year. Marketing is essential after the technical work focusses on bug fixing and maintenance. Business development is maintained to be pursued during this time and receives more means for further extension of the services after the experiences of the first service are implemented in software. Marketing is maintained on high level for increased market penetration.

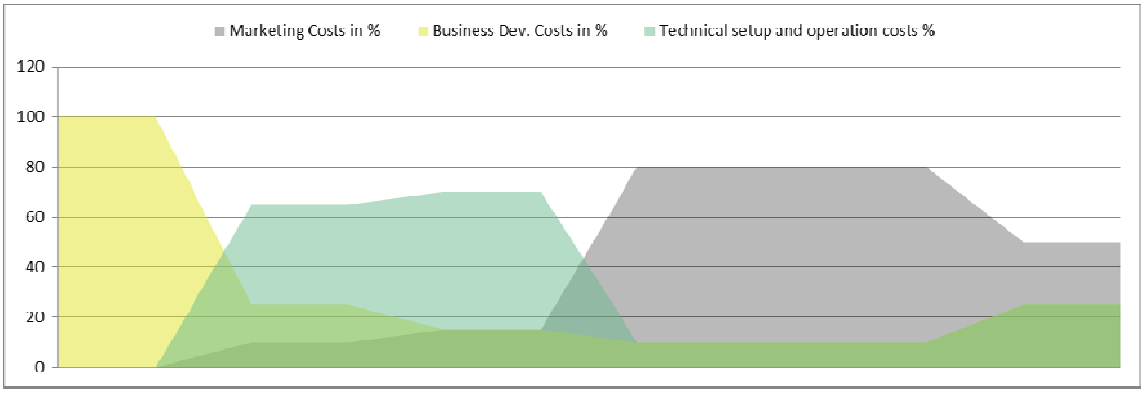

Figure 1: Effort per cost family in % for tourist information and public transport information service in first year

To generate revenues, the service concept foresees a multi-level approach.

Firstly, as this service adds to the touristic information capacity of a city or region and thus to the touristic attractiveness of a region, support from relevant public authorities, tourist organisations, chambers of commerce and other (local) entities can form one financing pillar. The relevant entities should have interests in fostering the industrial growth (e.g. the GDP of a region) or, especially, the tourist industry in a region. Specific programmes might even be available for (IT-) projects and endeavours which foster tourist numbers, help to reduce emissions and/or the access to regional heritage sites.

Secondly, the common revenue models for online services implemented today usually include the sales of advertisements utilising specific service providers and cooperation models such as Google AdSense™, a model, which can form an attractive second financial pillar. The revenue generated is normally related to the traffic of the site, the click rates on the advertisement banner and the revenue generation for a specific banner or advertisement type. Usually, large traffic volumes are required to generate reasonable results which is why this revenue type, in contrary to the first financial pillar, will rather become effective in later stages of market penetration.

Thirdly, microdonations performed in cooperation with established, specialised service providers such as Flattr™ can form the third financial pillar for the revenue generation. Typical for such a scheme, media providers such as the service operators place a donation button on their website, so that the users can click on that button if the page content appeals to them. Any payment and personal information is hereby kept with the donation-service provider which requires no data privacy protection on side of the tourist info service provider. At the end of the month the subscription amount is allocated to the media providers according to the clicks of the user. In this case the earnings depend on the satisfaction of the users with eCOMPASS and its homepage.

Fourthly, special cooperation's concerning ticket sales can be established, for example by integrating specific banners to ticket shops. This refers to public transport tickets as well as to access tickets for tourist sites and tourist (reduction) cards. This may also comprise "Taxi Call Button" which allows the user to ask for a cab without having to call a specific call centre and wherein the location is transmitted automatically (much like in e-call). Within these schemes, either a share of the ticket price of a fixed amount per ticket sale are usually applied to the operator placing the banner on his website.

Fifthly, cooperation's with specific retail stores or chains can be established which lead either to displaying information on current offers along the routes between sites or in the vicinity of tourist sites or even to specific route suggestions which allow the users to pass a specific vendor when travelling from one tourist location to another.

Also, Bluetooth enabled near field communication schemes such as the iBeacon™ by Apple Inc. can sense unique identifiers of local beacons utilising compatible applications. The identifier can be looked up over the internet to determine the device's physical location or trigger an action on the device such as a check-in on social media or a push notification. In this context, eCOMPASS could assume the role of the compatible app that sends the push notification to the iBeacon if user passes by. The tourist info service might collaborate with local businesses or chain stores as part of a slight profit sharing or offer indoor navigation and guidance for museums. For example, in collaboration with strategic partners, virtual museum tours could be offered on the user´s device.

Furthermore, the tourist info service can be branded in cooperation with traditional travel guide providers to complement their service range and providing an USP compared to their competitors. For example, traditional (paper-based) travel guides might contain further information which is not included in the POI descriptions of the service.

Lastly, the integrated tourist information and public transport information service can act as specific service provider to touristic services already established on the market acting in the background of an existing web offer.

User-fee based service schemes do not seem to be applicable to the tourist info service by design as the users might be reluctant to pay for a service they only use in one city or region and because of the general reluctance of IT service users to directly pay for the reception of a service. If the tourist info service covers a wide range of locations, such as several major cities on one continent, a package deal might be conceivable for financing as well but would apply to later stages of development.

The public transport information service is supporting this service as integral part.

The general business development strategy can target two principle approaches for market entry or any combination to form an USP to the end user in terms of content quality expressed in multitude, correctness and content depth of data:

- Concentrate on tourist hotspots with high concentration of competitors
- Concentrate on travelled but non-competed tourist areas which are optimally just developing and generate a unique network

In any case the strategy comprises to connect with possible content providers to provide rich background information on the touristic POIs which can increase user binding. This can go as far as to offer – likely with strategic partners for the content - location based services such as in-door tours through museums on basis of near-field communication technologies as multiple end user platforms will support these technologies.

6.4 Public transport information service

6.4.1 Description of the Business Case

Public transport information services which provide details on departure spots and times as well as multimodal routes are usually offered by the respective public transport operator to attract and foster traveller numbers in PT. Other approaches include free services such as Google Transit which act in the frame of bigger business cases. This means, that the business models behind those end user services are financed from sources other than the classical ones but additionally also enjoy the same marketing strategies (advertisements etc.) than an independent service would.

To compete, a service would have to offer an USP which is hard to generate considering that the public transport operators will have (at least) the same data quality as any other independent service.

For component providers, however, the business cases are radically different. Public transport service providers normally have their information services designed and operated by industrial partners and are interested in improved data and information quality and control. Any improvements here, as achieved in the eCOMPASS project on the algorithmic level, can contribute to improved service quality and hence have a sales potential to the clients. As the clients in these business cases are not the end users and this chapter only focusses on end-user services, details are to be provided according to the specific occasion. Additionally, the related business plans are highly specific, technology and component centric rendering any general approach futile from the very start. Hence the approach described herein is only a rough example and needs refinement on all levels within a concrete approach.

The business case itself covers the marketing of the developed algorithms and components in a B2B environment.

6.4.2 Business and Marketing strategy

As the market is B2B focused, professional venues, exhibitions and publishing activities in specialised media are key to a successful market entry, if no established business networks exist anyways.

Three basic market entry concepts can be chosen:

a) Sale of algorithm to one or more partners or licensing as flat rate
b) Licensing as volume dependent (e.g. number of routings)
c) Consulting

From experience, the one-time selling revenue grossly understates the investment required for the development of such algorithmic approaches also as the algorithms have to be integrated into existing systems and improvements also depend on the legacy system´s set up.

Hence, licensing on basis of usage of services might be a better option also possibly not preferred by the B2B partner as it would complicate licensing with his clients, the public transport operators.

However, some partners such as Google might be familiar with these usage based licensing concepts.

Option 3 deals with consulting. In such an approach, specialized software vendors purchase consulting services, e.g. workshops, in order to understand the novel approach and evaluate it.
At a later stage in some cases, if results are promising and adaptation effort has been estimated as acceptable, this could lead to an adaptation of presented new approaches to the existing engines as part of an in-house development project at company level.

7 Summary, Conclusions and Recommendations

All partners state, that the eCOMPASS services, algorithms and other outcomes prove to be attractive to be used after the project. Depending on the nature of the partner, be it a research entity or for-profit company, different exploitation plans were developed tailored to the specific situation, business and development strategy and ancillary conditions experienced by each partner, state that the future utilisation comprises either the integration into the product range or the utilisation in future research activities.

Also the high level business plan analyses performed within the elaboration of this report indicate, that the services consumer navigation, logistics planning as well as tourist and public transport information should provide a viable background for market entry.

Each high level business plan covers a typical eCOMPASS service. It is highly recommended to investigate the specific ancillary conditions such as data availability, market expectations, competitor and market analysis etc. in a highly detailed manner in case such a service should be implemented and also consider extension strategies for to support a long term economic viability of such endeavour. Concerning the public transport information service without flanking support of other services such as a tourist information service, a stand-alone information service is usually not the type of enterprise covering this use case in today´s markets. Alternatively, these services are usually provided directly under authority of the public transport providers, e.g. under subcontracting conditions. As eCOMPASS developed new algorithms, the business case explains the general approach to marketing those solutions.

As exploitation related conclusion it can be said, that the constant review and harmonisation of development targets during the project and especially the elaboration of the technical and conceptual results supports the generation of added value to each partner can be fostered adding to the attractiveness of collective research activities and the subsequent exploitation of results.

Hence it is, concerning the exploitation of the project results on partner level, recommended to strengthen schemes emphasising the harmonisation of development targets among the partners with each partner´s internal goals during the project runtime.