



# DELIVERABLE

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## D5.2 PERIODICAL VALIDATION REPORT BRUSSELS

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## Revision History

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### Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

## Executive Summary

Within the ECIM project, trials with end-users take an important part in the project since, following the Living Lab approach towards innovation; ECIM believes that involving users from the early stages of the development is a necessary condition to make applications that end users will want. As spelled out in D5.1 'Pilot Operations Plan', an iterative development path has been designed to develop three pilots in the cities of Brussels, Paris and Barcelona that will take lessons from each other. This iterative path follows a two-step approach: a pre-pilot phase in Brussels and a pilot phase in Paris and Barcelona. The present document describes the pre-pilot test in the pilot city Brussels that took place in September 2014.

In the second chapter, the reader will learn the importance of the pre-pilot in Brussels for the remainder of the project. As a first trial, three kinds of lessons are expected from the pre-pilot phase: operational lessons regarding the management of the test site (user recruitment and retention, user training and support, user participation, user communication), evaluation methodology lessons for ensuring data capture and analysis and finally design lessons based on user feedback.

The third chapter presents the elements that underpinned the pre-pilot trial: the scenario for a parking application as developed in D2.2 'Initial Technical Requirements and Use Cases' and D5.1 'Pilot Operations Plan', the first embodiment of this scenario in the functionalities present of the pre-pilot application and finally the test strategy that is build for this phase in two stages: a demo-test in the iMinds premises in Brussels and Ghent with a so-called demonstration group of testers and a driver test consisting of two groups, the iMinds recruits and the BePark and Mobile-for customers. While the demo-test took place in offices, the second test involved drivers using the application while being on the road. The iMinds recruits group consisted of a small number of users that used the ECIM pre-pilot with the aid of a test scenario. During this task a member of iMinds assisted the driver. This iMinds member made field notes and organized afterwards a short evaluation interview in order to capture the user experience. The BePark and Mobile4 Customers used the application without any formal instructions within their daily life context.

The fourth chapter of this deliverable provides the operational and methodological lessons learned. While for the demo-test and the iMinds recruits group all the actions foreseen in the Pilot Operation Plan were met successfully, the BePark and Mobile-for Customers group presented a challenge regarding management. Although the broad lines of the pre-pilot plan were executed along the objectives and actions defined in the Pilot Operations Plan, it became clear that for the first iteration of each pilot, testers using the application from their daily life context will need a more strict guidance and more direct interaction via face-to-face meetings or telephonic follow-up.

Secondly, we learned through these experiences that more qualitative methods such as interviews or participant observations are more fruitful in testing a pre-pilot with still limited functionalities. Indeed, a part of testers tended to no longer provide feedback on surveys because something (often it were small problems that could be fixed quite fast) went wrong in parking situations in which they needed information at hand. In order to prevent risks of dropout, for future pilot work, these lessons are necessary and they have been taken into account in the plans for the first tests in Paris and Barcelona. Moreover, these methodological lessons have been incorporated in D6.1 'Strategic Evaluation Methodology'.

The fifth chapter of the deliverable finally presents the analysis of the user feedback in the three test groups. The results demonstrated us that the pre-pilot was not rejected by any of the test groups and testers overall. The application is regarded as easy to use, accessible and having a good quality of content. Moreover, its usefulness is acknowledged, especially the integration idea, both on the level of services and on the level of taking into the account the whole parking experience from finding a parking spot to paying the session. Also positive usage feelings (attitudes and intentions to further use) were detected and users approved with the smart mobility potential of the app. Nonetheless, major future design work has been identified as well and they were present among all different profiles within the test population.

The fields of attention are navigation towards the parking area, working on a better icon representation of the menu buttons, a more simple log-in system to the different providers, reducing the visual display of icons on the map by establishing a preference systems that only shows information that is needed, incorporate location search functions based on Point of Interests, increasing the number of traffic info and mobility services present in the application and enhance the parking information, especially regarding availability and expansion of numbers of parking spots/providers.

These design lessons are summarized in the conclusion of this deliverable. The test results are currently investigated by ECIM and some of these design lessons have meanwhile been implemented in the Paris Pilot for which the first part of the testing started in December 2014.

# 1 Introduction

The present document is the first periodical evaluation period of WP5 and will give a detailed account of the user tests of the pre-pilot in Brussels that took place in September 2014. ECIM wants to take advantage of the Living Lab approach to build user demands and expectations in an iterative way into the design of the mobility services it will deploy in three pilot cities - Brussels, Paris and Barcelona. The Brussels pre-pilot is the first stage in this development track and plays a crucial initial role. As first test cycle, it will provide an opportunity for ECIM to take some important initial lessons learned regarding three dimensions of user testing:

- (1) Pilot operational lessons in order to ensure smoother operations for the future ECIM pilots;
- (2) Methodological lessons in order to create a more realistic strategic evaluation strategy, to be developed in D6.1, for the ECIM project;
- (3) User feedback related to user experience and acceptance of the pre-pilot, hence providing design insights for the technical work packages to make sure future pilots will meet customer demands.

This document reports on the lessons learned and insights gathered on these three axes in the following way. Chapter 2 provides an outline of the role of piloting and the use of the Living Lab approach to innovation followed by ECIM. Chapter 3 presents the Brussels pre-pilot in more detail. We start with describing the Brussels pilot scenario, then present the concrete embodiment of this scenario in the pre-pilot, the evaluation measures and methodology we planned to use to gather and analyse user feedback and finally the way the first test phase was designed. From chapter 4 onwards, we discuss the results of the tests. Chapter 4 focuses on the operational and methodological dimension of the test. The document will highlight whether regarding user recruitment, user requirements, user participation and user support and training, all the objectives set in D5.1 were met, and if not, explain why this was the case and which lessons for future testing within the ECIM project must thus be learned and implemented in the other pilot cities and the second cycle. It will moreover discuss the insights learned regarding methodology. Chapter 5 presents the analysis of the feedback gathered from users regarding their experience and acceptance. This feedback is presented along the measures used by the ECIM project and the six profiles that are useful to distinguish as different pre-pilot users. Just as with the first part, important lessons for the future development of the ECIM pilots are highlighted in the conclusion of this chapter. The document ends with a conclusion that summarizes the main lessons and their relation to other WPS and future work within ECIM.



## 2 The ECIM - philosophy of piloting

To fully grasp the meaning and place of the Brussels pilot within ECIM, we here provide a short overview of the piloting philosophy that ECIM is following. ECIM considers piloting as an important part of its activities towards the creation of a platform that sustains the creation of new smart mobility services. Moreover, ECIM makes use of the Living Lab approach to innovation in developing the pilots. This brings along some characteristics that ECIM believes will bring benefit for the project in reaching its targets. We therefore briefly present these aspects first, leading to, on the one hand, a presentation of the timeline of pilot testing and, on the other hand, an identification of the importance of the Brussels test for the future of ECIM.

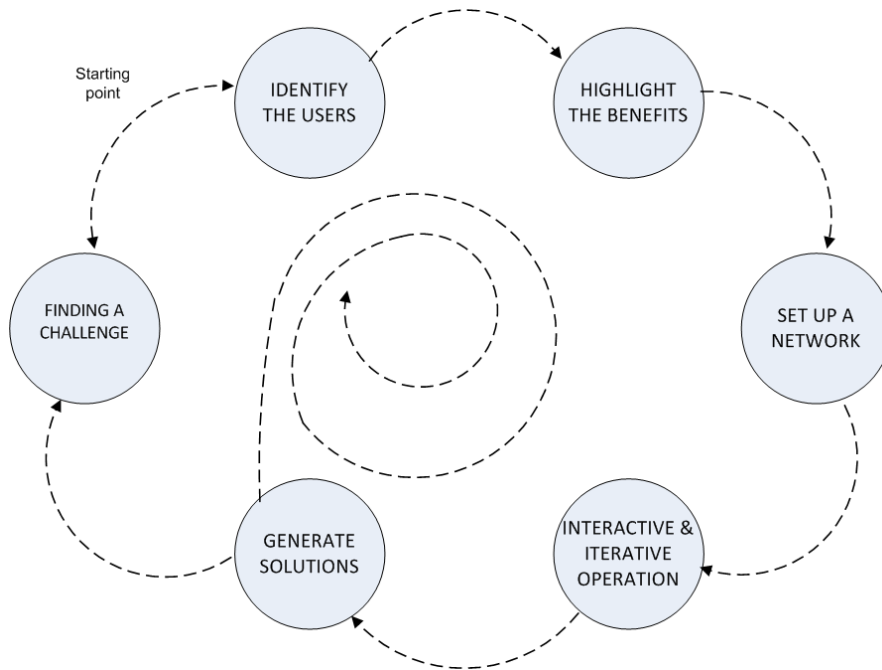
### 2.1 The role of piloting and Living Labs in ECIM

Historically, innovation has been viewed as a linear process, driven and controlled by the industrial developers of products for the marketplace. Today innovation is increasingly seen as a catalyst for growth and competitiveness and has been enthusiastically promoted at regional, national and international level and included in new policy formulation. The linear concept has evolved more towards a network model involving partners supporting innovation, often focused on cycles of innovation activity. The greatest shift in how we should consider innovation can be detected in what has been termed ‘open innovation’. This concept postulates that companies should have an open attitude towards ideas stemming from outside the boundaries of the firm since innovation can only thrive when a company utilises a network of partnerships beyond its traditional internal resources (Chesbrough, 2008).

The idea of open innovation converged with a greater acknowledgment of the role of the user in the development process. Living Labs build specifically on this trend, believing that gaining insight into the user and the usage context is one of the main critical determinants in successful product development processes (Eriksson, Niitamo, Kulkki, & Hribernik, 2006). Living Labs can be defined as a form of open innovation. Yet its activities distinguish themselves from other approaches (such as usability research) by confronting the user within their natural daily-life context with technology (e.g., a proxy, a prototype or a proof of concept) from the early stages in the innovation process onwards, and by regarding the user as the co-producer of technology by having particular attention to him and his context (Ballon et al., 2005, Veeckman et al., 2013, Pierson et al., 2005). Therefore, Living Labs create an innovation and experimentation environment - a kind of research laboratory - bringing together all relevant stakeholders (research centres, public institutions and organisations, companies) and users so as to develop a research methodology allowing to grasp and understand user reactions from their real life context towards the new technology, thereby enabling co-creation with the development team (Almiral & Wareham, 2008, Bergvall-Kareborn & Stahlbrost, 2009, Mulvenna et al., 2010, Feuerstein et al., 2008, Folstad, 2008).

The Living Lab approach is nowadays getting momentum in Europe, as shown by the creation and successive expansion of the ‘European Network of Living Labs’ (ENOLL - [www.openlivinglabs.eu](http://www.openlivinglabs.eu)) and a body of publications regarding Living Lab innovation projects (for recent overviews, see, among others: McPhee et al, 2012; McPhee et al, 2013)

The second Living Labs Summer School (2011) documents the process of setting up a Living Lab and its development as an ecosystem, placing the user at the heart and illustrating the process as iterative:



**Figure 1: How to set up a Living Lab**

ECIM creates an opportunity to use the Living Lab concept in Brussels, Paris (Grand Paris Seine Ouest) and Barcelona to:

- (1) Engage and connect citizens, public authorities and SMEs in the development process of smarter and user-friendly city mobility services, by enabling co-creation processes that influence the applications developers in an iterative fashion.
- (2) Collect, by means of user-centred methodologies, throughout the whole development process, a rich dataset of feedbacks related to consumer interest in the ECIM services and pilot applications and to user experience.

ECIM will use the Living Lab approach in two ways:

1. In the testing of a range of scenarios in the pilot cities that combine multiple services with local data sets in order to deliver enhanced functionality of current existing services in a relatively straight forward and cost effective manner
2. In an open innovation and co-creation setting that strives to engage citizens and SME's in developing new public services using open API's on the ECIM platform

The present document relates to the first target identified above. In three pilot cities - Brussels (Belgium), Paris- Grand Seine Ouest Area (France) and Barcelona (Spain) - three pilot scenario's have been developed and documented in D2.2 that will be the object of technological development and user testing:

- Brussels: "Park, Pay and Go"
- Paris - Grand Seine Ouest Area: "Buy Parking Time"
- Barcelona: "Conference mobility"

## 2.2 An Iterative development approach for ECIM pilots

As this is a key characteristic of service creation in Living Labs, ECIM took as a starting principle the operationalization of an iterative development strategy for its smart mobility service in the pilot cities by means of a three staged process: (1) a pre-pilot stage, (2) a closed stage and (3) an open group stage. Each of these three pilot stages will be accompanied by user tests that have a particular objective for each stage in order to allow that gathered insights will flow from one test stage to the other on the one hand, and, on the other hand, that the range of inquiries can be broadened to capture feedback as rich as possible.

### 2.2.1 Pre-pilot, Closed and open group test phase

The pre-pilot phase means that a first prototype of the application is deployed in a pilot city in a more controlled environment. Its main aim is, before launching the service in a wider community, to make sure that the prototype is working from a technical, functional and usability point of view as well as initially defined, allowing to investigate the service compliance with the scenario and to test the initial user requirements. As such, the pilot is live but with the aim of being a ‘first check’. Pre-piloting therefore goes along with its deployment in a restricted or ‘closed’ user group composed of early discoverers/adopters (people that follow new trends in mobile technologies and adopt such technologies quite early compared to the majority of future users) and innovators that have experience with testing prototypes in the context of an early development phase. Within ECIM, the pre-pilot is planned in the Brussels Region (the Brussels region is territory made up of the city of Brussels and its 18 surrounding municipalities).

The open group phase means that the pilot, after having incorporated the feedback from the pre-pilot test users in the design of the application, is launched in a wider community of users. Its aim is to test to what extent the pilot meets users’ expectations and demands. The test population is no longer made up dominantly of early adaptors or discoverers, but involves more local and diverse actors.

Within this open group test stage, 2 phases were identified: a small open group in a first test cycle and a wider open group in a second cycle. Working with two cycles is necessary because cycle 2 will provide more functionalities and services than the first cycle. Therefore, ECIM expands the involvement of more local and diverse testers gradually in order to capture meaningful feedback that helps the development towards the second cycle. The small open cycle therefore consists of end users that are known to the project partners, while the second cycle will involve end users that are recruited in the broader city environment.

### 2.2.2 Timeline of pilot testing

Placed on a timeline and for each pilot city, the timing of the development of the pilots and their consequent deployment and testing in Brussels, Paris and Barcelona was defined in D5.1 as follows:

Sept 14	Oct14	Nov14	Dec14	Jan15	Feb15	March15	April15
Pre-pilot Brussels			Open group Cycle 1 Paris	Open group Cycle 1 Barcelona		Open group Cycle 2 Brussels, Paris, Barcelona	

Table 1: Timeline of ECIM pilots deployment and user tests in the pilot cities

### 2.2.3 Importance of the Brussels cycle 1 pilot in the piloting strategy

As the timeline shows, the Brussels pre-pilot is the first pilot in the iterative development track of ECIM and thus plays a crucial role for learning valuable lessons for future testing in the context of ECIM in three aspects.

First, it is the first user test with the technology, hence providing valuable design insights for not only the second cycle pilot in Brussels, but also the other pilots to be developed in the three other cities (Paris, Barcelona, Birmingham).

Secondly, it is a first test for the operations we envisioned in our pilot operations plan, hence our experience on the operational level of preparing and managing the test population will give us the opportunity to learn decisive lessons to improve these aspects.

Thirdly, since the data gathered needs to be analysed in a meaningful way for the project, it provides ECIM with valuable insights regarding the design of its Strategic Evaluation Methodology, to be developed in D6.1.

The figure below provides a synthesis of the iterative deployment strategy for the ECIM pilots and the role of the pre-pilot:

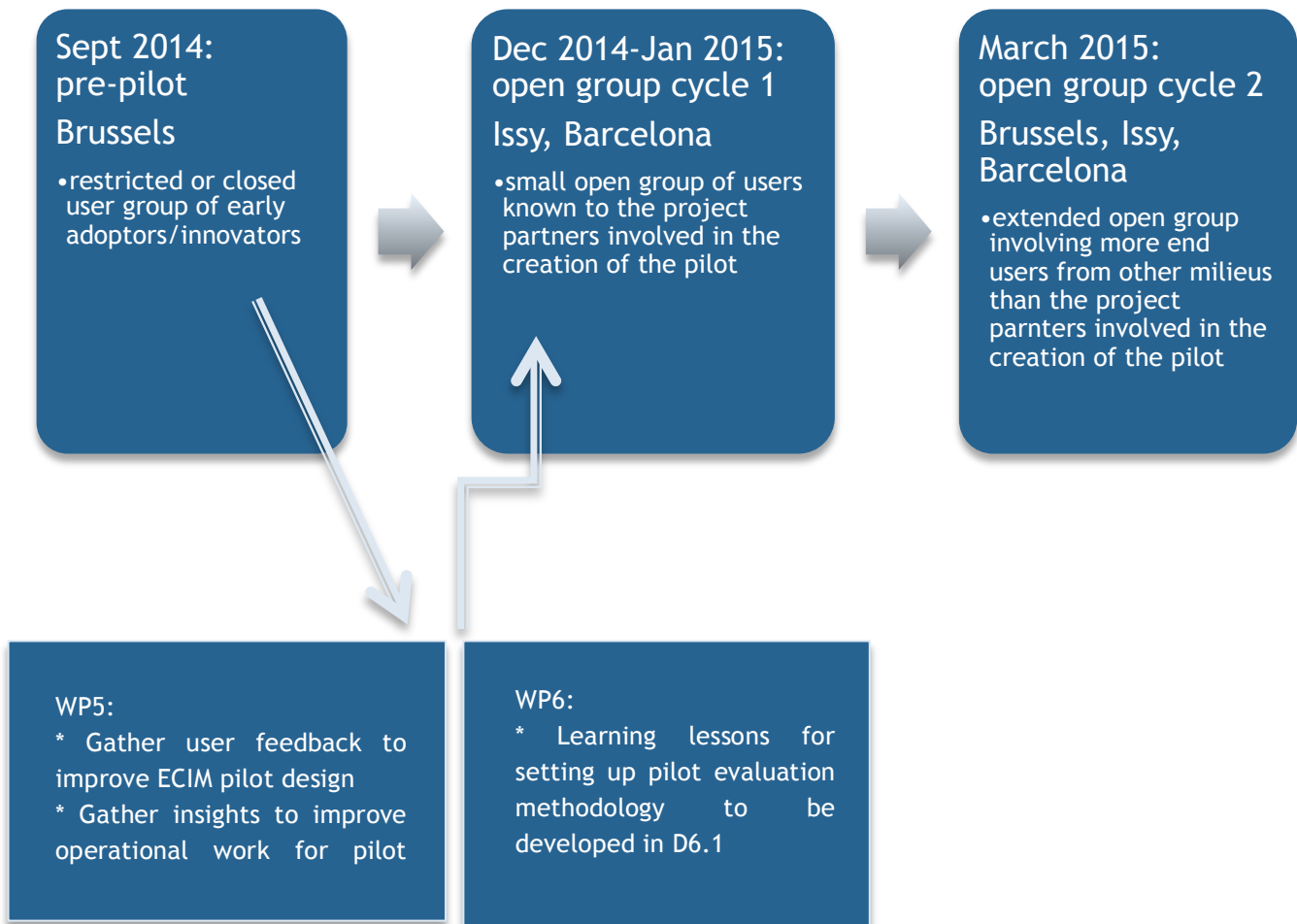


Figure 2: ECIM's pilot deployment and the role of pre-pilot in Brussels

## 3 Brussels pre-pilot: scenario, evaluation and test plan

Having explained the important role of pre-piloting in ECIM, we now, in order to provide the reader with a good knowledge of the context of the testing, provide an overview of (1) the scenario that underpins the Brussels pilot and how this has been embodied so far in the pre-pilot, (2) the evaluation methodology that was designed for gathering and analysing the user feedback and (3) the pre-pilot test plan that organized the trial operations.

### 3.1 Pilot scenario and functionalities of pre-test

#### 3.1.1 Brussels' Pilot scenario

As already mentioned in D2.2 *'Initial Technical Requirements and Use Cases'* and *'D5.1: Pilot Operations Plan'*, the Brussels pilot will use a wide range of datasets about parking (on-street and off-street location, price and availability), public transport (location of stops, arrivals), bike sharing and points of interests. It will combine these, if possible, with congestion level data (real traffic data, sensor data), traffic data and arrangements (real traffic data, raw sensor data, road works...) and maps about controlled city center circulating ring information, stations data, route data and route diagrams, and available public urban transport services.

The main goal of the application is (1) to allow users to find an off-street or on-street parking place in the Brussels Region near to a point of interest, such as a shopping mall, a hospital or cultural venue, (2) to start, manage, end and pay the parking session via the mobile application, and (3) to check public transport options to continue his journey in Brussels from or towards the parking spot.

##### 1. Find and drive to the parking place

The user will first use the application to search the Point of Interest and discover available nearby parking places on the map or by browsing a list, and then will drive to the location of the parking spot.

##### 2. Start, end and pay the parking session

###### 2.1 Start the session

If the user selects an on-street parking, he or she will have to insert or confirm provided information in the application, such as license plate and the zone code displayed on the parking meter. After confirmation, the parking session starts. In the case of off-street parking, the user will have to approach the parking gate and ask the application to open the gate. The application will display the parking code and the user has to check if this matches with the code on the gate. If the code matches, the user will confirm, the gate will open and the parking session will start.

###### 2.2. Manage the parking session

During the time of the parking session, the user has the ability to check through the application the elapsed and, if a maximum parking time is defined, also the remaining time of the parking session.

###### 2.3. End the parking session

In order to leave the parking, the user will use the application to select the active parking session and to confirm that he wants to end the session. After having received a message announcing the successful ending of the parking session and showing the information about the total cost, the user can drive away from the on-street parking or, in the case of an off-street parking, the application will perform the necessary actions to open the gate before leaving the place.

##### 3. Use public transport to go from parking spot to point of interest or vice versa

In order to go from the parking spot to the point of interest or to return to the parking place after the visit of the Point of Interest, the user can use the application to check public transport options.

### 3.1.2 Pre-test scenario and functionalities

Within this more encompassing scenario, the Brussels pre-test worked along the following elements:

1. Find and drive to the parking place: A user could search a certain location on address, indicate the kind of parking spot he was looking for (on street, or off-street, or both), see the results on the map near the location and get instructions about the route to go there (Parking list)
2. Start, manage and end the parking session:
  - a. When arriving at the parking spot, the user could log-in to on-street or off-street parking depending on the provider. He has a personal log-in for each provider. At an off-street parking, the user could click on start session, the gate code was returned and by confirming the gate got open and he could park his car. At an on-street parking, the user's license number was asked and then after confirming, his session started.
  - b. At the end of the parking session, the user could stop the session and pay. After having paid, the amount and duration of the parking session was immediately displayed
3. Use public transport or walk to go from parking spot to desired location or vice versa:

This meant that the pilot integrated the following data about parking:

- Data of off-street parking spots for Brussels (BePark): location, availability, price
- Data about paid on-street parking for Brussels (Mobile-for): location and price
- Data about taxi-stands in Brussels (CIBG)
- Public transport data
- Maps and routes (Google)

The following functionalities as listed were at the disposal of the testers:

Nr.	Menu button	Functionalities
1	Account-button	Log-in to each of the two providers Manual with explanations of icons used on the pilot Survey-button to access online version of survey
2	Search button	Search for location by address Filter on kind of parking's type and mobility (only taxi stops)
3	Parking icons on map	Discover availability for off-street (green: available/red: occupied) Discover the price and location and more information on the parking spot Start the parking session End the parking session
4	Parking session on button	Indication of running parking session Check elapsed time of parking
5	Navigation button	Suggested road by car, public transport or walking from current location to parking spot
6	Filter button	Access to a list of parking spots in the application Search on a particular parking by name

**Table 2: Overview of Functionalities in the Pre-Pilot**

## 3.2 Evaluation criteria and methods

As will be explained in more details in D6.1 ‘*Strategic Evaluation Methodology*’, WP6 and WP5 partners worked together to set-up a first evaluation plan for the Brussels pre-pilot. This was designed in line with the general framework that is underpinning the pilot evaluation methodology in D6.1 ‘*Strategic Evaluation Methodology*’.

In order to evaluate the user experience and user acceptance, following measures guided the testing of the pre-pilot. They are synchronized with the KPI’s and user requirements as provided in D2.1 “*Service analysis, including stakeholder workshops results*” and D1.2 “*Project management and quality plan*”. Thus, some predefined indicators had been developed in advance and were integrated in our methodology.

The user profile should be understood not as indicator itself but as the main categories upon which the different indicators could be broken down in the analysis of the user feedback. Not all users will have the same needs.

Measures	Description	KPI
User profile ECIM mobile app users-citizens	Demographics such as age, gender, .. ICT-skills and usage Mobility pattern	2, 3, 6
Ease of use	Degree to which a person believes that using a particular system would be free from effort (e.g. complexity, navigational efficiency, ...)	2, 3, 5, 6
Ease of access/accessibility	Degree to which a person can access the system anytime, anywhere	2, 3, 5, 6
Content quality	Degree to which a person believes that his/her subjective judgment of quality and usefulness of information in certain information use settings align with his/her own expectation of information or in regard to other available information (context/process-orientation towards e.g. trust, reliability, performance, relevance, or accuracy, ...)	2, 3, 5, 6
Usefulness	Degree to which a person believes that using a particular system would enhance his or her performance	2, 3, 5, 6
Usage feelings/attitude	Degree to which the offered system causes a positive or negative attitude to its use	2, 3, 5, 6
Intention to further use	Degree to which the system does not undermine the intention of its use	2, 3, 5, 6

**Table 3: Overview of testing measures for Pre-Pilot**

For the first cycle, the following methods to gather user feedback were planned and prepared by the Brussels pilot test team:

Test phase	User group	Method	Annex
Demo-test	Demonstration group	Survey Priority exercise	Annex I Annex I

Real life test	iMinds drivers	Participant observation Evaluation interview	Annex II Annex II
	BePark & Mobile-for customers	Short control survey middle of test period End Survey end of test period	Annex III Annex III

Table 4: Overview of evaluation methods in pre-pilot Brussels

## 3.3 Pilot test plan

For this closed group testing, D5.1 planned a two-step approach, consisting of a first demo-test phase, undertaken with a demonstration test group, and a second ‘real life’ testing phase, with a ‘car drivers test group’.

### 3.3.1 Demo-test

In the first ‘demo-test’ phase, members of the iMinds test panel were invited to test the application in an off-road environment at iMinds offices. This demonstration group in a controllable lab setting had a twofold purpose:

- Provide feedback regarding user experience and acceptance of the application by means of performing a test scenario that simulated a real life event and made them use all the functionalities of the application.
- Identify technical and potential safety concerns before the test with real drivers.
- Focus on user expectations regarding future developments of the pilot.

During the first two weeks of September, iMinds organized four demo-test sessions. Two sessions were organized in Brussels at the offices of iMinds-SMIT in order to attract testers out of the iMinds panel who live in Brussels or come on a daily or quite regular basis to the city, for work purposes. The first session took place on 3<sup>rd</sup> September 2014 in the early evening, the second session one week later on 10<sup>th</sup> September at the same time. The other two sessions were organized in the offices of iMinds headquarters in Ghent. By choosing this location, we wanted to attract testers that live outside Brussels and come to Brussels, for professional and private reasons (visiting relatives, going to events...).

### 3.3.2 Real-life test

In the consecutive ‘real-life test’ phase, we invited citizens to test the application ‘on the road’. The ‘car drivers test group’ had the aim to provide feedback regarding the usability, the technical performance, and the user experience of the application from its use in a ‘real life context’. This ‘car driver test group’ consisted of two segments: the ‘iMinds-recruits’ and the ‘BePark and Mobile-for Customers’

- iMinds recruits

This was a small group of drivers recruited by iMinds that performed a test-scenario, taking them from the iMinds offices in Brussels with their car to a certain location in Schaerbeek and meanwhile asking them to perform all interactions possible with the application in reaching their mission, id est finding a parking place in the neighbourhood of the proposed location, starting and ending the session. These drivers were every-time accompanied by an iMinds researcher whose aim was to capture the user experiences ‘on the go’ and get a clear view on usability of the application.

The group of drivers that iMinds recruited and had to perform a clear test scenario, tested the application on Monday 23<sup>rd</sup> of September (3 testers), on Saturday 28<sup>th</sup> September (1 tester) and on Monday 30<sup>th</sup> September (1 tester).

- BePark and Mobile-for customers

A group of drivers was recruited by the project partners Mobile-for and BePark out of their existing customers base in the Brussels Region. Since they all already use mobile applications for their real life parking needs, involving these testers could give us feedback from an ‘experienced’ public and allow to compare their feedback from other testers that were keen on using mobile applications for some aspects of



their mobility, but not necessarily parking mobile applications. In contrast to the iMinds drivers, who had to drive to a certain location that was defined by the test team, these testers did not get any instructions, but could use the application for a two-week period.

This group of drivers was giving access to the application from 18<sup>th</sup> of September onwards. As we will explain below, the initial test period was extended from two weeks to three weeks. They were able to use and test the application until 8<sup>th</sup> October 2014.

The pilot test plan was thus executed along the guidelines as laid down in D5.1, the first cycle of the Brussels pilot taking place during the whole month of September 2014 and the first week of October. The first Brussels pilot was tested by citizens within the timing as defined by the pilot operations plan. Since, in line with our risk and mitigation plan, test cycles were planned in such a way that periods can be easily extended if needed, the extension of one week in October did not impact any other work in the project.

### 3.3.3 User registration and parking credit

To gain access to the ECIM platform services for the Brussels application it was still required for the testers to register to both of the services separately. The present application of ECIM in cycle 1 thus made it possible to get access to the two services via the same application, but did not have a single-sign on and log in system for the two services.

For the demonstration group, BePark and Mobile-for each made 20 test accounts to get access to their service and every tester was given one unique account for BePark and Mobile-for for performing the test scenario and start and end a session. Since this application was still running in a test environment, the testers in fact simulated their entry and leave of the parking spot. These testers thus, tested the application only once and we re-used these accounts during the next demo-session.

For the iMinds drivers group, iMinds registered an account to both of the services and these accounts were communicated to the testers. Since each of these iMinds drivers tested at a different point in time, the same account was re-used each time.

For the BePark and Mobile-for Customers, the necessity to be registered on both services meant that a BePark Customer had to create an account at Mobile-for and vice versa. Therefore, the following procedure was elaborated between iMinds, BePark and Mobile-for:

1. Customers from BePark would click on a link in the recruitment call to a special registration page to sign up as a tester;
2. After signing up, iMinds sent them a confirmation and asked them the information that was needed for creating a temporary account on Mobile-for as well as to send a signed consent document that detailed the procedure and the rights of the testers;
3. Once the BePark customer returned the signed document and the extra information, the latter was sent to Mobile-for who created the temporary account;
4. The temporary account was then send back to iMinds by Mobile-for;
5. When the test was launched, iMinds communicated the temporary Mobile-for account to the BePark customer.

In the case of a Mobile-for customer, the same procedure was used, given the following flow:

1. Customers from Mobile-for would click on a link in the recruitment call to a special Mobile-for-registration page to sign up as a tester;
2. After signing up, iMinds sent them a confirmation and asked them the information that was needed for creating a temporary account on BePark as well as to send a signed consent document that detailed the procedure and the rights of the testers;
3. Once the Mobile-for customer returned the signed document and the extra information, the latter was sent to BePark who created the temporary account;
4. The temporary account was then send back to iMinds by BePark;
5. When the test was launched, iMinds communicated the BePark temporary account to the Mobile-for customer.

In this way, when using the ECIM-application to find a parking place, to start and end a parking session, the members of this test group could login to the provider of the parking spot they selected to park their car during the test period.

Moreover, the accounts created for the members of the drivers group and the iMinds driver account were given each a 25Euro parking credit for each provider. If the 25Euro limit for one provider was exceeded during the test period, the tester had to pay for the extra charges to the provider. Each tester could always check the status of its budget by logging-in with his account at the relevant provider.

Nonetheless, in this way, the testers were given a 50 Euro budget for parking in Brussels, which also served as an incentive to use the application.

Tester	Accounts	How	Budget
<b>Demonstration group</b>	Test-accounts for two providers	20 test accounts made for BePark; 20 test accounts made for Mobile-for → every member got one BePark and one Mobile-for account	n/a
<b>iMinds drivers</b>	1 iMinds Test-account for each of the two providers	1 iMinds account for BePark and 1 for Mobile-for given to the tester	25 euros on each account
<b>BePark and Mobile-for Customers</b>	Each tester had to subscribe to the other service	BePark customers used their BePark accounts for BePark parking locations but a temporary one for Mobile-for was created; Mobile-for customers used their Mobile-for account for getting access to the Mobile-for service on ECIM; Mobile-for customers needed to register to BePark and got temporary BePark account	25 euros on each account

**Table 5: Test procedure pre-pilot Brussels**

## 4 Brussels cycle 1: Pilot operations

Having outlined (a) the general philosophy of testing of the ECIM project and the place of the Brussels cycle 1 pilot test within it and (b) the scenario and evaluation procedure designed for the test, we now focus on the work performed within this framework for the Brussels pilot and the lessons we can learn out of this activity.

This report consists of two parts. In the first part, the current chapter 4, we will elaborate on the operational part of the test. It will on the one hand allow the reader to get an insight in the way the pilot test was prepared before and managed during the test phase by the Brussels pilot testing team. By systematically explaining such aspects as user recruitment, user participation and user training as well as support and relating these to the objectives of the initial pilot operations plan, this chapter will provide valuable insights or lessons learned for ECIM for the future user tests in Paris, Barcelona, the second cycle in Brussels and the Proof of Concept in Birmingham.

In the second part, the next chapter 5, we will discuss the analysis of the gathered data and the results. As such, this chapter 5 will provide ECIM with valuable insights regarding the user experience and acceptance of its first pilot on the evaluation criteria and will allow the pilot test team to formulate design lessons for the technical partners that within the ECIM project build the pilots.

### 4.1 Preparing and managing the test

D5.1 Pilot operations plan identified the actions and objectives for the different aspects of the test operations for the Brussels pilots. We will here indicate if we managed to reach the set targets (indicated with the symbol ✓) and explain, in case of deviation or change of plan, the reason for this deviation or change.

#### Recruitment channel & medium

Test segment	Channel	Medium	Target	Results
Demonstration Group	iMinds user panel	Online recruitment call	50	Channel: ✓ Medium: ✓ Registered testers: 28
Driver group: iMinds drivers	iMinds user panel & friendly users close to iMinds	Online recruitment call	15-20	Channel: ✓ Medium: ✓ Registered testers: 5
Driver group: BePark and Mobile-for	BePark and Mobile-for customers in Brussels	Online recruitment call		Channel: ✓ Medium: ✓ Registered testers: 16

Table 6: User Recruitment in pre-pilot Brussels

The table indicates that for the driver group, iMinds and BePark / Mobile-for managed to recruit the set target of registered testers that expressed an interest to test the application.

The target of 50 testers for the demonstration group could not be achieved, the number of registered participants being 28. However, we must acknowledge that D5.1 'Pilot Operations Plan' defined the initial

target as too high for this sort of testing. Literature on user design points out that group discussions are only fruitful if the group size is controllable (to make sure that everybody can participate) and allows for all participants to express their experiences (provide enough time to share and formulate their opinion). Therefore, the ideal number in the literature varies from 6 to 10 persons (for non-commercial products) or 8 to 12 persons (for commercial products). Moreover, four to five different kinds of focus groups are also seen as a number in order to reach saturation, meaning the point where you have heard the range of ideas and aren't hearing more new ideas (KRUEGER & CASEY, 2014; STEWART & SHAMDASANI, 2006). A number of maximum 30 registered testers that is composed of different user profiles is therefore more useful. In the case of this test cycle, we thus managed to recruit a satisfactory number of testers and, as will be explained in more detail below, different user profiles for ECIM were present within these 28 testers.

### User support and training actions and their implementation

Test	Training and support	Implementation
Demonstration group	Training: instructions on the app provided in the introduction part of the test session Support: direct support given by members of the user test team	✓ ✓
Drivers group: iMinds recruit	Training: instructions provided in the introduction before the test Support: direct support by user test team member that accompanies driver	✓ ✓
Drivers group: BePark and Mobile-for customers	Training: used to use mobile apps for parking purposes Remote support: Manual sent with launch of test - contact centre via email or telephone	✓ ✓

Table 7: User support and training pre-pilot Brussels

The user support and training tactics described in D5.1 were all implemented for the test phase. Testers could always, during the execution of the test, count on dedicated support.

### Communication to users

The communication for recruitment of interested testers was organized by iMinds for both segments of testers: the demonstration group and the iMinds drivers group. For the segment of 'BePark and Mobile-for customers', BePark and Mobile-for adapted a template of an invitation call designed by iMinds to their way of communicating to their customers.

After registration, the communication towards all the testers was undertaken by iMinds. For the different segments, the following communication actions after registration were undertaken in order to retain registered users and inform them about the test procedure:

- Demonstration group:
  1. Confirmation of registration and demo-test session to which they were inscribed;
  2. Reminder of demo-test session and practical information 4 days and 1 day before the demo-test;
  3. Incentive information.
- Drivers group - iMinds drivers:
  1. Confirmation of registration for test session they signed up for;
  2. Reminder of test session 4 days and 1 day before the test session;
  3. Incentive information.

- Drivers Group - BePark and Mobile-for customers:
  1. Confirmation of registration for test period;
  2. Follow up of registration process: information to sign up to other provider and consent document & confirmation of registration to the other service;
  3. Announcement of launch of test period and test guidelines (manual - budget) and account information;
  4. Announcement of short user survey (day 4 of test period);
  5. Reminder of test period (day 7 of test and day 10);
  6. Announcement of extension test period (day 12 of test period);
  7. Announcement of end of test period, end of temporary accounts and provided budget and invitation to complete survey (day 15);
  8. Reminder to complete the post-test survey (day 17 and day 20)

### User participation and results

	Required participation	Actual participation	Deviation
<b>Demonstration group</b>	Group discussion Test scenario and Survey Prioritization exercise	24 participants for 3 activities	4 last-minute drop-outs
<b>Driver Groups: iMinds drivers</b>	Test scenario and evaluation interview	5 participants	No deviation
<b>BePark and Mobile-for Customers</b>	Short survey Survey	13 from 21 testers	8 drop outs during the test

**Table 8: User participation pre-pilot Brussels**

Compared to the numbers of the test population recruited at the beginning of the test period for each test segment, the numbers of people that actually provided feedback was lower for the demonstration group and the BePark and Mobile-for customers test group.

For the participants of the demonstration group, this was due to last minute cancellation because of urgent private or professional reasons.

For the BePark and Mobile-for customer group, Google Analytics provided the following numbers of testers visiting the application during the test period, with the days on which a reminder was sent underlined:

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>Week 1</b>		<u>17</u>	<u>15</u>	4	6	1	2
<b>Week 2</b>	<u>11</u>	<u>8</u>	9	6	9	6	0
<b>Week 3</b>	<u>7</u>	<u>19</u>	4	6	3	1	2

**Table 9: BePark and Mobile-for customers visiting the application**

The table shows at least that the application was visited by the group of testers and especially that the application was visited more frequently the first days when the invitation was sent, the beginning of week 2 when a reminder was sent along with a short survey to report whether they experienced problems or not,

and the last week when a new reminder was sent. Nonetheless, we noticed that there was a drop in the second part of the week and that not all testers actually used the application to park their car and pay for the session despite the credit of free parking for 25 euro with each of the two providers.

The results of the short survey (10 out of 21 testers, with 7 testers completing the questions entirely) at the end of the first week confirmed that 9 of the respondents had opened the application and browsed on it. The one stating not having opened the application so far stated as a reason 'other', hence not blaming this on not knowing test instructions, experiencing technical difficulties or not understanding the functioning of the application. From the 9 testers that are confirmed to have opened the application and searched for parking, 5 of them claimed to have used the application for actual parking purposes. The four who did not use the application for starting and ending a parking session said this was due to the fact that there was no parking available in the chosen area visited and the two others gave 'other reason' as explanation. The fact of not having used the parking was not due to a registration problem with the services nor because of a lack of knowledge about how to start and stop a session with the application. Both potential reasons were given by iMinds as an option to answer in the short survey and were not selected by these testers.

Because of the initial low participation of the short survey, in line with the risk and mitigation plan, iMinds conducted a first drop out investigation after the first week of the test period to find out why users did not respond to the survey. Every tester was called by phone by a member of iMinds. Out of 11 testers,

1. 2 turned out not to be in Belgium during the first and second test week and did not use the application yet;
2. 2 declined to participate because they did not find time anymore to test the application;
3. 4 people had experienced difficulties with registration at one of the services, but had not find time yet to contact iMinds to signal the problem;
4. 3 others had not gone to Brussels yet or to the area where the parking spots, made available through ECIM, were located;
5. All 11 testers confirmed nonetheless that the test instructions send by iMinds were clear and understandable;

iMinds therefore proceeded to resolve problem (3) immediately and to extend the test period by one week. An email was sent to the 11 testers to thank them for their feedback and to announce that the test period was extended for one week.

Nonetheless, when it comes to completing the final survey, the participation in this task was again very low, with only 2 questionnaires completed online. We therefore decided to call the participants again in order to complete the questionnaire by phone. iMinds managed to contact 15 of the remaining 17 testers. At this stage, we actually learned that the low response rate was due to two reasons: one part of the testers (3 testers) did not have a need to be in Schaarbeek during the test period and hence so no reason to complete the survey since they would not be able to provide decent feedback. Another part stated that their registration to the services did not function well and they experienced problems with logging-in (2 testers) and another part (8 testers) stated that they forgot about the questionnaire because it had to be done from another device some time after the concrete parking experience and other events of their daily life then had interfered. They therefore preferred a direct call in order to give their experiences and feedback to the iMinds user test team.

## 4.2 Lessons learned for future ECIM piloting

The presentation of the operational work for the pre-pilot highlights that we met the broad objectives defined in the pilot operations plan (test in Month 9, 3 tests with 3 different groups, measures and methods in place to capture feedback). Nonetheless, on the operational and methodological level, important lessons were learned regarding the testing of the first prototypes of mobile mobility applications that are important for the next two ECIM tests in Paris and Barcelona. Both kinds of lessons emanated from the difficulties we experienced with one segment - the 'BePark and Mobile4customers' group - within the recruited test population.

On the operational level, it is important when testing a basic first version with limited functionalities in the next pilot phases of Paris and Barcelona (as well as in future projects about smart mobility using a living approach), the following aspects should be taken into consideration:

- Make sure that the registration procedure to the services present on the ECIM application becomes less complex for the end-user. If pre-registration to certain services might be needed for test purposes, it is essential that all the actions for the end-users will be done before the communication of the launch of the test period.
- The pilot test team should inform via a face-to-face meeting the participants who test the application in real life about the project. Although none of the people we contacted complained about the intelligibility of the online communication, the number of feedback gives us nonetheless the impression that its effectiveness was not optimal and that the whole design of the test was not always so clear as the testers stated initially. In this way, a face-to-face introduction meeting, where all the participation tasks and actions are explained, will be no doubt be more effective.
- Building upon this remark, some more face-to-face interactions or direct interactions via phone during the test period must be envisioned instead of distant communication via e-mail.

On a methodological level, the consequence of this lesson is to opt for more qualitative oriented research methods that allow more closely monitoring and guidance of testers in real life conditions and grasp their reactions more directly than via large-scale surveys and logs. Although surveys will be used here as well, they are more meant to bring patterns among users to the fore, but methods such as participant observations, focus groups or evaluation interviews will allow grasping and understanding these user reactions better from the context of use.

These lessons moreover bring also in perspective the added value of the living lab approach for ECIM. Indeed, they allowed us to detect initial problems from the start and thus provide ECIM with the opportunity to take learnings and adapt/improve its plan based on concrete experiences so that in the following tests better and valuable user response will be gathered.

## 5 Brussels pre-pilot: user experience and acceptance

Having outlined and discussed the operational aspects for the Brussels pre-pilot, this section will present in more detail the user feedback on the ECIM application.

In order to analyse the feedback in a meaningful way, we will present, for each of the three test exercises (demo-test with demonstration group, driver test with first the iMinds recruits and secondly the BePark and Mobile-for Customers), the feedback on each measure along two axes:

- Axe 1: Drivers being Brussels residents and drivers being non-Brussels residents
- Axe 2: The main reason of driving towards and in Brussels: private - professional - professional and private

This gives us the following 6 potential profiles:

Brussels Residents	Non-Brussels Residents
1 Brussels Residents: Personal	4 Non-Brussels Residents: Personal
2 Brussels Residents: Professional	5 Non-Brussels Residents: Professional
3 Brussels Residents: Professional + Personal	6 Non-Brussels Residents: Professional + Personal

Table 10: profiles of testers

### 5.1 Test Results

#### 5.1.1 Demo-test

##### Profiles of participants

The 23 testers had similar profiles. On a more sociological level, they were dominantly male (all Brussels residents participating were men), women being more or less equal present in the non-Brussels residents' population for the profiles of personal reasons to come to Brussels or a combination of personal and professional reasons. Apart from this variable, most testers have university degrees and claim to know basically mobile applications and feel comfortable working with them.

Regarding their knowledge and use of mobile mobility applications, a same pattern can be discerned. Public transport applications (with the difference here that Brussels residents have a tendency to know the applications for Brussels better and use them more frequently while inversely the non-Brussels residents know and use the ones from the Flemish Region better) are known and used more than car-or bike sharing and traffic applications, with the exception of Google Maps, that is used by most of them in all profiles. Regarding parking mobile applications, in all profiles their knowledge and use was very restricted.

Location based service are used by most of the testers in all profiles, while Point of Interests in Brussels are searched regularly (from daily to weekly), dominantly by means of Google Maps.

Finally, regarding parking behaviour in Brussels, there is a distinction between Brussels residents and the two sub profiles present and non-Brussels residents. In line with a growing trend in Brussels (Lebrun, Hubert, Huynen & Patriarche, 2014) that inhabitants of the region are more and more taking public transport or other public transport means (such as bike or care sharing) for their journeys within the city, our Brussels demo-tester claim to use these transport means for personal reasons. Non-Brussels residents who travel to Brussels for personal reasons use their car and don't use any other means to interrupt their car journey and use another transport mode to finale it (for example, they don't park their car at the edge of the city in transit parking spots to take the metro to their destination). The reason for this is the lack of existing alternatives in the city itself and an own lack of knowledge about alternatives that do exist (for example, although Brussels still does not have sufficient transit parking spots (see Lebrun, Hubert, Huynen



& Patriarche, 2014), they also claim to miss a tool that helps them in detecting parking in other area’s of the city they don’t know and could be interested in). Therefore they claim to go to the neighbourhood around the venue which they know or the parking mentioned in the website of the venue. One exception here was one retired tester: since he mostly travels over the day to Brussels and has no time-rush, he deliberately parks his car in a transit parking and then take the metro. Nonetheless, he also felt a lack of knowledge about all possible alternatives, since now he always used the same parking spot, which is not so convenient when having to be at the other side of the city or having to change metro-lines.

The table below details the profiles of demo testers in Brussels along the 6 profiles:

	Brussels residents (N=6)	Non-Brussels Residents (N=17)
<b>Professional reason</b>		<p>N = 6 ; Male: 5/female: 1</p> <p>Age: 4 &gt;30y; 1 &gt;30 &amp; &gt;40; 1 &gt;50</p> <p>University studies</p> <p>Nationality: 6 Belgian</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Large Majority uses location-based applications and GPS</p> <p>Use and know mobile applications for public transport especially for Flanders, in Brussels one less regular use; for traffic and sharing: not know specific solutions for Brussels; all use Google Maps ; parking applications not known for Brussels</p> <p>Searches for POI daily or many times a week mostly via Google maps</p> <p>Drives in the city either to same area or different areas across the city</p> <p>Searches for parking in the area of destination, no transit parking</p>
<b>Personal reason</b>	<p>N=3, all Male; 2 &lt;30&amp;&gt;40 - 1 &gt; 50</p> <p>All university</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Most (2/3) use location based applications and GPS</p> <p>Most public transport mobile applications are known and used; Sharing mobility services and traffic mobile applications are known, but not used, except Google Maps; Parking mobile applications are hardly known and used</p> <p>Searches for POI couple of times a week or month and via Google Maps</p> <p>Most use the public transport for journeys in city and if with car, either</p>	<p>6</p> <p>Male: 2/female: 4</p> <p>Age: 6 &lt;30y</p> <p>University studies</p> <p>Nationality: 6 Belgian</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Large Majority uses location-based applications and GPS</p> <p>Searches for POI couple of times a week or weekly basis; minority only couple of times a week, all via Google Maps</p> <p>Drives in the city to the same area, only one to different areas across the city</p> <p>Searches for parking close to the destination, no transit parking</p>

	in one area or all areas across the city	
<b>Both Professional and personal reason</b>	<p>N=3; all male; 2 &gt; 50 &amp; &lt;60 - 1 &gt;30 &amp; &lt;40</p> <p>All university</p> <p>Comfortable with working with mobile applications and have basic knowledge</p> <p>All used location-based mobile applications and GPS</p> <p>Most public transport mobile applications are known and used; Sharing mobility services and traffic mobile applications are known, but not used, except Google maps; Parking mobile applications are hardly known and used</p> <p>Searches for POI daily or couple of times a week and via Google maps</p> <p>Most uses the car for their journeys in the city and this is either to one area, or to all areas in Brussels</p>	<p>5</p> <p>Male 3/Female 2</p> <p>Age: 3 &gt;30y &amp; &lt; 40y; 2 &lt;30y</p> <p>University studies 5; secondary education: 1</p> <p>Nationality: 5 Belgian</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Large Majority uses location-based applications and GPS</p> <p>Searches for POI couple of times a week or weekly basis, all via Google Maps</p> <p>Drives to the city mostly in different areas across the city</p> <p>Searches for parking close to the destination, not looking for transit parking</p>

**Table 11: Background testers of demonstration group**

### Success of the test-scenario:

The participants of the demo-test had to execute a test-scenario consisting of eleven steps. The execution of this scenario provided a foundation for their feedback given through a survey. This was complimented by their concrete real-life experiences of finding a parking spot in Brussels. The table below indicates that the success-rate of the scenario was high with all 23 testers managing to perform all the required tasks. The main problem encountered during the demo-test session was the fact that due to a technical issue in the pilot, problems with the log-in arose in two sessions, when some test accounts were not recognized by the application.

Task	Action	Success rate	Problem
1	Open ECIM-app URL in browser	23/23	Session 3: 1 tester technical problem with mobile; another device provided to the tester for the session
2	Read manual (Info-button)	23/23	None
3	Log-in to the service providers	23/23	Session 2: problem with 3 test-accounts Session 4: problem with 4 test-accounts → new accounts provided by test team
4	Select on-street and off-street parking as search criteria	23/23	None
5	Search location of address given for test scenario	23/23	None

6	Explore available parking lots near the location	23/23	None
7	Select the parking of your choice which is available and check the route towards it with the route planner	23/23	None
8	Start the parking session	23/23	None
9	Find another Parking on the ECIM application via the List functionality	23/23	None
10	Wait 5 Minutes. Stop the parking session and check the price you have to pay. Pay	23/23	None
11	Complete the questionnaire	23/23	None

**Table 12: Success of Test Scenario**

The table illustrates that the demo-testers managed to execute all the steps in the scenario successfully. Only step 3 created problems twice, due to some technical issues with one of the providers, but these incidents were resolved during the session. Nonetheless, as shall be seen below, this experience probably had a negative influence on the testers' score of the application regarding its accessibility.



**Figure 3: Testing the demo of the Brussels pre-pilot**

### Survey results

We now discuss the results of the survey that each of the participants of the demo-tests session had to complete. Testers were confronted with a number of statements regarding the measures identified in Chapter 3: perceived ease of use, perceived accessibility, content quality, usefulness, attitudes and intentions. Besides these dimensions, we also confronted testers with statements to assess their perception of the smart mobility potential of the application and finally gave them 3 open questions at the end allowing them to on the one hand describe the negative points of the application (open question 1), the positive points of the application (open question 2) and on the other hand formulate suggestions for improvement (open question 3).

We first discuss the responses of the testers towards the statements. They had to indicate to which extent they agree or don't agree with the proposed statement by choosing one option from the following options:

strongly agree - agree - neutral - don't agree- strongly disagree. If they had no opinion or preferred not to tell us their opinion, they could also indicate 'no opinion' or 'prefer not to say'.

In presenting the results, we provide for each measure the different statements that were asked and the mean and standard deviation on each statement for each of the profiles and for the whole population (N=23). Each time, the following values were used: 1= strongly agree; 2= agree; 3 = neutral; 4= don't agree; 5= Strongly disagree; 6 = no opinion; 7= prefer not to say.

### Perceived ease of use

Respondents were presented with 7 statements in order to assess the ease of use of the pre-pilot. The overall score for each of the statements seem to indicate that most of the testers have a slightly positive score regarding the general appreciation of the ease of use of the application and the easiness to navigate through the application (I think the application is easy to use; M=2.52). The statement that pertains to the level of difficulty (I need instructions before I could use the application) gives the indication that most testers tend to disagree so that this slightly positive evaluation of the easiness of the application can be confirmed.

However, two points deserve more attention. First, the more neutral stance towards the question whether the application met up to all their expectations, indicates that there is still some room for improvement. When we ask about the ease of use concerned with specific aspects such as the log-in procedure (Took me long time before I could insert my log-in data to the providers), we see a rather negative evaluation in overall and across the profiles. Based on our experience during these sessions, we can conclude that this can be explained by the design itself of the application, but also to a large extent to the nature of the test-accounts. The latter were too long and too complex to insert easily with a keyboard on a mobile device. Secondly, the respondents overall rather disagree with the statement that they would prefer to use log-in via social media or an eID. It would thus be wise for ECIM to add the possibility of these methods besides the traditional one, without removing the existing one.

Statements	Brussels residents		Non-Brussels residents			Brussels + non-Brussels residents
	Personal (N=3)	Personnel + Professional (N=3)	Professional (N=6)	Personal (N=6)	Personal + Professional (n=5)	Overall (N=23)
It took me a long time before I could find where to insert my log-in data to the service	M: 4.33 SD: 3.06	M: 3.67 SD: 1.53	M: 3.83 SD: 1.83	M: 4.50 SD: 0.55	M: 1.80 SD: 0.84	M: 3.61 SD: 1.75
I prefer to log-in to services via social media-accounts or eID instead of the test accounts	M: 4.67 SD: 0.58	M: 5.33 SD: 1.53	M: 3.67 SD: 1.86	M: 2.83 SD: 0.98	M: 3.20 SD: 2.05	M: 3.70 SD: 1.66
I think the application is easy to use	M: 2.67 SD: 0.58	M: 2 SD:0	M: 2.67 SD: 0.82	M: 2.17 SD: 0.41	M: 3 SD: 1.22	M: 2.52 SD: 0.79
I need instructions before I can fully use the application	M: 3.33 SD: 2.08	M: 3 SD:1	M: 3.17 SD: 0.98	M: 3.33 SD: 1.21	M: 2.40 SD: 0.89	M: 3.04 SD:1.15

I find it easily to navigate through the menu of the application	M: 2.67 SD:0.58	M: 3 SD:1	M: 3.67 SD: 1.97	M: 3 SD: 1.10	M: 3 SD: 1	M: 3.13 SD: 1.25
I could easily find the information I was looking for	M: 3 SD: 1	M: 2.33 SD: 0.58	M: 4.17 SD: 1.47	M: 2 SD: 0.63	M: 3.40 SD: 1.14	M: 3.04 SD:1.30
The application meets my expectations regarding ease of use	M: 4.33 SD:2.31	M: 3.33 SD: 0.58	M: 3.50 SD: 0.84	M: 2.67 SD: 1.03	M: 3.80 SD: 1.30	M: 3.43 SD:1.24

**Table 13: Ease of use pre-pilot Brussels**

### Perceived accessibility

In order to learn how accessible the application was, we presented the testers with 5 statements. Clearly, no problems were encountered with opening the browser and the log-in as such (apart from the problems mentioned in the ease of use above). Also, the application is considered as interactive and intuitive, be it that testers who need to park for professional reasons tend to have a rather neutral stance compared to testers who need parking for personal reasons. Regarding the look and feel, the application is welcomed with a neutral attitude. As such, we can conclude that the application is not rejected regarding its accessibility, but improvement is needed on the look and feel. Especially for professionals looking for parking the interactivity and intuitively should be improved. Indeed, it might be the case that these users, while having to be on time for appointments and thus possibly in a mental condition of ‘urgency’, get the feeling that they are losing time on the application if they still need to press many buttons in order to get the information they need.

Statements	Brussels residents		Non-Brussels residents			Brussels + non-Brussels residents
	Personal (N=3)	Personal + Professional (N=3)	Professional (N=6)	Personal (N=6)	Professional + Personal (N=5)	Overall
I could easily open the application in my browser	M: 1.67 SD: 0.58	M: 1.67 SD: 1.15	M: : 1.67 SD: 0.82	M: 1.33 SD: 0.52	M: 1.80 SD: 1.30	M: 1.61 SD: 0.84
I could login to the providers without any restrictions	M: 2.33 SD: 1.53	M: 2.33 SD: 2.31	M: 2.83 SD: 1.72	M: 3.33 SD: 1.51	M: 2.20 SD: 1.64	M: 2.70 SD: 1.61
The application is interactive	M: 2.33 SD: 1.53	M: 1.33 SD: 0.58	M: 3.17 SD: 1.94	M: 2.83 SD: 0.98	M: 3.40 SD: 0.55	M: 2.78 SD: 1.35
The application is intuitive	M: 2.67 SD: 1.15	M: 3 SD: 1	M: 3.33 SD: 2.07	M: 2 SD: 0.63	M: 3.60 SD: 0.80	M: 2.91 SD: 1.35

The application has an attractive and understandable look and feel	M: 4.67	M:3.67	M: 3.17	M: 3.33	M: 3.20	M: 3.48
	SD: 2.08	SD:0.58	SD: 2.23	SD: 1.21	SD: 1.30	SD: 1.56

**Table 14: Accessibility pre-pilot Brussels**

### Perceived Content Quality

In addition to accessibility, several content-related aspects were investigated. Respondents acknowledged the good quality of the information and its trustworthiness as well as the fact that the language and the terminology used is clear and understandable. However, the accuracy is perceived as lower as well as the used icons used in relation to the information they represent. Again this position is more pronounced with testers looking for parking in Brussels mainly for professional reasons. As we will see later, we estimate that both scores relate more to the buttons used for the menu than to the icons that display the location of the parkings as such on the map. In the more open questions at the end of the survey, some of the respondents, who indicated here that they disagreed with the statement or have a more neutral position, suggested that these menu buttons (search button, log-in button, filter button) were confusing for them. This is the case since in the other applications they used more commonly they had another meaning. Nonetheless, since these comments came from more professional oriented testers, it is thus necessary to investigate how we can avoid such confusion in icons and increase the sense of accuracy for users that will be using the application under certain time-constraints.

Statements	Brussels residents		Non-Brussels residents			Brussels + non-Brussels residents
	Professional (N=3)	Personal + Professional (N=3)	Professional (N=6)	Personal (N=6)	Professional + Personal (N=6)	
The quality of the provided information is good	M:2 SD: 1	M: 2.33 SD: 1.53	M: 2.83 SD: 2.04	M: 2.33 SD: 0.52	M: 2.20 SD: 0.45	M: 2.39 SD: 1.20
The information provided is thrust-worthy	M:2.67 SD: 0.58	M: 1.67 SD: 0.58	M: 3.17 SD: 1.94	M: 2.67 SD: 2.16	M: 2 SD: 0.71	M: 2.52 SD:1.53
I think the provided information is accurate	M: 4.33 SD: 2.31	M: 2.33 SD: 1.15	M: 3.33 SD: 1.86	M: 2.67 SD: 2.16	M: 3 SD: 2.35	M: 3.09 SD: 1.95
The language and terminology used is clear and understandable	M: 2 SD: 1	M: 2.33 SD: 1.15	M: 3.67 SD: 1.97	M: 3 SD: 0.89	M: 2.60 SD: 0.89	M: 2.87 SD: 1.32
The used icons are relevant and understandable	M: 2.67 SD: 0.58	M: 4.67 SD: 0.58	M: 3.33 SD: 1.97	M: 3.50 SD: 0.84	M: 2.80 SD: 0.84	M: 3.35 SD: 1.27

**Table 15: Content Quality pre-pilot Brussels**

## Perceived Usefulness

In order to learn about how the respondents tended to perceive the usefulness of the ECIM application, 9 statements were proposed. Respondents acknowledged that from their perspective the application provides all the necessary information to park their car and that the application has a potential to enhance their current parking experience. Indeed, two more detailed statements on finding a parking spot point in the same direction: the application allowed finding a useful parking spot in the scenario and in a more efficient way. The four other statements referring to functionalities designed to improve the parking experience - a route planner to the parking spot so as allowing drivers to find instructions to go to the parking spot or to find their parked car back, the possibility to check the elapsed parking time anytime and the functionality to pay via the application for the parking session - were perceived as useful.

Statements	Brussels residents		Non-Brussels residents			Brussels = non-Brussels residents
	Personal (N=3)	Personal + Professional (N=3)	Professional (N=6)	Personal (N=6)	Professional + Personal (N=5)	Overall (N=23)
The application provides all the information I need in order to park my car	M: 1.67 SD: 0.58	M: 3.33 SD: 1.15	M: 2.33 SD: 0.52	M: 2.33 SD: 0.82	M: 2.20 SD: 0.45	M: 2.35 SD: 0.78
The application allowed me to achieve all the targets of the scenario	M: 3.67 SD: 3.06	M: 2.67 SD: 0.58	M: 2 SD: 0	M: 2.50 SD: 0.84	M: 2.20 SD: 0.45	M: 2.50 SD: 1.19
The route planner to my parking spot is useful	M: 2.67 SD: 2.08	M: 2.67 SD: 1.53	M: 3 SD: 1.22	M: 2.33 SD: 1.37	M: 2 SD: 1.41	M: 2.50 SD: 1.37
The application allowed me to find an available and useful parking spot	M: 2.33 SD: 1.53	M: 3 SD: 2	M: 1.80 SD: 0.45	M: 1.50 SD: 0.55	M: 1.80 SD: 0.45	M: 1.95 SD: 1
The application allowed me to find parking spots more efficiently	M: 1.67 SD: 0.58	M: 2.67 SD: 1.53	M: 2.20 SD: 0.45	M: 2.17 SD: 1.17	M: 1.80 SD: 0.45	M: 2.09 SD: 0.87
It is useful to check my elapsed parking time	M: 1.67 SD: 1.15	M: 1.33 SD: 0.58	M: 2 SD: 1	M: 1.33 SD: 0.52	M: 2.80 SD: 2.39	M: 1.86 SD: 1.36

The route planner is useful to find my parked car back	M: 2.67 SD: 2.08	M: 1.67 SD: 0.58	M: 2.60 SD: 1.34	M: 2.33 SD: 1.37	M: 3.20 SD: 2.17	M: 2.55 SD: 1.53
It is useful to be able to pay for my parking spot via the application	M: 2 SD:1	M: 1.67 SD:0.58	M: 1.60 SD: 0.55	M: 1.33 SD: 0.82	M: 1.40 SD: 0.55	M: 1.55 SD: 0.67
Generally speaking, I think that this application can enhance my parking experience	M:1.67 SD: 0.58	M: 2 SD: 1	M: 2 SD:1	M: 2 SD: 0.89	M: 2.20 SD: 0.45	M: 2 SD: 0.76

Table 16: Usefulness pre-pilot Brussels

### Intentions and attitudes towards use

The survey also confronted demo-testers with statements that are aimed to shed light on their attitudes towards everything the pilot has to offer and their further intentions to use the application (in the future). None of the respondents actually rejected, by selecting ‘disagree’ or ‘strongly disagree’, the statement that using this application actually makes parking easier. A positive feeling within the different profiles can be discerned towards the fact that more than one provider was present on the platform (91%). Nonetheless, it is necessary (73% strongly agreed or agreed) from an end-user perspective that other services related to mobility or parking are also present on the application. It thus proves that the integration idea of the ECIM application and the added value anticipated by the project partners - to avoid tunnel development and a myriad of applications - is indeed shared by the majority of end-users.

Also an overall positive attitude towards using the application during the test can be identified, although this feeling is slightly higher by Brussels residents compared to non-Brussels residents with a professionals’ need to park their car in the city. The same pattern can be discerned for their intention to re-use and recommend the application to friends: an overall agreement can be found (M2.57 & M1.83 with N=23), although a more neutral stance is currently present with non-Brussels residents that search parking for professional reasons.

Statements	Brussels residents		Non-Brussels residents			Brussels + Non Brussels residents
	Personal (N=3)	Personal + Professional (N=3)	Professional (N=6)	Personal (N=6)	Professional + Personal (N=5)	Overall (N=23)
The use of this application will make parking for me much easier	M: 1.67 SD:0.58	M:2 SD:1	M: 3 SD: 2.10	M: 2.17 SD: 0.75	M: 1.80 SD: 0.45	M: 2.22 SD: 1.24
I liked using this application	M: 2.67 SD: 0.58	M:2 SD:1	M: 3 SD: 2.10	M: 2.50 SD: 0.84	M: 3 SD: 1	M: 2.70 SD: 1.26



If possible, I would certainly consider re-using this application	M: 1.67 SD: 0.58	M:2 SD:1	M: 3.17 SD: 2.14	M: 2.17 SD: 1.17	M: 2.40 SD: 0.55	M: 2.39 SD: 1.34
I will recommend this application to friend and other persons I know	M: 2 SD: 0	M:2 SD:1	M: 3.17 SD: 2.14	M: 2 SD: 0.89	M: 3.20 SD: 1.10	M: 2.57 SD: 1.38
It is good that different providers are present on one platform	M: 1.33 SD: 0.58	M:1 SD:0	M: 2.83 SD: 2.32	M: 1.50 SD: 0.55	M: 1.80 SD: 0.45	M: 1.83 SD: 1.34
It is necessary that other services are provided on the application	M: 2 SD:1	M:1 SD:0	M: 2.67 SD:2.25	M: 1.83 SD: 1.33	M: 2.40 SD:2.61	M: 2.09 SD: 1.78

**Table 17: Attitude and intention pre-pilot Brussels**

### Smart mobility potential

Finally, we confronted the respondents with 7 statements about the ‘smart mobility’ potential of the Brussels application: discover parking quick, enlarging the scope of parking spots to be discovered, easy online payment, support multi-modality in the journey to and in the city, ecological benefits and being updated on the parking session status. In essence, the question was to identify to what extent the functionalities and information offered on the presented prototype already embodied the seeds of these aspects of smart mobility and offers therefore a potential added value compared to the existing services.

A slight overall positive evaluation can be discerned regarding the fact that the application allows to find more parking places in Brussels than with current apps. It seems that people searching for parking in Brussels for personal reasons certainly evaluate this aspect higher than people (both residents and non-residents of Brussels) looking for parking for professional reasons. The explanation here is probably due the fact that the pre-pilot only offered parking places in one area of Brussels and that these people often need parking in the areas not covered by the application so far. In line with the conclusion that testers esteemed it necessary to extend the number of available services, covering more parking in Brussels, which is the intention of the pilot for the second cycle, seem thus to be a logical conclusion and action point.

Nonetheless, the testers perceived the application as a tool that supports them in finding parking places quicker than nowadays, discover parking places they did not know before and in making parking payment more convenient. As such also the ecological potential of this kind of application was perceived as positively.

Those going for personal reasons with their car to Brussels acknowledged the route planner as a tool that might help in deciding to park car at a location further away from the destination and continue the journey with public transport. Drivers with a professional need to park tended to be more reluctant, mostly selecting ‘neutral’ in the survey. As we shall see later, this score can be explained by the concrete implementation of the idea of the route planner, which was rather negatively evaluated in the open questions. Also, some demo-testers testified that the tool in itself probably might support them to think in a more ‘multi-modal’ way to move around the city, but that their actual use of this function will depend on concrete policy actions of the city to provide enough public transport alternatives and transit-parking places at the edges of the city or strategic points within the city borders.

Finally, the majority of the respondents of all profiles indicate that the ECIM application should work on a notification system that allows being a

ble to monitor the status of the parking session in real time.

Statements	Brussels residents		Non-Brussels Residents			Brussels + non-Brussels residents
	Professional (N=3)	Personal + Professional (N=3)	Professional (N=6)	Personal (N=6)	Professional + Personal (N=5)	Overall (N=23)
The application allows me to find more parking places compared to existing applications	M: 1.67 SD: 0.58	M: 5 SD: 3.46	M: 3.17 SD: 1.94	M: 2.83 SD: 2.04	M: 2.20 SD: 0.84	M: 2.91 SD: 2
The application enables me to find potential interesting parking places quicker	M: 1.67 SD:0.58	M: 1.33 SD: 0.58	M: 2.83 SD:2.23	M: 2.17 SD: 0.75	M: 2 SD:1	M: 2.13 SD: 1.32
The application enables me to find the location of parking places that I did not know before	M: 1.33 SD:0.58	M: 2 SD: 1	M: 2.83 SD: 2.23	M: 1.40 SD: 0.55	M: 2 SD:1	M: 2 SD: 1.38
The route planner has the capacity to park my car in area remote from my destination but continue my journey with public transport	M: 2 SD:1	M: 3.33 SD: 1.53	M: 3.33 SD: 2.16	M: 2.60 SD: 1.34	M:2.40 SD:1.14	M: 3.05 SD: 1.76
The application has the potential to make parking more ecological by reducing the amount of parking search time	M: 1.33 SD:0.58	M:2 SD: 1	M: 2.67 SD: 2.16	M: 2.20 SD:0.84	M: 2.20 SD: 0.84	M: 2.18 SD: 1.30
The online parking payment mode makes payment for parking more convenient	M: 2 SD: 1	M:2 SD: 1	M: 2.50 SD: 2.35	M: 1.60 SD:0.89	M:1.60 SD:0.55	M: 1.95 SD: 1.36
I think it is a pity that the current version has not yet a notification system about my parking status (time remaining..)	M: 2.33 SD: 0.58	M: 3 SD: 3.46	M: 2.67 SD: 2.25	M: 1.40 SD: 0.89	M: 1.80 SD: 1.30	M: 2.18 SD: 1.79

Table 18: smart mobility potential pre-pilot Brussels

## Qualitative design feedback

Participants of the demo-test were given the possibility at the end of the survey to describe in more details the positive and negative points about the pilot through open questions. Moreover they could formulate their suggestions to improve the application. Providing this feedback was not an obligation and therefore not all testers completed this exercise, nor did they all give the same amount of feedback for each question (testers could give up to five aspects they like or didn't like and up to five suggestions).

Most of the feedback here could be found both in the group of Brussels residents and non-residents. In the table below we therefore present the feedback (negative comments labelled under the symbol '-' and positive under the symbol '+') in a more general way and highlight (if necessary) significant attribution to a specific user characteristic.

Measure	-	+	Suggestion
<b>Ease of use</b>	<p>Some buttons "hidden" in the menu such as information about icons</p> <p>One older tester pointed out that the operations are sometimes too complex, involving too much button to click</p> <p>Error messages not clear and understandable</p>	<p>Most feedback hints to simple way; intuitive; navigation easy</p>	<p>Put the 'information' as user support more upfront (like a FAQ)</p> <p>Improve error messages. Also provide contact details there</p>
<b>Accessibility</b>	<p>Separate log-in for each service</p> <p>Native application</p>	<p>Access to different services in one place</p> <p>No need for installation</p>	<p>Create a simply log-in for all services</p>
<b>Content Quality</b>	<p>Some parking information in French (especially mentioned by non-Brussels residents)</p> <p>Some icons of menu are confusing and don't correspond to their meaning in most of other apps</p> <p>Search on list of parking spots is not ordered well</p> <p>Information on on-street parking should include price and regulation</p> <p>No real time information on public transport</p>	<p>Broad overview of parking spots</p> <p>Accurate and good presentation on the map</p>	<p>Real time data of transport and services</p> <p>Availability of on-street parking or estimation</p> <p>Make some icons of the menu in line with their most common meaning in mobile apps (search right instead of left; sign for filter refers to menu)</p> <p>Search in list of parking spots should be ordered along types and characteristics</p> <p>Include information on parking zones and regulation</p> <p>Real time information on public transport or indicate minutes to wait based on schedule</p>

<b>Usefulness</b>	<b>Route Planner:</b> Possibly no use while driving; only to parking, not destination; no calculation of time and distance; no combination of different transport modes  Non-Brussels residents: public transport instructions are not clear  <b>Parking:</b> Availability of on-street parking missing  No view on past choices of parking or parking expenses  No real time update about parking status  Setting system: only on type of parking, not on price, availability, ...  Apart from description by provider, no other information about the parking	<b>Pools different information together; combines different steps of parking process in one solution (planning-finding-start, end &amp; pay session)</b>  <b>Route planner:</b> Find back the parked car back  <b>Parking:</b> Availability of off-street parking  Overview of price to pay at end of session	<b>Route Planner</b> Navigation/guidance  More choice options in route planner  Route-planner should the rout from the current location to the destination with parking options calculated in it  Road works/traffic information displayed, as well as time and distance  Improvements of information on public transport  <b>Parking:</b> availability of estimation for on-street  Setting system to display only the relevant parking spot for an individual  Indication of parking zones  History of use  Notifications about parking status  Review function/pictures
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**Table 19: Qualitative evaluation pre-pilot Brussels**

An important lesson from this overview is that the route planner is a great concern for the testers, as it is now in its current state conceived as not being useful while driving. Another concern is the need to incorporate traffic information (such as road works), in the application.

On the level of parking, it is clear that the on-street information should be improved, especially providing a real-time availability or at least some estimation. In any case, displaying the parking zones is also requested.

Thirdly, it seems that users would like to be able to select parking locations based on more preferences than just on- or off-street. For them, the current application now displays a lot of parking spots that they won't choose and therefore too much information might be displayed on the map.

Fourthly, it is also necessary to pay attention to different ages of people. Most of our testers were quite familiar with mobile apps and below 40 years old. One tester, being older, mentioned that the design is on some parts quite complex and attention should be paid to simplify especially the parking management for less skilled people.

## 5.1.2 Drivers test

### Profile of iMinds test drivers

The first step of the drivers test was the trial of ECIM by five drivers that iMinds recruited, the so-called '*iMinds drivers group*'.

In common with the demonstration-testers, these drivers felt quite comfortable with using mobile applications and claim to have a basic knowledge about them. They were all male and most of them hold a university degree. One of the testers living outside Brussels was retired. Here as well, we can see that for

personal reasons, the inhabitant of Brussels uses public transport means for private journeys in the city. The non-Brussels residents mostly don't make use of transit parking, but go most of the time straight to the point of their destination. Only the retired testers deliberately parked his car at the edge of the city and then took the underground. The main reason for going to Brussels was to walk in the centre with friends or visitors who stayed at their place. Regarding their current knowledge of mobility mobile apps, we also see here a greater knowledge of public transport services than other transport means or parking apps.

The table below gives a detailed overview of their profile:

	Brussels residents (N=1)	Non-Brussels residents (N=4)
<b>Professional reason</b>		<p>N= 1; Male; &gt;30 &amp; &lt;40; Belgian</p> <p>University Study</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Knows public transport mobility app and uses them; knows the sharing and traffic apps, uses some and most Google Maps; parking applications: does not know the parking mobility applications</p> <p>Search for POI couple of times a week and via Google Maps</p> <p>Parks in Brussels in the same area and makes no use of transit parking spots</p>
<b>Personal reason</b>		<p>N=2; Male; 1 &gt;20 &amp; &lt;30 &amp; 1 &gt;60; Belgian</p> <p>University Study</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Does not use of location based applications and GPS</p> <p>Knows and uses the mobile application of national public transport, but not Brussels; no knowledge of mobile apps for sharing and traffic, except Google Maps; no knowledge of parking application</p> <p>Parks in the same area. One uses transit parking, the other not.</p>
<b>Both personal and professional reason</b>	<p>N= 11; Male; 40&gt; &amp; &gt;50; Belgian</p> <p>University studies</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Knows mobile apps for public transport and uses them regularly; knows mobile apps for sharing and traffic info, but hardly uses them, except Google Maps, knows the</p>	<p>N=1; Male; 1 &gt;20 &amp; &lt;30; Belgian</p> <p>University study</p> <p>Comfortable with using mobile applications, having basic knowledge of their functioning</p> <p>Does not use location-based mobile application</p> <p>Knows and uses the mobile application of national public transport, not Brussels; does not know app for sharing and traffic info, except Google Maps; does not know parking mobile</p>

	<p>parking app but doesn't use them</p> <p>Search for POI couple of times a week and via Google Maps</p> <p>Parks in Brussels in areas all over the city and makes no use of transit parking spots; uses mostly public transport for journeys within the city</p>	<p>applications</p> <p>Searches couple of months for POI via Google Maps</p> <p>Parks in Brussels in different area's but never uses transit parking spots</p>
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**Table 20: Background iMinds-drivers pre-pilot Brussels**

The five people recruited for this test group executed the same test-scenario, which with three broad targets, asks them to (1) find a suitable on-street and off-street parking place near a certain location in Schaarbeek, (2) drive from the iMinds offices to the parking places with the help of the route planner and (3) start, end and pay the parking sessions at the parking spots. Afterwards, they returned to the iMinds offices for an evaluation interview where they could share their experiences and provide their feedback.

#### Participant observation report

We provide here a description of the usage of the application during these sessions along the three broad targets that include all the tasks of the test scenario. Since most of the experiences turned out to be quite similar, we provide here a more general account for the five testers and highlight some specifics for individual cases if needed.



*Target 1: find interesting on & off street parking near a location in Schaarbeek and find the route*

In the five cases, the finding of the location and the suitable parking did not cause any problem, as well as opening the route planner to find a suggested road to get there. Although the participants also received a manual explaining in detail how to use the application, they only glanced when they received it. It was not used in this first phase.

Fig. 4: Starting the parking session with one of the testers

#### *Target 2: Drive to the parking places and find them*

For the second target, it became immediately clear that the route planner is not adapted to use while driving. First, none of the testers had a special tool with them to secure their mobile phone in a safe way like for example a GPS function. The four testers not living in Brussels therefore used their own GPS in order to get guided, or a member of the pre-pilot test team provided the instructions. The tester from Brussels lived in Schaarbeek and knows by heart where the parking places displayed on the ECIM app are more or less located and drove in that direction. Secondly, when looking at the application, the testers could not find exactly where they were, leading to some confusion. In other way, it was annoying for testers that their current location was not updated automatically, unless a few buttons were clicked, which is obviously not desirable while driving.

The second incident was that, in one case, the road suggested by the ECIM application was blocked by temporary road works. It became clear that this a problem for ECIM, since these data are not on the pilot yet.

Thirdly, although this is not an aspect of the application as such, in the case of the off-street parking, three testers found it difficult to locate the parking, although they were on the street. A vocal notification that they are close to the off-street parking location can help.

*Target 3: Start, end and pay the on-street and off-street parking session*

Since the car is standing still in front of the parking place, in this phase, the application became useful again. Three testers consulted the manual and read the instructions for the log-in to the on-street or off-street parking (drivers were free to choose either one first). The log-in process went in all cases smoothly. In case of on-street parking, no particular events were signalled.

In case of the off-street parking, two important events happened in respect to starting the parking session. First, two testers did not manage to drive into the parking. The door opened but before they could get in, the gate closed again. This was due to the fact that the service of BePark requires the drivers to stand directly in front of the gate when confirming their entrance code, to be able to enter in time. Secondly, in one case, when our tester wanted to go outside for a break before ending the session after parking, the gate did not open and the application did not provide any help. It turned out that on the BePark mobile application there is actually a dedicated function for these situations. As a result, we had to use the BePark application to open the gate. Both situations showed us that the application and the manual should first highlight the case of standing in front of the gate and secondly should incorporate this function of opening the gate in case of problems when being parked. The tester found the situation particularly annoying in the end, so it is not difficult to imagine that in the large-scale test of the Brussels pilot, this issue might create a negative user experience towards the ECIM application.

Regarding the ending of the parking session and the payment, none of the testers experienced problems. All testers were pleasantly surprised to get to know the cost of the session after having confirmed the end of it through the application.

Test scenario targets	Work point detected
Target 1	- Not applicable
Target 2	<ul style="list-style-type: none"> <li>- Not a hands-free solution, which would allow some use while driving</li> <li>- Real-time location of the car not displayed while driving</li> <li>- No signalization of road works</li> <li>- Difficulty to locate the position of the parking</li> </ul>
Target 3	<ul style="list-style-type: none"> <li>- Include in the application and in the user manual the suggested position of the car to enter an off-street parking</li> <li>- Include a feature, which allows to exit parking by foot if parking gate remains closed at an off-street parking, and mention this in manual</li> </ul>

**Table 21: Insights gathered from participant observation**

**Evaluation-interview:**

After having returned to the iMinds offices, the pilot test team conducted an evaluation interview with each tester individually. This interview was structured along the six evaluation measures that also structured the survey (see Annex for Interview template).

- *Ease of use of application and accessibility*

All participants stated that the application is easy to use while not driving. As such, the search menu for finding potential parking spots, the login function to the parking provider and the start and ending of the sessions were seen as very user-friendly and easy to navigate. The route planner was only considered as easy to use for its capacity to display the suggested route and because of the non-hands-free nature of the application, not a user-friendly feature while driving.

Regarding accessibility, the participants highlighted that they found the look and feel attractive as well as recognizable with other mobile applications they know and use, which gives them a sense of confidence and assurance towards the ECIM pre-pilot.

The application was also considered as intuitive and would only need minimal user support such as an info button regarding the meaning of the icons. This assessment can be supported by the fact that the manual was hardly consulted by any of the testers. Although we did not actually record the duration of the actions during the participant observation (while we needed to observe), we also had the impression that our testers did not use a lot of time for executing the tasks.

- *Content Quality*

The participants generally appreciated the quality of the information as good and accurate. They liked that the parking information was quite complete (location, price, zone) to make an informed decision, although for on-street parking one tester suggested that it might be good to also include the regulation (e.g. max 3h in this zone). The information they all claim that was lacking was an indication of availability for on-street parking.

The five participants all evaluated the language and terminology on the application as clear and understandable for them.

Regarding the used icons on the pre-pilot, two testers suggested to have the possibility to display the logo of the service provider instead of the parking icons that are used now. For both of them, this related to a sense of not knowing with which service provider one is dealing. For one participant, this was a problem because he had a discount-card at one parking provider (not in the pre-pilot) and as such it might guide his choice. For the other participant, this aspect was related to trust. Although you can only log-in to a certain provider and thus know at that point with whom you are dealing with, for him this step was in a way too late. The other participant said that for him the icons were not a problem.

Three testers stated that they missed an essential point of information: points of interests in the city. It was not as such a professional need to park that triggered this remark, but more a need emerging from non-Brussels residents when going to the city for personal reasons, e.g. attending cultural events or shopping. Since in this case they often go to a certain number of venues, they are more familiar with this information than looking for information on streets. The tester from Brussels suggested the inclusion of Point of Interest as an interesting feature for visitors to the city. In his case, the user would be more interested in Points of Interest that relate to services connected to his journey with the car or public transport (gas stations, restaurants, kiosks, ...).

- *Usefulness*

As can be expected from the observation done during the driving session, the usefulness of the application was acknowledged for planning the journey (whether parking spots are located near the destination, which ones are available, what is their price, ...) and starting, ending and paying the session. The route planner as such was considered as easy to use before the journey, but from the point of view of usefulness it was not considered as being of much value during driving. All agreed that there is a lack of real-time update of current location while driving, or of unexpected events (road works, change of route suggestion). The aspect of the route-planner that was appreciated the most and considered as an added value was the option to find back your parked car and the suggestions it could give for walking and public transport.

- *Added value of the pre-pilot*

The participants were very positive towards the idea of integrating different services into one application. Although some did not know the area of Schaerbeek very well, from their own current pattern of parking in Brussels, they could imagine that if the number of parking spots would increase, this application would certainly broaden their horizon of parking places they know. The participants that mostly go for private reasons to Brussels to visit family or events testified that this application would help them with finding other interesting parking spots than the few they currently know and return to most of the time. In that sense, if these familiar parking spots were occupied, they would be guided more efficiently to other alternatives, which would improve their parking experience. The tester from Brussels saw the added value of the integration, especially for off-street parking availability. He claimed that out of experience, most people in Brussels know more or less where one can park on street. However, by combining off-street parking, this application is a real added value since it displays alternatives one would not always think about or have knowledge that the service exists.



The functionality of the parking payment method was also evaluated as an added-value, although, since we provided them with a parking budget and as such these testers did not had to register or pay, they warned us that ECIM should make sure that from an end-user perspective, the billing of all these services should be unified. If they would use the application in the future, it would make no sense to be confronted with small amounts from all the different providers on the applications because this administrative burden would lead them to not use all these services anymore in order to avoid these small payments via separate bank transfers. In other words, a simple payment solution is needed.

Finally, the participants were happy that the price of the session was immediately displayed when leaving the parking. Nonetheless, they stated that this was not enough.

- *Attitudes and intention to use*

We asked the participants about their attitude towards the application and intention to use it in the future. A common reaction here was they liked using this application, only the aspect during drive was seen as a great source of inconvenience. It was this aspect that was mentioned as the main reason why on a short term they would not use the application again or recommend it to friends to use, apart from maybe its planning aspect. Nonetheless, on a longer term, if these aspects would be solved, they certainly showed interest to use it again. Maybe in this respect, we can highlight, as was the case with some of the participants of the demo-test that 3 out of this 5 participants spontaneously volunteered as testers for the next iteration.

- *Suggestions*

Although we might conclude from the above description of the evaluation interview that the respondents did not reject, apart from the route planner, the testers nonetheless suggested throughout their answers concrete design suggestions to improve the user experience and user acceptance for the second cycle. Some of these suggestions were already mentioned in their answer on the questions and repeated here. We therefore mention here only the new ones. Moreover, the five testers shared these suggestions:

- A filtering functionality that allows selecting more in detail the options you want to have displayed on the map. Right now selecting is only available for on street and of-street, but this can be improved by selection on information such as on price-range, availability and range of distance from the location. In this way, the map is less crowded;
- In order to make the application more attractive and useful while driving, change automatically the interesting parking spots, based on preferences, in line with the position of the car;
- Include more data on other modes of transport (car-sharing, biking, ...) and public transport;
- Extend the information on on-street parking to zone display and regulation.
- Extend in the route planner the suggested road to the final destination, hence the parking is not the end point, but included. Based on individual preferences (by walking or other transport modes) the best way to arrive at the destination will be displayed.
- A history function that allows to get an overview of past transactions and of past parking preferences/choices in certain area so as to avoid having to perform a new search when having to go to the same neighbourhood.
- A possibility to review parking places and display pictures. Since you will maybe in the future get a choice of parking spots from different providers and you discover new places you never heard before, these might help you to make your choice and be assured that the place is safe. In that sense, the testers liked the fact that the BePark parking had pictures, but found it a pity that this was not the case for the on-street parking.

**Conclusion:**

As a summary of this test group, we can conclude that no fundamental differences between Brussels residents and non-residents existed in the provided feedback. Of course, this might be related to the fact that they performed the same scenario in the same area, that the functionalities of the pilot are quite restricted and that the displayed parking spot on the application are so far only lying in one part of the city. Nonetheless, a lot of interesting insights were gathered from this exercise “in the field”.

The table below provides therefore for each measure the evaluation and suggestions from the participant observation exercise and the evaluation interviews in a general way:

	Score	Attention points towards design
<b>Ease of use</b>	<ul style="list-style-type: none"> <li>+ Acknowledge for planning and start, end &amp; pay session</li> <li>+ No manual needed, intuitive, navigation fine</li> <li>- Problem for driving</li> </ul>	<ul style="list-style-type: none"> <li>Hand-free solution</li> <li>Real-time localization of car</li> <li>Road works/traffic info</li> </ul>
<b>Accessibility</b>	<ul style="list-style-type: none"> <li>+ Considered as accessible</li> <li>+ Look and feel attractive</li> </ul>	<ul style="list-style-type: none"> <li>One log-in to services</li> </ul>
<b>Content quality</b>	<ul style="list-style-type: none"> <li>+ Good, accurate, clear and understandable terminology</li> <li>- Point of interest</li> </ul>	<ul style="list-style-type: none"> <li>Parking information extension to availability of on-street and zoning</li> <li>Point of interest about main attractions</li> <li>Point of interest about services (gas stations, ...)</li> <li>Logo of provider or put the kind of provider more central</li> </ul>
<b>Usefulness</b>	<ul style="list-style-type: none"> <li>+ Integration of services in one application, try to take care of the whole parking process from planning to paying</li> <li>+ Expands the horizon of parking spots in Brussels</li> <li>+ Improves parking experiences; more efficient</li> <li>- Route planner;</li> <li>- Too much information displayed on map</li> <li>- Keep informed about the parking status</li> <li>- No overview of past transactions and choices</li> <li>- No indications about quality of parking (except BePark)</li> </ul>	<ul style="list-style-type: none"> <li>Increase number of parking services</li> <li>Increase other modes of transport (car-sharing, bikes, carpooling, public transport) to really enable multi-modality search</li> <li>Setting system for preferences not only on type of parking, but price</li> <li>Display only relevant and available parking places in a certain zone (e.g. 500m) from the destination</li> <li>Notification system</li> <li>History function</li> <li>User reviews/ratings</li> <li>Simple payment solution/unified billing</li> </ul>
<b>Attitude and intention</b>	<ul style="list-style-type: none"> <li>+ Nice feeling towards usage</li> <li>- Intention to re-use &amp; recommend to others low</li> </ul>	<ul style="list-style-type: none"> <li>Work on the 'here' and 'now' experience and notifications</li> </ul>

**Table 22: Lessons learned from iMinds-drivers testers**

The table depicts also that most of the feedback was already mentioned by the demo-testers. Nonetheless, the added value of this test is clearly that some aspects mentioned by these testers now were also confirmed.

### 5.1.3 BePark and Mobile-for Customers

As explained in the previous chapter, the feedback from this tester group was collected by means of a telephonic survey. Given the difficulty we experienced in managing this test group, the initial survey was adapted to a short survey that asked the respondents to provide a score on the measures of the application and a legitimization of that score and on the other hand reacted to the statements regarding their intention to use and the added value.

Regarding the measures of ‘ease of use’, ‘accessibility’, ‘content quality’ and ‘usefulness’, each tester was asked to say their score on a scale from 1 to 5, with one being very bad and 5 being excellent. The table below presents the lowest score given, the maximum score given and the average of all the scores given.

BePark/Mobile-for (N=11)	Minimum score	Maximum score	Average
Ease of use	1	4	3
Accessibility	2	4	3
Content Quality	3	4	3.4
Usefulness	3	4	3.6

**Table 23: Scores on measures BePark and Mobile-for Customers**

The scores indicate that for these measures, the majority of users did not reject the application and that their experiences, although not considered as perfect, were in the end evaluated as rather positive.

The legitimization of the scores has as the most common reaction that the application was good, but still not innovative enough compared to the service they use. The notion of innovative, however, referred more to the design than to the basic idea. On the dimension of usefulness, the testers appreciated the combination of parking data from different sources and being able to login to two providers. Nonetheless, a critique from some of the testers was that the application was restricted in its usefulness from the angle of their existing parking needs, since, at the moment of the test, they did not had to be often in Schaarbeek (municipality where the locations of the parking spot for the tests were situated). Also, regarding the dimension of content quality, the testers liked the amount of information provided, both on location of parking sites as well as on conditions (price of parking).

However, most of the testers expected a more attractive design than just a map and route planner that looked like Google Maps as well as the login since it was not considered as being the most optimal solution that can be envisioned. The low score of one point for ease of use and accessibility stood on the one hand in relation to the problematic of a native application. The tester claimed that he was used to a native application and that working with a URL was something not user-friendly. On the other hand, the maximum score of 4 just gave the opposite answer: the testers did not bother that it was a URL and said that the application gave on this aspect no different experience than with the mobile applications of the parking provider she currently uses. On the other hand, low scores were also explained by the fact that the application was not easy to use while being on the road: integration with a GPS or some hand-free solution was recommended.

Finally, a widely shared remark regarding navigation was that once someone had selected to explore a parking spot in more detail, it was not so simple to return to the previous page anymore. In other words, there was a kind of feeling of being in a kind of ‘tunnel’ here and that work on the ‘back’-function should be improved, especially because this could lead to unnecessary annoyance in front of a parking spot. The BePark and Mobile-for testers were also confronted with the statements regarding attitudes and intention. 70% of the testers acknowledged they had liked using the application and declared that they would recommend it to others in a future test period. Nonetheless, as with the other test groups, they also agreed that more mobility related services should be incorporated into the application.

	Negative experience	Positive experience	Suggestion
<b>Ease of use</b>	Not easy to use 'on the road'	Simple design, recognizable, easy in general approach	Hands-free Integration GPS
<b>Accessibility</b>	Native application experience Navigation: back button	Log-in to services is simple	Native application Improve back-button Look and feel more innovative/design (map)
<b>Content Quality</b>	n/a	Quite extensive information on parking (location/conditions)	n/a
<b>Usefulness</b>	Parking spots only one part of Brussels	Integration of two services	Expand range in Brussels

Table 24: Qualitative feedback BePark and Mobile-for testers

## 5.2 Lessons learned for future ECIM piloting

The discussion of each of the three test phases highlights that each time interesting user feedback was collected. When we compare the user reactions from each of these tests against one another, we can gather the following insights for improving the ECIM application that are common and shared by a large category of testers and those that were more specific to a certain category.

Measure	Evaluation	Profiles
<b>Ease of use</b>	Positive towards general ease of use Simple design	All
<b>Accessibility</b>	Look and feel attractive Navigation overall good, intuitive	All except people with professional needs
<b>Content Quality</b>	Content quality good, trustworthy Terminology and language used understandable	All All
<b>Usefulness</b>	All information in one place All steps in process of parking in one solution: finding, route suggestion, starting, ending and paying session, finding parked car back and route suggestion (walking, public transport) to parked car	All
<b>Attitude and Intention</b>	Positive usage feeling Recommendation to friends	All

<b>Smart mobility potential</b>	Expand one's own knowledge of parking spots in Brussels Potential to make parking more efficient and more ecological Improve current parking experience	All
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**Table 25: Positive aspects of the ECIM pre-pilot Brussels**

Regarding design and functionalities of the pre-pilot, the user feedback allowed to identify the following points of attention that should be considered by ECIM in order to increase the user experience and acceptance of ECIM-services:

Measure	Attention Point	Profile
<b>Ease of use</b>	Drive friendly solution such as hands-free/integration GPS Info button more upfront Sound/alert when approaching off-street parking Function to open parking gate when door don't open automatically Manual updated with instructions (1) to stay close to parking gate of off-street parking and (2) on how to open	All
<b>Accessibility</b>	Simplify log-in Navigation and look and feel, especially display and map, more streamlined in innovative way; back button Native app	All Professional drivers All, but also those using BePark/Mobile-for services already
<b>Content Quality</b>	Point of Interest - major places in city (shopping, cultural venues, hospitals, ...) + services for driving (gas stations, ...) Menu buttons: icons needs to represent content more, recognizable in relation to other mobile applications On-street Parking information should include zone display/pricing of zone, availability (real time or estimation) and regulation Traffic information to be expanded: road works, traffic density info Increase number of parking spots, especially also free on-street parking zones Filter overview of parking spots (and later on other services) should be	All All All, but professional users tend to be more sensitive to this point All

Usefulness	<b>Route Planner experience:</b>	
	Real time localization of car needed	All
	Should go from starting place/current location to destination with parking included	All
	Should include multi-modal choice	All
	Information, especially about public transport, better displayed	Non-Brussels residents
	<b>Parking experience:</b>	
	Increase number of parking spots/extend over wider area in Brussels (and larger area's)	All
	Notifications of parking status; remote extension of session	All
	History of past payment transactions and parking lot selections	All
	Favourites	All
	User reviews	All
	<b>General</b>	
	Incorporate more mobility services (parking + others such as bikes) in order to make more informed choices	Non-Brussels residents
Payment: unified billing	All	

**Table 26: Attention point for future piloting**

The concrete implementations of these user demands and needs depend also on the resources ECIM has as its disposal and the time it takes to implement them in such a way that this won't interfere with the smooth execution of the planning of pilots as proposed in D5.1 '*Pilot Operations Plan*'.

This exercise to incorporate the user feedback into the future pilots is currently being undertaken by ECIM. Some aspects of design - such as a more structured filtering list of services and a more up front information button - have already for example been incorporated in the Paris pilot which is being tested from beginning December 2014 onwards.

The next evaluation report to be delivered in Month 16 of the project will elaborate more on how this pre-pilot user feedback has been incorporated into the first cycle pilot tests of Paris and Barcelona (launch in January 2015), while also addressing the second cycle of testing in the three pilot cities that is planned from March 2015 onwards.

## 6 Conclusion

This document presented the results of the pre-pilot test in Brussels that took place in September 2014. Our discussion of the operational success of the test itself, the implementation of the evaluation methodology and the user feedback demonstrates that on these three levels, important insights were acquired for the ECIM project.

On an operational level, the pre-pilot experiences demonstrated that the pilot operations plan is realistic and that the majority of the objectives defined in that document were met. However, we learned that especially for a first pilot test, testing the application in real life situations without much guidance has a great chance to create problems among testers. Indeed, limited functionalities of a prototype that is meant to be used in circumstances where immediate on the spot solutions are needed, raise the danger of user drop-out once something in the testing chain goes wrong (be it in the communication or in the execution of a certain task on the application). Therefore, face-to-face information meetings with testers going to test such a prototype, making sure the registration processes for all testers are executed well before the launch of the test and telephonic or face-to-face meetings with testers during the test itself will be very effective means to assist these testers during the whole test and hence enhance their willingness to provide feedback. The operational lessons will be taken into account when setting up the forthcoming pilot tests in December 2014/January 2015 in Paris and Barcelona.

Regarding the implementation of the evaluation methodology, it becomes clear that given the nature of the pre-pilot, also for the first cycle tests in Paris and Barcelona, qualitative methods to grasp and understand user feedback from the angle of the context of use will be more fruitful rather than deploying large-scale surveys and logs. Consequently, since qualitative methods demand a higher commitment to follow-up testers for the pilot test team, lesser user numbers as participants will be the consequence in the first test cycle in Paris and Barcelona. This is however not a drama, since we believe that more valuable user feedback regarding user experience and acceptance will be gathered, allowing to learn fruitful design lessons. This feedback will flow back in D6.1 '*Strategic Evaluation Methodology*'.

Thirdly, regarding the evaluation of the application by the different end-users that took place in the various test sessions, some common lines can be distilled across the three test groups and the profiles. The pilot was by none of the three test groups rejected and overall, its ease of use, accessibility, content quality and usefulness was evaluated as positive (although strongly agree scores were hardly detected, at least the majority scores balanced around agree or between agree and neutral). Regarding the demands of users to improve the current pre-pilot in line with their expectations, we could distil an interesting list of suggestions and desires from end users. Most of them were shared by all the profiles, while some were more profile specific, which is valuable for ECIM, as it is one of its objective, in order to reach as much end users as possible.

The aforementioned insights have been taken into account by the ECIM consortium. The end user feedback was reported to the pilot development team (Work Package 3) at the end of October 2014 as well as to the communication team (WP7) for the manual. Although, as with every user research and its outcomes, not all recommendations can be taken into account at once (due to resources within the project, the fact that not each suggestion is as easily implemented and the need to make sure that implementing these demands must not interfere the global planning of piloting), for the first user test in Paris - a test of the prototype in a lab setting like in Brussels in the first two weeks of September 2014 - features, such as more user friendly test-accounts, a more structured display of the filtering functionality (according to service and type of parking) and a more upfront display of information (explaining icons) have been implemented.

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## 8 Annex

### 8.1 Annex 1: Survey demo-test

Demographic Questions	Scale
What is your gender?	Male/Female/Prefer not to say
In which year were you born?	List of Years
What is your nationality? If you prefer not to say, please leave the field open.	Open field
What is your current profession? If you prefer not to say, please leave the field open	Open field

**Table 27: Demographic questions used during the Brussels pre-pilot**

ICT and mobility profile Questions	Scale
How old is the smartphone/tablet that you use most regularly. If you prefer not to say, please leave the field open.	Open Field
How would you consider your ICT-skills, in particular your skills in handling mobile applications?	<ul style="list-style-type: none"> <li>• I find it easy to work with mobile applications</li> <li>• I am able with most of the mobile applications, but some applications I don't use</li> <li>• I find it difficult to work with mobile applications</li> <li>• Prefer not to say</li> </ul>
How do you consider your ICT-knowledge, in particular your knowledge about mobile applications?	<ul style="list-style-type: none"> <li>• I can work easily with mobile and internet applications, but I have no knowledge about their technical background and working.</li> <li>• I can work easily with mobile and internet applications and I have basic knowledge about their technical background and working.</li> <li>• I develop simple mobile and internet applications with free online building software (Wordpress, Wix, ...).</li> <li>• I develop ICT-tools myself with the aid of specialized software.</li> <li>• I prefer not to say.</li> </ul>
What is the operating system of your mobile phone?	<ul style="list-style-type: none"> <li>• iOS</li> <li>• Android</li> <li>• Windows</li> <li>• I prefer not to say.</li> </ul>

**Table 28: ICT and mobility profile questions used during the Brussels pre-pilot**

Questions about knowledge of mobile applications currently present in Brussels concerning mobility (public transport, parking, bike and car sharing, traffic information and planning).	Scale
Which applications regarding mobility and parking do you use already?	Public Transport (Open Field) Parking finding (Open Field) Parking Payment (Open Field) Bike or car sharing (Open Field) Navigation (Open Field)

**Table 29: Knowledge of mobile applications currently present in Brussels concerning mobility (public transport, parking, bike and car sharing, traffic information and planning)**

Questions about current parking behaviour	Scale
I drive and park in a city mainly for:	<ul style="list-style-type: none"> <li>Professional reasons.</li> <li>Personal reasons.</li> <li>Both professional as personal reasons.</li> <li>Prefer not to say.</li> </ul>
Generally speaking, when I drive to the city centre, I need parking places that are:	<ul style="list-style-type: none"> <li>More or less situated in the same neighbourhood.</li> <li>In different but neighbouring neighbourhoods (such as for example: the southern region of a city).</li> <li>In different neighbourhoods distributed over the city (both southern, western, eastern and northern part of the city).</li> </ul>
Do you live in the city?	<ul style="list-style-type: none"> <li>Yes</li> <li>No</li> <li>I prefer not to say.</li> </ul>
If you live in a city, do you mostly use for your journeys within the city borders:	<ul style="list-style-type: none"> <li>The car</li> <li>Public transport</li> <li>I prefer not to say.</li> </ul>
If you do not live in the city, but you go there with your car, what is your first thought:	<ul style="list-style-type: none"> <li>I drive with my car to the location where I need to be and search for a parking spot there.</li> <li>I try to park my car at places at the periphery of the city and try to find out the best public transport options to continue the journey to my destination.</li> <li>I prefer not to say.</li> </ul>

**Table 30: Questions about current parking behaviour. Ease of use, accessibility, usefulness of application, quality of the provided information**

Statements related to possible user attitudes and intentions with respect to the ECIM application.	Scale
The use of this application will make parking for me much easier	<ul style="list-style-type: none"> <li>• Strongly Agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly Disagree</li> <li>• No Opinion</li> <li>• I prefer not to say.</li> </ul>
I liked using this application	<ul style="list-style-type: none"> <li>• Strongly Agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly Disagree</li> <li>• No Opinion</li> <li>• I prefer not to say.</li> </ul>
If possible, I would certainly consider re-using this application	<ul style="list-style-type: none"> <li>• Strongly Agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly Disagree</li> <li>• No Opinion</li> <li>• I prefer not to say.</li> </ul>
I will recommend this application to friends and other persons I know	<ul style="list-style-type: none"> <li>• Strongly Agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly Disagree</li> <li>• No Opinion</li> <li>• I prefer not to say.</li> </ul>
It is good that different providers are present on one platform	<ul style="list-style-type: none"> <li>• Strongly Agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly Disagree</li> <li>• No Opinion</li> <li>• I prefer not to say.</li> </ul>
It is necessary that other services are provided on the application	<ul style="list-style-type: none"> <li>• Strongly Agree</li> <li>• Agree</li> <li>• Neutral</li> <li>• Disagree</li> <li>• Strongly Disagree</li> <li>• No Opinion</li> <li>• I prefer not to say.</li> </ul>

Can you tell us what you think are the weakest points of the application?	<ul style="list-style-type: none"> <li>• Weak point 1</li> <li>• Weak point 2</li> <li>• Weak point 3</li> <li>• Weak point 4</li> <li>• Weak point 5</li> </ul>
What are, according to you, the strongest points of the current application?	<ul style="list-style-type: none"> <li>• Strong point 1</li> <li>• Strong point 2</li> <li>• Strong point 3</li> <li>• Strong point 4</li> <li>• Strong point 5</li> </ul>
Can you tell us which functionalities or information you miss in the application and which you consider as essential to include?	<ul style="list-style-type: none"> <li>• Suggestion 1</li> <li>• Suggestion 2</li> <li>• Suggestion 3</li> <li>• Suggestion 4</li> <li>• Suggestion 5</li> </ul>

**Table 31: Statements related to possible user attitudes and intentions with respect to the ECIM application.**

## 8.2 Annex 2: iMinds-drivers Participant observation template & post-test interview guide

### Template qualitative research drivers

Thank you for your participation in our test drive. We first will let you execute a test scenario, meaning that we will ask you to use our ECIM- application to find a suitable parking place in Schaarbeek near a certain destination that we will tell you.

One of the members of our research team will drive with you in order to register your experiences and reactions ‘on the spot’ (and to provide you also with assistance in case of parking problems). This means he will, in case you do, note some exclamations or sayings of you, log if the action happened as expected and afterwards, based on his field notes, describe shortly what happened. These field notes will help us to gather the necessary insights regarding usability, experience and usefulness of the application in a real-life context

After having found the parking spot, we will ask you to drive back to our offices and have a short evaluation interview of around 20 minutes. Here we can gather your opinions and you can explain in more detail your feelings towards the applications. This will allow us to gather practical design wishes (going from usability to content provision) as well as the main factors of acceptance and use.

Before we start the test, we will now explain you the main functionalities of our application.

Field Notes ECIM pilot test

Test information

<b>Date</b>	
<b>Time</b>	
<b>Place</b>	

Table 32: Test Information

*Observer:*

<b>Name</b>	
<b>First Name</b>	
<b>Research Institution</b>	

Table 33: Observer

*Participant information:*

<b>Test ID</b>	
<b>Name</b>	
<b>First Name</b>	
<b>Age</b>	
<b>Profession</b>	
<b>Residence</b>	
<b>ICT-knowledge</b>	
<b>Current knowledge and use of mobility apps</b>	
<b>Main reason to come to city by car</b>	
<b>Main current parking need in city</b>	

Table 34: Participant information

*Notes for phases in the test-scenario*

Action= action in order to reach the goal in each step ;

Expressions: verbal or non-verbal expressions of driver;

Log: action as such successful or not;

Description: Description of context and action in detailed way; pay attention to problems and solution finding by participant.

Action 1	Installing the application on the mobile phone
Expressions	
Log	
Description	
Action 2	Finding the potential interesting parking options and use of route planner
Expressions	
Log	
Description	
Action 3	Driving to the parking neighbourhood
Expressions	
Log	
Description	
Action 4	Find the parking location
Expressions	
Log	
Description	
Action 5	Only on-street: park car and start parking session
Expressions	
Log	
Description	
Action 6	Only on-street: end parking session and leave parking
Expressions	
Log	
Description	
Action 7	Off-street parking only: open gate and find parking spot in building
Expression	
Log	

Description	
Action 8	Off-street parking only: leave parking spot by foot
Expression	
Log	
Description	
Action 9	Off-street parking: go back to car, end session and leave parking
Expression	
Log	
Description	

**Table 35: Template for the field notes for each action of test scenario**

### ECIM post driving test interview

Thanks for having executed our test-scenario. We will now ask you some questions about your experience with our application. Your feedback and suggestions will help us towards further improving our application. Thank you for your answers

Nr	Question
1	Did you think the application was easy to use? Can you tell us in a few lines why you consider it to be ease to use or not?
2	Did you think the application was accessible? Can you tell us in a few lines why consider the application to be accessible or not?
3	Was the application useful for executing the test scenario? Can you tell us why you consider it useful or not?
4	Do you think that the information provided on the application was of good quality and reliable in order to find parking?
5	Do you think that the application would be useful for your other parking needs? Would you, if you could, use it again and/or recommend it to others? If yes, why, if no, why?
6	What do you see as the main advantage of the current pilot regarding creating smarter parking solutions?
7	What are for you the strongest points of the application?
8	What are for you the weakest points of the application?
9	What would be your suggestions for improvement and why?

10	Are you interested in testing the second iteration of our application?
11	Did you think the application was easy to use? Can you tell us in a few lines why you consider it to be ease to use or not?
12	Did you think the application was accessible? Can you tell us in a few lines why consider the application to be accessible or not?

**Table 36: Template for evaluation interview after driving test**

## 8.3 Annex 3: BePark-Mobile-for testers survey

Since it turned out that a telephone survey was more convenient for these testers to provide their feedback, we designed a smaller survey for these testers, based on the survey that participants of the demo-test session had to complete. Regarding the measures of ‘ease of use’, ‘accessibility’, ‘content quality’ and ‘usefulness’, we asked them to give a score on a scale from 1 (=not useful at all) to 5 (=useful at all) instead of replying to a number of statements. For ‘attitudes and intentions’, we reduced the questions to two statements. Finally we asked them about the ‘smart mobility potential’ of the application and to provide us with some suggestions for further improvement.

Background	
1. Do you live in Brussels?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
2. Do you use the car to travel to and in Brussels mainly for	<ul style="list-style-type: none"> <li>• Personal reasons</li> <li>• Professional reasons</li> <li>• Combination of both</li> </ul>
Use during the test period	
3. Did you use the application actively during the test phase?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Not answer</li> <li>• Other</li> </ul>
4. Why didn't you use the application?	<ul style="list-style-type: none"> <li>• I had no time</li> <li>• The test instructions were not clear to me</li> <li>• I didn't feel motivated to test</li> <li>• The application was not attractive and too complex.</li> </ul>
Ease of use	
5. Did you find the application easy to use? Please indicate your opinion on a scale from 1 to 5	Slider (1=very uneasy to use, 5=extremely easy to use)
6. What are your reasons for giving the score you provided for ease of use?	Open Field
Accessibility	



7. Did you think that the application was accessible? Please indicate your opinion on a scale from 1 to 5	Slider (1= not accessible at all; 5= very accessible)
8. Can you give us the reasons why you gave this score?	Open Field
<b>Usefulness</b>	
9. Do you think the application is useful for your parking purposes? Please indicate your opinion on a scale from 1 to 5	Slider (1=not useful at all; 5 = very useful)
10. Can you tell us why you gave this score?	Open Field
<b>Content Quality</b>	
11. The quality of the provided information	Slider (1; 5)
12. Can you tell us why you gave this score?	Open Field
<b>Attitudes and intention to use</b>	
13. I liked using the application and would do it in the future	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
14. I would recommend this application to friends	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
<b>Smart mobility potential</b>	
15. I think this application has the potential to make parking more efficient compared to other applications	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
16. I think that combining different services in one application like this one is convenient	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
<b>Suggestions</b>	
17 Which are your suggestions to further improve the application?	Open field