

**Service name (and the specific application focus/branch)**

# IndoorNavigation

**Problem to solve (including stakeholder groups)**

Undergraduate students and non-regular visitors (e.g. guest lecturers) often have problems finding certain rooms or people on campus. By the use of Smartphones with integrated GPS devices, navigation outside of buildings is possible. Inside the buildings, however, GPS is not available.

**Description**

For indoor navigation numerous positioning methods are available, e.g. WLAN-, Bluetooth- or UMTS-tracking. Each of the methods comes with advantages and disadvantages. In order to compensate disadvantages multiple positioning methods and tools can be used inside buildings. Different tools come with specific applications.

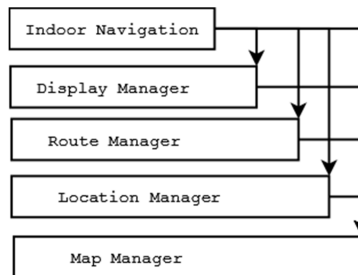
The application introduces a navigation service for Android, able to integrate different methods of positioning. Instead of multiple applications it is planned to provide a single Smartphone application for indoor navigation. Internally there are different modules managing the different positioning methods. Modules address maps, position, routes and visualization in order to enable indoor navigation.

**Base Service(s)**

**Innovation through PEOPLE**

**2 Key Challenges**

**Images**



**5 Keywords (social, technological and other)**

Smartphones, Android, routing, positioning

**References (literature, web services, other people services, etc.)**

**Service name (and the specific application focus/branch)**

**Single Sign-On for a PC-pool**

**Problem to solve (including stakeholder groups)**

At the University of Bremen numerous PC-pools can be found, e.g. in BIBA and TZI. They can be accessed in two Steps: The first step is to get into the room or area where the computers are located. In some cases users need an RFID Card to get inside. The second step requires users to enter username and password to log into a computer. Authentication and authorization are redundant in this case and therefore can be simplified.

**Description**

The service is meant to simplify the process of accessing PCs in the local PC-pools. Instead of an RFID card, users just place their Smartphone near a PC to get access. The first step of this service is to setup login information (i.e. username and password) for the PCs. This is done once on the Smartphone. In a second step the login information can be transferred via NFC to any other RFID (NFC) reader by dropping the phone near the reader. In case of a PC the phone would be dropped near the keyboard, for example. If the Smartphone is taken away, the computer is blocked for some time so the user can, e.g. pick up printed documents or pause for some time. Logout is realized either after a certain timeframe or by holding the Smartphone close to a reader near the door.

**Base Service(s)**

**Innovation through PEOPLE**

**2 Key Challenges**

**Images**



Logout of the PC-pool

**5 Keywords (social, technological and other)**

Smartphone, NFC, authorization, computer, security

**References (literature, web services, other people services, etc.)**

## Complementary Services

<b>Service name (and the specific application focus/branch)</b>
<h1>Smart-Environment-Application</h1>
<b>Problem to solve (including stakeholder groups)</b>
<p>In places like a university many people share rooms for lectures or conferences. These rooms have controls for the air condition, lights and probably presentation equipment like beamers. Sometimes it is complicated to adjust the equipment to the wanted settings. In many rooms the switches or thermostats are not in the same place and you have to walk around and search for the right one.</p> <p>Another problem is that you have to be in the room to active the switches. Sometimes it can be more comfortable to have a remote control for switches. One solution for this issue is a web-based (Smartphone) application for control. Lecturers, for example, can use a Smartphone to adjust heaters while they are on their way to the lecture room.</p> <p>Energy-saving is another issue which can be addressed with this application. Lights and heaters should be set to minimal power usage, if no one will use the room in the next time. This can be realized by the application in an automated way once it has information about booking or occupancy of rooms.</p>
<b>Description</b>
<p>The application is meant to optimize HVAC equipment in buildings. Switches within the room are substituted by Smartphones (or similar devices). Access to these virtual switches is either granted by a central office, managing all rooms of the university or by more complex access control software. Virtual switches can be accessed within a specified time frame before the room is occupied. Once the room is no longer occupied, HVAC equipment will be checked and set back to energy-saving mode (or turned off). Due to the required information about room occupancy potential integration into the Smart Scheduler application – containing those data – is possible.</p> <p>In order to reduce the effort of configuration, the application provides default settings based on the current season. Personalized settings can be provided through a standardized interface for different types of virtual switches. The largest user groups for this service are lecturers or tutors.</p>
<b>Base Service(s)</b>
<b>Innovation through PEOPLE</b>
<b>2 Key Challenges</b>
<b>Images</b>
<b>5 Keywords (social, technological and other)</b>
Smartphones, Internet of Services, smart environment, energy-saving, remote control
<b>References (literature, web services, other people services, etc.)</b>



<b>Service name (and the specific application focus/branch)</b>
<b>Examination Regulation Support Service</b>
<b>Problem to solve (including stakeholder groups)</b>
Examination regulation at a university is often difficult to understand for many students. Subjects have credit points and belong to certain groups (e.g. theory or practice). Some of the subjects have to be taken to receive a degree and others not. For some students it is difficult to keep overview over all subjects and to decide which to visit next semester.
<b>Description</b>
The application allows students to get overview over subject they already visited and helps to decide which subject to visit next semester calculating points and considering subject groups. The application shows student how many points he need to get or in which group he has to visit lectures and helps to organize his plan without overlapping lectures. Since course management is a major aspect of this application synergies or integration with the Stud.IP service are likely.  The application can also create a list of taken subjects for those companies looking for a student with experience in certain domain.
<b>Base Service(s)</b>
<b>Innovation through PEOPLE</b>
<b>2 Key Challenges</b>
<b>Images</b>
<b>5 Keywords (social, technological and other)</b>
Management, subjects, company
<b>References (literature, web services, other people services, etc.)</b>
Stud.IP at the University of Bremen

<b>Service name (and the specific application focus/branch)</b>
<b>FAQ-App for new students</b>
<b>Problem to solve (including stakeholder groups)</b>
There are many tasks students have to do, when they start their studies at the university. Currently it is a problem to get required information about public authorities, campus organizations and important places or activities. This is especially true for foreigners not speaking or reading German.
<b>Description</b>
<p>The application is meant to improve the orientation process for people entering the campus for the first time (e.g. students or visitors). It should provide most important information relevant for orientation and should be easy to use and manage. Examples for this information include location of public authorities, registration procedures or application of scholarships. Routing to the desired locations or persons can be realized through the IndoorNavigation service.</p> <p>The FAQ-App can be accessed via Smartphone and can make use of augmented reality, e.g. through the Layar AR-browser. The largest user group is expected to be the students starting each semester and visitors like guest lecturers. A major point of interest will be to guarantee that information is up-to-date.</p>
<b>Base Service(s)</b>
<b>Innovation through PEOPLE</b>
<b>2 Key Challenges</b>
<b>Images</b>
<b>5 Keywords (social, technological and other)</b>
Smartphone, Internet of Services, social integration, FAQ, new situation
<b>References (literature, web services, other people services, etc.)</b>
<a href="http://www.layar.com/">http://www.layar.com/</a> People - IndoorNavigation

<b>Service name (and the specific application focus/branch)</b>
<b>Physical and Electronic Bulletin Board for Students</b>
<b>Problem to solve (including stakeholder groups)</b>
In university restaurants and cafeteria students use bulletin boards in order to announce offers and to get a look on other offerings regarding used books, furniture, cars and apartments.
<b>Description</b>
<p>A “physical” bulletin board is a large wall, where students can attach notes and labels. Students use this infrastructure in order to find fitting offers or to place an own advertisement. In the internet there are several WEB-based electronic bulletin boards.</p> <p>The service aims to realize a combination of a physical bulletin board and a web-based bulletin board. Own advertisements can be placed on the board by using Smartphones with Near Field Communication (NFC). Advertisements appear on a big screen in place once they are attached. At the same time the advertisement will be placed also on the internet-based system, so other persons can reach them over the internet.</p> <p>In case people are searching for learning partners (e.g. for languages) the requests can be integrated into the Smart Scheduler application.</p>
<b>Base Service(s)</b>
<b>Innovation through PEOPLE</b>
<b>2 Key Challenges</b>
<b>Images</b>
<b>5 Keywords (social, technological and other)</b>
Bulletin board, physical, virtual, Smartphones, social integration
<b>References (literature, web services, other people services, etc.)</b>
People – Smart Scheduler

<b>Service name (and the specific application focus/branch)</b>
<b>Instant Message Service</b>
<b>Problem to solve (including stakeholder groups)</b>
Short-term cancellations or room changes of lectures can confuse students. Currently there is no mobile solution for notification of those events.
<b>Description</b>
The goal of this application is to send information like room changes to all students visiting the related lecture. The application is intended to communicate with PEOPLE-services. For example, in a case of room-change the application notifies students and shows the way to new event location via IndoorNavigation. Lectures can also be integrated into the Smart Scheduler application.
<b>Base Service(s)</b>
<b>Innovation through PEOPLE</b>
<b>2 Key Challenges</b>
<b>Images</b>
<b>5 Keywords (social, technological and other)</b>
Smartphone, notification, navigation, schedules
<b>References (literature, web services, other people services, etc.)</b>
People – Smart Scheduler Application People – IndoorNavigation



**Service name (and the specific application focus/branch)**

# Borrow books in the library with NFC

**Problem to solve (including stakeholder groups)**

When students go to the library (e.g. SUB) and want to borrow a book, they always have to go to a machine where they put a card into and enter a password.

**Description**

The service is used to borrow books just by putting your cell phone with NFC support on the book you want to rent. If you can borrow books like this, you don't have to put a card into the machine and type your password every time you borrow books from the library. The required information is stored in the cell phone where input is required only once (login). For more data security a session time can be set by the user. Once the session is over, the login information needs to be provided again.

**Base Service(s)**

**Innovation through PEOPLE**

**2 Key Challenges**

**Images**



Put the Smartphone on top of a book to borrow it

**5 Keywords (social, technological and other)**

Smartphone, NFC, library, books, borrow

**References (literature, web services, other people services, etc.)**

SUB – library of the University of Bremen:

<http://www.suub.uni-bremen.de/>

**Service name (and the specific application focus/branch)**

**NFC access control for buildings and rooms**

**Problem to solve (including stakeholder groups)**

Students, researchers and visitors that want to access certain buildings at the campus have to use RFID cards to enter certain areas. In case the buildings don't use a shared access system, multiple cards are required. However, storing and managing multiple cards is inconvenient from a user perspective.

**Description**

The service enables users to authenticate and gain access to the building with a Smartphone featuring Near Field Communication (NFC). NFC-technology allows users to enter buildings, rooms or even to borrow equipment. Users can substitute their RFID cards with their Smartphones, reducing the number of required cards. One example from the University of Bremen is as follows: At the TZI users need an RFID card to get into the building and another RFID transponder to access rooms.

Permission to access certain areas can be given based on room assignment for user groups from the Smart Scheduler application.

**Base Service(s)**

**Innovation through PEOPLE**

**2 Key Challenges**

**Images**



In both cases use the Smartphone to get access

**5 Keywords (social, technological and other)**

Smartphone, NFC, authorization, building, security

**References (literature, web services, other people services, etc.)**

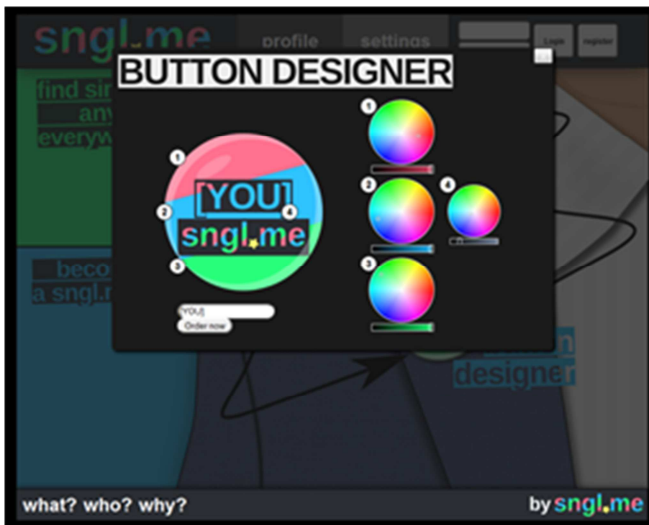
People – Smart Scheduler

<b>Service name (and the specific application focus/branch)</b>
<p><b>sngl.me – reality based dating (third-party service; open source stack &amp; web application template / closed source service)</b></p>
<b>Problem to solve (including stakeholder groups)</b>
<p>Many single persons come across each other in everyday life. Most only exchange a quick glance or smile and move along. They might not even know that the other person is also looking for a partner.</p> <p>Even if both of them like each other at first sight, there is often no chance to meet each other again. When the moment is over and none of them had the courage to take an approach, they can only hope to rejoin each other again.</p> <p>Stakeholder groups are single persons who spend their everyday life in busy areas like universities and cities.</p>
<b>Description</b>
<p><b>sngl.me</b> enables every user to create a personalized physical button that contains a self-selected <i>short-code</i>. This <i>short-code</i> connects the virtual user account to the users' real life. The button can be worn as an accessory by the user and enables other singles to establish relations and connect with the user in an uncomplicated way by remembering the <i>short-code</i> and writing a message on <b>sngl.me</b>.</p> <p>The button-carrier does not have to reveal his real identity to the other single and can decide if he or she wants to answer a certain person's messages or just ignore them.</p> <p>The buttons are distributed from France, the United Kingdom, Belgium, Denmark, Spain, Ireland, Italy, the Netherlands, Norway, Poland, Finland, Sweden, Austria, Switzerland and the USA and can be delivered to Europe, North America and Canada.</p>
<b>Base Service(s)</b>
<p>The service is almost ready to go live. The server back-end is written in Scala, a programming language for the Java Virtual Machine. The server stack consists of the Lift Framework for the Application Servlet, Jetty as a Servlet Container, the Akka Actor Framework as middleware, Hazelcast for Clustering and MongoDB as data storage. (links are attached in "references")</p> <p>The front-end is based on standardized cross-browser HTML, SVG and JavaScript.</p> <p><i>Although the application's source is closed, the stack is completely <u>open source</u> and a <u>web-application template / skeleton</u> will be provided to the public as a foundation for the project members to work with.</i></p>
<b>Innovation through PEOPLE</b>
<p>The service serves as a novel and unique connection between the social real world and the virtual sphere of the internet. It provides a simple and stylish way of getting to know each other on campus, in the city or anywhere else where people are meeting. It takes the speed out of the fast paced world, where everyone is just passing by, and creates valuable links between people.</p>
<b>2 Key Challenges</b>

As a third party service, **sngl.me** has to address the following two key challenges

- Be simple and intuitive in order to enable every user to join the service and participate
  - Easy and modern interface
  - Simple ordering & payment
  - International service for the whole of Europe and beyond
- Reach enough customers to be financially self-supporting
  - Cloud computing for a minimization of hardware usage
  - Embrace Open-Source and Open Standards to reduce development time and costs

### Images



© 2011 Peter David

### 5 Keywords (social, technological and other)

Social Web, Singles, Web Application, Internet of Things, Mass Customization

### References (literature, web services, other people services, etc.)

<http://sngl.me> ©2011 Peter David

Lift Web Framework	<a href="http://liftweb.net/">http://liftweb.net/</a>
Scala Language	<a href="http://www.scala-lang.org/">http://www.scala-lang.org/</a>
Akka Actor Framework	<a href="http://akka.io/">http://akka.io/</a>
MongoDB document database	<a href="http://www.mongodb.org/">http://www.mongodb.org/</a>
Hazelcast Clustering	<a href="http://www.hazelcast.com/">http://www.hazelcast.com/</a>
Jetty WebServer	<a href="http://jetty.codehaus.org/jetty/">http://jetty.codehaus.org/jetty/</a>

**Service name (and the specific application focus/branch)**

# Mensa-Speiseplan

**Problem to solve (including stakeholder groups)**

In the university students have to go to the Mensa to see the bill of fare, or they can use their Notebooks and use the official website.

**Description**

The application provides an expander rack to the website of the university for mobile media applications. It shows the menu of the mensa with all products and prices.

**Base Service(s)**

Information and selection

**Innovation through PEOPLE**

Brings information in a appropriate format and with context awareness to your smart phone.

**2 Key Challenges**

Context awareness, adapted format

**Images**



**5 Keywords (social, technological and other)**

Smartphone, menu, Internet, Android, SQL

**References (literature, web services, other people services, etc.)**

[http://www.studentenwerk.bremen.de/files/main\\_info/essen/plaene/uniessen.php](http://www.studentenwerk.bremen.de/files/main_info/essen/plaene/uniessen.php)

**Service name (and the specific application focus/branch)**

# Blackboard / Schwarzes Brett (Stud.IP)

**Problem to solve (including stakeholder groups)**

Students write announces on many different boards of the university, so they have the problem to coordinate the attention of other students on their individual notice. The central main board from Stud.IP called "Schwarzes Brett" needs too much time to be loaded, if you want to do an announce quickly.

**Description**

"Schwarzes Brett" is an expander rack to the Stud.IP of the university. The user has to log in with the Stud.IP account, after the login the user can read the latest announces or can write a new one faster on his mobile phone.

**Base Service(s)**

**Innovation through PEOPLE**

**2 Key Challenges**

**Images**



**5 Keywords (social, technological and other)**

Smartphone, Announces, Internet, Android, SQL

**References (literature, web services, other people services, etc.)**

<https://elearning.uni-bremen.de>

**Service name (and the specific application focus/branch)**

# Mobile Sports Registration

**Problem to solve (including stakeholder groups)**

Professors, Students and other people who wants to practice their favourite sports have to go to the website of the "Hochschulsport" and register on this homepage. But the places are very limited and early contact with the institute is therefore highly recommended.

**Description**

The application gives a possibility to register for the favorite sports faster than on the original website. Now the interested user doesn't need as much time for his registration than on the regular PC. Mobile-Sports enables by this modifications a more flexible and individual use of the registration process. Personal data are stored and reused instead of entering them again for each booking.

**Base Service(s)**

Starting with the existing web based service this project provides an improved access, which takes care about the time and mobility aspects.

**Innovation through PEOPLE**

Provides an app which enables an more adequate access.

**2 Key Challenges**

**Images**

The screenshot shows a mobile application interface for sports registration. At the top, there's a navigation bar with 'Sportangebot' and navigation arrows. Below it is a search bar with a keyboard icon. A list of sports is displayed on the left, categorized by letters 'A' and 'B'. On the right, a table lists specific offerings with columns for ID, description, day, time, dates, instructor, and price. Each row has a 'buchen' button, which is green for available and red for 'Warteliste' (waiting list).

ID	Activity	Day	Time	Dates	Instructor	Price	Status
1401	zum Spielen	Di	16:00-17:30	04.04.-17.07.	Barbara	17/ 42/ 21 €	buchen
1402	für Fortgeschrittene	Mo	17:30-19:00	04.04.-17.07.	Heiko	17/ 42/ 21 €	Warteliste
1403	für Fortgeschrittene	Mo	19:00-20:30	04.04.-17.07.	Jafar	17/ 42/ 21 €	Warteliste
1404	für Anfänger/-innen	Mo	16:00-17:30	04.04.-17.07.	Heiko	17/ 42/ 21 €	Warteliste
1405	für alle	Mi	20:00-21:30	04.04.-17.07.	Andreas	22/ 50/ 25 €	buchen
1406	für alle	Do	20:30-22:00	04.04.-17.07.	Andreas	17/ 42/ 21 €	Warteliste
1407	für Anfänger/-innen	Do	12:00-13:30	04.04.-17.07.	Michael	17/ 42/ 21 €	buchen
1408	für Anfänger/-innen	Di	17:30-19:00	04.04.-17.07.	Jafar	17/ 42/ 21 €	Warteliste
1409	für Fortgeschrittene	Di	19:00-20:30	04.04.-17.07.	Jafar	17/ 42/ 21 €	Warteliste
1410	für Anfänger/-innen	Fr	10:00-11:30	04.04.-17.07.	Michael	17/ 42/ 21 €	buchen
1411	für Fortgeschrittene	Fr	11:30-13:00	04.04.-17.07.	Michael	17/ 42/ 21 €	buchen
1412	für fortg. Anf. und Fortgeschrittene	Do	13:30-15:00	04.04.-17.07.	Michael	17/ 42/ 21 €	buchen

**5 Keywords (social, technological and other)**

Smartphone, Hochschulsport, Internet, Android, Sports

**References (literature, web services, other people services, etc.)**

<http://www.hospo.uni-bremen.de>

### 5.3 Themi

Themi pilot will be realized in an area that is situated at the lowest part of Anthemoundas basin, at the east side of Thessaloniki Urban Area. The area covers a total of 31.570km<sup>2</sup> and consists of almost the whole of Municipality of Themi. Themi constitutes one of the most populous municipalities in the Prefecture of Thessaloniki, with 16,014 residents in 2001, a number that is continuously growing over the last few years.

#### 5.3.1 Current situation

Themi is located between the continuous urban fabric of Thessaloniki and the city's International Airport 'Macedonia' (Figure 13). The importance of its location lies in the fact that it constitutes the only natural passageway from Thessaloniki to the south and, for this reason, three very important transport axes cross the area: the National road Thessaloniki - N.Mixaniona [2], the National Road Thessaloniki - Moudania [1] and the National Road Thessaloniki - Poligiros [4]. Themi has a strong developmental relationship with Thessaloniki Urban Agglomeration. It is a rapidly growing and economically viable zone, which is developed as a residential expansion of the TUA, but also as a pole for the location of industrial plants, tertiary sector activities and highly specialized services, maintaining, at the same time, the characteristics of a developed suburban agricultural economy.

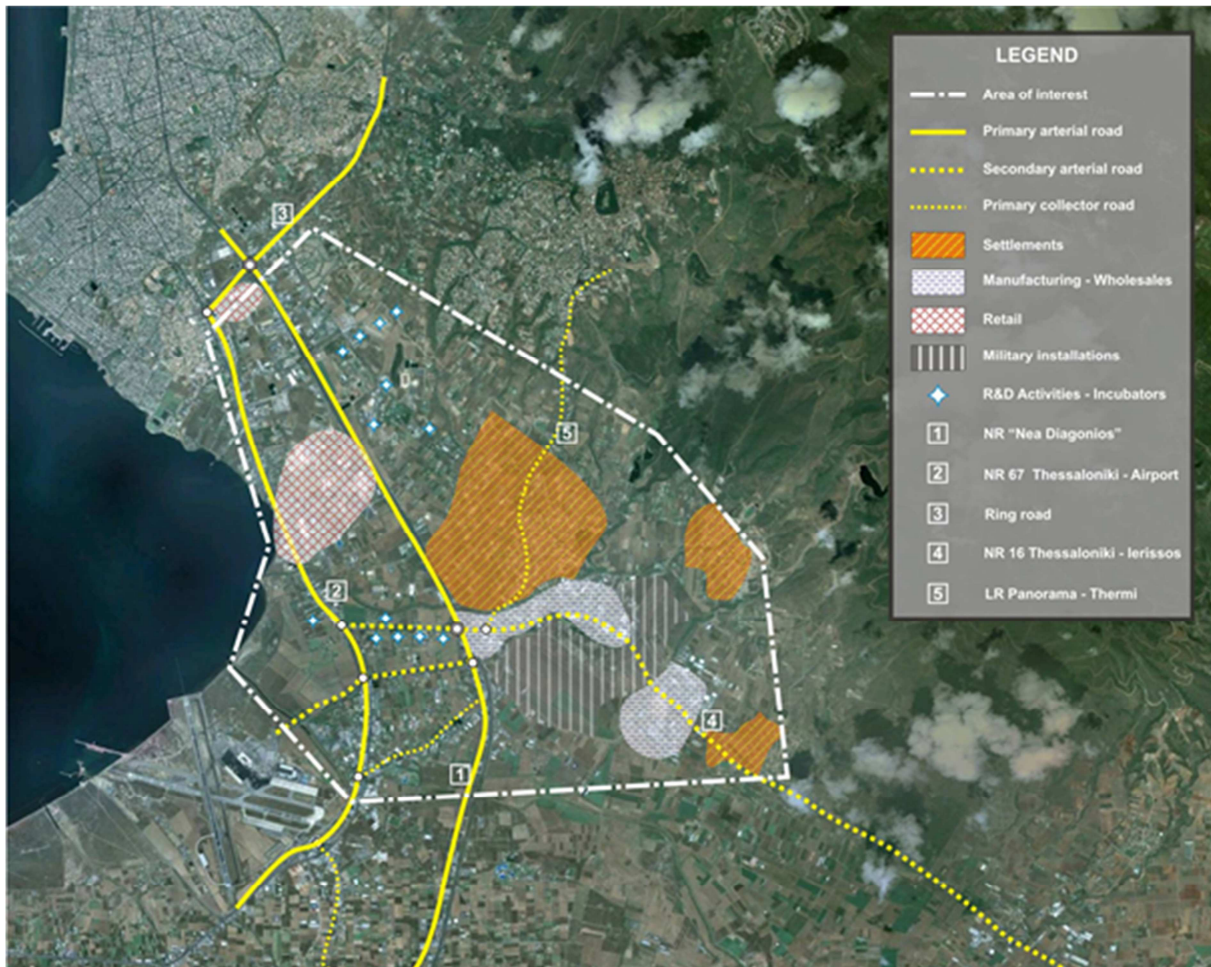


Figure 15: Important land uses and main transport axis in Themi wider area



Within the area of interest, there is a great dispersion of productive activities, both of the secondary and the tertiary sector, a pattern which is more evident along the basic road axes. There are also some activities of the tertiary sector of supra-local importance: administrative, academic, cultural, entrepreneurial etc. These are mainly developed along the axis of the regional road 'Thessaloniki-Thermi' (Center for Research and Technology Hellas-CERTH, Customs, Science Center and Technology Museum, Egnatia S.A., Aristotle University's Departments and head offices of many enterprises) and the axis 'Thessaloniki-Poligiros' (Ministry of Agriculture etc). In addition, there is a number of significant commercial activities, as some of the largest shopping malls of Thessaloniki are concentrated there. At the south east part of Thermi settlement, there is a planned area of soft manufacturing activities which has as a natural separator, the stream and a green zone. The zone of the industrial park is situated along the axis Thessaloniki-Poliguros, between the SEDES airport and the settlement of N. Redestos, and has led to the development of an important core-pole of growth. Finally, there are some large land property areas, such as the military installations, the airport, the American Farm School and the buildings of Aristotle University of Thessaloniki (AUTH) which cover a significant amount of land in the area.

**Building stock.** In general, the area is characterized by middle in the urban and low in the suburban space densities<sup>10</sup>. The quality of the building stock is characterized as good. Most residencies are relatively new (more than 60% of the total buildings of MD Thermi is being built after 1981) (Figure 1) and have more than 4 rooms (81.35%). Today, construction activities are developed within the boundaries of the latest urban expansion of the settlement.

**Transportation network and infrastructures.** As mentioned earlier, the wider area cross three very important roads (Figure 1) that belong to the secondary national road network. The city of Thermi can be accessed from three points: from the north, at the junction of local road 29 (Thermi – Panorama) to the local road Thermi – Pylaia, from south, at the junction of the local road 29 to the NR 16 and from the east, at the junction of local road 30 to the national road 16. The main road that connects the settlement with the Thessaloniki Urban Area is the National Road 'Nea Diagonios', through the local road 29 and the NR 16. It constitutes an important transport axis with good geometric characteristics and conditions.

The main road network of the settlement, does not present any problems despite the relatively narrow width of the streets. However, a continuously significant problem seems to be the parking as the parking places are very limited. There are very few pedestrian routes and no cycling lanes. The only public transportation means is the bus through a network that connects the settlements with each other, with the wider area and with the TUA.

Regarding ICT infrastructure, internet access in the area is provided by a number of operators, such as Otenet, Vivodi Telecom, Tellas, and Forthnet, with ADSL being the main broadband standard. Most internet providers use OTE's Bit Stream Network, which has the most extensive privately owned fiber optic network. Internet access is available either through a subscription to OTE's access service and then through the preferred ADSL ISP, or directly, through the preferred ISP. In addition, the Municipality of Thermi has created 13 Wi-Fi hotspots (Figure 2) through the development of a wireless broadband network. The wireless network consists of Point to Multipoint and Point to Point

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<sup>10</sup> The built up area of municipality of Thermi is 714,35 Ha, and the planned area 52,33Ha.

links, succeeding in this way to cover wider areas which are characterized by either large numbers of visitors (commercial districts, archaeological sites, plazas, etc.) or lack of other broadband infrastructures (ADSL). The wireless network provides free internet access to the citizens of Themi. It also supports the development of special services and applications such as VoIP (Voice over Internet Protocol) and VoD (Video on demand).

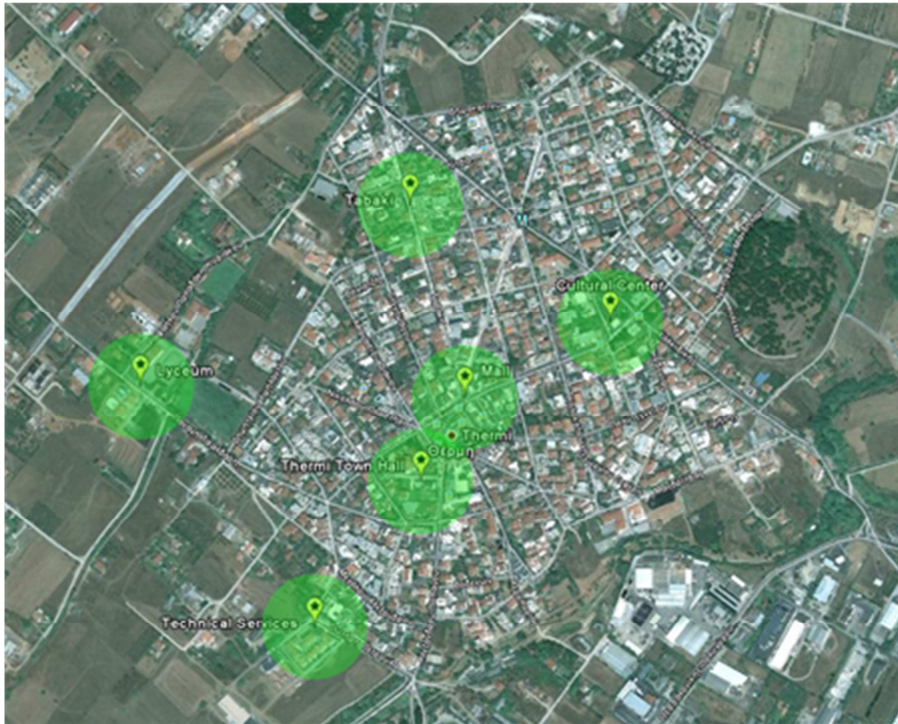


Figure 2: Wi-Fi hotspots in Themi pilot area

*Public services* at the pilot area are mainly regional (for the wider area of Thessaloniki) rather than local. Municipal services are not offered online, although some information is available on the municipality's website. Regarding the existing ICT services, these are related to mobility and commerce. A good example is the Information System for the Thessaloniki's Eastern Ring Road, a service is provided free of charge by the Regional Authority of Central Macedonia. It is an Intelligent Transport System which aims to serve citizens by providing real time information on traffic conditions and incidents. Currently the system covers a length of about 12.5 kilometers in each direction of the Eastern Ring Road. The data (cameras pictures, message signs, incidents and traffic rates) is also available through the internet (<http://rrits.lab.rcm.gr/>), refreshing every 2 minutes due to bandwidth constrains. Another mobility related service is provided by the Organisation of Urban Transportation of Thessaloniki (OASTH), the organization of mass Transportation in Thessaloniki Metropolitan Area. OASTH has installed satellite surveillance devices on all busses for their tracking and optimum bus circulation management and visitors of its website can find route planner applications and real time information about bus arrival at each stop.

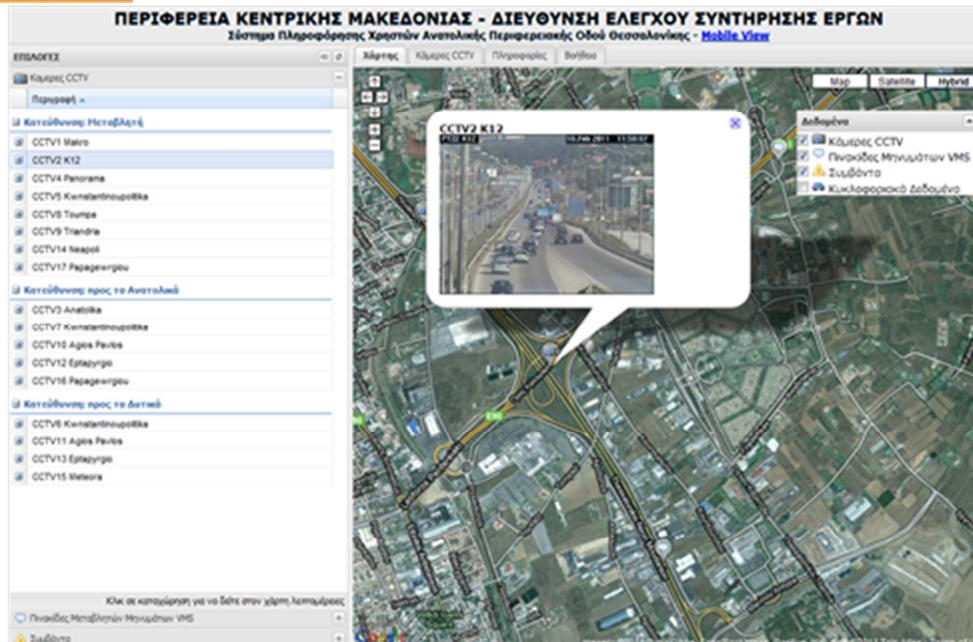


Figure 3: Information System for the Thessaloniki's Eastern Ring Road

**Stakeholder identification and involvement.** Thermi is characterized by a diverse range of activities e.g. commercial, leisure, cultural, as well as educational and research activities. And while the total number of the municipality population does not exceed 20.000 people, the number of those that work or visit the area on a regular basis is multiple.

Therefore, the pilot should be addressed to the following groups: a) residents and visitors of Thermi, b) local businesses and c) research institutes and organisations that are activated in the area.

**The Challenge and the Pilot's main objectives.** As mentioned earlier the city of Thermi is situated in an area where significant activities of the secondary and tertiary sector are developed, most of which are of supra-local importance. A detailed analysis of the region has showed the spatial concentration of commercial, administrative, academic and cultural activities combined with recreational and sports facilities, entrepreneurial and R&D organisations (Technology Park, Technology Museum, etc.). Yet, the spatial proximity of the abovementioned activities does not seem to create enough synergy or some kind of complementarities, especially in the case of different types of activities.

The shopping mall 'Mediterranean Cosmos' is a typical example. Mediterranean Cosmos attracts annually a large number of visitors (almost 8 million visitors - €250m turnover in 2010) and offers a wide variety of choices for its visitors, such as commercial shops, restaurants, coffee-shops, an open theatre, cinema etc. As in the case of most grand shopping malls worldwide, it operates unattached to the wider area, as an autonomous site of entertainment, as visitors do not usually combine Cosmos with another nearby activity of recreational character (such as a visit to the Museum of Technology, or a walk by the river).

On the other hand, according to the Basic Layer Specification report, Thermi municipality has 20.000 residents, while the number of those that work or visit the area regularly is multiple. Despite this large volume of people flows, local businesses lose their share at the benefit of nearby markets and malls (e.g. the market of Kalamaria, Cosmos etc.). Accordingly, it is observed that Thermi's residents

do not regularly use local services and the local market, reducing the profits of local businesses and professionals. This problem, which was revealed during the meetings with local stakeholders, is further increased by the traffic conditions around the city’s main square where the heart of the local market lays, the lack of street signalling etc.

The abovementioned observations constitute both an opportunity and a challenge for Thermi, in order to formulate a strategy aiming to its transformation as an intelligent city, through the use of new methodologies, applications and infrastructures, which will reinforce the economic development of the area and will improve its competitiveness in relation to nearby activities and markets. Based on the above, a primary objective of the present scenario is the creation of an integrated plan, which, through the development of a wide range of digital applications, will be able to interconnect the different activities that take place in the area, securing -one the one hand- more options to the residents and visitors and, achieving -on the other- the greatest possible benefit for each one of them separately (i.e. the local research and development activities and local-commercial activities, etc.). In other words, the aim of the present pilot is the creation of a platform for a smart commercial/entertainment district that a) will increase the commercial hinterland of Thermi’s commercial and business district and b) will take advantage of the huge commercial activity of Mediterranean Cosmos.

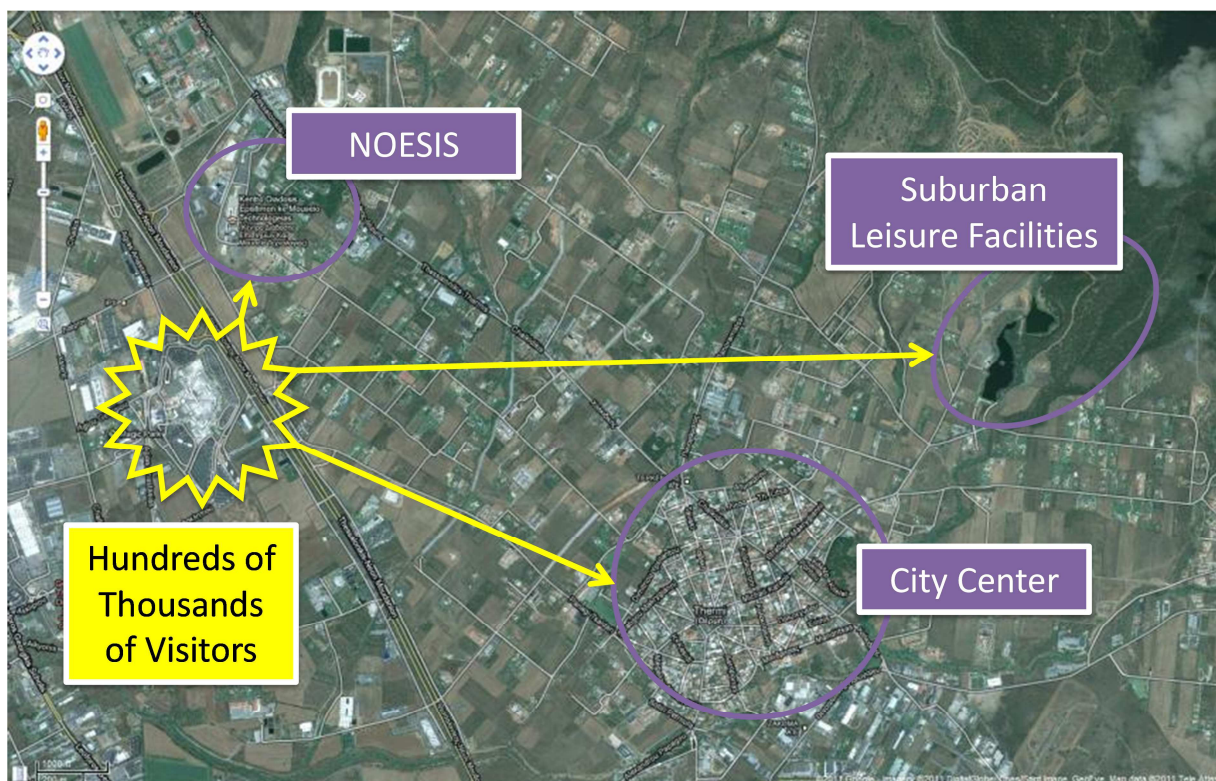


Figure 4: The challenge of Thermi pilot

### 5.3.2 Scenario description

The present section presents the scenario of Thermi’s pilot, by describing, firstly, the methodology used through a roadmap of separate procedural steps (Annex 1) and, secondly, the selected applications.

**Objective and Methodology.** This section describes the methodology for the scenario development in six steps (Figure 5). After defining the pilot’s objectives, the developing team collected initial ideas for potential applications and reviewed best practice examples of applications in other cities. These examples were examined taking into consideration potential constraints, such as development and data creation costs. Afterwards, they were presented to stakeholders for consultation. Both stakeholders (in organised meetings) and the public (via an online survey) evaluated the selected applications and, after recognising potential synergies, the best ones were decided to be included in the pilot. Each one of the abovementioned steps is described analytically in the following paragraphs.

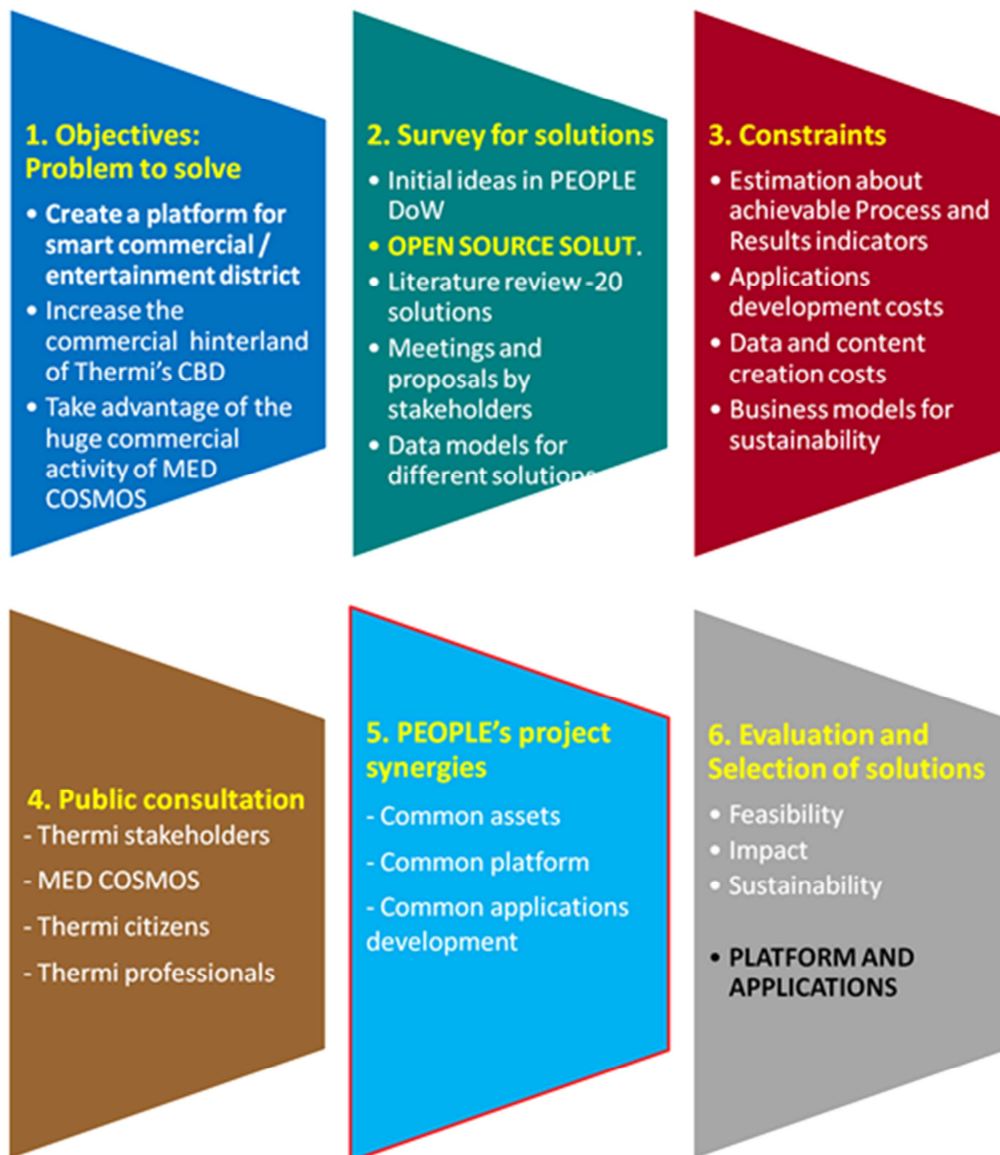


Figure 5: Thermi’s pilot scenario building roadmap

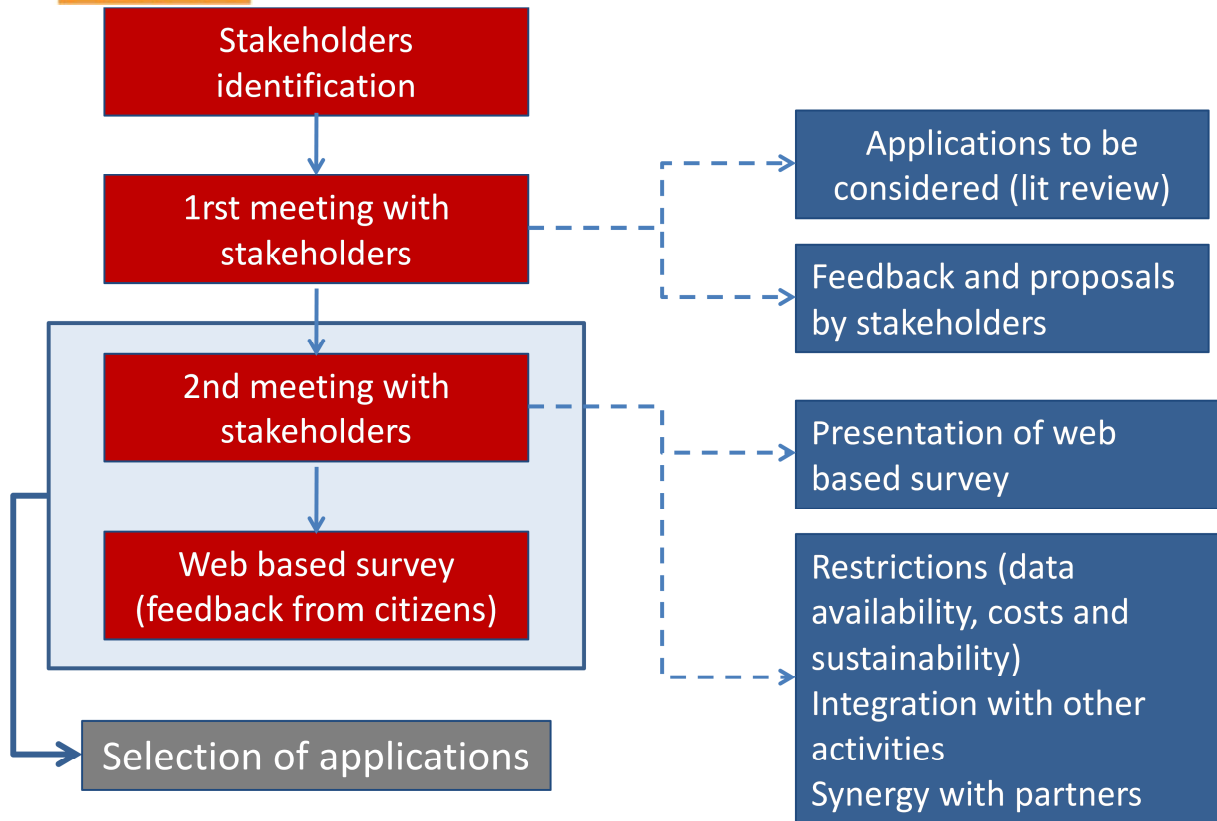
**Survey for Solutions.** As a preliminary stage of scenario building, a literature review was conducted regarding existing applications developed in various regions in the world, focusing on issues of intelligent mobility and urban information management. Intelligent cities demonstrate a wide range of applications on the abovementioned issues. The review came up with 20 successful applications on intelligent mobility, commerce, tourism and leisure (Annex 2), which are briefly mentioned below:

- Intelligent mobility applications: best route planning applications, parking finder and bike renting systems
- Applications related to commerce: Online applications for comparing prices of products at local stores (price watch systems), websites with daily offers (deal-of-the-day websites) and websites for purchasing products through social networks (social shopping)
- Applications related to tourism: Digital tours using interactive maps, video and panoramic photos, city guides for mobile phones (Smartphones), museum tour guides applications for presenting exhibits and informing about upcoming exhibition events etc
- Urban information management applications: QR codes which correspond to sites or advertisements, or show information about a buildings, businesses, etc. and observatories for environmental pollution (e.g. control of air quality), the level of criminality in specific areas etc.

Besides those found in the literature, other applications that were taken under consideration, were the ones proposed by local stakeholders, during the meetings that took place within the process of public consultation. These applications (e.g. online yellow pages, calendar of events etc) are believed to correspond better to the stakeholders' particular needs.

**Constraints.** The selection of the proposed applications has to take under consideration a number of constrains. Applications are examined in relation to their development cost but also to their requirement for data input, as both of the above are correlated to the feasibility and sustainability of the pilot. As there are not sufficient indicators for evaluating these applications, their sustainability is highly connected to the business model employed, as well as to the participation and active involvement of stakeholders of the area, a precondition analytically described in the following paragraph.

**Public Consultation.** For the selection of the proposed services it was necessary to organise a small number of meetings with the stakeholders of the area. Two meetings took place in the Cultural Centre of the city of Thermi: the first was realised on the 28<sup>th</sup> of February 2011 and the second on the 7<sup>th</sup> of April 2011. In the meetings participated representatives from the Municipality of Thermi, the liaison office of Centre for Research and Technology Hellas, the Cultural Centre of Thermi, the Science Centre and Technology Museum "NOESIS", the Traders Association of Thermi's market, URENIO research unit and Logotech S.A. Basic objective of these meetings was the selection of the most suitable applications that would serve Thermi's stakeholders, but also would address the needs of three interested groups: the visitors of Mediterranean Cosmos, the citizens of Thermi and the professionals of Thermi.



**Figure 6. Stakeholders activation process**

In the first meeting (Annex 3), the largest part of the discussion was based on pilot applications that focus on the commercial centre (Mediterranean Cosmos) and on the surrounding area of the Science Centre and Technology Museum “NOESIS” and the Centre for Research and Technology Hellas. The stakeholders mentioned the issue of the large number of visitors in the Mediterranean Cosmos that adjacents to the area of the pilot application. In 2010 the commercial centre had almost 8 million visitors. Only a small amount of these visitors extended their visit to the Science Centre and Technology Museum “NOESIS”, or the city of Thermi. It was suggested that the pilot applications should be developed towards a solution to this problem; in brief, how the visitors of the Mediterranean Cosmos can continue their activities in the area of the pilot. An illustrative list of such activities is the following:

1. Attendance of the events of the Centre for Research and Technology Hellas
2. Visits at the Science Centre and Technology Museum “NOESIS”
3. Visits at the commercial centre of the city of Thermi
4. Attendance of events of the Cultural Centre of the Municipality of Thermi
5. Visit at a suburban location of the Municipality of Thermi (e.g. the dam of Thermi, the traffic park for kids etc)

The participants agreed that this proposal is a very interesting. Based on the conclusions of the first meeting, a list of indicative applications (characterised by the stakeholders as useful) was created for further consultation. The aim is that the proposed scenario will include services that are closely connected to the needs of the stakeholders, as well as to the characteristics and the potentiality of the area.

In the second meeting (Annex 4), this list of applications was re-examined. The stakeholders agreed to the precondition that the applications should have a supplementary character in order to maximise benefits from their development. Finally, a questionnaire-based online survey (Annex 5) was presented to the stakeholders for dissemination to the public in order to secure users' involvement and to measure the response of citizens to the services offered.

After the second meeting, it was clear that the pilot applications could not be targeted exclusively for attracting visitors from Cosmos to other activities in the area or for reinforcing the attractiveness of the local market. The pilot should be based on three distinctive and mutually reinforcing targets:

- A group of applications that would attract people from Cosmos to visit NOESIS museum, the dam of Thermi, or other recreational sites of Thermi
- A group of applications that would make local market more appealing to the residents and people that work in the area
- A group of applications complementary to the above (e.g. air pollution observatories etc.)

**Project Synergies.** Along with Thermi pilot, the development of three more pilots in Bilbao, Vitry sur Seine and Bremen provides the opportunity for networking, cooperation and best practice exchange. The exchange of experiences from the pilot applications will contribute significantly to the project's final objective; that is the creation of an integrated scenario with locally embedded digital applications which will face the contemporary challenges of these four cities. Apart from the search for common applications, part of this task constitutes the search for the ability to use a common platform or common assets, a practice that would avoid the conduction of unnecessary expenditures.

As already mentioned, priority of the program is to exchange experiences and best practices among partners in order to address similar challenges that may arise in different areas of application. Within this framework, potential synergies arise with the region of Bilbao in Spain, where the interest is concentrated on the development of urban information management applications, including: a) developing networks to assess the quality of the environment b) in applications informing citizens and visitors about green areas and recreational facilities, but also for cultural spaces and sports' activities, c) digital learning spaces (schools, libraries, e-learning platforms), and d) applications with instructions for safe routes.

**Evaluation and selection of solutions.** The evaluation of the proposed services was based on the feasibility, impact and the sustainability of the services. The selection of the most appropriate applications was based both on the opinions of the stakeholders and on the results of the survey that was conducted over a 10 day period. The survey (presented to the stakeholders during the second meeting) included 12 questions and was taken by almost 200 people. Each question represented a separate application that was rated as useful by the stakeholders during the first meeting. Applications were presented by screenshots of existing examples and a small description. 93.2% of the interviewed people were either residents or frequent visitors or they were working in the eastern area of Thessaloniki. Both the survey results (Annex 6) and the selected applications are described in the following section.



Table 5: SELECTED APPS AND SERVICES

		1	2	3	4	5	na	Based on 5	Based on 4+5	Selected apps		
1	BEST ROUTE PLANNER	0,50	4,70	11,4	31,1	52,3	0,00	2	83,40	2		
2	PARKING SPACES AVAILABILITY	0,50	1,00	7,70	19,6	70,6	0,50	1	90,20	1	1	web +cellphone
3	BIKE SHARING SYSTEM	0,50	6,20	17,4	32,8	42,1	1,00	3	74,90	3	2	web +cellphone
4	DIGITAL CALENDAR OF EVENTS	0,5	4,6	20	32,3	41,5	1	2	73,80	2		
5	RECREATION FACILITIES GUIDE	0	6,7	18,6	43,3	31,4	0	4	74,70	4	3	web +cellphone
6	MUSEUM IN MOBILE PHONES GUIDE	2,1	10,3	26,2	37,4	24,1	0		61,50			cell phone
7	DIGITAL LEARNING SPACE	1,6	6,3	19,9	34,6	35,6	2,1	3	70,20	3		
8	VIRTUAL MARKETPLACE	1	9,8	17,5	34	37,1	0,5	1	71,10	1	4	web + screens
9	ONLINE YELLOW PAGES	0,5	4,1	14,4	37,4	43,6	0		81,00			
10	CITIZENS REQUESTS	0	0,5	3,1	19,5	75,4	1,5	1	94,90	1	5	web +cellphone
11	WIRELES ATMOSPHERIC POLLUTION	1,5	4,1	17,9	33,7	41,8	1	2	75,50	2	6	web +cellphone

**Scenario Description.** The proposed scenario has been formed taken into account both the survey results and the outcome from the stakeholders' consultation. The applications have been grouped into three areas of interest: a) mobility applications, b) applications related to commerce and recreation, and c) applications related to the environment. After the elaboration of the survey results (Table 5), pilot partners have been decided the development of 6 applications, which are the following:

- Parking Spaces Availability
- Bike Sharing System
- Recreation Facilities Guide and Museum in Mobile Phones Guide (merged in a common application)
- Virtual Marketplace and Online Yellow Pages (merged in a common application)
- Citizens Requests and
- Wireless Atmospheric Pollution.

Strengthen Thermi's market by encouraging its residents and visitors of Cosmos to buy from local shops

Attract visitors of Cosmos mall to nearby activities of recreational character

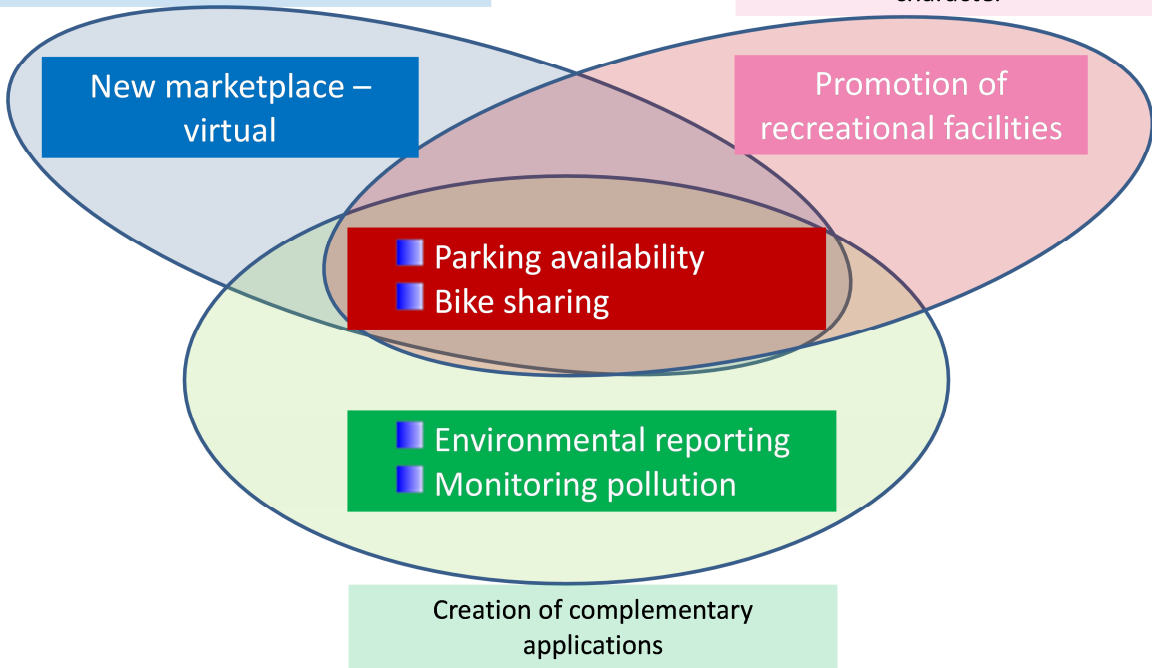


Figure 7. Services collaboration

## Service name (and the specific application focus/branch)

# Virtual Marketplace and Crowd-Media

## Problem to solve (including stakeholder groups)

Although Themi is highly populated, very few of its residents use local shops and professionals for their everyday needs. With the promptitude of the Municipality of Themi and of Themi's Association of Professionals and Merchants, it has been proposed the development of a virtual marketplace that will group local shops and professionals in a form of a thematic directory and which will represent the local market within an online-environment, offering a very popular channel for the commercialization of products and services. The service will stimulate the buying interest in the district. It can create a win-win situation where both customers and buyers have profit.

The participation of local businesses is correlated to their experience in using online applications. Therefore, in its simplest form e-shops can only dispose a photo, contact details and a short description, while in a more advanced form they can include bargains and offers for specific products and services.

## Description

The service aim to sustain the local marketplace and local businesses. It will consist of four subsystems / applications:

1. A **business directory** which will present the local businesses and professionals (about 400) on the city map. The information will be categorised (hotels, restaurants, clothing stores, real estate, doctors, lawyers, etc.). Each yellow page will present a minimum amount of information about the specific store or professional, whereas the owners can add additional information about his/her company, products and services.
2. A **virtual representation of the local marketplace and shops**.
3. A **coupon site containing promotional codes**, from local retailers and professionals, offering discounts to specific products and services. The visitors should print the coupons or store them to their mobile phones and bring them to local shops.
4. A **virtual supermarket** based on open data available from the relative price watch system of the Greek Ministry of Regional Development and Competitiveness. The system will enable users to compare consumer goods from local supermarkets in one central place, through the creation of a "personal basket of goods". Based on the price watch systems the basket will propose best prices and most suitable local store for purchases.
5. A **review engine** that assists customers in gathering local shopping information, posting reviews and opinions of local shopping-related content. The system will allow users to contribute different kinds of content, including reviews, photos, votes, quick tips and more. As result, a local social shopping network will be created.

The five subsystems will be interconnected allowing relevant information to flow among them. For example, the user who visits a store's page in the business directory will also have access to store's promotions and reviews (and vice versa).

Access to Virtual Social Marketplace will be made through PCs, mobile phones, large touchscreens and quick response (QR) codes embedded in the physical space of the city centre.

## Base Service(s)

The application will be built from scratch. Although the Greek Ministry of Regional Development and Competitiveness offers a web based supermarket price watch system, that system isn't user

friendly. In fact, it is very intractable. It isn't also accessible through mobile phones.

### Innovation through PEOPLE

The application does not exist prior to the project. Although there are available some open source e-commerce platforms such as PrestaShop and Magento they don't offer the required functionality. The proposed system is more than an e-commerce platform. Its five ingredients constitute an innovative way to connect Thermi's citizens and visitors with local businesses. Some other important innovative characteristics are:

- It is easily transferable to other cities
- It will be based mainly on the state-of-the-art web technologies such as HTML5, CSS3, Media queries, Smartphones Frameworks, etc.
- It will offer to visitors seamless access through PCs, mobile phones and large touch screens.
- QR codes will be used for the connection of Physical & Virtual World
- Semantic Web technologies such as ontologies and micro formats will be used for the description of system's data (hCard, hProduct, hReview, XFN, GoodRelations). This approach will allow data to be available as open linked data.
- The review engine could be possibly used from other pilot's applications (i.e. Tourism and Recreation Facilities Guide)
- The selection of the application and its components came through project's open innovation process. Their design and development will also be based on the same process.

### 2 Key Challenges

The pilot has to address the following key challenges:

- To stimulate the participation of local business and professionals to business guide. In order to lower the barrier to entry we will feed the system automatically with basic business information from municipality's public records and other sources. The Municipality of Thermi has strong collaboration with Association of Professionals and Merchants. The application was the favourite between them and they participate into design and development with comments and reviews.
- To populate the local social shopping network. The identification and stimulation of lead users who will be the first members of the network is very crucial. Incentives such as discounts should be considered. The pilot's dissemination process will make the service well known into the city. The smart basket component can also act as a tool of attraction for visiting the website. Coupon users will be invited and encouraged to submit reviews.

The above two challenges are strongly interconnected. A large amount of product and services offers will drive more visitors and vice versa.

Balance should be achieved between freedom of users to review the registered shops and businesses' willingness to participate into the system. A set of general guidelines regarding users' contributions should be created for that purpose.

### Images



Similar applications

### 5 Keywords (social, technological and other)

Virtual marketplace, social networks, yellow pages, business directory, interactive map, e-commerce

### References (literature, web services, other people services, etc.)

There are many examples related to different aspects of this application and which are ranging from deal searching to social shopping:

- Both the Dealmap and Deals are active in practically all major US cities.
- ShopSocially (<http://shopsocial.ly>) the world's most trusted shopping recommendation engine.
- Barcelonas' yellow pages business directory

<b>Service name (and the specific application focus/branch)</b>
<h2 style="text-align: center;">Tourism and Recreation Facilities Guide</h2>
<b>Problem to solve (including stakeholder groups)</b>
<p>Besides the existence of the Museum of Science and Technology (NOESIS), Thermi can also demonstrate a number of recreation facilities (parks, sites of archaeological interest, the dam of Thermi, the traffic park for kids etc.). These sites are not known to the public and could therefore be communicated through the development of a relevant application. An additional application can be developed to present NOESIS exhibitions and inform about current and upcoming exhibition events.</p> <p>Recreation facilities guides and virtual tours have proved incredibly popular and are used by the public as essential and informative tools. These types of applications do not only work as directories, but they can provide an added experience by enabling users to see a location as if they were there.</p> <p>On the other hand, mobile museum tour guides are developed to stimulate the interest of the public, as according to statistical studies, most visitors to a museum spend very little time at each single work. One solution commonly adopted nowadays is to install multimedia guides that can stimulate visitors' interest and motivation to acquire a deeper understanding. The use of mobile devices is becoming more and more widespread, where older technology (audio guides, information totems, etc.) now tends to be ignored by most visitors to museums, who prefer higher levels of interaction. The Museum of Science and Technology (NOESIS) hasn't yet developed an application like that.</p>
<b>Description</b>
<p>The application supports the creation of virtual tours of recreation facilities using interactive maps, 360° panoramas, video and three-dimensional images. It will be accessed through PCs, Smartphones, screens and quick response (QR) codes embedded in the physical space of the city. It can be complemented by a series of sub-applications that present exhibitions and guide to exhibits of the Center for Science &amp; Technology Museum on Smartphones.</p> <p>An interactive map of the city will be enhanced with the superposition of points of interest such as: public buildings, monuments, parks etc. The service will be available through the web, and can be complemented with additional Smartphone applications. Considering panoramas, the most common formats are Apple QuickTimeVR, jpeg and Adobe Flash, while in many cases, videos can be used instead. There is no need for special external devices interacting with the application.</p> <p>The application will also support the creation virtual tours inside buildings (i.e. Museum of Science and Technology)</p>
<b>Base Service(s)</b>
<p>The applications will be based on the “e-Promotion and Culture Module” of “Digital Cities Open Platform”. This platform has been developed three years ago and it was based on Joomla open source content management system. The module should be rewritten almost from scratch as Joomla has evolved from version 1.0.x in which the platform was built; to current version 1.7.</p> <p>The Digital Cities Open Platform is presented in a separated service card.</p>
<b>Innovation through PEOPLE</b>
<p>The application will offer superior functionality and usability compared to the old module. The aesthetics of the application will also be improved. These improvements will be based on the</p>