

ICT tools for a more efficient and sustainable e-mobility model

Eng. Alessandro RINALDI, PhD

Polytechnic University of Bari



Introduction



- **The evolution of mobility in a sustainable perspective requires specific attention to issues closely related to the changing needs of cities and public policies.**
- **This change is also imposed by** United Nation Agenda 2030 focusing on the several sustainable development goals linked to **improve the quality of life in urban area.**
- Studies show that, in European Countries, **the most frequent trip is made by car** and it is characterized by:
 - I. transport systems not efficient;
 - II. negative effects such as urban traffic congestion, parking shortages;
 - III. air pollution and noise pollution.

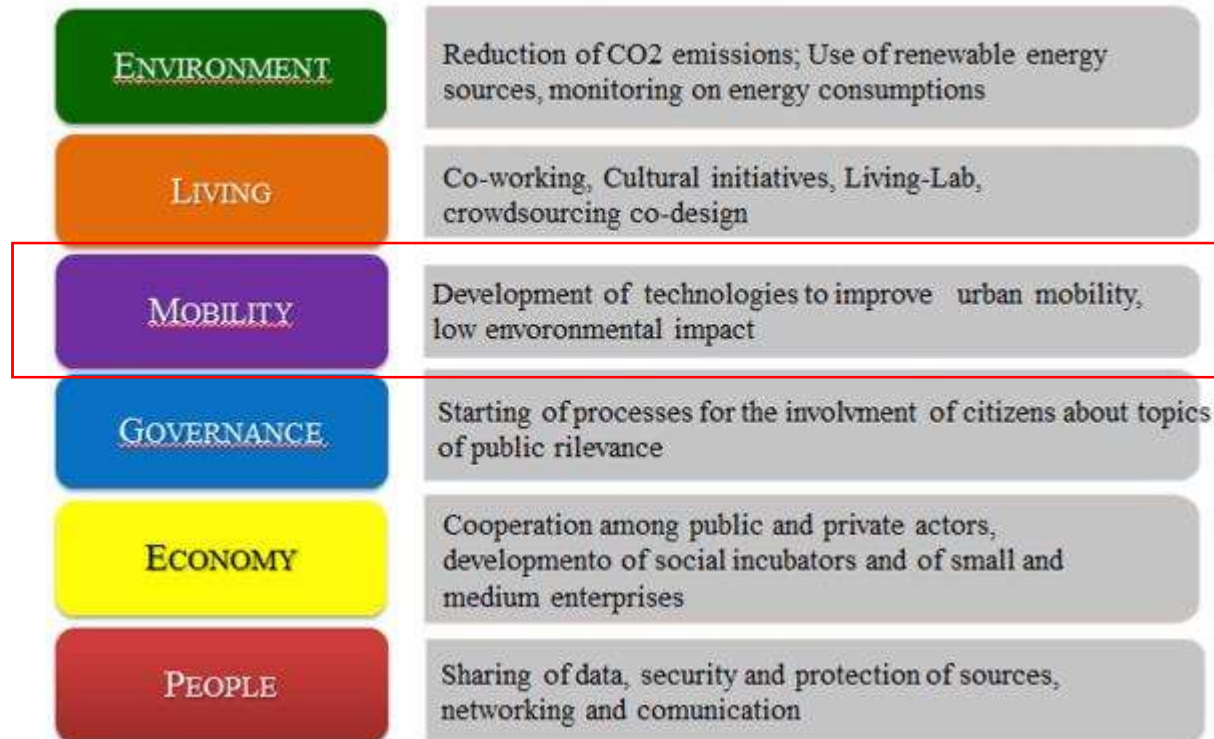
Introduction



- The transition to alternative mobility meets the **objectives of decarbonisation, decentralization and digitalisation.**
- In addition to the reduction of CO2 emissions and a clear improvement in air quality, a transport revolution based on more sustainable patterns and mobility habits and low environmental impact technologies has important repercussions not only in the environmental but also in the social sphere.
- In the field of mobility, a new transport mode is emerging, more based on access to services rather than on the use of a vehicle owned by the company.
- In this context, the **Sustainable Mobility** can allow the reduction of the negative effects inside the city area and to create a real smart city.

Mobility in Smart Cities

SMART CITY DEFINITION (EU)



The new vision of mobility is characterized by “**smart**” systems which improve the urban traffic and the inhabitants’ mobility. These systems are focused on **sustainability, innovation** and **safe transport**.

ICT in Electro-mobility

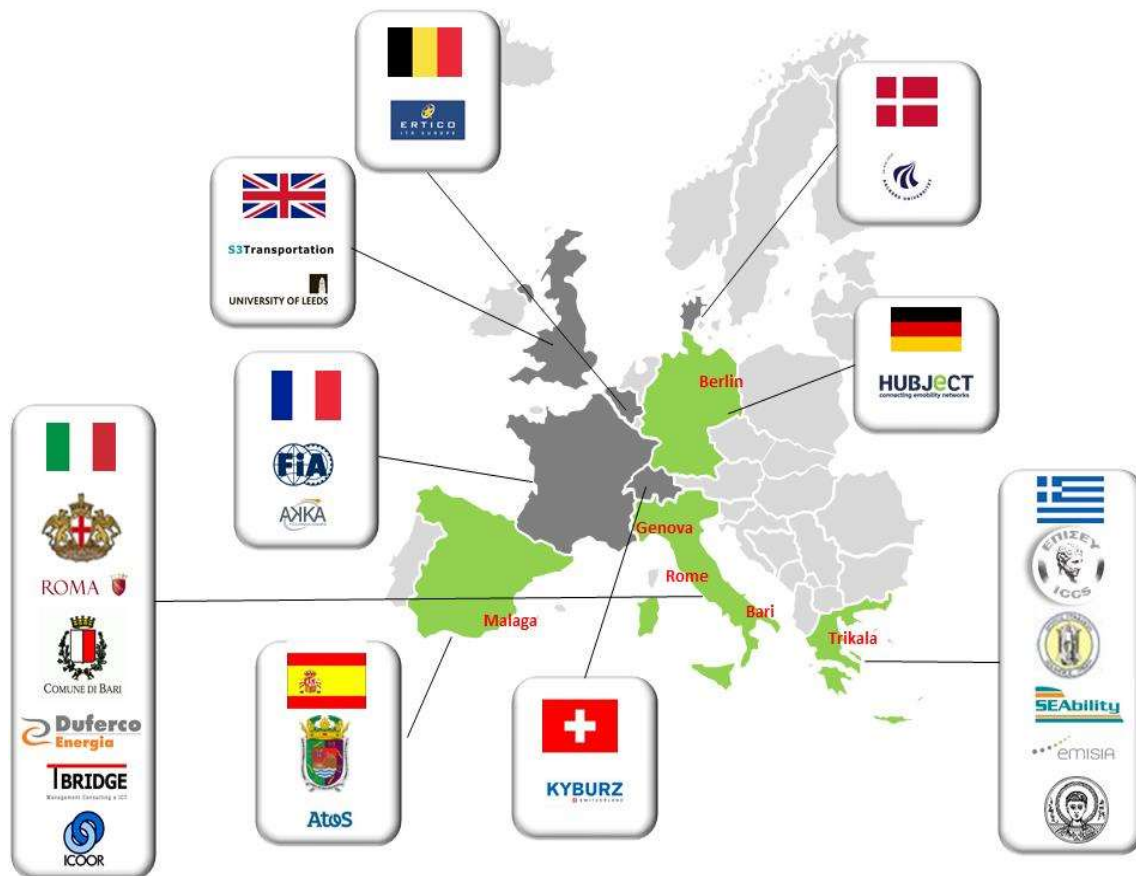


- Modern ICT solutions allow significant improvement in the mobility sector, especially for electro-mobility and sharing systems.
- **The ICT tools allow to incentivize and facilitate the use of Electric Vehicles (EV)** by providing services such as booking and brokering, charging station, parking spots, as well as payments and vehicle monitoring.

The ELVITEN project

ELVITEN at a glance

Electrified L-category Vehicles Integrated into Transport and Electricity Networks (ELVITEN)



Call identifier: H2020-GV-2017

Topic: GV-10-2017

“Demonstration (pilots) for integration of electrified L-category vehicles in the urban transport system”

EC funding: 7,840,648.75 €

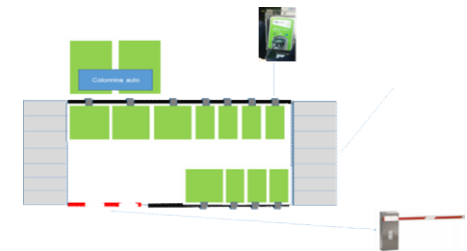
Duration: November 2017 – October 2020

Demonstrations in **Six** European Cities

ELVITEN Strategic Objectives



- Develop **replicable usage schemes** of EL-Vs for owners, sharers and light goods deliverers based on the deployment of :
 - EL-Vs **innovative parking and charge services** (including e-charging hubs, integration of public and private charge points in Brokering service, interoperable eRoaming platform)
 - EL-Vs **sharing and rental services**
 - **Support ICT tools to facilitate the usage** of EL-Vs (Brokering service to book and pay, Management system for the e-charging hubs) and **support ICT tools to motivate** the usage (Fleet Monitoring application with Digital Coach app, Serious Game app, Incentives Management Smart Card).
 - **Appropriate policies and incentives**
- Organise **long-term demonstrations** of the ELVITEN usage schemes in 6 Cities



ELVITEN Strategic Objectives



- Create a **big data bank of real driving and usage data** and users' experiences and opinions
- Derive **guidelines** towards **EL-V** manufacturers and Planning Authorities
- Develop **business models** for EL-V sharing, rental, parking and charge services
- Achieve a mind-shift among users, so that they become **e-Owners**, **e-Sharers** or **e-Deliverers**.

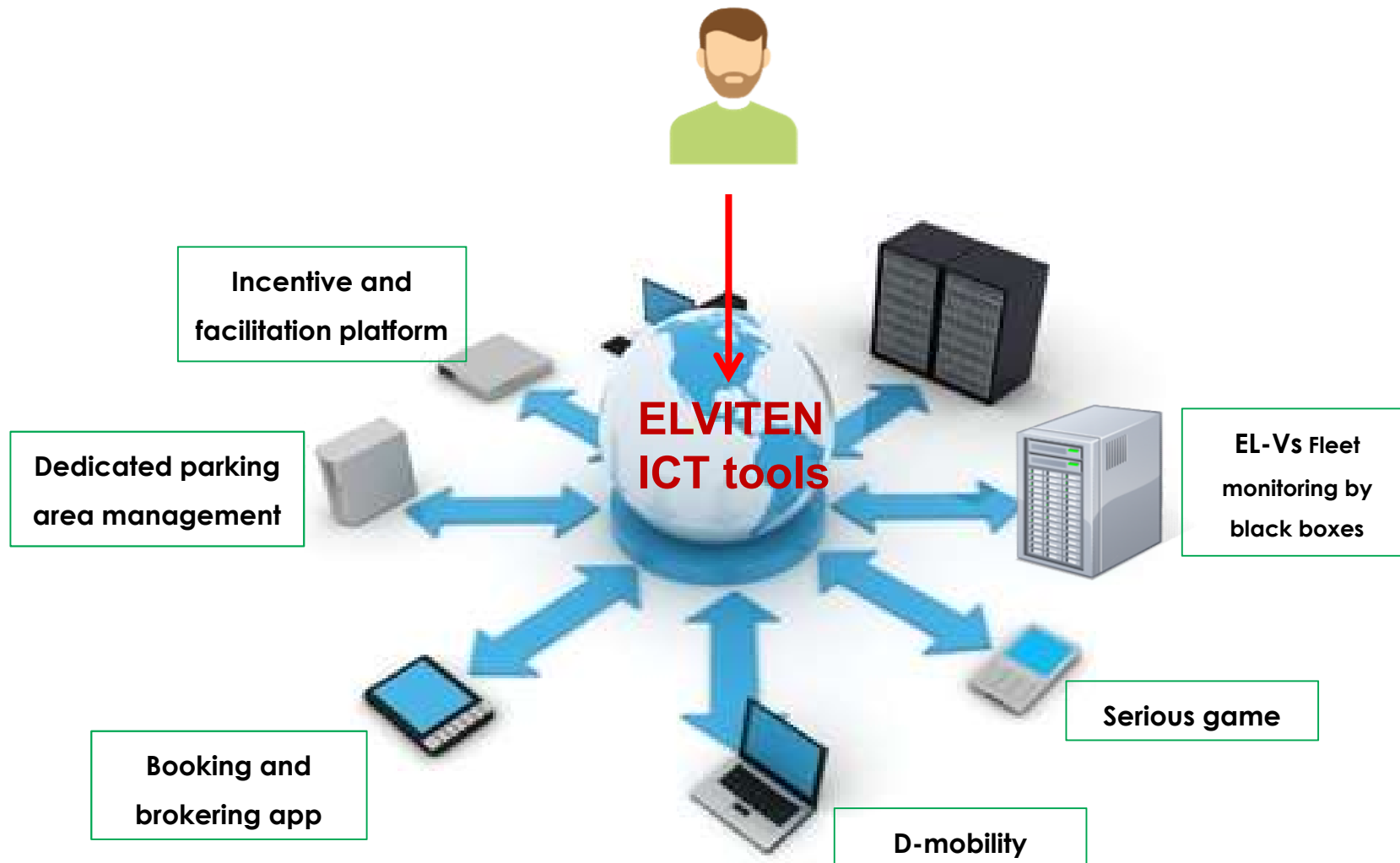
The ICT tools

Methodology



- **Study of the actual context**, by analysing the existing ICT assets available in each city for the EL-Vs management.
- **Identification**, on the basis of the foreseen EL-Vs usage schemes, the types of EL-Vs, and other facilities (e-hub), **of the required ICT assets** to be deployed in each city.
- **Definition of the ICT functionalities** to be adapted and implemented, by identifying interactions between the various service providers.
- **Develop, adapt and deploy existing ICT tools**, applications and services.
- **Set-up the infrastructure for the proper data collection** during the demonstration

The ELVITEN tools



Booking app

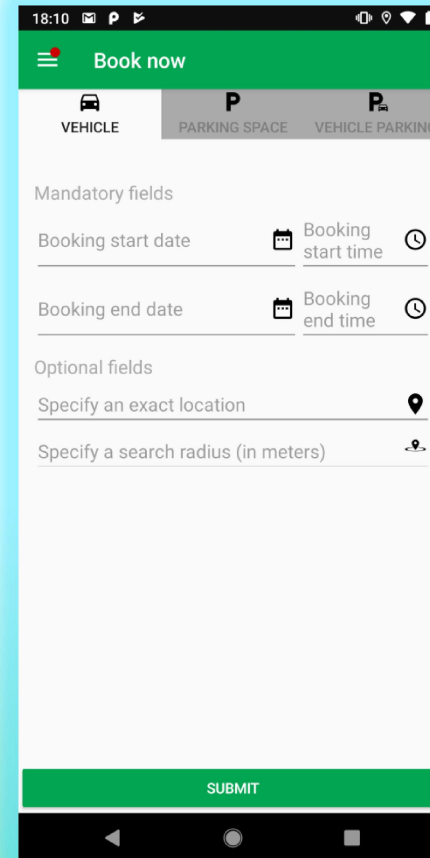
End user: ELVITEN short-term (sharing) EL-Vs drivers

Main Goals:

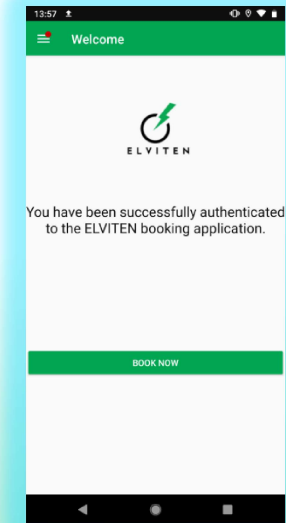
- Allow ELVITEN users to book resources with a handheld device

Features:

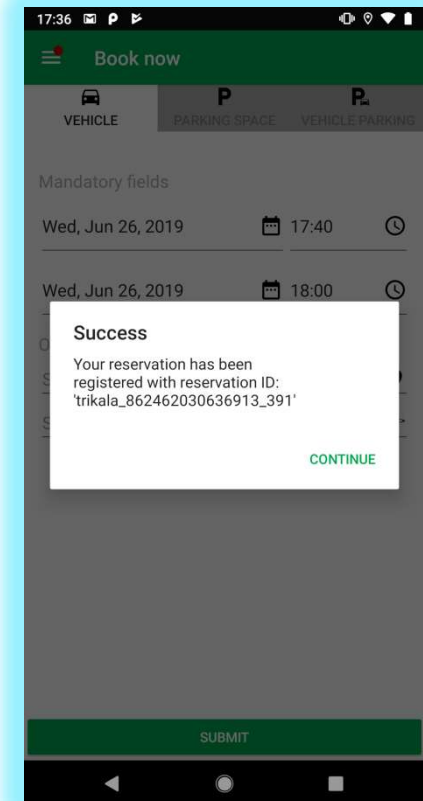
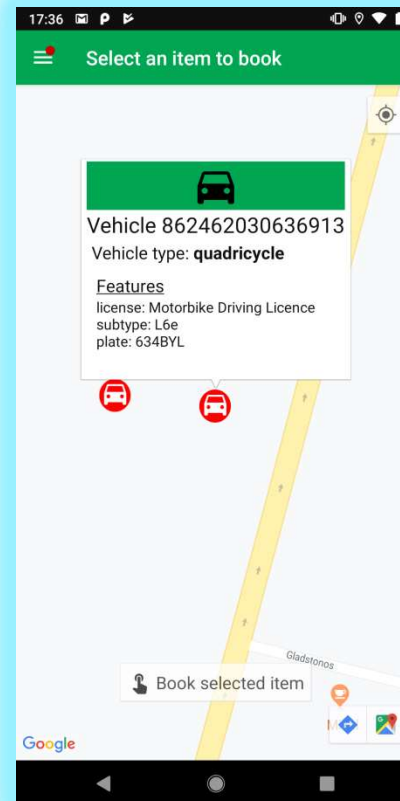
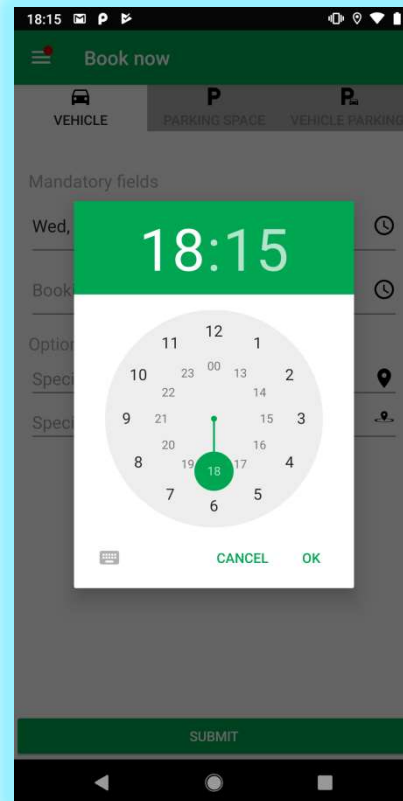
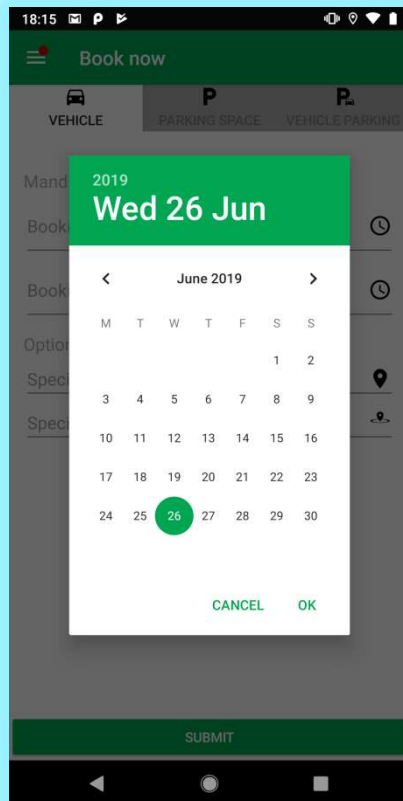
- Book vehicles
- Book charging points
- Book parking spaces
- Cancel bookings
- Fill in questionnaires



The screenshot shows the 'Book now' screen of the ELVITEN app. At the top, there is a green header with a menu icon and the text 'Book now'. Below the header, there are three tabs: 'VEHICLE', 'PARKING SPACE', and 'VEHICLE PARKING'. The 'PARKING SPACE' tab is currently selected. The main content area is divided into 'Mandatory fields' and 'Optional fields'. Under 'Mandatory fields', there are two rows: 'Booking start date' with a calendar icon and 'Booking start time' with a clock icon; and 'Booking end date' with a calendar icon and 'Booking end time' with a clock icon. Under 'Optional fields', there are two rows: 'Specify an exact location' with a location pin icon, and 'Specify a search radius (in meters)' with a location pin icon. At the bottom of the screen, there is a green 'SUBMIT' button.



Booking app



Digital Coach app



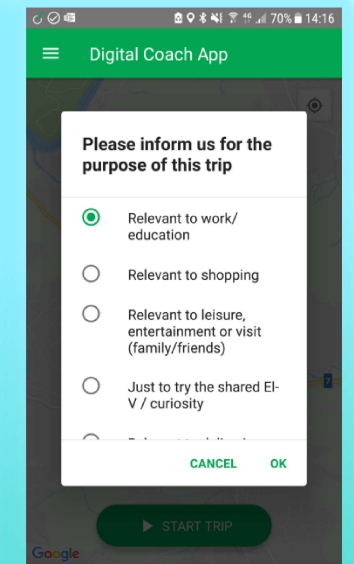
End user: ELVITEN registered user

Main Goals:

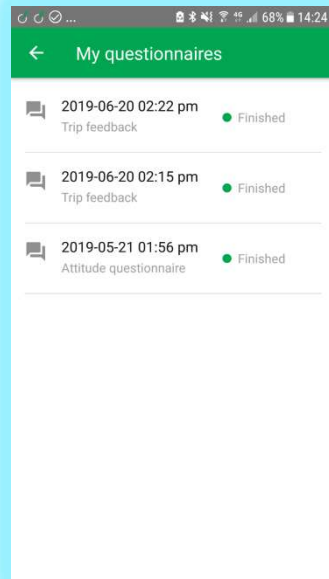
- Collect trips' data
- Collect questionnaires

Features:

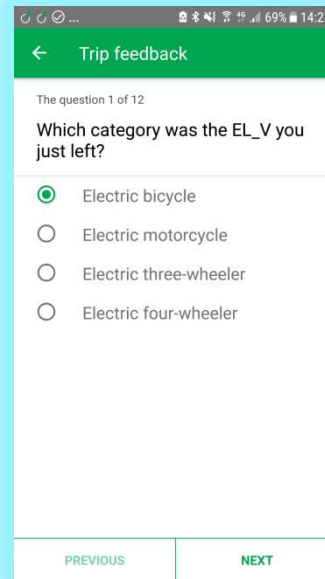
- User-reported trip start / stop
- User-reported trip purpose
- Fill in app-related questionnaires
- Discover trip score
- Access historical data (trips and score history)



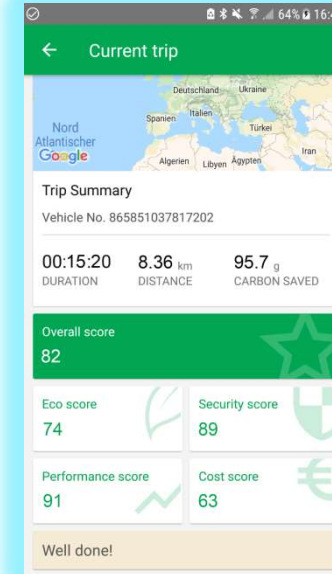
Digital Coach app



Questionnaire overview page



Trip feedback questionnaire



Trip score

Fleet Monitoring tool

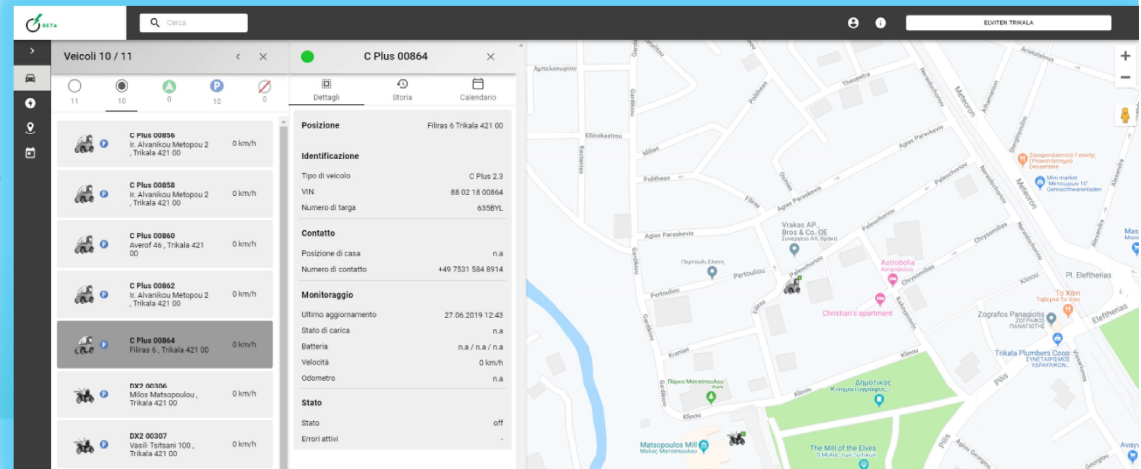
End user: ELVITEN city operator

Main Goals:

Provide a GUI to visualize EL-Vs on a map.

Features:

- Visualize black box data in real time
- Localize vehicles on a map
- See driven routes



Detailed view on vehicle

Serious Game

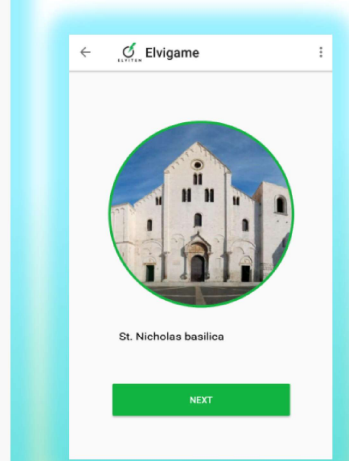
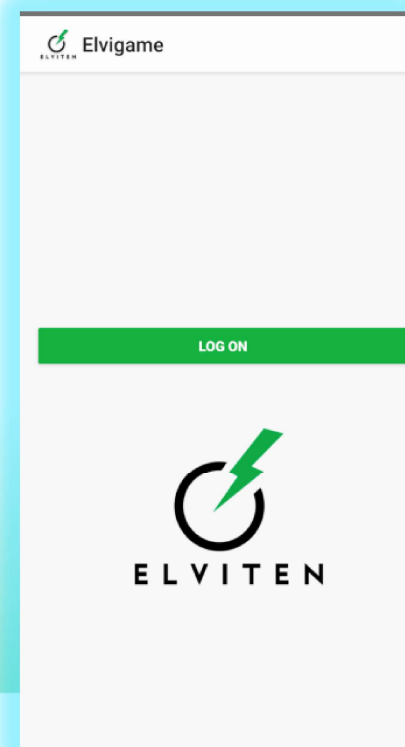
End user: ELVITEN registered user

Main Goals:

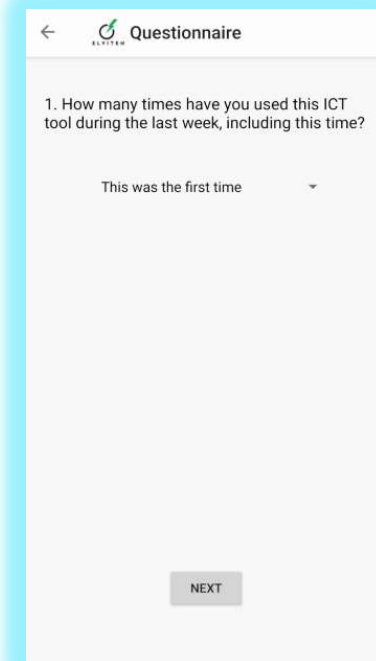
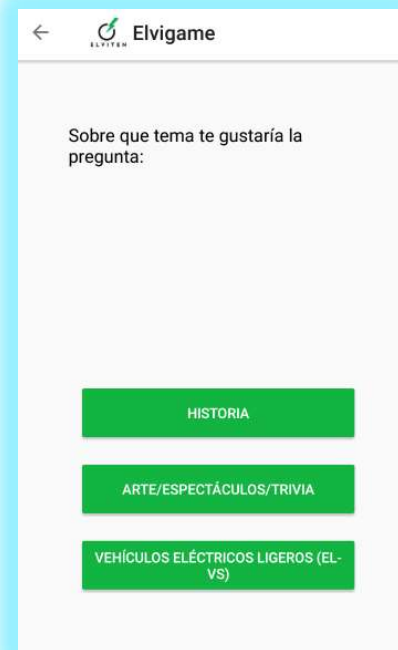
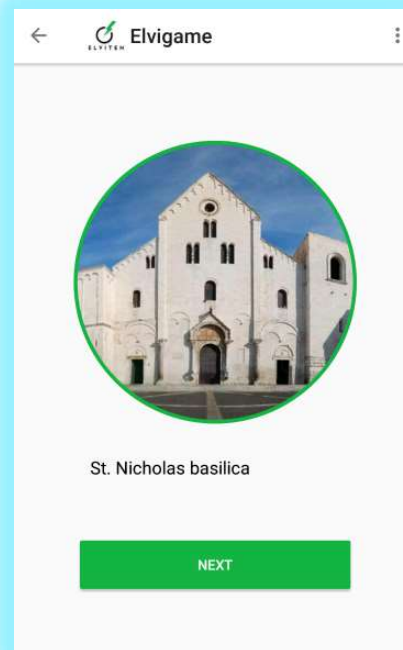
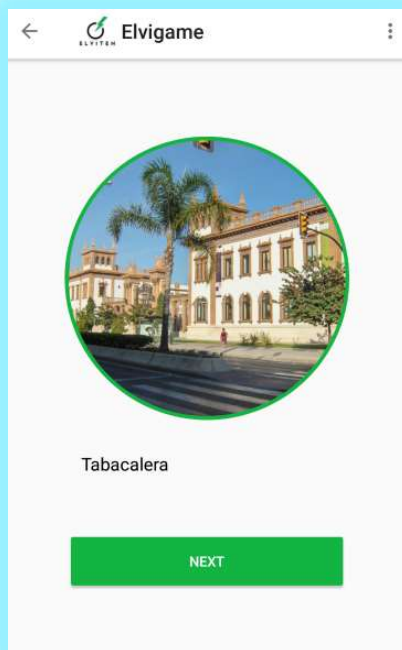
- Engage users into the project via gaming
- Collect questionnaires

Features:

- Show data regarding the City and Electric Light Vehicles
- Ask questions to gain points
- Collect points to reach achievements
- Reach point of Interest in the city to discover the city
- Fill in app-related questionnaires



Serious Game



Incentive Smart app

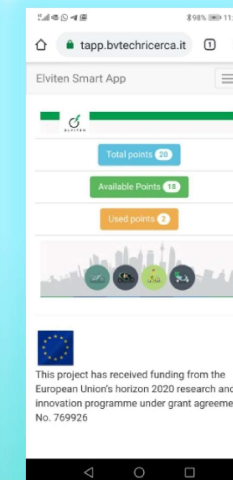
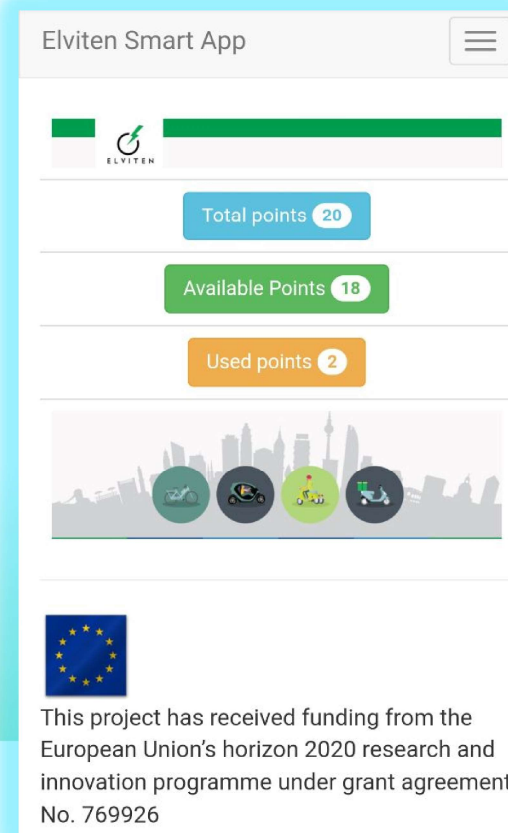
End user: ELVITEN registered user

Main Goals:

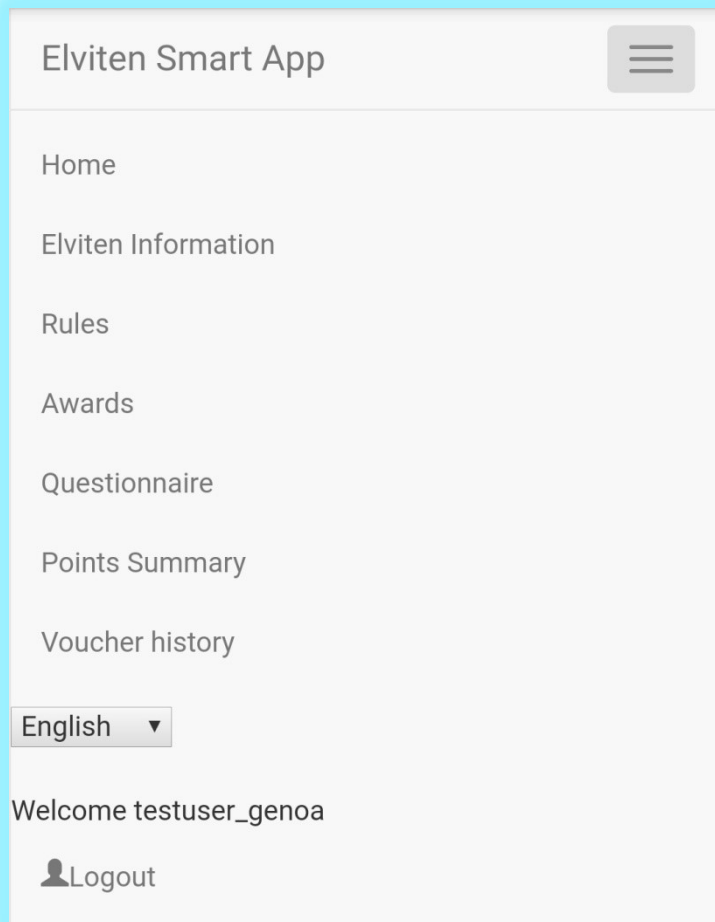
- Incentivize the use of ELVITEN services
- Collect questionnaires

Features:

- Discover rewarded actions (rules)
- Browse and claim awards
- Monitor available and used points
- Access historical data (rewarded actions and vouchers)
- Fill in app-related questionnaires




Incentive Smart app



Menu

Elviten Smart App

Descrizione	Punti	Città
Ricarica	4	genoa
Questionario sul background a Genova	5	genoa
Questionario sulla esperienza di viaggio a Genova	5	genoa
Questionario sulla predisposizione agli ELVITEN ICT tools a Genova	5	genoa
Questionario sui veicoli leggeri elettrici privati a Genova	5	genoa
Questionario sui veicoli leggeri elettrici condivisi a Genova	5	genoa
Serious Game	1	genoa
Km	2	genoa



Rules and corresponding points
(Italian, Genoa)

Incentive Administration Console



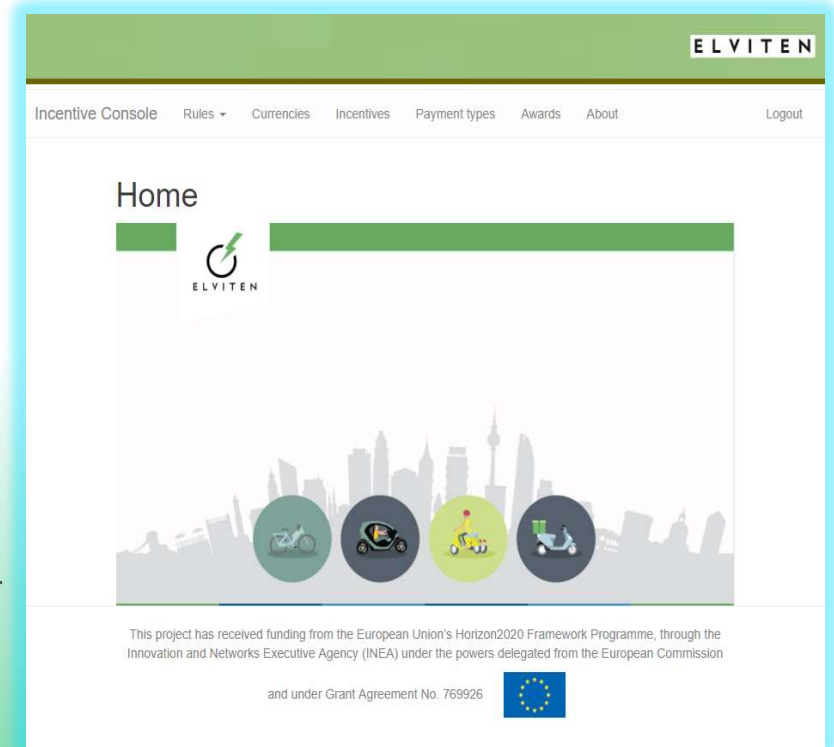
End user: City Operators only

Main Goals:

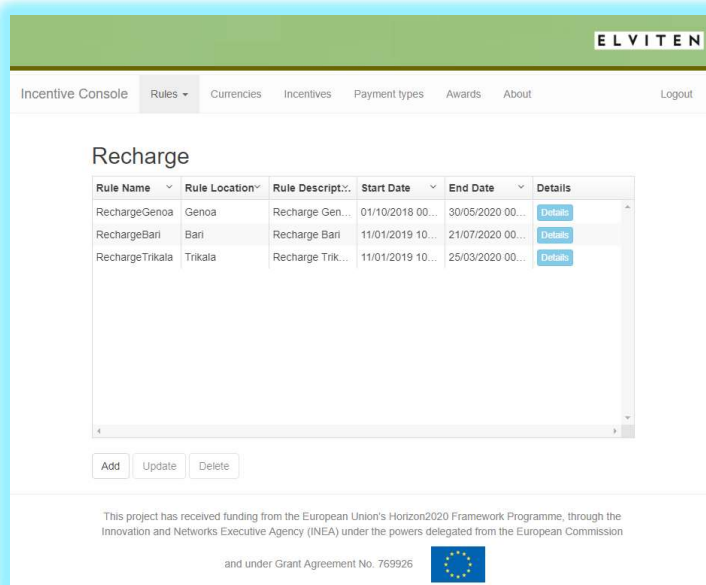
- Manage the incentive settings and objects:
 - Rules
 - Incentives
 - Awards (verifiable by awards provider)

Features:

- Customize City-specific rules, needed to gain points
- Define the awards that can be obtained for each City
- Manage general incentive settings




Incentive Administration Console

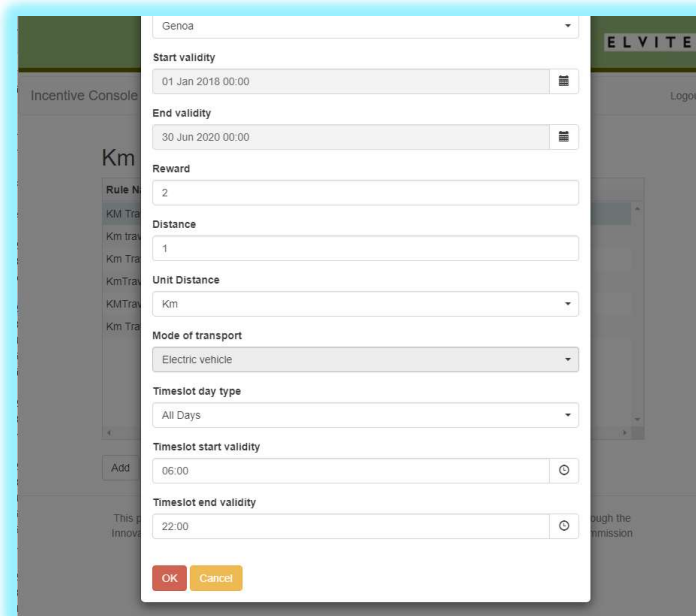


The screenshot shows the 'Incentive Console' interface with a navigation menu including 'Rules', 'Currencies', 'Incentives', 'Payment types', 'Awards', and 'About'. The main content area is titled 'Recharge' and displays a table of rules. Below the table are 'Add', 'Update', and 'Delete' buttons. At the bottom, there is a funding notice from the European Union's Horizon2020 Framework Programme.

Rule Name	Rule Location	Rule Descript...	Start Date	End Date	Details
RechargeGenoa	Genoa	Recharge Gen...	01/10/2018 00:...	30/05/2020 00:...	Details
RechargeBari	Bari	Recharge Bari	11/01/2019 10:...	21/07/2020 00:...	Details
RechargeTrikala	Trikala	Recharge Trik...	11/01/2019 10:...	25/03/2020 00:...	Details

This project has received funding from the European Union's Horizon2020 Framework Programme, through the Innovation and Networks Executive Agency (INEA) under the powers delegated from the European Commission and under Grant Agreement No. 769926 

List of rules of type
"recharge"



The screenshot shows the configuration form for a 'Km Travelled' rule. The form includes fields for 'Start validity' (01 Jan 2018 00:00), 'End validity' (30 Jun 2020 00:00), 'Reward' (2), 'Distance' (1), 'Unit Distance' (Km), 'Mode of transport' (Electric vehicle), 'Timeslot day type' (All Days), 'Timeslot start validity' (06:00), and 'Timeslot end validity' (22:00). 'OK' and 'Cancel' buttons are at the bottom.

Insert/editing rule of
type "Km Travelled"

Conclusions



In the smart mobility context, the ICT solutions:

- allow significant improvement in the mobility sector;
- **incentivize and facilitate the use of Electric Vehicles (EV)** by providing different services;
- **ensure high flexibility** in order to sustain a good and motivating experience for EL-Vs users.
- allow the transition to the smart mobility by improving the urban traffic and mobility on the basis of sustainability, innovation and safe transport.

Eng. **Alessandro RINALDI, PhD**

Polytechnic University of Bari



alessandro.rinaldi@poliba.it



www.elviten-project.eu



E L V I T E N

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