

International Scientific Conference on Mobility and Transport "Transportation Systems of the Future" Munich, 11 - 12 September 2019

# Shaping the mobility in university campuses throughout ICT solutions



E. Campos Diaz<sup>1</sup>, M.T. Tormo Lancero<sup>1</sup>, P. Valero Mora<sup>1</sup>, P. Papantoniou<sup>2</sup>, E. Vlahogianni<sup>3</sup>, G. Yannis<sup>3</sup>

<sup>1</sup>University of Valencia, <sup>2</sup>Technical University of Munich <sup>3</sup>National Technical University of Athens

Munich, 12 September 2019

#### Outline

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- Conclusions



## Background

- Sustainable Urban Mobility Plans (SUMPs) define a set of interrelated measures designed to satisfy the mobility needs of people
- A University Campus is similar to an urban model and it could be used as a test area for mobility policies and tools
- Information and communications technology (ICT) tools concern a collection of useful applications, services and tools for mobility areas



## Objectives

- To analyze University Campuses in order to obtain a defined state of art of data, policies and ICT tools concerning mobility from/to and inside Campus
- To evaluate the use of specific **ICT tools** on University Campuses from both experts as well general population
- To propose an integrated ICT platform model including Data-warehouse, DSS, ITS, enabling data collection, planning, management and monitoring



### Methodology

- A survey has been developed and implemented within the framework of CAMP-sUmp (CAMPus sustainable University mobility plans in MED areas) project
- A survey has been developed consisting of a questionnaire and an interview
- The following **Universities** participated
  - Magna Graecia Foundation Catanzaro University
  - National Technical University of Athens
  - University of Malta
  - University of Valencia
  - University of Split
  - University of Cyprus
  - University of Bologna



Project co-financed by the European Regional Development Fund



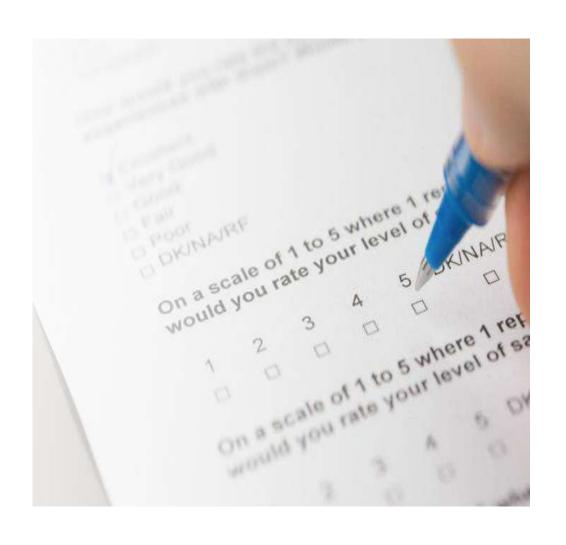




#### Questionnaire

#### Questionnaire topics:

- **Current mobility** to present current mobility of the participants both regarding mobility from/to and inside the Campus
- Desired Mobility to present the desired mobility of the participants both regarding mobility from/to and inside the Campus
- **Mobility problems** to identify the mobility problems both regarding mobility from/to and inside the Campus.
- Proposed measures/policies/tools to evaluate specific measures, policies and tools that are already implemented regarding the mobility from/to and inside the campus
- Participant information



## Expert's interview

The **interview** aimed to collect qualitative data (experts' views) of each University regarding the following thematic areas

- Soft modes Infrastructure
- Public transport
- **Car** related issues
- Road infrastructure
- Environment and energy
- Mobility management
- Freight Infrastructure and Management
- Information and communications technology (ICT) tools
- Sustainable Urban Mobility Plans (SUMPs)



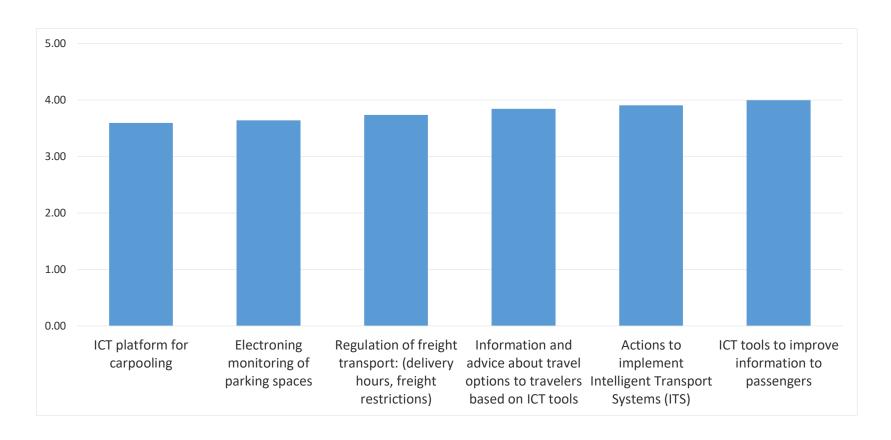
## Survey characteristics

	University	Location	Area (m²)	Students	Personnel	Questionnaires	Interviews
1	University of Catanzaro	Outside	260,000	11,000	500	104	9
2	National Technical University of Athens	Outside	1.000.000	13,500	3,400	124	8
3	University of Malta	Inside	194,452	11,500	600	250	2
4	University of Valencia (1 campus)	Outside	1,000,000	10,000	2,000	227	3
5	University of Valencia (2 campuses)	Inside	400,000	35,000	5,000	100	3
6	University of Split	Inside	245,000	24,000	1,500	100	6
7	University of Cyprus	Outside	1,200,000	7,000	1,100	85	5
8	University of Bologna	Outside	6,570,023	85,000	3,000	100	9

- >5 campuses were located **outside** the city centre 3 are located **inside** the city
- >1.078 Questionnaires and 36 expert's interviews were collected



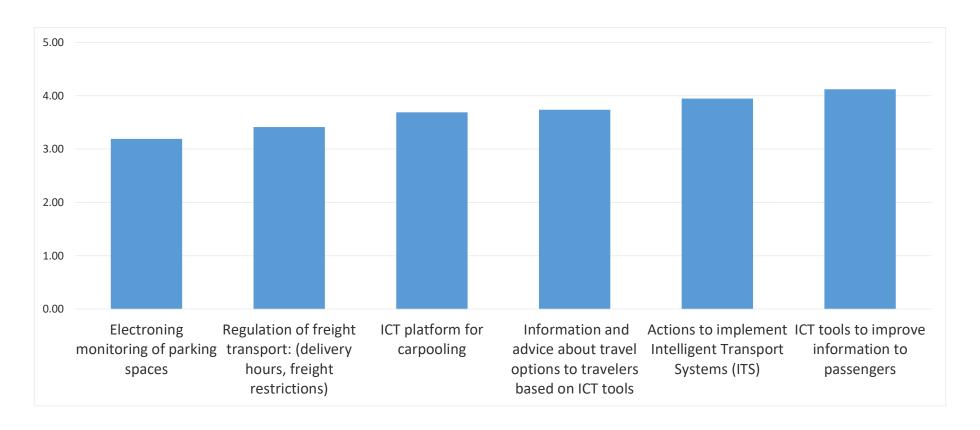
### ICT tools for campuses located inside the city



- The most important type of measures is "ICT tools to improve information to passengers"
- The lowest importance occurs in an ICT platform for car-pooling



### ICT tools for campuses located outside the city



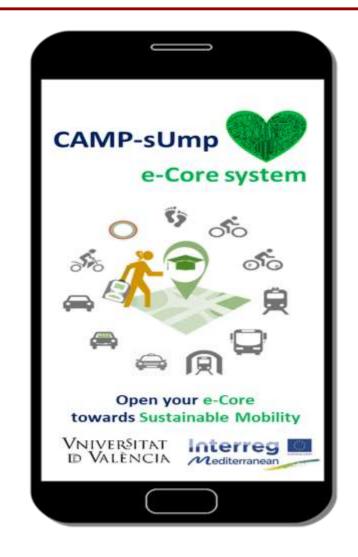
- The most important type of measures is "ICT tools to improve information to passengers"
- The lowest importance refers to "electronic monitoring of parking spaces"



#### E-Core system scope

The e-Core System describes the integration of many **independent and self-contained nodes** to satisfy needs and purposes of sustainable mobility at Universities

- a set of top-level assumption, variables, actors, stages and nodes
- a strategic plan for designing an integrated sustainable mobility system
- a top-level approach
- technology independent



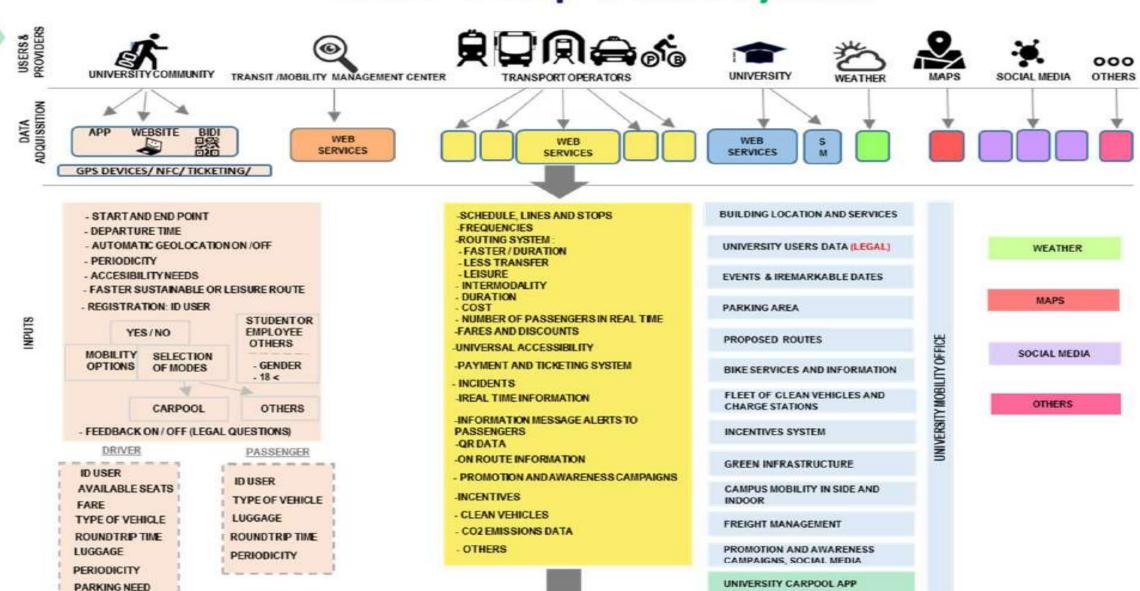
### E-Core system architecture

The e-Core System consists of 6 phases

- **1. Users/providers** (diverse profiles which provide vital information to the system)
- 2. Data Acquisition (how the providers can provide the information to the System
- 3. Input about mobility options
- **4. Aggregated Information system** (data are aggregated gathered and organized in different blocks)
- **5. Dissemination tools** (website, mobile apps, mobility card)
- 6. Output based on transport mode









TRANSITMOBILIT Y MANAGEMENT CENTER





TRANSPORT OPERATORS









CITY COUNCIL OTHERS

SOCIAL MEDIA

ID USER DATA

UNIVERSAL ACCESIBILITY

ID USER DATA











INTERMODALITY

INCIDENTS

PARKING

OTHER SOURCESOF INFO

A ST

#### WEBSITE

#### **MOBILES APPS**



ADVICE SYSTEM

#### MOBILITY CARD

皇凤

ANALYSIS PREDICTOR LOCATION - TIME - MODE



FREE PARKING SPACES

NIGHT PARKING SERVICES

REPAIR AREA AND FIRST AID KIT

SHOWER AND LOCKER **FACILITIES** 

RENTING SERVICE

APP TIPS

BIKE POINTS, WORKSHOP AND SECOND

HAND SHOP

TRAINIG. THEMATIC DAYS. COMPETITIONS

DISCOUNTS

MEDICAL CONTACT

ON ROUTE INFORMATION

INCIDENTS AND BLACK SPOTS

NEXTBIKE

INCENTIVES

#### PUBLIC BIKES:

AVAILABLE BIKES, SPACES AND STATIONS, LOCATIOND AND FARES

FACILITIES: SHOWER AND LOCKER SERVICE



EDUCATION THEMATIC DAYS. COMPETITIONS

GREEN INFRASTRUCTURE

DISCOUNTS

MEDICAL CONTACT

INCENTIVES

FARES

FREQUENCIES

DISCOUNTS

SCHEDULES, LINES, STOPS\*

REAL AND ON-TIME INFORMATION

ON ROUTE INFORMATION

ALERTS AND INFOR SYSTEMS

E- PAYING AND E-TICKETING

NUMBER OF PASSENGERS

QR. NFC OR OTHER TECHNOLOGIES

TRAINING, THEMATIC DAYS. COMPETITIONS

INCENTIVES

DEPARTURE TIME

COST PER SEAT

AVAILABLE SEATS

STARTING AND ENDING POINTS

TYPE OF VEHICLE

LUGGAGE ALLOWED

PERIODICITY

TOTAL PARKING SPACES

AVAILABLE PARKING SPACES

SEATS BOOKED

PARKING FARES

TRAINING, TEMATIC DAYS, CAMPAINGS

CLEAN E-VEHICLES BENEFITS

BOOKING AND CANCEL SYSTEM

ROUTE RATING AND INCENTIVES

USER PROFILE: STUDENT

WORKER AND OTHERS

PARK & RIDE

LAST MILE

TOTAL PARKING SPACES

PARKING AVAILABLE SPACES

CAR PLATE RESTRICTION

PARKING FARE

ON ROUTE INFORMATION

TRAINING ON EFFICIENT DRIVING

AND ROAD SAFETY

LIMITED ACCES OF PRIVATE CAR WITHIN/AROUND UNIVERSITY AREAS

SUSTAINABLE MOBILITY AWARENESS CAMPAINGS

E-CHARGE POINTS

CLEAN AND E-VEHICLES BENEFITS AND DISCOUNTS

ELECTRIC VEHICLE FLEET TO RENT

INCENTIVES

#### Conclusions

- ICT tools apply in almost all thematic areas and play a crucial role for every campus sustainable mobility plan
- Campuses have different mobility **gaps/needs** based on their location (inside/outside the city)
- The tools that provide **information to passengers** were found to be the most important based on the questionnaire
- The **architecture** of the proposed System is based on European frameworks for standardization and ITS design
- E-Core system is an integrated ICT platform model enabling data collection, planning, management and monitoring







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