Conference on Sustainable Urban Mobility 2018

24 - 25 May 2018, Skiathos Island - Greece

Programme — Location: THE SKIATHOS PALACE HOTEL — Date: Thursday, 24/5/2018

Room: "Lalaria"

Time	Session / Presentation
08:00-09:00	Registration
	Session 1A: Social networks and traveller behavior I — Moderators: Odile Heddebaut, Piyushimita Thakuriah
09:00-11:00	The walkability of Thessaloniki: citizens' perceptions - *Roxani Gkavra, Dimitrios Nalmpantis, Evangelos Genitsaris and Aristotlelis Naniopoulos*
	Perception of smartphone applications about transportation among university students - *Charis Chalkiadakis, Rallou Taratori, Socrates Basbas and Ioannis Politis*
	Social networking and Driving. A study about young Greeks - *Theonymphi Xydianou, Pantelis Kopelias, Christos Marios Polymeropoulos and Elissavet Demiridi*
	Crowdsourcing and visual research methodologies to promote data collection for sustainable mobility planning - *Efthimios Bakogiannis, Maria Siti, Konstantinos Athanasopoulos, Avgi Vassi and Charalampos Kyriakidis*
	Megatrends, a way to intentify the future transport challenges - *Vladislav Maras, Mirjana Bugarinovic, Eleni Anoyrkati and Alba Lina Avarello*
	Unveiling the potential of C-ITS: market research analysis - *Ivan Zaldivar, Eleni Anoyrkati, Alexeis García-Pérez, Alba Lina Avarello, Viara Bojkova, Xavier Leal and Victor Corral*
	Tactical urbanism: Reclaiming the right to use public spaces in Thessaloniki, Greece - *Margarita Angelidou*
	How big data affects the design of urban furniture: An approach from the perspective of industrial design - *Selim Hikmet Şahin and Füsun Curaoğlu*
11:00-11:30	Coffee Break
	Keynote Speakers Session — Moderator: Eftihia Nathanail
11:30-13:30	"A Geospatial Perspective on Sustainable Urban Mobility in the Era of Big Data" - *Prof. Bin Jiang*
	"Exploring social and economic implications of big data for mobility" - *Prof. Piyushimita Thakuriah*
	"ECO Driving: Strategies and Impacts" - *Prof. Alexander Skabardonis*
	Sponsors Session — Moderator: Eftihia Nathanail
13:30-14:00	"Attica Tollway Traffic Operations. Enhancing Road Safety with the use of new technologies" - ATTIKI ODOS: *Dr. Dimitris Serbis*
	Capabilities and applications of ArcGIS"- *Marathon Data Systems*
14:00-15:00	Lunch
	Session 2A: Traffic emissions and environmental impacts I — Moderators: Fotini Kehagia, Dimitris Serbis
15:00-17:00	Development of a methodology, using Multi-criteria Decision Analysis (MCDA), to choose between full pedestrianization and traffic calming area (woonerf zone type) - *Ioannis Vasileiadis and Dimitrios Nalmpantis*
	Influence of traffic emissions on urban air quality: a case study of a medium sized city - *Aggelos Aggelakakis, Afroditi Anagnostopoulou, Alkiviadis Tromaras and Maria Boile*
	Cycling as a key component of the Athenian sustainable urban mobility plan - *Efthimios Bakogiannis, Maria Siti, Georgia Christodoulopoulou, Christos Karolemeas and Charalampos Kyriakidis*
	Assessment of CO2 footprint of the new Athens Metro line 4 during the operation phase - *Aristidis Giakoumis, Fotini Kehagia and Efthimios Zervas*
	Considerations on sustainable mobility: The contribution of cycling to the shift of transportation behaviour - *Elias Papastavrinidis, George Kollaros, Vasiliki Kollarou and Antonia Athanasopoulou*
	Modelling travelers' behavior in the presence of reward schemes offered for green multimodal choices - *Amalia Polydoropoulou, Ioanna Pagoni, Athena Tsirimpa and Ioannis Tsouros*
	Densificaiton of cities or improved transport technology to curb CO2 emissions? - *Harald Nils Rostvik*
	Traffic and environmental rehabilitation of the Agioi Anargyroi square of the Municipality of Agioi Anargyroi – Kamatero - *Christina Margariti, Efthimios Zervas and Dimitrios Nalmpantis*
17:00-17:30	Coffee Break
	Session 3A: Data security and legal issues — Moderators: Antonio Comi, Pantoleon Skayannis
17:30-19:30	Major limitations and concerns regarding the integration of autonomous vehicles in urban transportation systems - *Panagiotis Fafoutellis and Eleni Mantouka*
	Data protection in smart cities: application of the EU GDPR - *Maria Stefanouli and Chris Economou*
	Connected and autonomous Vehicles – Legal issues in Greece, Europe and USA - *Elissavet Demiridi, Pantelis Kopelias, Eftihia Nathanail and Alexander Skabardonis*
	Implementing a blockchain infrastructure on top of vehicular ad hoc networks - *Anargyros Gkogkidis, Nikolaos Giahoudis, Georgios Spathoulas and Ioannis Anagnostopoulos*
	Shared autonomous electrical vehicles and urban mobility: a vision for Rome in 2035 - *Agostino Nuzzolo, Luca Persia, Antonio Comi and Antonio Polimeni*
	Do urban transport planning principles apply to Norwegian medium-sized sprawling city regions? The case of Stavanger region - *Daniela Mueller-Eie*
	Health related benefits of non-motorised transport: an application of the Health Economic Assessment tool of the World Health Organisation to the case of Trikala, Greece - *Pantoleon Skayannis, Marios Goudas, Diane Crone, Sonja Kahlmeier, Nick Cavill and Vasilena Mitsiadi*
	Autonomous vehicles and blockchain technology are shaping the future of transportation - *Panagiota Georgia Saranti, Dimitra Chondrogianni and Stylianos Karatzas*
20:30-23:30	Gala Dinner @ My Ithaki Restaurant

Room: "Kechria"

Time	Session / Presentation
08:00-09:00	Registration
	Session 1B: Public transport and demand responsive systems I — Moderators: Antonio Polimeni, Mihails Savrasovs
09:00-11:00	Evaluation of probabilistic demands usage for the online dial-a-ride problem - *Athanasios Lois, Athanasios Ziliaskopoulos and Tsalapatas Spyros*
	Understanding taxi travel demand patterns through Floating Car Data - *Agostino Nuzzolo, Antonio Comi, Enrica Papa and Antonio Polimeni*
	Critical Moment for Taxi Sector: What should be done by traditional Taxi sector after the TNC disruption? - *Kaan Yildizgoz and Prof. Dr. Murat Celik*
	Predictive maintenance for buses: Outcomes and potential from an Italian case study - *Maria Vittoria Corazza, Daniela Vasari, Enrico Petracci and Luigi Brambilla*
	Electrification of public transport: lessons from the ELIPTIC project - *Yannick Bousse, Maria Vittoria Corazza, Jan Kowalski, Gerhard Sessing, Diego Salzillo Arriaga and Marjorie De Belen*
	Conjoint Analysis for the optimization of a potential flexible transport service (FTS) in the region of Zagori, Greece - *Alexandros Tsoukanelis, Evangelos Genitsaris, Dimitrios Nalmpantis and Aristotelis Naniopoulos*
	Theoretical view on the designing of prototype of business model for a transport company - *Oksana Skorobogatova and Irina Kuzmina-Merlino*
11:00-11:30	Coffee Break
14:00-15:00	Lunch
	Session 2B: Public transport and demand responsive systems II — Moderators: Umberto Crisalli, Ioannis Politis
15:00-17:00	Investigating potential synergies among social entrepreneurship and public transport through experts' consultation in Greece - *Afroditi Stamelou, Evangelos Genitsaris, Dimitrios Nalmpantis and Aristotelis Naniopoulos*
	Modeling transit user travel time perception in a post-economic recession era: The case of Athens, Greece - *Athanasios Kopsidas, Konstantinos Kepaptsoglou, Eleni Vlahogianni and Christina Iliopoulou*
	The aesthetic integration of a tramway system in the urban landscape- evaluation of the visual nuisance - *Christos Pyrgidis, Antonios Lagarias and Alexandros Dolianitis*
	Redefinition of public transport in the Alto Minho region, Portugal – an overview - *Sara Baltazar, Luís Barreto and António Amaral*
	A criteria-based evaluation framework for assessing public transport related concepts resulted from collective intelligence approaches - *Evangelos Genitsaris, Afroditi Stamelou, Dimitrios Nalmpantis and Aristotelis Naniopoulos*
	A concept for smart transportation user-feedback utilizing volunteered geoinformation approaches - *Benjamin Dienstl and Johannes Scholz*
	Operating resilience of severely disrupted urban transport systems - *Sofia Bouki, Alexandros Deloukas, Efthymia Apostolopoulou and Anna Anastasaki*
	Public transport in transnational peripheral areas: challenges and opportunities - *Federico Cavallaro and Giulia Sommacal*
17:00-17:30	Coffee Break
	Session 3B: Application of big data technologies in transport — Moderators: Spyridon Vougias, Irina Yatskiv
17:30-19:30	Applying unsupervised and supervised machine learning methodologies in social media textual traffic data - *Konstantinos Kokkinos, Eftihia Nathanail and Elpiniki Papageorgiou*
	Making big data real in upcoming future: the dynamic toll prices in the Portuguese highways - *André Ramos, Alexandra Rodrigues, Sónia Machado, Filipa Antunes, Pedro Ventura, Artur Martins and Akrivi Vivian Kiousi*
	Assessment of dynamic geo-positioning using multi-constellation GNSS in challenging environments - *Stella Strataki, David Bétaille and Urs Hugentobler*
	A thorough review and analysis of journey planners - *Dimitrios Sourlas and Eftihia Nathanail*
	Investigating multiple areas of mobility using mobile phone data (Smartcare) in Chile - *Paul Elliott and Romain Deschamps*
	The contribution of open big data sources and analytics tools to sustainable urban mobility - *Stavros Samaras-Kamilarakis, Petros Angelos Vogiatzakis, Teti Nathanail and Lambros Mitropoulos*
	Beyond travel time savings: Conceptualizing and modelling the individual value proposition of mobility - *Giuseppe Lugano, Zuzana Kurillová, Ghadir Pourhashem and Martin Hudak*
	Future technologies in the EU transport sector and beyond: an outlook of 2020-2035 - *Alkiviadis Tromaras, Aggelos Aggelakakis, Merja Hoppe, Thomas Trachsel and Eleni Anoyrkati*
20:30-23:30	Gala Dinner @ My Ithaki Restaurant

Programme

Location: THE SKIATHOS PALACE HOTEL
Date: Friday, 25/5/2018
Room: "Lalaria"

Time	Session
	Session 4A: ALLIANCE Special Session — Moderators: Irina Kuzmina-Merlino, Irina Pticina
09:00-11:00	Integrating logistics and transportation simulation tools for long-term planning - *Ioannis Karakikes, Wladimir Hofmann, Lambros Mitropoulos and Mihails Savrasovs*
	Development and simulation of priority based control strategies of ground vehicles movements on the aerodrome - *Iyad Alomar, Juri Tolujew and David Weigert*
	Design and prototyping of IoD shared service for small and medium enterprise - *Aleksandrs Avdeikins and Mihails Savrasovs*
	Comparing the customer use and satisfaction in two Latvian transport Interchanges - *Irina Yatskiv and Vaira Gromule*
	Investigating the accessibility Level in Riga's International Coach Terminal: A comparative analysis with European Interchanges - *Evelina Budilovich, Vissarion Magginas, Giannis Adamos, Irina Yatskiv and Maria Tsami*
	Impact of critical variables on economic viability of converted diesel city bus into electric bus - *Kristine Malnaca and Irina Yatskiv*
	Shopping malls accessibility evaluation based on microscopic traffic flow simulation - *Mihails Savrasovs, Irina Pticina and Valery Zemljanikins*
11:00-11:30	Coffee Break
	Session 5A: Data-driven infrastructure management — Moderators: Socrates Basbas, Alexander Skabardonis
11:30-13:30	Performance evaluation of GLOSA-algorithms under realistic traffic conditions using C2I-communication - *Michael Kloeppel, Jan Grimm, Severin Strobl and Rico Auerswald*
	Have information technologies forgotten pedestrians? to what extent can it/its improve pedestrian's mobility and safety *Hector Monterde-I-Bort, Socrates Basbas, Charlotta Johansson, Lars Leden and Per Garder*
	Trip generation rates for a University campus: the case of the Aristotle University of Thessaloniki, Greece - *Socrates Basbas, Konstantinos Takatzoglou, George Mintsis, Christos Taxiltaris and Ioannis Politis*
	An analysis on drivers' self-reported questionnaire responses, regarding aggressive driving, attitude toward cyclists and personal values - *Kyriakos Andronis, Nikolaos Mavridis, Alexandros Oikonomou and Socrates Basbas*
	Redesigning the seafront area of Pafos - *Spyridon Vougias, Konstantina Anastasiadou and Giorgos Vergas*
	Development of an aggregate indicator for evaluating sustainable urban mobility in the city of Xanthi, Greece - *Anastasis Tsiropoulos, Apostolos Papagiannakis and Dionisis Latinopoulos*
13:30-14:30	Lunch
	Session 6A: City logistics systems — Moderators: Athanasios Galanis, Daniela Mueller-Eie
14:30-16:30	A new gold mine? Identifying crucial factors affecting the potential of a freight tram for urban freight distribution - *Katrien De Langhe, Hilde Meersman, Christa Sys, Eddy Van de Voorde and Thierry Vanelslander*
	Development of a smart picking system in the warehouse - *Raitis Apsalons and Genadijs Gromovs*
	A conceptual framework for planning transhipment points for cargo bikes in last mile logistics - *Tom Assmann, Evelyn Fischer and Sebastian Bobeth*
	SWOT analysis for the introduction of night deliveries policy in the Municipality of Thessaloniki - *Efstathios Bouhouras and Socrates Basbas*
	Design of a digital collaborative tool to improve mobility in the Universities - *Ariela Goldbard, Ana Velazquez, Rodrigo Rebollo, Erick López, Octavio Mercado and Felipe Victoriano*
	The implementation of environmental friendly city logistics in south Baltic Region cities - *Stanisław Iwan and Kinga Kijewska*
16:30-17:00	Coffee Break
	Session 7A: NOVELOG Special Session — Moderators: Giannis Adamos, Harald Nils Rostvik
17:00-19:00	Environmental aspects of urban freight movement in private sector - *Afroditi Anagnostopoulou and Maria Boile*
	Assessing traffic and environmental impacts of smart lockers logistics measure in a medium-sized municipality of Athens - *Vasileios Kiousis, Eftihia Nathanail and Ioannis Karakikes*
	Adaptability/transferability in the city logistics measures implementation - *Stanisław Iwan and Kinga Kijewska*
	Does the implementation of urban freight transport policies and measures affect stakeholders' behavior? - *Eftihia Nathanail, Giannis Adamos, Ioannis Karakikes and Lambros Mitropoulos*
	An agent-based simulation of retailers' ecological behavior in central urban areas. The case study of Turin - *Elena Maggi, Elena Vallino and Elena Beretta*
	Diagnostic of the European logistics and road freight transportation sector - *Georgia Aifadopoulou, Iraklis Stamos, Monica Giannini and Josep-Maria Salanova*
	Urban traffic management utilizing soft measures: A case study of Volos city - *Maria Karatsoli, Ioannis Karakikes and Eftihia Nathanail*
19:00-19:15	**Conference closure**
	End of CSUM2018

Room: "Kechria"

Time	Session
	Session 4B: Traffic emissions and environmental impacts II — Moderators: Apostolos Papagiannakis
09:00-11:00	Investigating mobility gaps in University campuses - Panagiotis Papantoniou, Eleni Vlahogianni, George Yannis, Maria Attard, Pedro Valero Mora, Eva Campos Diaz and Maria Tereza Tormo Lancero
	Big and open data supporting sustainable mobility in smart cities – the case of Thessaloniki - *Georgia Aifadopoulou, Josep-Maria Salanova, Panagiotis Tzenos, Iraklis Stamos and Evangelos Mitsakis*
	Economic cost of urban freight GHG mitigation - *Christophe Rizet and Tu Thi Hoai Thu*
	Road traffic noise reduction and sustainable transportation: A case survey in the cities of Athens and Thessaloniki, Greece - *Vassilios Profillidis, George Botzoris and Athanasios Galanis*
	Sustainable urban mobility plans in Mediterranean port-cities: The SUMPORT project - *Marios Miltiadou, George Mintsis, Socrates Basbas, Christos Taxiltaris and Antonia Tsoukala*
	Cooperative intelligent transport systems as a policy tool for mitigating the impacts of climate change on road transport - *Evangelos Mitsakis and Areti Kotsi*
	Analysis of mobility patterns in selected University campus areas - *Eleni Vlahogianni, Panagiotis Papantoniou, George Yannis, Maria Attard, Alberto Regattieri, Francesco Piana and Francesco Pilati*
11:00-11:30	Coffee Break
	Session 5B: Social networks and traveller behavior II — Moderators: Francesco Viti
11:30-13:30	Investigating the role and potential impact of social media on mobility behavior - *Maria Karatsoli and Eftihia Nathanail*
	Campaigns and awareness-raising strategies on sustainable urban mobility - *Vissarion Magginas, Maria Karatsoli, Giannis Adamos and Eftihia Nathanail*
	A comparison of bicyclist attitudes in two urban areas in USA and Italy - *Nikiforos Stamatiadis, Giuseppina Pappalardo and Salvatore Cafiso*
	Behavior and perceptions of University students at pedestrian crossings - *Socrates Basbas, Andreas Nikiforiadis, Evaggelia Sarafianou and Nikolaos Kolonas*
	Influence of ICT evolution and innovation on travel and consumption behaviour for determining sustainable urban mobility - *Odile Heddebaut and Anne Fuzier*
	ProMaaS - Mobility as a Service for Professionals. Integrated sectorial business platform for multimodal cross border mobility - *Christophe Feltus, Adnan Imeri, Sebastien Faye, Gerald Arnould and Djamel Khadraoui*
	TRACE – Cycling & walking tracking data for planning and policy - *Pasquale Cancellara, Giacomo Lozzi, André Ramos*
	The use of social computing in travelers' activities preference analysis - *Charis Chalkiadakis, Panagiotis Iordanopoulos, Evangelos Mitsakis and Eleni Chalkia*
13:30-14:30	Lunch
	Session 6B: Big data and transport modelling — Moderators: Vitalii Naumov, Nikiforos Stamatiadis
14:30-16:30	New indicators in the performance analysis of a public transport interchange using microsimulation tools - The Colégio Militar case study - *André Ramos and João de Abreu E Silva*
	Improving the assessment of transport external costs using FCD data - *Livia Mannini, Ernesto Cipriani, Umberto Crisalli, Andrea Gemma and Giuseppe Vaccaro*
	A big data demand estimation framework for multimodal modelling of urban congested networks - *Guido Cantelmo and Francesco Viti*
	Exploring temporal and spatial structure of urban road accidents: some empirical evidences from Rome - *Antonio Comi, Luca Persia, Agostino Nuzzolo and Antonio Polimeni*
	Modeling demand for passenger transfers in the bounds of public transport network - *Vitalii Naumov*
	Microsimulation modelling of the impacts of double-parking along an urban axis - *Katerina Chrysostomou, Achilleas Petrou, Georgia Aifadopoulou and Maria Morfoulaki*
	Problems, risks and prospects of ecological safety's increase while transition to green transport - *Irina Makarova, Ksenia Shubenkova, Vadim Mavrin, Larisa Gabsalikhova, Gulnaz Sadygova and Timur Bakibayev*
	Short-term prediction of the traffic status in urban places using neural network models - *Georgia Aifadopoulou, Charalampos Bratsas, Kleanthis Koupidis, Aikaterini Chatzopoulou, Josep-Maria Salanova and Panagiotis Tzenos*
16:30-17:00	Coffee Break
	Session 7B: Transport data and analytics — Moderators: Konstantinos Kokkinos, Agostino Nuzzolo
17:00-19:00	Measuring the spatial accessibility of public transport: the case of the new urban rail systems in the city of Thessaloniki, Greece - *Ioannis Baraklianos, Konstantina Karagouni and Apostolos Papagiannakis*
	TAToo – A Tracking for plAnning Tool applied to cycling and walking data - *André Ramos and João Bernardino*
	Combining land use, traffic and demographic data for modelling road safety performance in urban areas - *Efthymis Papadopoulos and Ioannis Politis*
	Urban form and transportation infrastructure in European cities - *Poulicos Prastacos and Apostolos Lagarias*
	Assessing the impact of changes in mobility behaviour to evaluate sustainable transport policies: case of university campuses of Politecnico di Milano - *Samuel Tolentino, Alberto Bertolin, Paolo Beria, Eleonora Perotto, Fabio Carlo Guereschi, Paola Baglione and Stefano Caserini*
	Neural network-based road accident forecasting in transportation and public management - *Georgios N. Kouziokas*
	Assessment of drivers' perception of quality of service on urban roundabouts - *Maria Perpinia, Efterpi Damaskou and Fotini Kehagia*
	Luminance adaptive dynamic background models for vision-based traffic detection - *Nazmul Haque, Md Hadiuzzaman, Md Yusuf Ali and Farhana Mozumder Lima*
19:00-19:15	**Conference closure**
	End of CSUM2018

Crowdsourcing and visual research methodologies to promote data collection for sustainable mobility planning

Efthimios Bakogiannis[1], Maria Siti[1], Konstantinos Athanasopoulos[1], Avgi Vassi[1] and Charalampos Kyriakidis[1]

[1] Sustainable Mobility Unit, National Technical University of Athens

Abstract. This paper aims to present and compare two methodologies in order to gather data from residents and visitors about their mobility behavior in the urban environment: crowdsourcing and visual research. These methodologies were used in two Sustainable Urban Mobility Plans (SUMPs) in the medium-sized cities Kozani and Drama in Greece. Public input proves to be efficient in recognizing problems, proposing priorities and describing detailed proposals towards achieving desired aims. Results show that the issues that were recorded through the applications of visual research were also perceived by the inhabitants, through the ideas they proposed. It was also found that residents are focusing on concrete proposals, mostly realistic, sometimes presenting a specific spatial reference. On the other hand, public participation in the crowdsourcing platform was low. Combining the two methodologies proves to be effective towards raising public input validity.

Keywords: crowdsourcing, on-line platform, visual research, sustainable urban mobility plan, medium sized cities

1 Traditional and innovative methods for studying the urban environment

In recent years, the use of modern tools, such as electronic applications and crowdsourcing, is at the forefront of understanding the city's environment in a quick and cost-effective manner, since the collection of the data is performed by citizens who act as "sensors", as pointed out by Pödör, et.al. [16], with the use of their smarthphones [5], [25]. The development of such practices is rapid, resulting in a new type of geography called "Neogeography", which demonstrates a new approach of the city by its residents, as they do not just live in it but are becoming active members in the city's planning process, contributing to the gathering of data as well as to traditional consultation meetings [20].

There are two elements that should be pointed out. The first relates to the importance of photography in Neogeography, as most users consider they recognize the space better through pictures, which are then uploaded to social media platforms or Flickr. Besides, photography provides an easy and tangible description of areas or situations that can be imprinted over time, which can not be done with the same ease with other forms of communication [12].

The second concerns the way that the public becomes active so that the necessary data is available when needed. New technologies, like smartphone applications, can be at the core of such methodologies that provide enough data in a series of plans, such as SUMPs, which are strategic and integrated urban and transportation /mobility plans. However, due to the fact that not all population uses such tools, public engagement and involvement are not applied in overall following these methods. Indeed, as claimed by See et.al. [18], the type of used tools results to a different degree of social participation in various plans.

Traditional visual techniques based on scientists' observation haven proven to be useful for understanding behaviors in public spaces as well as the development of cities and do not require participation of users. Indeed, according to Abbott [1], the Chicago School of Sociology was largely based on the observation of public spaces. Reiss [17] has accordingly systemized such approaches, arguing that systematic social observation can be a key strategy for measuring and understanding social phenomena. Finally, William Whyte [26], in his research on small public spaces in New York, was a strong supporter of observations with the help of videos and photography, in order to reassess spaces with clear mind. Tools used include photo assessment (monitoring photography/ time lapse phtography, re-photography of old pictures), as well as innovative and participative ways such as photo elicitation / auto driven photo elicitation and photovoice, where contact is immediate and face-to-face.

Based on the above, the topic of this particular research paper is to compare two techniques in terms of performance and effectiveness to record data useful for a Sustainable Urban Mobility Plan. At first it analyzes the success of a crowdsourcing platform to activate the public for city planning. The quality of the data collected is evaluated. On the other hand, the paper examines the success of visual research as a key methodology in implementing a SUMP. The paper deals with two study areas, Kozani and Drama, which are two typical medium sized Greek cities.

2 Case studies research

2.1 Aim and Objectives

The work presented is part of the SUMPs that are currently under implementation in the cities of Kozani and Drama by the research team of the Sustainable Mobility Unit at NTUA. The presentation of these specific case studies constitutes a way to increase the understanding of two specific research methodologies, namely crowdsourcing data and visual techniques, in the context of implementing SUMPs, which is allowed through the assessment of case studies, as a methodological tool [2].

2.2 Methodology

The two methodologies presented are part of a greater methodological framework organized under the implemented SUMPs for the two case study cities. The two assessed cities are Kozani and Drama. They are two medium-sized cities, which, aside of the similar population size, exhibit a variety of other common characteristics: their central districts have been developed without strict city plans over the centuries; arterial roads are passing through their central districts; their central districts display

analogous land use dispersion and clustering; SUMPs are implemented. The aforementioned factors were considered for the selection of these two cities as comparable case studies [3], within the framework of the research. More details about the urban characteristics of the two cities can be found on table 1.

Table 1 - Cities examined

City	Kozani	Drama
Population (Dense Urban Core)	41,066	44,823
Population (Including Areas of Urban Expansion) (approximately)	47,000	51,500
Area (Including Urban Expansion) (approximately) (km2)	20	27
Bicycle Infrastructure Length (km)	2.5	3.3
Size of pedestrianized or traffic-calmed areas (hectares)	12.4	17.4

Indeed, in both Kozani and Drama, a series of methods formed the basis for the design of the designated policy to inform the public and its activation towards the successful planning of the SUMP. Tools utilized for the implementation of the specific action are both innovative, such as web applications, crowd sensing and crowdsourcing techniques, mainly through mobile appliances like smartphones and pads [15] and traditional, such as workshops [7]. In the context of this particular research, interest is mainly focused at the mechanics of the online platform, where citizens were invited to present their ideas on how they envisage their city.

Moving on to the next level, research is on the pursue of relating the ideas embedded on electronic platform, in connection to the outcomes that arose from inspection and examination of video and photographic material, obtained from non-participatory observation. Research took place under good weather conditions. More specifically, in Drama it was carried out on July and in Kozani on March, for a time period of one week per city. This observation was made at consecutive intervals between 7 am-10 pm and 8 am-12 pm, in proportion to their respective research work [8], [10], [13]. Photos were examined qualitatively and behavioral patterns were noted, particularly regarding the issue of mobility, both for pedestrians and drivers.

As it is obvious, the two procedures that were conducted simultaneously, aimed at answering three different types of questions. Visual research corresponds to "how the city has changed through time" and "how people behave in the public space" and the e-platform crowdsourcing research corresponds to "how people want to make/ alter their cities". These two methodologies function within the context of implementing a SUMP like complementary studies in order for the planners to collect data. These questions in fact are not independent. People have a view about the future having in mind how the city has changed through time and what problems they face when

moving in the public space. These consistencies allow the comparison of the methods in regard to their effectiveness to provide feedback to planners.

2.3 Looking for new ideas: Participatory planning through an on-line platform

In the context of the implementation of the two SUMPs, ideas were solicited in order to discover concepts of how inhabitants envisage their cities. The necessity for the aforementioned was based at the intention to raise the voice of citizens, who fully know their city and extended equally to the mobilization of the public towards the successful implementation of the derived SUMP. On these grounds, additionally to the traditional engagement methods, the research group decided to design an on-line platform where residents and visitors would be able to present their own ideas for the city.

In Kozani forty-two (42) ideas were submitted while the platform counted seventy-six (76) registered users. In Drama twenty-two (22) ideas were accrued, while the platform counted nineteen (19) users, meaning that there were some users submitting more than one ideas.

As to the substance of the interventions, with the exception of some general statements, which in the case of Kozani were higher than in Drama (e.g. A focus on changing attitudes/education residents, to make the city more calm), most of the ideas were specific and some were clearly documented. This is also met on the photo selected by each user to support his/ her idea. Indeed, 58.2% of the e-platform users in Kozani, opted to post a photo. From this proportion, 11.9% reflected the idea very precisely. In Drama, 77.8% of the ideas posted on the e-platform were accompanied by a picture. Moreover, a percentage accounting for 22.7% of the images, are perfectly targeted demonstrating accuracy, particularly regarding the idea or the area of the proposed intervention.

In both cities, it was obvious to the public that a critical part of the city's problem was related to the strong presence of the car at their center. Indeed, this is evident in both cities, although travels within the city are short. This fact as identified from the proposed ideas, is directly linked to the perception of the researchers for the SUMP about the shift of motorized traffic from city centers and the overall SUMP ovjectives [14], [19], [21], [22], [23].

Participation of volunteers, in the case of e-platform was relatively small compared to the population of the two cities so far, as was the case for participation to environmental data collection [3].

The online crowdsourcing platform, additional to providing space to develop future ideas, provided a link to an online survey questionnaire. In particular, 1,829 questionnaires were completed for the city of Kozani and 528 for the city of Drama. For the city of Kozani, the profile of those responded to the survey can be described as follows: male 18-30-year-old, student or freelancer with an average income less than 1,000 Euros/month, who owns a bicycle and/or a private car, and he identifies himself also as a pedestrian. Accordingly, in Drama, the profile of the average respondent can be described as follows: male employee aged 31-45, with an average income less than 1000 Euros/month, owning a private car and using it to travel around

the city. The questions varied and were related generally to the traffic and urban problems presented in the two cities, as well as to the people's behavior in terms of city traffic and their intention to use more sustainable means of transport. Focusing on the problematic issues of commuting, it is worth noting that the main issue recorded in the case of Drama was the lack of parking spaces in the city center. The same problem was categorized as the third priority in the case of Kozani, with the cost of transportation and pollution, occupying the first and second place of identified priorities. In overall, it was appraised that the quality of transport is assessed as being on an average level, as well as the state of the public spaces. A typical such case is the Aghia Varvara Park in Drama, which is believed to present places that need to be improved and maintained so that pedestrians' presence will be increased in the future.

In overall, the results of the questionnaire are analogous to those of e-platform research, with some discrepancies relying on the small size of the sample participating in the e-platform. In any case, this participatory method is assessed as an important step in activating the public, through the provision of an official state for filing in the citizens' opinion, which will be later re-evaluated after the completion of the research programs.

2.4   **Visual Research**

As previously stated, observation, video capture and taking photos took place in the framework of the research in order to understand the behavior of drivers and pedestrians. Besides, observation is an important methodological tool that can respond to "what's happening", but cannot answer to "Why" discovering an objective opinion [11], which is being explored through interviews or questionnaire research.

The most basic conclusions that emerged from reading the pictures and video snapshots support the conclusions that emerged during the observation. These could be summarized as follows:

- Connections between pedestrians and the public space: Pedestrians' behavior is influenced by the form of the built environment, the traffic load and the overall attitude and habits of the inhabitants. The above is confirmed by the observation of pedestrians using the road at places where the pavements were of small width or of poor quality. At the same time, another important point is the issue of road crossings. In both Kozani and Drama the crossing of streets was observed at points without zebra-crossings or at points with zebra-crossings but at the time when the traffic light was red for the pedestrians.
- Drivers' relations to public space: Drivers' behavior was observed to mostly comply with the rules of the Road Traffic Code. In both cities drivers seemed to respect the traffic lights and the horizontal signaling, giving space and time to pedestrians to cross the roads. However, severe illegal parking issues have been encountered, concerning unregulated and illegally parked vehicles, without respect for public space.
- Drivers' relations to pedestrians: Observing the behavior of the two categories, there was a clear difference. Drivers respect pedestrians in most cases and stop before zebra-crossings, so that there is adequate space for pedestrians to move/ cross. At the same time, most of them slow down or stop in cases where

pedestrians use the road without warning. On the contrary, pedestrians do not respect the road rules, as they were observed to cross the roads while the traffic light was red for them. They also move from one side of the road to the other at points without zebra-crossings, resulting in conflicts with the vehicles, especially in urban areas, where the traffic flows are high.

- Infrastructure and the use of it: Most traffic lights and other traffic-related infrastructure work well in both cities. However, improvements could be made at bottlenecks. With regard to horizontal signaling and especially zebra-crossings, there is room for improvement. Regarding pavements' condition there is also room for improvements although there are several provisions for children and disabled people.

3   Conclusions

In order to check the level of understanding of the city's problems by its citizens as well as the response of the proposed ideas to the existing issues, two methodologies were compared in regard to their effectiveness to provide input to planners, namely visual research (observation) and public participation through a crowdsourcing platform. The methodologies were conducted at the same stage of research but were independent. The aim of both was to collect information, especially qualitative, which would present a geographical reference. Through crowdsourcing, citizens were asked to step in and actively showcase the issues and participate in city planning by providing ideas on how to address some of them.

The issues that were recorded through the applications of visual research were also perceived by the inhabitants, through the ideas they proposed. The lack of parking spaces and high speed driving within the urban fabric, as well as the improper and sometimes illegal behavior in public spaces were observed and mentioned by the citizens in both Kozani and Drama. Indeed, there was an important need to regain public space and elements of the natural environment, through pedestrianized roads and more green areas. In fact, the demand for green spaces was greater in Drama, although a large lung of urban green is located at the center of the city. Realizing the "occupation" of several city areas by motorized traffic, was also reflected to the existence of several proposals for limiting car through traffic and promoting public transportation. Proposals were in favor of public transportation, cycling and vehicle sharing options along with the limitation of motorized traffic, recognizing the importance of pedestrianized surfaces for the promotion of urban sociability and social cohesion.

Through the research that emerged by applying this methodology, it was also found that residents are focusing on concrete proposals, mostly realistic, sometimes presenting a specific spatial reference. The suggested ideas have been applied abroad, hence researchers assume citizens have seen what they propose on one of their or their friends' journeys or on websites, TV etc.

From the above it is clear that the public input proves to be efficient in recognizing problems, proposing priorities and describing detailed proposals towards achieving desired aims. But as public participation proves to be a difficult task, combining the two methodologies (visual research and crowdsourcing) could contribute to a more complete analysis of the urban phenomena (Table 2). Their operation is complementary since the information collected, is checked and evaluated by the study group, resulting in reliable data to be used within the SUMP planning process.

Table 2 - Topics recognized by the two methodologies.

Topics	Visual Research	Crowdsourcing Platform
Illegal/ Excessive on-street parking	Yes	Yes
Poor Quality of Pedestrian Infrastructure	Yes	Yes
Behaviour of Drivers/ Pedestrians	Yes	No
Concrete/ Realistic Proposals	No	Yes
Recognize Social Priorities	No	Yes

References

1. Abbott, A.: Of Time and Space: The contemporary relevance of the Chicago School. Social Forces 75(11), 49-82 (1997).
2. Bakogiannis, E, Siti, M, Vassi, A., Christodoulopoulou, G. and Kyriakidis, C.: Case studies and sustainable urban mobility research schemes: A communication channel among researchers and interdisciplinary community groups. International Journal of Service Science, Management and Engineering 1(4), 42-51 (2014).
3. Bakogiannis, E, Kyriakidis, C, Siti, M., Kougioumtzidis, N. and Potsiou, C.: The use of VGI in noise mapping. In: GeoPreVi 2017 Bucharest, Romania (2017). Article of the month, FIG (Febraury 2018). http://www.fig.net/resources/monthly_articles/2018/ Bakogiannis_etal_february_2018.asp, last accessed 2018/02/17.
4. Bakogiannis, E., Kyriakidis, C., Siti, M. and Eleftheriou, V.: Four stories for sustainable mobility in Greece, Transportation Research Procedia 24, 345-353 (2017).
5. Ganti, R., Ye, F. and Lei, H.: Mobile crowdsensing: Current state and future challenges. IEEE Communications Magazine 49(11), 32-39 (2011).
6. Grady, J.: Visual research at the crossroads. Forum: Qualitative social research 9(3), n.r. (2008).
7. Kyriakidis, C.: Citizen and city: Issues related in public participation in the process of spatial planning. In: 3rd National Conference of Planning and Regional Development, University of Thessaly, Volos (2012).
8. Kyriakidis, C.: The function of urban public space in relation to local parameters: Comparative study between Larisa and Nottingham, Aeichoros 26, 67-85 (2016).

8

9. Kyriakidis, C., Bakogiannis, E. and Siolas, A.: Identifying environmental affordances in Kypseli Square in Athens, Greece. In: Proceedings of the International New York Conference on Social Sciences (ICONSOS 2017), pp. 83-96 New York, USA (2017).

10. Kyriakidis, C. and Bakogiannis, E.: How the physical characteristics may affect the social life of streets in Athens, Greece? In: 14th International Conference on Social Sciences. Goethe University, Frankfurt (2018).

11. LeGates, R.: Prologue: How to study cities. In: LeGates, R. and Stout, F. (eds) THE CITY READER, 5th ed. Routledge: London, pp. 7-12 (2011).

12. Liebenberg, L.: visual image as discusion point: Increasing validity in boundary crossing research. Qualitative Research 9(4), 441-467 (2009).

13. Mehta, V.: The street. A quintessential social public space. Routledge: London and New York (2013).

14. Nikitas, A., Wallegren, P. and Rexfelt, O.: The paradox of public acceptance of bike sharing in Gothenburg. In: Proceedings of the Institution of Civil Engineers – Engineering Sustainability, 169(3), pp. 101-113 (2016).

15. Papadopoulou, C. and Stratigea, A.: Traditional VS Web-based participatory tools in support of spatial planning in 'lagging-behind' peripheral region. In: Proceedings of International Conference on 'Socio-economic sustainability, Regional Development and Spatial Planning: European and International Dimensions and Perspectives'. Pp. 165-170. Mytilene, Greece (2014).

16. Pödör A. Révész A, Oscal A. and Ladomerszki, Z.: Testing some Aspects of Usability of Crowdsourced Smartphone Generated Noise Maps. Journal for Geographic Information Science 1 (2015), 354-358 (2015).

17. Reiss, A.J.: Systematic observations of natural social phenomena. Sociological Methodology 3, 3-33 (1971).

18. See L, Mooney P, Foody G, et al: Crowdsourcing, citizen science or volunteered geographic information? The current state of crowdsourced geographic information. International Journal of Geo-Information 5(5), n.r. (2016).

19. Shokoohi, R. and Nikitas, A.: Urban growth and transportation in Kuala Lumpur: Can cycling be incorporated into Kuala Lumpur's transportation system?. Case studies on Transport Policy 5(4), 615-626 (2017).

20. Somarakis G, Stratigea A.: involvement in taking legislative action as to the spatial development of the tourist sector in Greece – The "OpenGov" platform experience. Future Internet 6, 735-759 (2014).

21. Vlastos, Th., Barbopoulos, N. and Milakis, D.: The "spatial capacity" approach for a sustainable urban transport planning. The case of Kallithea, Athens. In: Proceedings of the Congress "Urban transport and the environment for the 21st Century IV", pp. 133-143. Wessex Institute of Technology Press (2003).

22. Vlastos, Th., Milakos, D. and Athanasopoulos, K.: Research on cycling in Greece. Methodology of planning, infrastructure standards and a typology of design solutions. In: 15th International Velo-City Conference, Dublin, Ireland (2005).

23. Vlastos, Th. And Athanasopoulos, K.: Obstacles to public participation in sustainable mobility policies: The case of tram implementation in Athens. Aeichoros 5(2), 4-25 (2006).

24. Wang, C.C., Yi, W.K., Tao, Z.W. and Carovano, K.: Photovoice as a participatory health promotion strategy. Health Promotion International 13(1), 75-86 (1998).

25. Xiao Y, Simoens P, Pillai P et al: Lowering the barriers to large-scale mobile crowdsensing. In: 14th Workshop on Mobile Computing Systems and Applications. Jekyll Island, Georgia (2013).

26. Whyte, W.:The social life of small urban spaces. Conservation Doundation: Washington, DC (1980).