Conference on Sustainable Urban Mobility 2018
24 - 25 May 2018, Skiathos Island - Greece
### Session 1A: Social networks and traveler behavior

**Moderators:** Odile Hedebeaut, Pythiamentha Thakuriah

- The walkability of Thessaloniki: citizens' perceptions - Konstantinos Konstantinou, Evangelos Gentzis and Aristotle Naniopoulos
- Perception of smartphone applications about transportation among university students - Choros Cholamidas, Rafii Tattari, Socrates Rados and Ioannis Politis
- Social networking and Driving: A study about young Greeks - Themisopoulous Ypilonas, Panos Klopelis, Christos Marinos Polyemopoulos and Elissavet Demidri
- Crowdsourcing and visual research methodologies to promote data collection for sustainable mobility planning - Ethnomis Bokanisios, Maria Siti, Konstantinos Athanasopoulou, Agis Vassil and Choromonomiens Kyriakides
- Hagetrends, a way to identify the future transport challenges - Vladimir Maras, Miljana Bugarinovic, Elmi Anoyrkati and Alba Linda Ayvereto
- Inviting the potential of CITS' market research analysis - Ivan Zhilkov, Elen Anoyrkati, Alexis Garcia-Perez, Alba Linda Avereto, Vlora Bjokova, Xavier Leal and Victor Corral
- Public transport 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 - Seim Kireem Jatin and Fuxian Kuanglu

**Coffee Break**

**Moderator:** Eftihia Nathanail

### Session 2A: Traffic emissions and environmental impacts

**Moderators:** Fotini Khayega, Dimitris Seris

- 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. Pythiamentha Thakuriah
- TCO Driving: Strategies and Impacts - Prof. Alexander Skabardonis
- Advocating Traffic Data Operations, Enhancing Road Safety with the use of new technologies - ATTIKI ODOS: Dr. Dimitris Seris
- Modelling travelers' behavior in the presence of reward schemes offered for green multimodal choices - Amalia Polydoropoulou, Ioanna Pagoni, Athena Tsirimpa and Ioannis Tsouros
- Cycling as a key component of the Athenian sustainable urban mobility plan - Ethnomis Bokanisios, Maria Siti, Christos Christodoulopoulos, Christos Karolemes and Choromonomiens Kyriakides
- Influence of traffic emissions on urban air quality: a case study of a medium sized city - Angelos Angelakakis, Akras Asimakopoulos, Alkivadias Tsalamis and Maria Bole
- Assessment of CO2 footprint of the new Athens Metro line 4 during the operation phase - Aristidis Giosikomis, Fotini Khayega and Ethnomis Seris
- Cycling and environmental rehabilitation of the Agios Anargiroi square of the Municipality of Agios Anargiroi - Kamatero, Christina Manogri, Ethnomis Zervas and Dimitris Nalmpantis
- Traffic and environmental rehabilitation of the Agios Anargiroi square of the Municipality of Agios Anargiroi - Kamatero, Christina Manogri, Ethnomis Zervas and Dimitris Nalmpantis
- Influence of mobility and travel on the urban ecosystem and the landscape: a case study of Athens - Prof. Konstantinos Konstantinou
- Assessing dynamic geo-positioning using multi-constellation GNSS in challenging environments - Stella Strataki, David Bétaille and Eftihia Nathanail
- The aesthetic integration of a tramway system in the urban landscape: evaluation of the visual nuisance - Christos Perygids, Antonis Zagorias and Alexandros Dolianitis
- Modelling travelers' behavior in the presence of reward schemes offered for green multimodal choices - Amalia Polydoropoulou, Ioanna Pagoni, Athena Tsirimpa and Ioannis Tsouros
- Assessing dynamic geo-positioning using multi-constellation GNSS in challenging environments - Stella Strataki, David Bétaille and Johannes Scholl

**Lunch**

### Keynote Speakers Session

**Moderator:** Eftihia Nathanail

- Prof. Alexander Skabardonis
- Dr. Dimitris Seris
- Eftihia Nathanail

### Session 2B: Public transport and demand responsive systems

**Moderators:** Umberto Crusli, Ioannis Politis

- Investigating potential synergies among social entrepreneurship and public transport through experts' consultation in Greece - Akras Asimakopoulos, Evangelos Gentzis, Dimitris Nalmpantis and Aristotelis Naniopoulos
- Modeling transit user travel time perception in a post-economic recession era: The case of Athens, Greece - Akras Asimakopoulos, Konstantinos Kepogiannis, Eleni Vlahogianni and Christine Iliopoulou
- The walkability of Thessaloniki: citizens' perceptions - Konstantinos Konstantinou, Evangelos Gentzis and Aristotle Naniopoulos
- Assessment of CO2 footprint of the new Athens Metro line 4 during the operation phase - Aristidis Giosikomis, Fotini Khayega and Ethnomis Seris
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**Programme**

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

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### Session 4A: ALLIANCE Special Session  
**Moderators:** Irina Kuzmina-Merlino, Irina Pticina

- Integrating logistics and transportation simulation tools for long-term planning - Ioannis Karakikes, Wislitrin Hofmann, Lambros Mitropoulos and Mihalis Savvasou
- Development and simulation of priority based control strategies of ground vehicles movements on the aerodrome - Ayad Alomari, Juri Toljew and David Weigert
- Design and prototyping of IoS shared service for small and medium enterprise - Alexandros Avdikinis and Mihalis Savvasou
- Comparing the customer use and satisfaction in two Latvian transport interchanges - Iris Yatskiv and Vale Ogrume
- Investigating the accessibility level in Riga's international Coach Terminal: A comparative analysis with European Interchanges - Eveline Audlovič, Vissarion Migganos, Giannis Adamos, Iris Yatskiv and Maria Tsami
- Impact of critical variables on economic viability of converted diesel city bus into electric bus - Kristine Molnaco and Iris Yatskiv
- Shopping malls accessibility evaluation based on microscopic traffic flow simulation - Mihalis Savvasou, Irina Pticina and Valerio Terminiokos

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### Session 4B: Traffic emissions and environmental impacts II  
**Moderators:** Apostolos Papagiannakis

- Investigating mobility gaps in University campuses - Panagiotis Papantoniou, Eleni Vlachogianni, George Yannis, Maria Attard, Pedro Valero, Mery Campana, Diana Ercegovic and Maria Tereza Torna Lancer
- Big and open data supporting sustainable mobility in smart cities – the case of Thessaloniki - Georgia Afpopoulos, Josep-Maria Solanou, Panagiotis Titanos, Inaki Stamos and Evangelos Mitakis
- Economic cost of urban freight GHG mitigation - Christophe Ruet and Tu Tho Hoa Thu
- Road traffic noise reduction and sustainable transportation: A case survey in the cities of Athens and Thessaloniki, Greece - Vasillios Profillidis, George Biotoris and Athanasios Galanis
- Sustainable urban mobility plans in Mediterranean port cities: The SUMPORT project - Marinos Miltiadou, George Mitikis, Socrates Basbas, Christos Taxisiari and Antonia Tsaoulou
- Cooperative intelligent transport systems as a policy tool for mitigating the impacts of climate change on road transport - Evangelos Mitakis and Areti Kotsi

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### Session 5A: Driver-driven infrastructure management  
**Moderators:** Socrates Basbas, Alexander Skabardonis

- Performance evaluation of GLOSA algorithms under realistic traffic conditions using C2I-communication - Michael Kleoppel, Jan Grimm, Severin Strahl and Rico Aeurrwold
- 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, Lina Leden and Per Gander
- Trip generation rates for a University campus: the case of the Aristotle University of Thessaloniki, Greece - Socrates Basbas, Konstantinos Takozoglou, George Mitikis, Christos Taxisiari and Ioannis Politis
- An analysis on drivers’ self-reported questionnaire responses, regarding aggressive driving, attitude toward cyclists and personal values - Kyriakos Andonis, Nikolos Movridis, Alexandros Dikonomos and Socrates Basbas
- Redesigning the selfaddress of Patos - Spyridon Vougias, Konstantinos Anastasiadou and Giorgos Vergas
- Development of an aggregate indicator for evaluating sustainable urban mobility in the city of Xanthi, Greece - Anastasios Tsipoulos, Apostolis Papagiannakis and Dimitis Loutropoulos

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### Session 5B: Social networks and traveller behavior II  
**Moderators:** Francesco Viti

- Investigating the role and potential impact of social media on mobility behavior - Maria Karatsoli and Eleftheria Nathanael
- Campaigns and awareness-raising strategies on sustainable urban mobility - Vissarion Migganos, Maria Karatsoli, Giannis Adamos and Efthymios Nati
- A comparison of bicyclist attitudes in two urban areas in USA and Italy - Nikiforos Stamatiadis, Giuseppina Pappalardo and Salvatore Scafì
d- Influence of ICT evolution and innovation on travel and consumption behaviour for determining sustainable urban mobility - Odile Hedebleaut and Anne Fauvir
- Prolfaas - Mobility as a Service for Professionals. Integrated sectorial business platform for multimodal cross border mobility - Christophe Felius, Adrian Imrei, Sebastien Faye, Gerald Arnaud and Qamal Khadriou
- The use of social computing in travellers’ activities preference analysis - Charis Chalkiadakis, Panagiotis Ioannidoupolis, Evangelos Mitzakis and Eleftheria Nathanael

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### Session 6A: City logistics systems  
**Moderators:** Athanasios Galanis, Daniela Muellner-Ep

- A new gold mine? Identifying crucial factors affecting the potential of a freight tram for urban freight distribution - Kostis De Langhe, Hilde Meersman, Christi Sy, Eddy Van de Voorde and Thierry Vanvelander
- Design of a smart picking system in the warehouse - Rallis Apasolas and Genaadis Gromos
- A conceptual framework for planning transport corridors for big cars in last mile logistics - Tom Assmann, Evelyn Fischer and Sebastian Bobeth
- Exploiting spatial and structural patterns of urban road accidents: some empirical evidences from Rome - Antonio Calo, Luca Perissi, Antonio Nuzzolo and Antonio Palemi
- SWOT analysis for the introduction of night deliveries policy in the Municipality of Thessaloniki - Efthathis Bouhouaras and Socrates Basbas
- Design of a digital collaborative tool to improve mobility in the Universities - Ariela Goldbard, AnaVelazquez, Rodrigo Rebollo, Erick Lopez, Octavio Mercado and Felipe Victoria
- The implementation of environmentally friendly city Logistics in south Baltic Region cities - Stanislav Iwen and Kingo Kijewski

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### Session 7A: NOVELOG Special Session  
**Moderators:** Giannis Adamos, Harald Nilsson

- Environmental aspects of urban freight movement in private sector - Afroditi Anagnostoupolous and Maria Boile
- Assessing traffic and environmental impacts of smart lockers logistics measure in a medium-sized municipality of Athens - Vassilios Gioulis, Efthiha Nathanael and Ioannis Karakikes
- Adaptability/transferability in the city logistics measures implementation - Stanislav Iwen and Kingo Kijewski
- Does the implementation of urban freight transport policies and measures affect stakeholders’ behavior? - Efthiha Nathanael, 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 Valinio and Elena Beretto
- Diagnostic of the European logistics and road freight transportation sector - Georgia Afpopoulos, Inaki Stamos, Monica Giannini and Josep-Maria Solanou
- Urban traffic management utilizing soft measures: A case study of Volos city - Maria Karatsoni, Ioannis Karakikes and Efthiha Nathanael

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### Session 7B: Transport data and analytics  
**Moderators:** Konstantinos Kokkinos, Agostino Nuzzolo

- Measuring the spatial accessibility of public transport: the case of the new urban rail systems in the city of Thessaloniki, Greece - Ioannis Konkolinos, Konstantinos Karagoun and Apostolis Papagiannakis
- TAOo – A Tracking for planning Tool applied to cycling and walking data - Andre Ramos and João de Abreu E Silva
- Combining land use, traffic and demographic data for modelling road safety performance in urban areas - Efthymi Papadopoulos and Ioannis Politis
- Urban form and transportation infrastructure in European cities - Poulias Papatassi and Apostolis Cogias
- 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 Berio, Eleonora Petitto, Fabio Carlo Guereschi, Paolo Baglione and Stefano Cernichiari
- Neural network based road accident forecasting in transportation and public management - Georgios A. Kroukalis
- Assessment of drivers' perception of quality of service on urban roundabouts - Maria Peripis, Erfuhi Damauskus and Fatima Rehagia
- Handling adaptive dynamic background models for vision-based traffic detection - Nazmok Hoque, Md Mazidul Islam, Md Yousuf Ali and Farhana Mazumder Lim
Cycling as a key component of the Athenian Sustainable Urban Mobility Plan

Efthimios Bakogiannis¹, Maria Siti¹, Georgia Christodouloupoulou¹, Christos Karolemeas¹ and Charalampos Kyriakidis¹

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Abstract. The Athenian Strategic Plan for Sustainable Urban Mobility (SUMP) aims to support the most efficient ways of daily commuting towards mitigating limited public spaces, pollution and delays, while increasing individual cycling use and bike sharing services. Bicycle is a major issue in terms of promoting and implementing a robust urban mobility strategy. Improvement of existing infrastructure, development of new networks and specialized lanes, adaptation of the traffic code, awareness raising and integration of technology are among the key aspects of such a strategy. The inclusion of an integrated and coherent cycling network in the Athenian SUMP is the fulfillment of a key strategy, aiming at the development of cycling policies and infrastructure within the overall priorities of a SUMP (i.e. promotion of walking, cycling and public transportation). The promotion and integration of cycling as a bold commuting mode could address a range of mobility problems, making Athens’ transportation environment equivalent to other European capitals’ that are healthier, functional, safe, productive and attract residents, visitors and investors. This paper presents the methodology of designing the Athenian cycling network, within a new concept of mobility management promoting coexistence rather than the conventional separation standards, while at the same time adjusting vehicle speeds in the various street types. Several elements regarding road safety enhancements are reported, as well as the specific terms of introducing cycling in the current network and bus lanes, sidewalks and pedestrian streets. Lastly proposals regard the supplementation of the existing traffic code and other institutional issues of cycling.

Keywords: cycling, sustainable urban mobility plan, cycle path network, public transport, walking

1 Introduction

The integration of a unified and coherent cycle path network in the evolving Sustainable Urban Mobility Plan (SUMP) of the Municipality of Athens is tantamount to fulfilling the basic criteria set by the strategic directions of Sustainable Urban Mobility in Athens with the aim of promoting cycling and developing its infrastructure in the network of the city, as part of a more general change in priorities that will make the capital city a city of public transport, bicycle and walking.

This paper presents the criteria for the integration of cycle paths in the Athenian network as they result from the analysis of: The Strategic Plan for Sustainable Mobili-
ty in the Municipality of Athens, formulated by the Sustainable Mobility Unit of the NTUA [3] and the main Strategic texts and plans that have been developed and proposed for Athens, over the last five years.

The objective is to establish the corresponding criteria for the cycling network, which will be met according to the Athenian mobility strategy, and also match the activities, proposed actions and projects developed by the SUMP Working Group in all work stages of the project. Cycling in the center of Athens when all interventions will have been completed, will address a wide range of commuting issues, helping the city to become a real European capital, healthy, functional and productive, with a high standard of living, able to attract visitors and investors.

2 Issues related to the integration of bicycle into the Athenian urban transportation system – Theoretical Approach

According to Vlastos [10], pedestrians and cyclists are known to be the best consumers because they have advantages in terms of their increased accessibility in various activities. Their number increases where the conditions for walking and cycling are favorable. New businesses, commercial and recreational activities as well as offices are encouraged to be reallocated to the city center. According to Visitors’ Satisfaction Survey & Attica Hotel Performance 2016-2017 [2], foreign visitors prefer hotels located in the historical center of the city and close to museums and shopping streets. A city like Athens, well-known all around the world, should enhance what the visitor wishes to see and enjoy managing to prolong his/her stay with attractive routes linking its key elements and monuments. This means that the whole city, besides its historic center, should be attractive, safe and easily accessible through various means.

Pedestrians and cyclists have direct contact with the space due to their low speed. It is up to them to decide how quickly or slowly they move, or when and for how long they stop according to their surroundings. This is not the case for car or motorcycle drivers who are following the rhythm and speed of the flow. Pedestrians’ and cyclists’ senses are vivid; hearing, vision, smell and touch allow them to immediately perceive and communicate to the physical and social environment of each trip. They have every reason to be interested and claim a city that is beautiful and rich in stimuli and incentives. These needed qualities differ to those of people who are isolated in the enclosed space of their cars.

The request for a ‘4km/h architecture’ argues the need for infrastructure addressed to pedestrians and cyclists, and spaces that have an identity and are in direct dialogue with people, in contrary to the common demand of those locked within their car passing through the city. The ‘architecture of 50 or 80 km/h’ is empty of details and silent in communication terms; it is an architecture to watch from a distance while driving through the places. It would not be an exaggeration to argue that sustainable mobility perspective paves the way while also directs the aesthetic reformation of the center of Athens. Sustainable mobility cannot exist in an urban environment which is architecturally indifferent as pedestrians and cyclists need an upgraded environment in terms of public space aesthetics and level of comfort. Cycling shall be integrated progres-
sively in the Athenian streets, starting from where the conditions are already friendly, such as the pedestrianized historical center. It is also important for further cycling integration to be included in all future regeneration plans for the urban and environmental rehabilitation of Athens.

3 Methodology on implementation sustainable mobility strategies for cycling

The Strategy seeks to develop a cycling promotion policy. The development of exclusive cycling infrastructure is the most conventional way of cycling enhancement and, for some, the safest way to do so. However, very few European cities have such infrastructure and most have acquired recently. However, this seems still not enough to convince residents to get on their bicycles. Many of their commuting trips rarely match with the few kilometers of separated bicycle paths that were built, due to the high cost of it or the street geometry. This is the case for the countries that do not have the necessary culture and courtesy to respect cyclists and just ‘build’ a bicycle lane with a white line on the road. It is very natural that these countries are reluctant to risk integrating cyclists in roads where flows and speeds are high.

"City bikes" appear as an alternative to the car, but also as an incentive to move in city centers, which are the most congested with various destinations in relatively close distances. They are also an incentive for residents of the suburbs to use public transport to get to the center and then use the bicycle to easily reach their specific next destinations. Shared bicycles and public transportation can function in ideal cooperation, as allies in helping citizens and cities to become less car-dependent. With regard to the traffic parameter, the presence of bicycles is a proof of prevalence of sustainable mobility conditions. Segregated infrastructure with high cost is not necessary. There is a rich experience of cities with high bicycle rates thanks to horizontal road signaling. In these cities however, there is road courtesy. That is why the Municipality of Athens should not underestimate the importance of education and awareness raising for both children and adults. In order for cycling to be enhanced, the number of on street cars (either moving or parked) shall be reduced along with their speed.

In Europe, bicycle infrastructure solutions are provided by simply drawing special lanes on the road, or by building separated bicycle paths (different surface levels), or even by extending pedestrian zones and building traffic calmed areas where no exclusive infrastructure is required. In the case of a single bike lane, a white line is easily drawn on road, quickly and without cost. However, this is not the solution to the hostile behavior of the Greek driver. This is why the Sustainable Mobility Unit of the National Technical University of Athens [11, 12], after studying road conditions in dozens of Greek cities and playing an active role to the dissemination of bicycle use, has proposed the reallocation of bike lanes from the roadway to a special lane on the sidewalk, through widening it accordingly. This was the solution that was systematically applied due to its advantages related to enhancing pedestrian convenience as many cities lacked the needed minimum sidewalk widths. However, this seemed to be the optimal solution for several cases before the Greek economic crisis and today it
would be absurd to keep on with the same practice. The current optimal solution would be to develop bike lanes on road and put weight on education and training policies for drivers and motorcyclists to drive with caution.

A complete solution is to create traffic calmed zones, with a maximum speed of 30 km/h in order to protect pedestrians and cyclists. Cyclists in such zones do not demand specialized infrastructure as they can safely move along with cars in low speeds. Such zones, although very common in European cities, are quite rare in Greece. The Strategic Plan for Sustainable Mobility in the historical center of the Municipality of Athens should have traffic calmed areas at its planning core.

In addition to the above policies, the rapid growth of electric bicycle rental systems in Europe in the recent years is quite interesting [8]. They are a direct incentive that function as an alternative to the use of cars, especially in the central areas, which are the most congested with various destinations in relatively close distances. They are also an incentive for suburban residents, when they need to reach different destinations within the city center. Indeed, the electric bicycle, when public transportation is inadequate in the center, gives them a radical solution. Electric shared bicycles and public transport can function in ideal cooperation, as allies in helping citizens and cities to become less car-dependent. For visitors, e-bike rental systems are part of the city's infrastructure, a means of approaching the details and exploring the city. The installation of electric bike rental systems gives a clear boost to the first rides in an environment that is fairly considered hostile. However, it demands some key elements to be considered safe; pedestrianized streets, some bicycle lanes, pedestrianized historical centers etc. But, is this space enough? Obviously, system users will use conventional roads, and this shall progressively make drivers more cautious in every way, since the bike network is completed.

4 The case of Municipality of Athens: Integrating cycling in transportation planning

The Athenian Strategic Plan for Sustainable Mobility and Transport [5] aims to support the most efficient ways of commuting through the city, towards the issue of limited public space, and put an emphasis on strengthening the use of bicycles, both private and shared ones. Bicycle is a key pillar of the sustainable mobility strategy. It needs infrastructure improvements, several adaptations to the Road Traffic Code (RTC), raising awareness and mobilizing citizens, as well as technology upgrades. It is important to emphasize to the positive characteristics of the bicycle and its vulnerability in terms of road safety and to clearly define the conditions of its circulation on street, on bus lanes, on sidewalks and pedestrianized streets roads. Moreover, speed limits shall be redefined in various streets, on the basis of coexistence, rather than exclusion or separation.

In addition, the Plan proposes the creation of special lanes to accommodate buses and bicycles. After the trial period of bicycle circulation in the bus lanes, results were assessed, and adjustments or improvements are proposed for the institutionalization of this solution of shared bus-bicycle lanes, allowing Athens to acquire a crucial net-
work at very low cost. The development of a Public Bike Sharing System can offer a great deal in improving mobility, and add a touch of optimism and inspiration for addressing its problems. Also, it can promote collaboration and synergy among the various institutions involved.

The Regulatory Master Plan for Athens-Attica 2021 stresses the necessity of organizing traffic at the municipal level and town planning units, based on the principles of sustainable urban mobility, with emphasis on quiet transport modes such as public transport, cycling, walking. It also emphasizes the enhancement of pedestrians’ and cyclists’ accessibility. As far as the bicycle is concerned, the Master Plan aims to recover public spaces by upgrading and expanding the pedestrian and bicycle network while also reallocating on-street parking to off street private spaces. In addition, it aims at building integrated networks for pedestrians and cyclists alike, between major natural, urban, transport and cultural centers. The need to extend pedestrianized zones or create pedestrian, bicycle and public transport routes on commercial roads is emphasized, following special transport studies. Pedestrian routes connecting public buildings and monuments of architectural, artistic and historical interest are also promoted. The promoted traffic related directives include the diversion of through traffic out of the central area and integrating walking and cycling areas, as well as overall cultural routes. The development of an extensive metropolitan cycling network will provide access to important areas of cultural and recreational interest, such as Elefsina, Ktima Tatoiou, Marathonas and Sounio, which if combined with local bike lanes through the surpassing municipalities can further contribute to cycling promotion in Attica basin.

The Operational Program of the Municipality of Athens (2015-2019) [7], states the various traffic issues in Athens, which seem to derive from the increase of car ownership, the lack of infrastructure and the inadequate management of the transport system. Among the most frequently encountered issues are walking and cycling inconsistencies, inadequate provision of motorbike parking (including bicycles), lack of bicycle routes, as well as the failure to make them part of the official city plan.

Fig. 1. a. Athens Metropolitan Cycling Network. b. Cycling Infrastructure in Thessalonikis Str. (Source: SMU)
The Plan for Integrated Urban Interventions [6] in the center of Athens assesses that in the city center there was no planned or constructed bicycle paths. Attempts made back in 2012 by the Municipality of Athens to implement a bicycle path connecting the archaeological sites of Kerameikos with Plato Academy were not successful, due to negative responses by the local councils of the 3rd and 4th Municipal Communities. Moreover, the plan assesses the metropolitan cycling route linking Kifissia, Athens and Faliro as divided into two sub-projects. The southern part received all necessary approvals and was eventually constructed, while the northern part connecting Gazi (Athens) to Kifissia remains unbuilt. The plan also referred to the Athens' Metropolitan Cycling Network, which was finally approved and institutionalized. The plan considers that the implementation of a pilot bicycle sharing system with 1,000 bicycles and 70 automatic pick-up and return stations, would be the lever for promoting all bike-related issues, such as cycling in bus lanes, establishing the movement of bicycles within pedestrian roads and adapting the traffic code to the new requirements for the dissemination of safe bicycle use in Greece. In line with the above, among the objectives set in this plan, the achievement of sustainable mobility conditions is also mentioned by pointing out that "the bicycle as a means of transportation in the city is friendly to the human and the environment, while its use is costless compared to the use of other private vehicles" [6]. However, the lack of appropriate cycling infrastructure creates a sense of insecurity and discourages unfamiliar citizens who would like to use the bicycle as a means of transport on a regular or occasional basis. In order to restore the sense of safety to cyclists, a coherent bicycle network should be created to allow for integrated cycling circulation, i.e. from any desired starting point to any desired destination, with a sense of comfort and safety. Along with the development of a bike network, solutions should also be provided for safe bike parking at destinations integrated into the public spaces. Institutional problems concern the completeness and clarity of cycling in the existing institutional framework. According to the current Traffic code bicycle is a vehicle, which makes its ability to move on sidewalks or pedestrian streets to be highly questioned, while at the same time the concept of a bicycle route is not properly defined. A similar issue is also noted for the movement of bicycles within the bus lanes. The plan also states that arrangements for the common use of bus lanes should be defined together with bus operators [6]. Lastly, the activation, co-ordination and cooperation of all parts involved (Municipality of Athens, Ministry of Transport and Networks, Ministry of Environment and Energy, Ministry of Culture, Bus Operator etc.) as well as active citizens or groups of citizens and stakeholders is a task that must be conducted through information and consultation campaigns [9].

5 Proposed actions and measures

Sustainable Urban Mobility Plans (SUMPs) are emerging as a new integrated and long-term urban mobility planning approach, that allow local authorities to develop and implement urban mobility strategies on the basis of in-depth analysis of the current situation. SUMPs provide a clear vision for the sustainable development of the
urban areas for which they are designed, including reducing energy consumption, air and noise pollution, accidents, congestion, preservation of communal areas, etc. They rely on existing planning practices and are inspired by the principles of unified design, participation and evaluation to meet the movement and mobility needs of people today and in the future, for a better quality of life in the city and its surroundings. The bicycle is one of the 3 pillars of the SUMPs along with walking and public transport [3]. In Athens, a lot of effort shall be put on introducing decisive policies for the implementation of infrastructure, especially where the operation of the network is burdened by a large number of vehicles and motorcycles that sometimes move and park illegally, using/occupying spaces that normally belong to pedestrians and cyclists. Bicycle integration will prove to be a pleasant upgrade of the city’s network. This shall not be achieved independently from the overall course of the city. Integrating the bicycle, which by default is a peaceful vehicle, in everyday transport means demands traffic calmed conditions and quality spaces. The development of cycling in Athens will largely depend on projects and policies directly related to cycling integration (such as bicycle lanes, bicycle corridors), but also on projects and policies that concern the overall transportation planning system (such as traffic regulations, BRT systems, car restrictions etc.). The key priority steps include:

• solving the institutional problems concerning the use of bicycles in the city and make legislative interventions in the Traffic Code that are compatible with the recent guidelines for integrating cycling (Decree 1053 / B / 14.4.2016)

• effective cooperation of the various services and authorities during the elaboration and the maturation of the needed studies, since both the SUMP and any traffic regulations required for the integration of cycling are at the responsibility of many authorities and legal bodies apart from the Municipality.

• initiating the implementation of a coherent cycling network which shall consist of primary (inter-municipal) and local cycling routes, which will provide citizens with the desired feeling of safety and comfort to use the bicycle as the main alternative means of transport.

• developing traffic calmed areas where bicycles will coexist with cars in cycle streets according to the recent guidelines for integrating cycling (Decree 1053 / B / 14.4.2016)

• informing, educating and raising awareness for the public and all interested stakeholders regarding the conscious use of bicycle and its benefits to the city. This shall alleviate controversies and enhance the culture of coexistence and mutual respect among citizens.

• taking action to reduce the risks of negative reactions of specific stakeholders, since the redistribution of the public space will affect those who enjoy some legitimate or illegitimate 'privileges' mostly related to parking.

6 Conclusions

Athens is currently a city that has given absolute priority to the car, while public transport sharply shrinks its ability to thrive. In these conditions, cycling commuting
is struggling. However, as stated before, there are a lot to be done by the Municipality of Athens in order to change priorities in transportation planning. Residential areas, covering the vast majority of the city's surface, should be the top priority. It could be easy to convert them into traffic calmed zones at low cost, serving both the cyclists and pedestrians. The SUMP is a critical tool for promoting cycling in the city, and it is expected that in the coming years there will be major alterations in favor of sustainable mobility compared to the current city image.

References