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Evaluation of sustainable urban mobility in the city of Thessaloniki

Vasiliki-Maria Perra[a*], Alexandros Sdoukopoulos[a], Magda Pitsiava-Latinopoulou[a]

[a]*Aristotle University of Thessaloniki, Transport Engineering Laboratory, Thessaloniki 54124, Greece*

Abstract

Transport is one of the most important urban planning functions that ensures mobility within the urban area and access to various land uses. The characteristics of modern cities create high requirements for high quality levels in mobility, as well. However, the transport systems have a negative impact on economic, social and environmental parameters as they are connected to sustainable development. This interactive relationship is the subject of sustainable urban mobility, a concept that addresses the sufficiency of transport systems according to the principles of sustainable development. Integrated and sufficient promotion of sustainable urban mobility requires the continuous monitoring of mobility levels so as to develop the appropriate policies. A widespread practice of monitoring audit is the evaluation using performance indicators that quantify the variables related to sustainable urban mobility. This paper deals with the evaluation of sustainable urban mobility levels in the city of Thessaloniki. Initially, the paper introduces the theoretical background clarifying the subject of sustainable urban mobility and the contribution of indicators to evaluation and implementation of the best practices. Furthermore, the study area is defined, which is in fact the Metropolitan area of Thessaloniki, and its special regional, urban and transport characteristics are briefly analyzed. Then, the sustainable urban mobility indicators are assessed through a procedure that requires the collection of transport data in coordination with the data processing, including statistical and spatial analysis and cartographic and diagrammatic representation of the produced information. This evaluation concludes to a SWOT analysis focused on the urban mobility features of Thessaloniki and the values of the calculated indicators. In conclusion, the SWOT analysis has the prospects of being used in policymaking, defining strategic directions and the implementation of measures towards the fulfilment of sustainable urban mobility in the second largest city of Greece.

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Keywords: Sustainable urban mobility; indicators; city of Thessaloniki
* Corresponding author. Tel.: +30-694-856-3827. E-mail address: perravml@gmail.com

1. Introduction

The conventional transport planning approach not only failed to cope with the externalities of the transport system such as traffic congestion, air pollution, transport noise and degradation of the built environment, but also led to their exacerbation. The aforementioned phenomena can be efficiently addressed by adopting a contemporary sustainable planning approach which will create a totally new "scenic". The sustainable planning approach aims at satisfying the basic access needs of individuals and societies in a manner affordable and efficient, environmental friendly and with equity within and between generations (EU, 2001). Whilst the conventional approach was focused on the optimization of the traffic flows as well as the increase of the capacity and the travel speed by providing additional road infrastructure, the sustainable approach sets as primary objectives the accessibility and the quality of life and focuses

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on the optimization of use of the current infrastructure as well as on the provision of cost-effective solutions, mobility services and information systems. The transport planning process alters from an exclusive domain of traffic engineers to an interdisciplinary planning process that integrates the urban/land use planning, the environmental concerns and the social needs. Besides experts and other important stakeholders are now actively involved in the planning process. The short and medium-term perspective and the limited impacts assessment that characterized the conventional approach are now getting replaced by the long-term vision and the intensive impacts assessment. The reference area is now defined by functional boundaries instead of the administrative boundaries that used to limit the examined area in the case of the conventional approach. The sustainable urban mobility should consist the vision of every urban area no matter how difficult its attainment is. Sustainable urban mobility is a challenging issue that requires besides paradigm shift, the continuous evaluation of the current mobility conditions since according to several researchers "what gets measured gets managed" and "an issue that cannot be clearly measured will be difficult to improve" (Zheng et al., 2013; Amekudzi et al., 2011; Böhringer & Jochem, 2007). Towards this direction, indicators can play a key role. Indicators, according to the definition of the European Environmental Agency (2005), are "quantitative measures that can illustrate and communicate complex phenomena simply, including trends and progress over time" and due to their numerous advantages consist of the most common tool for tracking progress towards sustainability. Within the framework of this paper, an attempt has been made to evaluate the sustainability of the mobility conditions in the city of Thessaloniki through the use of a number of sustainable urban mobility indicators.

2. Description of the study area

The city of Thessaloniki comprises the study area of the current research. Thessaloniki is the administrative center of the region of Central Macedonia and the second largest city of Greece both in terms of area and population. Thessaloniki's metropolitan area extends over an area of 100 km^2 while according to the results of the recent (2011) census that was carried out by the Hellenic Statistical Authority, its population reaches approximately a total of 1.000.000 inhabitants, which corresponds to 7,6% of the national population. The metropolitan area consists (after the implementation of "Kallikratis" plan which has reformed the Greek administrative system) of 7 Municipalities and is considered as the most significant economic, industrial, administrative and cultural center of Northern Greece. According to the latest data (2016) extracted from the World Economic Outlook Database of the International Monetary Fund, the area of Thessaloniki is responsible for the 32,8% of the total economic activity in the region of Northern Greece whilst it contributes to the national economy by a significant share which corresponds to 8,6%.

Regarding the study area's traffic features, the findings of the General Transportation study of the Thessaloniki metropolitan area indicate that approximately 1.600.000 trips are being made daily while the 25% of them have as origin or/and destination the city center. The road network of the city is often congested, delays and illegal parking are presented during peak periods mainly due to the vast majority of daily trips (55%) that are being made by private vehicles and the high levels of car ownership that despite the financial crisis are still being observed (EPOMM, 2010). Another reason contributing to the aforementioned phenomena is the lack of multiple means of public transport, since the Metro is still under construction and consequently the present public transport system of Thessaloniki consists only of the public bus system operated by the Organization of Urban Transportation of Thessaloniki (OASTH). OASTH operates in 79 routes of total length of approximately 970 km serving the whole metropolitan area of Thessaloniki (Organisation of Urban Transportation of Thessaloniki, 2016). The bus fleet is composed of 622 thermal buses (mini, standard and articulated). Every day over 5.800 journeys are being made with an average of 15 min service interval and a mean occupancy of 42% (Thessaloniki's Integrated Transport Authority, 2016).

As far as environmental issues are concerned, Thessaloniki is considered as one of the most polluted cities in the European Union in terms of air quality, as a result of the operation of the transport system, the mediterranean climate, the geographic location and the topography of the city.

3. Methodological approach

In the context of the current research a methodological approach was developed in order to assess the sustainability of the present mobility conditions in the city of Thessaloniki and propose relevant measures and potential interventions