

## Land Use and Transportation: Identifying the relationship between parking and land use in the Municipality of Zografou, Athens

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### Abstract

The aim of this paper is to evaluate the methodology of Sustainable Urban Mobility Plans as a tool for combined urban and traffic planning to redefine land use in cities. Sustainable Urban Mobility Plans (SUMP) set the strategic objectives of cities and define the required actions for the desirable development and organization of the land use and movement system of citizens as well as the transport/distribution network of goods in urban areas. The fundamental principle of SUMP is the promotion and wider dissemination of forms of mobility that meet the economic, social and environmental requirements of sustainable development. The ultimate goal of the SUMP, as well as their notifying difference with the approaches followed by 'traditional' traffic studies, is their focus on serving people's movement instead of servicing the (mostly motorized) vehicles in the available urban space. The production of urban space is considered a necessary social equipment, it determines the need for development and the small property is the basic urban unit in Greece. The urban property and the uses it may have are an important part of the most complex form of the Greek city, which is totally connected to the transport system.

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### 1. Introduction: Land uses, urban transportation strategy and parking policy

A key issue for gaining the goal of sustainable development is the relationship between land use and transportation (Toth, 2011; Gavanas, Pouzoukidou and Verani, 2016). Although land use and transportation are independent aspects of urban planning strategy there is a strong relation between them, similar to a chicken-and-egg one (Morimoto, 2015). That is the reason why it has been hotly debated by researchers around the world (Giuliano, 1989; Srinivasan, 2000; Vlastos and Milakis, 2006). Indeed, Gomez-Ibanez and Meyer (1981), who indicate how government policies were misdirected and how future public transportation could be made more effective, point out that new transit developments are for the benefit of existing urban cores and do not imply new land into development. Contrary to that view, Morimoto (2015) and Toth (2011) stress that creating new or expanding existing roads and developing new public transportation nodes increases the attractiveness of the areas the pass through, promoting new social activities and, as a result, new urban facilities. That is the reason why Gordon, Kumar and Richardson (1989) argue that suburbanites have gained more benefits from commuting economies than have the residents of the city centers.

Contrary to Gordon, Kumar and Richardson (1989, p.140), who point out that “the a priori relationship between residential densities and mean travel time is unclear”, Bill Hillier (1996, p.43) highlights “that socio-economic forces shape the city primarily through the relations between movement and the structure of the urban grid” and, thus, when moving from an urban area that is dense to another dispersed and fragmentary, the mean length of journeys will, other parameters being equal, increase. Gerayeli and Jenkins (2016), the research of whom has focused on the length of motorized travel within urban areas, agree on this view as they mention that on average those who live in denser areas tend to drive less. However, it could be supported that transportation supply affects more the way people choose to locate their homes and businesses (Toth, 2011) than travel time.

Taking the above, into consideration, it is clear that the future transportation investment policies and programs should be combined with land use policies and programs if future cities are to be successful. Pouzoukidou, Gavanas and Verani (2015) agree on this opinion as they highlight the necessity of using land use models in setting the framework of strategic transport plans, emphasizing in the importance of treating cities as evolving and complex organisms by adopting holistic approaches. Dominant land uses develop a specific character in each urban area and as a result they should be faced differently according to that. Streets in urban centers and neighborhoods, for example, need to be designed as places of social interaction and economic exchange; places where people walk, children play and commercial strips can be developed as boulevards, safe for both walking and cycling (Toth, 2011).

The above considerations allow the development of some questions about what is democratic or not in today's city, at least in Greece. The reason is that Greek cities, which have historically developed due to specific spatial constraints and freedoms in the individual building initiative, do not allow all citizens to use public spaces to the same extent. Indeed, green spaces are not equally distributed within the city, and access to them is even more difficult due to the characteristics of the Greek street network. Small sidewalks, no ramps, low trees, bumps and many parked vehicles right and left of the road are elements that outline the form of Greek roads. Aftereffect of the above mentioned issues are the limited movement of pedestrians and especially of people with limited mobility, such as the disabled and the elderly. In this way, indirectly, they are encouraged to use private vehicles for their journeys, thus increasing the problem of parking in central areas of cities where there are usually land uses that function as poles of public attraction, creating a continuous and unavoidable circle of such phenomenon.

The issue dealt with in this research focuses on the relationship between parking and land use and, in particular, the way in which parking can be managed in the light of the organization of cities in order to convert them into more people-centric urban cores. As a case study, the Municipality of Zografou (Section 2) was selected in the Athens metropolitan area for which there is an on-going SUMP process. The resulting conclusions (Section 3) are related to the implications for urban parking if the planned measures are implemented by the official design specifications, without the additional implementation of some interventions through the SUMP. Through these conclusions, a debate can arise as to whether SUMP in Greece are tools of radical change or simply act as a means of restoring legality and democracy in the public space. Given that more and more Greek cities are pursuing the implementation of SUMP, the above issue is something that citizens need to be aware of in order to see the importance of implementing these plans and the need not only for support and acceptance of interventions but for increased participation on their behalf in the planning process.

## **2. People and parking requirements in the Municipality of Zografou, Athens: How land use attributes and parking policy are related each other?**

### *2.1. Aim and Objectives*

The aim of the research paper is to investigate the issue of parking in the municipality of Zografou, Athens. In particular, the relationship between existing parking spaces on the streets of the city and the land uses developed in the area is examined. In this way, conclusions will arise for: (a) the relationship between land use and parking, which is a basic parameter of traffic regulation, (b) whether the current situation is approaching a situation of legitimacy or not, (c) the way in which the legality of road design can be restored, in cases it does not already occurring. Although the above conclusions concern the municipality of Zografou, which is the study area in the specific paper, they could be generalized for the whole of Greek cities, since in the majority of them they present similar characteristics of the organization of the road space.

### *2.2. Methodology*

After the delimitation of the problem, the study area was selected. The reasons for choosing the Municipality of Zografou are the following: (a) it is an area that is close to important landmarks that function as poles of attraction for residents of many areas of Athens metropolitan area, such as the two campuses of the Kapodistrian University of Athens as well as the National Technical University of Athens, civilian and military hospitals and Goudi Park where cultural and sports facilities are located, (b) it is located in the periphery of the metropolitan complex of Athens and its eastern part can simulate the way in which regions close to the boundaries of cities operate, (c) it is not served by means of a fixed track transport (metro or tram) and thus looks more like most of the Greek cities, (d) it is characterized by a high building density and population density (Kyriakidis and Iliadis, 2018), like several Greek cities, (e) the organization of land use at municipal level, based on the institutionalized General Development Plan (1989), refers to the monocentric organization of cities, which is common in most Greek cities, (f) the variety of road types, most of which are small in width and are neighboring with pedestrian streets of small widths also, also the phenomenon of parking, (g) it presents morphological elements that refer both to the construction of the Hippodamian system and to the organic and (h) there is an on-going SUMP process. The area was examined at the administrative boundaries of the municipality for the investigation of research questions.

Initially land use was recorded at municipality level in order to identify possible deviations from the institutionalized land use planning proposal, based on the General Development Plan (1989) and then digitized using the AutoCad software. Subsequently, the roads in the Municipality of Zografou were hierarchied first, the one-way roads and the two-way roads were recorded, the traffic loads were calculated, the pedestrian network was mapped and finally the way in which parking is managed, was examined. On-site research was an important element for the collection of the above-mentioned information, such as, for example, when calculating traffic loads. Optical research was also utilized for the investigation of the width of free pedestrian path on the sidewalks of the study area. This specific research method was conducted on a sample basis. The information gathered was also triangulated) in order to detect any discrepancies. Specifically, regarding the last issue, all the available parking spaces were recorded, in order to ascertain their adequacy and their distribution in the area. Finally, the geometric characteristics of the municipal road and street network were recorded and a map was produced using ArcGIS, which shows the widths of the roads as well as the widths of the street sidewalks for the whole study area.

At the same time, a survey of questionnaires was conducted for the citizens and visitors of the municipality. The questionnaire was available on-line, but research was also made to be person-to-person at various central points

of the municipality to collect opinions from people less familiar with computer and internet use. For the collections of opinions regarding problems that are identified in the Municipality of Zografou, a web-platform was developed in order for those interested to propose ideas for the future vision of the city, formulating solutions for specific problems. In the case of this research, the web-platform and the questionnaire survey functioned as two different methodological tools that helped to identify the public's view regarding the parking issue (methodological triangulation).

The above data contributed to the understanding of the current situation in the Municipality of Zografou with regard to the issue of parking. In this way the data for parking, pavements, road surface, roads and street network and land-uses were parameterized and compared with the provisions of the Greek legislation for the organization of the road space.

### 2.3. Analysis

The Municipality of Zografou is located in the eastern part of the Athens metropolitan area and is characterized by a high density (Kyriakidis and Iliadis, 2018). According to the General Development Plan (1989), the center of the municipality develops along Papagou Avenue, where a series of central operations are planned to develop, as shown in red in Figure 1a. Individual neighborhood centers are being developed in other areas of the municipality, while most of the built-up area is proposed to be used for residential areas (housing). The two campuses of the universities are located in the eastern part of the municipality, just like the cemetery. Existing land uses, however, are differentiated. Commercial activities are being developed along other important road axes, such as the Oulof Palme and Afxentiou streets (Figure 1b).



Figure 1a. Institutionalized land uses in the Municipality of Zografou. Source: General Development Plan (1989).

Figure 1b. Existing land uses in the Municipality of Zografou. Source: Own elaboration.

Figure 2a shows the road surface width for all roads in the municipality. As it is evident, most of the municipal roads have a road surface width of 5-7 m (66.4%). The roads with a road surface width of 7-9 m are the second most frequent category of roads, with a large percentage difference (18,23%). From the rest of the roads, almost all of them, have a road surface width of more than 9 m (11,76%), since only 3,61% of the municipal roads have a road surface width less than 5 m. Comparing Figure 2a with Figure 2b, it is established that there is a ratio between

the width of the road surface and the width of the pavement. On most streets with a wide surface width there are pavements with a wide sidewalk width. Therefore, the small width of the road surface that was observed was accompanied by a small width of pavements, in the whole municipality. 57,78% of the municipality's sidewalks have a width of less than 1,5 m, with 1,13% of the municipal roads not having sidewalks. This finding implies that 58.91% of the streets of the Municipality of Zografou do not fulfill the conditions set by the Ministerial Decision 52907 (OGG 2621 / 31-12-2009), according to which the sidewalks in the cities must have a minimum width of 1, 5 m, which will be used as a free pedestrian space, ie without the presence of urban equipment.

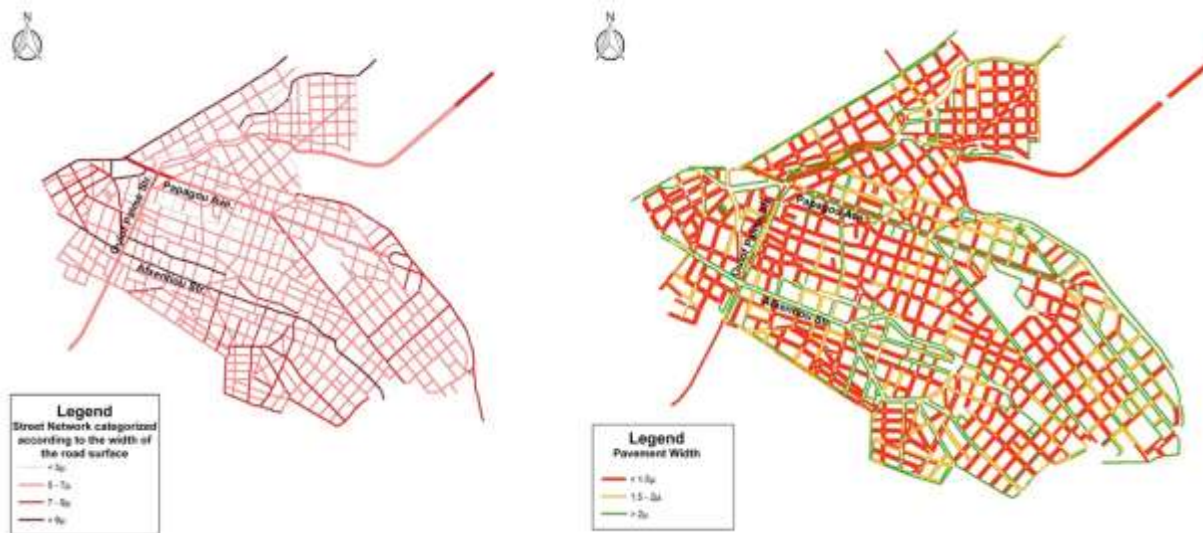


Figure 2a. Categorization of the street network in the Municipality of Zografou, according to the width of the road surface. Source: Own elaboration.

Figure 2b. Categorization of the pavements in the Municipality of Zografou, according to their width. Source: Own elaboration.

As it emerged from the visual research, even on roads where the width of the pavements is calculated 1.5-2 m., the requirements of the institutional framework are not met, since a series of urban equipment elements restrict the pedestrian traffic. These data, which in other circumstances would act as elements of attraction to the public, are now functioning as negative environmental affordances, as recorded in the case of Papagou Avenue (Kyriakidis and Bakogiannis, 2018). It is paradoxical that such cases of pavements are recorded on highly commercialized streets, such as Papagou Avenue and Oulof Palme Street, which has the effect of limiting the assembly of pedestrians and reducing the commercial traffic of the shops. It is characteristic that, in a total of 1,513 questionnaires, 678 respondents feel that pedestrian traffic is not comfortable and pleasant. 526 responses also highlight that pedestrian traffic, besides unpleasant, it is also insecure. Similarly, the results of the questionnaire survey on access to schools were similar, since 557 students highlighted the inadequacy of the pavements.

Negative environmental affordances in the study area (Kyriakidis and Bakogiannis, 2018) include parking, since pedestrian traffic is often impossible in places where cars are parked in very close distances. Papagou Avenue, which according to the General Development Plan (1989) is the core of organizing the commercial activities of the municipality, is one of the areas where this problem is identified. The same issue is strongly observed in other areas of the municipality where large commercial road axes operate polarizingly for the gathering of the public. As

a result, wider residential areas are burdened with additional parking pressures, with the aim of making the public more accessible to shopping streets.

#### *2.4. Proposal for redesigning the bypass parking*

Assessing the above data, it is noted that much of the road space is devoted to parking the vehicles. This is more evident in the central areas of the municipality, such as the commercial streets and their adjacent areas. However, because of the saturation of the central areas, the phenomenon of bypass parking is also increasing in residential areas. Altogether, 7,087 legitimate parking spaces were registered. The question that has arisen is: To what extent are the above parking spaces legal since the institutional specifications for the width of the pavements are not respected?

Thus, it is proposed a redesign of the municipality, based on the specifications for the design of the pavements in the Greek cities, at the points, at least, that have been observed that they do not meet the minimum dimensions. By extending the sidewalks and ensuring the minimum width of free pedestrian crossing, it was estimated that 1,174 parking spaces are eliminated. This proposal is not related to the implementation of additional interventions, such as the conversion of roads to mild traffic roads. It concerns only the legalization of roads and the guarantee of equal access of citizens to public infrastructure, with the aim of promoting democracy in cities (Bakogiannis and Kyriakidis, 2018).

After the legalization of the road space, in the Municipality of Zografou is expected to be offered 5,913 legal parking spaces. The implementation of additional measures, in the context of SUMP, it is expected to be related with further reduction of the number of places. Although the above proposals are expected to generate social reactions, in the short run, however, they are expected to contribute radically to increasing the number of citizens in the public space and to increase social life in the city, since they will be able to break their course and socialize with their fellow citizens (Vlastos, Barbopoulos and Milakis, 2003).

Summarizing, the above confirms the view of Vlastos (1993) that traffic planning - and therefore parking management - is a basic parameter for the social organization of modern cities. Such an approach advocates in favor of integrated policies, where land management policy and traffic planning will be combined in order to produce successful urban spaces.

### **3. Conclusions**

Urban planning, over the decades, often has variations in how space planning is being practiced. The emphasis on the use of the car and the organization of land use as almost a unique element of organizing the urban space were two concepts that led to unsuccessful urban interventions. Problems are still evident today. This is evident even in Greek cities, where most problems are found in traffic planning and not in land use, since the functionalistic approaches regarding absolute separation of land uses have not been applied on a large scale.

In this research paper, the Municipality of Zografou was studied as a city presenting similar problems with urban travel and parking. The main conclusions that arose are summarized as follows:

- The organization of the Municipality refers to typical urban formations, where commercial activity and services occupy central locations in the cities and around them are developed the residential areas. The commercial development of the city, however, was not limited to urban planning, but it was expanded to

include additional important roads which, although planned to accommodate the housing needs of the inhabitants, nevertheless took the character of commercial roads.

- Shopping streets are the ones that attract more visitors during the day. As a result, many pedestrian walking across these streets and there are many parked cars along the streets and in the neighboring areas. According to people, it is difficult to move on the shopping streets of the study area.
- Most of the city's sidewalks have not been designed under current urban planning regulations, with the result that residents feel uncomfortable to move around and feel exposed to hazards due to the heavy circulation of motorized vehicles
- In order to promote democracy in the city and legitimacy in the public space, it is proposed to extend the sidewalks on the streets of the city. This would reduce existing spaces by 16.5%.
- In order to promote sustainable urban mobility in the city it is expected that further interventions will be required which are expected to further reduce the number of legally provided parking spaces. This is expected to trigger reactions in the short term. However, the results are expected to be different in the long run, where the presence of pedestrians in the public space will be increased and the same increase will be observed in the commercial activity on the main streets.

The above points, although they concern the Municipality of Zografou, may also concern other Greek cities. The restoration of legality, without simultaneously solving all urban and traffic problems, is necessary for the safe movement of pedestrians on the streets. For this reason, the above interventions need to be incorporated as the SUMP defines, where that need exists.

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