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Traffic impacts of innovative traffic and parking arrangements in Athens, Greece

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INTRODUCTION

In the city of Athens, traffic delays and high travel times are noticed due to the high levels of inner-city traffic. Consequently, sustainable mobility practices are imperatively required. The present study aims to assess the traffic impacts of innovative traffic and parking arrangements in the Athens city network, examine interventions that are part of a new policy of upgrading public space.

METHODOLOGY

The examination of alternative traffic management schemes were performed through macroscopic simulation using the Athens city network in Aimsun software (Figure 1-a).

Study Area

The traffic impact assessment was evaluated in relation to two areas of analysis shown in Figure 1-b, the Intervention Area and also the Wider Analysis Area.

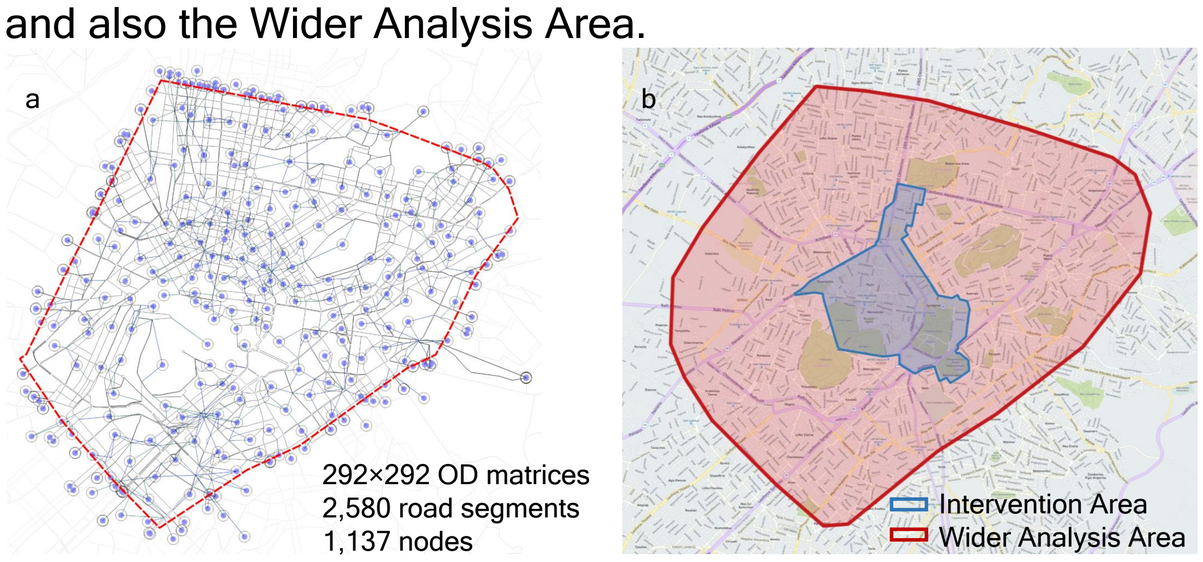

Figure 1: (a) Athens network in Aimsun software; (b) the analysis areas

Simulated Scenarios

The simulated scenarios were the current conditions (scenario A) and four alternative scenarios (B1, B3, C1, C0) that included interventions related to:

- Enlargement of sidewalks in several streets
- Adding new exclusive lanes for pedestrians, cyclists and public transport
- Parking management and traffic arrangements
- Setting 30 km/h speed limit

The scenarios differed in the traffic conditions of Panepistimiou Str. (reference area):

- Scenario A: as a six-lane street (one contraflow bus lane)
- Scenario B1: as a three-lane street (one parallel bus lane)
- Scenario B3: as a four-lane street (one parallel bus lane)
- Scenario C1: as a two-lane street (one parallel bus lane)
- Scenario C0: as a pedestrianized street

Two additional scenarios (B2 and B4) were investigated, concerning the modal shift from passenger cars to public transport in the corresponding scenarios B1 and B3.

RESULTS

Comparing the results extracted from simulation (Table 1), no major differences were noticed, while the choice of the B1/B2 scenario over the rest of the scenarios seems to pave the way for the implementation of a new sustainable urban mobility plan.

Table 1: Impact assessment for the alternative scenarios

KPI	B1	B2	B3	B4	C1	C0
Vehicle-hours for private cars (Intervention Area)	+7.2%	-22.6%	+4.3%	-22.5%	+24.5%	+6.7%
Average vehicle speed (Intervention Area)	-18.1%	-3.1%	-13.5%	-0.4%	-28.3%	-16.5%
Level of service (Intervention Area)	+7.8%	+4.2%	+6.7%	-5.5%	+13.6%	+3.6%
Level of service (Wider Analysis Area)	+1.8%	-3.7%	+1.1%	-3.6%	+4.4%	+2.3%
Travel times (Intervention Area)	+18.1%	+3.1%	+13.5%	+0.4%	+28.3%	+16.5%
Urban reforms on road axes	+10ha	+10ha	+9ha	+9ha	+10ha	+6ha
Streets with limited access to passenger cars	+5ha	+5ha	+5ha	+5ha	+5ha	+4ha
Bus lanes length (affecting 50 bus lines)	+3.8km	+3.8km	+2.6km	+2.6km	+2.1km	+2.1km
Average public transport speed (Panepistimiou Str.)	+28%	+35%	+32%	+37%	-7.2%	+28%
Average public transport speed (Akadimias Str.)	+22%	+26%	+23%	+27%	-	+22%

According to the Analytical Hierarchy Process analysis, scenario B1/B2 was evaluated 32% higher than the current conditions, while scenario B3/B4 30%, scenario C0 24% and scenario C1 22%. Therefore, scenario B1/B2 presented overall the optimal performance and its pilot implementation was performed (Figure 2). Both vehicle and pedestrian traffic data were collected confirming the forecasts of the simulation model for the majority of road segments.

Figure 2: Before and after pilot implementation in Panepistimiou Str.

CONCLUSIONS

The results of the present research open up an opportunity for a new policy of sustainable urban mobility in Athens, aiming for a gradual implementation of an integrated network of bicycle lanes. The provided framework will be beneficial for future management of cities, as sustainable urban mobility management is complex and requires suitable innovative strategies.

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