

Active Transportation in Urban Environments: Lamia Citizens' Views for the Use of the Bicycle

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Abstract

Academics, organizations, and urban planners are increasingly focusing on bicycles as a mode of transportation to improve the urban transportation system and create more sustained communities in densely populated areas. The study aims to highlight from a citizen-based perspective the use of bicycles in the urban environment of a Greek city; and the possible strengths and/or weaknesses to encourage green mobility using bicycles. The findings revealed an average preference for the use of bicycles, as well as a negative assessment of existing bicycle infrastructure and safety concerns. Citizens seem to emphasize the contempt for the rules of the Highway Code by both bicycle and motorcycle riders.

Keywords

cycling, healthy mobility, sustained communities, urban environment, urban planning, green mobility

1. Introduction

Active urban transportation development has designated the bicycle as a landmark of sustainable urban transportation and integral part of green mobility. While it should be noted that the COVID-19 pandemic has drastically altered mobility routines and transportation schemes, proving that cycling should be encouraged as a healthy mobility solution to replace public transportation and car use in daily life [1].

Urban planning plays a critical role today in building sustained communities and tackle climate change effects, as most of the planet population lives in urban environments [2]. It should actively engage the citizens to participate and secure Democratic and participatory procedures that would lead to sustained mobility [3]. As a result, citizens' perspectives are regarded as extremely valuable data for overcoming impediments and increasing efficiency in urban planning and promoting active transportation.

Cycling in the city is a timesaving, healthy and green mobility transport option which in many countries was further developed with smart applications and renting systems. Norway is regarded as a best practice in terms of regulations, city dweller culture, and bicycle infrastructure, with a more than 250-kilometer bicycle network in Oslo [4]. Whilst the use of bicycle cannot be considered a sustainable and beneficial mobility solution if it is not also safe. A lack of infrastructure means a lack of safety for cyclists, with children being particularly vulnerable. Several studies have found that the low rate of bicycle use is largely due to safety concerns [5].

The study aimed to provide insights about active transportation development in the urban environment of Lamia through the citizens' perspective and regards the use of a bicycle. The scope of

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the research along with its findings is considered indicative for academics, public and private companies, and urban planners, as it shed light on the citizens' views on the use of bicycles as regards cycling frequency; an association of cycling in the context of a healthy mobility and lifestyle; characteristics and individual issues in bicycle use; factors influencing their decision to use it; infrastructure; reasons for the use of bicycle and preferable distances; suitability of the city for the use of the bicycle in terms of spatial planning and design; road safety and road Highway Code compliance issues for both bicycle and motorcycle riders.

2. Materials and Methods

2.1. Study Area

The study area is the city of Lamia, situated in central Greece, inhabited by 52.006 citizens on an area 413.5 km².

The urban network of bicycle paths in Lamia consists of 7.5 km of route and connects the southern end of the city (Ambliani area) with the center (see details on the map in Figure 1). Includes two small lanes (for walking and cycling) flower beds with greenery and sidewalk (Figure 2).



Figure 1: Map of Lamia with bike infrastructure (in pink color), Source: Dimos Lamieon [6].



Figure 2: A view of a bicycle lane in the city of Lamia, Source: Dimos Lamieon [6].

2.2. Methodology

Since of its simplicity, simple random sampling was chosen over other approaches because it required the least amount of knowledge concerning the population [7]. The formulas for simple random sampling were used to estimate the proportion of the population and the standard error of the proportion of the population sp. [8]. A pre-sampling of 50 persons was conducted to determine the sample size for each quantitative and qualitative variable using basic random sampling formulas: where $t = 1.96$ and $e = 5\%$ [9]. The sample was estimated to be 400 citizens for possibility $(1-\alpha)100=95\%$, $e=0,049$.

Hierarchical Log-linear Analysis was used to examine two groups of four variables. Prior to using Hierarchical Log-linear Analysis, the expected frequencies in the contingency table were examined [10]. Tabachnick and Fidell's criteria [11] were used to group classes together. The Statistical Package for Social Sciences (SPSS 27) was used to analyse the data. Before performing the Hierarchical Log-linear Analysis, we ensured that there were no weaknesses with low expected frequencies.

3. Results

The use of bicycles is seen positively by 54% of Lamia residents, neutrally by 32.8%, and negatively by 13.3%. Whereas similar studies in other Greek cities show higher acceptability, with 79.5% in Orestiada [12], 82.8% in Alexandroupolis [13], 2019), and 90.5% in Preveza [14].

The residents of Lamia reported that they always ride a bicycle in a percentage of 3.5%, 9.3% often, 13.3% sometimes, 17.8% rarely, 56% never, and 0.3% did not answered. Bicycle use was higher in other Greek cities, with inhabitants in Orestiada claiming that 5% of them always go by bicycle [12], Alexandroupolis 13.3 % [13], and Preveza 28.2% [14]. As a result, it could be claimed that citizens' positive attitudes toward bicycle riding in their city are linked to their increased use (more frequent use).

Cycling is associated with embracing a healthier lifestyle that includes walking and cycling as well as perceiving the behavior of the social environment. In response to the question "what is the distance over which the use of a car, motorcycle, or public transportation is required," 50% of citizens agree that they should use a vehicle for distances up to 2.5 km and the remaining 50% for distances greater than 2.5 km. (Table 1).

Table 1

Distance over which the use of a car, motorcycle or public transport is required.

Distance	Percent	Cumulative percent
always	32.8%	32.8%
100 meters	1.5%	34.3%
300 meters	0.8%	35.0%
500 meters	1.8%	36.8%
1 Km	3.3%	40.0%
1.5 Km	3.5%	43.5%
2 Km	6.5%	50.0%
3 Km	11.3%	61.3%
4 Km	10.85	72.0%
5 Km	28.0%	100.0%

Cycling knowledge is not a barrier, as 75.5% say they are familiar with it. However, the proportion of citizens who do not know how to ride a bike is quite high at 24.5%. Surprisingly, the residents state that the use of bicycles by their fellow citizens would lead them to such a decision at a rate of 64%, while 36% say it would not.

For the variables "bicycle parking places", "distance that requires the use of car, etc.", "imitation of other citizens" and "bicycle use" Hierarchical Log-linear analysis was applied. No interaction was

observed per 3 criteria, as the X^2 for Pearson's test is 4.469 with probability (p) = 0.484 and because the X^2 likelihood ratio is 4.512 with probability (p)= 0.778. The hereunder are the interactions:

- Citizens who admit they are influenced by whether their fellow citizens ride bicycles, by imitating them, say they rarely ride bicycles. Those who do not follow their peers, on the other hand, claim that they never ride a bicycle.
- Citizens who state that they are influenced by whether their fellow citizens ride bicycles, by imitating them, express a positive attitude toward cycling. Those who do not follow their peers, on the other hand, claim to be neutral or negative about bicycle use.
- Citizens who claim to be affected by whether their fellow citizens ride bicycles, copying them, claim that motor vehicles are required for distances greater than 2.5 km. Those who do not follow their fellow citizens, on the other hand, claim that motor vehicles are required for distances of less than 2.5 km.
- Citizens who say they are positive about cycling, say they travel from always to rarely cycling. Those who say they are neutral or negative about cycling, on the other hand, say they never ride a bicycle.

The citizens of Lamia characterize their city as absolutely suitable for the use of bicycles as a mode of transportation at a rate of 0.5 %, 8 % as very suitable, 30.8% quite suitable, 43.5 % less suitable, and 17.3% unsuitable. For a city to be suitable for bicycle use it should have the necessary infrastructure and a well-established driving culture for all kind of road users.

The infrastructure for bicycle use is classified as moderate by 39.3 %, poor by 34.8 %, very bad by 13.5 %, good by 11.5 %, and very good by 1 %.

As regards safety issues 35% of citizens say that motorists rarely respect cyclists, while 32.8% say that this happens sometimes, 11.3% state it never happens, 17.8% often and always 3.3% of the citizens.

Respectively, 36.5% of the citizens state that sometimes cyclists follow the Highway Code rules, rarely 29.3%, often 20.8%, never 10% and always 3.5% of the citizens. According to Vlastos et al. [15], any cyclist, experienced or inexperienced, tends to ride freely and is not constrained by Highway Code rules. A large proportion of citizens accept this freedom in cycling without fixed rules [12]. Thus, when asked if mandatory training and examinations for young cyclists should be required, 51.5% of citizens replied positively while 48.5% were negative.

Hierarchical Log-linear analysis was applied to the variables "city suitable for cycling", "infrastructure for bicycle use", "motorists respect cyclists" and "cyclists follow the Highway Code". No interaction was observed per 3 criteria, because the X^2 for Pearson's test is 2.744 with probability (p) = 0.738 and as the X^2 likelihood ratio is 2.608 with probability (p)= 0.760. The interactions are as follows:

- Citizens who rate the bicycle infrastructure as very good to mediocre say Lamia is very to quite suitable for cycling. On the contrary, those who rate the bicycle infrastructure as poor to very poor claim that the city is less to unsuitable for cycling.
- Citizens who classify the bicycle infrastructure as very good to mediocre claim that motorists always to sometimes respect cyclists. Those who believe that bicycle infrastructure is poor to very poor claim that motorists rarely, if ever, respect cyclists.
- Citizens who believe that bicycle infrastructure is very good to mediocre state that adult cyclists follow the Highway Code rules on a scale from always to sometimes. On the contrary, those who describe bicycle infrastructure as poor to very poor claim that adult cyclists rarely, if ever, follow the Highway Code.
- Citizens who believe that Lamia is very to quite suitable for cycling believe that adult cyclists follow Highway Code rules on a scale of always to sometimes. On the contrary, those who rate the city on a scale of less to unsuitable for cycling believe that adult cyclists rarely, if ever, follow Highway Code rules.
- Citizens who are of the opinion that motorists respect cyclists on a scale of always to sometimes state that adult cyclists follow the Highway Code rules on a scale of always to sometimes. On the contrary, those who claim that motorists rarely, if ever, respect cyclists also claim that adult cyclists rarely, if ever, follow the Highway Code rules.

The bicycle as a means of transportation is easily accessible to children. Safety in the city for children is important. 41.5% and 35% of the citizens consider that the bicycle as a means of transport, in the city, especially for minors, is not at all and a less safe, respectively. An average opinion was given by

20.3% who answered that the bicycle is quite safe, and only 2% and 1.3% answered that it is very or absolutely safe respectively. In fact, according to the citizens, the junior cyclists rarely (31%) or sometimes (24.3%) follow the safety rules when traveling with their bicycles. Lower percentages receive other options such as often (21.5%), never (17.8%) and always (5.5%) respectively.

Finally, cost issues such as purchasing and maintaining a bicycle do not appear to be an impediment to bicycle use for 71% of citizens, while 28.8% consider it an impediment and 0.3% prefer not to answer the question.

4. Conclusions

The scope of the research, as well as its findings, are considered indicative since they shed light on citizens' views on developing and promoting active transportation in Lamia's urban environment using bicycle. Therefore, it provides important insights into citizens' perspectives on bicycle use as well as specific challenges that should be addressed.

Almost one in two of the citizens in Lamia are positive with the use of bicycle, which is considered as a low rate compared to the views of other citizens in Greek cities with similar characteristics. This finding is accompanied by low frequencies in the use of bicycle in the city.

There is an association of cycling in the context of a healthy mobility and lifestyle, as lamia residents admit they should use active transportation by bike to cover short distances until 2.5 km. The majority of citizens appear to have cycling skills, which is not a barrier to further developing this mode of urban transportation; in fact, nearly 8 out of 10 report knowing how to ride a bike.

The use of hierarchical Log-linear analysis revealed a positive correlation among factors influencing citizens' decisions on bicycle use, such as the use of bicycles by their fellow citizens in terms of imitation, and the adoption of healthier mobility and lifestyles in everyday life transportation for distances up to 2.5 km.

Eventually, most of the responders take a critical stance on the city's suitability for bicycle use in terms of spatial planning and design, which is explained by their perception of insufficient cycling infrastructure. This was also supported by the results of the hierarchical Log-linear analysis performed on the respective variables. In addition, it appears that road safety issues require additional organization and control. Furthermore, the citizens highlight the issue of motorists who appear to disregard cyclists' use of roads. Possibly they intend to emphasize the importance of stricter Highway Code compliance for both bicycle and motorcycle riders.

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