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Pedestrian Corridor for the Integration of the Administrative, Financial, and Commercial Center in the City Esmeraldas, Ecuador

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ABSTRACT

The investigative work shows the spatial problems of the urban area of the city of Esmeraldas, Ecuador; along 690 meters of Simón Bolívar Avenue, a site where there are problems related to the deterioration of the urban image, traffic congestion and environmental noise, product of the human interaction of the sector. The research proposes the creation of a pedestrian corridor that integrates the administrative, financial and commercial center of the urban center of the city of Esmeraldas as a strategy to improve pedestrian mobility. The proposed methodology is of a mixed type, using measurement instruments and information collection such as observation, statistical analysis, interview, measurements of vehicle capacity and environmental noise. The analysis of the results obtained corresponds to the dynamics of the historic urban center, interpreting that noise, vehicular congestion and the daily influx of citizens when carrying out activities, lead to their chaotization and environmental affectation. The creation of a pedestrian corridor is proposed as a solution to the urban problems of the study area, to offer citizens an inclusive public space in which the pedestrian is privileged, guaranteeing their mobility and contributing to the reduction of environmental pollution and vehicular traffic.

Keywords: Public space, Pedestrian mobility, Pedestrian corridor, Traffic congestion, Environmental noise

INTRODUCTION

Migratory processes, industrial and urban growth have modified human settlements, also transforming the way we move from one place to another. The excessive concept of using public space to privilege automobiles results in the feeling that some cities are not designed for people, but for cars (Daher, 2017). The street is the most important public space in the urban area, it often represents the largest area of public space in a city, however, despite its importance, streets are considered one of the most forgotten forms of public space because their formal feature favors the needs of cars. For streets to become better places, we must first of all: think about them, design them, manage them, and program them as places for people (Wallace and Zaugg, 2019). In this context, those concepts that define the use and function of the street

as such should be considered; Thus, in terms of use, the street as a public space is considered as the physical support, the daily scenario of collective urban social interactions and is physically characterized by its accessibility; and from the point of view of the function fulfilled by the street, three types can be considered: the social function, the cultural function and the political function (Dziekonsky *et al*., 2015). Thus, another way to determine the function of the street is to establish the external activities that are carried out in it, in this way they can be divided into three categories: necessary activities, optional activities and social activities (Gehl, 2006).

Pedestrianizations have been conceived as an urban planning tool to order space, so that pedestrians can make use of public space, but this action of mobility management must also serve to order traffic in cities, in other words, they must be integrated interventions in urban transport projects (Castro, 2018). Based on these concepts and as a reference for the approach of pedestrian corridors, The Ramblas of Barcelona is taken as an example, considered one of the most representative pedestrian corridors in the world and one of the most emblematic public spaces of that city, which has become for more than five centuries a central place where commercial, institutional financial activity and the representation of the urban scene converge in an integrated way (Ospina-Tascón, 2014); other references that are considered are: the pedestrianization of Francisco I. Madero Street, which responds to an intervention that is part of a Comprehensive Management Plan that seeks the rehabilitation of the historic center of Mexico City (Ortega-García, 2015); in the same way the street Las Flores (rua Das Flores) of the city of Curitiba, which was the first avenue in Brazil in which since 1971 the transit of motorized vehicles was prohibited to prioritize pedestrian mobility; and also within the local scope, the Mobility and Public Spaces Plan of the city of Cuenca is taken as a reference that, since 2015 it launched a process for the reduction of motorized traffic in some streets of the historic center and consequently the increase in pedestrian mobility (GADM Cuenca, 2015).

This research work aims to know the state of space and urban image, vehicular capacity and environmental noise of Simón Bolívar Avenue in the city of Esmeraldas -Ecuador, in order to propose a pedestrian corridor that allows integrating urban activities, with which mobility is facilitated pedestrian safely.

MATERIALS AND METHODS

Delimitation of the Study Area

Simón Bolívar Avenue is located in the urban area of the Esmeraldas parish of the city of Esmeraldas, and considered as an iconic road of the city and the most notable of the historic center, it is characterized by having a large influx of citizens, since it converges important institutions of public administration and in addition, commercial activities are developed with a considerable influx of customers. For the development of the research, a 690-meter stretch of the study site has been estimated, which goes from Juan Montalvo Street to Salinas Street (see Figure 1).

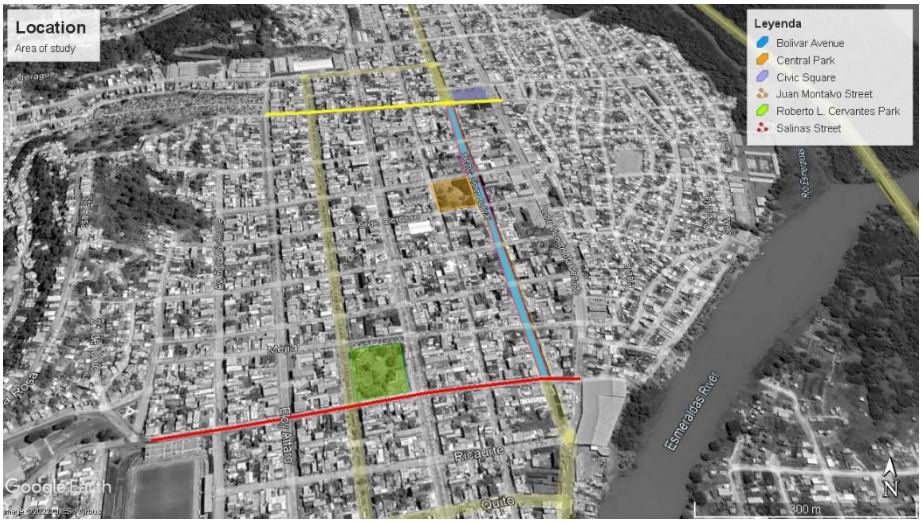

Figure 1: Location of the study area, Simón Bolívar Avenue (Source: Google Earth, 2022).

Study Methodology

The type of research used was mixed, being the quantitative and qualitative methods those used in the present study; in the beginning the research was exploratory since it served to know the problems of ambient noise, vehicle capacity, as well as those that correspond to the espacio and urban image; then becomes descriptive, since data collection was needed to measure the community's perception of pedestrianization, problems at the study site, vehicle capacity and the level of ambient noise.

The implementation of the field research was carried out under the following aspects: 1. Observation and analysis of public space; 2. Data collection based on the opinion of the owners or dependents of commercial premises (surveys) and a representative of the municipal administration (interview); 3. Analysis of vehicular congestion; and 4. Analysis of the ambient noise.

The observation and analysis of public space (observation fichas) was carried out on January 7, 2022 in 7 sections that cover a length of 690 meters of Bolívar Avenue (see figure 1): Tramo 1 that goes from Juan Montalvo Street to Rocafuerte Street, Section 2 from Rocafuerte Street to 10 de Agosto Street, Tramo 3 from Calle 10 de Agosto to Calle 9 de Octubre, Tramo 4 from Calle 9 de Octubre to Calle Piedrahita, Tramo 5 from Calle Piedrahita to Calle M. Cañizares, Tramo 6 from Calle M. Cañizares to Calle Mejía, and Tramo 7 from Mejía Street to Salinas.

Subsequently, a perception survey was carried out to the owners or managers of 62 commercial premises, using a systematic probabilistic sampling with adjustment to finite population (every two premises), being the sample number 47, confidence level = 95%, margin of error = ± 5 ($n = N\ ^{Z2}\ pq / d\ ^{2}$ (N - 1) + Z2 pq). The survey was structured with five closed questions referring to: the perception about the concept of pedestrianization, considerations about the problems that occur in Bolívar Avenue and the aspects that disfavor

its image; factors that can help improve the spatial image of the street and the opinion regarding the acceptance of the pedestrianization of the avenue.

The semi-structured interview was addressed to the Director of Planning of the Municipality of Esmeraldas, through which it was possible to know the opinion on the approach of a pedestrian corridor on Simón Bolívar Avenue; the processing of information from the interview was using the method of systematic analysis.[1]

For the calculation of the vehicle capacity, two points were considered for data collection: Point A, located in the Importadora Castro commercial house; and Point B located in the Almacenes TIA commercial house. In obtaining data on vehicle capacity, a descriptive cross-sectional study was used, recording the passage of vehicles for three days of the week (Monday, Wednesday and Friday) in three time periods: from 08h00 to 10h00, from 12h00 to 14h00 and from 16h00 to 18h00; each a time interval of 10 minutes.

Environmental noise: Data collection was carried out at the same points determined to obtain vehicle capacity data, using a descriptive cross-sectional method, simple random sampling; making the data collection on February 18, 2022 [2]in three time periods with intervals of 5 minutes: from 08h00 to 10h00, from 12h00 to 13h45, and from 16h00 to 17h45.

RESULTS AND DISCUSSION

Space and Urban Image

The results obtained through observation sheets (see table 1) assessed the state of the sidewalks and their width, as well as the state of ramps that allow accessibility for people with reduced mobility; the existence of urban furniture and its condition; the presence and species of urban trees; invasive elements of the environment or urban image; and the signage of both vehicular and pedestrian traffic, as well as that corresponding to evacuation in cases of natural disasters. It was observed that the sidewalks are not in good condition and some have deterioration in the curbs, a large number of raised pavers and recurrent subsidence in the pavement were evidenced; the average width of the sidewalks meets the parameters established for pedestrian circulation, but they have been invaded by the presence of informal merchants who occupy these spaces. The ramps accessible to people with reduced mobility meet the required slope, however, they present failures in the rolling surface. As for the street furniture, there are 19 metal benches and few garbage cans (6) and due to their state some need maintenance and others must be replaced. There are about 18 trees of species *ficus benjamina* whose height ranges between 3m and 4m in height, the state of most of this urban trees is regular, but some of them are without the foliage, so it requires attention to improve its condition. In addition, it should be mentioned that no signage of evacuation routes was observed that indicate the routes that should be taken

[1]Identify topics a analyze from the patterns of the answers given that allows get conclusions for each of them.

[2]according to observation on Fridays it is perceived one greater number of people and vehicular influx.

Table 1. Results obtained from the observation sheets (Source: own elaboration).

Results of analysis of observation sheets									
Variables	**Description**		**Stretch 1**	**Stretch 2**	**Stretch 3**	**Stretch 4**	**Stretch 5**	**Stretch 6**	**Stretch 7**
Sidewalks	Average width	east side	2.00m	2.50m	3.00m	2.00m	2.00m	2.50m	2.50m
		west side	2.50m	3.50m	3.50m	3.00m	2.50m	3.50m	3.00m
	Condition		Poor	Regular	Regular	Regular	Poor	Poor	Poor
Accessibility for reduced mobility	Ramps	number of ramps	4	6	6	4	4	6	8
		admissible slope	yes	yes	yes	yes	yes	yes	yes
		status	Regular	Regular	Regular	Poor	Regular	Regular	Regular
Urban furniture	Benches	number of benches	0	4	10	4	2	1	1
		status	N/A	Regular	Regular	Poor	Regular	Regular	Regular
	Garbage cans	number of garbage cans	0	0	2	1	1	1	1
		status	N/A	N/A	Regular	Regular	Malo	Malo	Malo
Urban trees	Species		Ficus benjamina	Ficus benjamina	Ficus benjamina	Ficus benjamina	Ficus benjamina	Ficus benjamina	Ficus benjamina
	Quantity		4	2	2	1	3	3	3
	Height		3m - 3.5m	3m	3.5m - 4m	4m	3.5m - 4m	3m - 3.5m	3m - 4m
	Status		Regular	Regular	Regular	Poor	Regular	Regular	Regular
Urban image	Overhead cabling	status	Poor	Poor	Poor	Poor	Poor	Poor	Poor
	Sign	status	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Signage	Traffic	status	Regular	Regular	Regular	Regular	Regular	Regular	Regular
	Risk	status	N/A	N/A	N/A	N/A	N/A	N/A	N/A

to the meeting point in case of a natural disaster, this is important considering that Esmeraldas is a city with high vulnerability to earthquakes.

The results obtained from the survey determined that 45% of respondents relate pedestrianization as a concept in which pedestrians are favored with the use of public space, while 22% believe that pedestrianization is an urban tool used to improve the street. The main problems that arise at the study site and that were perceived by citizens through the surveys are: insecurity (30%), traffic congestion (26%),poor condition of sidewalks (14%),and environmental noise (15%). Regarding the impact on the urban image, 45% of respondents identified the poor aerial wiring as a factor that causes a bad appearance to the image of Bolivar Avenue, followed by 35% who considered that the presence of street vendors does not give a good image ; while 18% considered street furniture and trees in poor condition as a factor that damages the image of the street. Regarding the factors that can help improve the image of Bolivar Avenue, 33.70% of respondents considered that burying aerial wiring can help improve the image of the avenue, while on the 24th. 72% mentioned that the improvement of sidewalks would favor to give a better appearance to the street. Finally, 55% of respondents indicated that they were in favor of a proposal to create a pedestrian corridor on a stretch of Bolivar Avenue, compared to 26% who did not agree with pedestrianization. Mediante interview conducted to Arch. Palacios, Director of Planning of the Municipality of Esmeraldas, considered pedestrianization feasible, but partially, that is, that vehicular traffic is not restricted in its entirety.

Vehicle Capacity

The data obtained from the analysis of vehicle capacity on Simón Bolívar Avenue during the days Monday, Wednesday and Friday of the week of January 17 to 21, 2022 during a period of time of 6 hours in three periods

(8h00-10h00, 12h00-14h00 and 16h00-18h00), determined that 11553 cars circulated through point A, while 13736 vehicles passed through point B.

Ambient Noise

The results obtained on the environmental noise that were recorded in the study area fluctuate between 58. 83 dB and 98. 50dB, and the hours in which these decibels were recorded correspond to a schedule that goes from 12h00 to 13h00. These values exceed the range allowed by the Municipal Ordenanza 035 GADMCE, [3]in which it indicates that 55dB is the permissible value in a mixed residential area, land use that corresponds to the study site.

CONCLUSION

Through the analysis of the results, it can be concluded that pedestrianization is a preponderant factor in the recovery of public space for pedestrians, the improvement of the urban image, the reduction of vehicular traffic and the reduction of environmental noise; That is why through the surveys it was possible to determine that the majority of the respondents agree with the pedestrianization of Simón Bolívar Avenue, considering this concept a como an urban tool with which pedestrians are favored.

The proposal to create a pedestrian corridor on Simón Bolívar Avenue through which the administrative, financial and commercial sector can be integrated will improve road safety and pedestrian mobility, as well as help reduce environmental noise and CO2 pollution produced by cars, that is, it will improve the quality of life of citizens, as well as have a favorable impact on local commerce.

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