

Methodological proposal for the characterization of mobility in small cities tourism

Juan Carlos Poveda D'Otero¹, Héctor Mauricio Sánchez Abril²

¹ Pedagogical and Technological University of Colombia, Tunja, Boyacá, Colombia

² St Thomas University Sectional Tunja, Boyacá, Colombia

Email for correspondence: hectorsanchezabril@hortmail.com

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Objective

Present the results of research conducted to propose a methodology to characterize the mobility of small resort towns held from the background check on the methods traditionally used to characterize mobility in small and intermediate cities and their possible applications, and clearly the shortcomings of these existing when applied in small tourist towns (CTP in Spanish).

Data/Methodology

To accomplish the objective that was raised for the research was necessary to study a typical tourist city in Colombia. This small town called *Villa de Leyva*. We conducted a brief description of it at the geographical, economic, social, demographic and described the tourist importance that presents, and the attractions it has to be considered as a case study city. Then through field work was carried out applying the suit symbols and the proposed methodologies. Finally, comparisons were made between results obtained with typical methodologies and the proposed methodology for CTP, which allowed completion and testing in another small town like *Ráquira* in *Colombia*.

Results/Findings

He won a compilation of basic concepts for the development of research was called "Exposition of a methodology to characterize mobility in small tourist towns" and defined the issues that affect a city that is characterized as a differentiation brief tour of cities according to the nature or type of tourism that occurs in them. They did a background check on the methods traditionally used to characterize mobility in small and intermediate cities and their possible applications as well as the shortcomings of these clearly exist when applied in CTP.

Implications for Research/Policy

The methods traditionally used to characterize mobility in small tourist towns did not address some key aspects for these cities, such as seasonality of tourism demand, proper implementation of origin-destination surveys, the correct definition of typical days and atypical and adequate expansion of the OD matrix obtained from this, also, the inclusion of different types of tourists and non-traditional modes constitutes an important contribution. As previously mentioned, the proposed methodology makes an essential contribution to the transport consultants to small tourist cities in Latin America and even in the world, contextualizing some necessary factors. Input as to where and how to take the information is also something new that was provided to this investigation.

1. INTRODUCTION

The reach of this article is subject to the advances of the denominated investigation "Proposal of a methodology to characterize the mobility in small tourist cities. Case of study: *Villa de Leyva*". Before treating the properly this topic of methodologies, it is necessary to approach the city concepts, mobility and the reaches of this characterization, since single framing can be defined the contribution of this investigation and of this article

For the characterization of the mobility some methodologies are used at the present time according to the city type. One of the characteristics of the city is the size whose classification according to Owners for Colombia it would be given by cities micro, small, medium, big and very big. The borrowed attention to the mobility in Colombia has been focused to the medium and big cities, due to the conflicts found in these and to the available resources to give solutions to the conflicts in its mobility; however, inside the politicians of the National Planning Department (DNP) settled down in the document of the Vision Colombia II Centennial "to Build kind cities" in their general principles that guide the goals, plans and projects, it is captured as strategy the improvement of the quality of life and the planning of the growth of the cities including the small ones. This investigation consisted on to gather and to analyze the methodologies traditionally used to characterize the mobility in big, medium and small cities and some studies carried out at international level and in Colombia and to analyze its utility in CTP by means of its application in Villa of Leyva like city study. Likewise, starting from this information, they thought about some modifications or variations to the traditional methodologies to characterize the mobility in this type of populations, what is presented like a new methodology exclusively applied CTP.

Inside the traditional methodologies to characterize the trips different applicable tools exist to the small tourist cities, however, they exist other that are exclusively useful for big cities and you intermediate. As an entrance supposition one has that this methodologies and tools when being applied in small cities as Villa of Leyva are enough, however, by means of this report it is given to know that to the traditional forms of taking information to determine characteristic of trips it should be included ways to take information to the tourists who contribute an important number of the trips that you/they are given in those in small tourist cities CTP.

2. ANTECEDENTS

Observing the regional context, one has that the characterization of the trips for small cities and you intermediate he/she has been carried out using the traditional methods for such an end, carrying out the modifications to this methods according to the context of the city and according to the existent necessities. The data here shown they are been of a previous revision carried out to different studies in small cities and you intermediate in Colombia, like part of the definition of methodological antecedents to characterize the mobility of their cities, of the denominated investigation "Implementation of a methodology to characterize the mobility in small tourist cities: Cases study Villa of Leyva."

At the present time the HCM (Highway Capacity Manual, Manual of capacity of freeways) it is constituted in the Manual of more conceptual consolidation, as well as in that of more use in our means. There the concepts and more important methodologies are contemplated, although the conditions of our means and environment are different from those characteristic of the means in that manuals were developed as the HCM.

In Colombia, several municipalities of tourist type exist, some with more visitors and for ende bigger problems of mobility that other, however, a clear methodology doesn't exist to characterize the mobility of these. The tourist populations have outstanding aspects that differentiate them of the other ones as for their mobility and it is for this reason that they should be analyzed in a detailed way and to intend contributions to the methodologies for the characterization of the trips. Clearer one of the relating ones in Colombia regarding the traffic studies and transport one has in Bogotá, since there it was hired to

the signature Lime and bigger and Associates to develop what is known as the planning Manual and design for the administration of the traffic and the transport that it serves like support and it indexes for the development of the contracts of taking of data that he/she carries out the Secretary of Mobility (Previously Secretary of Traffic and transport STT), and in general "he/she becomes the local tool in the planning, conception, development and supervision of studies related with the system of transport of the city" (Lime and bigger, 2005). In this manual all the necessary studies of transport are consigned for the characterization of the mobility of big cities and they have been used with certain modifications in diverse studies in intermediate cities of Colombia.

2.1 applications of the current methodologies in Colombia:

They are had as relating the following documents of Colombian intermediate cities:

a). Manizales:

- Study Plan Vial and of Transport of the City of Manizales. System of Public transportation of the City of Manizales, Diagnostic. Engineering of Consultation Ltda. Municipality of Manizales. August of 1992.
- Plan of Massive Transport for Manizales. Governorship of Manizales. October of 1992.
- Plan Vial of the Municipality of Manizales 2005. National university of Colombia - Headquarters Bogotá. Municipality of Manizales.
- I study of the Main Origin Destination of the city of Manizales. Union temporary Urban Matters - Wilmer Pipicano. Municipality of Manizales. 2001.

b). Armenia:

- I study of the Plan Vial and of Transport for the city of Armenia - Phase I. University of the Quindío. Ability of Engineering. August of 1995.
- I study for the upgrade of the Plan of Transport and Infrastructure of the Department of the Quindío. Government of the Quindío. Infrastructure management. University of the Quindío. Ability of Engineering. December of the 2000.
- Upgrade of the Plan Vial and of Transport of the Municipality of Armenia. University of the Quindío. Ability of Engineering. Julio 2005.
- Diagnostic Vial of the Municipality of Armenia. Municipality of Armenia. December of 1994.

c). Ibagué:

- I study for the elaboration of the Plan Pilot of Traffic and Transport of the Municipality of Ibagué. Final report. National university of Colombia - Headquarters Bogotá. Ability of
- Study of Capacity vial of Intersections at Level for the city of Ibagué. National university of Colombia - Headquarters Bogotá. Ability of Engineering. It programs of the United Nations for the Development (UNDP). November of 1999.

d). Popayán:

- Study of restructuring of routes of urban collective public transportation. Engineering of Consultation Ltda. Municipality of Popayán. June of 2003.
- Plan of Administration of Traffic and Transport for the Municipality of Popayán. National university of Colombia - Headquarters Bogotá. Ability of Engineering. It programs of the United Nations for the Development (UNDP). 2000

- Plan Vial and of Transport Central Area 1997 - 2007. Engineering of Consultation Ltda. Municipality of Popayán. 1997

e). Tunja:

- You interview domiciliary of mobility in the city of Tunja. Pedagogic and Technological university of Colombia. Databases de1993.
- You interview domiciliary of mobility in the city of Tunja. Pedagogic and Technological university of Colombia. Databases of 2003.
- The urban mobility in Tunja 1993 - 2003. Cárdenas, Daniel H; Poveda, Juan C.; Díaz, Sonia E. Pedagogic and Technological University of Colombia.

f). Grass:

- Characterization of the mobility in the Municipality of Grass. National department of Planeación. UNDP. October 2004.
- Characterization of the Mobility in the Municipality of Grass 2004. Márquez, Luis G.; Cárdenas, Daniel H; Leguizamón, Luis C. Pedagogic and Technological University of Colombia.
- Contrast of the behavior of the mobility of the Municipality of Grass in normal time and in time of vacations. Leguizamón, Luis C.; Cárdenas, Daniel H; Márquez, Luis G. Pedagogic and Technological University of Colombia.

g). Envigado:

- Plan Vial and of Transport of the Municipality of Envigado 2000 - 2007. Diagnostic. National university of Colombia - Headquarters Medellín. December of 1999.

h). Yopal:

- Integral plan of Traffic and Transport for the Municipality of Yopal. National university of Colombia. Ability of Engineering. Governorship of Yopal. 2005.

i). Valledupar:

- Execution of the first Phase of the Urban Projects and of Mobility outlined in the POT. National university of Colombia. Ability of Engineering. Municipal institute of Traffic and Transport of Valledupar. 2002.

j). Tuluá:

- Plan Vial of the Municipality of Tuluá 1998. Sarmiento, Iván; Fuentes Sandra P.; Jaramillo, Gaudelia C. National University of Colombia - Headquarters Medellín. Municipality of Tulúa. 1998.

k). Bogotá:

- Plan Teacher Of urban Transport. JICA, IDU, municipality of Bogotá 1996

- Study of Traffic of the longitudinal Avenue of West. IDU - Egi - associated Nasar, 1997

l). Other studies:

- Modelación of the Distribution of Trips in Colombian Intermediate Cities. Sarmiento Ordosgoitia, Iván R. IV Congress of Engineering of Transport. Valencia-Spain. 2000

As a historical antecedent of analysis of the mobility in the municipality of *Villa de Leyva*, he/she is a titled thesis "CLASSIFICATION OF THE TRAFFIC FOR THE *VILLA DE LEYVA* MUNICIPALITY", presented in 1999 as grade option by the engineer of roads and transports Diana Marcela Sarmiento, in which the pedestrian and vehicular mobility is characterized, as well as the present signaling in the municipality in that time.

2.2 Concepción of City

The cities can be classified according to their number of inhabitants according to that shown in the Chart 1¹. Likewise, according to their form and structure they can also be classified, either differing for their radial layout (aesthetic) or type grid.

TYPE OF CITY	PEOPLE (Number)
Micro	10.000
Small	100.000 low capacity
Medium	1.000.000 half capacity mediates
Big	10.000.000 High capacity
Macro	> 10.000.000

Chart 1 - Classification of the cities according to their populational size

3. METHODOLOGIES USED AT THE PRESENT TIME

At international level, they took as relating the cases of Spanish small cities where have been carried out different works. In the titled report "Analysis of different methods of study of the mobility in urban and metropolitan areas. Proposal of new solutions" of José's responsibility Antonio Cracks them, Maite Antón Millán and Julián Sastre González, is mentioned that during the decade of the 90 they were carried out studies of mobility in a large part of the main Spanish cities being based on family domiciliary surveys and likewise they are carried out some proposals of modifications especially

¹ Quality of the service in the public transportation system in the public transportation system in Buses in small cities and you intermediate of the Latin American environment. Polytechnic university of Valencia, Spain 2000 p. 17.

This wide experience, in which the authors of the mentioned article have participated, allows to carry out a reflection on determined critical aspects and to carry out some proposals for its future application on:

Organization of the works.

Surveys type.

Control of the survey.

Method of summary of information.

Adjust of the main O/D.

Necessity of specialized software.

Periodic upgrade of the domiciliary surveys.

After the carried out revision you could conclude that they have not been disclosed in an enough way the studies of mobility carried out in small cities of Colombia and neither in the CTP, being these studies the most important to verify if they have been carried out substantial changes in the used traditional methodologies.

3.1 methodologies to characterize trips in big cities and you intermediate

a). you Interview domiciliary: They consist on surveys that are carried out directly in each one of the housings that belong to a previously selected sample; they allow to obtain information on the trips that were carried out in the day immediately previous to the day of the survey, for each one of the five year-old grown-ups, as well as information on the socioeconomic variables as they are the entrance and the holding of vehicles, among others.

b). Method of vehicular seating capacity: The drivers are stopped to a side of the road and investigated on the origin, destination and other data wanted on the trip that he/she carries out in that moment. To stop the vehicles it is convenient and necessary to have the support of the police or agents of Traffic. For effects of expanding the sample, it is necessary to carry out vehicular counts, during the period of the seating capacity, classifying the vehicles.

c). Method of surveys in generating centers of trips: Of this method they come off other that are based in questionnaires. Inside these the one carried out employees are and the one carried out in public transportation terminals.

- Method of Questionnaire to employees: I study specialized of a generator peculiar of traffic. The questionnaires can be distributed to all the employees of a work center, like an industry or a group of offices, to be picked up in the same day. The information that one can obtain understands: place of the employees' residence, like they arrive to the work place, hour of entrance and exit, information on the parking and the costs of the trip.
- Method of Questionnaire in public transportation terminals: Study for planning of routes of passengers' public transportation, parkings and project of terminals. He/she consists on giving questionnaires in returnable post cards to all the people that approach or they get off the buses, trains, or airplanes in the terminal, during 24 hours of a typical day, or during the hours of maxim it demands. This study type allows to obtain information on like it traveled the passenger, origin, destination and purpose of the trip. The questionnaires given to people that

get off a public vehicle will be deposited in the properly obtained mail. If the cards surrender to people approaching the vehicle, the operator picks up all the cards during the trip.

The domiciliary interviews are used at international level to obtain detailed information on the characteristics of the trips that the inhabitants of an urban area carry out (basic Models of planning of the transport). The obtained data are used to estimate the flows of trips among all the areas in that a city is divided. These exchanges of trips are usually represented by means of values that they appear in a cell of an origin womb and destination; each cell corresponds to a combination peculiar of origin and destination of the urban trips.

They should be considered the characteristics peculiar of each study in which will use the results of the domiciliary interviews, with the purpose of guaranteeing the attainment of the outlined objectives. Starting from the form in that the information of uses of the floor is ordered and of other aspects of the urban planning of the City, he/she should intend a basic procedure for the realization of the domiciliary interviews.

For the work carried out in *Villa de Leyva* like CTP case of study, the domiciliary surveys were used.

4. CHARACTERIZATION OF TRIPS USING THE DOMICILIARY SURVEY, I MARRY STUDY: VILLA DE LEYVA

4.1 characteristics of *Villa de Leyva*

The municipality of *Villa de Leyva* is on the oriental mountain range of the Andes, in the central region of the department of Boyacá, located to about 40 kms to the west of Tunja, grateful as historical and cultural patrimony, it is characterized by its architecture of colonial style and for its varied rural landscapes that you/they go from the moor area with its births and little lakes of water to the desert area and it dries off.

The municipality has an extension of 128 km² and its height on the level of the sea in the urban helmet it is of 2.143 meters, the temperature average is between the 17 and 18 °C. The population, according to the census of 2005, is of 12.032, of which 6.819 compose the urban population and 5.213 the rural one. The economy of *Villa de Leyva* is based on the tourism, the agriculture and the stone exploitation, clay and marble. "The main economic entrance of the municipality is the Tourism"²

4.2 domiciliary survey of mobility

According to the census of the one DAMAGED in the year 2005 *Villa de Leyva* the number of homes it was 2635 and the number of housings was 2517. The population in the urban area belonged to 5219 inhabitant and According to the projections carried out by the one I/you/he/she DAMAGED for the year 2009 the population of *Villa de Leyva* in her urban area you/he/she belongs to 7999 inhabitants. They were carried out domiciliary surveys. This survey was calculated and it applied to a random sample of 100 homes indexing the origins and the destinations of the trips and the mentioned Areas (DANE-2005³), being used this geographical aggregation for the expansion of the sample.

² <http://www.villadeleyva-boyaca.gov.co/sitio.shtml?apc=m1T1--&m=f#vias> (September 19 of 2012)

³ COLOMBIA. NATIONAL ADMINISTRATIVE DEPARTMENT OF STATISTIC. Magnetic file on demographic characteristic and areas. Base 2005.



Figure 1. 12 th Street – career 10 of *Villa de Leyva*

For this work previously intended a configuration zone of *Villa de Leyva*. At urban level they were defined six areas. These areas shown in the Chart 2 and in the Figure 2, they Allowed to carry out an appropriate work of domiciliary surveys.

AREA	DESCRIPTION
AREA 1	Between 8 th Career and 10 th Career between 14 th and 11 th street
AREA 2	Between 14 th y 15th street and 8 th career and <i>Arcabuco</i> way
AREA 3	Between 15 th and 12 th street and 10 th y 14 th career
AREA 4	Between 10th y 15th and 8 th to 1 st career.
AREA 5	Between 6th and 12 th y 10 th <i>fossil</i> way and 10 th career
AREA 6	Between <i>fossil</i> way and 7 th career and 10 th street to <i>Villa de Leyva</i> exit

Chart 2 - *Villa de Leyva* Areas

The domiciliary survey was applied during two days, one among week on Thursday September 6 and other one weekend, Sunday September 9 2009 to be able to carry out a contrast.

a). Coefficient of expansion of the sample: One kept in mind the number of homes of the census of the year 2005 since it is the well-known information.

b). Results: He/she was considered in 28115 trips newspapers the day Wednesday among week and in 17022 trips newspapers a day Saturday like chosen day for the taking of information the weekend.

c). Study of vehicular occupation that hurtled that in high season was made (weekends of discharge it demands tourist, with day festival Monday) especially in hours of the afternoon, the quantity of vehicles peculiar with 4 or more occupants it is relatively high in the exit toward *Tunja*, compared with the other points of taking information. While in the street 8 with career 9 trafficked many motorcycles without passenger in hours of the night. In the day of not very attractive tourist the little vehicular flow

is noticed, having like critical tract the career 9 with street 8 in hours of the afternoon, mainly in particular vehicles only with the driver.

d). vehicle Holding for home: In the figure 3. the vehicle holding is shown by home in percentage according to the domiciliary survey. This vehicle holding doesn't vary for Wednesday and Saturday because the same homes were interviewed.

e). Size of the home: according to the domiciliary survey the home size that appears in the chart 3 settled down.

SIZE HOME (Number of people)	% HOME
1	10,00%
2	21,00%
3	25,00%
4	20,00%
5 or more	24,00%

Chart 3 - Size of the home obtained in the domiciliary survey

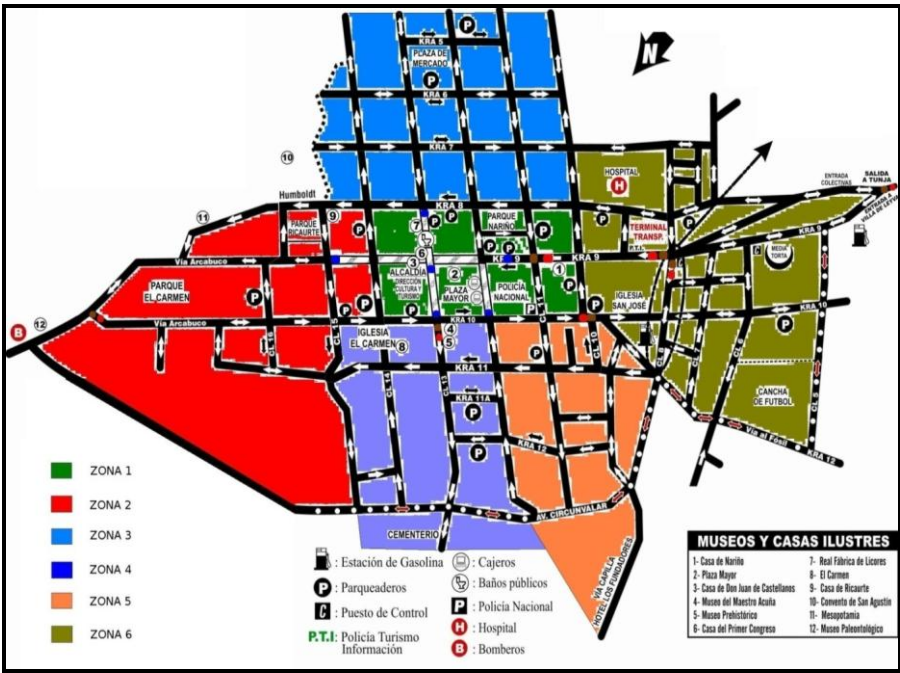


Figure 2 – Areas used - Villa de Leyva (modified of the EOT)

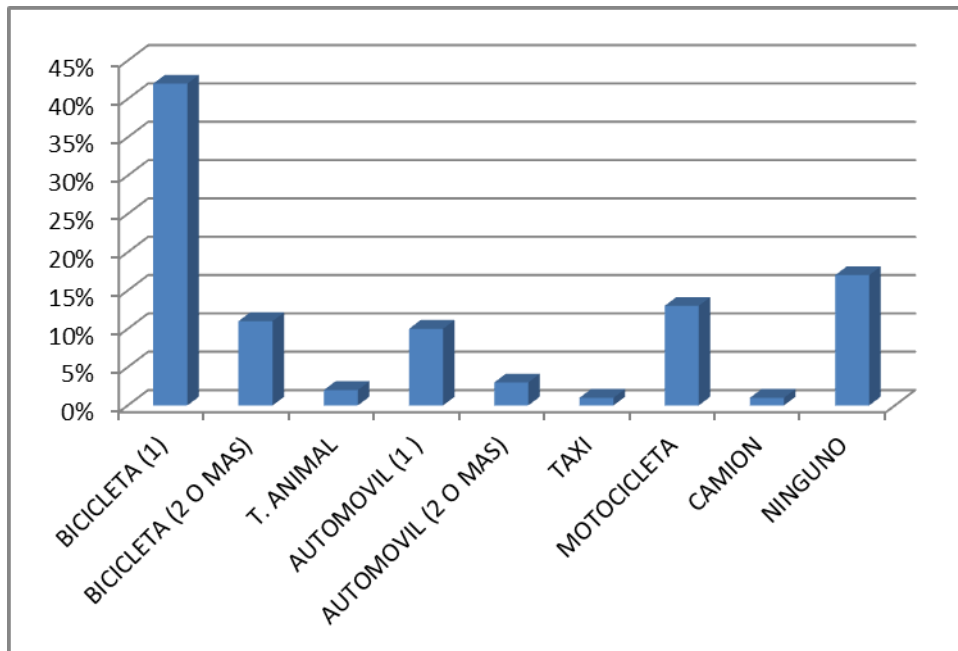


Figure 3 - Vehicle Holding for home

4.3 Main Origin - Destination

The womb origin-destination that was obtained for the day Wednesday is presented in the Chart 4. There it is noticed clearly that the main destination and origin of the trips of the residents of *Villa de Leyva* is the Area 1, where the following places of interest are located:

- House of *Ricaurte*
- House of *Nariño*
- House of *Juan de Castellanos*
- Bigger square
- Cathedral of *Villa de Leyva*
- Temple *San Agustín*
- Church of *Moniquirá*
- Museum of colonial art
- Paleontological museum

ORIGIN/DESTINATION	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
Area 1	2213	1607	1291	1792	1001	1449
Area 2	1555	1133	53	26	26	632
Area 3	1423	1212	580	474	53	474
Area 4	1133	711	26	105	26	184
Area 5	1265	501	553	26	553	843
Area 6	2082	1001	975	26	158	949

Chart 4 - Origin-destination Matrix – Wednesday

The womb origin-destination that was obtained for the day Saturday is presented in the Chart 5. In this womb it is noticed clearly that the number of trips is smaller than the day among week, because neither the students, neither some of people that usually work from Monday to Friday carry out trips.

ORIGIN/DESTINATION	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
Area 1	1950	949	764	1001	474	922
Area 2	1291	474	606	184	132	105
Area 3	1159	553	132	211	237	53
Area 4	870	53	53	26	26	26
Area 5	1001	79	184	264	26	316
Area 6	1818	343	184	79	53	422

Chart 5 - Origin-destination Matrix – Saturday

4.4 ways used to carry out the trips

In the Figure 4. the high use in the trip ways is noticed on foot and bicycle, with 49% and 32% respectively according to the domiciliary survey carried out for the trips of the day Wednesday, this due to the size of the municipality, the short distances to travel and the vehicular readiness for home shown in the Figure 3.

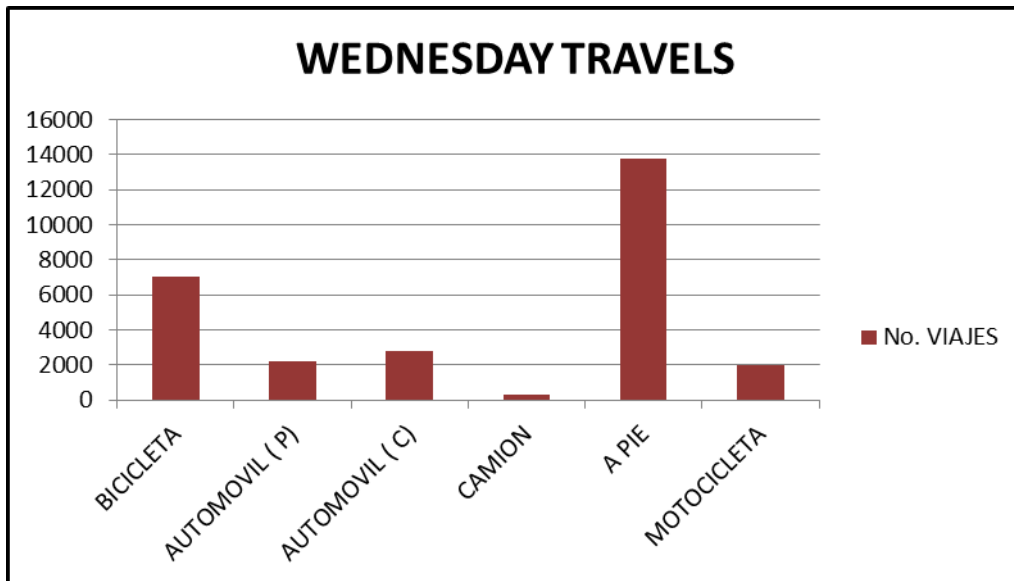


Figure 4 - Travel carried out by mode in *Villa de Leyva*

4.5 purpose of the trips

The biggest trip purpose the Wednesday turned out to be study in 40%, followed by work in 38%, leisure in 10%, purchases in 8% and others in 4%. For the Saturday turned out to be Work in 35%, Leisure in 30%, you purchases in 20% and others with 15 remaining%.

5. PROPOSED METHODOLOGY FOR CHARACTERIZATION OF TRIPS

The methodology that already intends part of the methodology existent but to this they are carried out some necessary modifications due to the city type as for their size⁴, characteristic socioeconomic and people's that carry out the trips type.

The methodology that intended as for the size of the city defines the following thing:

- The size of the city should be determined previously to the study. Even this is necessary to have as approaches the population's size as well as the territorial extension of the urban areas. Of the size as for territorial extension of the urban area of the city the conception depends on what is a trip.

- We need to define that is considered like trip. For small tourist cities in those that their territorial urban extension is not very big should be defined a minimum distance to be considered as trips keeping in mind that of not counting trips in short distances the number of trips he/she decreases substantially.

- It was considered like a form of defining the methodology that intends that is applicable to tourist cities with an inferior number of inhabitants at 20.000.

⁴ To characterize Tunja before studying their mobility. *Cárdenas, Daniel H.* Has Thought and Action. No. 4-5. ISSN 0120-1190. *Tunja*. 1.999.

- They should be considered the possible origins of tourists. For this it is necessary to keep in mind the near cities.

5.1 socioeconomic characteristics of the CTP

The socioeconomic characteristics of the city define if this is tourist or nr. For this proposed methodology one keeps in mind as small tourist city all that in the one that their main revenues contribute them the tourism, either because of taxes, trade or of services. Additionally, they interest the levels of the residents' of the CTP revenues.

Another of the characteristics that you/they should be defined in the CTP is since the type of tourists that you/they are attracted, the sociocultural conceptions of the same ones, they define in great way their mobility, subject as it is obvious to the infrastructures with those that it counts the city. From this aspect it should be kept in mind three types of people according to their origin and that they are mobilized in the CTP. These are the residents, the national tourists and the foreign tourists.

What differentiates the residents of the tourists is their bigger knowledge of the infrastructure, available ways, operators, schedules and rates of the transport, reason why, it owes himself he/she had a special care when designing an instrument to apply the tourists when characterizing the mobility.

5.2 Concept of travel in the CTP

It is considered like trip that entire displacement of a place to other (origin - I dedicate) that is carried out with a specific purpose, using a way of transport at a specific hour. The trip can be characterized according to this definition, since it is sought to know the time used in this, where he/she originated and which was the final destination, how he/she was carried out (ways and existence of I transfer) and the cost of this trip.

For the case of study and in general for the CTP is considered trip if the carried out displacement is bigger or similar to 200 m of distance what you/they would be on the average two blocks of 100m in terms of the common one. This minimum distance to consider a trip kept in mind for the CTP depends on its characteristics of territorial urban extension as it had already been mentioned, being able to be bigger.

5.3 used ways

One of the first previous works to the characterization of the mobility in any city is to identify the available trip ways. In the case of the CTP attention should be lent to this phase of the characterization, since the available ways to carry out the trips are not necessarily there the existent ones, but those that can arrive for the transport of the tourists. Initially he/she intends to identify the existent ones in the CTP and I eat later stage the most usual ways they should be identified for the transport of the tourists.

5.4 Concepción of typical and atypical days

One of the entrance hypotheses when approaching the investigation was the definition by day typical for the taking of information. In the analyzed studies, in those that make use of the domiciliary survey of mobility he/she was defined as typical day on Wednesday, supplemented this to the month that was considered as more capable to carry out the taking of information that was October. The hypothesis then for the CTP as for the typical day is that it depends on the maxim it demands tourist, due to the generation of conflicts for this cause, not attributed to loose or not very frequent phenomena but to lingering periods the weekends and in certain times of the year, like it happens in *Villa de Leyva*.

The urban mobility is one from the fundamental variables to keep in mind when thinking about development objectives in a city. The repercussion of the pattern of mobility about the quality of the inhabitants' life is since of great importance it affects to a wide variety of environmental and social aspects as they are it the quality of the air, the readiness of space public, the security, the health, the social integration and other external costs of the transport⁵.

If the characterization of the mobility is carried out in days of drop it demands tourist and with these results are carried out proposals of mobility, the result will very surely be a not very kind CTP⁶ for the tourists, but if it is carried out the days of discharge it demands tourist (weekends) the proposals of mobility will be serious solutions and appropriate forms of offering the tourist a pleasant CTP that motivates future returns and new visits.

5.5 use of survey origin - I dedicate to drivers and domiciliary survey

Inside the methodology that intends it includes the use of these two methods "traditional" to characterize the trips, however it is recommended to pay bigger attention to the information of the weekend, since it is the one considered as typical day for the CTP.

5.6 use of complementary interviews to tourists

The proposed methodology has like one of its main tools this interview that is denominated survey origin - I dedicate to tourists and it is complementary to the work carried out with residents. These you interview they should carry out in places of tourist affluence.

Inside the options of interviews on trips made to tourists are:

- You interview phone of mobility: They make reference to carried out questionnaires in a phone way to the tourists that are put up in the hotels of the CTP in which are asked about their origins, trip destinations, ways of transport used for their journeys in the CTP, schedules of trip and rates. The restrictive ones existent in this interview form was the distrust for the fame of insecurity of Colombia and the opposition of the owners or administrators of the hotels, for what intends that for the use of this tool one keeps previously in mind its authorization and support, involving there asks to improve the quality of the service in the hotel and in the CTP.

- Questionnaires prepared in commercial centers, store, restaurants and cafeterias of the CTP. They should prepare these questionnaires in two languages to guarantee the obtaining of the answers on the part of the tourists.

⁵ EXTERNAL COSTS OF TRANSPORT UPDATE STUDY, Final Report, Zurich/Karlsruhe, October 2004, Pg. 23-24.

⁶ Presentation "kind cities how to build them from sustainable urban mobility?" Montezuma Ricardo, DNP Bogotá, May 18 of 2006

- The questionnaires or surveys should involve the same areas that possess the domiciliary surveys to build the total womb of trips of the CTP.

5.7 calculation of the factor of expansion of the sample

As what is looked for it is to supplement the information obtained starting from the domiciliary survey with the survey to tourists, it becomes necessary to calculate the factor of expansion of the sample in a different way, since in fact they would be two samples that different populations represent (tourists and residents), reason why he/she intended to use the expansion factor for the sample to residents applied to the womb of trips of these and an expansion factor to obtain the womb of the tourists' trips. After the above-mentioned, the two wombs of trips should be added.

6. CHARACTERIZATION OF TRIPS USING THE PROPOSED METHODOLOGY

6.1 justification of *Villa de Leyva* selection

It was chosen *Villa de Leyva* like case study, because this municipality or CTP like here he/she was defined, he/she has several tourist attractiveness as they are it the house of Ricaurte, the house of Nariño the house *Juan de Castellanos* the biggest square, the ictiosaurio (good known as the fossil), the garden of the eminent columns Musicians, the cathedral of *Villa de Leyva*, San Agustín's temple, the church of *Monquirá*, the museum and church of the Carmen, the museum of colonial art, the paleontological museum and the ammonites or fossil shells. The events that there are carried out they also have high recognition at national and international level as they are it the parties of the Carmen's Virgin in July, the Festival of comets in August, the festival of lights and competition of the manger in December, encounters of astronomy and national and international managerial and academic events.

All the above-mentioned makes it constitutes a reference parameter to find the causes of the problem that it has been observed concerning to the mobility in some sectors of this grateful municipality.

6.2 characteristics of *Villa de Leyva* like CTP

Villa de Leyva was considered for this investigation like a small city, since he/she has but of 12000 inhabitants in total and in its urban area more than 7000 according to projections of the one DAMAGED at 2009. According to that shown in the chart 1, it would be a city micro when keeping in alone mind their population of the urban helmet, however, the hypothesis regarding the aspect population of the CTP is based that is to say on the characterization of its mobility according to the population that carries out trips inside this, the own one and the floating one or in other in agreement terms with the investigation, the residents and the tourists. The area configuration that one kept in mind was the proposal in the Chart 2.

Additionally, it is classified *Villa de Leyva* like CTP because their main source of revenues is the tourism.

6.3 travel definition in *Villa de Leyva*

To be able to carry out a study of mobility in *Villa de Leyva* like CTP and to build a womb origin-destination he/she was defined like trip that entire bigger or same displacement 200 m, with a defined purpose.

6.4 travel purposes

The possible trip purposes that were defined in *Villa de Leyva* for the studies of mobility were purchases, study, work, entertainment, cultural tourism, tourism for vacations and home.

6.5 travel modes

The trip ways defined for *Villa de Leyva* were: automobile like driver, automobile like companion, bicycle, bus, buseta, on foot, animal traction (carriages or horse), motorcycle and other for the case in that the tourists arrived to the CTP with a different vehicle that you/they were described during the case study.

6.6 definition by day typical to characterize the travels

The methodology proposed for the characterization of trips in the CTP defines as typical day one in the weekend, be Saturday for the common weekends or Sunday for the weekends that include festival bridge. The chosen month for the taking of information was September contrary to that usually proposed that it is the month of October. The days in which he/she took the information were on Wednesday 2 and on Sunday September 5 2009. He/she was carried out the taking of information these two days for he/she carries out a contrast with that only obtained using the common methodology for big cities or you intermediate.

6.7 procedure for the taking of information

They were carried out several surveys to determine the proportion of tourists regarding the number of residents. For this in two occasions (August 8 and August 22 2009) 100 people that were walking in the central square of *Villa de Leyva* were chosen aleatorily (it Figures 5.) for each case and that obtained there was contrasted with the information that he/she appears in the Figure 6.

TYPE	QUANTITY
FOREIGN TOURIST	12
NATIONAL TOURIST	31
RESIDENTS	57

Chart 6 - Results 1st a survey to pedestrians

TYPE	QUANTITY
FOREIGN TOURIST	8
NATIONAL TOURIST	39
RESIDENTS	53

Chart 7 - Results 2nd a survey to pedestrians

According to the results obtained by means of these surveys, he/she took the decision of carrying out the domiciliary survey to 100 homes and a survey origin-destination to 120 tourists that gave the information that has been able to offer 40 homes of three members each one (Chart 3.).



Figure 5 - Central Square of *Villa de Leyva*

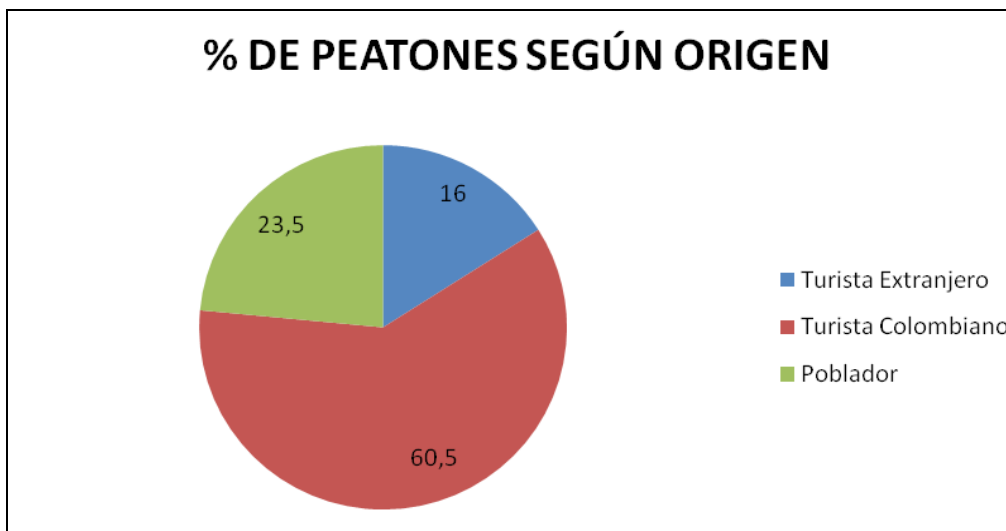


Figure 6 - tourists' Percentage and residents in *Villa de Leyva*⁷

6.8 obtained results

A factor of expansion of the womb was calculated obtained with the domiciliary survey and an expansion factor for the resultant from the survey origin-destination to tourists. The expansion factor for the domiciliary survey was 26.35 and the expansion factor for the tourists (2000 people that arrived to *Villa de Leyva* approximately the day August 29 2009) it was 16.67.

The main origin - I dedicate obtained when using the methodology that thought about for *Villa de Leyva* the weekends It appears in the Chart 8. In this one can notice the incidence that you/they have the trips of the tourists mainly in some areas. The main origin - I dedicate expanded and obtained of the survey to the tourists is shown in the Chart 9.

⁷ SÁNCHEZ, Héctor M. The pedestrian mobility in small tourist cities of Colombia: Case studies *Villa de Leyva*. Report I International Congress of Civil Engineering - University Saint Tomás Tunja, May of 2009. Pg. 8.

ORIGIN/DESTINATION	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	TOTAL
Area 1	2625	1346	1068	1313	573	1120	8045
Area 2	1775	556	733	177	210	168	3619
Area 3	1732	649	177	336	228	84	3205
Area 4	1220	351	51	42	42	42	1747
Area 5	1280	126	294	287	42	304	2332
Area 6	2048	546	261	126	67	439	3487
TOTAL	10679	3573	2583	2281	1162	2157	22435

Chart 8 – Total Origin – Destination Matrix

ORIGIN/DESTINATION	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	TOTAL
Area 1	750	433	333	350	117	233	2217
Area 2	533	100	150	0	83	67	934
Area 3	617	117	50	133	0	33	950
Area 4	383	300	0	17	17	17	733
Area 5	317	50	117	33	17	0	533
Area 6	300	217	83	50	17	33	700
TOTAL	2901	1217	733	583	250	383	6068

Chart 9 – Main Origin - Destination of Tourists

What shows the womb OR-D of tourists it is that it is the area 1 (Chart 2.) the one that more generates and it attracts trips.

6.9 purpose of the trips

For the day Saturday August 29 and according to the one consolidated of domiciliary surveys and to tourists the main purpose turned out to be Leisure with 32% followed by work with 28%, you Buy with 25%, Culture in 8%, I study in 3% and others in 4 remaining%.

6.10 used ways

After carrying out the one consolidated for tourists and residents the figure it was obtained 7 where it is shown clearly that the used way is on foot, followed by the bicycle, the automobile like companion, the motorcycle and the automobile like driver. The vehicles of animal traction appear since they are carried out cavalcades or walks in carriage pulled by horses.

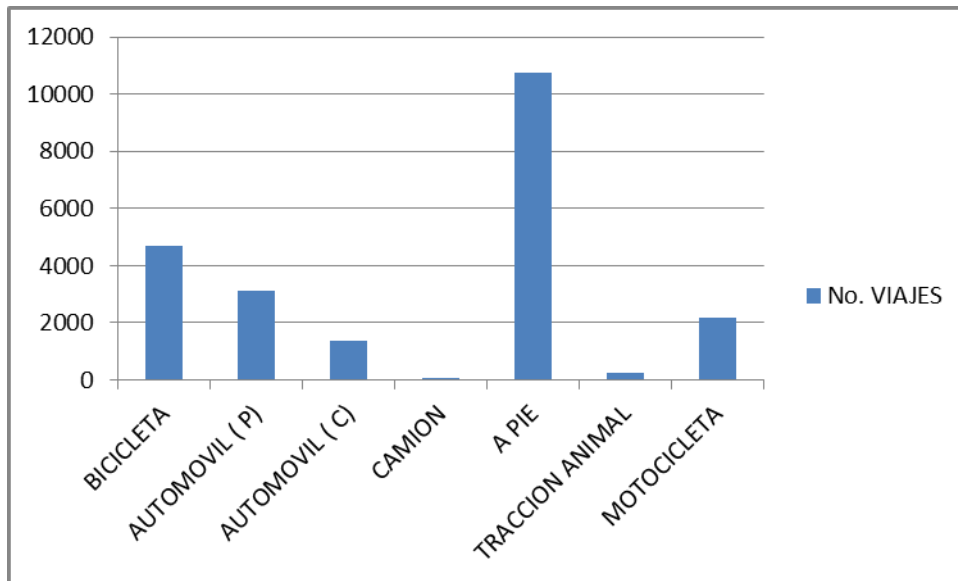


Figure 7 - Number of travels for way (Residents and Tourists)

7. ANALYSIS OF THE RESULTS

The results obtained with the proposed methodology show clearly that it is necessary to take information of trips to the two types of users, that is to say, to tourists and residents, since the day Saturday through the domiciliary surveys they were considered 17022 travels contrary to that obtained using the domiciliary survey more the survey to tourists also for one day Saturday that was of 22435 travels.

It is notorious that the way of more used trip is the walk, followed by the use of the bicycle and the automobile like companion. The use of the motorcycle has come increasing due to the increase of this type of vehicles in *Villa de Leyva* and to its easy acquisition.

The proposed methodology and in development stage it detected some difficulties regarding such important aspects as the sampling, the expansion of the sample and the form like it should be approached the tourists due to their little information regarding the city in study.

The certain areas that attracts more and It generates more of travels they were the areas 1 and 2 respectively, being fundamental for this the incidence of the existent tourist and commercial places there.

The results obtained when implementing this methodology were compared alone for the day of weekend with the one obtained by means of the application of the domiciliary survey because this was defined as typical because of the tourists.

They should be carried out comparative with information obtained starting from phone interviews in hotels or simple surveys obtained by the tourists, prepared in restaurants, hotels or business districts, to know the form in that the tourists are mobilized in the CTP.

8. CONCLUSIONS

8.1 OF THE SMALL TOURIST CITIES CTP

- The CTP is not clearly defined in the Colombian legislation, as if it is the case of countries like Spain, where it was legislated (Andalusia) about how to classify the cities and as defining if these are tourist or nr.
- The existence of CTP in Colombia makes important the use of this outlined methodology and special attention should be paid to the mobility with ends of increasing the tourist competitiveness.
- The definition of CTP according to the outlined methodology presents some difficulties due to the lack of economic information for some of these.
- It is indispensable to pay attention to the infrastructures for the tourist and resident as well as to the signaling for the same ones that allow an appropriate accessibility and mobility inside the CTP.
- The methodologies traditionally approached to characterize the mobility they can be applicable to the CTP, however in the specificity of their use, it becomes necessary to enter to consider special aspects or unique situations in these, what generates a waste in the process of taking of information or ambiguity in the development of studies of this type.

8.2 OF THE METHODOLOGY TO CHARACTERIZE THE MOBILITY IN CTP

- The methodology is simple and its application is highly feasible, thanks to the access easiness to the tools or instruments that he/she intends to use.
- The use of interviews or surveys on the part of people unaware to hotels or restaurants were a challenge for the case study, since the national tourists and foreigners that spend the night in the CTP according to that observed have certain prevention or personal fear for the antecedents of insecurity in the country.
- The characterization of the trips in the CTP requires of a process very planned especially to obtain the information of the trips of tourists.

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