ASSESSING THE WALKING ENVIRONMENT OF GUIMARÃES CITY CENTER IN PORTUGAL

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ABSTRACT

People who walk for transportation or pleasure face many challenges in the physical environment. Many people in the U.S. and in Europe want to walk for utilitarian, health, or recreation purposes, but are discouraged from doing so, in part, by a lack of pedestrian facilities and a predominance of auto-dominated infrastructures, which causes threats to their safety. While facilities of Non-Motorized Travel (NMT) are becoming more common in some areas, the influence of transportation infrastructure and of the overall physical environment on walking activity remains uncertain. Guimarães city is one of the municipalities in Northern Portugal that has a long tradition of walking environment in the city center area. This is desirable for the residents because they want to walk around for shopping and social recreation. Nevertheless, some problems of walkways in city center areas discourage people to walk. This paper tries to categorize existing problems in different criteria and assesses the present condition of the walkways in the study area. Questionnaire surveys were conducted in the beginning of 2010 to know the responses from the walkers. Observation surveys have been carried out at the same time to know the physical characteristics of the walkways and the built environment. Finally, the paper discusses policies and methodologies that can be useful for similar kinds of municipalities in Portugal to assess the present walking environment in city center areas.

1. INTRODUCTION

Proponents of 'new urbanism' or 'neotraditional town planning' developments have claimed that high-quality pedestrian environments enhance the sense of community by increasing interactions among neighbors (Lund, 2002). Studies have shown that 'taking backstreets' from motor vehicles and converting those to pedestrian ways have improved the public space not only for social gathering but also for attracting and generating business activities (Kim, 2006 and Yuen, 1998). Wave of internet and information about climate change and sustainable mobility spreads different ideas to the professionals and researchers to think more about walking as one of the important modes of accessibility. Pedestrian's master plans from Portland, Seattle, and London have also increased the importance of pedestrianization in urban planning world wide as a matter of quick dissemination of information through the internet. In Portugal, the two largest cities, Lisbon and Porto, experienced only some revitalization attempts in riverfronts in the 1990s (Carlos, 2007) in which a segregated walking environment was clearly favored. The present study is also an attempt to aware researchers, professionals, practitioners and stakeholders to take advantages of knowing the walkway environment

in a typical medium sized city in Europe. In order to develop a pleasant and comfortable walking environment in city center, sidewalks and cross walks should be designed according to pedestrian's perception and by considering the concept of sensibility ergonomics that is defined as engineering approach to apply human sensitivity to product (Lee, 2009). Sustainable mobility can be achieved if urban environment offers comfortable and barrier free walkways for the pedestrians in the city center. Walkways in Guimarães city center are very well connected among different urban facilities such as: police station, shopping centers, university of Minho, Guimarães castle and football stadium. Walkers and tourists, who are using walkways to take a short trip (within 2 kilometers) among those urban attractions, are feeling more comfortable when the walkways are free of illegal parking and free from unwanted obstacles. This study focuses on the existing problems that the pedestrians encounter in their regular life in Guimarães city center. Series of interview and observation surveys have been carried out and their results quantified to assess the walkway environment in city center. It also incorporates the impressions of walkers to know their satisfaction level while using the walkways in Guimarães city center.

2. OBJECTIVES OF THE STUDY

This paper has two specific objectives. Those are as follows:

(i) To explore the present problems of the pedestrians on walkways in Guimarães city center and
(ii) To assess the problems according to pedestrian's choice to know the realistic information based on specific criteria

3. STUDY AREA

Guimarães, a northern city of Portugal, has a very rich cultural heritage since beginning of medieval times and it keeps projecting the future as it will be European Capital of Culture in 2012. The municipality has a land area consisting of almost 241 sq. km with 161,000 inhabitants (Guimarães Municipality, 2010) while its head consists of 40.000 inhabitants. Over many years, Guimarães city officials pursued a policy of preserving architectural forms and rededicating spaces to new functions so that old and forgotten areas of the city center were given a rebirth. Guimarães is the focus of greater levels of interest and recognition, both nationally as the first capital of Portugal and internationally, as a result of the city's strong commitment to the criteria it adopted and craftsmanship it supported in this area. The last thirty years have testified the accomplishment of some old projects and ambitions. The renovation of public spaces and of municipal buildings, dedicating them to new functions and services, along with the technical and financial support for private initiatives, represent the three main strategies that have helped in achieving the prime goals for the Historic City Centre of Guimarães. Those goals were basically:

First, the renovation of the landmarks in the Historic City Centre strove for the highest level of authenticity by using traditional materials and techniques, an ideal which not only maintained the architectural integrity but also respected the quality of form and function.

Second, the number and type of residents living in the Historic City Centre should be maintained, the living conditions of this population improved and gentrification was not welcomed.

The historical city center is dedicated for the walkers with pedestrian precinct. But the adjacent areas have access to cars and motorized vehicles with several shops that attract people to buy different kinds of goods. The study has identified that there are different types of shops in the adjacent areas of city center as: newspaper stands, pharmacies, clothing shops, souvenir shops, kiosks, restaurants, others. In the central area, there is a water fountain and beautiful resting arrangements for people who can spend time walking and seating in the sun. Natural landscape is placed with small trees, bucket of flowers and small gardens. Walkways are well connected within 1 kilometre radius of city center to integrate football stadium, police station, University of Minho campus, shopping malls, municipality office, historical monuments, church and the famous Guimarães castle to attract tourists and local people.

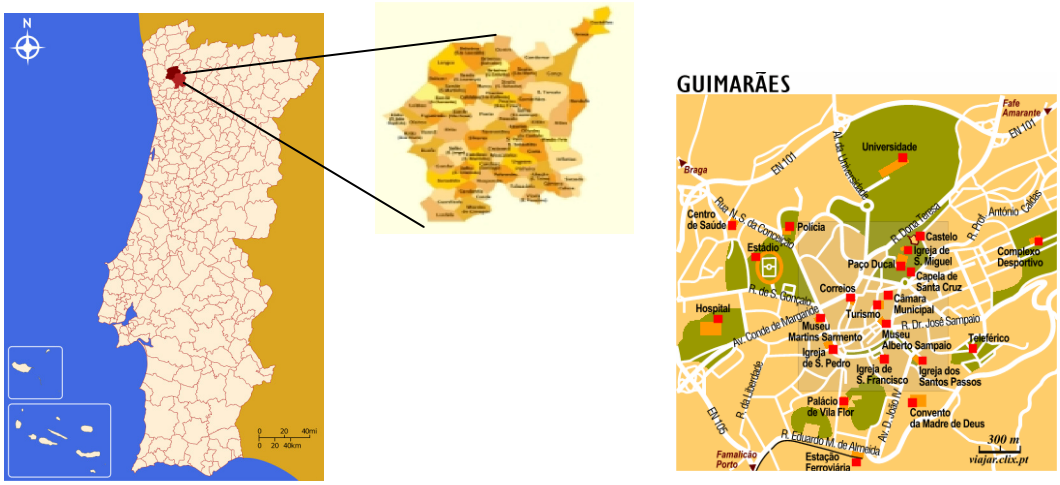

Fig. 1 Map of Guimarães and Guimarães city center

Figure 1 shows the map of Guimarães and the detailed city center streets. It can be seen that the major attractions are very near by from the city center of Guimarães city to walk within 2 km radius. Both sides of the major square in city center have car lanes and sidewalks and at the center, there is a pedestrian precinct.

(a) **(b)**

Fig. 2 Pedestrian Precinct and Sidewalks in Guimarães city center

Figure 2 shows the beautiful central square with wide pedestrian precinct. Next to the pedestrian precinct, streets are shouldered with beautiful sidewalks. But the sidewalks have some major problems which will be discussed in the analysis part of this paper and in major findings.

4. METHODOLOGY

Guimarães city center and the adjacent areas within 500 sq. meters have been selected as the study area to know the pedestrian's impression about the walking environment in city center. Both interview and observation surveys have been conducted to assess some selected criteria based on literature reviews and World Wide Web (www) navigation. Several criteria have been cited considering landscape, urban structures, environment, socio-economic composition of city dwellers, weather, mobility pattern, etc. and selected criteria have been assessed after following factor analysis to screen out the less important aspects. Southee, for example, has mentioned about four criteria that can assess the walkway environment in the US cities as: travel distance, weather condition, physical ability and environment (Southee, 2005). This study considers five criteria to assess the existing walkway environment.

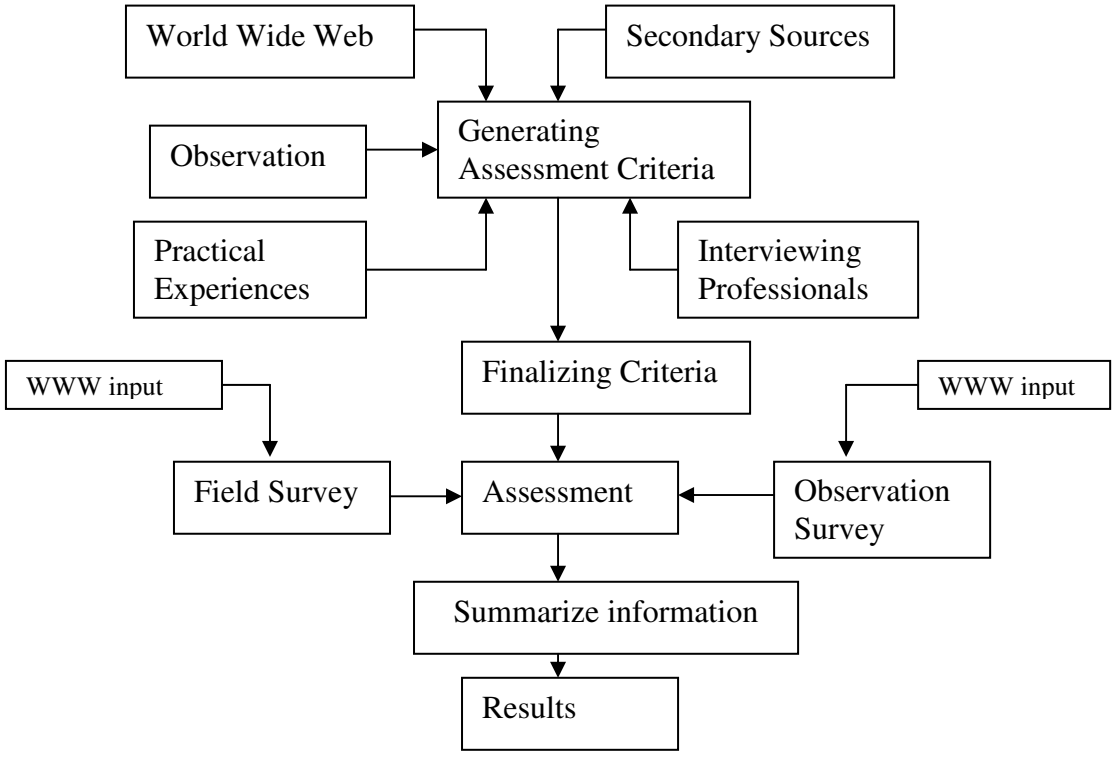

Fig. 3 Work Flow Diagram of the study

Figure 3 shows the work flow diagram of this study. In the beginning, nine criteria have been fixed based on literature and practical experiences to assess the walking environment in city center of Guimarães. After careful review and judgment, five criteria have been finalized as:

a) Safety : It incorporates the pedestrian's perception about safety while walking in city center

b) Connectivity: It offers the assessment of connectivity among urban facilities and attractions with city center
c) Hindrances: Dustbins, billboards, electric pillars, beautification staffs and switchboards of utility services offer unpleasant walking environment on sidewalks which are considered as hindrances
d) Illegal Parking: Illegal parking on sidewalks creates problems for walkers and forces them to walk on carriage way which is considered one of the major assessment criteria for city center walking environment.
e) Identity: It considers the identity of the walkers within the built environment in city center.

After fixing these criteria, a brief questionnaire has been prepared to interview the walkers in Guimarães city center. One hundred questionnaires have been distributed and graduate students have been sent to ask the questions on street at different time periods. Observation survey has been conducted in the same period of time to know the pedestrian speed and volume, physical features on walkways followed by photographs that describe well the existing problems in the studied area. Finally the collected information have been summarized and analyzed following simple statistical methods in a presentable format.

5. MAJOR FINDINGS

Satisfaction of a pedestrian in city center depends more on emotional perception (Lee, 2009). Besides, satisfaction also depends on environment, walking condition as well as weather factors. If the surface of the walkways is not well maintained, if the effective of the walkway width is not continuous and if the walkways are full of waste and hindrances, pedestrians do not feel comfortable to walk (Khan, 2006). An interview survey consisting of one to five scale has been made to the pedestrians to rate their impressions in order to assess the walking environment in Guimarães city center. In the scale, one (1) means the best case and five (5) means the worst case scenario of the walkways that includes crosswalk, sidewalks and transit walks in the heart of the city center.

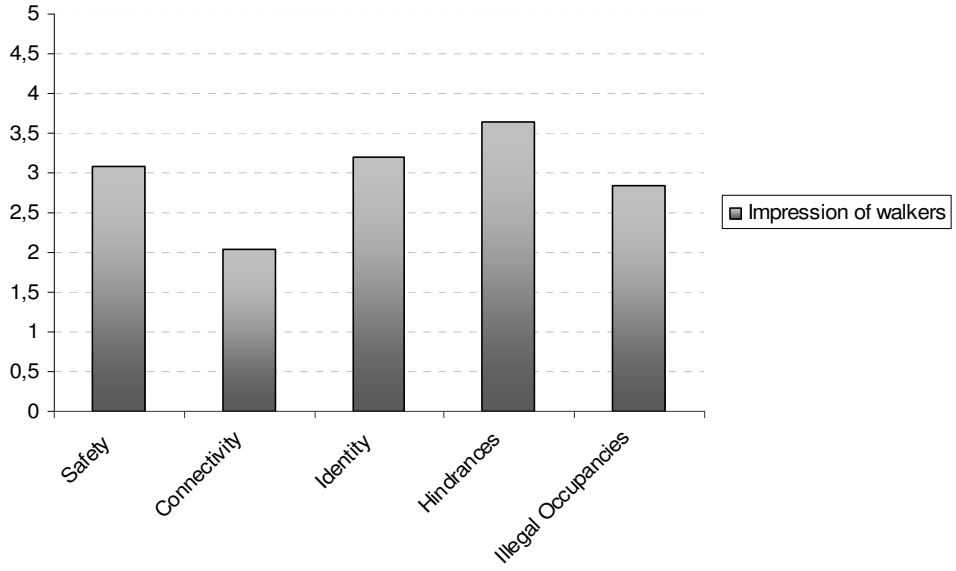

Fig. 4 Pedestrian's Overall Score of Satisfaction

Figure 4 shows connectivity has been graded better evaluation in comparison to hindrances, safety and illegal occupancies by the pedestrians. The worst scenario can be seen in case of hindrances. Hindrances are consisting of different items on sidewalks. Most cases, hindrances are being considered as electric or telephone switchboard on walkways, signboards, trees and street furniture, dustbins and unwanted elements or items on sidewalks. It has been experienced in the city centre's sidewalks in Guimarães that there are many hindrances on streets. It has been well justified from the observation survey that the pedestrian's impression about hindrances are not unusual.

(a) **(b)**

Fig. 5 Hindrances caused by trees, dustbins and signboards

In the figure 5 (a, b) it can be seen that a tree almost makes it impossible for the walkers to walk comfortably on sidewalks. The pedestrians must down their heads to avoid the trees when crossing the area. This situation creates very uncomfortable walking environment. Observation surveys reveal that at least 90% (except the children) of the pedestrians need to bend their body to adjust the space and to bypass the tree on sidewalks. Observation survey also reveals that there are at least 11 trees presenting a similar situation to the one shown in figure 5 (a) within a radius of 500 meter from the city center of Guimarães. In some areas, there is not enough lighting on streets. At night, these trees create even more inconvenient walkway environment. Picture at the right hand in the above picture (figure 5) also shows that a signboard and dustbin has been placed at the adjacent crosswalk. If the pedestrian walks unconsciously, they will necessarily collide with this dustbin or signboard pillar especially at night. Dustbins are usually important for the pedestrians to through small garbage and litters on their way. It offers convenience to walkers especially in summer time when pedestrians drink canned water and soft drinks on ways and can through them in the nearest bins placed on sidewalks.

Safety comes at as an acceptance level and gets an average three points by the pedestrians. It is not at its best because observation surveys revealed discontinuity of walkway pavements and broken or elevated surfaces in several spots on sidewalks. According to the Highway Capacity Manual (HCM) 2000, an elevation of more than 1.3 cm on walkways is not comfortable for the walkers.


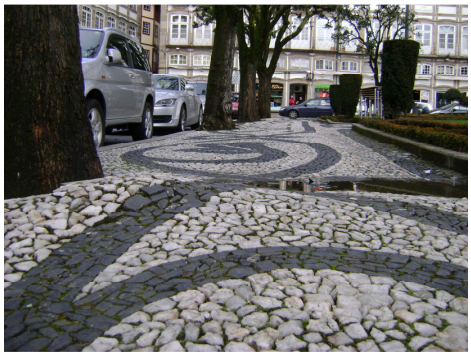

Fig. 6 Uneven Elevation of sidewalks in Guimarães City Center

Pictures in figure 6 shows the uneven elevation of sidewalks. It has been measured that the elevation in these points are more than 1.3 cm which is not offering a comfortable walkway environment. Besides, when rain droplets come, the walkways do not clear the rain waters quickly rather hoarding the water on sidewalks. People can not see if there is any small hole or broken surfaces which offer less safety in the areas especially for children and older walkers. Another important problem of pedestrian safety was shown by observation survey at intersection crossings. Jaywalkers have been found who were crossing streets even in the red lights. There are at least 14 major intersections with zebra crossing and 8 major intersections with signal lights in the city center area. But some jaywalkers still cross streets without paying attention to green or red traffic lights. The percentage is significantly very low (only 8% in 15 minutes survey period) of walkers who did cross the streets without proper attention to the lights. In such condition, pedestrians still evaluate accepted level of safety on sidewalks in Guimarães city center because: a) there is less number of walkers (42 to 60 walkers per 15 minutes) in each direction of roads and b) pedestrians are not in a hurry (speed less than 1 m/sec) in almost 80% or more cases.

Identity has received an average 3.6 out of 5 by the pedestrians. It means the pedestrians do not consider themselves as walkers in the city center with any special encouragement. In this case, identity considers the value and status of walking as individual mode of transport in city center. There are pedestrian precincts only for the walkers but it has been found that on the open spaces, campaigns of new products or events related to new business promotions are carried out. In most cases, people are walking to shop and to take transit in city center. The pedestrians often park their cars at the adjacent car parking lots and then come to shop in the city center. In this case, the walkers do not identify themselves as only walking to workplaces, schools or for leisure.

Illegal parking and encroachment of sidewalks by the shopkeepers are being considered as illegal occupancies on sidewalks in the city center. Drivers park their cars on the sidewalks for short period of time (5 to 25 minutes) depending on their needs to shop in the adjacent shops of the streets. It creates hindrances for the pedestrians and this implies less safety for them on sidewalks. This unwanted situation forces pedestrians to invade on adjacent traffic lanes where cars are running at a speed of 20 to 40 kilometres per hour. In another way, shopkeepers take the frontier of their shops illegally to show up their commodities. Many walkers are coming everyday in the city center for different

reasons and the shopkeepers want to show their products to the walkers to promote their businesses.

Fig. 7 Illegal parking and illegal encroachment on sidewalks

In figure 7, it can be seen that illegal parking and illegal encroachment have taken almost 40 to 80% of sidewalk width. Usually the drivers park their cars on sidewalks when they buy goods from the nearest shops. Observation survey clearly shows that drivers park their cars longer times when they visit restaurants. They park the car comparatively lesser time when they go to pharmacies in the adjacent areas of sidewalks.

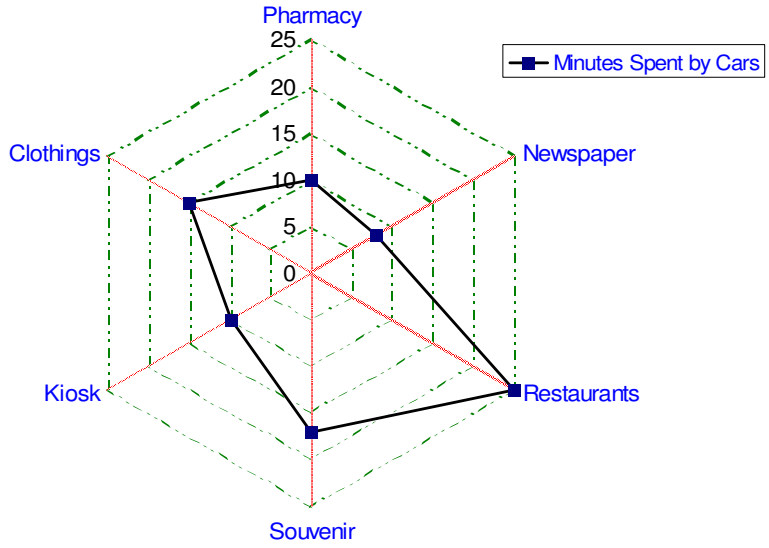

Fig. 8 Time spending by cars in front of different shops on sidewalks

Figure 8 shows that drivers spend time up to 10 minutes in front of kiosk, pharmacy and newspaper stands in comparison to 25 minutes in front of restaurants and 17 minutes in front of souvenir shops. Considering these major problems in the city center, the pedestrians put their impression in the scale and it implies that the authenticity of evaluation follows similar evidences in line with the observation survey.

6. CONCLUSION

Guimarães is traditionally being considered as a pedestrian friendly city center. It has a major public open area of pedestrian precinct in the city center. These walkways are well connected with shopping areas and other city center facilities. People of different ages are coming to the city center for socialization, shopping and recreation purposes. Moreover, the city center has a medieval tradition of connections to the shopping and attraction spots. The study reveals that there has been a recent increase in interest in pedestrian mobility as Guimarães has been declared as the European City of Culture in the year 2012, therefore it is expecting that many tourists from different continents will visit in coming years to see the rich and traditional cultural heritage of the city. This study portrays an attempt to introduce some problems in recent times in Guimarães city center and to summarize the pedestrian's impression of the existing walking environment. However, more empirical research is in demand to better understand this important mode of people's mobility. Albeit there has been a significant policy shift in which local governments are taking up increased responsibility in ensuring a safe pedestrian environment, much remains to be implemented. Representations of safer and convenient city walkways thus encourage more people to walk for shorter trips which certainly lead to healthy and carbon neutral cities. This study is further an attempt to propose a methodology for quick assessment of walking environment and walkways problems in medium-sized city centers in Portugal. More empirical research is in demand to further develop this methodology. The importance of this approach is that less time is needed to apprehend the problems, to list and classify them and to assess the present condition in the line of observation survey. Likewise, more time can be devoted to problem discussion and finding of solutions within a public participatory atmosphere.

7. ACKNOWLEDGEMENT

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