6. Analysing urban mobility in ageing populations: the case of two Portuguese historic centres

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6.1 INTRODUCTION

The promotion of sustainable cities is part of the global agenda, and care for social dimensions (including inclusion and equity) is fundamental to the wellbeing of their inhabitants. This chapter focuses on the trend of the ageing population in the most developed countries, and the needs and conditions of mobility of those who are older, considering that the urban environment and the transport system must be adapted to guarantee these conditions and meet those needs. Projections indicate that, between 2016 and 2060, the proportion of people over 65 will rise from 19.3 per cent to 29.0 per cent of the total population. In the same period, the active population (15–64 years of age) in the European Union is expected to decrease by 11.6 per cent (EC, 2009, 2012). Illustrating this, and according to the National Statistics Institute of Portugal (INE), a ratio of 317 elderly people per 100 young people is expected by 2080 (INE, 2017).

Although this circumstance is a triumph of medical, social and economic development (Ball and Lawler, 2014; Fernández-Ballesteros, 2011; Plouffe and Kalache, 2010) it is simultaneously one of the greatest challenges for public policies (Coughlin, 2017; WHO, 2019; UN, 2019; UNECE, 2019). Recognizing these demographic changes, policies, projects and various initiatives have aimed to adapt to these new circumstances. The role of the United Nations, World Health Organization and the European Commission has been relevant in encouraging the promotion of relevant policies. The increased attention devoted to this type of issue is expressed in some publications, such

as in Cheng et al. (2019) which analyses how the built environment affects the possibilities of active mobility for the older adults, or in Bergefurt et al. (2019) which highlights the influence of active mobility on their quality of life. Among other contributions, Guo et al. (2019) analyse accessibility to urban parks, one of the essential urban facilities for maintaining active mobility.

The mobility of older adults is particularly difficult in old European urban centres, where roads are often steep, narrow, and have uneven pavements, and where this age group tends to be concentrated, both residents and visitors. This situation is particularly relevant in Southern European cities less affected by the world wars, where various layers of urban structures remain. This happens in almost all the old centres of Portugal. Many of these urban centres have been classified as World Heritage Sites by the United Nations Educational, Scientific and Cultural Organization (UNESCO). This last circumstance often means the impossibility of altering several aspects of the urban space, creating difficulties for local accessibility to public transport and for walking. The elderly are particularly affected by these circumstances. In addition, much of the urban rehabilitation is dedicated to new tourist facilities and not to the urban public space.

The travelling population is also ageing, not only in Portugal, but throughout Europe. The tourist activity, natural in this type of areas, also creates some gentrification problems, and the changes allowed are not always adapted to the needs of visitors or residents. These aspects are presented in the work of Temelová and Dvoráková (2012) showing the consequences of the invasion of tourism in these areas, which affects the lives of the local population, especially the low-income older population with mobility restrictions. Similarly, gentrification also creates problems in Sarajevo, as specified in a work by Pobric and Robinson (2019).

Another characteristic of the mobility of older people, namely in Portugal, is the fact that they usually walk or use public transport, for different reasons, namely because in the past they did not take a driving licence or because they can no longer drive for health or retirement/income reasons. In general, in Portuguese historic urban centres, a large part of the older population has low income and is less likely to own or drive a car. Therefore, the present chapter focuses on the mobility of the elderly in public spaces, and the quality of access to services and transport systems, identifying barriers and motivators both on the side of urban design and on the side of the transport system.

This research focuses on identifying criteria for the establishment of future indexes able to manage and classify urban walking routes and transport systems in terms of quality of mobility and accessibility for all, active and sustainable, assuming that cities more adapted for the older are cities optimized for all citizens. The choice of the Coimbra and Porto case studies is also related to their difficult urban structures and higher ageing problems.

In terms of structure, this chapter begins with a literature review (section 6.2) on motivators and barriers in pedestrian movements and in the use of public transport by the elderly, dividing the relevant factors into categories of personal characteristics and urban environments (with subcategories). Then, it focuses on the case studies (the cities of Coimbra and Porto), presenting the locations and explaining the interview method and the analysis of the results (sections 6.3 and 6.4). Finally, it ends with some conclusions in view of the initial objectives (section 6.5).

6.2 LITERATURE REVIEW

A considerable amount of information already exists showing us that this topic has been growing in importance, mainly in the last decade, due to the growing need to adapt the urban public space to elderly adults' special needs. Urban public spaces must be adapted to the needs of the elderly (Cinderby et al., 2018) to improve the quality of life for this age group and the general population. The perspective of an age-friendly city is therefore influenced by awareness of the impact of an ageing population on urban planning and design (Buffel et al., 2012). Transport is indicated as a key element in this relationship.

Currently, older people tend to remain active. However, this population has specific travel needs, in terms of destinations, travel times and options for modes of transport. Thus, the urban planning of the public urban space and the public transport system that adequately accommodates these needs is fundamental, also contributing to the conditions of an active life, fundamental for all ages. Factors related to the physical environment can make the difference between an elderly person's autonomy and their dependence on others. Thus, it is essential to understand not only the characteristics of the elderly, but also the factors that influence their mobility.

Regarding the main characteristics of trips made by the elderly, we can say that they travel less frequently (Collia et al., 2003; Habib, 2014; Tacken, 1998; Wretstrand et al., 2019; Yang et al., 2018), walk more slowly (it is estimated that while adults aged 25 to 34 years walk at an average speed of around 1.25 m/s, adults over 64 years walk at 0.96 m/s, according to a study by de Silva et al. (2014) and travel for a shorter time and distance (Collia et al., 2003; Moniruzzaman et al., 2013; O'Hern and Oxley, 2015; Szeto et al., 2017; Yang et al., 2018). In addition, some factors can be impeding mobility such as living alone (Tacken, 1998), having health problems (Yang et al., 2018), having a low level of education (Tacken, 1998) and having a low income (Habib, 2014).

In addition to the specific characteristics of older adults and their trips – which act as factors for or against their mobility – it is important to consider the characteristics that make a city more inclusive, in terms of urban design and also in terms of the transport system. Table 6.1 shows the barriers and

motivators for pedestrian mobility of the elderly, identified through a systematic analysis of the literature.

Table 6.2 shows the barriers and motivators for mobility using public transport, also identified through the literature.

Previous literature identifies several main motivators and barriers for the mobility of the elderly as pedestrians and public transport users. It identifies common factors valid for all places with characteristics similar to those considered in these case studies of historical city centres. Therefore, the case studies were selected by also taking into account their representativeness, especially considering the similarities of many historic urban centres in Southern Europe.

6.3 INTERVIEW ANALYSIS

Portugal follows the ageing trend of the European population. Two case studies were considered, in Coimbra and in Porto, delimiting an area of analysis within their historic centres. These areas have a higher concentration of older residents and both represent critical areas in terms of mobility and accessibility, due to the old and irregular urban structure. In these areas, the car was gradually phased out (more in Porto than in Coimbra) due to some urban rehabilitation projects, and they are still inhabited by a local population mainly formed by older adults, despite the growth in tourism and in visiting population. The urban structure is made up of streets and small, rugged squares, narrow and maintained with old pavements. People travel the areas mainly on foot and using public transport lines, which in the case of Coimbra are mostly composed of small buses that cross its inner areas.

Residents and tourists were interviewed. Participants were chosen from a stratified sample. In the first phase, the city councils responsible for the historical centres (in Coimbra and Porto) were consulted for recommendations on how to interview the older adults who live in those areas. The recommendation was to contact the social institutions that daily support those elderly and where they stay during the day. In a second phase, in those institutions, the social assistants provided indications about the people to be interviewed, selecting those who were in good cognitive condition and/or who still had autonomy to walk and use public transport.

In the case of the residents interviewed, the interviews sought to identify their routines in terms of mobility, covering three main sets of aspects: personal characteristics; motivators and barriers in pedestrian movements; and motivators and barriers in the use of the public transport system. Tourists were interviewed on the street, with the same type of questions. Overall, the interviews in Coimbra and Porto corresponded to a total of 46 respondents, being 24 residents and 22 tourists, 28 women and 18 men, all in the 65 to 95 age group. Regardless of age or gender, or the condition of residents or tourists, the

Table 6.1 Motivators and barriers in older people's pedestrian movements

Factor types	Motivator/barrier	Sample of specific literature
Safety issues	Presence of pedestrian paths	Boarnet et al. (2005), Kerr et al. (2012), Powell et al. (2003), Southworth (2005)
	Signal-controlled pedestrian crossings	Boarnet et al. (2005), Powell et al. (2003), Southworth (2005)
	Buffering from road traffic	Powell et al. (2003), Southworth (2005)
	Sense of personal safety	Kerr et al. (2012), Southworth (2005), Gallagher et al. (2010), Moniruzzaman et al. (2013), Cinderby et al. (2018), Gómez et al. (2010), Plouffe and Kalache (2010), Sonmez Turel et al. (2007), Van Cauwenberg et al. (2012), Wang and Lee (2010)
	Enforcement of speeding and other traffic laws	Powell et al. (2003), Southworth (2005)
Interac.	Availability for shopping/eating/ recreational activities	Cervero and Duncan (2003), Handy et al. (2002), Sugiyama et al. (2012)
	Opportunities to talk or meet with friends and neighbours	Carver et al. (2005), Krizek (2003)
Pleasant/ visual qualities	Concern for the natural environment or 'being green'	Nilsson and Kuller (2000)
	Pleasant environment/cleanliness of neighbourhood and streets	Alfonzo et al. (2008), Handy et al. (2002), Gallagher et al. (2010), Yung et al. (2016), Feng (2017), Gómez et al. (2010), Borst et al. (2009), Wang and Lee (2010), Moniruzzaman et al. (2013), Cinderby et al. (2018)
	A visually appealing environment/ attractive points	Alfonzo et al. (2008), Kerr et al. (2012), Sugiyama et al. (2012), Michael et al. (2006), Moniruzzaman et al. (2015), Van Cauwenberg et al. (2012), Wang and Lee (2010), Yoo and Kim (2017), Yung et al. (2016), Feng (2017), Cao et al. (2010), Musselwhite and Haddad (2010)
Activity	Opportunities for exercise	Owen et al. (2004), Suminski et al. (2005)
	Easy terrain	Cervero and Duncan (2003), Dill (2004), Humpel et al. (2004), Pucher and Buehler (2006)
	Weather on a given day	Cervero and Duncan (2003), Dill (2004), Humpel et al. (2004), Pucher and Buehler (2006)

Factor types	Motivator/barrier	Sample of specific literature
	Walking for pleasure	Cao et al. (2010), Gallagher et al. (2010), Plouffe and Kalache (2010), Wang and Lee (2010), Moniruzzaman et al. (2015), Borst et al. (2009), Sonmez Turel et al. (2007), Cinderby et al. (2018)
	Distance to destination	Cervero and Duncan (2003), Dill (2004)
	Saving money	Pucher and Buehler (2006)

Table 6.2 Motivators and barriers for older adults in transport system use

Factor types	Motivator/barrier	Sample of specific literature
Urban design/urban environment	Good pedestrian environment	Moniruzzaman et al. (2015), Cinderby et al. (2018)
Public transport services	Transport availability	Gilhooly et al. (2002), Burkhardt (2003), Banister and Bowling (2004), Su and Bell (2009), Ipingbemi (2010), Wong et al. (2018)
	Low travel costs	Burkhardt (2003), Su and Bell (2009), Olawole and Aloba (2014), Szeto et al. (2017)
	Clear information	Ipingbemi (2010), Wong et al. (2018)
	Proper vehicle design	Gilhooly et al. (2002), Burkhardt (2003), Ipingbemi (2010), Aceves-González et al. (2015), Wong et al. (2017)
Safety issues	Personal safety	Gilhooly et al. (2002), Gallagher et al. (2010), Olawole and Aloba (2014), Aceves-González et al. (2015)

results were aggregated considering motivators and barriers, both for walking and for using public transport.

6.4 INTERVIEW RESULTS

The common factors identified in the interviews of both residents and tourists are presented in Table 6.3. The reason for this aggregation has to do with the fact that there are no substantial differences between residents and tourists, except in the case of tourists who noticed, on the one hand, the feeling of good cleanliness and urban security (the residents have a different opinion since they live there permanently) and, on the other hand, the lack of urban signs (not important for residents). It was considered that these differences would not be enough to disaggregate the two groups and, consequently, it was considered that all the factors mentioned should be considered important for the mobility of the older population as a whole.

Table 6.3 Motivators and barriers identified in the interviews

Walking		Using public transport	
Motivators	Barriers	Motivators	Barriers
• Travel to the day centre, supermarket, pharmacy, hairdresser, church; • exercise, good for health; • greater flexibility; • enjoy the landscape; • simpler than using public transport; • preference for the flatter and safer path (floor, lighting, handrail); • density of points of interest; • cleanness and safety	• Inadequate pavement with slippery or uneven surface material; • lack of maintenance; • steep slopes; • moving traffic; • parked cars; • lack of public safety; • steps without handrails; • poor lighting; • dirty walls; • poor hygiene; • poor sign quality	• Travel to the day centre, supermarket, hospital, physiotherapy; • prevent physical tiredness; • socialize with other passengers; • enjoy looking out of the window; • easier to carry weights (shopping); • being empty out of rush hours; • some minibuses tailored for historic centres that they can use	• Long waiting time/poor availability; • not punctual; • difficulties getting on and off the bus; • behaviour of other passengers; • lack of seating; • driver antipathy; • driver does not always wait for older person to take a seat; • unsafe driver driving; • unstable vehicle;

Regarding age, the group interviewed showed good cognitive condition and autonomy to walk and use public transport, and no noticeable differences were found between them, regardless of being 65 or 95. Considering these results, and cross-checking them with the bibliographic review and with the characterization of the public urban space and the transport system in the two case studies, there is a generalized convergence of what can be the main factors to consider in promoting the mobility of the older population, both in terms of barriers and in terms of motivators.

With regard to pedestrian infrastructure, in particular, reference is made to the lack of some elements of the infrastructure, the inadequacy of physical characteristics and/or the lack of maintenance in relation to pavements with inadequate surfaces, lack of stairs, ramps and handrails (a slope that is too steep and without supports is a central aspect in this analysis). In terms of interaction with other modes of transport, namely with motor vehicles, reference is made to the lack of buffer zones and the prevalence of motor vehicles (moving and parked), increasing the sense of insecurity. Interestingly, the constraints related to intersections between cars and pedestrians are more pressing in the historic centre of Coimbra than in Porto, probably because there has been greater urban regeneration, with the creation of shared spaces in Porto.

In relation to public transport, the interviewees emphasized negative aspects related to human behaviour, such as the performance of public transport drivers and the behaviour of younger travellers, who do not give way to older people. This last aspect may not be specific to the Portuguese case, but it was not identified in previous studies, which is why its detection in this case study was considered interesting.

The interviewees also highlighted the feeling of insecurity caused by walls with offensive graffiti or the lack of public lighting. The feeling of urban insecurity, emphasized by local residents, is based on their contextualized local assessment. Most likely, this is due to age-related vulnerability and not to any real problem of local or regional insecurity. The opposing opinions of tourists give weight to this finding.

6.5 CONCLUSIONS

Through this analysis, the identification of common factors that influence the mobility of the older adults will allow the development of planning tools that can help to promote sustainable urban mobility (on foot and by public transport) for adults with increased physical difficulties, being beneficial for all. These instruments should advocate the adaptation of both the public urban space and its multiple infrastructures and the public transport system. The convergence between the factors identified in the literature and the results of the analysis of the case studies allows us to validate those factors to a large extent.

This analysis also identified other factors related to human behaviour that may be a consequence of the local urban mobility culture itself, which highlights the importance of analyses developed with social proximity, with the public participation of some of those most directly affected by motivators and barriers to mobility in historic urban centres: the still active older adults (much more active than the word 'elderly' makes us think), who are a growing population in the developed world.

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