AN ANALYSIS OF ELDERLY TOURISTS' CONSTRAINTS IN THE USE OF PUBLIC TRANSPORT

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ABSTRACT
The present work is part of the Project for Scientific Research and Technological Development "Accessibility for All in Tourism", focusing on modal interfaces designed according to the concepts of "Universal Design" and "Age Sensitive Design". In this project 851 surveys were carried out on elderly tourists who travelled in the Algarve (Portugal) through the international Airport of Faro, in 2018, with a view to understanding their use of means of transport in their daily life. It characterizes the senior tourist in the Algarve according to: gender, age, disabilities that affect mobility and the need to use technical aids to move. It analyses and compares the means of transportation used by elderly tourists with and without disabilities. Findings demonstrate that elderly people with disabilities walk less on foot daily and several times a week and the majority of the respondents with disabilities claim to never using the bus, train and tram/metro. Respondents concede to having specific limitations in the use of some public transport. Older people with disabilities behave differently than other older people with regard to the choice and frequency of a particular means of transport.
Keywords: bus users, daily mobility, disability, elderly people, elderly tourist, means of transport.

1 INTRODUCTION

The current generation of elderly people is more active compared to previous generations of older people [1,2]. Active ageing is a lifelong process shaped by several factors (e.g. transportation) which, alone and acting together, favour health, participation and security in older active life [3]. From a tourism perspective, it favours travelling securely and safely. This point of view is very relevant since there has been an exponential increase of elderly tourists, with and without disabilities, that travel to the European Union (EU). However, only 9% of the EU countries provide accessible facilities, and the levels of accessibility vary. For example, some countries (e.g. Portugal) exhibit a gap in the implementation of outstanding transportation accessibility due to lack of financial support that would allow its implementation [4]. Therefore, by investing in a good transport system and services, not only could it increase the number of tourists (and consequently the economic power of the country), but also benefit local citizens.

The quality of collective transport systems depends upon system accessibility (e.g. needs of people with reduced mobility, design of stations including intermodality, linking trip attraction areas to public transport), affordability (e.g. fare levels), socially desirable services (e.g. fare concessions), safety/security (e.g. quality of lighting, surveillance systems), travel convenience (e.g. comfort and information), and less environmental impact (e.g. emissions) [5].

Accessibility for all people has been perceived as a quality attribute of transportation systems. Traditional transportation planning approach tends to be supplier (operator) oriented

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and presently, in an ageing context, transportation planners must meet the mobility needs of elderly people [6].

Around one-third of all people of retirement age are disabled and this condition reduces their mobility [7]. Disability (e.g. reduced activity/mobility; difficulty in the execution of a task; participation limitations; physical, mental, cognitive and/or sensory disabilities) is a permanent factor of human nature, as 6–15% of the world population live with it [4,8–12]. This is an important issue, since these impairments may act as barriers to the use of public transportation and consequently, to one's autonomy, independence and social life.

International studies have shown that daily mobility decreases with increasing age [13,14] as people become older they choose to drive less [15], and elderly people with higher levels of education travel more frequently and tend to use public transport [16].

Some authors also revealed an association between driving and quality of life, in which elderly people who stopped driving a car reported reduced levels of quality of life [1], due to what the loss of mobility means to them. In particular, elderly people value their mobility to be able to access services and be more social, as well as a desire for independence and maintaining social status [1], and by losing these their quality of life decreases. On the other hand, elderly people who are more active and maintain a social connection with their community and peers exhibit better levels of mental and physical health, independence and physical activity, as well as a decrease in social isolation levels [2].

Public transport systems, including accessible and affordable public transport, are a key factor influencing active ageing in cities where older people live and in tourist destinations where senior citizens travel. The transport capacity of a tourist destination determines greater participation of older tourists in the experiences offered and greater access to the cultural and health services they need.

Ageing is a dynamic process that is accompanied by biological, psychological and social changes in the elderly, which have implications on their functional and motor capacity, and therefore in the use of public transport. Particularly, functional capacity (e.g. muscle strength) at a certain point in people's lives declines, a situation that is related to factors associated with lifestyle, but also to external social, environmental and economic factors [17]. As stated above, reduced mobility is a known disability that emerges with ageing [13], and it has a great influence on the choice of mode of transportation used by the elderly based on their sense of security. This is important since with increasing age there is also a greater risk of falling, as well as fear of falling, in which 49% of falls of people over 65 years old happen when they are walking [18]. These falls can occur due to external (e.g. tripping on uneven surfaces, sloped kerbs, inadequate lighting) or internal circumstances (e.g. dizziness, poor vision and hearing) [19–21]. Therefore, it is important to have adequate access to public transportation not only to prevent people from falling and support mobility, but also to give them a higher sense of security.

Consequently, for many elderly people, public transportation (e.g. buses, trams, trains) is very problematic or even impossible to use due to: (a) difficulties in getting in or out of the vehicles (i.e. poor boarding facilities) [7]; (b) lack of room to manoeuvre wheelchairs and lack of restraints for them; (c) the individual level of education; (d) the negative attitude and discriminating behaviour of the drivers and employees of the vehicles towards people with disabilities and/or reduced mobility; (e) and in some means of transportation (e.g. metro) the excessive presence of stairs and lack of lifts contribute to the non-use of these modes of transport [4]. In particular, for wheelchair or other technical aids users, the step that exists to enter the vehicle can be insurmountable. For elderly people who cannot fully use their arms and legs, it is difficult to climb the vehicle's steps, which frequently exist. Older people with

walking aids and/or trolleys can only get into the vehicle if they receive help/assistance from others, since they cannot be autonomous in their mobility. In a tourist context, passageways are mostly narrow and regularly congested, making it difficult to accommodate mobility aids, wheelchairs or people with suitcases.

A study by Venter et al. [22], also highlighted three obstacles in the use of transportation for people with impairments, namely social (e.g. being expensive, absence of incapacity awareness, struggles in communication), psychological (e.g. feeling unsafe) and structural (e.g. infrastructure, operations, services, information, barriers) [11].

Hence, inclusive transport services should be provided for people with disabilities and/or reduced mobility [9], and the means of transport and their terminals should be accessible for all to make their daily life easier. This specific and adequate transportation would allow for a reduction in the levels of social isolation and dependency of people with impairments [12]. Therefore, adequate access to public transportation is needed (e.g. platforms should be at the same level as the vehicles, existence of ramps, lifts, platform lifts or floor-lowering transportation), thoughtful information regarding the needs of people with impairments (e.g. visual and acoustic setups), and the information should be available in different modes of communication (e.g. websites, mobile applications) [4,23]. These parameters meet our proposal to develop an accessible, smart and sustainable bus stop to be located at Faro International Airport, in the Algarve, Portugal.

However, to be able to develop an obstacle-free transport system it is necessary to understand what elderly people with disabilities fear, which and what are their choices of modes of transportation.

In Britain, in 2012, 39% of individuals aged 70+ had problems walking or using a bus [24].

Research developed in Sweden, regarding the mobility of older citizens (75+), concluded that older generations are frequent bus passengers. Nonetheless, in cities, more than 27% of those questioned did not travel by bus at all. Only 16% travelled by bus two or more times per week [25].

Analysing mobility surveys carried out in the European Union [26] considering people 55 years of age or older, 44.8% use a car, 20.8% use public transport, 19.3% walk and 0.8% use a motorcycle, amongst other means.

On the other hand, a survey regarding the use of public transportation by tourists with disabilities showed that due to the difficulty of accessibility of the means of transport, people with disabilities do not use: buses (26.6%), coaches (80.6%), trams (69.4%), trains (66.7%), metro (75%) and the ferry (83.3%); preferring to use the car as the main transportation [4]. Thus, we can imply that the use of public transport is not the first choice of mobilization for people with disabilities.

The increasing socioeconomic importance of senior tourism in the Algarve region (Portugal), coupled with the sustainability requirements that tourism must fulfil, requires a closer look at the mobility and accessibility needs of the elderly tourist with functional diversity (related to sensorial, intellectual and/or physical difficulties). Therefore, it is considered useful to understand the profile of these users with their modal choices.

The Research Project ACCES4ALL – Accessibility for All in Tourism, gives attention to modal interfaces designed according to the concepts of "Universal Design" and "Age Sensitive Design". Its main objective is to develop a pilot study of an accessible, smart and sustainable bus stop to be located at Faro International Airport, in the Algarve, Portugal. Within the scope of this Project, surveys were carried out on elderly tourists aged 60 or over to understand their characteristics and to recognize their mobility patterns and perceptions.

This paper focuses on the profile of senior tourists with disabilities and their use of assistive devices. In the analysis of the means of transport frequently or never used by these older people, it describes their difficulties in using public transport and the relationship between their profile and choice of transport. The intention is to understand how modal choice changes with elderly people with or without disabilities. This information will be useful for local authorities and transport operators and planners so that mobility in Portugal can be made more sustainable and inclusive.

In order to achieve the objectives, the SPSS Statistical package is used, and information from the various data is cross-referenced.

2 CASE STUDY: SURVEY OF ELDERLY TOURISTS AT FARO INTERNATIONAL AIRPORT

2.1 Data collection

There is an increasing need for relevant information to be collected on tourist mobility so that tourism policies linked to specific road transport activity can be properly monitored to achieve sustainability.

Tourist road mobility statistics are not currently part of the National Statistical System. There is no regular and coordinated data collection in the field of tourist road traffic statistics as already exists for road vehicles in general.

In the scope of the Project ACCES4ALL, surveys were carried out on elderly tourists to understand their profile and perceptions of built environments and to recognize their mobility patterns. Questionnaires were developed considering four sets of questions: information about the respondent; characterization of their mobility where they live and in the Algarve region (as tourists); information on the perception of universal accessibility conditions in bus stop environments; use of information and communication systems and technologies.

The survey was developed for the elderly tourist aged 60 or over. In the months of April, August and September 2018, inquiries were conducted randomly at Faro International Airport, mainly at waiting areas before departure. In April they were developed by a tourist student and in the other months by professional inquirers. During the survey the interviewers used photographs to explain technical aspects to elderly tourists.

The number of elderly tourists visiting Portugal using Faro airport is high, according to data given by VINCI Airports/ANA Aeroportos de Portugal. In the summer of 2018, 7% of passengers were over 60 years old. In August of that year, 1,156,279 passengers were registered, 80,940 of whom were elderly, and in September there were 1,090,104 passengers of whom 76,307 were elderly.

In this survey with a population size of 157,247, for a 95% confidence level and an approximately 3.4% degree of accuracy (percentage of maximum error required) we get a sample size of inquiries equal to 851.

Knowing that some of the respondents do not answer some of the questions, it is apparent that in these cases there is a sample below 851 (total number of surveys). This situation is always worsened when the intersection of answers is necessary. However, as the number of responses is still representative, what was done was to present the sum total of answers to each question and to recalculate the percentages.

Data were introduced into an electronic file and advanced statistical analysis capabilities of Statistical Product and Service Solutions (SPSS) was used.

2.2 Characterization of elderly tourists

The characterization of elderly tourists is made considering: gender, age, level of education, professional occupation, country of residence, city or town where they reside, disabilities affecting mobility and the need for technical aids to get around. This paper focuses mainly on the analysis of age groups, their disabilities and mobility aids to walk.

From valid inquiries, 60.3% are elderly men, 39.0% are elderly women, 0.1% are other gender, and 0.6% did not respond. Older people are dominant in the 60–69 age group (44.8%), 70–79 year olds amount to 39.9% and only 15.4% aged 80 or over.

Tourists surveyed came from over 30 countries around the world but mainly from Europe including; the United Kingdom 340 individuals (40.6%), Germany 116 (13.8%), Ireland 72 (8.6%), France 65 (7.8%), The Netherlands 38 (4.5%), Italy 28 (3.3%) and Belgium 27 (3.2%). Most respondents live in a city 605 (75.3%), which is an important fact in terms of representation of the sample. The European elderly population mainly inhabit urban areas.

Elderly tourists with disabilities mainly come from the United Kingdom (45.3%), Germany (14.5%), Ireland (9.8%), Spain (5.6%), France (5.1%), and Belgium (3.3%). These elderly people with disabilities live predominantly in cities (78.8%).

As ageing is usually associated with dependency, loss of functionality, and cognitive impairment, older people were asked if they had disabilities that affected their mobility, 209 (25.0%) answered positively, considering 835 valid inquiries.

The nature of the disability is mainly related to motor problems (61.6%), hearing problems (15.2%), visual problems (14.8%) and orientation problems (1.7%). Disability affects more females (26.8%) than males (23.8%).

Motor problems fall within the disabilities of the elderly, and can limit the choice of means of transport. It appears that motor problems are high and increase with age (Fig. 1). In the age group of 60–64 years old, only 6.4% have motor problems, and in ages above 84 this percentage increases to 54.2%.
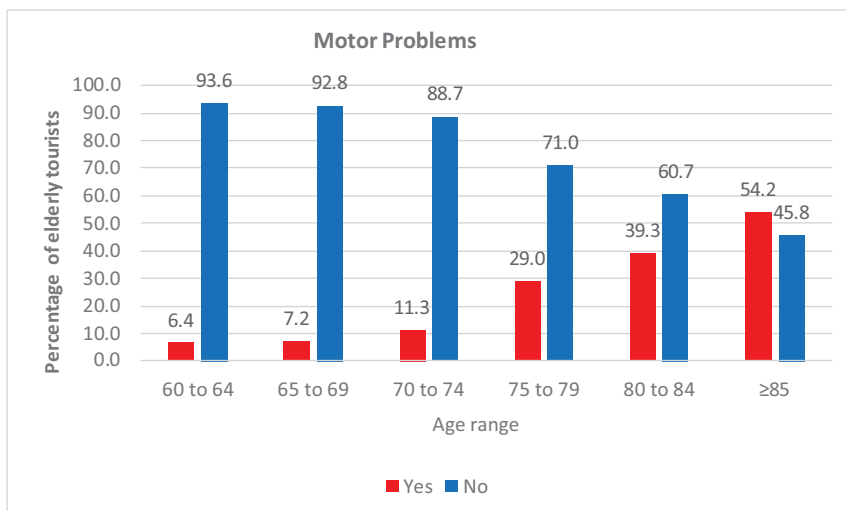

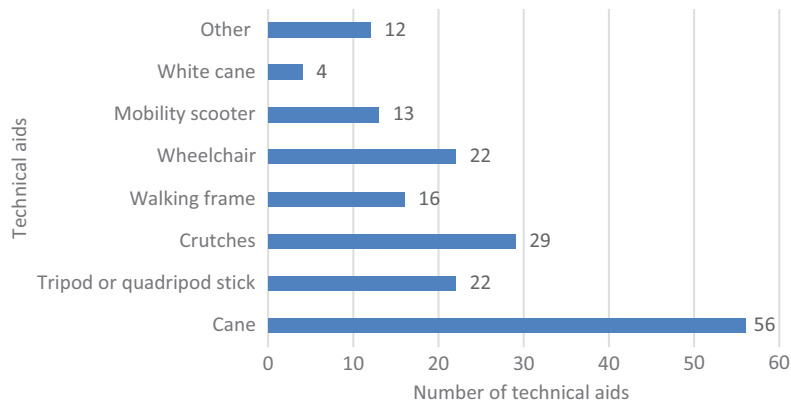Figure 1: Elderly tourists with motor problems. *(Source: Authors' elaboration).*

Figure 2: Technical aids used by elderly tourists. *(Source: Authors' elaboration).*

Table 1: Technical aids used by elderly tourists.

Technical aids	Number of technical aids	Elderly tourists%
Cane	56	6.7
Tripod or quadripod stick	22	2.6
Crutches	29	3.5
Walking frame	16	1.9
Wheelchair	22	2.6
Mobility scooter	13	1.6
White cane	4	0.5
Other	12	1.4
Total	174	20.8

Source: Authors' elaboration.

Elderly tourists rely on technical aids to overcome some of the difficulties in moving around. Of the 209 tourists who reported having at least one disability which affects their mobility, 174 reported having technical assistance. Within the aids referred to in the question-naire the following were included: cane, tripod or quadripod stick, crutches, walking frame, wheelchair, mobility scooter, white cane or other (Fig. 2).

With regard to technical aids, 20.8% of older people use technical aids to get around, 6.7% specify cane, 3.5% crutches, 2.6% tripod/quadripod and 2.6% wheelchair (Table 1). In relation to other aids, elderly tourists refer to: prosthesis in the knees and legs and the use of hearing aids.

2.3 Transportation usage patterns of senior tourists with and without disabilities in the country where they live

The aim is to make a comparative analysis of the modal choices of senior tourists with dis-abilities (EPwD), and senior tourists without disabilities (EPwoD), perceived by them as affecting their mobility. This comparison will be made using the journeys they make in their

Table 2: Means of transport used by senior tourists with and without disabilities in their countries.

		Almost daily		Several times per week		Twice a month or sometimes		Never	
		ETwD %	ETwoD %	ETwD %	ETwoD %	ETwD %	ETwoD %	ETwD %	ETwoD %
On foot	alone – to travel, not to exercise	11.0	20.0	21.1	26.7	22.9	17.0	45.0	36.2
	with friends/family	7.9	13.0	16.6	**31.3**	32.5	25.3	43.0	30.4
Car	driver	**45.9**	**48.6**	12.4	22.1	8.2	11.1	57.6	18.2
	passenger	45.9	32.5	22.7	20.2	23.2	27.0	8.1	20.2
Bus	alone	5.4	10.0	**22.3**	24.1	15.7	33.3	56.6	32.6
	with friends/family	5.6	5.7	18.8	20.8	20.6	33.0	55.0	40.5
Train	alone	0.7	3.0	5.4	5.5	23.5	43.8	70.5	47.7
	with friends/family	0.7	1.9	5.3	4.2	39.3	**56.0**	54.7	37.9
Tram	alone	4.2	5.7	8.4	8.4	3.5	13.6	83.9	72.2
or metro	with friends/family	2.9	3.5	6.4	6.6	7.9	15.9	82.9	73.9
Taxi/uber	alone	8.8	7.4	15.6	15.5	38.8	47.0	36.9	30.1
or similar	with friends/family	10.4	8.0	18.2	16.5	**53.2**	52.6	18.2	22.9
Chauffeur or personal assistance		6.3	2.3	7.0	1.0	9.9	4.6	76.8	**92.1**
Bicycle		0.7	2.5	1.4	2.8	3.5	4.6	**94.4**	90.1
Motorcycle		2.8	2.8	0.7	0.8	4.5	4.8	91.9	91.6

ETwD – elderly tourists with disabilities; ETwoD – elderly tourists without disabilities. Source: Authors' elaboration.

daily lives, in the country of origin. Respondents were asked to indicate how often (almost daily, several times a week, occasionally, twice a month or never) they use the various means of transport. Table 2 shows the results of the different modes of transport used by senior tourists with and without disabilities in their daily lives in their country of residence.

The first finding of the analysis is that there is availability of different means of transport other than the car.

Concerning senior tourists with disabilities on daily trips, there is a revealed preference for individual means of transport (car and on foot). The most used means of transport is the car, as a passenger, 85 elderly people (45.9%) followed by the car, as a driver, 37 (21.8%), then walking alone, 12 (11.0%) and taxi/uber or similar (accompanied by friend or family) with 16 (10.4%), which is the most preferred means of collective transportation. The use of bus (alone or accompanied) is around 5%, by tram/metro (alone) is around 4% and by train is only 0.7%. On trips made several times a week (but not every day) the most commonly used means of transport is the car, as a passenger, 42 (22.7%) followed by the bus (alone) 37 (22.3%), walking alone, 23 (21.1%) then the bus (accompanied) 30 (18.8%) and taxi/uber or similar (accompanied by friend or family) with 28 (18.2%). On trips made occasionally or twice a month there is a revealed preference for taxi/uber or similar (accompanied by friend or family) with 82 (53.2%), followed by train (accompanied by friend or family) with 59 (39.3%), and again taxi/uber or similar (alone) with 62 (38.8%), followed by walking (accompanied by friend or family) with 49 (32.5%). Around 6% use a chauffeur or personal service almost daily and 7% several times per week. Of the respondents without disabilities 134 (94.4%) claim to never using a bicycle and 130 (91.9%) never use a motorcycle. Forty-five percent never walk alone. Fifty-eight percent never drive a car. Fifty-seven percent never use the bus alone. Seventy-one percent never use the train alone. Eighty-four percent never use the tram/metro alone.

Concerning senior tourists without disabilities, on daily trips there is a revealed preference for individual means of transport (car and on foot). The most used means of transport is the car, as a driver, 285 (48.6%) followed by the car, as a passenger, 143 (32.5%), then walking alone: 101 (20.0%), and walking accompanied by friend or family member: 56 (13.0%). Within collective transportation, the bus was the most revealed preference (alone): 47 (10.0%). On trips made several times a week (but not every day) the most commonly used means of transport is walking accompanied by a friend or relative, 135 (31.3%) followed by walking alone 135 (26.7%) then the use of bus alone, 113 (24.1%) and use of car, as a driver, 130 (22.1%). On trips made occasionally or twice a month there is a revealed preference for public transport, particularly train (accompanied by friend or family), with 241 (56.0%), followed by taxi/uber or similar (accompanied by friend or family) with 236 (52.6%). Around 90% of the respondents without disabilities claim to never using a chauffeur or personal service, bicycle or motorcycle. Thirty-six percent never walk alone. Eighteen percent never drive a car. Thirty-three percent never use the bus alone. Forty-eight percent never use the train alone. Seventy-two percent never use the tram/metro alone.

Making the comparison between elderly people with disabilities and those without disabilities some findings can be assumed:

- Elderly people with disabilities walk less on foot on daily outings and several times a week;
- Elderly people with disabilities never walk alone, drive a car, use a bus alone, use the train alone or use tram/metro to any greater degree than elderly people without disabilities;
- Elderly people with disabilities drive less, but on the other hand they have a special preference for the car as a passenger on daily outings;
- Elderly people with disabilities use the bus, train and tram/metro less on daily outings;

- Elderly people with disabilities use a taxi/uber or similar more, and more often than not they use this means of transport accompanied by family or friend;Elderly people with disabilities use the bus, train and tram/metro less on daily and several times per week outings;
- Elderly people with and without disabilities use the bus more several times a week;
- Elderly people with disabilities also resort more to a chauffeur or personal service;
- The use of a bicycle or bike is equally low having similar percentages of use among elderly people with and without disabilities.

The majority of the respondents with disabilities claim to never using the bus, train or tram/metro.

2.4 Factors that limit the use of public transport by senior tourists

In the inquiries a question was raised about the "factors limiting the use of public transport" and 256 (30.1%) of the respondents responded that they have limitations in the use of public transport. This percentage is high and corresponds to an important condition for using this means of transport. The limitations mentioned are: 142 (55.5%) have difficulty walking; 135 (52.7%) difficulty climbing stairs; 33 (12.9%) have difficulty staying upright; 33 (12.9%) have hearing problems; 29 (11.3%) have visual problems; 12 (4.7%) difficulty in holding or manipulating objects. Twelve (4.7%) travel with a wheelchair and 8 (3.1%) use a mobility scooter. It is important to mention that a large part of the elderly mentioned more than one limitation, an acceptable assumption being that those who have difficulty walking also have difficulty in climbing stairs.

Walking, climbing stairs or steps and staying upright are some of the difficulties deemed by elderly people to be limiting in the use of public transport. Figures 3–5 depict the relationship of these difficulties with age.

One of the biggest problems affecting the mobility of elderly tourists is difficulty in walking. Difficulty in walking grows exponentially with age according to the equation $y = 1.6914e^{0.5627x}$ (see Fig. 3).
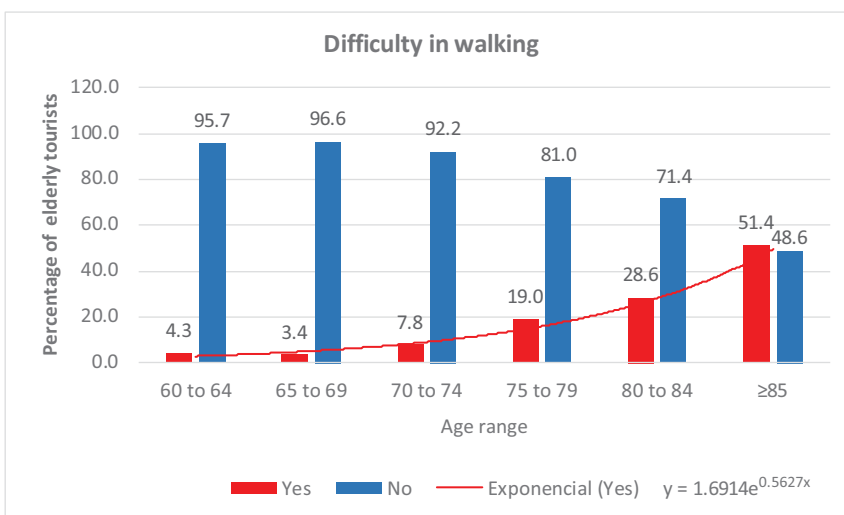

Figure 3: Difficulty of elderly tourists in walking. (*Source: Authors' elaboration*).

In the 60-64 age group only 4.3% reported having difficulty walking but for those aged over 84 difficulty in walking represents 51.4% of respondents in this age range.

Another problem related to the mobility of the elderly is the difficulty in staying upright (see Fig. 4). This difficulty affects the use of public transport and walking and requires the need to be accompanied to move around.

Another obstacle in the use of public means of transport is the need for the elderly to climb steps or stairs. Difficulty in climbing steps or stairs grows linearly with age according to equation: $y = 6.4594x - 4.597$ (see Fig. 5). In the age group of 60–64, only 6.4% reported
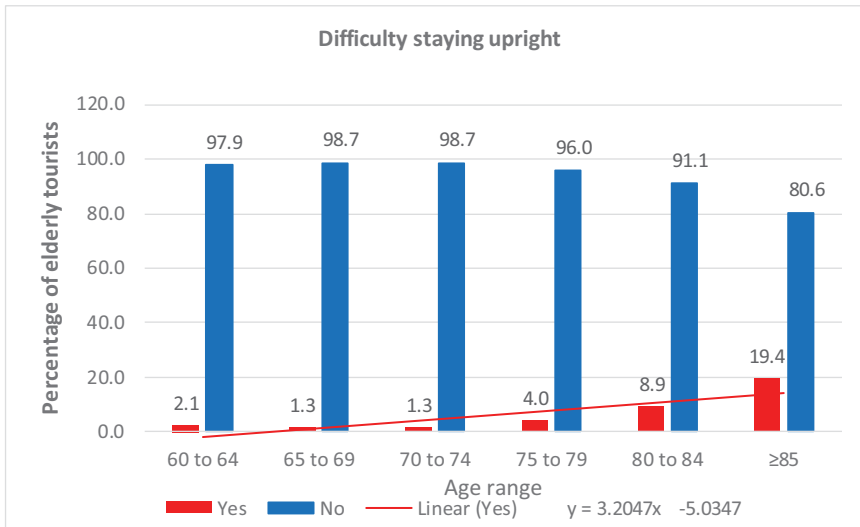

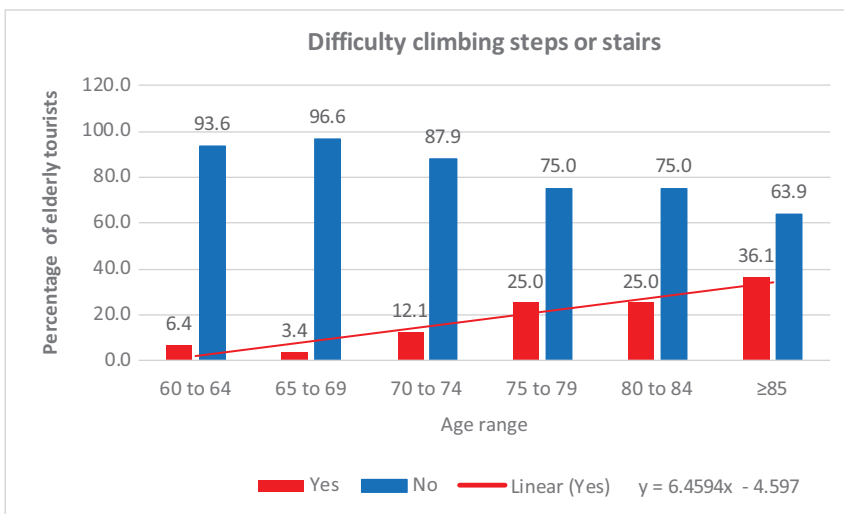Figure 4: Difficulty of elderly tourists in staying upright. (S*ource: Authors' elaboration*).

Figure 5: Difficulty of elderly tourists climbing steps or stairs. (*Source: Authors' elaboration*).

having difficulty climbing steps or stairs, but for ages over 84 this difficulty represents 36.1% of respondents in this age group.

Eleven elderly tourists (1.3%) stated that wheelchair use makes it difficult for them to use public transport and eight (1%) report that using a mobility scooter also makes it difficult for them to access public transport.

2.5 Study of the dependence between modal choices and functional diversity of elderly people

The aim is to find out if there is a dependence between the modal choices of elderly tourists in the region where they live and the fact that they are people with disabilities.

As previously mentioned, there are 209 (25.0%) elderly people with disabilities that affect their mobility.

It is therefore intended to verify whether the frequency of use of means of transport used in everyday life (ordinal variables: almost every day, several times a week, occasionally or twice a day, never), in the country where they reside, correlates with elderly people with disability (nominal variable).

For this purpose, the chi-square test will be applied between an ordinal and nominal variable, available in SPSS. The chi-square test hypotheses: H0: the variables are independent versus H1: the variables are dependent.

In particular, the null hypothesis (H0) for this test assumes that there is no relationship between elderly people with or without disabilities and the frequency with which they choose a particular means of transport (assumes that there is no association between the two variables). The fact that elderly person with disability does not condition the choice and frequency of the means of transport.

The alternative hypothesis (H1) assumes that there is a relationship between elderly people with or without disabilities and the frequency with which they choose the means of transport (there is an association between the variables). The fact that an elderly person with a disability conditions the choice and frequency of the means of transport.

The null hypothesis H0 is rejected at the significance level of 5% or 1% if the *P*-value (test value) is less than 0.05 or 0.01, respectively.

Table 3 presents the designations of the ordinal variables and the result of the Chi-square test through *P*-value. For the first 9 tests with *P*-value <0.01, based on this sample, we can conclude with 99% confidence that there is statistical evidence to reject the null hypothesis. Thus, we conclude that there is a significant association between the two variables, i.e., the fact that elderly people with or without some form of disability is related to the choice and frequency with which they use these 9 means of transport. Considering the results presented and the answers to the surveys, we can try to understand how the use and frequency of the means of transport changes with the existence of a disability. Elderly tourists with disabilities have different behaviours regarding the use and frequency of walking (alone or accompanied). In reality, elderly tourists walk less on foot alone and more on foot accompanied than elderly people in general.

It is proven that in relation to the frequency of the use of a car as a driver and as a passenger, behaviour is also different. Elderly tourists with disabilities have a special preference for the use of a car as a passenger.

Also, in relation to the use of a chauffeur service or personal assistant elderly tourists with disabilities resort more to this aid than elderly tourists in general.

Table 3: Means of transport and results of the Chi-square test.

Types of transport	*P*-value	Decision
Walking as mean of transport (alone)	0.000	Reject ($\alpha = 0.01$)
Walking as mean of transport with friends/family	0.001	Reject ($\alpha = 0.01$)
The use of car, as driver	0.000	Reject ($\alpha = 0.01$)
The use of car, as passenger	0.000	Reject ($\alpha = 0.01$)
The use of bus (alone)	0.000	Reject ($\alpha = 0.01$)
The use of train (alone)	0.000	Reject ($\alpha = 0.01$)
The use of train with friends/family	0.002	Reject ($\alpha = 0.01$)
The use of tram/metro (alone)	0.004	Reject ($\alpha = 0.01$)
The use of chauffeur or personal service	0.000	Reject ($\alpha = 0.01$)
The use of bus with friends/family	0.015	Reject ($\alpha = 0.05$)
		Do not reject ($\alpha = 0.01$)
The use of tram/metro with friends/family	0.124	Do not reject
The use of taxi/uber or shuttle (alone)	0.267	Do not reject
The use of taxi/uber or shuttle with friends/family	0.617	Do not reject

Source: Authors' elaboration.

To verify the existence of an association between the choice and frequency of "the bus with friends/family" as a means of transport, we obtained a *P*-value equal to 0.015. Thus, based on this sample, we have 95% confidence to reject the hypothesis of independence, but not 99%. Therefore, it seems that the fact an elderly person has a disability may in some way condition the choice and frequency of the use of the bus accompanied with friends or relatives.

In the remaining cases, we obtained a *P*-value greater than 0.05. Thus, based on this sample there is evidence not to reject the hypothesis of independence between the fact of elderly people having or not having some form of disability and the choice and frequency of these three means of transport (tram/metro accompanied by friend/family, taxi/uber or similar alone or accompanied by a friend or family member). This tells us that there is insufficient evidence to suggest a statistically significant association in the choice of these three means of transport and an elderly person with disability, i.e., an elderly person with disability does not condition the choice and frequency of the type of transport. Elderly people with or without disabilities choose these means of transport in equal measure.

3 STRENGTHS AND LIMITATIONS

Usually elderly people are presented in literature as a homogeneous age group with needs and expectations. However, the understanding of these is limited, due to the heterogeneity within this group. The Project ACCES4ALL gives innovating information related to the functional disabilities of elderly people and the consequent choice of means of transport.

This survey influenced a collaborative design process to develop relevant inclusive urban solutions around perceptions of the elderly. The results facilitate identifying urbanistic needs and priority areas for action to improve the built environment associated with bus stops [27].

Although the sample size is appreciable, this study has some limitations. The respondent tourists have sufficient health to be in a mobile condition at Faro Airport. The most severely ill people (for example, those who were institutionalized) and those who have no financial access to tourism experiences, and others, were not considered in the study. So, the group of tourist respondents may not generalize all older adults.

The results should not be extrapolated to the world population because the majority come from developed European countries.

Another limitation of the study is the larger proportion of men (than women) and the small number of respondents aged 85+ when these specific age groups have multiple disabilities.

The nature of the disabilities is mainly related to motor, hearing, visual and few concern orientation problems. Intellectual disabilities are not well represented, so the perceptions of elderly tourists with these specifics are not equally considered.

A large percentage of respondents are urban residents; consequently, the perceptions of rural residents are not equally reflected.

It is suggested that complementary studies should be carried out, to provide a wider and deeper understanding of the reasons for not using different means of public transport by elderly people.

4 CONCLUSIONS

Hundreds of senior tourists 60+ years old answered the survey developed at Faro Airport and 25% reported having at least one disability that affects their mobility. The nature of the disability is mainly related to motor, hearing, visual and orientation problems.

Previous results of the project ACCES4ALL established that elderly tourists are conscious of the importance of universal accessibility attributes of bus stops and their environments and perceive that part of these attributes exist in their country [27]. The present results show that there is infrequent use of public transport by elderly people and that they have multiple difficulties in usability. This is associated with their functional diversity and could be related to the means of transport and the built environment's conditions of accessibility, that do not match their needs.

The functional diversity of these older people is heterogeneous within this group. When asked if they used technical aids (assistive devices) to get around, 20.8% answered yes.

Respondents perceive they have specific limitations in the use of some public transport.

A list of means of transport was presented: walk, drive, ride with a friend or relative or driver/personal assistant, bus, rail, metro or tram, taxi/uber or similar, bike, motorbike or scooter. When asked how often they use these different means of transport, respondents mostly use the car, as a driver or as a passenger, and use the bus alone or with a friend/relative. Findings demonstrate that elderly people with disabilities walk less on foot on daily and several times a week outings and the majority of the respondents with disabilities claimed to never use the bus, train or tram/metro.

Older people with disabilities behave differently to other older people concerning the choice and frequency of a particular means of transport.

The infrequent use of public transport by elderly people may be for the reason that associated means of transport do not satisfy their needs. The use of assistive devices and the multiple difficulties they have (e.g. walking to and on the bus, stepping on and off the bus, standing because there are no benches) could make travelling on public transport difficult and raise the need to be accompanied by a friend, relative or personal assistant. Therefore, it is necessary to minimize the height of the steps on the vehicles. Ideally, a low-floor bus has no steps between the ground and the floor of the bus at the entrance(s). For better service, this low-floor could be complemented by a hydraulic or pneumatic 'kneeling device', that brings the step of the floor down to the waiting area.

The introduction of these low-floor wheelchair-accessible buses, through a kneeling system, has been increasing in some European countries. These benefit all passengers, including those who are disabled, elderly people, persons with baby strollers. But there are a lot of

places where buses only have a low floor and no kneeling system. In this case, a raised bus boarding area assists passengers boarding/leaving the vehicle and enables wheelchair users to board using a ramp with an adequate gradient. There will be a small vertical gap, as the boarding platform is almost at the same level as the vehicle floor.

To increase the access and the safety and wellbeing of senior citizens in transportation systems, accessibility calls for vehicles, modal interfaces and pedestrian infrastructures to have a combination of quality characteristics, where age-sensitive design prevails. Specific built environments in pedestrian infrastructures and modal interfaces can make the difference between age-related decline and health and longevity, and this context calls for age-friendly bus stops [27].

If collective transport becomes more attractive by improving standards of service, organisation and greater accessibility for people whose mobility is limited, large numbers of tourists and local people would be encouraged to use it regularly. This would contribute to more sustainable mobility and economic benefit for operators and increase access to centres of attraction.

The use of public transport by tourists increases their experiences because it allows for greater contact with local communities and the enjoyment of non-tourist environments that usually have a greater cultural identity.

Due to the heterogeneity of this user group, more studies must be developed in order to understand exactly the needs of older people, which probably goes beyond universal accessibility issues, as older people can have different needs from other passengers with disabilities. Age-related personal restrictions on the use of public transport must be perceived and attended to by transport authorities, operators and planners.

This survey shows that there is availability of different means of transport, other than the car, in the countries of the senior tourists questioned. These tourists come mainly from the United Kingdom, Germany, Ireland, France and Spain. These developed countries have strong public transportation policies. This diversity of means of transport could be one of the most important ways to maintain older people's mobility at home and in tourist destinations.

The use of collective transport is fundamental for the environmental sustainability of territories and sustainable tourism in particular. It is also necessary for more accessible and inclusive mobility. Improved public transport services in tourist destinations can offer viable travel alternatives for all senior age groups, but especially for those who are older and who may no longer be able to drive a rent a car, for example. These sustainable strategies can also meet the needs of local communities.

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