

DIGITAL LITERACY OF ELDERLY TOURISTS IN THE ALGARVE DESTINATION

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Abstract: This paper studies the digital literacy of elderly tourists who have chosen the Algarve as their destination. Quantitative methods were applied to analyze part of the data collected within the project ACCES4ALL - Accessibility for All in Tourism (2017-2019). In this project, questionnaire surveys were answered by 851 senior tourists aged 60+ at the International Airport of Faro. The present research has the specific goal of identifying and analyzing what characteristics influence the use of the Internet, QR code and NFC technology. Descriptive and inferential statistics were performed. The results show that as the age of the surveyed elderly tourists increases, their Internet use decreases. The higher the respondent's level of education, the higher their internet use. Elderly tourists without disabilities use the Internet more than those with disabilities. Few surveyed elderly tourists are familiar with the use of QR codes and NFC technology. In general, it was possible to observe that the elderly tourists surveyed have a high digital literacy concerning the use of the Internet. Further research will analyse if these senior tourists use digital tools for travel planning.

Keywords: Elderly Tourists; Digital Literacy; Smart Cities; Inclusive Cities; Accessible Tourism

Introduction

Approaches associated with sustainable development, social inclusion and active ageing are driving changes in the current role of seniors in a global society where digitalization is increasingly in the spotlight. The social dimension of sustainability considers social inclusion and social equity, i. e. equal opportunities in the access to goods, services and information, encouraging active participation of citizens and accepting the right to this participation. Inclusiveness is related to equal opportunities, public participation, citizen engagement, co-design, universal design, accessibility, and affordability, and it is considered one of the values of the New European Bauhaus.

In the context of developing tourism activities, social sustainability has implications for the access of all tourists to infrastructure, equipment and services, and therefore access to the city and the rural environment, using public transportation, enabling new experiences in destinations.

These attributes are also associated with the ageing process, which must be considered in the whole tourism value chain. These approaches are being taken institutionally in the United Nations, the European Union and Portugal, which have triggered actions under the New Urban Agendas.

The “Convention on the Rights of People with Disabilities” (United Nations, 2007) helped to dictate the need for improvements by promoting and ensuring the rights and dignity of people with disabilities (e.g. physical, mental, intellectual or sensory disabilities). This convention seeks to empower people with disabilities to live autonomously and fully participate in society by guaranteeing, among other things, equal access to information and communications.

Concerning the United Nations’ Sustainable Development Agenda 2030 (United Nations, 2015), the Goal 9 - to build resilient infrastructure, promote inclusive

and sustainable industrialization and foster innovation - refers to the need to increase significantly access to information and communications technology and strive to provide universal and affordable access to the Internet. Goal 11 concerns the systematic implementation of policies to make cities inclusive, safe, resilient and sustainable. It presents a holistic vision of an inclusive society that serves vulnerable communities by integrating people with disabilities and the elderly, among others, and by focusing on accessibility according to the universal design approach.

People of all ages, social statuses and skills are taken into account within the universal design approach, i.e. every citizen enjoys its implementation, and the whole society benefits from solutions accessible to all. This approach depends on processes in which the perceptions and needs of users are considered and co-design processes are valued.

Inclusive cities have been associated with intelligent cities, requiring specific digital knowledge from users who tend to be connectivity-dependent. Information and Communication Technologies (ICT) are fundamental tools for social inclusion, as they promote equity in access to information. These technologies tend to be used by tourists when planning their trips.

Current transport interfaces, as well as the urban infrastructure around them, must be rehabilitated in order to be accessible for all and connected, as these are attributes of the quality of transport services. Moreover, in the context of smart tourism and social inclusion, interfaces, e. g. bus stops, need to be connected with the digital world.

This is the context of the project ACCES4ALL - Accessibility for All in Tourism (2017-2019), an innovative Portuguese project developed at the University of Algarve, the promoting entity. Its main objective was to develop a pilot study of an accessible, intelligent and sustainable bus stop, to be located at Faro International Airport, meeting the processes of "Universal Design" and "Age Sensitive Design". At this digital bus stop, the availability of Wi-Fi and interactive information regarding the public transportation network was met through Quick Response (QR) codes, Near Field Communication (NFC) technology and an interactive panel that can provide service information on

real-time schedules, transportation lines, location maps, daily news and weather conditions, among others.

Seamless travelling allows individual tourists to extend their mobility radius and search for different modes of transport to use their time more efficiently (Döge & Abraham, 2020).

The universal accessibility of information considers all users and should be addressed in this innovative urban furniture. The question was whether older tourists have sufficient digital literacy to use these cutting-edge technologies and to take advantage of these inclusion opportunities.

Thus, as part of the ACCES4ALL Project, surveys were conducted on elderly tourists (aged 60 and over) as users of Faro International Airport. The questionnaires contained questions about their use of information, communication systems, and technologies, among others.

The main goal of this article is to present the digital literacy of elderly tourists who have chosen the Algarve as their destination. In addition, it has the specific objective of identifying and analyzing what characteristics influence the (non-)use of the Internet, QR code and NFC technology.

Smart and Inclusive Cities and Tourism

Smart Cities

Smart cities are often defined as urban areas that use divergent types of electronic Internet of Things (IoT) sensors to collect data and then use the data to manage assets and resources efficiently (Baltac, 2019). However, they should be defined less based on the IoT solutions implemented and the number of digital devices used and more on the optimization of its functions. Along the same line of thought, Nesmachnow & Hernández-Callejo (2020) argue that smart cities rely on adapting smart devices to traditional physical systems to optimise their functions. Therefore, the technology in smart cities can assist in reducing social problems.

Combining smart cities and digital technologies can provide a multidimensional solution to support elderly people and people with

disabilities. For example, ICT technologies empower the widespread diffusion of monitoring and sensor technologies to aid transport delivery, mobility and efficiency in urban services (Li & Woolrych, 2021). In the tourism context, the situation is no different, as numerous digital technologies can support seniors and people with disabilities in their tourist destination.

Regarding people with disabilities, it is possible to state that ICT technologies make it possible to improve the infrastructure of public spaces in order to increase autonomy and facilitate the daily life of people with disabilities (Lopes et al., 2018).

According to Skouby et al. (2014), the artificial intelligence implemented in cities can also help to “overcome” many age-related disabilities, such as mobility, visual and cognitive problems. Nowadays, there are audible and vibrotactile signals for pedestrians augmented with systems that can tell older people where they are, systems that translate voice to text or convert and reproduce sign language. These devices can guide seniors through their tasks, among many other digital technologies that can help them on trips and in their daily lives.

In contemporary society, many projects are being developed involving digital technologies that aim to improve senior citizens' and tourists' quality of life. Skouby et al. (2014) refer to the STIMULATE project that uses ICT technology to offer its users centric services such as specific assistance needs, planning a trip, optimizing transport means and itineraries, security advice, local shopping recommendations and assistance.

In the ACCES4ALL Project, Rodrigues et al. (2018) presented the proposal to create a smart bus stop, which would integrate all the features from the existing bus stops, as well as intelligent features to allow its adaptation to different users' needs through QR code, NFC technology and an interactive panel where the communication adjusts to the profile of the user.

QR code is a type of barcode that can be read easily by a digital device and stores information as a series of pixels in a square-shaped grid. It allows the user to access information instantly. At bus stops, the information is usually about real-time schedules and transportation lines.

NFC is a set of short-range wireless technologies, usually requiring a distance of 4cm or less to initiate a connection. For example, a contactless payment where a customer holding or tapping a mobile device establishes contact with the payments terminal. The NFC-enabled reader and the smartphone pass encrypted information back and forth to each other to complete the payment.

On public transport, people can pay for the trip or use a subway pass by waving the phone to pass through the gates. Tapping the phone at a kiosk gives up-to-date information about schedules, delays, and a lot of other information. NFC technology is designed to increase convenience when learning, shopping, and sharing data.

Emphasis on "Seamless Mobility" is given to promote interventions in the improvement of coordination of the various available mobility services, namely to facilitate transfers between the different means of transport and to make information available about supply transports and digital tools for supporting travel planning, among others.

The use of digital technologies can contribute to the inclusion of seniors in contemporary societies (Dias, 2012). Digital systems and visual communications have been created for all people (Pohlmeyer, 2017). It is assumed that the Internet holds much potential for enhancing opportunities for people with disabilities (Dobransky & Hargittai, 2006).

Inclusive cities have been associated with intelligent cities, holders of innovative technology and digital connectivity, which require specific digital knowledge from users. With the global COVID-19 pandemic having accelerated digitalization, the urgency for universal digital inclusion has hastened (Ng et al., 2022).

Accessible and Inclusive Tourism

Universal Design is a key attribute of accessible and inclusive tourism. The concept of universal design was developed in The Center for Universal Design at North Carolina State University and defined as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Connell et al., 1997).

In this context, accessibility in accordance with the universal design approach is considered an important attribute of the quality of infrastructure, facilities, services and information associated with mobility and tourism. According to the European Concept of Accessibility, “accessibility is the characteristic of an environment or object which enables everybody to enter into a relationship with, and make use of, that object or environment in a friendly, respectful and safe way” (Aragall et al., 2003, p. 3). Groups often underrepresented such as older adults, children, and people with disabilities, must be integrated (Tauke et al., 2016).

These approaches must be considered in the tourism chain, where online travel planning can influence the choice of destinations. One requirement that allows people with disabilities to travel is accessible online information (Buhalis & Michopoulou, 2011). However, accessibility seems not to be a determinant in tourist sites' performance (Rucci & Porto, 2022).

For the effective implementation of accessibility for all, seven principles associated with the universal design must be considered: 1) equitable use; 2) flexibility of use; 3) simple and intuitive use; 4) perceptible information; 5) tolerance for error; 6) low physical effort; 7) size and space for approach and use (Connell et al., 1997). These principles must always be incorporated in the conception of products, environment, services and information, to create a fair society, where all people have the right to use them, independently and naturally.

This is a great challenge because the World Wide Web and electronic devices (e. g. desktop computers, laptops, tablets, smartphones) have to be designed considering all users, which is not always the case. For example, QR codes and NFC technology are very dependent upon contactless, which is impossible or difficult for people with visual disabilities. These technologies cannot be used or understood by some specific users. On the other hand, the accessed websites have to be designed and developed so that people with disabilities can use them, i.e. *Web accessibility*.

As Richards et al. (2010) write, the tourism sector should be accessible and inclusive for all. Darcy and Dickson (2009) present the concept of Accessible Tourism as a practice that allows all individuals, including the ones who travel

with disabilities (such as the elderly), to move independently and with equity through the provision of tourist services and products designed universally to reach the largest number of people. However, according to Burns et al. (2009), tourism is not always accessible and inclusive, since there are tourists with special needs who are excluded from various leisure activities due to their physical and social limitations. When approaching Accessible Tourism, it is unavoidable to not refer to the elderly population since disability and old age are often related (Alén et al., 2012). Ageing is usually associated with dependency, loss of functionality, and cognitive impairment. Associated with ageing are limitations of mobility, visual and hearing impairments and high disease susceptibility, especially chronic diseases (Skouby et al., 2014).

In the ACCES4ALL Project, it was observed that the nature of the disability of elderly tourists was mainly related to motor problems (61.6%), hearing problems (15.2%), visual problems (14.8%) and orientation problems (1.7%). It was also evidenced that disability affected more women (26.8%) than men (23.8%).

Senior Tourism has been a field of special interest for researchers and the academic community, having emerged in various studies in the area of gerontology, travel and leisure time. The elderly are one of the most prominent market segments in the tourism sector (Patterson, 2012; Alén et al., 2016).

Travel tourism can be considered one of the sectors that most contributes to global mobility and the quality of life of seniors (Ovsenik, 2015). But seniors have some special needs and requirements that must be considered, such as "nearby health services, adapted transportation, and so on" (UNWTO, 2016, p. 32), to promote accessibility, inclusion, and equity for this age group.

Digital Literacy

Digital literacy skills are fundamental for social inclusion since they promote equity in access to information. According to Loureiro and Barbas (2014, p. 451), digital literacy is "a person's ability to effectively perform tasks in digital environments". Thus, to be considered digitally literate, the social agent must know how to access information; collect, handle and organize it in order to

use it, as well as evaluate, integrate, interpret and compare information through various sources/sites; create and generate knowledge and finally, communicate and relate information according to the context in which it is found (Loureiro & Barbas, 2014).

The debate about the digital literacy of the elderly has been increasing since they currently have a higher level of use of technologies and the Internet compared to previous generations (Martin et al., 2017).

In April 2012, the Pew Research Center showed that 53% of older adults (aged 65+) in the United States enjoyed the Internet (Zickuhr & Madden, 2012). According to Smith (2014), this number increased to 59% in just one year. The results of a study by Ramos Soler et al. (2019) show that seniors currently play an active role in tourism travel planning through Relational, Information and Communication Technologies. Many seniors choose their travel destination according to their experiences, as well as the recommendations of friends, and in some cases, contrast this information with ideas found on the Internet. In addition, the Internet, considered as the most used information search tool, is often mobilized to book accommodation and transportation.

However, some academic studies show that older adults are still lagging in their digital development (Hargittai & Hinnant, 2008; Song et al., 2021).

Methodology

As part of the co-design process developed in the ACCES4ALL Project, the research team developed a questionnaire survey to understand the profile and perceptions of elderly tourists in the Algarve destination. It considers four sets of questions: (1) information about the respondent; (2) characterization of their mobility; (3) information about the universal accessibility of a bus stop; (4) use of information and communication systems and technologies. The characterization of elderly tourists was 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 the town.

The survey was developed for foreign elderly tourists aged 60 or over, mainly in August and September 2018. Inquiries were conducted in such a way that involved equal opportunities for different profiles of people (randomly) by professional inquirers (experts on Marketing) at Faro International Airport, mainly in waiting areas before departure. During the survey, the interviewers used photographs to explain technical aspects to elderly tourists. Inquiries, totalling 851, produced considerable data that was introduced into an electronic file, using the advanced statistical analysis capabilities of Statistical Product and Service Solutions (IBM SPSS, v.26). Because of the low frequency of participants who were 90+ years old, 85+ years old participants were grouped.

This article only focuses on the use of information and communication technologies, referring to the fourth part of the applied questionnaire surveys. It should be noted that in this part, only three questions regarding the use of the Internet, QR, and NFC, were selected for further analysis since they are the ones that most represent the sample's digital literacy.

Descriptive statistics of the frequency of each answer were created, characterizing elderly tourists by gender, age, level of education, disability and type of geographical residence area (city and countryside). Bar graphs representing the frequency of Internet, QR code and NFC technology use by age, level of education, gender, disability and type of geographical residence area were created with error bars representing a 95% confidence interval. Inferential statistics were performed to determine if there was a statistically significant difference between the several groups for each characteristic regarding the use of the Internet, QR code and NFC technology. The chi-square test of independence was performed to assess the statistical significance of these relationships. The level of statistical significance was set at 5%; thus, whenever results provided $p < 0.05$, $p < 0.05$ it was assumed that there is statistical evidence to consider that the study variables are dependent and that the differences tested are statistically significant. To perform the chi-square test, in the case of the analysis by age, only three groups were considered, namely 60-69, 70-79 and 80+, and regarding the level of education, again three groups were considered, namely basic+secondary, vocational and higher education. The error bars in the bar graphs complement

chi-square test results indicating the groups (by age, gender, level of education, the condition of having or not having a disability and by type of geographical residence area) with significant differences regarding the study variable (frequency of Internet, QR code and NFC technology use) by looking for the overlap of the correspondent error bars.

Results

Considering valid answers, 60.7% of the respondents are men and 39.3% are women. The age group of 60-69 is the group with higher frequency, namely, 44.8%, the age group 70-79 amounts to 39.8 % and only 15.4% aged 80 or over. Concerning the different levels of education, 2.5% have a basic level, 23.2% secondary level, 54.0% vocational/technical training, and 20.3% have a higher level. 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, and 25.3% answered positively. In terms of geographical residence area of the respondents, 24.7% live in the countryside and 75.3% live in the city.

Digital Literacy of the senior tourists

The total percentage of elderly tourists surveyed that use the Internet is 97.5%, which means that the vast majority of respondents use the Internet. As for the total percentage of elderly tourists that use QR code and NFC technology, this corresponds to only 18.2% and 11.5%, respectively, thus allowing us to consider that most respondents do not use these technologies.

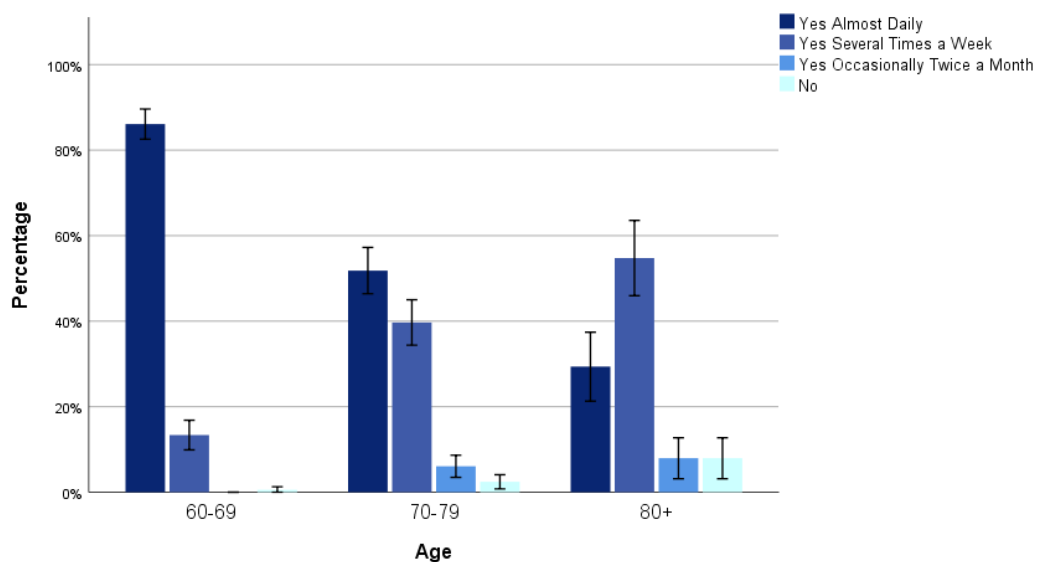
Frequency of internet use

Analyzing the frequency of internet use by age, it is possible to verify that 86.1% of the respondents aged between 60-69 use the internet “almost daily”, 13.4% use the internet “several times a week” and 0.5% do not use it at all; 51.8% of the respondents aged between 70-79 use the internet “almost daily”, 39.7% use the internet “several times a week”, 6.1% use it “occasionally twice a month” and 2.4% do not use it at all; 29.4% of the respondents aged over 80

use the internet “almost daily”, 54.8% use the internet “several times a week”, 7.9% use it “occasionally twice a month” and 7.9% do not use it at all.

The results show that the frequency of internet use is not the same between the three age groups considered, $[\chi^2(6; n = 830) = 117.15, p = 0.000][\chi^2(6; n = 830) = 117.15, p < 0.001]$. Moreover, senior tourists that most use the internet “almost daily” are aged between 60-69 and the “almost daily” internet use decreases with the age of the senior tourists. On the other hand, the “several times a week” internet use increases with age and senior tourists that mostly use the Internet “several times a week” are 80 years old or more. Regarding “occasionally twice a month” usage, there is no difference between the groups 70-79 and 80+ groups, but the group 60-69 differentiates from these two and is the group that least uses “occasionally twice a month”. Regarding no internet use, there is no difference between the 60-69 and 70-79 groups, but the group 80+ differentiates from these two and is the group that most does not use the Internet (Figure 1).

Figure 1. Percentage of elderly tourist participants by age and frequency of internet use (Source: Authors' elaboration)

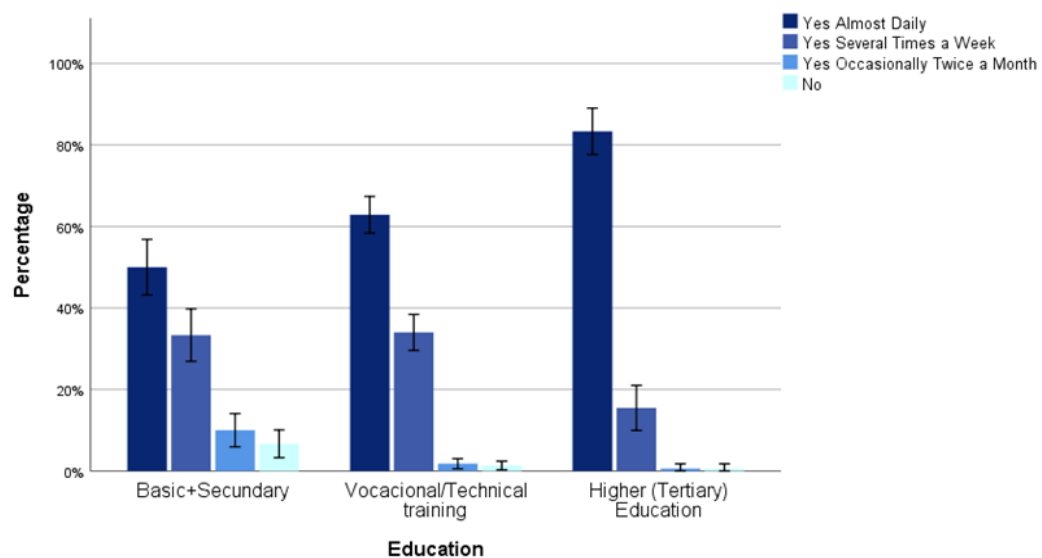


Looking at the frequency of internet use by level of education, it can be observed that 50.0% of the respondents with basic or secondary education use the internet “almost daily”, 33.3% use it “several times a week”, 10.0% use it “occasionally twice a month” and 6.7% do not use it at all; 62.9% of the respondents with vocational/technical training education use the internet

“almost daily”, 34.0% use it “several times a week”, 1.8% use it “occasionally twice a month” and 1.3% do not use it at all; 83.3% of the respondents with higher (tertiary) education use the internet “almost daily”, 15.5% use it “several times a week”, 0.6% use it “occasionally twice a month” and 0.6% do not use it at all.

The results show that the frequency of internet use is also different between the three levels of education groups, $[\chi^2(6; n = 825) = 82.25, p = 0.000]$ $[\chi^2(6; n = 825) = 82.25, p < 0.001]$. Senior tourists with higher education are the ones that mostly use the internet “almost daily”. In addition, the “almost daily” internet use increases with the level of education. Regarding “several times a week” usage, there are no differences between basic or secondary education and vocational/technical training education. However, the group with higher education differentiates from these two groups and is the group that least uses the internet “several times a week”. However, in the case of the “occasionally twice a month” usage and no usage at all, there are no differences between vocational/technical training education and higher education but the group with basic or secondary education differentiates from these two groups and is the group that most uses the internet “occasionally twice a month” or that do not use it at all (Figure 2).

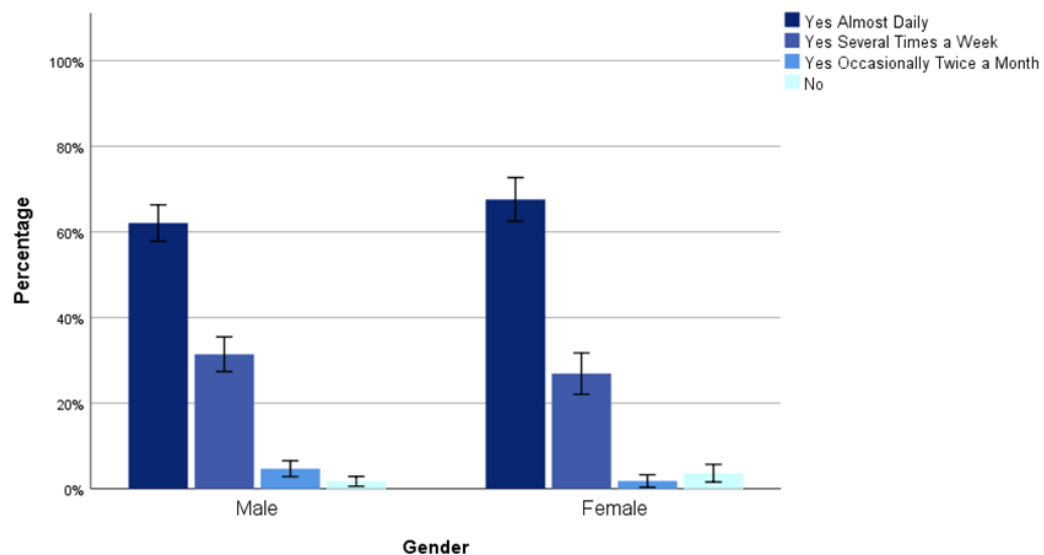
Figure 2. Percentage of elderly tourist participants by level of education and frequency of internet use (Source: Authors' elaboration)



Concerning the frequency of internet use by gender, it can be observed that 62.1% of the elderly male respondents use the internet “almost daily”, 31.4% use it “several times a week”, 4.7% use it “occasionally twice a month” and 1.8% do not use it at all; 67.6% of the elderly female respondents use it “almost daily”, 26.9% use the internet “several times a week”, 1.8% use it “occasionally twice a month”, and 3.7% do not use it at all.

The results show that there are differences between men and women regarding the frequency of internet use, [$\chi^2(3; n = 836) = 9.78, p = 0.021$], [$\chi^2(3; n = 836) = 9.78, p = 0.021$], but only in the case of “occasionally twice a month”, men being the ones that most use the internet “occasionally twice a month” (Figure 3).

Figure 3. Percentage of elderly tourist participants by gender and frequency of internet use (Source: Authors' elaboration)

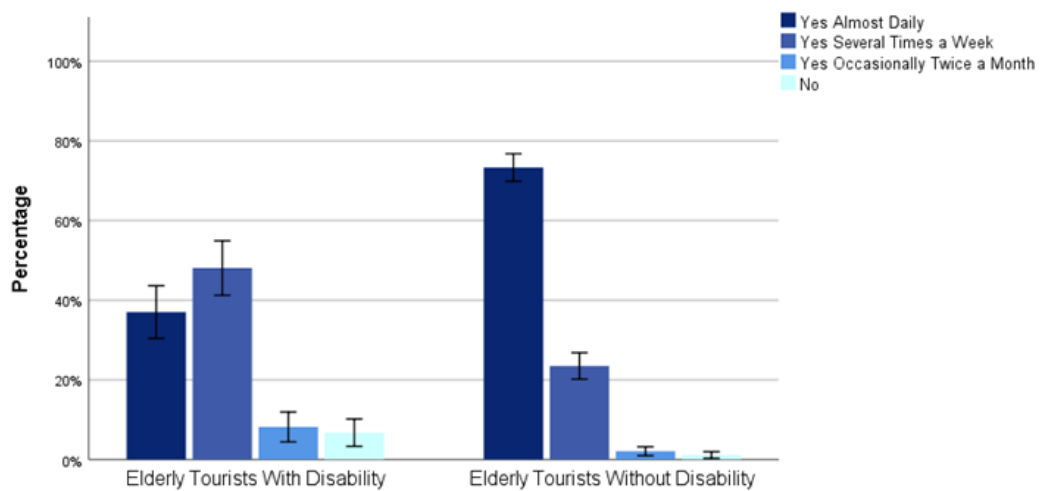


Considering the groups of senior tourist respondents with or without disability, it can be observed that 37.0% of the elderly with disability use the internet “almost daily”, 48.1% use it “several times a week”, 8.2% use it “occasionally twice a month” and 6.7% do not use it at all; 73.3% of the elderly without disability use the internet “almost daily”, 23.5% use it “several times a week”, 2.1% use it “occasionally twice a month” and 1.1% do not use it at all.

The results reveal that in all categories of frequency of Internet use, there are differences regarding having or not having some disability, [$\chi^2(3; n = 838) =$

100.01, $p = 0.000$], $[\chi^2(3; n = 836) = 100.01, p < 0.001]$, and that the senior tourists without disability are the ones that use the internet “almost daily” most, but the senior tourists with disability most use it “several times a week”, “occasionally twice a month”, and are also the ones that most do not use it at all (Figure 4).

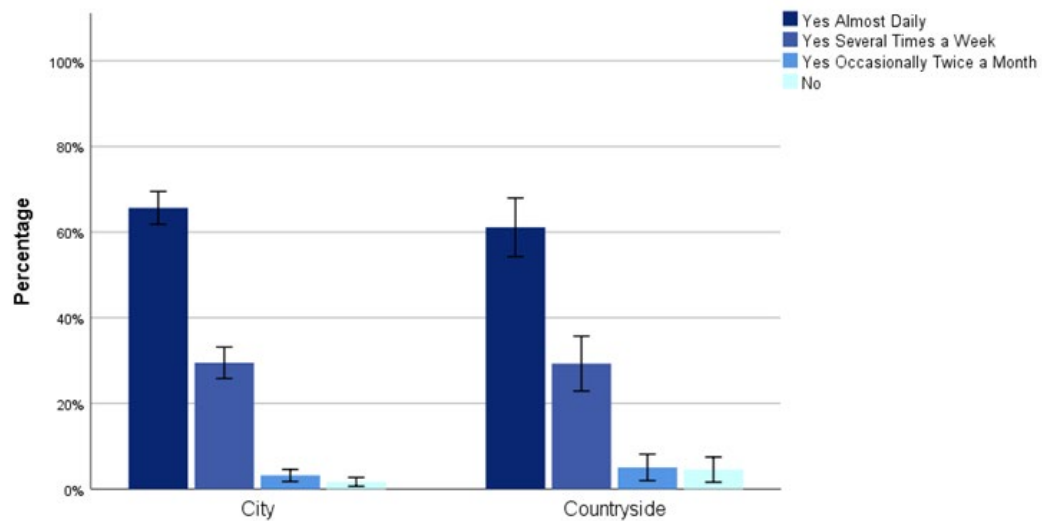
Figure 4. Percentage of elderly tourist participants by disability and frequency of internet use (Source: Authors' elaboration)



In the case of the type of geographical residence area, 65.7% of the respondents that live in a city use the internet “almost daily”, 29.5% use it “several times a week”, 3.2% use it “occasionally twice a month” and 1.7% do not use it at all; 61.1% of the respondents that live in the countryside use the internet “almost daily”, 29.3% use it “several times a week”, 5.1% use it “occasionally twice a month” and 4.5% do not use it at all.

The results indicate that there are no differences regarding the frequency of internet use between the two groups, $[\chi^2(3; n = 795) = 7.03, p = 0.071]$ $[\chi^2(3; n = 836) = 7.03, p = .071]$ (Figure 5).

Figure 5. Percentage of elderly tourist participants by geographical residence area and frequency of internet use (Source: Authors'elaboration)

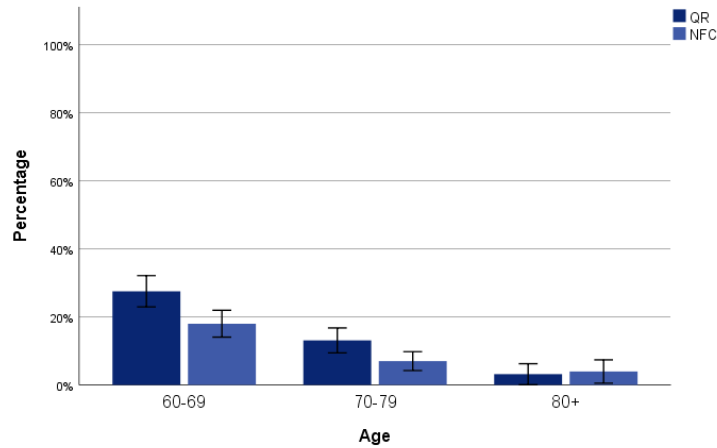


QR code and NFC technology use

Analyzing the QR code use by age, it is observed that it is used by 27.4% of the respondents aged between 60-69, 13.1% of the respondents aged between 70-79 and 3.1% with age over 80. Analyzing the NFC technology use by age, it is observed that it is used by 17.9% of the respondents aged between 60-69, 7.0% of the respondents aged between 70-79 and 3.9% aged over 80 (Figure 6).

The results indicate that the QR code and NFC technology use decreases with the age range [$\chi^2(2; n = 825) = 46.47, p = 0.000$] [$\chi^2(2; n = 825) = 46.47, p < 0.001$] and [$\chi^2(2; n = 825) = 29.02, p = 0.001$], [$\chi^2(2; n = 825) = 29.02, p < 0.001$], respectively. Note that the results also indicate no differences in NFC technology usage for the age groups 70-79 and over 80 years old, but the group 60-69 differentiates from these two, being the group that uses it the most.

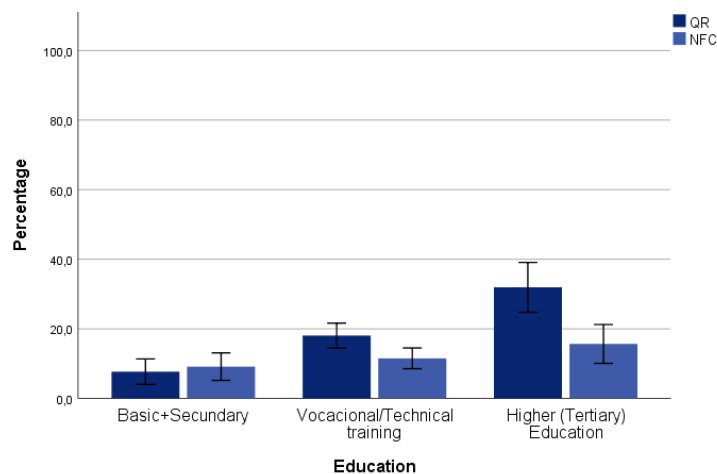
Figure 6. Percentage of elderly tourist participants by age who use QR code and NFC technology (Source: Authors' elaboration)



Considering the level of education, it is observed that the QR code is used by 7.7% of the respondents with basic or secondary education, 18.1% of the respondents with vocational/technical training education and 31.7% of the respondents with higher education. It is also observed that NFC technology is used by 9.0% of the respondents with basic or secondary education, 11.5% of the respondents with vocational/technical training education and 15.7% with higher education (Figure 7).

The results indicate that the QR code use increases with the level of education [$\chi^2(2; n = 819) = 36.18, p = 0.000$] [$\chi^2(3; n = 819) = 36.24, p < 0.001$], but the NFC technology use is independent of the level of education [$\chi^2(2; n = 819) = 3.96, p < 0.138$].

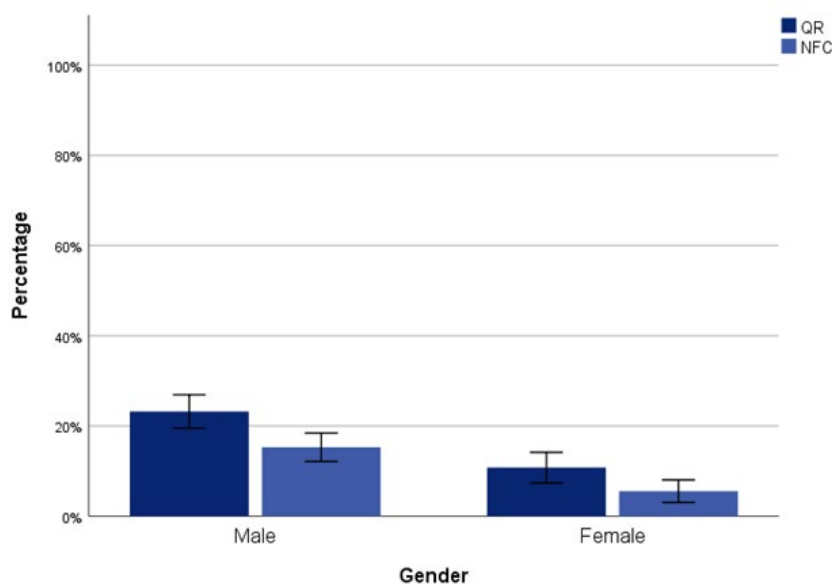
Figure 7. Percentage of elderly tourist participants by education who use QR code and NFC technology (Source: Authors' elaboration)



Analyzing the QR code use by gender, it is observed that it is used by 23.2% of the elderly male respondents and 10.7% of the elderly female respondents. Analyzing the NFC code use by gender, it is observed that it is used by 15.3% of the elderly male respondents and 5.5% of the elderly female respondents.

The results indicate that the QR code and NFC technology use is different between men and women [$\chi^2(1; n = 831) = 19.66, p = 0.000$] [$\chi^2(1; n = 831) = 19.66, p < 0.001$] and [$\chi^2(1; n = 831) = 17.76, p = 0.000$], respectively [$\chi^2(1; n = 831) = 10.38, p < 0.001$]. Moreover, it is possible to verify that more men use the multimedia QR and the NFC than women (Figure 8).

Figure 8. Percentage of elderly tourist participants by gender who use QR code and NFC technology (Source: Authors' elaboration)

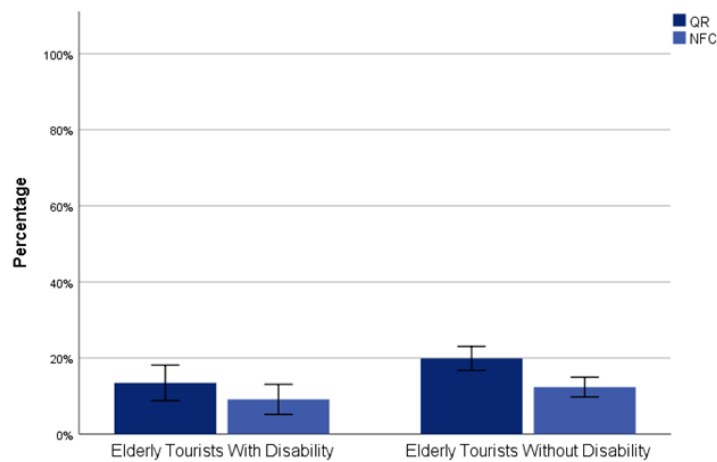


Looking at the QR code use considering the groups of respondents with or without disability, it is observed that it is used by 13.5% of respondents with disability and 19.8% of respondents without disability. Looking at the NFC technology use considering the groups of respondents with or without disability, it is observed that 9.1% of the respondents with disability and 12.3% of the respondents without disability use it.

The results indicate that the use of the QR code and the NFC technology is independent of having or not having some form of disability [$\chi^2(1; n = 833) =$

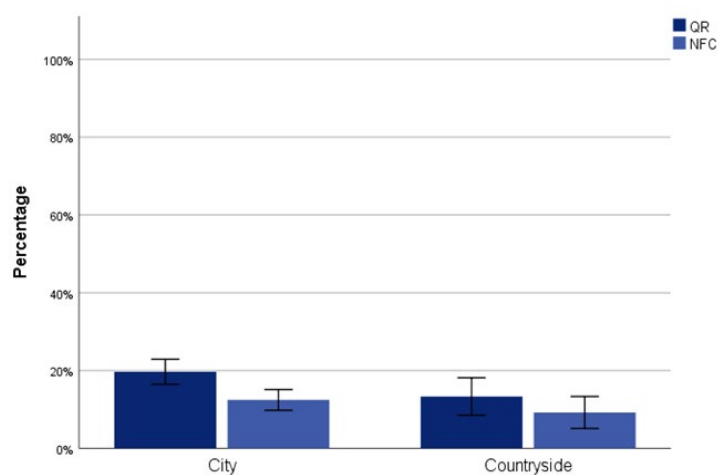
3.84, $p = 0.059$] [$\chi^2(1; n = 833) = 3.84, p = .059$] and [$\chi^2(1; n = 833) = 1.32, p = 0.251$], [$\chi^2(1; n = 833) = 1.32, p = .251$], respectively (Figure 9).

Figure 9. Percentage of elderly tourist participants by disability who use QR code and NFC technology (Source: Authors' elaboration)



Now, looking at the QR code use considering the geographical residence area, it is observed that it is used by 19.7% of the respondents that live in a town or in a city and 13.2% of the respondents that do not live in a town or in a city. In the same way, looking at the NFC technology use considering the geographical residence area, it is observed that it is used by 12.4% of the respondents that live in a town or in a city and 9.2% of the respondents that do not live in a town or in a city (Figure 10).

Figure 10. Percentage of elderly tourist participants by geographical residence area who use QR code and NFC technology (Source: Authors' elaboration)



The results indicate that the type of geographical residence area and the QR code or NFC technology use are independent, [$\chi^2(1; n = 791) = 3.79, p = 0.052$][$\chi^2(1; n = 791) = 3.79, p = .052$] and [$\chi^2(1; n = 791) = 1.16, p = 0.282$], [$\chi^2(1; n = 791) = 1.16, p = .282$], respectively (Figure 10).

Discussion

Digital resources include devices, internet connection and digital literacy which have become basic needs (Ng et al., 2022).

This investigation has helped to understand that the great majority of elderly tourists who have chosen the Algarve as their destination and participated in this study have some digital literacy since 97,5% of them use the Internet. The results indicate that the frequency of internet use by the elderly tourist respondents depends on the age range, level of education and the condition of having or not having a disability of the surveyed elderly tourists. Nevertheless, relative to gender and the geographical residence area, no association with the frequency of internet use was verified.

Regarding the age range, it was observed that as the age of the surveyed elderly tourists increases, their Internet use decreases. This is consensual with previous studies that concluded, in the case of older adults, there is a higher digital illiteracy (König et al., 2018), which can imply that there are not the same opportunities in terms of access to information.

This may be linked to the fact that most older seniors have a lower level of education than most younger seniors, so they have greater difficulty in learning how to use the Internet, or simply in using the proper devices that allow them to have access to it (for example, computer or cell phone). Besides that, the older an individual gets, the more limitations in physical and cognitive mobility arise, which means that age can be a limiting factor in the use of the Internet or other technologies due to cognitive or even visual and/or hearing problems (Skouby et al., 2014). So, this is a disability issue. Eusébio et al. (2020) recommended the promotion of text alternatives for any non-textual content to make the switch to other formats possible according to the

needs of people with disabilities, e. g. large print, braille, speech, symbols or simpler language.

Relative to the level of education, the results indicate that the higher the level of education of the respondent, the higher their internet use. Probably because the less information there is, the greater the distrust, insecurity, and less knowledge. If the individual has a low level of education and training, the less familiar they will be with new technologies and their benefits (Martin et al., 2017; Song et al., 2021).

When it comes to the surveyed elderly tourists with or without disabilities, it is possible to observe that the respondents without disabilities are the ones who use the Internet the most. This may be linked to the fact that elderly people with disabilities could have less access to the use of the Internet and that the proper devices are not accessible to them due to their disability. This evidence becomes interesting since it is expected that individuals with disabilities have a greater need to use the Internet as a tool that allows them access in their daily life for planning their activities, planning trips and/or searching for information on the place of destination, without having to go somewhere to obtain this information physically.

Relative to gender and the geographical residence area, no association with the frequency of internet use was verified.

Analysing the inquired elderly tourists who do not use the Internet (Table 1) there are always people who are not integrated into the global group of people that use the Internet, mainly tourists aged over 80, those with less education, women, people with disabilities and those living in the countryside. They are excluded from the digital world which has implications in terms of access to important touristic information.

This is consensual with Dobransky and Hargittai (2006), who assumed that information technology can increase social inequality by leaving behind certain groups of the population, including people with disabilities and older people. In addition, the present study adds people with less education, women, and people who live in the countryside.

Digital societies have excluded many people with cognitive or physical disabilities because access to online information and the ability to navigate website elements such as radio buttons, sliders, navigation bars, and website forms can be barriers to a useful digital experience (Mason, 2020).

A study conducted by Johansson et al. (2021) has demonstrated that most people with disabilities lag behind those without such impairments, i.e. they do not have as much access to devices, they barely use the Internet to pay bills compared to those without disabilities, they use the Internet to shop online less, they use mobile bank ID for identification less, and they feel less included in the digital world. According to these authors, the type of disability/diagnosis, gender and socio-economic factors, especially education and accommodation, have an influence on disabled people's digital literacy. Thus, equitable public measures should be created considering each specific situation so that all people with disabilities are included in the process of expanding digital literacy.

Table 1: Percentage of elderly tourist respondents who do not use the Internet. (Source: Authors' elaboration)

a) By age group

Age group	Percentage
60-69	0.5
70-79	2.4
+80	7.9

b) By level of education

Level of education	Percentage
Basic or secondary	6.7
Vocational/technical training	1.3
Higher	0.6

c) By gender

Gender	Percentage
Men	1.8
Woman	3.7

d) By (dis)ability

(Dis)ability	Percentage
With disability	6.7
Without disability	1.1

d) Residence

Residence	Percentage
Town/city	1.7
Countryside	4.5

Education and income, governmental policies, family and social supports, personal attitudes and motivations are major contributors to the severe impacts of the age-related digital divide on older adults during the pandemic (Song et al., 2021). The access to the use of ICT is influenced by different social statuses, such as income, education and labour-force participation, which can explain some of the inequality between those with and without disabilities (Dobransky & Hargittai, 2006; Song et al., 2021).

Relative to the use of the QR code and NFC technology, it was observed that few surveyed elderly tourists are familiar with the above-mentioned technologies, as only 18,2% and 11,5% of the respondents use these technologies, respectively. Still, it is important to note that variables such as disability condition and the environment (urban or countryside) in which the surveyed elderly tourists live have no association with the use of these technologies.

Moreover, it was observed that the use of technologies, such as QR code and NFC technology, depends on the age range and the gender of the respondents. It was also possible to see that the QR code usage depends on the level of

education. This may be related to the fact that, the higher the level of education of the respondents, the higher their digital competence. Nevertheless, when it comes to the NFC technology, this association was not verified. However, it can be noted that the QR Code is more present in electronic devices than the NFC.

It should be emphasized that the QR code and NCF technology are recent technologies and have been gaining more prominence due to the current pandemic situation, so it is normal that older people are not yet familiar with them (Song et al., 2021). In fact, due to the COVID-19 pandemic, for public health reasons, the use of QR codes has intensified to transmit information, for example, menus in restaurants.

A good measure to promote the use of digital technologies by older people would be to encourage them to learn how to use this equipment through lectures, documentaries, and many other methods, increasing their digital literacy and guaranteeing their inclusion in contemporary society. According to Tavares and Souza (2012, p. 4). "the State should offer resources not only for regular school education, but also for the teaching of new technologies". Alternatively, older adults can teach each other. They could receive more peer-based social support, increasing digital literacy diffusion (McGinty, 2020). The United Nations (2019), governments, civil society and institutions are demanding to work towards achieving full digital inclusion and digital equality.

In order to be able to influence the shape of future technologies, older people need to be actively engaged in identifying and articulating their goals, needs and aspirations, and evaluating and validating alternative options (Olphert et al., 2005). It is essential to integrate elderly people into co-design and co-creation processes, influencing the conception of age-friendly spaces and products, such as the Project ACCES4ALL advocated.

During the COVID-19 pandemic, increased digital technologies are being applied (Song et al., 2021). Digital society has become necessary, so universal access to information and services is needed, and older adults' difficulties must be considered in social inclusion aims (Xie et al., 2020).

Considering the strengths of Project ACCES4ALL, it gives innovative information on the use of the Internet and other digital tools. The survey influenced a collaborative design process to develop inclusive and smart bus stops considering the perceptions of the elderly and/or people with disabilities. The proposed smart and interactive panel has intelligent features to allow its adaptation to different users' needs (Rodrigues et al., 2018). In the case of elderly people, communication is attained, for example, using simple language.

Considering the weakness of the present study, although the sample size of the survey is appreciable, this study has some limitations. The respondent tourists have sufficient health to be mobile at Faro Airport. The most severely ill people (for example, institutionalized) and those with 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.

Conclusions

Today accessibility in the built environment goes beyond urbanistic aspects. Considering transport systems, it is related to information services provided to passengers (written and auditory information), intelligent systems of orientation for the blind, ticket boxes, and other smart equipment installed in loco, such as bus stops, among others. The implementation of accessible and smart bus stops together with the improvement of the conditions of accessibility of other interfaces in touristic places are considered an essential part of accessible tourism and sustainable mobility.

This innovated digital world has much potential to increase opportunities for people including the elderly and people with disabilities, but demands digital literacy.

This paper analyzed the digital literacy of elderly tourists who chose the Algarve as their destination. The data evidenced that most of the elderly tourists who participated in the study are in some way digitally literate since they use the Internet. It was also noted that the more education the elderly respondents had, the more they used the Internet. In addition, it was

perceived that elderly tourists with disabilities use the Internet less than those without. Regarding the QR code and NFC technology, the study showed that many elderly tourists are not familiar with these technologies. These findings reveal that nowadays, most of the elderly tourists possess some digital literacy, although there are still many technologies they do not fully master or are aware of.

Considering the inquired elderly tourists, some do not use the Internet and are not integrated into the digital world, mainly tourists over 80, those with less education, women, people with disabilities or people living in the countryside. They are excluded from the digital world which could have implications in terms of less access to important touristic information.

Nowadays, seniors play an active role in tourism travel planning through relational, information and communication technologies, although there is still a long way to go to reach the inclusion of the elderly and/or people with disabilities in the present digital society.

More research is needed to understand why older people do not use the Internet or access fewer types of digital content, with the aim of creating equitable measures that consider each specific situation, so that all people, including seniors and people with disabilities are included in the process of expanding digital literacy.

Therefore, it is imperative that digital devices and websites enable people with access requirements to operate independently, that is, with autonomy, guaranteeing equitable use (first principle of the Universal Design). The online information has to be presented with multiple communication methods, e. g. text or sound, images, graphics, video, music, and multimedia objects, to guarantee flexibility of use (second principle). The proposed QR codes or technology NFC can increase access to information which would be simple and intuitive to use and guarantee perceptible information (third and fourth principles). Digital travel planning does not require going to travel agencies, guaranteeing low physical effort (sixth principle). For many people, small screen size presents significant constraints, so digital devices must be of adequate size (seventh principle). In other words, devices with structures

adaptable to the conditions of people. Usability is an important criteria of design, that guarantees the ease of use and intuitiveness of the product.

In order to be able to influence the shape of future technologies, older people need to be actively engaged in co-design and co-creation processes, influencing the conception of age-friendly spaces, products, services and information systems. Older adults must be considered as active users of technology systems and be included in the user-centred design approach.

There is a strong need to make seniors more aware of the benefits of the Internet and other technologies. For example, when it comes to the tourism sector, the Internet is very useful because it allows people to have more access to information related to travel arrangements and the country of destination, whenever they need it. These are only a few of many advantages of using digital equipment. Apart from this, a good measure to promote the use of digital technologies by older people, would be to encourage them to learn how to use this equipment, through lectures, documentaries, and many other methods, that increase their digital literacy and so guarantee their inclusion in contemporary society.

In addition, tourism services should be welcoming and provide safety for the elderly and people with disabilities in order to respect their personal values; support the use of technological tools; and have a list containing other suitable tourist services in the area, such as restaurants, museums, among others, and with accessibility for all clients.

It is believed that this research will sensitize society and organizations to the importance of implementing public policy measures by developing effective strategies that contribute to increasing digital literacy of the elderly, also allowing the elderly themselves to see its usefulness.

Presently, in smart cities there is a large focus on technology, energy and water resource efficiency, low carbon society to emphasise their innovative identity. Some good examples are emerging associated with social inclusion, but efforts in this field must be greater and systematic. It is imperative to reduce inequalities “no one is left behind”, as the 2030 Agenda for Sustainable Development recommends.

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