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OPPORTUNITIES OF USING NEW TECHNOLOGIES (VR/AR) IN ORDER TO FACILITATE THE ACCESS OF PERSONS WITH DISABILITIES TO TOURIST PRODUCTS

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Abstract: *This paper has the goal of aims at identifying the main barriers that people with disabilities face when they travel, especially for tourism purposes, in order to find solutions to facilitate their access to services in tourism. In this respect, a qualitative research has been conducted, in which the opportunity of using Virtual Reality (VR) for obtaining information about the destination in advance has been tested. The results stress the need of the people with disabilities for better information before the visit, new technologies like Virtual Reality (VR) or Augmented Reality (AR) being considered a very good tool for exploring the accessibility of a potential tourist destination. These technologies can offer actual insights to destinations from the people's home with minimum effort.*

Key words: *people with disabilities, qualitative research, barriers, accessibility, virtual reality, augmented reality*

1. Introduction

In 2010, the European Commission adopted the *European Disability Strategy 2010-2020*, which focuses on removing barriers that prevent people with disabilities from fully participating in society and enjoying their rights. The Strategy establishes eight main areas for action: accessibility, participation, equality, employment, education and training, social protection, health and external action.

Starting from the above goals, we have addressed in our research the area of action related to accessibility. This one is considered a "precondition for the people with

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disabilities within society and economy", and the aim of the Strategy is to ensure the access of people with disabilities to goods and services, as well as to assistive devices. This aim can be achieved by removing barriers such as the built environment, transport, information and communication (European Commission, 2017).

In this context, the authors conducted semi-structured individual interviews among people with disabilities and their parents or attendants with the aim to find answers to the following research questions:

(1) What are the main problems that people with disabilities are facing during their journeys in different tourist destinations?

(2) How do the sample members appreciate the benefits of using new technologies for virtual tours in various tourist destinations?

2. Literature Review

People with disabilities face a lot of barriers in their daily activities, being often excluded from different facets of the social life (Williams et al., 2017). Thus, a better understanding of the people with disabilities in their way of behaving as tourists helps increase their social inclusion, and also helps the suppliers of tourist products provide a better integration of this consumer segment and a better compliance to their needs (Kastenholz et al., 2015).

There are some studies on the way people with disabilities perceive the accessibility of tourist products. Thus, for instance, five accessibility dimensions have been identified in travel and hospitality services: access to physical features; access to service procedures; ease of access to physical and service features; upkeep of accessible physical and service features; and access to accurate and reliable information (Park and Zhang, 2015). Other studies analyse the experiences of people with disabilities as tourists and the main conclusions were that these persons' needs should be considered in each stage of a tourist product designing, in order to improve services for all tourists (Daniels et al., 2005).

In a study conducted on a sample of Koreans with disabilities, in order to better understand how the decisions to choose among tourist products are made, the conclusion was that accommodation facilities were considered the most important, followed by transport facilities, the interviewed tourists being willing to pay more in order to enjoy equipped transport means appropriately (Lyu, 2017). Regarding the criteria which are considered in the process of choosing the accommodation, and the preferences of the persons with disabilities regarding the way information related to the accommodation facilities is presented, the conclusion was that the most important motivation in selecting criteria and preferences for information depends on the type of disability (Darcy, 2010).

The studies conducted in order to understand the needs of people with disabilities related to their participation in tourist activities also highlighted a series of barriers, obstacles which must be taken into account in designing the products from the hospitality industry. In a study conducted in Turkey with respect to the disabled people's expectations from the suppliers of tourist services and their views on the provided services, the main obstacle identified is not the disability, but the income; and while

accommodation services enjoyed good evaluation, the transport ones were identified as important barriers (Karacaoglu et al., 2015). Lee, Agarwal and Kim (2012) identify three categories of barriers when people with disabilities participate in tourism activities: travel constraints (coming directly from travel, environment-related barriers and barriers of interaction), learned helplessness and the intention to travel. By studying these barriers, the authors highlight the great influence of learned helplessness on the intention to travel for a sample of 301 Korean people with disabilities. The difficulties encountered by people with disabilities are also emphasized following a study conducted on persons with disabilities from Macao, a study which points out physical, human and economic difficulties before, during and after the visit in an integrated resort, as an one-stop entertainment centre (King and Wan, 2015). Poria, Reichel and Brandt (2011) come to the conclusion that the difficulties faced by disabled people in the accommodation facilities are generated by two factors - the physical environment and the staff; moreover, differences of experiences were noted among people with various types of disabilities.

Disabled people usually need personal assistance which can be offered by the family members or external persons (Duner and Olin, 2017). A highly interesting topic approached in literature is the experience of the parents of children with disabilities, who directly assist these children in most of the cases. Four main challenges faced were identified: access to information and services, financial barriers, inclusion in schools and community and financial support. Caring for a child with disabilities can be a challenge, but this is due, most of the time, to the lack of necessary environmental supports (Resch et al., 2010). In a study conducted on Korean families with disabled children, aimed at investigating the activities, the tourist motivation and the connections between them, the "disabled children's physical competence (mastery)" was identified as the strongest motivational factor and "sedentary outdoor activities" as the most important activity. The conclusions of this study are considered useful in achieving more efficient tourism services for these families (Kim and Lehto, 2013).

In studies conducted in order to identify and analyse the obstacles faced by people with disabilities in purchasing tourist products, in experiencing a trip, an important barrier found was the psychological one, which makes the purchasing decision more complex. For a person with disabilities, to be a tourist means to overcome a series of doubts, to gain self-confidence and to redefine oneself (Blichfeldt and Nicolaisen, 2011). Related to this psychological barrier, the human factor, the staff within the hospitality industry, has a crucial role in achieving the tourist product. Where physical factors fail, human factors may compensate for this failure, but the importance of individual characteristics and the contextual situations are also considered. This conclusion was reached as a result of studying the interaction between human (capacity, attitude and efficiency), physical (accessibility, convenience and security), individual (personality and sensitivity) and situational factors which may create a positive and a negative experience in tourism (Zhang et al., 2016). Dwelling upon the idea of educating the staff within the hospitality industry as regards the way of approaching people with disabilities, considered an even more important niche in the hospitality industry, Bizjak, Knezevic

and Cvetreznik (2011) emphasize the need to change the attitude of the students in tourism schools towards people with disabilities.

New technologies based on Virtual Reality (VR) or Augmented Reality (AR) might help people by providing a safe framework in which they can practice activities that could raise dangers in the real world. VR is a technological system which provides a multisensory environment by using several devices (like eyeglasses, data gloves, audio systems etc.). VR can help users travel in an alternative world or a virtual location (Biocca, 1992). The specialized literature also stresses that VR cannot be considered only a technological system, but mainly a means that facilitates peoples' presence in an environment which is not in close proximity to them (Steuer, 1992). VR facilitates peoples' immersion into a digital environment, which differs from the physical reality (Coxon et al., 2016). Thus, VR is based on three principles: immersion, interaction and user involvement with the environment. The VR use is facilitated by more user friendly and economically accessible devices (Ott and Freina, 2015).

The main difference between AR and VR is that AR puts digital information to a real-world environment and VR replaces the real world with a virtual one (Riva et al., 2016). An experiment on children with different forms of disabilities regarding the learning of geometry reached the conclusion that the use of AR was beneficial, because children were able to solve the tasks faster than in the classic way, this technique contributing to an increase in motivation and a decrease in frustration (Lin et al., 2016). AR may also be used to improve the "sense of self-reflectiveness and personal efficacy for the users", so it can be used for personal change (Riva et al., 2016). For people with intellectual disorders, studies have revealed that the use of AR in navigation for spatial orientation is much more efficient than Google maps or physical maps (McMahon, Cihak and Wright, 2015; Smith et al., 2016). The most important advantage identified for the use of VR in education is that it promotes enhanced learning achievement (Akçayır and Akçayır, 2017).

Hugues, Fuchs and Nannipieri (2011) define AR starting from its scope – combining the real and virtual environments – which allows the user to create activities in a new space. The advantage of AR compared to VR resides in the creation of a greater sense of physical presence and it allows real experiences, as a result of the fact that the elements of the interaction from the application are real (Juan et al., 2005). Kesim and Ozarslan (2012) argue that AR offers unique benefits through combining virtual and real words with user control.

3. Research Methodology

Some issues debated in literature and a short analysis made in one of the best known Romanian tourist destinations, Brasov County, have revealed there is only a poor attention towards the problems faced by people with disabilities. The research was based on a qualitative method consisting of a number of 40 semi-structured interviews conducted among people with disabilities and their parents or attendants in Brasov County, Romania. The data were collected in the period April - June 2019 at two institutions from Brasov County, Romania that work with disabled people.

Eleven adults were interviewed – persons with special needs and 29 parents or attendants of children with special needs.

The interviews were conducted by one of the co-authors and they included the testing of the Samsung Gear VR eyeglasses and some AR applications. The duration of the interviews varied between 30 and 60 minutes.

The discussions were based on an interview guide that covered 3 themes, aiming at obtaining answers to the aforementioned research questions:

(1) Describing some aspects regarding the travels they had made for tourism purposes up to that moment, in order to find both the strengths and the possible problems, difficulties, constraints of the respective trip;
(2) The subjects' presentation of their impressions after testing the Samsung Gear VR eyeglasses with the virtual-reality presentation of several tourist attractions: museums, images from cities recognized as tourist destinations, theme parks, walks in nature etc.;
(3) Discussions on how new technologies (VR/AR) might help them better understand the features of the tourist products, as well as the destinations' accessibility.

4. Results

The first researched aspect refers to the trips made so far by persons with disabilities, including children with disabilities, together with their parents or attendants. Thus, the interviewees revealed that most of the families that include persons with disabilities travel during holidays, either on their own, or on camp, through foundations that organize trips. The majority regularly travel in the country, the destinations visited so far including: the Romanian seaside (a destination visited by more than half of the respondents), salt mines, the surroundings of Brașov, some of the great cities in the country or "the countryside", at their relatives. Moreover, a few subjects (5 out of the 40 interviewees) went on trips even abroad, to countries such as: Italy, Germany, Ukraine, Spain and Austria.

The results revealed the existence of a few persons who, because of their limited financial possibilities, had not managed to travel together with their family or child to a tourist destination up to that moment; however, they mentioned that, whenever possible, they take walks, hikes, trips around their city of residence. As follows, we sought to identify the problems, restrictions, constraints they encountered while travelling. Thus, the subjects specified that, when they travel, they encounter problems in terms of access to the location, various tourist sights, public transport, showrooms; they had no access to the cable car. The mother of a 20-year-old girl with spastic tetraparesis from birth, nonverbal, declared to us:

> "*We arrived with the children at the Dolphinarium (Constanța) and we hardly managed to get in. They would not let us in with the children in wheelchairs. We eventually came in, painfully, and feeling very bad, guilty of disturbing, but the children liked the show very much and we finally forgot our hardships. […].*

There are not enough places for wheelchair users in buses, and only few drivers help disabled persons get in the bus".

Another mother of a 13-year-old boy with spastic tetraparesis from the age of one, as a side effect of a vaccine, declared:

"I haven't encountered problems, as I have always carried him in my arms so far. We only went where we were sure to arrive."

Most access-related problems are especially faced by persons with physical, locomotion problems, wheelchair users, because of the lack of infrastructure customized to their special needs (in public transport, there is not enough space for wheelchair users, the ramps are missing and, even if they exist, they are inaccessible, being very steep). Such persons were often not able to visit tourist sights, as they faced access problems.

An example in this regard was given by the personal assistant of a 14-year-old autistic boy, who recounted her own experience, how, in one of their trips, when they arrived at their destination, they found out that it was impossible for them to get from the station to the place of accommodation (there were no means of transport, the road was not paved, everything was utterly inaccessible for disabled children). She also explained how she managed to understand and adapt to the child's needs, in time:

"We leave home at 5 am, as he does not like crowds."

Basically, wherever they travel, the parents said they had to prepare their children in advance, as it is more difficult for them to adapt to new situations, places and experiences. In this respect, parents explain to children with disabilities where they are to go and what program they are going to have. If there is a possibility to show them images, videos from the location, that would be an opportunity for them, as they would know what to expect and how to react.

Furthermore, crowded places should be avoided, as in these places children become nervous. In addition, there must be variety in their activities, as they do not have patience to spend too much time in the same place.

Being asked about situations when they were worried about their safety or their child's security during a trip, a very large number of subjects (24 of the 29 interviewed attendants of disabled children), stated that, at the beginning they were worried about the fact that the child would not like it; also, they did not know how their child would react to the new environment (in the room, in the restaurant, in the public transport). In this respect, they emphasized the need for the child's pre-training (through information with the most detailed aspects possible) in order to accustom him/her to the idea of departure, to the place of arrival, so that the child might know exactly what to do and how to adapt to the route. Two adult subjects with motor disabilities stated they had always experienced some concern about travelling, but they learnt to mitigate by thoroughly informing and planning the trip.

The presentation of VR eyeglasses and AR applications delighted the subjects, only 2-3 people having heard of them or having had the possibility to test them up to that

moment. Being asked to what extent they considered VR glasses or AR applications might help them better orient themselves in terms of the access to various tourist sights, the subjects considered that it would be a very useful instrument in the travel planning stage, thus managing to orient themselves much better by means of these technologies.

A great part of the respondents in the sample identified the usefulness of the glasses, even for travel simulation, with a view to adapting children to the sensation. An example in this respect was the air flight. However, even for those who do not have the possibility to go on a trip, the subjects welcomed the idea of using these glasses in order to enjoy various virtual experiences.

Four of the subjects, parents, proposed that these technologies (VR/AR) be tested also by children, in their presence. The children (a 15-year-old autistic boy, a 14-year-old boy with mental deficiency and communication problems, a 14-year-old boy with mental and associated deficiencies, and a 15-year-old girl, with mental deficiency, and emotional and behavioural instability) tried the glasses in turn. They were very excited, delighted, and the parents unanimously reached the conclusion that such a technology might help them adapt to new situations.

5. Conclusion

The issue of accessible tourism is largely debated in literature. As a consequence, different marketing actions that could be put into practice in a tourist destination in order to meet the special requirements of people with disabilities were identified. Among the most important difficulties such persons face, the following could be highlighted: the transportation means, the accessibility in different places (infrastructure), service features and flexibility, staff and people empathy, information availability etc. Personal factors are also emphasized, they depend on the type of disability, the capacity to adapt to various constraints (ex: persons with intellectual disabilities) and the capacity to collect and analyse information, but also financial barriers.

Starting from the above-mentioned issues the aim of our research was to identify the opportunity of using Virtual Reality (VR) or Augmented Reality (AR) to facilitate the access of people with disabilities to tourist products. The results of this research reveal that people with disabilities use to travel and they plan to travel on tourism purposes, but there are some problems they usually face during the journeys. Among these problems we can mention the poor access to locations, tourism attractions, public transportation etc. Such results are in line with the issues identified in different tourist destinations and mentioned in literature. Other problems are related to the attitudes other people and the staff of tourist service providers have towards people with disabilities. The interviewees suggested a better training of contact persons employed by service providers regarding the process of interaction with persons who have special needs, which is also very often met in the literature. The need for a better education of the entire population regarding the tolerance towards people with disabilities was also mentioned by the sample members. The lack of tolerance could create security fears

and poor integration of such people in society, which seems to be a real issue in the Romanian society. The security problem has also been mentioned in relation to the availability of the information about the facilities that exist in different destinations for people with disabilities. From the beginning, in most of the situations, people with disabilities have to renounce the sights they cannot reach because of poor access or poor information. But security could increase if the information regarding the facilities was available. In this respect, one of the research aims was to test the opportunity of using VR and a computer application meant to provide information about the tourist products' accessibility to disabled people.

The idea of using VR or AR for exploring various places and destinations before the actual visit was highly appreciated by the sample members. It was also considered very useful even for those persons who do not have the possibility to travel for different reasons (including financial ones). In this respect, the use of AR media platforms could be a useful tool for people with disabilities in order to explore new destinations and to better plan their travels.

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