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## Investigating the Facilities Needed by Wheelchair-User Tourists in Museums to Develop Accessible Tourism

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### Abstract

Accessible tourism is a type of tourism that includes the process of cooperation between stakeholders that enables people to function independently with justice and dignity through the fulfillment of accessibility needs (motor, visual, auditory, and cognitive), through the provision of universal services and products and empowers tourism environments. This study investigated the standards required by wheelchair users at the Natural History and Technology Museum in Shiraz City. Data were collected using the observation method based on a checklist. The results showed that the crossing routes, ramps, and slopes suit wheelchair users. Still, there is no place for wheelchair users in the conference hall, no elevator is installed to access the second floor, and toilets and parking are not designed for wheelchair users. Furthermore, because most of the items displayed in the museum are not at a suitable height, sensory access is not possible for wheelchair users. Based on the museum director's welcome and the suggestions provided, the museum can create a more suitable environment for accessible tourism.

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## Introduction

People with disabilities often encounter significant internal (intrapersonal) and external (interpersonal and structural) barriers to enjoying tourism activities. While some intrapersonal barriers may be difficult to eliminate, governments and the tourism industry can still improve accessibility by providing better transportation, accommodation, and tourist attractions. In other words, some attractions may exist, but governments and the tourism industry must do more to ensure these services are available for all individuals with disabilities.

The initial association of tourism with disability dates back to the Stoke Mandeville Games, which were later called the Paralympic Games in 1960 (Darcy et al., 2020). Apart from sports areas, people with disabilities who wanted to travel for reasons such as access to transportation and accommodation have not been present in the history of tourism (Horn & Isola, 2014). Accessible tourism is a type of tourism that includes the process of cooperation between stakeholders that enables people to function independently with justice and dignity through the fulfillment of accessibility needs (motor, visual, auditory, and cognitive), through the provision of universal services and products and empowers tourism environments. This definition includes the approach that people benefit from the benefits of accessible tourism throughout their lives and includes people with temporary and permanent disabilities, the elderly, obese people, families with young children, and those who work in safer and more socially sustainable designed environments (Buhalis & Darcy, 2010; Polat & Hermans, 2016).

Disability is defined as any physical or mental deficiency that prevents a person from participating in regular activities and social interactions in their environment (Scheer & Groce, 1988). Disability has been conceptualized in medical (Bingham et al., 2013), social (Barney, 2012), biological, and psychosocial (Le Boutillier & Croucher, 2010) fields. The World Health Organization describes disability as a complex relationship between a person's health status and personal and external factors that reflect the circumstances in which a person lives (WHO, 2023).

According to the World Health Organization (2023), approximately 16% (more than one billion people worldwide) live with some kind of disability, which is expected to increase due to factors such as the aging of the population and the increase in chronic diseases. Among the disabled groups, the group with the most needs in terms of interior and exterior space arrangement is the physically disabled group. These people need to be given the most consideration in space design and need equipment to move (Yılmaz, 2005). Access to tourist attractions is very important for people with physical disabilities because it enables them to participate with their families in traveling or enjoying activities like other people (Sen & Mayfield, 2004). However, everyone's access to tourism facilities, products, and services is a requirement of sustainable tourism policy. In addition to human rights issues, this access is a commercial opportunity for destinations and companies to accept all visitors and increase their revenue.

The museum is a tourist attraction with a cultural and historical foundation. Historical buildings, monuments, statues, architecture, handicrafts, religious works, and ways of life are cultural resources that can be tourist attractions (Rosyidie et al., 2010).

Currently, museums are becoming one of the main foundations of education in the United States (American Alliance of Museums, 2022). Disabled individuals should be able to benefit from tourism spaces with the standards defined for them. Therefore, in the present study, the facilities needed by wheelchair users in the Museum of Natural History and Technology in Shiraz, which is one of the largest museums in Iran and includes various departments such as zoology, geology, technology, stamps and coins, anatomy, plants science, old industries, and taxidermy workshop, were investigated and compared with international standards to pave the way for the development of accessible tourism.

### **Literature review**

Accessible tourism has grown significantly in recent years. It is known as universal tourism, comprehensive tourism, accessibility tourism, and barrier-free tourism in many countries such as Japan (ENAT, 2010). Accessible tourism is the process of empowering physically disabled people and the elderly based on the principles of justice, independence, and dignity through the global presentation of tourism services, products, and environments. This definition includes people with motor, visual, hearing, and cognitive disabilities (Darcy, 2010). In tourism, from arrival to departure from the destination, an unbroken chain of access must be guaranteed for all visitors. This chain includes local transportation, food, sleeping, shopping, and visiting attractions. If only one link in the chain is broken, the entire journey becomes inaccessible (ENAT, 2014).

Historically, disability has been viewed from a medical perspective as a health condition that is a problem with the individual and needs to be treated or resolved (People with Disability Australia, 2018). From a medical perspective, the focus is on the individual and considers disability as a cause of dependency, low productivity, and legitimate rejection (Thomas, 2004). The emphasis is on treatment and rehabilitation strategies to change the individual to fit with society (Burchardt, 2004). A consequence of this view is the feeling of rejection, worthlessness, and pressure to conform to a questionable norm (Goering, 2015). This view has been abandoned in recent years in favor of the social view. In this model, blaming people for their injuries is avoided and emphasis is placed on empowering people instead of focusing on their weaknesses so that all people can work in a public and inclusive environment. From a social perspective, the barriers are attitudinal, physical, information, and communication. This model focuses on identifying barriers and finding ways to reduce or eliminate them (People with Disability Australia, 2018). Removing these barriers provides equal and independent choices for disabled people (Pressman & Schulz, 2021). The model of human rights, which is based on

the social perspective, states that disability is a natural part of human diversity that should be respected and protected.

Furthermore, disabled people have rights similar to other members of society, and disability should not be an obstacle to depriving them of their rights or freedoms. The United Nations Convention on the Rights of Persons with Disabilities lists the rights of persons with disabilities. In connection with museums, especially in the context of the right to equal participation in cultural affairs, recreation, leisure, and sports, it is mentioned in this list and requests the signatories to ensure that persons with disabilities have access to places of cultural services such as theaters, museums, cinemas and libraries, and to the extent possible to enjoy access to buildings and places of cultural significance (Hendriks, 2007).

Similar to other tourism products and environments, museums should also be considered accessible to tourism and should seek to standardize it for the use of all members of society (Boylan, 2004). The International Council of Museums, as a global symbol of museum and museology, in its guidebook entitled "Museum Administration: A Practical Guide" in 2004, in a chapter entitled Attention to the Visitor, emphasizes the need to create high-quality services for visitors in the museum. Referred to visitors with special needs such as physical-motor, low vision and blindness, deafness, and learning disorders, and introduced special facilities for each. An inaccessible environment is the main obstacle faced by disabled people. Some countries have established mandatory laws that require tourism service providers to design an accessible environment for disabled people.

Three prominent examples are the national legislation of the United Kingdom, the United States, and Australia (Buhalis & Darcy, 2010). According to The Council for Museums, Archives and Libraries (The Council for Museums, Archives and Libraries, 2001), barriers may be physical, sensory, intellectual, emotional/attitudinal, financial, social, cultural, or educational (Table 1).

**Table 1. Barriers to Access**

The type of access	Some issues to consider	Possible approaches to audience development
Physical access	-Is our museum building physically accessible?	Install ramps, handrails, and seats
Sensory access	-Can our exhibitions, events, and facilities be used by people with hearing or sight impairments?	-Offer objects that can be touched -Use varied means of interpretation such as taped guides and subtitled audio-visual presentations etc - Use hearing enhancement systems
Intellectual access	-Do our exhibitions exclude people with limited background knowledge? -Can people with learning disabilities access our services?	-Consult and involve new audiences in the production of exhibitions -Evaluate levels of understanding among a range of audiences when developing exhibitions

Financial access	-Does our admission charge deter people on low incomes? -Do our shops and cafes sell items that families can afford?	-Offer free admission on certain days and publicize it widely Take the museum into the community -Provide free transport
Emotional/attitudinal access	-Is our museum environment welcoming to new visitors? -Does our staff have an open attitude toward diversity?	-Train staff -Organize special events and activities to build confidence amongst new audiences
Access to decision making	-Does our museum consult potential new audiences and value the input of external stakeholders?	-Develop projects in partnership with audiences Establish a consultative panel
Access to information	Does our publicity effectively reach and communicate with new audiences?	Develop new, accessible marketing networks and communication methods  -Produce publicity and orientation in large print, tape, Braille, different languages, etc.
Cultural access	-Do our collections, displays, and events reflect the interest and life experiences of our target audience?	Implementation of a new collection policy -Undertake re-displays with appropriate interpretation

Chart adapted from Building Bridges by Jocelyn Dodd and Richard Sandell, P14, Museums & Galleries Commission (1998). Retrieved from the London Association of Museums, Archives and Libraries (2001)

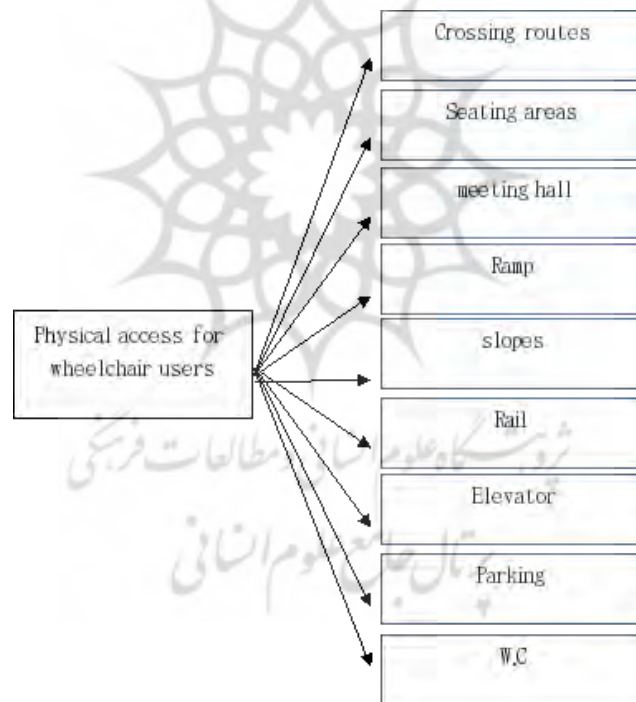
Few studies have been conducted on the accessibility of museums for wheelchair users. Silva and Almeida (2018) emphasize the importance of making communication and information accessible at various levels. In addition, Ferreira and Martins (2021) identify pathways that facilitate access as a crucial factor that enhances the experience for all visitors.

To achieve accessibility, it is necessary to make interventions in signs, communication through different languages, diversity in support devices (wheelchairs), appropriate feeding devices, medical and health equipment, materials and equipment for communication, transmission, and clothing and its equipment (Associação Salvador, 2022). The museum staff believes that they have provided the highest level of accessibility and facilitation for wheelchair users (Tokar, 2004). However, some studies don't support this assessment (Bass, 2022). In examining the facilities needed for physically disabled individuals in the Museum of Surabaya, Noviyanti and Hadi (2022) concluded that the facilities needed by these people, such as ramps, elevators, special toilets, stairs with handrails, and parking for disabled people, are not available in the museum. Bass (2022) investigated the experiences of four disabled adults at the Burke Museum, and the results showed that there are significant accessibility barriers in the museum that take a lot of energy from disabled people before, during, and after the visit. However, studies show that accessibility problems of wheelchair users begin before reaching the museum and prevent them from accessing the museum, which includes the lack of proper parking, museum entrance, how to open and close the doors, toilet, sinks, and cupboards, and high panels (Gallagher Worthley et

al., 2018; Lisney et al., 2013). Of course, this issue is not only related to disabled people but also includes temporary or permanent limitations for all members of society (Silva & Borges, 2019). According to reports, the use of wheelchairs will increase by 13.8 % between 2022 and 2025 (Ali et al., 2024). It should also be noted that even in places where the infrastructure for using a wheelchair exists, it is almost impossible for tourists with reduced mobility to use a wheelchair (Tecău et al., 2019). Approximately 40% of tourists with reduced mobility have difficulty accessing buildings, indicating a lack of access (Agovino et al., 2017).

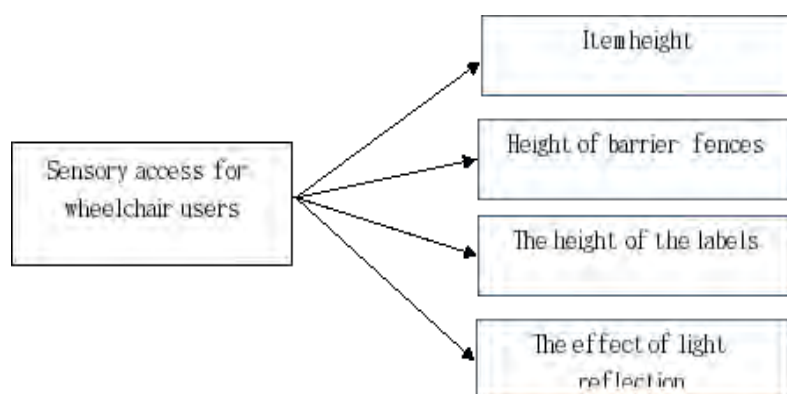
### Method

The method of data collection in this research was observation. To achieve this, we first developed a checklist of accessibility standards based on the guidelines provided by the Smithsonian Institution (Smithsonian Institution,1996) this checklist includes the physical accessibility of museums for wheelchair users, such as passageways, seating areas, assembly halls, and slopes (Figure 1).



**Figure 1. Review summary of physical accessibility standards for wheelchair users**

Additionally, we assessed the sensory accessibility of museums, which includes the height of items, fences, and labels (Figure 2)



**Figure 2. Summary of sensory accessibility standards for wheelchair users Source: Authors**

The assessment was conducted at the Natural History and Technology Museum of Shiraz City, where the facilities were evaluated and compared against international standards.

### Result and Discussion

The investigated accesses included sensory and physical access. The data related to the physical access of 44 patients are presented in Table 2. The symbol √ means compliance with the standard and × means that the condition of the museum does not match the required standards.

**Table 2. Physical standards reviewed to facilitate the visit of wheelchair users**

1	Does the wheelchair user have a turning diameter of at least 1525 mm (60 inches) or a T-shaped area of 915 mm (36 inches) to turn 180 degrees from the position area?	√
2	To be accessible to people using wheelchairs and other mobility-oriented assistive devices, is the circulation route at least 915 mm (36 in.) wide for one-way traffic?	√
3	For two-way routes, is there a minimum width of 1525 mm (60 in.) to allow wheelchair users to stop and look at cases without blocking the route?	√
4	Is available for wheelchair users a minimum clear floor space 760 mm (30 in.) wide by 1220 mm (48 in.) long?	√
5	Are people able to reach the visiting space from the circulation route?	√
6	If the wheelchair user is to turn around an obstacle, is there a U-shaped turning path around the object that is less than 1220 mm (48 inches) wide? (The width of this path increases to at least 1065 mm (42 inches) in the entrance way and 1220 mm (48 inches) in the circulation)	√
7	Where the circulation route is divided (split into several branches) to allow viewing of showcases or objects, there is a circular branch end with a diameter of at least 1525 mm (60 inches) or a T-shaped circulation space of 915 mm (36 inches).	√
8	Where the circulation route is divided (split into several branches) to allow viewing of showcases or objects, there is a circular branch end with a diameter of at least 1525 mm (60 inches) or a T-shaped circulation space of 915 mm (36 inches).	√
9	At a reasonable distance of 61 meters (200 feet), if the circulation path has a width of less than 1525 mm (60 inches), are there passages with a width of at least 1525 mm (60 inches) and a length of 1525 mm (60 inches)?	√

10	At a reasonable distance of 61 meters (200 feet), if the circulation path has a width of less than 1525 mm (60 inches), are there passages with a width of at least 1525 mm (60 inches) and a length of 1525 mm (60 inches)?	√
11	clear floor space (approximately 760 mm (30 inches) by 1220 mm (48 inches)) is planned to allow the wheelchair user to either move parallel to the case and then proceed in a forward motion or to move perpendicular to a case and then back away easily?	√
12	Are the samples and showcases placed in such a way as to avoid creating a dead end in the walls? When this is not possible, is a turning space of at least 1525 mm (60 in) diameter provided at the end?	√
13	Is there at least 2030 mm (80 inches) of specified safe distance along the circulation path?	√
14	Do objects on the floor that are less than 305 mm (12 inches) in height contrast with the floor?	√
15	Is the surface of the circulation path stable, firm, and resistant to slipping?	√
16	Is the slope of the circulation path 5% or less?	√
17	Is the slope more than 5% turned downhill?	√
18	Is the transverse slope (slope that is perpendicular to the direction of travel) of the circulation path less than 2%?	√
19	When there is a change in the surface between 605 mm (1/6 inch) and 13 mm (1/2 inch), should the edge be beveled?	√
20	Has a change of more than 13 mm (1/2 inch) in the surface become downhill?	√
21	Are the middle exits of the exhibition (especially in large exhibitions) installed for people who get tired, confused, or disturbed in the exhibition?	×
22	Is there a special space for the wheelchair user's knees to allow them to approach the display cases?	×
23	Are the seats or benches firm and between 430 mm (17 in) and 510 mm (19 in) above the floor?	√
24	Do chairs or benches have both handles and backrests?	×
25	Are the backs of the bench firm and have edges greater than 455 mm (18 inches)?	×
26	Is the height of the handles proportional to the height of the back?	×
27	Are the seats a cut hazard?	√
28	Does the place of sitting create an obstacle for people with reduced mobility?	√
29	Are the benches and seating areas in one stretch?	√
30	Is there at least 760 mm (30 inches) 1220 mm (48 inches) of space for a wheelchair user to sit next to another person on a bench?	×
31	Is the number of available seats specified and embedded in the planning (meeting) space with the help of a table?	×
32	Are the seats spread throughout the space?	×
33	For a person to enter a wheelchair space from the side, are those spaces at least 1525 (60 inches) long?	×
34	Are the spaces at least 1220 mm (40 inches) long for a person who uses a wheelchair and enters the meeting space from the front or back?	×



35	The width of the space for one wheelchair user is at least 760 mm (30 inches), and the space required for two wheelchair users together is at least 1675 (66 inches).	√
36	Are the emergency exits next to the elevator marked with an international symbol?	×
37	Is the slope of the ramp 5% or 1.20 compared with the length of the ramp?	√
38	Is the slope of the sloping surfaces less than 8%?	√
39	Are there fences installed on both sides of the stairs and steep surfaces that are continuous along the entire length of the steep path and stairs?	×
40	The vertical height of the fences (handholds) is at least 865 mm and at most 965 mm?	×
41	Has the minimum height of 450 mm and the most appropriate height of 500 mm been observed for the bathroom?	×
42	1200 1200 mm minimum toilet rotation space is considered?	×
43	Is there an elevator with a minimum space of 1200 1200 mm to access the second floor?	×
44	Is there a parking space for disabled people?	×

As shown in Table 2, 30 of the 44 physical access standards evaluated in the Natural History and Technology Museum of Shiraz have been considered.

The standards reviewed in relation to sensory accessibility, which were 8 items, are presented in Table 3. As in Table 2, the symbol √ means compliance with the standard and × means the museum's condition does not match the required standards.

**Table 3. Facilities needed for sensory access of wheelchair users to the museum**

1	Are objects placed on a stand or table mounted at an appropriate height (no more than 915 mm (36 inches) from the floor of the room)?	×
2	Are small items installed at the appropriate height (small items should be installed at a height of more than 1015 mm between 1090 and 1295)?	×
3	Exhibit barriers (eg fences) are at a maximum height of 915 mm (36 inches)?	√
4	Are wall decals between 1220 mm (48 inches) and 1675 mm (67 inches) above the floor?	×
5	Are there photos in the exhibition space that make objects that need to be installed in a high or low light position accessible?	×
6	Is the top of the wall stickers installed at a distance of the sticker rails approximately 1015 mm above the floor?	×
7	In changing the direction of the negative effects of lights (reflection and glare), have such effects been considered from the viewpoint of short and sitting people?	×
8	For use by wheelchair users and people of short stature, are devices that require a person to look at a specific area (for example, a microscope) at a height of no more than 915 mm (36 inches) above the floor?	×

The results in Table 3 show that in relation to sensory accessibility in the Museum of Natural History and Technology of Shiraz, only one standard has been considered.

## Conclusion

It can be said that due to its newness and the lack of accessible tourism, the facilities needed by wheelchair users have not been considered in the Natural History Museum of Shiraz. The standards that have been followed have been prepared unintentionally without considering the physical condition of the tourists.



**Picture 1. ramp and its suitable slope**



**Picture 2. Don't exist a special space for the wheelchair user's knee**

By evaluating the results of the research, it was observed that among the physical access required in the museum, passageways, ramps, and slopes are suitable for wheelchair users (pic. 1). However, there is no place for wheelchair users in the assembly hall, the middle exits are used when tired, a special space for the wheelchair user's knee (pic. 2), a railing on both sides of the sloping surfaces, an elevator to access the second floor is not installed (pic. 3), and toilets and parking are not designed for wheelchair users.

In terms of sensory accessibility, the results showed that the items displayed in the museum are inaccessible to wheelchair users in terms of wall stickers, height, and light (pic. 4). The lack of these facilities, combined with factors such as pain and fatigue, makes disabled visitors unable to interact with the museum as they expect, which affects their perception of the museum.



**Picture 3. elevator to access the second floor is not installed**



**Picture 4. Items are inaccessible to wheelchair users (wall stickers, height, and light)**

According to the obtained results and the fact that in tourism, all affairs and activities are connected to each other in an unbroken chain, it can be said that the Museum of Natural History and Technology of Shiraz city is not facilitated according to the accessibility tourism for wheelchair users, especially in the field of sensory access.



**Picture 5. Items are installed in the staircase**



**Picture 6. Items are inaccessible to wheelchair users**

In general, it can be said that until now, the accessibility approach in museums has not been considered by museum management. However, it is worth mentioning that the museum management has welcomed this approach, and it seems that in the future activities will be based on accessible tourism.

Based on the standards reviewed in the museum, the required facility areas are as follows:

- Facilities required for physical access: installation of an elevator to access the second floor, installation of a fence with a standard height on sloping paths, installation of a standard emergency exit, consideration of having a special space for wheelchairs in the meeting hall of the museum, consideration of the place for the knees of wheelchair users to get closer to the showcases, installation of exits in addition to the main exit for people who get tired, standard toilets, and parking for wheelchair users.
- Facilities required for sensory access: installing items and labels at a suitable height and field of vision for wheelchair users, considering the reflection of light from the showcases, which prevents them from seeing.

In the future, the researchers will investigate the facilities needed for other disabled groups, as well as the level of reception and enjoyment of different disabled groups from the facilities and attractions of the museum. It is also recommended to pay attention to the social atmosphere and interact with other visitors without disabilities.

### Data Availability Statements

The data generated during the current study are available within the manuscript. Additional information not included in the manuscript can be obtained from the corresponding author upon reasonable request.

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**Ethical Considerations:** first our team obtained consent from museum and present visitors during the data collection (does seen in the pictures).

**Conflict of Interest and Source of Funding:** The author declares no conflict of interest for this study

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