**Original Research Article**

# The Role of Technology in Urban Inclusiveness-With the Emphasis on the Presence of People with Disabilities in Urban Spaces

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## Abstract

**Problem statement:** The importance of inclusive access to urban spaces has become important due to the rapid growth of urbanization in recent years. Inclusive design and planning create equal opportunities for all groups of citizens, regardless of their personal limitations and abilities. According to the principles of inclusive cities, all groups of citizens, including people with disabilities (PWDs), should have equal rights to access urban spaces. According to the rules of inclusive cities, all groups of citizens, including PWDs, should have the right to access and be present in urban spaces; but this is not the case in cities of our country, including Tehran.

**Research objective:** This research aims to investigate the role of technology in urban inclusiveness, with an emphasis on the presence of PWDs in urban spaces.

**Research method:** The research goal is met by using a descriptive-survey research method following two main consecutive steps: meta-analysis and review of the international library documents related to the research subject and then analysis of the findings of a questionnaire with 80 participants with disabilities in Tehran city.

**Conclusion:** The research findings confirm that all participants in the study face many challenges in participating in urban spaces. The results of the questionnaire show that 82% of the participants use smart electronic devices more than five times a day, and the examples of using assistive technology are attractive to over 90%. Finally, it is anticipated that the use of such technologies will facilitate accessibility and increase the presence of PWDs in the city. This article introduces three new approaches: inclusive smart city (ISC), application of Information and Communications Technology (ICT), and E-inclusion.

**Keywords:** *inclusiveness, technology, people with disability, accessibility.*

## Introduction

Nowadays, the concept of the city consists of three main components: people who are residents of the city, urban places which constitute the city physically, and technology as an intermediary or mediator. On the other hand, with the rapid growth of the urban population, the importance of inclusive and equal access to urban spaces has been noticed (Szaszák & Kecskés, 2020).

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An inclusive or universal city is considered as a process for the realization of the formation of the city for its original owners, that is, the people who live in the city ( Bag-Mohamadi & Salavarzi, 2021). In other words, inclusive cities are the ones that appreciate the needs and rights of all the people. People with disabilities (PWDs) are one of the target groups for inclusive planning and the design of cities. According to the World Health Organization's estimation, people with disabilities account for 15% of the world population (Wahba, 2020). Therefore, it is necessary to consider the attendance of this group of citizens in urban spaces.

Although various cities in our country, especially Tehran, have formulated many rules and guidelines for the adaptation of passages and urban spaces for attendance of people with disabilities, we can claim that most of these guidelines have not been successfully executed (Taghvaei, Moradi & Safarabadi, 2010) and this group of citizens faces a variety of challenges while attending urban spaces. Inclusive design and planning of the cities as the main assumption of this study, in such a way that none of the population groups is ignored, could be considered as a desirable strategy to increase the presence of people with disabilities in urban spaces.

Since nowadays digital technologies have imposed many changes to planning and urban management systems (Hasler, 2017), this research intends to investigate the effects of exploiting assistive technologies for attendance of people with disabilities in urban spaces. This aim is fulfilled using a descriptive-survey research method and in the form of several main steps; firstly, foreign and domestic literature on the research subject is explored, and then people with disabilities will be provided with a questionnaire. Finally, based on study findings, several strategies and suggestions will be proposed to increase the presence of people with disabilities in urban spaces using assistive technologies.

### Research question

The main goal of this research is to examine the role of technology in the inclusiveness of cities. The main question of this research, which is in line with this goal, concerns the role technology plays in the inclusiveness of cities. In addition to the main question, this study seeks to answer the question of what effects technology has on the presence of people with disabilities in urban spaces?

### Research method

Since the goal of this study is to examine the effects of the usage of technology on the presence of PWDs in urban spaces and to address a practical issue, first global studies related to the role of technology in the inclusiveness of cities were comprehensively reviewed by meta-analysis, and finally, to gather study data, a questionnaire consisting of 17 items with multiple choice and short answers was prepared. The prepared questionnaire was provided for the groups and associations of people with disabilities in an online form due to the COVID- 19 pandemic. Overall, 80 members of the community of people with disabilities who were living in Tehran participated in answering the questionnaire questions. Some of these people were also briefly interviewed online about some questionnaire items for more information.

### Literature review and theoretical foundations

Domestic research has been conducted on urban inclusiveness and groups with disabilities and their accessibility to urban spaces so far, no research has been done to find the role of technology in inclusiveness and its effects on the presence of people with disabilities. This study, thus, tries to fill the existing gap while taking advantage of the opinions of people with disabilities.

In the first part of the Theoretical Foundations of the research, inclusiveness and people with disabilities as a target group of inclusiveness have been examined and then the accessibility of urban spaces for people with disabilities and the challenges this group faced in attending the urban spaces are discussed. In the final part of Theoretical Foundations, which was the

main subject of this study, the role of technology in inclusiveness and the noteworthy approaches in this field were explored and several instances were presented.

### • Inclusiveness

UN-Habitat defines a universal or inclusive city as a city that promotes equitable growth and is defined as a place where everyone, regardless of economic status, gender, race, ability, ethnicity, or religion, is able to fully participate in the social, economic, and political opportunities of the city (UN-Habitat, 2001).

A universal city provides all its citizens with a safe, livable environment, with affordable and fair access to city services, social services, and livelihood opportunities and promotes its optimal human capital development, and is assured of respect for human dignity and equality (Asian Development Bank, 2017).

Considering the challenges raised by the rapid growth of urbanization, to achieve an inclusive world where no one is left behind and ignored, it is necessary to pursue inclusiveness in all aspects and to eliminate spatial, economic, and social deprivation (Wahba, 2020). In general, rules of inclusiveness in cities involve identifying deprivation, learning from diversity, and finally, solving a problem for one person and extending it to the whole community (Fig. 1).

### • The presence of people with disabilities in urban spaces

Urban and public spaces are spaces that are created with regard to the needs of citizens; therefore, their use is free for the public (Shaterian, Oshnoei, & Ganjipour, 2017). People with disabilities as a target group of inclusiveness in the cities are a group who face specific obstacles to enter such spaces. These people are faced with a lack of widespread access to roads and housing, public buildings, basic services such as health, education, public transportation, and emergency response and disaster preparedness programs (Wahba, 2020). In the meantime, the concept of discrimination based on disability is defined as follows: any type of discrimination, exception, or limitation based on disability, whose aim or effect is disability or denial of recognition, enjoying or exercising all human rights and fundamental freedoms on an equal basis with others in the civil, cultural, social, economic, and political spheres (law legislated by the Convention on the Rights of Persons with Disabilities (CRPD, 2006).

People with disabilities have the right to use and attend the urban spaces like other citizens. For this to happen, their accessibility of spaces should be realized according to their limitations and abilities. The concept of accessibility means removing the physical barriers of the environment. The barriers in the physical environment impede equal social,
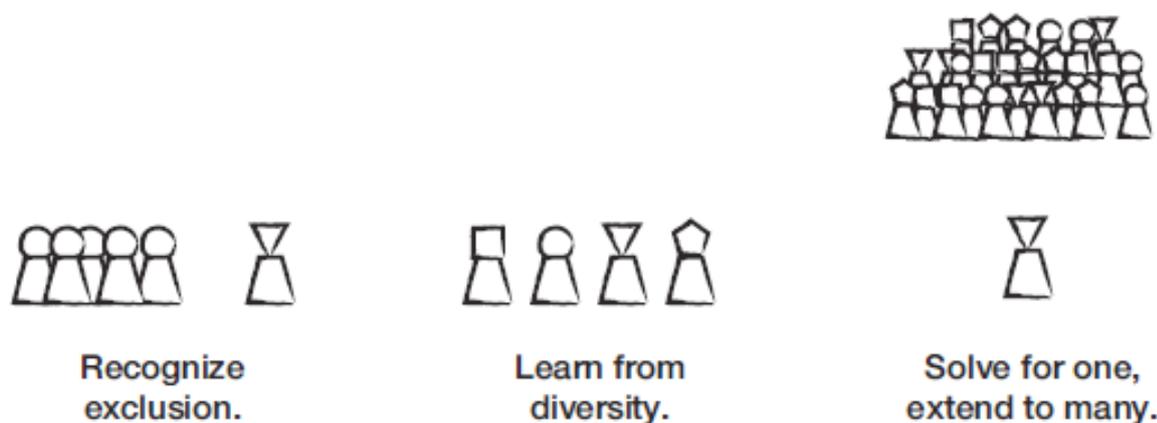


Fig. 1. Rules of inclusiveness.  Source: Holmes, 2018, 12.

cultural, and occupational participation; therefore, more access is in the interest of the whole community and vice versa. Social exclusion is manifested in the form of physical barriers in the environment (Szaszák & Kecskés, 2020). The Convention on the Rights of Persons with Disabilities defines accessibility as follows:

The ability of people with disabilities to live independently and their full participation in every aspect of life, the access of people with disabilities to the physical environment, transportation, information, and communication, including information and communication technologies and systems, and other facilities and services open or provided to the public, whether in the city or rural areas, should be similar to other people (CRPD, 2006).

**- Challenges of people with disabilities to attend urban spaces**

Previous sources and conversations with people with disabilities show that this group of citizens is faced with numerous challenges in attending urban spaces. Although in our country, more than 15 years have passed since the formulation of the first set of rules and regulations on urban planning and architecture for people with disabilities, it is clear that these guidelines have not been successfully executed. The evidence for this claim is the current situation of roads and public spaces in cities, which has made the movement and use of people with disabilities practically impossible (Taghvaei et al., 2010). Among the challenges that people with disabilities face in attending urban spaces, the following could be mentioned:

- Lack of safety (lack of standard ramps, the existence of many ups and downs, etc.);
- Lack of security in urban spaces;
- Difficulty in using public transport;
- Lack of proper restrooms for people with disabilities;
- Lack of parking space for cars for people with disabilities;
- Unfavorable conditions of urban furniture (bench, relaxation space, etc.) tailored to the needs of people with disabilities;

Inattention to the needs of various groups with disabilities (physical-motor, visual, auditory, and sensory);

Therefore, it is necessary to attend to the mentioned challenges in the design of urban spaces and plan for them. Inclusive or universal design means designing products, environments, programs, and services, which everyone can use as much as possible, without the need for any adaptation or special design (Islamic Consultative Assembly Research Center, 2006).

**• The role of technology in inclusiveness**

Technology is an everyday revolution that most people do not realize, but it has changed the way old and new residents are welcomed into a city (d'Antonio & Tanskanen, n.d.). Nowadays, digital technologies change urban planning and management systems drastically. By creating new forms of interaction between urban planners and city residents, these technologies have provided an opportunity to change the planning process and to become useful tools for sustainable and responsive planning (Hasler, 2017).

Applications and technologies, which are increasingly changing, have enhanced the quality of life and have also changed the way citizens live and think about the city, and as an economic incentive, they lead to inclusiveness and continuous change in urban contexts (d'Antonio & Tanskanen, n.d.).

Generally speaking, technology develops a special capacity that contributes to facilitating inclusiveness through citizen participation, better targeting for government support and public access to services, tailoring services to all groups of society, and democratizing access to city policymakers (Wahba, 2020).

**- Examples of using assistive technology to increase the presence of people with disabilities in urban spaces**

In order to make cities universal around the world, there are examples of the use of assistive technology

for people with disabilities that have facilitated the accessibility of urban spaces for this group of citizens while increasing their space attendance. Fig. 2 shows several examples of these technologies regarding access to urban spaces, presence in urban spaces, assistive applications, and public transportation services.

The following section presents four examples of the use of assistive technology for people with disabilities and the elderly in Tables 1 to 4, which have been executed in different countries around the world.

**- Approaches to achieving inclusive cities using assistive technology**

Using assistive technology can lead to the inclusiveness of cities. Nowadays, some approaches have been proposed to achieve inclusiveness-related goals using new technologies. In the following section, three approaches, including Inclusive Smart City (ISC), Information and Communications Technology (ICT), and E-inclusion are discussed.

Inclusive Smart Cities

Smart cities use technology to improve the quality of life, efficiency of urban operations and services, and economic competition (Smart Cities for All, 2017). A constant feature of a smart city is the widespread use of information and communication technology to create a livable, efficient, and more sustainable city. However, researchers criticize this approach to smart cities and highlight the importance of shifting emphasis from technology to people (Hasler, 2017) instead.
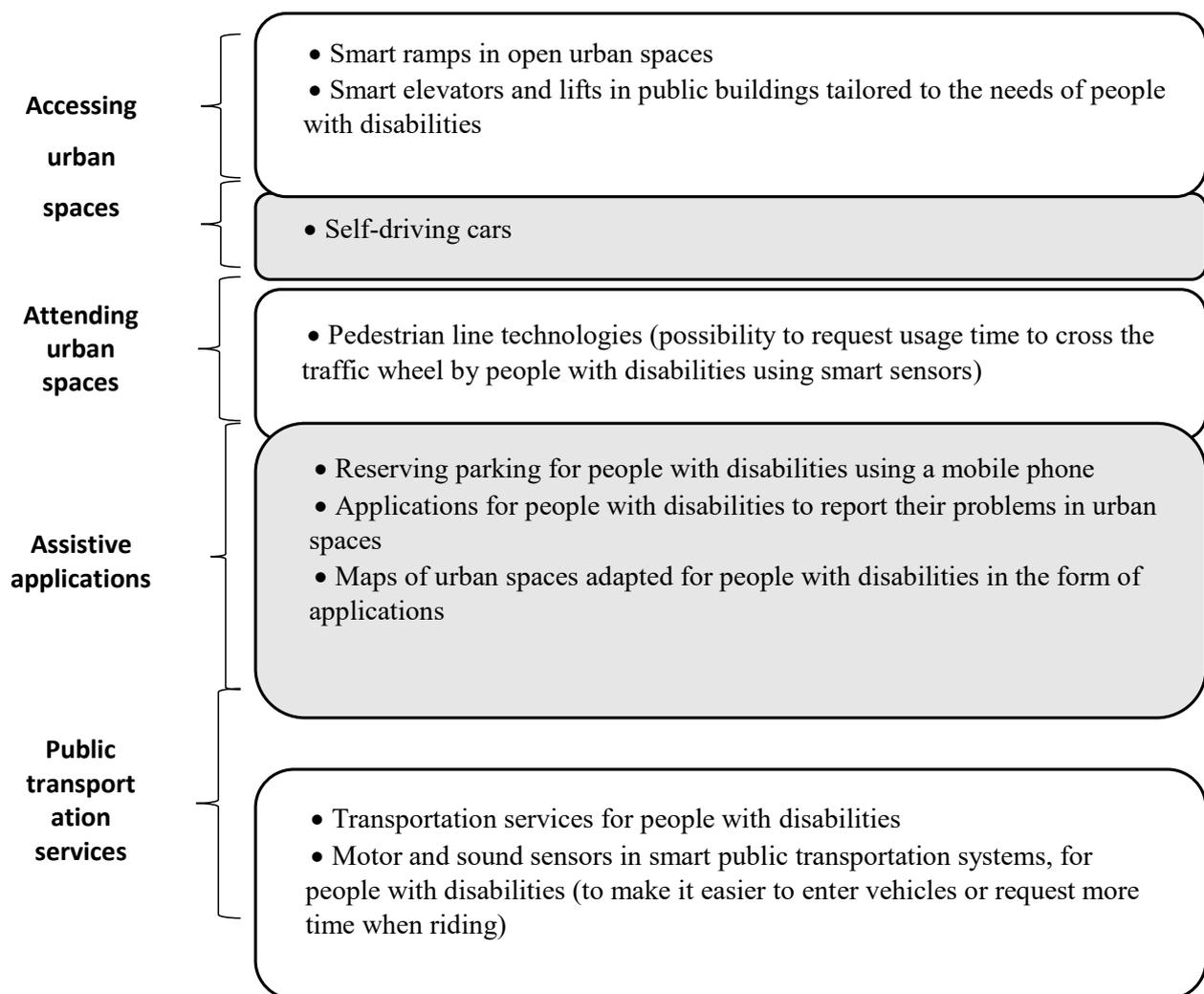


Fig. 2. Examples of Using Assistive Technology for people with disabilities. Source: Authors.

Table 1. Description of the first example. Source: Authors based on www.wheelmap.org.

| Usage | Country of production | Year of preparation | Descriptions |
|---|---|---|---|
| A map to find and rank wheelchair accessible places | Germany | 2010 | ▪ Provides an editable and open map of the world that can be installed for free on a mobile phone.<br>▪ People from all over the world can find the locations on the map and use traffic light systems in green, yellow, and red to assess wheelchairs on a daily basis.<br>▪ Elevators and escalators in this map use instant information. They are shown in green when working and automatically change to red in case of failure. |
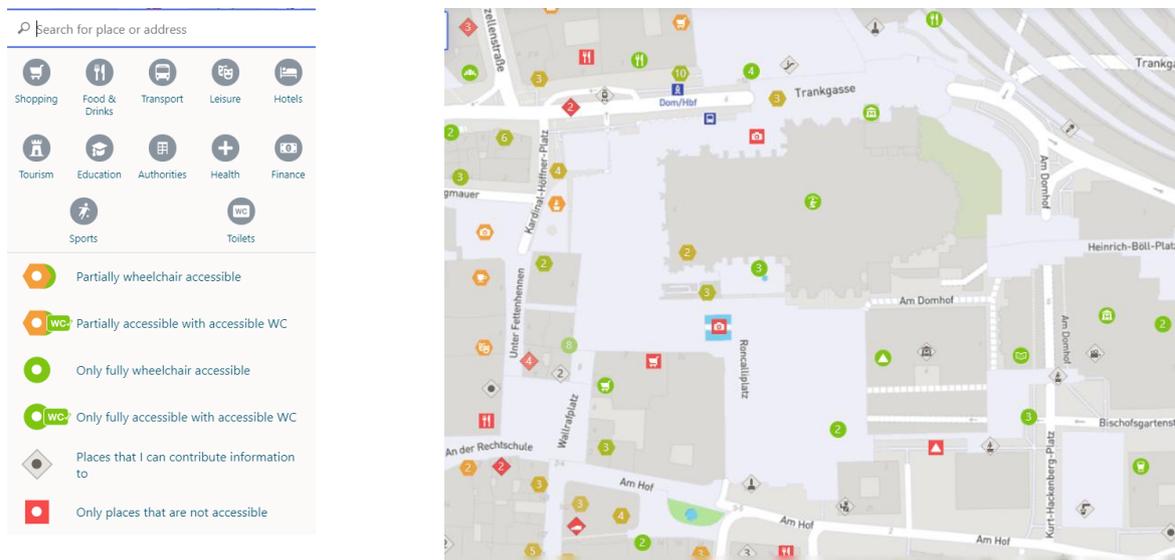


A smart city is a place that enhances the experience of the residents of urban spaces through digital assistive technologies and fits the safe and autonomous performance of residents' daily activities with their needs. The concept of a smart, inclusive city is based on collaboration, awareness of user needs, and integrating their principles throughout the process, from the planning and designing stage onwards (Szaszák & Kecskés, 2020).

Inclusive Smart Cities are a set of urban, all-encompassing digital assistive technologies adopted by major government officials and civil society to help groups with special needs in the cities. Inclusive Smart Cities allow special groups to be present in the city independently and engage in activities to have a more desirable experience of being in urban spaces. In other words, an Inclusive Smart City is a comprehensive effort to balance and compensate for environmental deficiencies in communicating and interacting with people with special needs. Inclusive Smart City initiatives seek to strengthen the social dimension of smart cities in a way that provides a wider range of citizens with inclusiveness, citizens who are stakeholders in urban innovation services and technologies (de Oliveira Neto, 2018).
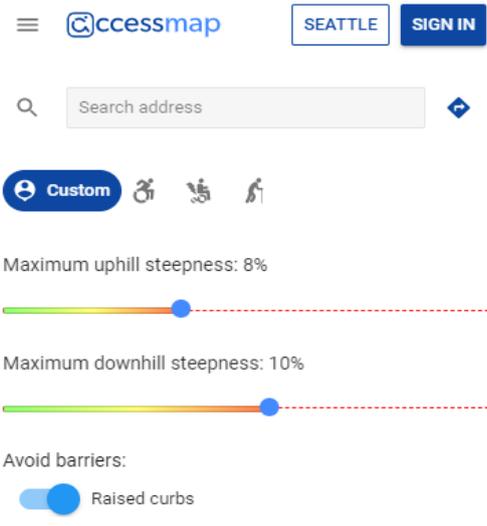
Fig. 3 demonstrates the vision of Inclusive Smart Cities. The access layer provided by the vision of Inclusive Smart City is considered the partition between different groups of citizens and smart city services.

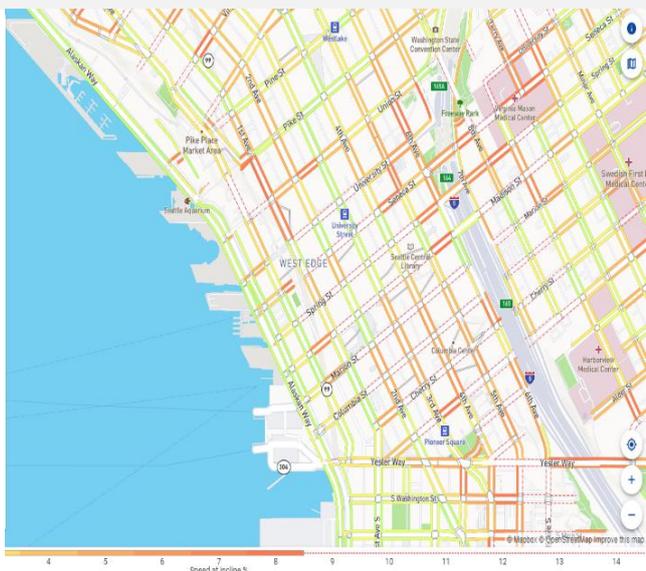**- Application of information and communication technology**

Information and communication technology can be at humanity's service. Advanced information and

Table 2. Description of the second example. Source: Authors based on www.accessmap.io.

| Usage | Country of production | Year of preparation | Descriptions |
|---|---|---|---|
| Routing and mapping in built environments | USA (Seattle) | 2020 | ▪ It is a routing map that can be installed for free on smartphones, tablets, and laptops.<br>▪ Provides custom instructions for pedestrians and wheelchair users seeking to avoid hills, construction sites, and other barriers to access. |



Table 3. Description of the third example: Octopus card. Source: Authors based on www.scmp.com.

| Usage | Countries of production | Descriptions |
|---|---|---|
| Asking for more time to cross the intersection | Hong Kong (2016)<br>Singapore(2009)<br>Netherlands (2018) | ▪ The device is connected to a traffic light near the uses utilized by the elderly and people with disabilities.<br>▪ By tapping the device with a special card for people with disabilities or the elderly, they can have a few seconds extra time to cross the streets. |



communication technology training can contribute to creating an inclusive society in which all people, regardless of their abilities, could be supported equally for social and economic growth (Thang Tze Yian & Park, 2018).

If executed and integrated sufficiently and purposefully, information and communication technology could increase the access of marginal and deprived groups (ibid., 2018). Digital technologies, especially the Internet of Things (IoT), Big Data, Artificial Intelligence, and Blockchain, promise a greater contribution to social learning (OECD, 2017).

Table 4. Description of the fourth example: LIFT paratransit. Source: Authors based on www.trimet.org/lift.

| Usage | Country of production | Year of preparation | Descriptions |
|---|---|---|---|
| Shared travel service for people with disabilities | USA (Portland) | - | ▪ Shared travel service is for people who cannot use public transportation due to disability or health problems. The target audience of this service is the elderly, people with disabilities, and people in need of medical services.<br>▪ People can request their services based on a common path with other people. |
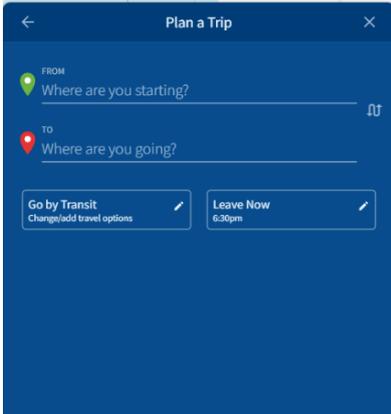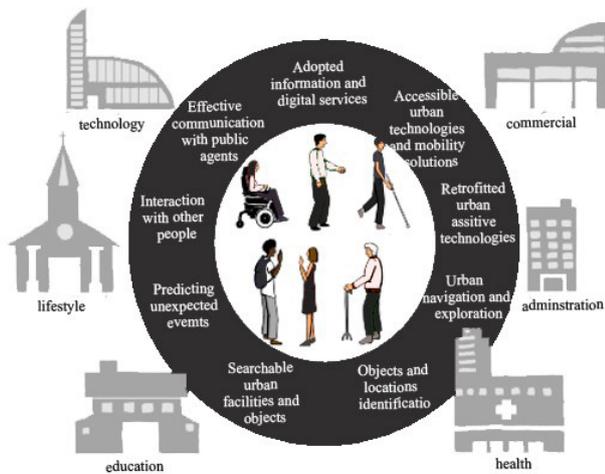




Fig. 3. Inclusive Smart City Vision. Source: de Oliveira Neto , 2018, 155.

Table 5 shows the benefits of each information and communication technology application for people with disabilities.

Fig. 4 below shows how these emerging digital technologies contribute to new social inclusion programs in the four areas listed in Table 1.

## E-inclusion

The Internet has proven to be a valuable tool for inclusiveness; it is a place where accessibility-based and disability-based technologies can bridge the gap in integration by creating a powerful platform through E-inclusion (Garcia Crespo, Paniagua-Martín, Colomo-Palacios & Miguel Gómez Berbis, 2014).

Promoting the adoption of information and communication technology by households and individuals is done to advance social policy goals such as E-inclusion. In this regard, supply-side actions are often complemented by initiatives to increase the level of digital literacy and awareness of online risks and opportunities (OECD a, 2016). E-inclusion is a new term often used to refer to the use of digital technologies and to remove barriers to gender, race, age, disability, or social class (Riddell & Watson, 2003).

E-inclusion could be understood in the context of topics related to social inclusion and social justice. In a sense, E-inclusion can cover all aspects of technology usage to ensure the inclusiveness of all members of society (Abbott, 2007).

## Discussion

As it was mentioned in the Research Methodology section, this study uses a descriptive-survey research

Table 5. information and communication technology applications and the benefits of each of them for people with disabilities. Source: Authors.

| Application | Definition | Benefits for People with Disabilities |
|---|---|---|
| E-training | Information and communication technology has introduced new training sources for remote learning, training, and assessment of students (OECD b, 2016). Online education is available from anywhere with an internet connection and at a lower cost (OECD, 2017). | • Possibility of distance learning without the need for physical presence<br>• Utilization of educational technologies for people with hearing and visual disabilities |
| E-commerce | Digital platforms like retail websites are for trading, buying, selling, and bank transfers and provide faster, easier, and cheaper services (OECD, 2017). | • Doing e-business without being present in any specific place<br>• Using remote banking services |
| EHealth | EHealth means health services provided or enhanced through the Internet and related digital technologies that enable better access, higher quality, and lower cost than conventional health services (Eysenbach, 2001). | • Wearable biomedical sensors and medical capsules<br>• Ability to receive medical services and prescribe medication remotely |
| E-government | E-government or digital government is the use of digital technologies by the public government, such as for providing public services (OECD, 2017). | • Doing administrative work remotely<br>• Voting electronically |
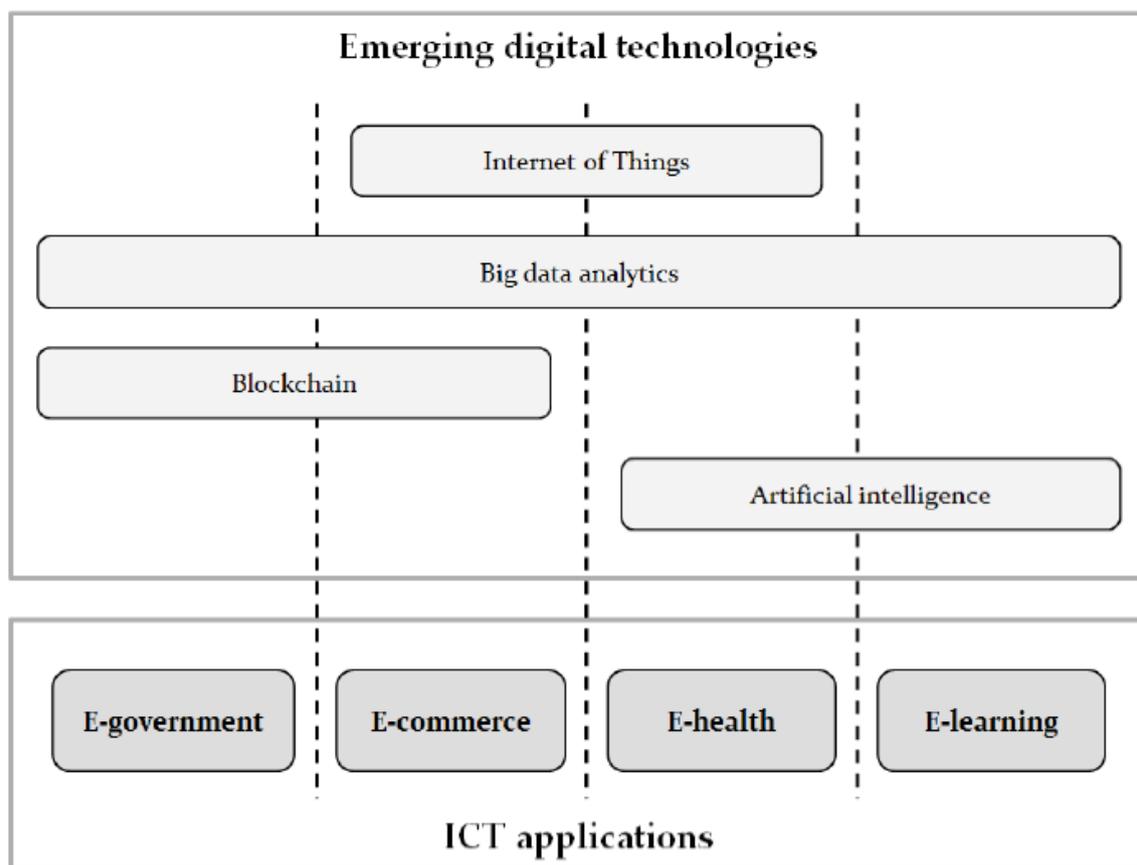


Fig. 4. Areas of application of information and communication technology in inclusiveness. Source: OECD, 2017.

method, and in this regard, a questionnaire and a short interview have been utilized. By examining people's answers to the questionnaire questions, the following results are obtained:

The sex ratio of the respondents is approximately equal to 1, and in terms of age, most of the respondents are in the age groups of 30 to 44 years old (48%), 18 to 29 years old (33%), 45 to 65 years old (17%) and under 18 years old(1%), in order of age.

Among the respondents to the questionnaire, 93% answered the questions via mobile phone, 4% via tablet, and 4% via personal computer. In fact, the mobile phone is the most accessible device for people.

Most people have the ability and skill to use technologies such as smartphones, and 82% of people use smart electronics more than five times a day.

Reasons for people to use the Internet include using social networks, banking services, reading books and articles, making phone calls or texting services, and finally, entertainment such as listening to music or watching movies. Outdoor participants use their mobile phones to do things such as finding information about public transportation, using taxi finder applications, forecasting the weather, and getting information about different places.

Everyone from the lowest to the highest level of disability faces many challenges in attending urban spaces, which were addressed in the Theoretical Foundations section.

People with disabilities sometimes experience emotions such as fatigue, dizziness and unrest, discomfort, and insecurity when attending public urban spaces.

Examples of using assistive technology in cities around the world are interesting to a large part of the examined sample (up to 90%).

Although more than half of the people have never seen (58%) or experienced (68%) the use of assistive technology for people with disabilities, 85% of people believe that these technologies can facilitate accessibility and attendance of people with disabilities in cities.

## Conclusion

This article studies the world literature on the research subject and introduces three approaches, including Inclusive Smart City, Application of Information and Communication Technology, and E-inclusion as new approaches to utilize technology to increase the inclusiveness of urban spaces, and then examines examples of assistive technology use to increase the presence of PWDs in urban spaces.

From the findings of this study in the previous sections, it can be concluded that today the use of smart technologies can reduce the restrictions of certain groups of citizens to attend urban spaces, and it ultimately provides a platform to pave the way for inclusiveness in cities.

The results of the questionnaire and interviews with people with disabilities confirm that the use of assistive technology is attractive to most people with disabilities, and it is predicted that while widely welcomed by groups with disabilities, these technologies can facilitate the accessibility and presence of people with disabilities in cities.

In the end, relying on the approaches introduced in the study and examining the views of people with disabilities, several suggestions are proposed to increase the attendance of urban spaces for groups with disabilities, using technology:

- Recognizing the right of citizens with special needs to be present in urban spaces and considering all types of disabilities.

- Involving people with disabilities in urban planning and exploiting participatory approaches.

- Providing informative training for IT teams and managers, planners, and policymakers about the needs of people with disabilities in urban spaces.

- Allocating specific government and industry financial resources to accessibility, especially for groups in need of special access.

- Aligning new programs and plans with elements like justice and equality in cities and elements of inclusiveness.

- Providing accommodations to people with disabilities to use facilities, providing the infrastructure they need, and facilitating their access to these facilities.
- Assessment of current programs and plans periodically in terms of accessibility for people with disabilities.
- Modeling the global examples of the use of assistive technology for people with disabilities in different neighborhoods or urban spaces as an experiment and receiving feedback from users:
- using open and accessible data sets including information about people with disabilities (type of disability, its severity, etc.), as well as various urban spaces and places.
- providing innovative services to groups with disabilities such as router applications, with the ability to display spaces adapted for people with disabilities.
- Establishment of shared transportation systems for people with disabilities in organizations such as universities or the organizations where they work.

## Reference list

• Abbott, Ch. (2007). *E-inclusion: Learning Difficulties and Digital Technologies*. London: Future Lab.
• Bag-Mohamadi, A. & Salavarzi, M. (2021). An Analysis of the Indicators Affecting the Inclusiveness of Urban Spaces: A Case Study of Ilam. *Human Geographic Research,* 3(53), 921-941.
• *Convention on the Rights of Persons with Disabilities* (CRPD). (2006). New York: United Nations.
• d'Antonio, S. & Tanskanen, E. (n.d.). *Smart Cities and Smart citizens: The apps and the technologies that make cities more inclusive and open.* Medians of the Council of Europe. Retrieved July 20, 2021, from https://www.coe.int › mediane › source › eemp.
• de Oliveira Neto, J.S.(2018). *Inclusive Smart Cities: theory and tools to improve the experience of people with disabilities in urban spaces.* Unpublished Ph.D. Thesis, Escola Politécnica da Universidade de Sao Paulo, Sao Paulo,Brazil.
• *Enabling inclusive cities: tool kit for inclusive urban development.* (2017). Mandaluyong City, Philippines: Asian Development Bank.
• Eysenbach, G. (2001). *What is e-health? Journal of Medical Internet Research*, 3(2). Retrieved July 20, 2021, from https://www.jmir.org/2001/2/e20/
• Garcia Crespo, A., Paniagua-Martín, F., Colomo-Palacios, R. & Miguel Gómez Berbis, J. (2014). E-Inclusion for People with Disabilities in e-Government Services through Accessible Multimedia. *International Journal of Information Systems and Social Change*, 3(3), 37-51.
• Hasler, S. (2017). *Digital Technologies for Inclusive Urban Planning*. International Conference on Urban Design & Cities Planning. Malaysia: Kuala Lumpur.
• Holmes, K. (2018). *Mismatch: How Inclusion Shapes Design.* Cambridge, Massachusetts: The MIT Press
• *Inclusive: A Microsoft Design Toolkit.* (2016). Retrieved July 20, 2021, from https://www.microsoft.com/design/inclusive/
• *Islamic Consultative Assembly Research Center* (2006). Law ratifying the Convention on the Rights of Persons with Disabilities
• OECD. (2016a). *Stimulating Digital Innovation for Growth and Inclusiveness- The Role of Poliies for the Successful Diffusion of ICT.* (Organisation for Economic Co-operation and Development) Retrieved July 20, 2021, from https://www.oecd-ilibrary.org/science-and-technology/stimulating-digital-innovation-for-growth-and-inclusiveness_5jlwqvhg3l31-en
• OECD. (2016b). *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills. Paris* (Organisation for Economic Co-operation and Development) Retrieved July 20, 2021, from https://doi.org/10.1787/9789264265097-en
• OECD. (2017). *Making Innovation Benefit All: Policies for Inclusive Growth* Retrieved July 20, 2021, from https://blogs.worldbank.org/developmenttalk/making-innovation-benefit-all-policies-inclusive-growth
• Riddell, Sh., & Watson, J. (2003). *Disability*. Harlow: Pearson Education.
• Shaterian, M., Oshnoei, A. & Ganjipour, M. (2017). Study the appropriate urban spaces for access the disabled and veterans Case Study Government offices in Kashan. *Geographical Planning of Space*, 6(22), 59-76.
• Smart Cities for All. (2017). *A Global Strategy for Digital Inclusion Proposed by G3ict and World Enabled.* Retrieved July 20, 2021, from https://smartcities4all.org/wp-content/uploads/2018/08/SC4A_Vision-Six_Strategies_XT.pdf
• Szaszák, G. & Kecskés, T. (2020). Universal Open Space Design to Inform Digital Technologies for a Disability-Inclusive Place-Making on the Example of Hungary. *Smart Cities Journal,* 3 (1293), 1293-1333.
• Taghvaei, M., Moradi, G. & Safarabadi, A. (2010). Investigation and evaluation of Isfahan city Parks conditions

Base on existing standards for access of weak and disabled people. *Geography and Environmental Planning,* 21(2), 47-64.

• Thang Tze Yian, Th., & Park, J. (2018). *Technology-enhanced TVET delivery for improving access, relevance and inclusion in Asia and the Paciic.* In Skills and the Future of Work: Strategies for inclusive growth in Asia and the Paciic. Thailand: ILO Regional Office for Asia and the Pacific.

• UN-Habitat. (2001). *Inclusive Cities Initiative-The Way Forward.* Retrieved July 20, 2021, from https://scirp.org/reference/referencespapers.aspx?referenceid=1370384

• Wahba, S. (2020). *Smarter cities for an inclusive, resilient future. Digital Readers.* Retrieved July 20, 2021, from https://digileaders.com/smarter-cities-for-an-inclusive-resilient-future/