**Forum:** Advisory Panel Question (APQ)

**Issue:** Developing disability-inclusive infrastructure through technological advancement

**Chair:** Chloe Chang (President), Jacqueline Lu (Deputy President), An Pham (Deputy President)

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## Introduction

Even with 15 percent or one billion of the global population experiencing a type of disability, the majority of the world's infrastructure remains disability-exclusive, creating additional barriers for individuals with disabilities. The challenges such as not disability-friendly stairs limit the inclusion of individuals with disabilities to be a part of societal and economic development. Surrounded by exclusive infrastructure, individuals with disabilities have no choice but to remain a marginalized group as they do not have a voice of their own to participate in society like everyone else. The exclusive infrastructure prevents individuals with disabilities from being able to perform the same duties and tasks, limiting their full potential.

With rapid technological advancements such as speech recognition software and ergonomic tools, the issue of developing disability-inclusive infrastructure can be simply solved. The potential for the revolutionization of current infrastructure that caters to the needs of all people exists because of modernization across the entire world. Day by day, new inventions are made that can allow for a more disability-inclusive infrastructure in all cities. Through the transformative powers of technological solutions, inclusive and equitable infrastructure will finally be made accessible to all by 2030 according to goal 11 of the 17 SDGs; hopefully empowering people with disabilities to make contributions to society.

Discussion topics must include how innovations in areas necessary for a more inclusive infrastructure such as transportation, and communication systems can be harnessed in creating smart cities. This will further enhance inclusivity by prioritizing accessibility for individuals with disabilities; allowing for more active participation from individuals with disabilities. During the discussion, member states must discuss the best ways to seamlessly integrate technological advancements into current infrastructure without causing any additional challenges for individuals with disabilities to engage with the environment more effectively.

As technology continues to evolve, its ability to break down barriers separating individuals with disabilities and their true potential constricted by the disability-exclusive infrastructure becomes more evident. To sustain and increase the upward trajectory of societal transformation, collaboration and aid between nations and organizations are crucial in harnessing the full potential of a disability-inclusive society.

## Definition of Key Terms

### Inclusivity

The practice of providing equal access, opportunities, and treatment to all individuals, regardless of their differences on the grounds of background, culture, ability, gender, race, or other aspects of diversity. It involves creating an environment that values and respects diversity, ensuring that all individuals feel welcome, respected, and included. Inclusivity aims to foster a sense of belonging for people from a range of diverse lifestyles.

### Empowerment

A multi-faceted concept that generally refers to the process of giving individuals or groups the power to gain control over their own lives, make informed decisions, and exercise their rights in all capacities. Empowerment involves providing people and groups with the tools, resources, and support they need to become self-sufficient, confident, and capable of participating in decision-making processes.

### Sustainability

The ability to maintain lasting functionality over a long period of time. When considering sustainability in the context of disability, it often involves creating systems, policies, and environments that support the well-being and inclusion of people with disabilities in a way that is environmentally friendly, holds strong structural integrity, and is viable.

### Accessibility

The design and implementation of facilities, systems, and services that can be accessed, understood, and used by as many people as possible. This includes members of the population with disabilities and diverse characteristics. The goal of accessibility is to create an inclusive environment that lacks significant barriers, enabling equal opportunities in life for everyone, regardless of their physical, sensory, cognitive, or other functional abilities.

### Inclusive Infrastructure

The planning, design, and development of physical structures, systems, and services that accommodate and benefit the diverse needs of all individuals in a population. This includes people of all abilities, backgrounds, and characteristics. The goal of inclusive infrastructure is to create environments that are accessible, user-friendly, and welcoming to everyone, fostering a sense of social equality, and diversity.

**Urban Planning**

A complex field that involves the design, organization, and development of cities, towns, and other urban areas. The primary goal of urban planning is to create sustainable, functional, and attractive environments that improve the quality of life for both residents and visitors. It considers a range of issues and considerations, including land use, transportation, housing, infrastructure, environmental sustainability, social equity, and economic development.

**Assistive Technology**

A device, tool, or system that is designed or adapted to help people with disabilities overcome challenges and perform tasks that they might otherwise find difficult or inconvenient. The main goal of assistive technology is to enhance the independence, functional capabilities, and quality of life of people with disabilities. These technologies can help people with a wide range of disabilities, including disabilities related to mobility, communication, cognitive impairments, and sensory issues.

**Infrastructural Adaptations**

Modifications and/or improvements made to infrastructure, systems, and facilities to meet the changing needs of the population, improve functionality, and improve overall organization. These adaptations can be applied to various types of infrastructure, including transportation networks, buildings, utilities, and public spaces. The purpose of infrastructural adaptations is often to address new challenges, account for growth, or respond to evolving technological, environmental, or societal conditions.

**Public Awareness**

Increasing the understanding and knowledge within society about the experiences, challenges, and abilities of individuals. It encompasses efforts to educate the public, challenge stereotypes, reduce stigma, and promote inclusivity, in an effort to better the community as a whole.

**Smart Cities**

Urban areas that leverage advanced technologies and creative solutions to improve the organization, sustainability, and overall quality of life for their residents. In a smart city, various

interconnected systems and services are bridged through the use of information and communication technologies (ICT). These technologies enhance urban living, address rising challenges, and optimize the use of resources. The goal is to create a more collaborative, resilient, and sustainable urban environment by using data and technology to streamline services and generate well-planned solutions.

**Intelligent transportation systems (ITS)**

A broad range of electronic technologies that include wireless and wireline communications information. When integrated intricately into a transportation system's infrastructure and vehicles, these technologies have the capacity to relieve congestion, improve safety, and enhance efficiency. ITS are made up by various types of technology-based systems, including intelligent infrastructure systems and intelligent vehicle systems.

## Background Information

### Universal Design Principles: Disability-Inclusive Infrastructure

Universal design principles are a set of guidelines and concepts aimed at creating products, environments, and systems that are accessible, usable, and inclusive for people of all abilities, ages, and backgrounds. The principles were developed to promote the idea that design should be inherently inclusive, eliminating barriers and accommodating a diverse range of users. By integrating these principles into the design process, designers aim to create environments and products that are accessible to as many people as possible, irrespective of their physical, sensory, or cognitive abilities. The principles guide the development of inclusive solutions that benefit a broader spectrum of users, creating more user-friendly and inclusive solutions for everyone; thus, promoting equal participation in society.

#### *Equitable Use*

Equitable use focuses on ensuring that the design is accessible and accommodating to people with diverse abilities. It aims to create products, environments, or systems that do not exclude or marginalize any user group. Instead, it seeks to provide equal opportunities for use and enjoyment. The principle encourages designs to think inclusively from the outset, considering the needs of a broad spectrum of users. This includes individuals with disabilities, but also those with varying ages, cultural backgrounds, and levels of expertise.

#### *Flexibility in Use*

The principle of "Flexibility in Use" is a core concept in Universal Design which involves designing products or environments with features that allow for a variety of uses and adaptability.

The goal is to create solutions that can be utilized by a wide range of users, accommodating their individual preferences and needs without requiring specialized modifications. Flexibility in Use recognizes that users have different levels of skill, experience, and physical or cognitive abilities, and it seeks to provide a range of options to cater to their diversity, ultimately making products and environments more user-friendly for a broad spectrum of individuals.

### *Simple and Intuitive Use*

A fundamental component of universal design is the "Simple and Intuitive Use" principle, which highlights the significance of creating settings, products, and interfaces that are simple to comprehend and operate for a variety of users, regardless of their experience level, background, or ability. Promoting usability, lowering the learning curve, and guaranteeing clear-cut and intuitive interactions are the goals of this approach. Making environments and interfaces that are simple to comprehend, traverse, and engage with is a key component of designing for easy and intuitive use. Through the implementation of standards, limiting complexity, and incorporating user feedback, designers can produce products that are more user-friendly and accessible to a wider range of users.

### *Perceptible Information*

Perceptible information is a key principle in universal design that focuses on ensuring that information is presented in a way that can be easily perceived and understood by individuals with diverse sensory abilities. This principle recognizes that people have different ways of gathering information, and it aims to make information accessible through various sensory modalities. By addressing perceptible information, designers can create environments and products that are more inclusive, ensuring that individuals with different sensory abilities can access and understand information effectively. This contributes to a more equitable and accessible experience of everyone.

### *Tolerance of Error*

In universal design, the "Tolerance for Error" approach places a strong emphasis on building environments and products that reduce the unfavorable effects of mishaps or errors. This idea acknowledges that mistakes will be made by users during interactions, no matter how skilled they are, and that is why designs should be accommodating and allow for correction. Tolerance for Error refers to the design of systems that are tolerant of errors made by users. Rather of penalizing users for making mistakes, the design should provide answers or detours to make it easier for users to move past their faults. Recognizing that mistakes are inevitable in user interactions, Tolerance for Error aims to create designs that are easy to fix, encouraging, and forgiving. Through the application of these principles, designers may improve the overall user

experience and create more user-friendly, especially for individuals who may be prone to errors or face challenges in using traditional interfaces.

### *Low Psysical Effort*

The universal design principle known as "Low Physical Effort" places emphasis on creating settings, products, and interfaces that need the least amount of mental work from consumers in order for them to interact with them. This idea is essential to ensuring that users of various physical capacities can interact with the design in a comfortable and strain-free manner. Taking ergonomic design into account to make sure that users can interact with objects in a comfortable way. This entails being aware of things like posture, hand movements, and reach. Wide ranges of body forms and sizes should be supported in designs. The intention is to create inclusive spaces where people with different physical abilities can interact comfortably and without needless physical challenges by giving minimal physical effort top priority in design. This principle contributes to a more accessible and user-friendly experience for everyone.

### *Size and Space for Approach and Use*

The universal design principle of "Size and Space for Approach and Use" places emphasis on designing settings, goods, and interfaces that have sufficient proportions and room to accommodate a wide variety of users. This idea is essential to ensuring that people using assistive technology, mobility aids, and various body sizes may approach and utilize the design in a comfortable manner. The goal of universal design is to create spaces that are friendly and accessible to people of all sizes and abilities by placing a high value on approachability and usability of space and size. This idea encourages equitable access and involvement for all, making the experience more welcoming and inclusive.

## Major Countries and Organizations Involved

### International Disability Alliance (IDA)

The International Disability Alliance established in 1999 is a global alliance of 14 global and regional organizations across eight global and six regional networks that advocates to the United Nations (UN) for an increment for disability inclusion. The organization serves as a voice for the one billion people with disabilities by aiming to implement the United Nations Convention on the Rights of Persons with Disabilities (CRPD) worldwide. The IDA with the mission to advance the human rights of people with disabilities in hopes of creating a society where the full potential of people with disabilities is recognized strives to build a better world.

### Sweden

Sweden has established itself as one of the most inclusive countries in the world for disabled people where a legal authority exists ensuring inclusion for all. The Act concerning Support and Service to Persons with Certain Functional Disabilities enforced in 1994 is a human rights law that gives people with disabilities to live independently with equal living conditions and full inclusion in the community. This act reflects Sweden's progressiveness in fostering a positive attitude toward those with disabilities. The advancements made to promote awareness and combat discrimination show the evolution of Sweden to an empowering society where accessibility barriers are almost non-existent.

### The United Kingdom

The United Kingdom is proud to be recognized as a leader holding a progressive stance on disability inclusion, especially by promoting disability inclusion through ways such as but not limited to inclusive education, social protection, and humanitarian action. The Foreign, Commonwealth, and Development Office (FCDO) of the United Kingdom plays a crucial role in encouraging disability inclusion throughout the world. The FCDO collaborates and partners with countries and international organizations with the main goal of advocating for the rights of individuals with disabilities. The government of the United Kingdom has implemented multiple policies, acts, and legislations regarding issues on disability inclusion that will hopefully provide all the necessary and basic services such as but not limited to healthcare, education and transportation to those with disabilities.

### Japan

Japan is globally recognized as a country where innovation has no limit. Japan focuses on improving the quality of life for people with disabilities by making all public spaces, transportation and digital platforms disability inclusive. A very important convention regarding the rights of individuals with disabilities is The Convention on the Rights of Persons with Disabilities that was ratified in 2014. The Convention on the Rights of Persons with Disabilities is an important convention that protects human rights such as no discrimination towards individuals with disabilities. The government attempts to improve employment opportunities and to create more inclusive education aims in order to ensure equal participation in society. Persistent efforts are made for a more inclusive environment in Japan as well as the raising of awareness towards the rights and needs of individuals with disabilities in Japan.

### Australia

Australia attempts to foster a society where everyone has the same social and economic opportunities. Australia's Disability Strategy from 2021-2031 calls for a more inclusive community where individuals with disabilities are able to fulfill their potential without any restrictions caused by exclusive infrastructure. The strategy aims to guide the nation to be fully inclusive by delivering necessary support

for individuals with disabilities to enhance their outcomes. With a sustained and well-established plan, Australia is aiming to realize its vision of a supportive society where everyone can fulfill their potential as members of society by actively participating and contributing to their community.

### Humanity & Inclusion (HI)

Humanity and Inclusion is a world-renowned organization dedicated to working alongside people with disabilities established in 1982. Humanity and Inclusion believe that individuals with disabilities should also have equal access to rights, opportunities, and services and that they should be protected from all forms of discrimination and abuse. The reduction of the lack of infrastructural services is a very important goal for Humanity and Inclusion so that individuals with disabilities are able to access all information, services, and infrastructure everywhere. This Non-Governmental Organization (NGO) advocates for changes in areas that limit the accessibility of individuals with disabilities such as health services. To sum it up, Humanity and Inclusion hold a large role in advocating for more disability inclusion infrastructure in hopes of enabling individuals with disabilities to give their opinions and to be heard by society.

## Timeline of Events

| Date | Description of event |
|---|---|
| July 26th, 1990 | Americans with Disabilities Act (ADA) was passed in the United States, establishing a comprehensive set of standards for accessibility in public spaces, including infrastructure |
| May 5th, 1999 | Web Content Accessibility Guidelines (digital accessibility) were released which marks the start of efforts to make websites and online services more inclusive for people with disabilities |
| 2000s | Universal design principles gain prominence, influencing architects, urban planners, and engineers to incorporate inclusive features in infrastructure projects |
| 2015 | Goal 11 of the SDGs emphasizes the importance of making cities and human settlements inclusive, safe, resilient, and sustainable; prioritizing disability-inclusive infrastructure |

## Relevant UN Resolutions and Treaties

- The Convention on the Rights of Persons with Disabilities, 3 December 2006 **(A/RES/61/106)**
- Declaration on the Rights of Disabled Persons, December 1975 (**A/RES/3447**)
- Transforming our world: the 2030 Agenda for Sustainable Development, 25 September 2015 **(A/RES/70/1)**
- Accessibility to ICTs for Persons with Disabilities, 25 September 2015 **(ITU-R 67-1)**
- Implementation of the World Programme of Action Concerning Disabled Persons: Towards a Society for All in the Twenty-first Century, 30 September 1998 **(A/RES/52/82)**
- Mainstreaming Disability in the Development Agenda: Towards 2015 and Beyond, 28 November 2012 **(E/CN.5/2013/9)**
- Standard Rules on the Equalization of Opportunities for Persons with Disabilities, 4 March 1994 **(A/RES/48/96)**
- World Programme of Action concerning Disabled Persons, 3 December 1982, **(A/RES/37/52)**

## Possible Solutions

**Establishment of a Global Accessibility Technology Fund (GATF) supported by international organizations, government, and private sector stakeholders.** The GATF aims to finance research, development, and implementation of innovative technologies that enhance accessibility across various forms of infrastructure. This fund would support projects that integrate cutting-edge technologies, such as AI-driven navigation systems, sensor-based accessibility features, and universally designed smart infrastructure. The GATF would facilitate collaboration between technology developers, disability advocacy groups, and governments to identify and address key challenges in inclusive infrastructure. Technologies that collect and process personal data include AI-driven navigation systems. Gaining public trust and adhering to international norms requires protecting privacy and addressing ethical issues surrounding the use of data.

**Creation of a government comprehensive set of criteria and guidelines for inclusive infrastructure design and technological integration.** The government would be encouraged to adopt and implement these standards in their infrastructure projects, and private sector entities involved in technology and construction would be incentivized to seek certification (criteria) for their products and projects. Governments, as key stakeholders, would integrate these standards into their regulatory frameworks, making certification a requirement for public infrastructure projects. The private sector, including technology developers and construction firms, would actively participate in the program to enhance their projects' accessibility and gain a competitive edge in the market. Ensuring standards are widely followed can be difficult, especially if there are weak enforcement measures in place. Monitoring

and enforcing the application of accessibility standards across a variety of projects and sectors may present challenges for governments.

**Universal Design in Information Technology and Accessibility for the development of disability-inclusive infrastructure.** This guarantees that the goal of designing digital interfaces is to make them universally accessible. Users may be able to operate computer interfaces using speech commands thanks to the development of voice recognition technologies. People with vision and hearing impairments can access digital information with the use of technologies like screen readers and captioning implementation features. This makes it possible to install technology in inclusive public areas like bathrooms and smart parks. furnished with accessible chairs, navigation systems, and sensory-friendly features. A wide range of abilities will be able to use these IoT-enabled facilities with features like voice-activated controls, height-adjustable sinks, and automated doors.However, technology is always changing, and new gadgets, interfaces, and ways to engage with it appear all the time. It is a constant task to make sure that all of these technologies follow the guidelines of universal design.By combining these technological solutions, communities can create a more inclusive infrastrucutre that addresses the unique requirements of indivduals with disabilities.

## Questions for Further Research

1. How should technological solutions consider the intersectionality of disabilities, ensuring that infrastructure addresses the diverse requirements of individuals with different impairments, including physical, sensory, and cognitive disabilities?
2. What role can international collaboration and knowledge-sharing play in advancing global standards for disability-inclusive technological infrastructure, and how can countries work together to implement these standards?
3. In what ways can assistive technologies and smart infrastructure contribute to enhancing the mobility, independence, and overall well-being of individuals with disabilities?
4. What are effective approaches that allow for people with disabilities to have input on the design and implementation of disability-inclusive infrastructure?
5. How can assistive technologies be integrated into already existing infrastructure without creating additional barriers for people with disabilities?
6. How can collaboration and partnership with organizations such as NGOs and the disability community strengthen the development of disability-inclusive infrastructure?
7. What challenges exist in the development and implementation of accessible digital interfaces, particularly in the context of smart cities?
8. What are the key considerations for designing transportation infrastructure that accommodates the diverse needs of people with disabilities?

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