



University at Buffalo

Center for Inclusive Design and Environmental Access

School of Architecture and Planning

A Resource Guide for an

# Inclusive Smart City

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## Introduction

The “Smart City” concept has widely spread all over the world, attempting to combine traditional infrastructure with technology to enrich citizens’ quality of life.<sup>1</sup> However, people with disabilities and older adults, are not always considered when designing and building Smart Cities. The essence of a Smart City should be inclusive and accessible to all citizens. Inclusive Smart City (ISC) should be the goal as government authorities continue to integrate technology in the urban infrastructure.<sup>2</sup>

Currently, there is no official definition for “Inclusive Smart City.” In 2018, De Oliveira Neto defined Inclusive Intelligent/Smart City as cities with “a set of pervasive and digital urban assistive technologies, suggested and/or adopted by government authorities and civil society to assist People with Disability in the cities, allowing those citizens to move around independently and perform their daily activities autonomously, resulting in a better user experience in urban spaces.”<sup>3</sup> Another interpretation of ISC is “a new citizen-centered approach that aims to extend the experience provided by Smart Cities solutions to all citizens.”<sup>4</sup> Thus, the main feature of an ISC is the ability to identify the needs of everyone, especially persons with disabilities and older adults. To be considered ‘inclusive’ and ‘smart’, a city must not only employ smart city technology to provide a better urban experience for both ‘abled’ and ‘disabled’ people, but also “reinforce the participations of everyone, recognize the diversity of citizens, struggle against the segregation of minorities, and try, as much as possible, to eliminate, not only physical but also digital, barriers.”<sup>5</sup>

Many Smart Cities fail to consider the needs of individuals with disabilities and/or older adults when implementing Smart City solutions. One example is LinkNYC kiosks, installed on sidewalks in New York City in 2016. Shortly after installation, the city was sued by the American Federation for the Blind for lacking an audible form and screen-reading functionality for individuals with visual and hearing impairments.<sup>6</sup>

Fortunately, there is a trend for urban planners and city leaders to incorporate inclusive principles in their Smart City efforts. An international survey of over 200 Smart City and accessible technology experts shows that more than 90% of experts “agree or strongly agree that Smart City initiatives leveraging information communication technology (ICT) accessibility would help persons with disabilities and older persons to be more included in their communities”.<sup>7</sup> Similarly, there was consensus that Smart City initiatives should consider people with disabilities and older adults.

## Tools, Resources, and Best Practices

With the aging population and increasing number of people with disabilities, it is necessary and important for urban planners, policy makers, and key stakeholders to have access to the most current tools, strategies, and best practices related to Inclusive Smart Cities. The following is a compilation of relevant information and materials.

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<sup>1</sup> Chambers, J. and Elfrink, W. (October 2014). The Future of Cities: The Internet of Everything will Change How We Live. *Foreign Affairs*.

<sup>2</sup> Korngold, D., Lemos, M., and Rohwer, M. (2017). Smart Cities for All: A Vision for an Inclusive, Accessible, Urban Future. AT&T.

<sup>3</sup> de Oliveira Neto, J. S. (2018). Inclusive Smart Cities: theory and tools to improve the experience of people with disabilities in urban spaces (Doctoral dissertation).

<sup>4</sup> Eid, N. (2018). Smart City Means Building an Inclusive Society for All.

<sup>5</sup> de Oliveira Neto, J. S., & Kofuji, S. T. (2016, July). Inclusive smart city: An exploratory study. In International Conference on Universal Access in Human-Computer Interaction (pp. 456-465). Springer, Cham.

<sup>6</sup> Woyke, E. (August 2019). *Smart cities could be lousy to live in if you have a disability*. Available from: <https://www.technologyreview.com/s/612712/smart-cities-could-be-lousy-if-you-have-a-disability/>

<sup>7</sup> Thurston, J. (2017). *Smart Cities For All: Results of the 2016 Global Expert Survey*. G3ict and World Enabled.

## Tools

- [“Smart City for All” Toolkit](#)

The Global Initiative for Inclusive Information Communication Technologies (G3ict), together with World Enabled and supported by Microsoft, launched the “Smart Cities for All” Toolkit in 2016. The toolkit is available in eight languages. It is a monumental effort to define the state ICT accessibility in Smart Cities around the world. The toolkit aims to eliminate the digital exclusion of older adults, persons with disabilities, and other disadvantaged individuals, and provide urban planners, city leadership, researchers, and private sector owners with guidance on how to build accessible and inclusive Smart Cities for all. Specifically, four tools in the toolkit are designed to help city planners implement Smart City projects or services and ensure Smart City technology initiatives benefit all citizens, including people with disabilities and older persons.

- *First Tool: Guide to Implementing Priority ICT Accessibility Standards:* The first tool yields an inventory of three key ICT accessibility standards that are critical to designing an ISC. Also, a step-by-step checklist is provided for city leaders to ensure the digital inclusion for all citizens.
- *Second Tool: Guide to Adopting an ICT Accessibility Procurement Policy:* This guide is designed to help cities adopt policies that require and ensure any public purchase of ICT to be accessible and inclusive to persons with disabilities and older persons. The guide also provides a step-by-step checklist for adopting such policies.
- *Third Tool: Communicating the Case for Stronger Commitment to Digital Inclusion in Cities:* In order to raise awareness of disability and ICT accessibility, this tool presents arguments with statistics and cases to help effectively communicate the advantages of adapting ICT accessibility to the public or other key stakeholders. This guide is also designed to eliminate the digital exclusion of persons with disabilities.
- *Fourth Tool: Database of Solutions (Alpha Version):* This database is designed to showcase more than 350 existing products and solutions that have been adopted in Smart Cities from all over the world. This database is also expected to serve as a reference guide for city leaders, governmental organizations, policy makers, or technical developers and professionals, when they try to implement Smart City apps and solutions to benefit the lives of seniors, persons with disabilities, and a diverse range of other citizens living in Smart Cities.

## Resources

- [Inclusive Smart Cities: A European Manifesto on Citizen Engagement](#)

In 2016, The European Innovation Partnership on Smart Cities and Communities (EIP-SCC), a major market-changing organization supported by the European Commission, organized a conference on citizen engagement in Smart Cities. According to the final manifesto, six activities were proposed to “foster accessible urban services for citizens in order to improve the quality of life of all citizens and contribute to sustainable cities and a liveable environment.”<sup>8</sup>

- [U.S. Department of Transportation 2015 Smart City Challenge](#)

In 2015, the U.S. Department of Transportation (US DOT) announced the Smart City Challenge as a call for proposals for developing a universal smart city model with technology-aided transportation systems that can be imitated by other American cities. This Smart City Challenge

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<sup>8</sup> Kakderi, C. (2017). Inclusive Smart Cities: a European Manifesto on Citizen Engagement. Retrieved January 4, 2018.

was the first nation-wide project after the 2015 White House Initiative on Smart City. It provided 12 vision elements and required applicant cities to clarify their proposed visions to ensure they aligned with some or all of the elements. For example, #5 User-Focused Mobility Services, specifically required applicant cities to “increase transportation choices and options by supporting and improving mobility for all travellers, including aging Americans and persons with disabilities”; #9 Connected, Involved Citizens suggested using advanced technologies to “enhance overall mobility for all citizens including people with disabilities, older adults, and young Millennials.”<sup>9</sup>

- [Smart Cities for All: A Vision for an Inclusive, Accessible Urban Future](#)  
AT&T collaborated with Business for Social Responsibility (BSR) and released this report at the 2017 M-Enabling Summit, in Washington D.C. This report highlighted the potential of Smart City technology to help people with disabilities and the aging population, as well as showed global applications, including products, services and institutional research. This report aimed to help cities identify ways that technologies make cities smarter, more inclusive, and more accessible. The report was based on public research, interviews with experts in smart city fields, and engagement with relevant stakeholders.
- [Inclusive Smart Cities: A Smart City for All Capabilities](#)  
In order to make cities more accessible for all, this article looked at five initiatives and proposed five solutions to address the needs of older adults, people with visual impairments, people with hearing impairments, people with asthma, and people with learning difficulties.
- [A Global Strategy for Digital Inclusion](#)  
Aside from the Smart City for All toolkit, G3ict and World Enabled also proposed six interrelated strategies to address digital exclusion barriers and make progress in order to create more inclusive and accessible Smart Cities.
- [How to Ensure that Your Smart City Strategy is Inclusive?](#)  
*Bee smart city*, a leading global smart city solutions network and community in Europe, provided six strategies to ensure a Smart City is inclusive. These strategies highlight the fact that citizen-centric Smart City solutions are vital in designing and building an ISC.

## Best Practices/Pilot Projects

- [Bluetooth Audio Cues: Pilot Project](#)  
In 2018, an eight-month pilot scheme was implemented in Melbourne, Australia, to assist individuals with visual impairment to navigate public spaces. The project applied Bluetooth technology and offered free GPS smartphone app, BlindSquare, to support navigation and wayfinding.
- [Mobility Assistance for People with Cognitive Disabilities: Pilot Project](#)  
Columbus, Ohio, was the winner and awardee of the 2015 Smart City Challenge. With US DOT funding and investment from Paul G. Allen Family Foundation, Columbus, OH proposed a pilot project to provide mobility assistance for people with cognitive disabilities so that they can travel more independently.
- [Transportation Network Companies \(TNCs\) Pay for Wheelchair Accessible Services Fund](#)

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<sup>9</sup> U.S. Department of Transportation (cited July 11, 2019). *Smart City Challenge Vision Statements*. Available from: <https://www.transportation.gov/smartcity/visionstatements/index>.



The City of Seattle, WA passed an ordinance in 2014 to request TNCs to contribute 10 cents per ride for the Wheelchair Accessible Services Fund, whose intent was to attract more wheelchair-accessible taxi drivers and encourage more wheelchair-accessible vehicles on the street.

## Other Useful Resources:

- [Bee Smart City Solution Database](#)  
*Bee Smart City* created a global network to connect Smart City stakeholders with globally successful Smart City solutions. Planners and policy makers can seek strong global partners, share successful Smart City experiences, and identify new solutions to make inclusive and accessible smart cities.
- [Urban Street Design Guide by National Association of City Transportation Officials \(NACTO\)](#)  
This comprehensive guidance summarizes principles for street design in urban space and outlines a clear vision for complete streets. It aims to provide tactics and tools to make street safer, friendly, livable, and accessible to all citizens.
- [Smart City Library](#)  
Launched in 2017, the Smart City Library is a public online database, collecting Smart City related news. It has two categories, 'Inclusion' and 'Accessibility,' which provides sufficient news, cases, and articles about how to build an ISC. This online premier resource also aims to integrate consciousness about persons with disabilities into Smart Cities and to support a network benefiting a diversity of users and stakeholders, such as researchers, planners, and policy makers.



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