



How Can We Build an Accessible and Inclusive Built Environment?

The AccesS User Centered Design Approach



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About AccesS

AccesS aims to **revolutionise the accessibility and inclusivity of smart buildings and smart cities** with the groundbreaking Universal Accessibility Suite initiative. By leveraging advanced technologies and innovative solutions like AI, BIM, and GIS, AccesS aims to create barrier-free environments, facilitate smooth mobility, and enable equal access to essential services and facilities.

About the report

This report outlines the User-Centered Design (UCD) approach for the AccesS project and highlights **findings related to user needs, expectations** and challenges for accessibility of **the built environment and active mobility solutions** across the six demo sites of the project, focusing on three different types of buildings:

- **Case of cultural heritage buildings**, which covers the Brancacci Chapel in Florence, Italy and Christo and the Jeanne-Claude Center in Gabrovo, Bulgaria.
- **Case of people care facilities**, which covers the Droom je Thuis Foundation in Naaldwijk, Netherlands and the Casa Girasole in Massagno, Switzerland.
- **Case of public services buildings**, which covers the Palazzo di Citta in Bari, Italy and the Mercado de Verónicas in Murcia, Spain.

This report is intended to inform a broad spectrum of stakeholders engaged in the planning, design, implementation, and evaluation of inclusive and accessible built environments and mobility solutions. Its findings are particularly relevant to urban planners, architects, municipal decision-makers, technology developers, and digital tool designers, who play a central role in shaping physical and regulatory infrastructures and in the creation of accessible smart systems. Additionally, the UCD approach offers a knowledge base for academic researchers and evaluators working in the areas of smart cities, universal design, and mobility systems.

Access User-Centered Design Approach

User-Centered Design (UCD) puts the user at the centre of the design process and encourages an iterative and collaborative approach. Key features of UCD are:

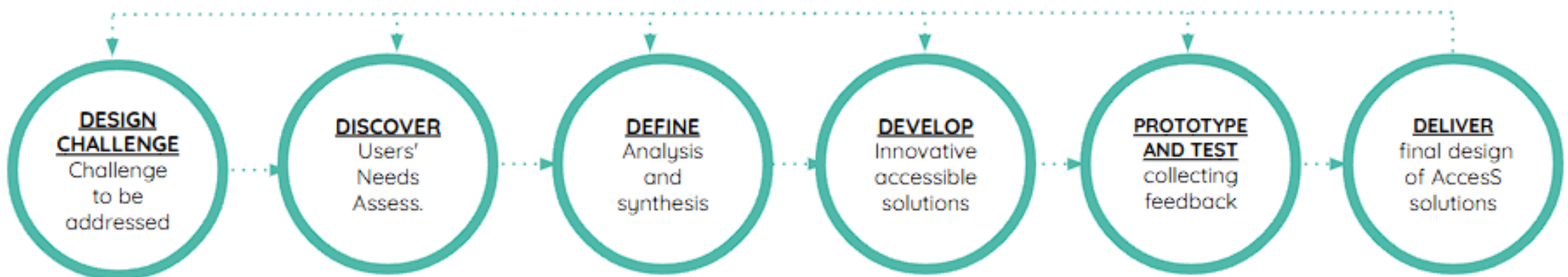
- **User centrality:** This empathetic approach helps create truly useful and desirable solutions by deeply understanding users' needs, desires, and challenges.
- **Iterative approach:** Ideas are continuously tested, refined, and improved based on the feedback received. The design process goes through a cycle of subsequent stages that are not linear and often overlap, with continuous returns to the previous stage to improve the final solution.
- **Multidisciplinary collaboration:** promotes collaboration between people with different skills and perspectives. Multidisciplinary teams work together to tackle complex challenges, stimulating innovation and creativity.

By adopting this approach, the objective is to ensure that the design and development of Access solutions across the project's demo sites are informed by a deep understanding of the needs and challenges faced by individuals with disabilities, reduced mobility, and other vulnerable groups at the six demo sites.

Access UCD approach follows six main steps:

1. **Definition of the design challenge**
2. **Discover**
3. **Define**
4. **Develop**
5. **Prototype and test**
6. **Deliver**

This report focuses on the findings of step 3, i.e., defining the user insights, needs, challenges, and expectations that emerged from the engagement of actors for each pilot site. The subsequent steps, develop, prototype and test, and deliver, will be applied during the remaining phases of the project. Moreover, it presents a tailored roadmap for each demo site, outlining the key considerations. For detailed information on the approach, refer to [Deliverable 2.1 User-centered Design Approach and Inclusive Active Mobility Solutions](#).



Step 1 - Framing the design challenge



At the beginning of the UCD process, the general challenge to be addressed in the project is a generative question. The table below highlights the general design challenge for the demo sites:

Typology	Demo sites	Location	General design challenge
Case of cultural heritage buildings	Brancacci Chapel	Florence, Italy	‘How can we improve the accessibility of museums and cultural spaces and its surroundings for people with disabilities, ensuring easy navigation, inclusive experiences and enhanced comfort for all visitors and workers while taking into account the need to preserve heritage assets and respect legal and architectural constraints?’
	Christo and Jeanne-Claude Center	Gabrovo, Bulgaria	
Case of people care facilities	Droom je Thuis Foundation	Naaldwijk, Netherlands	‘How can we make care facilities and its surroundings accessible and comfortable for patients, families, visitors, and workers, addressing their accessibility and vulnerability needs?’
	Casa Girasole	Massagno, Switzerland	
Case of public services buildings	Palazzo di Città	Bari, Italy	‘What solutions can we implement to make public buildings and spaces and its surroundings more accessible and inclusive while ensuring usability and comfort for all citizens?’
	Mercado de Verónicas	Murcia, Spain	

Step 2 - Discover



This phase involves listening to each group of stakeholders with the aim to gather context specific insights. A combination of qualitative and quantitative methods, such as **interviews, focus group discussion, online surveys, and desk research** was employed to gather data from **demo site leaders, end users, public authorities, and disability advocacy organisations** across demo cities to understand site-specific requirements, barriers, and user needs related to accessibility and active mobility. A broad and diverse group of stakeholders was engaged. **Over 280 individuals participated**, involving end users and institutional actors. These included demo site leaders, governmental authorities, and representatives from disability organisations, alongside various user groups such as **visitors (169), caregivers (8), artists (10), employees (44), and shopkeepers (32) across the demo sites**. The process involved **17+ representatives from disability advocacy groups** and 6 professionals from architecture and urban planning.

Step 3 - Define



Within this phase, insights are defined for AccesS tools comprising findings from the data collection activities. The **insights related to the built environment** are categorised based on the key areas adapted from the **European Standard EN 17210:2021 for accessibility and usability of the built environment**, namely:

1. **Wayfinding** - navigation, signage, and orientation support within spaces.
2. **Horizontal circulation** - accessibility of entrances, doors, windows, patios, terraces, and the suitability of surface finishes and materials.
3. **Vertical circulation** - features such as ramps, stairs, handrails, lifts, and escalators that support movement between different levels.
4. **Specific areas, equipment, and provisions** - includes service counters, seating areas, waiting zones, storage areas, kitchenettes, and accommodations for assistance dogs.
5. **Sanitary accommodation** - accessible toilets and washroom facilities designed for diverse user needs.
6. **Engagement** - user interfaces, controls, switches, and interactive elements that support user engagement and autonomy
7. **Evacuation and emergency exit** - inclusive fire safety measures and accessible emergency exit routes for all users.
8. **Environmental conditions** - factors such as lighting, acoustics, and indoor climate that impact comfort and usability.

For the **mobility section**, the user needs are structured around five central pillars

1. **Inclusive pedestrian infrastructure and spatial continuity**
2. **Inclusive micromobility design and integration**
3. **Access to public transport**
4. **Digital inclusion and mobility platforms**
5. **Accessible active mobility infrastructure**

Step 4 - Develop



The user insights gathered during the Define phase offer a perception or expectation-based understanding of needs and challenges in various accessibility areas. While not all identified issues or expectations can be fully addressed within the scope of the project, these insights play a key role in shaping the design and development of the following AccesS tools:

- **Energy Efficient and Sustainable Design Tool** leverages Building Information Modelling (BIM) technology to support the design of sustainable buildings. It integrates with multiple software services to simulate various usage scenarios, enabling designers to assess and optimize energy performance.
- **Energy Comfortness Tool** explores the connection between energy efficiency and user comfort. It evaluates how different energy-saving strategies affect indoor environmental quality, helping ensure that sustainable solutions also promote wellbeing and comfort for all users.
- **ErgoFlow** offers expert-driven design recommendations to enhance ergonomics and comfort for furniture items in indoor environments.
- **Virtual User Models (VUM) and VUM-based Virtual Humans (VH)** simulate the physical and behavioral characteristics of users with different abilities. These models provide realistic representations of people with disabilities, enabling designers to anticipate accessibility challenges from the early stages of design.
- **3D Simulation Environments** - The VUM and VH models will be assessed in 3D simulation environments to improve design issues under different scenarios and deliver spaces designed for all.
- **Adaptive Building Operation and Management System (BOMS)** is a smart system that connects with existing building infrastructure to gather real-time data on energy use, occupancy, and environmental conditions. Powered by AI and big data analytics, it continuously optimizes building performance and user comfort by adapting operations to changing needs and behaviors.
- **Micromobility and Inclusive City Planning** aims to develop a proof-of-concept design for a micromobility solution, suitable for the elderly, and an analysis of micromobility options, enhancing accessibility and inclusivity while promoting sustainable transportation choices for all.
- **Integrated e-Mobility** component integrates electric vehicles (EV) directly into the building ecosystem. It enables EVs to function as active energy components within the system, supporting sustainability goals while ensuring that mobility solutions are accessible and user-friendly.
- **Universal Accessibility Assessment Tool** helps in evaluating the accessibility of buildings and urban environments. It identifies architectural, physical, and technical barriers for people with disabilities and older adults, offering actionable recommendations to enhance inclusivity and compliance with accessibility standards.
- **AccesS Suite** is the main integrated platform for accessing and managing all components, interfaces, and services of the AccesS digital tools and as such it will be designed with a focus on accessibility, making it easier for individuals with disabilities and older persons to use and navigate the system.

Step 5 - Prototype & Test



When the design of proposed solutions is in a preliminary phase, demo site leaders can **involve key stakeholders to collect feedback** about the site-specific proposed solutions. Moreover, a general consideration across the pilot sites is that evaluation activities should systematically collect feedback on the Key Performance Indicators (KPIs) as proposed within the AccesS evaluation framework, such as Ease of circulation, User satisfaction with the accessibility of digital solutions, comfort of buildings, etc.

Step 6 - Deliver



In this final stage, the AccesS tools undergo a last round of validation with key stakeholders to ensure that the iterative design process has effectively addressed user feedback and requirements. Therefore, it is essential that:

- **Feedback mechanisms** are integrated into the tools, allowing users and relevant stakeholders to share their experiences and suggestions in an accessible and straightforward manner.
- **Usability and maintenance** procedures are designed to be inclusive and easily manageable by all user groups. For example, ensure that all digital tools (apps, websites, and multimedia content) are fully accessible and including features such as text-to-speech, high contrast modes, and voice navigation.
- **Clear guidance and support resources** are provided to facilitate long-term adoption and adaptation of the tools in real-world contexts. For example, develop a comprehensive accessibility guide in multiple formats (print, digital, audio, Braille, and easy-to-read versions).



I. Brancacci Chapel



Florence, Italy

About Brancacci Chapel

It is located in one of the central districts of Florence, Italy. The Chapel is situated within the boundaries of the **UNESCO area** and is housed in the Santa Maria del Carmine Church. It is one of the most significant examples of the Renaissance era in Florence, with frescoes by Masaccio, Masolino, and Filippino Lippi, and operates as a **civic museum**, owned by the Municipality of Florence. The Chapel is intended to serve as a model for Florence, promoting accessibility for all and exemplifying urban sustainable regeneration that incorporates the surrounding area into the city's smart framework, reflecting the principle of **“no person and no place left behind”**. Importantly, carrying out structural changes is not feasible due to legal protections and heritage conservation constraints.

User Characteristics

On average, the Brancacci Chapel receives **200 visitors per day**, amounting to approximately **70,000 annually**. The majority of visitors are first-time visitors, and the most common reasons for visiting the Chapel were as part of a longer trip and for religious interest.

The Chapel's structure permits **access only for small groups of up to 30 people** and requires prior reservation. Entry is limited to 30 visitors every half hour to safeguard the frescoes, which have been recently restored and are subject to continuous monitoring and diagnostics.

At the site, there are three companies and cooperatives that provide services: ticket office, security, and cleaning staff. A total of 30 people work there, with an average of 6 per day. During the conservation and diagnostic activities on the frescoes, conservators and researchers were also active at the site.



User needs and challenges for the built environment

Wayfinding:

- Enhance the visibility of the ticket office through clearer and more prominent signage within the building.
- Combined entrance for friars and tourists is a possible challenge.
- Staff training to better interact with neurodivergent individuals and visitors with sensory disabilities.
- Need for braille maps, signage with large, high-contrast letters, and marked sensory paths within the Chapel.
- Need for improved information through apps, and video guides with both subtitles and LIS (Italian Sign Language) explanations.

Horizontal circulation:

- The ticket office has a manual door, which presents a challenge for wheelchair users.

Vertical circulation:

- Issues with the wheelchair lift - sometimes out-of-order, and difficult to use, particularly for visitors with reduced mobility.

Specific areas:

- Enhancing seating arrangements for visitors in front of the Chapel. The absence of chairs with armrests could pose challenges for individuals with reduced mobility or elderly visitors.

Engagement:

- Suggestions included better navigation tools and tactile displays for sensory-sensitive individuals.
- Some visitors reported unclear signage.
- To better understand the frescos within the Chapel, suggestions included installing rigid multi-language descriptive panels.
- Lack of trained staff for assisting blind or partially sighted visitors, and a lack of alternative accessibility solutions beyond Braille. Suggested solutions included touchscreen totems with voice synthesisers and automated audio guides.
- Absence of targeted visit solutions for deaf visitors. Suggested measures include introducing sign language video guides, staff training, and organising group tours with interpreters.

Evacuation and emergency exits:

- Emergency exits may pose challenges in case of a blackout.
- Utilising light-based emergency signals.

Environmental Conditions:

- Inadequate lighting and slightly uncomfortable climate conditions during the winter months at the ticket office location.

User needs and challenges for mobility

Inclusive Pedestrian Infrastructure and Spatial Continuity:

Challenges are especially for wheelchair users and individuals with reduced mobility, due to:

- Historical cobblestone streets hinder smooth movement; however, the streets cannot be structurally modified because of their architectural and heritage value.
- Narrow pedestrian pathways, and
- Lack of ramps or tactile signage.

Inclusive Micromobility Design and Integration:

- Lack of awareness regarding adapted scooter services among tourists.

Access to Public Transport:

Lacks the fundamental aspects of accessibility for people with visual and cognitive disabilities:

- Insufficient contrast in signage, and
- Limited tactile markers on streets.

Digital Inclusion and Mobility Platforms:

- Platforms such as KIMAP, which provide accessible itineraries, show considerable promise in enabling route planning for people with mobility and hearing-related disabilities. However, their use is constrained by a lack of awareness among potential users.

Accessible Active Mobility Infrastructure:

- Parking for people with disabilities is available in Piazza del Carmine and nearby streets. Holders of the CUDE permit are also entitled to free parking and can access the ZTL (Restricted Traffic Zone) and preferential lanes upon prior notification to Servizi alla Strada (SAS). However, in order to ensure inclusive, end-to-end mobility, there is still a need to strengthen communication about these services among potential users and tourists.

AccessS roadmap

Considerations while **developing AccessS tools**, taking into account that structural modifications within the Chapel are constrained by legal and heritage protection requirements. It imposes limitations in addressing various user needs, especially those requiring physical alterations.

Wheelchair users or those with reduced mobility

- Precise measurements of doorways, pathways, and inclines to ensure wheelchair and mobility aid accessibility.
- Reliable and spacious wheelchair lifts and improved handrail usability.
- Design of seating areas with varying heights and armrest options for diverse comfort needs.
- Layout of emergency exits, ensuring clear and accessible routes for all mobility levels.
- Improve pedestrian pathways around the Chapel by levelling uneven surfaces.

Deaf visitors

- Development of clear video guides, both in LIS and with captions and navigation cues.
- Emergency exit instructions include visual alerts.
- Development of video guides for public transport.
- Train staff in sign language and deaf awareness.
- Offer navigation apps with visual cues and vibration alerts.

Blind or visitors with low vision

- Integration of Braille and high-contrast informational materials, and audio descriptions for frescos.
- Development of clear navigation with tactile floor markers.
- Appropriate lighting levels to minimise glare while maximising visibility.
- Install tactile paving and high-contrast visual signage on key routes to the Chapel.

Neurodivergent visitors

- Trained staff for better support and understanding, accommodating cognitive and sensory processing needs.
- Simplified navigation, using clear symbols and concise language, and consistent layout and wayfinding to reduce confusion.

Elderly and other vulnerable groups

- Improved handrail usability.
- Easy to read fonts in all signage.
- Comfortable seating areas with armrests.
- Improve access to the Chapel through better wayfinding and signage.
- Enhance pedestrian safety with lighting and handrails.
- Raise awareness on accessible micromobility solutions such as adapted scooter services.

Workers at the site

- Control over lighting, sound, and temperature levels to create a comfortable sensory environment.
- Ensure smooth pathways for movement,
- Training to understand and accommodate the needs of diverse visitors.

II. Christo and Jeanne-Claude Center



About the Center

It is centrally situated in Gabrovo, Bulgaria and will be located within the premises of the **former vocational textile high school**, owned by the Municipality of Gabrovo. The building comprises two interconnected four-story buildings linked by a two-story passageway. Abandoned since 2009, the building is in a state of significant disrepair and **has several accessibility challenges**. Currently, the center is in the preliminary **planning and design phases of an extensive renovation**, with construction works foreseen to start by mid-2026. The Center is part of integrated territorial investments planned under Gabrovo's Integrated Development Plan (2021-2027), which includes the renovation of the building and the revitalisation of the adjacent riverside zone as part of integrated territorial investments.

The renovation efforts aim to meet high energy efficiency standards, aligning with Gabrovo's strategic objectives for smart, sustainable and inclusive growth. The vision for the Center is to become a **hub of creativity, innovation, and cultural engagement**. Its programming will feature the works of Christo and Jeanne-Claude, famous for their large-scale environmental works of art, alongside temporary art exhibitions, artist residencies, and workshops. The Center also plans to support collaboration and entrepreneurship activities through co-working spaces and research initiatives while promoting cultural exchange and community engagement with educational programs and communal spaces.

User Characteristics

The center will cater to a diverse range of users, broadly classified into two main categories: **employees and resident artists working within the building** and **visitors** engaging with its cultural and artistic activities. The first category includes **museum staff** responsible for administration, curation, visitor engagement, security, and maintenance. Additionally, **artists-in-residence** will use the space for creative activities, exhibitions, and performances. The second category of users consists of visitors, the center will attract the general public, **local citizens** interested in exhibitions, performances, and other cultural activities. **Students** will visit for guided tours and educational programs. **Tourists, both domestic and international**, will explore Gabrovo's cultural heritage through exhibitions and artistic showcases.

Although the center is still in the process of being established and does not yet host regular activities, a number of artistic events, community engagements, and planning processes have already taken place on site. However, as these are still occasional and linked to the development phase, the visitor data from the nearby Museum of Humor and Satire (MHS), an established cultural institution and project partner provides a more stable reference point. The museum reported approximately 50,000 visitors in 2023 and 47,000 in 2024, including nearly 1,000 visitors with disabilities. Given the larger scale, broader scope, and more diverse functionality planned for the Christo and Jeanne-Claude Center, these figures can serve as a useful benchmark when estimating its future potential reach and impact, which we expect the Center will exceed.

User expectations for the built environment

Results presented below for this site differ from those of other pilots due to the Center's current non-operational status. The data collected includes expectations and recommendations aimed at ensuring the renovated building is inclusive and accessible for everyone.

Wayfinding:

- Seamless transitions from arrival points to entrances, implementing solutions like elevators, ramps, and step-free thresholds across all zones.
- Familiarize visitors with the Center's layout, promoting it as an accessible cultural institution. Participants expressed a desire for multisensory experiences.
- The importance of mediators was highlighted, particularly for children, minority groups, and other vulnerable groups.

Horizontal circulation:

- Need for accessible entrances, such as sensor-operated doors that automatically open for wheelchair users, and for tactile paving with varying textures to help individuals with low vision or blindness navigate.

Vertical circulation:

- Proposed features include elevators, ramps, and specialised mobility equipment accessible to people with visual and motor disabilities.

Specific areas:

- Each functional space within the center, including workspaces, recreational areas, the hotel, and the restaurant, must have tailored accessibility solutions.
- Design of interactive and multisensory exhibitions.
- It was also suggested that dedicated spaces be provided for specific activities, such as workshops and discussions, and that permanent exhibitions have a minimum level of accessibility for all major disability groups.

Engagement:

- The importance of colour schemes was highlighted in public spaces, as certain colours can overstimulate individuals with cognitive disabilities.
- Proposed features such as tactile features, audio guides, and magnifying glasses for reading exhibition texts.
- It was suggested that people with disabilities be involved in the design of events and exhibitions and that organisations of people with disabilities be collaborated with for specific events.
- Implementation of regular and embedded workshops in the center's programming, exhibitions dedicated to vulnerable groups, and engagement of the community in the activities of the Centre.
- Need to address digital accessibility: this includes difficulties in navigating online platforms, using public service websites, or accessing digital information in adapted formats

User expectations for mobility

Inclusive Pedestrian Infrastructure and Spatial Continuity:

- The surrounding pedestrian infrastructure of the Center is inadequate, since it is still under construction.
- Existing sidewalks are cracked, narrow, and often obstructed by parked vehicles.
- The absence of ramps, tactile pathways, and level crossings severely restricts access for individuals with physical and sensory disabilities.

Inclusive Micromobility Design and Integration:

- Current micromobility services in Gabrovo are still underdeveloped.
- While there is interest in the use of inclusive micromobility stakeholders expressed serious concerns about safety and parking infrastructure.
- Integration into the urban fabric requires designated routes, docking areas, and support services such as training or volunteer assistance.

Access to Public Transport:

- The public transport network of Gabrovo is considered adequate for a medium-sized city, but it has low spatial coverage and low frequency.
- It is not entirely accessible for wheelchair users and other individuals with reduced mobility.
- Many passengers must rely on expensive taxis due to the absence of accessible vehicles, stops, and links to pedestrian networks.

Accessible Active Mobility Infrastructure:

- Lack of bike paths and poor connectivity of the Christo and Jeanne-Claude Center with a number of other leisure or cultural activities.

AccessS roadmap

Considerations while **developing AccessS tools:**

Artists and center staff

- Accessibility training programs, resources, and guidelines for creating accessible content, promoting awareness of diverse user needs.
- Adequate resources for implementing accessibility solutions, encouraging collaboration with people with disabilities in the creative process.
- Include staff involvement in co-design workshops for infrastructure planning and cultural programming, to ensure inclusivity is embedded in project design.
- Create internal feedback loops to capture staff observations on day-to-day access challenges faced by visitors and co-workers.

Visitors and city community

- Programs that actively involve people with and without disabilities, including multisensory and interactive activities and events promoting accessibility awareness.
- Provide clear and accessible information about the center and its services, with alternative formats, such as audio, braille, digital versions. For instance, audio guides can be complemented by video guides in sign language to support deaf users.
- Collaboration with local disability organisations, and also providing trained mediators (such as sign language interpreters) to assist individuals with diverse needs.
- Ensure walkable connections between nearby urban points and the center (e.g., riverside path), with inclusive signage and safety infrastructure.
- Promote sustainable, community-based mobility solutions (e.g., volunteer-driven shuttles) that bridge gaps in public transport.

Wheelchair users or those with reduced mobility

- Precise measurements of doorways, pathways, and surfaces to ensure wheelchair and mobility aid accessibility.
- Installation of ramps and elevators with accessible controls.
- Ensure exterior paths to the center are restructured with appropriate slopes, surface conditions, and uninterrupted pedestrian continuity.
- Develop inclusive parking/drop-off points near the entrance, particularly due to the site's placement near a high-traffic road.

Blind or low vision visitors

- Development of clear navigation with tactile paving
- Information in braille and large print and provide audio versions of written materials.
- Ensure staff is trained to guide and assist visitors with sight disability.

Neurodivergent visitors

- Provide quiet spaces and sensory-friendly environments, with spaces dedicated to different uses.
- Train staff to recognize and respond to sensory and communication needs.

III. Droom je Thuis Foundation



Naaldwijk, Netherlands

About Droom je Thuis Foundation

The Droom je Thuis Foundation is a **residential care facility** in the heart of Naaldwijk, dedicated to providing individuals with multiple or intellectual disabilities a secure and supportive environment characterized by warmth and a sense of belonging.

The facility was realised by a parent-initiated foundation, for providing residential care 24 hours a day for twelve young adults with intellectual or multiple disabilities. The project as a whole, from the phase of securing funding, acquiring land, development, and construction, took a total of 10 years, and in April 2023 Droom Je Thuis care facility was ready, with 12 spacious care flats, communal areas and fully equipped with state-of-the-art care technology. The foundation's core mission is to **cultivate a supportive, small-scale living environment prioritizing individualized care, companionship, and personal attention.**



(Source: [website of Droom Je Thuis care facility](#))

User Characteristics

It is home to **young adults with multiple and intellectual disabilities**, who require 24-hour care and support: the residents are **12**, with **ages ranging from 20 to 30 years** as of 2024; the gender distribution is balanced, with 5 women and 7 men; all residents have intellectual disabilities, and approximately 50% also have physical disabilities. The group is noted to be **diverse in terms of their level of functioning and need of support**. In particular, residents present diverse disabilities, primarily in the following categories:

- **Cognitive disabilities**
- **Multiple disabilities and mobility challenges**
- **Sensory sensitivities and autism spectrum conditions**

While **all residents need some level of daily care from caregivers**, many can perform tasks like dressing, eating, and using the bathroom independently. Most residents **struggle with complex spatial navigation**. Residents engage in a wide variety of daily activities outside the premises, often supported by caregivers, parents, or volunteers. These include recreational and therapeutic outings such as swimming, frame running, horse riding, theatre visits, music lessons, trips to the forest or beach, and market or grocery shopping. Activities like church attendance, cinema visits, DJ sessions, and even vacations are also part of their routines, enriching their social lives and supporting wellbeing. While most of these outings require some level of assistance, a few residents are able to walk independently, go to the supermarket alone, or drive around the immediate surroundings, demonstrating varying levels of autonomy and participation in the community.

Some residents can use basic digital tools (e.g., touchscreens, voice commands), but **many are not able to navigate complex digital interfaces independently**.

User needs and challenges for the built environment

Wayfinding:

- Clear wayfinding inside the building, simple cues for recognizing locations (their own flat, the dining area, exits), and intuitive design that reduces confusion. For users with cognitive disabilities to feel confident in moving independently, the environment should facilitate predictability and familiarity, ensuring they can safely and efficiently reach their destinations without requiring constant guidance from caregivers.

Horizontal circulation:

- The caregivers have indicated that it would be preferable for automatic doors to be equipped with a sensor instead of a push button. This would eliminate an extra step for the staff. For the front door, they expressed a preference for installing a sliding door, as the current door often malfunctions.

Vertical circulation:

- Current elevator is too small to accommodate a wheelchair and an additional transport cart simultaneously. If a resident requires both a wheelchair and additional mobility aids, such as a medical support cart or walker, the elevator space may not allow for both, leading to separate trips or reliance on caregivers.

Specific areas:

- Wheelchair users struggle to reach certain kitchen elements, likely due to storage spaces and appliances being positioned at inaccessible heights. As a result, residents often require caregiver assistance for basic tasks that should ideally be manageable independently, reducing their ability to engage in daily food preparation.

Engagement:

- Simple and intuitive control systems are essential to promoting independence and reducing reliance on caregivers for everyday interactions with their environment. Many residents have limited digital literacy or cognitive or physical disabilities, which means that interfaces, controls, and switches must be designed with accessibility in mind.
- Poor Wi-Fi coverage in certain areas of Droom je Thuis has been reported and may limit the usability of digital devices, affecting residents' ability to use communication aids or future technology-based accessibility solutions.
- Currently, there is no intercom system, particularly one that connects apartments with key locations like the kitchen, from where the caregivers would call the residents on the intercom when meals are ready.

Evacuation and emergency exits:

- Battery issues for fire alarm pagers were reported by caregivers.

Environmental conditions in buildings:

- The only concern raised relates to outdoor lighting. A caregiver noted that the area immediately outside the residence lacks sufficient lighting, which could affect visibility and safety.

User needs and challenges for mobility

Inclusive Pedestrian Infrastructure and Spatial Continuity:

- The main connecting road (Zuideinde) lacks accessible pedestrian infrastructure
- Wheelchair users often find themselves on the carriageway, and safety is at risk.
- Sidewalks are blocked, discontinuous, or narrow, which hinders independent mobility for residents with wheelchairs or walkers.
- Parents and carers frequently identify the lack of safe and direct access to the city centre as a key impediment to mobility.

Inclusive Micromobility Design and Integration:

- Individuals with mild intellectual disabilities typically use tandems or tricycles, but they do not use e-bikes or e-scooters because of their lack of skills and unfamiliarity with these devices.
- Interest in accessible micromobility, provided that designed features are included (e.g., low boarding, mobility aid storage, speed limitation).

Access to Public Transport:

- Public transport remains underutilized by locals, primarily due to the fact that it is not accessible: few low-floor buses, no reserved seats, and no tactile or real-time information.
- Access relies greatly on the Droom je Thuis bus service and family transport.
- Taxi availability is unreliable, costly, and logistically unpredictable, often causing inconvenience.

Digital Inclusion and Mobility Platforms:

- There are no structured digital instruments which are utilized for coordinating or easing mobility among residents of Droom je Thuis.
- Both parents and staff outline the requirement for systems that assist in planned and reliable transportation planning, such as concurrent daily pickups.

Accessible Active Mobility Infrastructure:

- Mobility aids such as wheelchair bikes and tandem bicycles are utilized, but the existing infrastructure is characterized by fragmentation and inadequate support.
- There is no such infrastructure for supporting active mobility in the vicinity of Droom je Thuis (e.g., protected bike lanes, signage, safe crossings).
- Micromobility and walk modes are also not yet incorporated into public transportation, which limits multi-modal choices for travellers.

AccessS roadmap

Considerations while **developing AccessS tools**:

Wheelchair users and residents with reduced mobility

- Ensure all doorways and thresholds are compatible with wheelchairs and walkers, including turning radius and approach space.
- Consider automated or sensor-based doors to reduce reliance on physical force.
- Include accessible kitchens and bathrooms, with adjustable or lowered surfaces and appliances.

Residents with intellectual or cognitive disabilities

- Consider simple, consistent layouts and predictable spatial organization.
- Develop visual cues, icons, and color-coded systems to aid in recognition of spaces.
- Avoid overstimulation: favour clear design and minimize visual noise.
- Support memory and routines through reminders, symbolic markers.

Residents with multiple disabilities

- Combine design solutions that support both mobility and cognitive needs.

Caregivers and assistants

- Ensure smooth workflows through intuitive design and automated systems (e.g., remote-controlled doors, central communication panels).
- Design equipment solutions to facilitate care delivery without congesting the space.
- Involve staff in the testing of assistive features to ensure ease of use and integration in daily care routines.

Family members and visitors

- Ensure all doorways and entrance point are compatible with wheelchairs and walkers, including turning radius and approach space.
- Involve families in the testing of assistive features to ensure ease of use and integration in daily care routines.

IV. Casa Girasole



Massagno, Switzerland

About Casa Girasole

Casa Girasole is a non-profit **residential care home** located in Massagno (Switzerland), owned by the Municipality, offering care services outside the hospital environment, since 2002. It is dedicated to senior citizens who can no longer manage independent living and are in need of professional care and assistance. The home care aims at providing a secure and comforting atmosphere, ensuring residents receive essential care to preserve their well-being and life quality.

Casa Girasole actively participates in the 'Motta District' energy community, demonstrating a proactive approach to energy transition, thanks also to the municipality supports to Casa Girasole's inclusion in the energy community, aiming at fostering energy transition within the urban district of Via Motta in Massagno.

User Characteristics

Casa Girasole primarily **serves elderly people facing reduced autonomy**. These individuals often require different levels of assistance with daily living activities, encompassing personal care, medication management, and nutritional support. The facility offers both long-term residency and temporary assistance (for those who need rehabilitative activities or lack family support for certain periods) catering to diverse needs arising from age-related fragility, chronic issues or post-hospitalization recovery.

Beyond the core user group, represented by elderly people (aged between, Casa Girasole's user base extends to its healthcare and management employees. This team comprises professionally qualified nurses, caregivers, administrative personnel, volunteers to animate leisure time with recreational activities and the parish priest. Their roles are crucial in delivering comprehensive care and fostering a supportive and stimulating environment

User needs and challenges for the built environment

Wayfinding:

- Improvements in the internal wayfinding, can represent an opportunity for both the residents and the workers: for example, the use of tactile maps, visual cues, hearing aids and the integration with digital tools (e.g., apps, electronic signage) can represent an opportunity to further increase the use of spaces both for the residents and the workers.

Horizontal circulation:

- The main challenge is the maintenance of the building and the devices used by both the residents and the workers.
- For the purpose of enhancing an independent mobility of people with reduced mobility, the local Advocacy Group provides some general suggestions, for example the installation of automated accessibility solutions such as automated door opening through the use of phones. These suggestions also do not forget to consider the physical accessibility of common areas (such as the kitchen, outdoor spaces) for wheelchair users.

Specific areas:

- Lack of a charging station in the neighbourhood for any type of group with disabilities or specific needs.

Engagement:

- Remote Control Systems: The integration of remote-control technologies for key infrastructure elements, such as door actuation and lifts' remote-control system allowing for pre-emptive call and floor selection, thus streamlining vertical transit.
- Accessible Elevator Controls: In addition to remote lift control, accessible elevator control panels could improve usability for blind or individuals with low vision or reduced mobility.
- Digital Wayfinding and Maps: The provision of comprehensive digital building maps could be crucial to cater to diverse sensory and cognitive needs.

Environmental conditions in buildings (lighting, acoustics, indoor climate):

- The facility is committed to further improve comfort and quality of living in the accommodation, equipping the building with additional IoT solutions in selected areas of the building such as battery-powered sensors to monitor humidity and temperature and visualize the values on a display.
- When it comes to further improvements in internal environmental conditions, workers of Casa Girasole highlight the importance of lighting in key areas of the building, suggesting for example the installation of LED lights with motion sensors in corridors and common areas.

User needs and challenges for mobility

Inclusive Pedestrian Infrastructure and Spatial Continuity:

- Hilly landscape presents inherent geographical impediments to walking and makes infrastructure improvement more difficult.
- Architectural and way-finding obstacles, including confusing signage and inadequate lighting in shared or outdoor spaces, were also noted by stakeholders.
- Improved maintenance of paths and access features like ramps and tactile surfaces continues to be a requirement.

Inclusive Micromobility Design and Integration:

- Micromobility is not ideally utilized in Casa Girasole currently because of the non-autonomous nature of the majority of residents and dependence on assisted transportation.
- Stakeholder advocacy organizations pointed out scope for inclusive micromobility if designed to be safe, easy to use, and accessible. The mentioned barriers were:
 - unawareness,
 - unavailability of adapted vehicles, and
 - unaffordability, which restrict the feasibility of current micromobility services.

Access to Public Transport

- There is subsidized and public transportation by the Municipality of Massagno that offers an essential mobility connection for inhabitants.
- There are Casa Girasole resident-specific vehicles that reduce the need for conventional transit for numerous individuals.
- While formally available, individuals continue to encounter first- and last-mile access obstacles because of environmental conditions.

Digital Inclusion and Mobility Platforms

- Advocacy organizations suggest utilizing navigation applications and simple-to-use digital tools to facilitate independent travel for individuals with sensory or cognitive disabilities.
- The requirement for real-time support, i.e., app-initiated assistance from care staff or volunteers, was also presented as a prospective strategy.
- Universal access mapping and simple interfaces to assist users in navigating both indoors and outdoors is of interest.
- Nevertheless, the use of these tools remains low, pointing to an awareness creation necessity and digital literacy for caregivers and residents alike.

Accessible Active Mobility Infrastructure

- Physical access facilities and assistive technologies (i.e., ramps, elevators) are already in place at Casa Girasole but are problematic in terms of maintenance.
- Although mobility aids are intensively used inside the building, with few links to outdoor environments and wider infrastructures, the municipality is investing in multifunctional public spaces that have the potential to facilitate inclusive mobility but whose design needs to be sensitive to universal accessibility ideals.
- Urban initiatives like bike-share and better pedestrian paths must make sure they are inclusive of disability requirements.

AccessS roadmap

Considerations while **developing AccessS tools:**

Residents (elderly people with reduced mobility, hearing and low vision or blind)

- Clear and diverse navigation supports (for example: the use of tactile maps, visual cues, hearing aids and the integration with digital tools such as apps, electronic signage) to ensure circulation for people with physical disabilities and reducing reliance on caregivers' assistance.
- Improve and facilitate the movement from one space to another in the building, through the installation of automated accessibility solutions, such as automated doors.
- Appropriate space for wheelchair movements in common areas.
- Evaluate lighting levels in different interior spaces to maximise visibility (e.g., installation of LED lights with motion sensors in corridors and common areas).
- Improve energy efficiency and indoor air quality and comfort through the installation of battery-powered sensors to monitor humidity and temperature and visualize the values on a display.
- Ensure clear and accessible routes to emergency exits for all mobility levels and instructions include visual alerts.

Technology developers

- Take into account that the current main challenge is the maintenance of the building and devices used by both the residents and the workers.

Users (family members and Casa Girasole workers) with disabilities or reduced mobility

- Install a charging area for electric vehicles, designed with accessibility as a core principle, in the parking adjacent to Casa Girasole for improving accessibility for both visitors and workers

V. Palazzo di Città



Bari, Italy

About Palazzo di Città

Palazzo di Città functions as the central administrative hub of the municipal government, offering a range of essential public services, for instance it provides information, guidance, and assistance to citizens regarding municipal procedures, manages the issuance of official documents, such as residence and family status certificates, registration of births, marriages, and deaths, etc. It is situated in the city's historic core and has undergone multiple transformations since its establishment in the mid-19th century. The **building is architecturally significant**, that frames historic **Teatro Piccinni**. Originally developed in response to growing municipal needs, its construction began in the 1860s, with subsequent expansions in the early 20th century to accommodate government offices. The **building houses notable artistic and historical elements**, including frescoes by Nicola Colonna, intricate woodwork, and sculptures, which highlight Bari's artistic heritage. The Mayor's Office and the Giuseppe Massari Room contain valuable artifacts and artwork reflecting the city's political and cultural evolution.

User Characteristics

Palazzo di Città serves a diverse range of users, including **municipal employees, local citizens** accessing administrative services and visitors engaging in various events and public interactions. The Municipality of Bari employs approximately 1,800 staff members, who are distributed across multiple municipal offices located throughout the city. Of these, **122 employees have their primary workplace at the Palazzo di Città**. Considering the distribution of employees and the building's administrative functions, the municipality estimates that **approximately 500 individuals, including municipal staff, citizens, and visitors, access the central office on a daily basis**.

Among these users, special attention is given to **employees with reduced mobility**. To accommodate these employees effectively, their workstations are strategically **located on the ground floor** of the Palazzo di Città, an area specifically designed to be obstacle-free and accessible. This arrangement aims to facilitate their autonomy, ensuring smooth navigation. However, the broader goal remains to extend this level of accessibility throughout the entire building, creating a fully inclusive environment for all users, including those with visual or other sensory disabilities.

User needs and challenges for the built environment

Wayfinding:

- Absence of tactile maps as a major obstacle for individuals with visual or cognitive disabilities.
- Signage at the main entrance to support initial orientation upon entry.
- Need for clearer signage indicating the locations of offices and rooms, which would be particularly helpful for first-time visitors.

Horizontal circulation:

- Absence of ramps, elevators, or adequate circulation paths significantly impedes access for wheelchair users
- Narrow internal doors and constricted corridors, low ceilings and steep staircases

Vertical circulation

- Employees expressed concern about the inaccessibility of the upper floors, especially the second and third levels.
- Replacing chair lifts with a portable ramp.
- Safety concerns were reported related to the staircases leading from the Via Cairoli entrance.

Specific areas:

- Absence of designated seating or resting areas throughout the premises.
- Stairwells are poorly lit.
- Information desk and service counters were each rated poorly accessible by employees.

Sanitary accommodation:

- Restrooms are physically restrictive, lacking adequate space for movement.

Engagement:

- Lack of clear and accessible information about what services are available and how they can be accessed.
- There is a need for well-trained staff who can provide consistent assistance to individuals with disabilities.

Evacuation and emergency exits:

- Entry and exit infrastructure may not adequately support rapid or safe movement, particularly for individuals with various physical and sensory needs.

Environmental conditions in buildings

- Lighting in common areas was inadequate, especially in stairwells and corridors during the afternoon and evening hours.
- Ventilation and temperature control are insufficient in various building parts, including workspaces and public areas.
- Improved thermal comfort is needed, as corridors and shared offices often lack effective heating or cooling, depending on the season.
- Need for more ergonomic workstations, particularly for those with physical needs.

User needs and challenges for mobility

Inclusive Pedestrian Infrastructure and Spatial Continuity

- Bari's old town, which is pedestrianized, could offer the same active mobility, yet pedestrian infrastructure is unequal and disjointed.
- Unsafe crossing issues, uneven surfacing, and a lack of tactile or visual signals disproportionately impact individuals with reduced mobility or visual disabilities.

Inclusive Micromobility Design and Integration

- Micromobility is yet to be exploited, but there is an increasing demand for existing micromobility services.
- Key barriers are:
 - the absence of adapted vehicles,
 - few adapted docking stations,
 - low levels of security, and
 - lack of familiarity with existing formats.

Access to Public Transport

- Public transportation is used regularly—especially by commuters but held back by integration issues, inaccessibility of stops, and discontinuity of service.
- For passengers with low vision or reduced mobility, obstacles are insufficient audio/visual information and insufficient last-mile connectivity.
- To provide independent and secure access by public transportation, there needs to be better coordination of transport modes, set-down points near the Palazzo, and universal accessibility criteria in vehicle and stop design.

Digital Inclusion and Mobility Platforms

- Especially underdeveloped are digital aid tools that offer real-time instruction or on-demand instructions.
- Stakeholders requested universal design navigation apps that offer haptic maps, voice announcements, and real-time information for public transportation and micromobility travellers.

Accessible Active Mobility Infrastructure

- Active mobility infrastructure in Bari is still inadequate for persons with disabilities.
- Stakeholders suggested ensuring that docking stations are accessible, offering routes free of obstacles, and providing better interlinkage among mobility services and cultural or administrative attractions such as the Palazzo di Città. S

AccessS roadmap

Considerations while **developing AccessS tools:**

Wheelchair users or those with reduced mobility

- Ensure seamless, step-free access at all public entry points and within internal circulation routes through the installation of ramps, wide corridors, and automatic doors.
- Elevators or inclined platforms must be reliable and accessible across all floors, particularly where municipal services are located.
- Need accessible restrooms with sufficient space, support bars, and easy-to-reach fixtures.
- Require service counters at accessible heights and layouts designed for wheelchair users.
- Improve pedestrian pathways: remove obstacles, level surfaces, add ramps.
- Design rest points and shaded seating along routes.
- Deploy adapted micromobility vehicles, including seated scooters and low-step e-bikes, with designated docking hubs

Blind or low vision visitors

- Require tactile and auditory guidance, such as Braille signage, large-print maps, and voice-based navigation tools.
- Ensure all public information, online and physical is compatible with screen readers, available in audio formats, and presented with clear visual contrast.
- Install non-glare, well-distributed lighting in corridors, stairwells, and service areas to improve visibility and orientation.
- Enhance public transport with audio announcements and GPS-integrated navigation apps.
- Promote use of accessible tools with real-time wayfinding

People with cognitive or intellectual disability

- Need simplified signage, easy-to-read maps, and visual aids to navigate the building independently.
- Ensure staff are trained to provide simple explanations and visual cues when offering services.

People with sensory disabilities

- Implement visual communication tools including text-based announcements, visual alert systems for emergencies, and service counters equipped with visual display screens.
- Offer public service information in Italian Sign Language (LIS), captioned video, and written instructions.

People with chronic fatigue or visitors

- Require seating and resting areas throughout the building to pause and recover during visits.

Employees

- Need improved ventilation, lighting, and thermal regulation in shared workspaces.
- Ensure ergonomic, inclusive work environments with adjustable desks, appropriate seating, and accessible staff facilities
- Offer training on inclusive service delivery and communication with citizens with diverse need.
- Equip staff with feedback channels to report accessibility incidents and manage real-time BOMS adjustments.

VI. Mercado de Verónicas



Murcia, Spain

About Mercado de Verónicas

The Mercado de Verónicas is a main municipal **food market** in Murcia, situated in the Plano de San Francisco, close to landmarks such as the Convento de Verónicas and the Segura River. Designed by Pedro Cerdán Martínez between 1912 and 1916, it is a two-floor historic building with a surface of 3.000 m² to be renovated; it has served as a **focal point for commerce and social interactions** for over a century. Although the facade has remained intact, the market's interior has been modified over time to meet changing commercial needs. In 1975, architect Daniel Carbonell Ruiz added a mezzanine level, reorganizing the space to include 116 stalls on the ground floor and 120 on the upper level, primarily for selling fish and vegetables.

The Murcia City Council has approved the initial **phase of renovating the Mercado de Verónicas**, allocating €3.7 million to the project. The **first phase** (ongoing) **restores the exterior**, enhancing energy efficiency while preserving its historic character. The **second phase** (from 2027 onwards) **will upgrade the interior**, modernizing systems and layout to improve accessibility and functionality.

User Characteristics

The Mercado de Verónicas serves a diverse group of end users, primarily consisting of shopkeepers and customers who frequent its food market for fresh, high-quality produce. The market attracts two main demographic segments: **middle-aged and elderly shoppers, as well as younger, health-conscious consumers**. A significant portion of the visitors are individuals aged 50-60 and retirees, many of whom reside in the surrounding neighbourhood. Moreover, the market occasionally draws **tourists** who visit Murcia and seek authentic local experiences.

The market has a highly variable occupancy depending on the time of day or day of the week. On average, the market receives **500+ daily users**, including **52 regular shopkeepers, 430 consumers** (estimated from 1,720 daily tickets divided by four), and **60 tourist visitors**.

User needs and challenges for the built environment

Wayfinding:

- Lack of accessible information as a key barrier, particularly for deaf individuals who are unable to independently navigate.
- First-time visitors experienced difficulty locating specific shops or services.

Horizontal circulation:

- Lack of ramps and narrow or obstructed paths and hallways
- Wider pathways to facilitate smoother navigation for wheelchair users and for those with strollers or carts.
- Need for better organisation of stalls and aisles.
- Crowded spaces are a significant barrier to movement
- Need for wider aisles, better spatial flow, and improved visibility.

Vertical circulation

- Respondents noted difficulty using stairs or escalators. They reported issues with elevators and noted that escalators were frequently reported as out of service.
- Shoppers using carts, strollers, or wheelchairs struggle with vertical circulation due to inadequate infrastructure, and they suggested installing large-capacity mechanical ramps or freight elevators as a solution.

Specific areas:

- Lack of resting areas.
- A ramp or elevator should be installed to connect the market to the parking area.
- Service counters were reported inaccessible, pointing to issues such as counter height, queuing space, and clarity of design.

Sanitary accommodation:

- Need for dedicated toilets with showers specifically for market workers.
- Absence of child-friendly adaptations highlights the need for more inclusive sanitary infrastructure.

Engagement:

- Difficulties in maintaining a smooth customer flow around the stalls by the shopkeepers.
- Long waiting times at popular stalls or services.
- Need for sign language communication services.

Evacuation and emergency exits:

- There is a need for adequate lighting, reliable public address systems, and clear visual emergency signage to ensure safety for all during a crisis.

Environmental conditions in buildings (lighting, acoustics, indoor climate)

- Stakeholders described the current acoustic environment of the market as inadequately conditioned, with high noise levels.
- Concerns regarding the overall hygiene and visual appearance of the market.
- Inadequate lighting in or around the stalls.
- Poor ventilation or temperature control.

User needs and challenges for mobility

Inclusive Pedestrian Infrastructure and Spatial Continuity:

- Narrow pathways in the city, continuous changes in levels, and poorly maintained curbside areas create significant obstacles, particularly for wheelchair users and those who rely on mobility aid devices.
- Lack of safe pedestrian infrastructure, coupled with the frequent invasion of sidewalks by delivery trucks or urban furniture, adds to the difficulties faced by people with disabilities.
- Neglect of addressing the problem of sensory accessibility in active mobility plans in the city.
- Lack of visual warning and comprehensible signs is a primary obstacle, particularly in environments with a high level of noise.
- There is the need for extensive implementation of visual alarm signals, video intercom systems, readily visible digital signage with subtitles, and induction loops for public spaces.
- Challenging signs, excessive sensory information, and insufficient information can cause individuals with intellectual and cognitive disabilities to feel lost or excluded.
- The stakeholders recommended the need of clear, readable, and familiar signs and designing quiet resting areas within transport terminals and public areas.

Inclusive Micromobility Design and Integration:

- Inadequacy of current micromobility schemes in terms of accessibility.
- Existing micromobility alternatives are usually operated at high speeds and without set, secure itineraries, adding tension in shared public areas without adequately helping individuals with mobility limitations.

Digital Inclusion and Mobility Platforms:

- Inclusive digital tools, such as real-time navigation apps and virtual tours, need to be developed and promoted so that technological advancement does not widen existing gaps in accessibility, especially for older adults or those who are economically disadvantaged.
- Technological advancements should be followed through with appropriate staff training and infrastructure development to enable fair and uniform delivery of services throughout the city.
- Embracing digital innovation must be realized with caution to avoid widening the digital divide among the elderly or the economically disadvantaged.

Accessible Active Mobility Infrastructure:

- Accessibility is still uneven, particularly in far-flung areas where investment in infrastructure has not been proportional.
- The renovation of the Saavedra Fajardo Market is a positive example of successful application of universal design principles and improvement of accessibility in public spaces.

AccessS roadmap

Considerations while **developing AccessS tools:**

Wheelchair users or those with reduced mobility, strollers or shopping carts

- Install accessible ramps and sturdy handrails wherever there are level changes.
- Reconfigure stall layout to reduce congestion and create wider aisles for strollers and mobility aids.
- Provide accessible restrooms with appropriate fixtures and support bars.
- Design seating and furniture (service counters) with appropriate height and clearance for wheelchair users.

Deaf or hard-of-hearing individuals

- Include sign language-trained staff or video interpretation services.
- Install visual and acoustic emergency alerts that are accessible from all areas of the market.
- Equip elevators with translucent doors to enable visual communication.
- Provide accessible websites and information portals with Spanish Sign Language and subtitle options.

People with cognitive/intellectual disability or first-time visitors

- Design intuitive navigation aids such as color-coded paths and logical spatial layouts.
- Incorporate visual icons and tactile maps to support users with cognitive challenges.
- Use user-friendly digital navigation aids (e.g., QR codes) to guide first-time visitors.
- Provide staff support or guidance stations to help newcomers find their way easily.

People with visual disabilities

- Improve lighting quality with LED fixtures that reduce glare and increase visibility.
- Use high-contrast colour schemes and tactile signs for easier orientation.

Shopkeepers

- Provide dedicated rest zones for shopkeepers to rest.
- Install clean, dedicated restroom facilities with showers for market staff.
- Use real-time data systems to manage crowd levels and services.
- Improve thermal comfort, ventilation and air circulation to reduce discomfort during warmer months and improve overall air quality.
- Improve lighting systems to ensure bright, glare-free, and consistent illumination that supports both visibility and safety.

People with chronic fatigue

- Install resting areas at regular intervals to accommodate those who need breaks.
- Ensure family-friendly restrooms with changing stations for children.

All visitors

- Install visual alarms and illuminated exit signs to guide people during emergencies. Provide tactile signage and auditory emergency announcements.
- Ensure emergency exits are barrier-free and clearly marked from all areas.
- Ensure regular hygiene and sanitation within the market and its surroundings.
- Minimize noise levels.

Conclusions

This report aimed to identify and assess the needs, expectations, and challenges experienced by diverse user groups, individuals with disabilities, reduced mobility, and other vulnerable groups across six demo sites, with a dual focus on the accessibility of the built environment and the inclusivity of active mobility solutions. The approach aims to ensure that technological and infrastructural innovations respond effectively to the real needs of users.

This work has provided **a roadmap for capturing the diverse needs of end-users**, especially those with cognitive, physical, or multiple disabilities **and translating them into actionable insights for the development and implementation of AccesS tools and mobility solutions and plans**.

Moreover, the analysis of the pilot sites has highlighted the **diversity of challenges faced by users not only in terms of physical accessibility, but also regarding cognitive, sensory, and social aspects**. The process of adequately addressing the full spectrum of disabilities, such as sensory, cognitive, and psychosocial dimensions, remains a continuous learning effort. Equally important is the need to ensure **accessible information and communication**, which must be designed to accommodate diverse needs, including multiple formats (such as Braille, sign language, easy-to-read versions, and digital tools). Accessible information and effective communication systems are essential for enabling independent navigation, active participation, and informed decision-making by all users, particularly those with communication or sensory disabilities. There is a need for deeper collaboration with disability advocacy groups, experts in inclusive design, and local communities to ensure that future design iterations are comprehensive and representative of all user groups.

The analysis of user needs has shown that **accessibility, usability, comfort, and sustainability are not separate goals, but deeply interconnected dimensions of inclusive innovation**. The findings collected so far will guide the prototyping and testing phases, enabling iterative development of smart and adaptable tools co-created with stakeholders and tested in real-life settings to support active mobility, energy awareness, and digital inclusion.

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