



Inclusive Design: How GenAl can close the Digital Access Gap

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Across the world, some people are still unable to access many digital products and services. While generative AI (GenAI) can be used to customise interfaces for diverse user groups and bridge the digital access gap, GenAI alone will not automatically promote inclusivity. The implementation of inclusive design—rooted in an inclusive culture—is essential to building a fair society where everyone, regardless of their background or abilities, has equal access to digital services and opportunities.

This article offers practical advice and illustrative case studies to guide organizations on their journey towards adopting inclusive design practices and fostering inclusive cultures. By embracing these practices, organizations can contribute to a more equitable world, empower individuals, enhance business performance, and reduce reputational risks.



Summary

The digital access gap is a widespread issue globally. Historically, many of the digital services and products designed by our societies are not inclusive. Despite governmental efforts and regulations, a persistent access gap remains, resulting from inadequate inclusiveness in both public and private sectors. This results in diverse user groups being unable to optimally access services, while scarce design and technology specialists continuously try and fix solutions to make them accessible, placing metaphorical 'plasters' to websites and apps. Although compliance with regulations over time is somewhat achievable, transforming the global digital landscape into a universally accessible environment remains a formidable challenge.

Generative AI (GenAI) is disrupting the structure of the digital landscape. Recently, Jacob Nielsen (2024) discussed how AI could soon rescue diverse user groups, by creating customized user interfaces for everyone, tailored to their specific needs. This concept is already being demonstrated by innovations in development and working digital solutions. However, the question remains:

Can GenAI really close the digital access gap?

It is becoming clear that GenAl alone will not inherently foster inclusiveness. Inclusive design (or inclusive culture) is crucial in building a fair society where everyone, regardless of background or abilities, has equal access to services and opportunities. Organizations creating products and services are responsible for steering modern technologies towards inclusivity to bridge the digital access gap.

This article provides hands-on advice and example cases guiding organizations in the journey of adopting inclusive design practices and fostering inclusive cultures. By doing this, organizations can not only help build a more equitable world with autonomous individuals but also improve their business performance and mitigate reputational risks, increasing users' loyalty and trust.



The digitalaccess gap

A mismatch between services and user needs



Despite the efforts of governments, many digital services and products are not inclusive – they can't easily be accessed by people who have either a temporary, situational or permanent visual, audio, motor, speech or cognitive impairment. As a result, a persistent access gap remains.

Global estimates indicate that 16% of world population has an impairment (WHO, 2023). In Europe, 27% of the population over the age of 16 had some form of disability in 2023 and face challenges related to discrimination, social exclusion, unemployment and high risk of poverty (European Council, 2023). One of the underlying causes for those challenges is the limited access they have to digital services. In the US, 42% of individuals with disabilities reported struggling to navigate government websites (Deloitte Insights, 2023). In the Netherlands, almost half (49%) of government applications and websites do not comply with accessibility obligations (Dashboard Digitoegankelijk, data reported on 27-03-25). As well as those with permanent accessibility limitations, many people with temporary or situational impairments can be affected.

The digital access gap can severely impact people's lives. Accessibility limitations can prevent people from using a basic government service, such as renewing an ID or passport, where citizens usually have no choice. This is why accessibility and inclusive design is a must-have in public digital services.

Beyond government-related services, accessibility limitations can, for example, impact people's ability to buy products and services online. A lack of accessible digital experiences can also make people feel like they don't belong in a workplace or social context, directly impacting their wellbeing.

The access gap is set to widen as the population ages and society seeks to include more citizens in the workforce. The rapidly aging population is likely to increase the number of users with age-related mental and physical impairments (WHO, 2024). Furthermore, new groups with possible mismatches are also being identified, as science and health advances our understanding of humans and the associated needs. For example, neurodiverse people have specific needs to navigate and make use of digital services effectively.

Accessibility

From differentiator to 'hygiene' factor

Regulatory initiatives have been helping increase the accessibility of digital services. The World Web Consortium has been providing recommendations since 1999, publishing updated Web Content Accessibility Guidelines (WCAG) 2.2, and a Working Draft for WCAG 3 at the end of last year (W3C, 2024). These global recommendations are supported by European initiatives, including the EU Web Accessibility Directive in 2016, which focused on the accessibility of web sites and mobile applications within the public sector. Approved in 2019, and coming into effect in June 2025, the European Accessibility Act expands accessibility requirements for commercial products and services regarded as the most important ones for people with disabilities (European Commission, n.d.).

Historically, some businesses have been able to use accessibility as a point of differentiation. Users with disabilities are naturally more loyal and willing to buy from companies with an explicit inclusive culture and accessible services, while general audiences may also take a more favorable view of these organizations. As well as positively impacting commercial outcomes by enabling diverse user groups to access a product or service, inclusive design also contributes to higher customer trust and loyalty, reducing reputational risks. In 2024, Nike was publicly criticized by a Paralympian for using amputee mannequins to promote its products when it doesn't sell single shoes (Gilibrand, P. & Pandey, M., 2024). This episode prompted the company to further explore ways to sell one single shoe for this client group.

However, isolated and reactive actions and regulations are insufficient to address the complexities of inclusivity. As their expectations rise, audiences are increasingly vocal about their needs and rights. Inclusive design is now evolving into a fundamental hygiene factor. While governments are promoting inclusivity, success depends on the commitment and collaboration of the ecosystem and the private sector.

In light of the current labor market challenges, which encompass both surpluses and shortages, it is critical to increase the chances of matching skills and tasks. A significant number of individuals with disabilities represent untapped potential within the workforce.



Through inclusive design, access to jobs can be improved, leading to greater productivity and higher overall employment rates, ultimately contributing to a more equitable and productive society.

Al-powered personalization promises to narrow the accessibility gap

Generative artificial intelligence (GenAI) has the potential to create customized user interfaces for everyone, tailored to their specific needs (<u>Nielsen</u>, J., 2024). This concept is already being demonstrated by innovations such as <u>"Be My AI"</u>: a functionality of a mobile app that uses GenAI (GPT-4) to offer blind or visually impaired users vivid descriptions of images and scenes, along with context-specific assistance. In the past, the same service was only provided by volunteers; the introduction of GenAI technology has broaden the service capability and complements very well with the additional comfort and humanity of volunteer contact.

Al can detect the specific access needs of an individual and then automatically adjust the user interface and interaction to match the contextual needs and disabilities of users. This can benefit both permanently and temporarily disabled people. Here are some possible scenarios where GenAI could help reduce the digital access gap or foster and inclusive digital culture: The GenAl revolution brings the possibility to create a new inclusive digital landscape, leaving part of the unintentional digital access gap created in the past.



ADAPTIVE INTERACTION FOR PASSPORT CONTROL

As a visually impaired citizen arrives at an automated passport control, a camera detects the traveller lacks eyes focus and has 'clouded' eyes. The camera initiates voice interaction to complete the passport control. To prevent feelings of exclusion or discrimination, this type of machine could select the initial user interface channel randomly, when no cues are present, and then leave it up to the user to choose their preferred interaction mode.



SIGN LANGUAGE AVATAR IN CAFE

A deaf person enters a busy café and wishes to place an order. Upon entry, a smart device equipped with GenAI technology detects the individual's hearing impairment. The device automatically activates a sign language avatar on its screen, which greets the customer and asks how it can assist them today.



ADAPTIVE SMART HOME INTERACTION

A father is feeding his newborn baby at home. Detecting the father's hands are occupied, the smart home system enables him to use voice commands to adjust the room temperature or play soothing music for the baby. The system could also provide visual cues, such as notifications on a smart display, ensuring that the father remains informed, without having to divert his attention from the baby.



CONTEXT-AWARE INTERACTION ON THE GO

Traveling with big bags and boxes on public transport, a citizen has no hands available to open and share the ticket available in her e-wallet. Connected AI detect the situation (using e.g. behaviour patterns, agenda information and context data) and enable her to confirm the exchange of ticket information with the machine using voice control.



GENAI ASSISTED ACCESSIBILITY

Beyond these examples, in the short-term, technology and AI are already helping reduce the digital access gap by automating accessibility testing. AI-assisted accessibility testing is also a promising temporary solution to the access gap: It can perform the 'plaster' work to remove existing accessibility hurdles more effectively and efficiently. In summary, Generative AI technologies promise to revolutionise accessibility, unlocking new opportunities and breaking down barriers for individuals enhancing:

- Al-driven adaptive interface and personalisation: Adapts display and modality according to unique user needs.
- **Context-aware interaction:** Switches to more convenient modality based on users' context (e.g. voice control if users' hands are occupied).
- **Content simplification:** Automatically rewrites and summarizes text or information in a way humans can process with less effort.
- Automated accessibility testing and fixes: Flags and solves design gaps like missing alternative text for keyboard navigation or poor color contrast.

Inclusive design to ensure product and service fit



Inclusive design is an umbrella term that relates to (or combines) usability, inclusivity, and accessibility. Inclusive design is an umbrella term that covers usability, inclusivity and accessibility. Whereas digital accessibility focuses on enabling people with diverse needs to access digital products, inclusive design is the practice and design process that revolves around the diversity of users and their needs. Note, there can be friction between inclusive design and universal design, which focuses on high-volume user groups and might therefore exclude minorities (The Interaction Design Foundation, 2016).

Inclusive design perceives disability as a mismatch between human needs and features of a product, built environment, system or service (Holmes, 2018). By recognising and responding to these differences, inclusive design can ensure a final product or service welcomes all users, regardless of gender, race, age, language, life situation and neurodiverse profile.

An inclusive design culture fosters empathy, accessibility and equity, striving to create products, services and environments where individuals across a spectrum of demographics, abilities and cultural contexts feel safe. Education and awareness are crucial to ensure an inclusive mindset in organizations.

Inclusive design methods take a social- or human-first approach. This means involving diverse groups in co-creating, testing and improving proposed digital services. This approach ensures there is enough diversity in feedback to improve services, thereby increasing the chances of a match between the end product and the needs of all possible users. This has an obvious positive commercial impact, which has been underlined by market research: "57% of consumers are more loyal to brands that commit to addressing social inequities in their actions" (Deloitte Insights, 2022).

Inclusive design practices and their outcomes are not only beneficial for individuals experiencing permanent, situational, or temporary disabilities; they also enhance the overall user experience. The more adaptable and intelligent the user interface and interaction modalities, the better the experience will be for all users.

Inclusive design: illustrative cases

Despite the ongoing digital access gap, numerous examples of inclusive design have emerged, facilitated by GenAI and other technological developments. In this section, we present a non-exhaustive overview that highlights both inclusive products and service design, showcasing how innovative solutions can bridge accessibility barriers and enhance user experiences for everyone.



DISPUTE RESOLUTION PLATFORM

In the Netherlands, homeowners can use an <u>innovative platform</u> to help resolve disputes. Users are guided by a navigator ("Verkenner"), which uses AI to collect relevant details, identify relevant legal precedents, deliver concise summaries and help finding suitable next steps. If a resolution cannot be reached collectively, the platform offers professional guidance, ensuring that all members have easy access to the necessary resources and assistance for effective conflict resolution.



VIRTUAL CIVIL SERVANT

This prototype of a virtual assistant, created by Deloitte, assists citizens with the translation of letters and answers to contextual questions. The Generative AI-enabled virtual assistant serves as the interface between citizens and government information, helping with inquiries and transactions through empathetic, natural language. It distills and summarises information from myriad sources on a variety of topics in multiple languages, facilitating access to government digital services, such as retrieving regulatory information or scheduling appointments.



SUBSIDY ASSISTANT

Developed by Deloitte, the <u>Subsidy</u> <u>Assistant</u> helps farmers navigate the complex landscape of subsidy programs by providing easy access to information on available subsidies. It simplifies the intricacies of subsidy applications and eligibility criteria. After gathering basic figures and investment plans from companies, the Subsidy Assistant matches and prioritizes relevant subsidy programmes.



OMRING: DIGITAL HUMAN WENDY

Employing AI, <u>Wendy</u> is designed to provide companionship for lonely people. The software simulates human interaction with a friendly voice and facial expressions, allowing users to communicate through conversation, emotion and context. Wendy was developed by Deloitte in collaboration with Omring.



ARKITE: ASSEMBLY OPERATOR GUIDANCE

Arkite supports machine operators by providing live feedback and instructions using colours and lights. <u>The system</u> displays coloured projections on picking locations, supported by text, image and video instructions, along with 3D sensor validation of correct picking. This solution facilitates the onboarding of new employees and enables the inclusion of cognitively impaired individuals in assembly jobs.



SIGN LANGUAGE COFFEE BAR

In some buildings in the Netherlands, <u>sign language coffee</u> <u>bars</u> employ partially deaf employees and enable clients to order coffee in sign language. The technology is simple: clients can tap a screen to select their coffee order, which then displays a short instructional video in the corresponding sign language.



BE MY EYES (AI)

This <u>mobile app</u> employs GenAl to offer blind users descriptions of images and scenes. Read the section 'Al-powered personalization promises to narrow the accessibility gap' for more information on this illustrative case.



How to scale up inclusive design

To truly harness the potential of inclusive design, organizations should follow a structured approach, encompassing five steps.

STEP 1: DISCOVER

Empathise with diversity in user groups

Avoid the common pitfall of assuming familiarity with your user groups. Instead, engage in thorough research to understand the diverse needs and contexts of all potential users. This includes recognizing different profiles with accessibility challenges, such as those with visual, auditory, cognitive or physical impairments. Incorporate these insights into your personas and customer journey maps, ensuring that the design process reflects the full spectrum of user experiences.

STEP 2: DESIGN

Adopt an inclusive approach

When brainstorming design concepts, actively involve diverse groups to ensure their specific use cases and scenarios are considered. This collaborative approach fosters innovation and leads to solutions that cater to a wider audience.

Prototype with GenAl

Leverage GenAl to create prototypes quickly and efficiently. GenAl can facilitate the rapid development of multiple iterations, allowing teams to explore various design avenues that address the diverse needs of users. Testing these prototypes in real-world settings provides valuable insights and helps refine the design further.

STEP 3: EVALUATE

Conduct comprehensive accessibility testing

Perform rigorous accessibility tests on your prototypes to identify potential barriers. These tests should evaluate usability from the perspective of individuals with different accessibility challenges.

Engage diverse user groups

Whenever possible, involve a broad spectrum of user groups, including those with varying needs and disabilities, in your user testing phase. Their feedback is invaluable in assessing the effectiveness of your design and ensuring that it meets the intended accessibility standards.

STEP 4: BUILD

Embrace an accessibility-first approach

When transitioning from prototype to development, prioritize an 'accessible first' methodology. Building with accessibility in mind from the outset is far more effective and efficient than attempting to rectify accessibility issues after the fact.

STEP 5: SCALE UP

Assess accessibility status

Conduct regular accessibility audits to evaluate the current state of your products and services. These assessments should provide insights into areas that require improvement.

Obtain accessibility certifications

Pursue recognised accessibility certifications to validate your commitment to inclusive design. Use the recommendations from these audits and certifications to enhance your offerings continually.

Create development roadmaps

Develop clear roadmaps for the ongoing integration of inclusive design and accessibility into your product and service development processes. This strategic approach ensures that accessibility becomes ingrained in your organisation's culture.

Cultivate Inclusive Design capability

Make inclusive design an essential capability within your organisation. Provide training and resources to empower your teams to prioritise inclusivity in all aspects of their work, fostering a culture that values accessibility and diversity.

By following these steps, organisations can leverage inclusive design and technology to make meaningful progress towards reducing the digital access gap, ultimately creating a more equitable digital landscape for all users.

Addressing potential risks and mitigations

Beyond disabilities and accessibility, various analyses and experiments have highlighted the significant risks of bias related to gender, race, age, and other factors within GenAI. While GenAI has considerable potential to address the inclusion gap, it also carries substantial risks of perpetuating exclusion. It is essential to recognise that GenAI alone cannot guarantee inclusion.

To become inclusive and accessible, organisations need to address potential risks and mitigations across three areas:

- Data ethics and privacy: Using sensors and cameras to personalise interfaces, for example, requires rigorous safeguards. Government organisations should articulate clear guidelines about data collection, usage and retention, ensuring citizens' privacy is always respected.
- Al bias: If GenAl models are trained on data that does not represent diverse groups (e.g. minority languages or less common forms of disability), the system may inadvertently exclude or misrepresent them. To mitigate this, ensure representative datasets, conduct algorithm assessments, and run testing with diverse users.
- **Technical reliability:** Accessible services must stay functional under various bandwidth conditions and devices. Governments and commercial organisations should maintain robust infrastructure and test for low-tech or offline scenarios to drive equitable access.

Deloitte offers comprehensive support for organisations in managing various challenges associated with AI, including designing and implementing AI risk and quality management frameworks, conducting independent algorithm assessments, and ensuring regulatory readiness. Promoting fairness, transparency, robustness and privacy in algorithm deployment, while also addressing the risks and guidelines associated with integrating trustworthy and generative AI, is crucial to manage the risks and maximise the benefits of AI (<u>Deloitte Insights</u>, 2025).



Looking ahead: a call to collaboration

Designing inclusive digital services demands more than technology upgrades. It requires cultural buy-in at all levels, strong collaboration between government agencies and the private sector, and co-creation with users.

Over the coming years, the digital world will evolve into Aldriven, adaptable, context-aware hubs, supporting voice, gestures, augmented reality and more. By embedding inclusive design as a core principle today, governments and companies can ensure that these future innovations reach every person and cement trust in their organisations.

Inclusive design backed by GenAI and organisational commitment, can transform the digital landscape so that every user, irrespective of their background, abilities, context and situation, can benefit from and participate in society on equal terms.



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