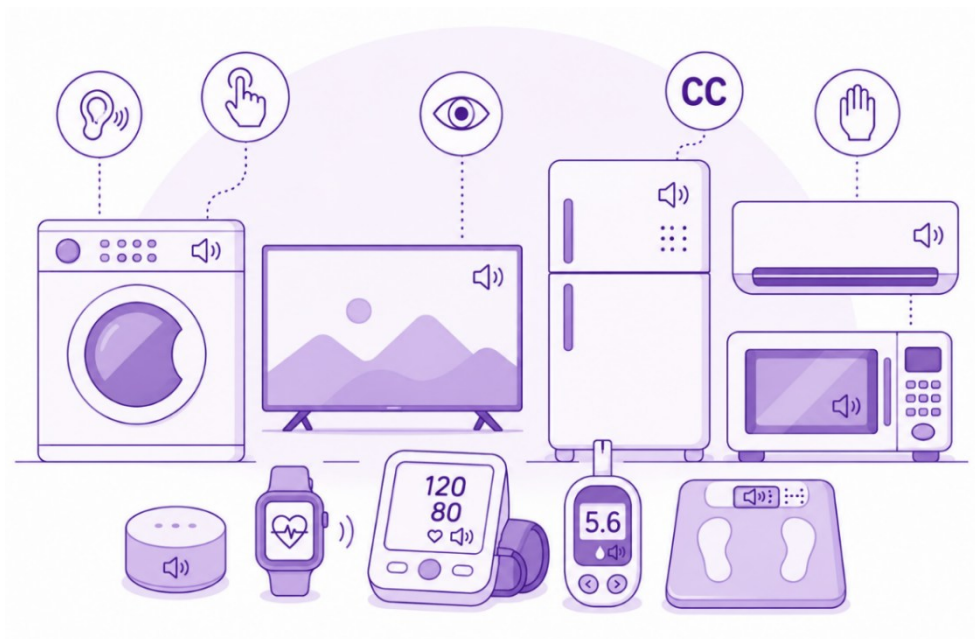




BUILT TO INCLUDE

Expanding the Reach of Consumer Products through Accessibility

Global Accessibility Awareness Day 2026



Xavier's Resource Centre for the Visually Challenged (XRCVC)

St. Xavier's College, Mumbai

Built to Include: Expanding the Reach of Consumer Products through Accessibility

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A white paper prepared by the [Xavier's Resource Centre for the Visually Challenged \(XRCVC\)](#). St. Xavier's College, Mumbai

1. Executive Summary

Consumer products are increasingly becoming smart, app-based, and touch-enabled. This paper highlights the importance of ensuring these products become increasingly accessible and usable for diverse consumers, including persons with disabilities, elderly users, and people facing situational challenges.

The Need for Product Accessibility

The paper highlights the need for accessibility of various white and brown goods through four key perspectives:

- The Human Case – promoting independence, safety, and inclusion for a wide range of consumers
- The Business Case – expanding markets, improving customer experience, and strengthening brand value
- The Regulatory Need – aligning with evolving accessibility laws and standards
- Alignment with global goals and guiding principles – accessibility of products aligns with the United Nations Sustainable Development Goals (SDGs) and Economic Social and Governance (ESG) principles

Towards Increased Accessibility of Products and Customer Experience

The paper outlines practical pathways for organisations to improve accessibility through:

- Inclusive design of physical product and accessibility of its digital infrastructure
- Organisational awareness and accessibility training
- Co-creation with persons with disabilities and diverse user groups

The paper Built to Include, thus positions accessibility as an opportunity to create better products, stronger customer experiences and better brand equity for businesses through inclusive innovations and designs.



2. Introduction

Consumer products – both white goods and brown goods – are an integral part of everyday modern life. From home appliances and kitchen devices to televisions and entertainment systems – these technologies enable comfort, convenience, communication and independence.

As their technology continues to evolve, ensuring their accessibility becomes critical. Accessibility, simply put, is creating usable, safe and effective products and experiences that account for human diversity, so that these products can be used independently and meaningfully by all consumers, irrespective of their abilities, age, situational and environmental limitations, thereby expanding the reach and relevance of these products.

This paper has been prepared to mark the occasion of the Global Accessibility Awareness Day, 2026, a consciousness-raising awareness day focussed on digital access and inclusion for persons with disabilities. It is a call to manufacturers of consumer electronics to place accessibility at the centre of product innovation, ensuring that no consumer is excluded from participating fully in an increasingly digital world. This is in alignment with the idea of “Leave No One Behind” of the United Nation’s Agenda 2030.

3. The Need for Product Accessibility

The importance of product accessibility can be understood through four interconnected themes -

- 3.1. The human case for accessibility
- 3.2. The business case for accessibility of products
- 3.3. The regulatory need for product accessibility
- 3.4. Alignment with global goals and guiding principles

The key ideas of these themes have been summarised below.



Figure 1: The Need for Product Accessibility – the 4 core themes

The Human Need	The Business Case	The Regulatory Need	Alignment with Global Goals and Guiding Principles
<ul style="list-style-type: none"> • Promotes independence and equal participation in everyday life for persons with disabilities • Creates safe and usable products for wide range of populations such as the ageing population, those with temporary disabilities, and situational and environmental limitations 	<ul style="list-style-type: none"> • Business impact through expanded customer base and improved product adoption • Brand differentiation through positioning as a leader in inclusive and responsible innovation • Improved overall Customer Experience (CX) for all 	<ul style="list-style-type: none"> • Alignment with international conventions United Nations Convention on the Rights of Persons with Disabilities • Alignment with national laws and regulatory standards such as the Rights of Persons with Disabilities Act (2016), Bureau of Indian Standards BIS 17802 • Increasing judicial focus on building accessibility into products and services 	<ul style="list-style-type: none"> • Contributes to United Nations Sustainable Development Goals (SDGs) - specifically SDG 9 (Industry, Innovation and Infrastructure); SDG 10 (Reduced Inequalities) and SDG 11 (Sustainable cities and communities) • Strengthening of Environmental Social and Governance (ESG) commitments

3.1 The Human Case for Accessibility

The World Health Organization (WHO) and the International Bank for Reconstruction and Development (IBRD), also known as the World Bank, in their World Report on Disability 2011 had estimated that over 1 billion people (15% of the population) live with disability.¹

The prevalence of disability in India was 2.2% of the total population, with an incidence of 86 per 100,000 persons according to the National Sample Survey Organisation (NSSO)'s 76th Round survey (July–December 2018), released in Report No. 583.²

Most experts believe that these are highly conservative figures and disability would range between 6-7percent of the total population of India. Further, this number was calculated keeping in view the old definition, where only 7 conditions were recognised by law as a disability. However, with the new law, The Rights of Persons with Disabilities (RPWD) Act, 2016, 21 conditions have been recognised as disabilities. Moreover, geriatric difficulties have not even been taken into consideration while calculating these numbers.

¹ World Report on Disability 2011, The World Health Organisation and The World Bank

² National Sample Survey Organisation (NSSO)'s 76th Round survey (July–December 2018), Ministry of Statistics and Programme Implementation, Government of India



The population of senior citizens (aged 60 and above) in India was approximately 104 million in 2011, and is projected to rise from 138 million in 2021 to 173 million by 2026, comprising roughly 12.4% of the total population by then. By 2036, this number is projected to increase to 230 million. The challenges of aging population include:

- Acquired disabilities and additional incapacities increase with aging population and longevity of life does not necessarily correlate with the quality of existence
- Changing family dynamics leading to a growing trend in the number of elderly living alone with minimal help or caregiving requiring them to be as self-sufficient as possible

This requirement notwithstanding such persons find themselves helpless when they have to engage with gadgets which are supposed to improve their quality of life and promote their independence. The broader eco and social systems including products and services would have to provide offerings to meet this increased need. Proactive organisations who look at design from a born accessible perspective would definitely gain traction from a first mover advantage point of view.

In modern days, there is a trend to develop most machinery with touch screen interfaces or those operable by apps which tend to be inaccessible. This results in overdependence of people with blindness and other print disabilities upon their friends, relatives and paid assistance.

We share below few of the typical issues and challenges that persons who are not able to effectively engage with the mainstream products based on touch-screen interfaces or inaccessible apps often times have to encounter.

- A person with blindness, while using a touch screen washing machine, inadvertently, changed the program which he did not realise until much later, when he had to call his neighbour to see why the machine did not stop at its scheduled time.
- In a different case, a 70+ year old person, inadvertently touched the machine as she was passing by it, which resulted in the child lock being activated. As she was alone at home and could not understand what had happened, she became overly anxious, leading to a severe asthma attack. Incidences of these kinds are quite common due to lack of accessibility. It is always desirable to have machinery that is accessible and easily usable by all.
- Persons with blindness often times prefer to buy a microwave with push buttons as they give greater haptic feedback. The same if built into a touch screen interface with beeps / voice enabled outputs could reach a larger audience.
- Many persons with disabilities totally have to shut down their units washing machines / microwave and restart them over again to understand where the



cycle of the unit is currently. This can result in food being under cooked or over cooked in the case of microwaves and wastage of water and detergent for washing machines.

- Inadequate tactile markings on tea / coffee vending machines for cup positioning have caused burns on the fingers of blind persons or staining the machine, operating such devices independently as they did not get the correct orientation.
- A person with blindness living alone not being able to use the communication system on the smart doorbell installed by the society to speak with the person outside because of the lack of tactile buttons on the touch-screen interface defeating the purpose of this key safety feature of the system.
- A blind person locked out of the house because of inaccessibility of the smart lock app till trusted sighted assistance could be available.

Therefore, it is crucial to consider accessibility of products, especially those like home appliances, and vending machines – both in terms of physical structure, and, wherever applicable, mobile apps and websites. All this, in present times, can be achieved easily as the technology and knowhow is available and inexpensive.

3.2 The Business Case for Accessibility of Products

3.2.1 Business Impact – Expanded Customer Base

Products that are designed to be usable by diverse groups can help businesses expand their reach to a wider market including people who are often left out by design such as:

- Rural users
- Persons with disabilities and their families, caregivers and supporters.
- Elderly users – a huge number ignored in products and services.
- People facing temporary or situational challenges (injury, poor network, etc.).

Thus, by designing for inclusion and accessibility and addressing unmet customer needs, businesses can unlock greater expansion opportunities.

3.2.2. Brand Differentiation

Designing inclusive and accessible products for all has a great impact on the brand equity of a business as it:

- Positions the company as a leader in inclusive and responsible innovation
- Builds trust and loyalty among customers
- Gives a strong competitive advantage in India and global markets



3.2.3. Improved Customer Experience

Accessibility improves usability for everyone through the “Curb Cut Effect” wherein features made for persons with disabilities often end up benefiting everyone. Examples of this include features such as voice control, closed captioning for videos, ramps etc which improve convenience and ease for all users. Creating accessible products can significantly improve the overall Customer Experience (CX) for all users, not just a few, reaping rich dividends for the business.

3.2.4. Alignment with Organisational Values

An analysis of vision, mission and organisational values statements across businesses portrays common themes of innovation, customer-centricity, sustainability, quality, and improving everyday life for consumers. Accessibility and inclusive design align closely with these values by ensuring products become more usable, relevant, and meaningful for diverse consumers.

3.3. The Regulatory Need for Product Accessibility

Beyond the social and human imperative, policy formulators globally and nationally have taken note of this human rights requirement and we have a range of laws and policies which address the accessibility needs.

United Nations Convention for the Rights of Persons with Disabilities was the first human rights convention of this century and India was one of the first countries to sign and ratify it. Under its obligations, India is required to make all the facilities and amenities provided to its citizens universally accessible.³

This obligation has also been made part of India's domestic legal framework through the enactment of the Rights of Persons with Disabilities (RPWD) Act 2016. Sections 40-46 of the Rights of Persons with Disabilities Act 2016 lay emphasis on various aspects of accessibility, and section 43 particularly addresses the designing of accessible consumer goods based on principles of universal design, promoting the full and effective participation of persons with disabilities in all spheres of life.⁴

Additionally, there is an increasing legal focus on accessibility. In the case of Rajive Raturi vs Union of India (UOI) and Ors., (2024) the Hon'ble Supreme Court of India recognised accessibility as an essential human right. Recently **over 150 organisations** have been flagged for inaccessible products by authorities.

[Annexure A](#) provides a list of various standards laid down by several international and national authorities to promote the ease of use and consequent accessibility.

³ United Nations Conventions on the Rights of Persons with Disabilities, 2008

⁴ Rights of Persons with Disabilities Act, 2016



3.4. Alignment with Global Goals and Guiding Principles

Accessibility is increasingly recognised as a key contributor to global sustainability and governance frameworks. Integrating accessibility into products and services aligns with both the United Nations Sustainable Development Goals (SDGs) and broader Environmental, Social, and Governance (ESG) priorities.

3.4.1. Sustainable Development Goals

India has been a leading signatory to the UN's Agenda 2030 document, central to which is the motto, 'Leave No One Behind'. Accessibility contributes directly to several SDGs of the United Nations⁵, including -

- **SDG 9: Industry, Innovation and Infrastructure** – Promoting inclusive and sustainable innovation in product design and technology
- **SDG 10: Reduced Inequalities** – Ensuring equal access to products and services for persons with disabilities and other underserved groups
- **SDG 11: Sustainable Cities and Communities** – Enabling accessible and inclusive environments through everyday products and systems

3.4.2 Alignment with Environmental Social and Governance (ESG) Priorities

The World Economic Forum (WEF) recognizes ESG as a strategic concern for businesses that underlie their long-term survivability⁶:

- **Environmental (E)**: Inclusive design reduces inefficiencies, product misuse, and resource wastage by improving usability for all
- **Social (S)**: Promotes inclusion, accessibility, and equitable user experiences
- **Governance (G)**: Supports compliance with evolving accessibility regulations and global standards

This alignment strengthens the ability of businesses to meet global benchmarks, regulatory expectations and stakeholder expectations.

⁵ United Nations Agenda 2030, 2015

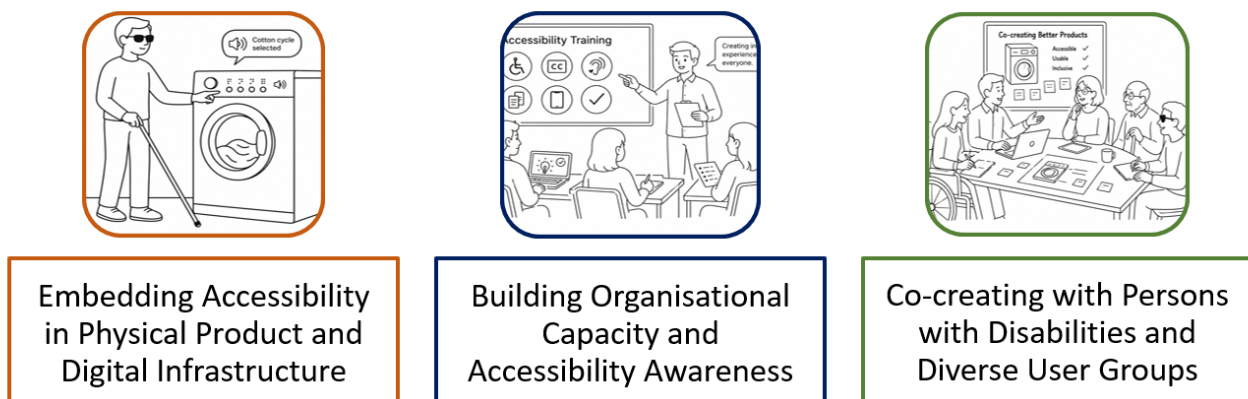
⁶ World Economic Forum, ESG

4. Towards Increased Accessibility of Products and Customer Experience

Building accessibility into products that meet the needs of diverse populations can be an opportunity for businesses to reach wider markets, improve customer experience, create brand equity and make their business future-ready. Accessibility is most effective when it is integrated into the design and development stage itself rather than being added later as a retrofit or compliance requirement.

There are three key areas through which organisations can move towards increased accessibility of products and customer experience. These have been summarised in figure 2 below

Figure 2: Three Key Areas for Increasing Accessibility of Products



4.1 Embedding Accessibility in Physical Product and Digital Infrastructure

4.1.1 Accessibility of the Physical Product

The physical design of the product can be made inclusive through -

- Improving physical ergonomics and customer interface for ease of use for all consumers with intuitive layouts, easy-to-grip controls, large and readable displays with high contrast
- Adding tactile, audio, or visual indicators in appliances and devices to support multi-modal interaction



4.1.2 Digital Infrastructure Accessibility

With the growing trend in smart products relying on touchscreen interfaces, Internet of Things (IoT) and AI-enabled systems, the need for the digital infrastructure to be accessible cannot be emphasised enough. A few steps to enhance the accessibility of this digital ecosystem of the product include:

- Making websites, apps, and portals fully accessible (WCAG standard compliant)
- Building inclusive Internet of Things (IoT) and smart device interfaces
- Ensuring AI systems have features such as voice interaction and screen reader and assistive technology compatibility
- Providing built-in features like dark mode, adjustable text size and support for device accessibility settings
- Providing accessible user manuals (accessible PDF or alternate accessible formats).
- Creating accessible marketing and communication content:
 - Social media posts
 - Emails and documents
 - Videos with closed captioning and sign language

While accessible features exist in day-to-day products, there is still a lack in the accessibility with advancements in technology. The following illustrative list offers suggestions for features for both white goods and brown goods that make products accessible for various user groups:

Product	Features	How it Helps
Microwave oven	Tactile buttons and knobs, audio prompts, high contrast display, accessible app for smart microwaves	Supports independent cooking for people with sensory disabilities, elderly and prevents risk of incorrect settings, burns and injuries
Washing Machines	Tactile buttons, audio prompts, large and high contrast display, accessible app compatible with screen-readers, adjustable text size etc	Enables persons with sensory and cognitive disabilities and elderly users to operate independently and prevents wastage of water and resources



Refrigerator	Large display, adjustable text size, high contrast display, tactile buttons and knobs for temperature control, audio alerts for door	Helps persons with low vision, blindness and elderly users operate independently
Smart Doorbells/ Intercom	Physical tactile buttons, multi-sensory input and feedback options, accessible mobile apps	Ensures independent and safe communication for persons with visual impairment, hearing impairment and elderly users
Vacuum cleaners/ robotic cleaners	Voice assistance, accessible apps, simple physical tactile controls	Supports independent use by persons with various disabilities and elderly users
Smart speakers/ AI assistants	Voice interaction, simple set up process	Enables independent usage by persons with disabilities and elderly people
Coffee and Tea Vending machines	Audio cues, tactile buttons and markers for cup placements, Braille labels, large readable controls	Increases independent usage and safety for persons with disabilities and elderly users
Televisions	Tactile controls, audio indicators, adjustable text size display, high contrast display	Supports ease of use of persons with disabilities, elderly users
Personal User Home Health Devices (BP monitors, glucometers, weighing scales)	Large display, adjustable text size, audio output, high contrast tactile buttons	Helps correct usage of devices and independent monitoring of health for persons with visual impairment, print disabilities, elderly users

4.2 Building Organisational Capacity and Accessibility Awareness

An important aspect of creating accessible products is building awareness and sensitisation among key stakeholders such as leadership teams, designers, product managers, engineers, customer experience teams, and related functions making accessibility not just a part of compliance requirements, but product innovation. These can be done through:



- Conducting awareness and sensitisation workshops about the lives of persons with disabilities
- Creating awareness about assistive technology and its impact on the everyday living experience of persons with disabilities
- Providing relevant training to teams on various aspects of accessibility such as accessibility of website and mobile applications, accessible documents, accessible marketing communication and social media

4.3 Co-creating with Persons with Disabilities and Diverse User Groups

Co-creation with relevant consumer segments and participatory design help businesses improve the usability and ability of its products to meet unmet needs. This can be done through:

- Consulting with experts and organisations working in the disability sector during the various stages of product development
- Seeking user feedback from persons with disabilities and other diverse populations regularly to improve accessibility and usability over time

5 Concluding Thoughts

As consumer products and technology evolve, the human and business imperative for ensuring accessibility of products, both white and brown goods, becomes increasingly critical. Accessibility is most effective and economically sustainable when integrated from the early stages of product development. Inclusive product design enables independent and safe usage of products by a wide range of diverse users ensuring that the products meet felt needs, expanding their reach to wider markets and building brand equity for the business as a customer centric, sustainable, future-ready brand.

6 About the XRCVC and its Work on Inclusion and Accessibility

6.1 About the XRCVC

The Xavier's Resource Centre for the Visually Challenged (XRCVC), proud recipient of the National Award 2024 Divyang Sashaktikaran Hetu Sarveshrestha Sansthan (Inclusive Education) by the Government of India, is a department of St. Xavier's College, Mumbai. It was set up in 2003 as an Assistive Technology support centre for students with visual impairment in higher education. Through its various initiatives over the past two decades, it has grown into a national-level pan-disability direct support and training centre, Assistive Technology hub, and awareness centre championing the rights of PWDs through policy interventions in the larger society and promoting accessibility and accessible solutions. XRCVC's work has received many awards and recognitions – a snapshot of these can be found in [our brochure](#).



6.2 Key Achievements

- Providing print access to persons with print disabilities through the Copyright (Amendment) Act 2012
- Financial access for persons with visual impairment through changes in rules of the RBI and NSDL to allow barrier-free independent access to financial services – including design and deployment of thousands of accessible ATMs across the country
- Amendments to CBSE, HSC, Physiotherapy and Psychology education rules to create access for students with visual impairment and development of appropriate aids and technology such as accessible geometry kits, accessible physiotherapy machine to support this access
- Subject matter experts via an MOU with National Institute for the Empowerment of Persons with Visual Disabilities, Ministry of Social Justice and Empowerment, Government of India for promotion of accessible STEM (Science Technology Engineering and Mathematics) education
- Training partners for Maharashtra State Faculty Development Academy (MSFDA) for training on inclusion in higher education
- Consultants for premier institutes across the country like IIT Delhi, IIT Madras, Ashoka University for replicating our inclusive education model
- Trainers for Election Commission of India, State Election Commission, Jharkhand and Rehabilitation Council of India for creation of accessible documents and social media posts
- Dr. Sam Taraporevala and Ketan Kothari have been on various expert committees set up by the government and its related institutions to support appropriate policy-making for persons with disabilities.

6.3 Collaborations for Accessibility of Products and Services

XRCVC has partnered with leading brands and organisations across sectors such as education, e-commerce, banking, travel and fintech on accessibility of their various offerings such as:

- Reserve Bank of India
- Indian Banks' Association
- Bank of Baroda
- Union Bank of India
- PayTM



- NCR Atleos
- Diebold
- Hitachi Payment Systems
- NSE Data & Analytics Ltd.
- Akasa Air
- Jet Airways
- Amazon.in
- Reliance Jio
- Mohawk Group
- Johari Digital
- Unique Medical Systems
- Tapsi Electro Medical Systems and Services
- Encore Research
- Viviana Mall (now Lake Shore)
- F. D. Alpaiwalla Museum
- Ashoka University
- IIT Delhi
- AssistTech, IIT Delhi

For further information, please reach out to us at

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5. Annexure A: National and International Standards and Mandates on Accessibility

Useful Links

Global Goals and Guiding Principles:

1. [United Nations Sustainable Development Goals](#)
2. [World Economic Forum on ESG](#)
3. [United Nations Convention on the Rights of Persons with Disabilities \(UNCRPD\)](#)

Indian Regulatory Framework

1. [Rights of Persons with Disabilities Act \(2016\)](#)
2. [BIS Standards 17802](#)

For Website Accessibility

1. [CIS – Accessibility of Government Websites in India](#)
2. [GIGW – Guidelines for Indian Government Websites & Mobile Apps](#)
3. [WCAG 2.2 – Web Content Accessibility Guidelines](#)
4. [W3C – WCAG Overview & Resources](#)

Mobile Accessibility

1. [CIS – Mobile Accessibility](#)
2. [W3C – Mobile Accessibility](#)
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