

Connecting Persons with Disabilities through Information and Communication Technologies (ICT) and Mobile Phones in Rural India

Concept Note and Call for Proposals

Introduction

India has one of the largest disabled populations in the world. It was estimated to be approximately 2.13 per cent of India's total population or 2.19 crore as per census 2001.¹ However, the 2011 census, by applying new data collection methodologies, is likely to bring this number to a much higher level. It is believed that there are at least 70 million persons with disabilities in India. Many of these persons live in rural areas and have no access to basic means of communication and accessing information. They are left out of mainstream education and employment opportunities and are unable to lead a life of inclusion, independence and dignity.

In the information society, enjoyment of all other rights, such as education, employment, recreation, access to public information, etc are inextricably interwoven with access to electronics and information and communication technologies (ICTs). This is especially so in the context of persons with disabilities, since many of them depend solely upon the availability of assistive technology and Internet connectivity to access information.

International obligation

UNCRPD

India was one of the earliest countries to sign and ratify the United Nations Convention on the Rights of Persons with Disabilities (“UNCRPD”) in October 2007. Article 1 of the Convention defines persons with disabilities as including, “those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others. “Article 9 of the Convention recognizes the right of persons with disabilities to enjoy equal access to the physical and digital environments and transportation in rural and urban areas. This article specifically enumerates some of the obligations of state parties with respect to advancing digital accessibility, such as ensuring that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility (b), providing training for stakeholders on accessibility issues facing persons with disabilities (c), promoting other appropriate forms of assistance and support to persons with disabilities to ensure their access to information (f), promoting access for persons with disabilities to new information and communications technologies and systems, including the

¹ <http://www.disabilityindia.com/html/facts.html>

Internet (g) and promoting the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost (h).

ITU

In its ICT Regulation Toolkit, the ITU recognizes that the three hallmarks of universal access and universal service are availability, accessibility and affordability.² The toolkit stresses more on the fact that the special initiatives division of the International Telecommunications Union (ITU-D)³ places special importance to promoting accessibility for persons with disabilities through its Persons with Disabilities Initiative⁴, which came into existence from Resolution 56 of the fourth World Telecommunications Development Conference (WTDC-06). The focus of this initiative is to create awareness about equal opportunities for Persons with Disabilities (PwDs) and to support member states to meet obligations under Article 9 of the UN Convention for Rights of Persons with Disabilities.

National Obligation

The Constitution of India guarantees the fundamental rights to equality, non discrimination, to freedom of speech and expression and to access information and to life. This is given effect through a number of legislations and policies, such as the Right to information Act 2006, Right of Children to Free and Compulsory Education Act 2009, The Persons with Disabilities, (Equal Opportunities) Protection of Rights and Full Participation Act 1995, etc.

Recognizing the potential for digital technologies and communication to transform the lives of not just persons with disabilities but also those who are illiterate, who live in remote areas and have limited connectivity, elderly persons and groups with linguistic differences, the Department of Information and Technology, MIT in 2010 formulated a draft National Policy on Electronic Accessibility, which essentially called for all providers of information and services to make their products and services accessible. This includes creating websites which conform to the Web Content Accessibility Guidelines (WCAG 2.0) of the World Wide Web Consortium, calling for manufacturers of electronic goods, software and hardware to make their products accessible, requiring all public procurement, including telecommunications equipment, to be accessible and so on. The policy is presently being circulated amongst various government departments and ministries for feedback before it gets notified.

² <http://www.ictregulationtoolkit.org/en/Section.3160.html>

³ <http://www.itu.int/ITU-D/information/aboutbdt.html>

⁴ <http://www.itu.int/ITU-D/sis/PwDs/index.html>

Barriers to deployment of ICT in India

The use of assistive technologies combined with Internet connectivity on computers and mobile phones offer tremendous scope for India to bridge the digital divide, especially in the context of persons living in remote and rural areas. However, there are several issues which need to be addressed in order to effectively leverage ICTs for inclusion. Focused efforts need to be made to develop assistive technologies in local Indian languages, compatible hardware on which these technologies can be used, i.e., mobiles and computers should be made available at affordable rates, training to use these technologies for both disabled users, as well as support staff in schools needs to be provided, Internet connectivity must be enabled at low cost, access to existing digital resources could be enabled through setting up of library networks and so on. Although the Indian telecom sector has not yet recognized making accessible handsets and services as a distinct need, there may be several accessibility features already existing in present day mobile phones which could benefit the disabled as well. Hence catering to customers who have disabilities need not necessarily be an entirely new exercise but may just require relooking at existing concepts and features to ensure that they are used to make handsets more accessible.

Accessibility in telecommunications

There are several accessibility features which could be added to landline and wireless phones to make them useable for persons with disabilities. Accessibility considerations need to be taken into account in four aspects, namely, hardware, software, services and content. Accessibility is not necessarily very complex or expensive and can often be provided by improving existing design and functions of devices so as to ensure effective access. A sample list of accessibility features has been provided in Annexure I for easy understanding.

Apart from these, there are also several service related issues which are problematic for persons with disabilities. For instance, in India, the software for connecting to the Internet is often not navigable for a person relying solely on the keyboard. Another problem is the relative inaccessibility of telephone bills which are generated for the customer. Hence, in order to ensure end to end accessibility of services, it is important for service providers and hardware manufacturers to ensure accessibility as part of their products or services. At present, accessibility solutions for persons living in India are few and expensive. This is largely due to the fact that the market for accessible goods in India remains unrecognised and hence most of the accessible software is developed in other countries. However, there is a very strong business case for creating accessible mobile phones for the mainstream market, because they cater not just to the needs of persons with disabilities, but also to those who are elderly, illiterate or have language barriers. Annexure II is a case study of NTT Docomo's experience in Japan which illustrates this point.

International Universal Service Fund (USF) Initiatives on Disability

Using the USF for bridging the digital divide for persons with disabilities is not an entirely new concept. A brief survey of neighbouring countries such as Pakistan and Malaysia in the Asia-Pacific region, countries in Europe and Latin America and Australia reveals that several countries have already initiated USF projects on accessibility for the disabled. Even small countries like Jamaica and Pakistan have invested 6 million and 31 million respectively in the year 2009 on providing accessible infrastructure, facilities and services. The table given below provides an overview of the ongoing projects in different countries. Detailed information about each country is given in Annexure III.

USF accessibility projects	Countries
Supporting purchase of hardware and software infrastructure, accessible telephones, etc.	Jamaica, Pakistan, Australia, Ireland
Subsidies for broadband/fixed and mobile telephony	Portugal, Lithuania, Italy,
Billing in accessible formats	Czech Republic, France, Greece, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Sweden, Switzerland, UK.
Special measures of access for emergency situations	Czech Republic, France, Greece, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Romania, Slovakia, Slovenia, Sweden, Switzerland, UK, Australia.
Text Relay Services	Czech Republic, Germany, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, Norway, Portugal, Slovakia, Sweden, Switzerland and UK.
Video Relay service	Germany and Sweden
Handsets with large keys for fixed telephony	Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia,

	Sweden, Switzerland and UK.
Quick dial and speed dial keys for mobile telephony	Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Sweden, Switzerland and UK.
Universal Service Provider (USP) as the main provider of text relay services	Czech Republic, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Slovakia, Switzerland and UK.
USP as the main provider of special enquiry services	Czech Republic, France, Ireland, Italy, Latvia, Netherlands, Norway, Portugal, Slovenia, Switzerland and UK.
The USP as the predominant provider of handsets with accessible features for fixed telephony	Czech Republic, Greece, Hungary, Ireland, Malta, Poland, Portugal, Slovakia, Switzerland, UK.
USP as the main provider of information about accessible services and functions	Czech Republic, Greece, Ireland, Italy, Latvia, Malta, Norway, Portugal, Slovakia, Slovenia, Switzerland and UK.
Information about USO accessible services	Czech Republic, France, Greece, Ireland, Italy, Lithuania, Malta, Norway, Portugal, Slovakia, Slovenia, Sweden, Switzerland and UK.

Recommendations

- The Universal Service Obligation Fund (USOF) should fund several projects to promote accessibility across various telecommunications devices and services such as mobile phones, fixed landline phones and Internet connectivity.
- Given that there is a very large disabled population in India and that there is a huge need and demand for accessible services and products, the USOF should channel several million dollars towards accessibility related projects, as have been done by countries like Pakistan and Jamaica which have a comparatively smaller percentage of disabled population.
- The USOF should partner with different stakeholders in execution of its projects, such as NGOs, service providers, hardware manufacturers, educational and research organizations, government departments and other relevant groups.
- Should pilot projects to connect persons with disabilities in rural areas yield positive results, it would be desirable to expand the charter of the USOF to include urban areas, where persons with disabilities experience a similar lack of accessible ICT products and services.

Accessibility in telecommunications Devices⁵

Disability	Accessibility Features
Blindness /visual impairment	<ul style="list-style-type: none">• Flexibility for adjustment of font size, colour contrast• Text to speech facility to read aloud the text• Screen Readers• Clear audio• Mini daisy player for reading books• Text scanning facility with optical character recognition software• Integrated GPS for geo-positioning• Large button phones
Deaf persons/persons with hearing difficulties	<ul style="list-style-type: none">• SMS on landline phones• Sign language via video calls (especially on 3G networks)• Connection to hearing aids• Audio amplification• Flashing light on in coming call• Extra loud ringing tone• Captioned telephony relay service
Persons with cognitive disabilities	<ul style="list-style-type: none">• Pictorial address books
Persons having difficulty in using the keyboard	<ul style="list-style-type: none">• Voice recognition software

⁵ Information collected from the E-Accessibility toolkit for policy makers available at http://www.e-accessibilitytoolkit.org/toolkit/technology_areas

Business Case: NTT DoCoMo's experience in Japan

By Axel Leblois

As is the case in many mobile phone markets, the penetration of mobile phones in Japan progressed very rapidly, reaching rates of over 80 per cent for the general population between 20 and 50 years of age as early as 2004. With such market penetration, attracting new customers became more difficult. NTT DoCoMo, whose market share is 51.3 per cent, identified the potential to attract new customers among elderly populations. While penetration of young adults was over 80 per cent in 2004, it was only 10 per cent for persons aged 70 to 80 and less than 4 per cent for persons 80 years or older.

Based on an in-depth evaluation of the reasons for non-adoption of mobile technologies among elderly persons, NTT DoCoMo identified the lack of accessible and assistive products and services as a key factor. Based on this finding, the company developed a comprehensive plan to adopt universal design across all activities of its product development and services divisions.

This meant developing accessible handsets for different types of impairments, offering customer service adapted to persons with disabilities and the elderly such as accessible point of sales with trained personnel in various adapted forms of communications, braille and sign language, tailored services for the elderly and persons with disabilities, and special marketing and rate plans.

The new product line which resulted from this effort, the "Raku-Raku", was launched in 2002 and has incorporated multiple accessible and assistive services, several of them benefiting from 3G services since 2005 such as:

- A large screen with large characters
- Dedicated buttons to call certain pre-recorded numbers automatically
- "Read aloud" menus and text
- Voice input for text messages and email
- Screen reader
- Access to a network of talking books (Bibulio-net, 12,395 titles as of March 2009) with an integrated DAISY player
- An optional bone conductor receiver to transmit sound waves directly from bone to nerve

The business results of this initiative have been stunning: NTT DoCoMo has sold over 15 million units of Raku-Raku phones since inception in 2002. Over half of those are 3G handsets. Penetration of mobile among the elderly has tripled between 2004 and 2008 and NTT DoCoMo has a much higher market share of the elderly market than its national average.

This case study validates the business benefits of addressing the needs of persons with disabilities and the elderly. It also validates the effectiveness of applying the “Three Tenets of Universal Design”:

1. User centered: Recognizing the range of different capabilities and skills, past experiences, wants and opinions within the population
2. Population aware: Understanding the quantitative population statistics is vital to inform design decisions
3. Business focused: Achieving profitability in the commercial context and sustainability in the public context

International USF Initiatives on Disability

This section outlines some of the initiatives of countries to utilize their USFs to enable access for persons with disabilities.

Jamaica

Jamaica's Universal Access Fund supports its e-learning project. In 2009, the fund was used to provide computers and audio-visual equipment worth \$6million to six schools for deaf students in the country.⁶ The schools were able to interact with one another through tele-conferencing using equipment such as desktops, laptops, video cameras, document cameras, projectors, desk jet printers, projector screens and workstations provided by Fujitsu Transaction Solutions.

Pakistan

¹ The Universal Service Fund of Pakistan signed a \$25million contract¹ with the Al-Shifa Eye Trust in order to increase accessibility to Information Technology and telecom for people with low vision and visual impairments. The following activities were outlined as part of the collaboration.

- Extending support to the low vision center at Rawalpindi hospital for expanding infrastructure, recruitment of trained professionals and provision of modern low vision equipment.
- Up-grading the low vision center at Sukkur, Sindh
- Establishing low vision centers on the lines of Rawalpindi and Sukkur at Kohat, Khyber Pakhtunkhwa.

The USF has also signed a \$6.1million contract with the Pakistan Foundation Fighting Blindness for digitizing its Audio World Library and establishing an Internet café at the Darakhshan Rehabilitation Centre and Islamabad.

http://www.iis.gov.jm/officePM/html/20091002T000000-0500_21351_JIS_UNIVERSAL_ACCESS_FUND_DONATES_ICT_EQUIPMENT_TO_THE_DEAF.asp

European Union

The European Commission Universal Service Directive ([Directive 2002/22/EC](#))⁷ outlines specific rules for disabled users and people with special needs with regard to telecommunications. Member states of the European Union are duty-bound to take necessary measures to guarantee access and affordability to publicly available telephone services at a fixed location, such as ensuring that public pay phones are accessible to persons with disabilities, making available public text telephones for persons with hearing and speech impairments, providing directory enquiry/ telephonic assistance services free of charge for blind people and persons with visual impairments.

Under the EC Directive, member states can adopt region specific measures to guarantee adequate choice of telecommunication services and service providers to disabled users. Various telecommunication services for persons with disabilities have been implemented by the National Regulatory Authorities (NRA) of member states. ⁸

[Link](#)

Source: Electronic communications services: Ensuring equivalence in access and choice for disabled end-users- Body of European regulators for electronic communications

⁷http://ec.europa.eu/information_society/policy/ecomms/todays_framework/universal_service/index_en.htm

⁸ Electronic communications services: Ensuring equivalence in access and choice for disabled end-users- Body of European regulators for electronic communications

EU Universal Service Directive in Practice – Examples from Member states

Czech Republic

Under the EU directive, the USP in Czech Republic is mandated to sell or rent fixed line electronic communications terminal equipment to persons with disabilities at the same price as standard electronic communications equipment at 29 CZK (€1.14) per month if leased or 459 CZK (€18) if purchased, VAT included.

France

In France, the USO is used to provide public pay telephones for end-users with disabilities with the following accommodations –

- ❖ A special button on payphones for blind users and persons with visual impairments with voice based server with pricing information;
- ❖ Publimentels or listening text public telephones for deaf users or users with hearing and speech impairments.
- ❖ 'Locomotor' disabled - devices without door, with lowered position or with a larger host.

Portugal

In Portugal, service end-users with hearing impairments need only pay €30.90 towards their fixed handset service, with the remainder subsidised by the USP provider on a voluntary basis. This offer is facilitated through a foundation created by the USP that is geared towards research to accommodate the needs of disabled end-users.

Lithuania

The first 300 litas (approx €85) of the cost of a new handset every six years is covered by the state budget. In addition, Lithuania's USP is mandated to ensure that the total number of public pay phones that cater to the needs of disabled end users is no less than 10 per cent of all pay phones in the country.

These payphones must be equipped with instructions for users in large, easy-to-read font and be illuminated when dark.

The USP also is mandated to install at least one textual public payphone in every disabled rehabilitation centre.

Italy

Italy's national regulator, Agcom has introduced a scheme of subsidies for services for persons with disabilities. Under the scheme, blind users can avail a 50 per cent waiver on their monthly Internet fee or use at no charge the equivalent of 90 hours of internet connection free.

Denmark

Denmark's USO mandates the provision of a Web-based text phone service and a PC-based text phone service. This includes a broadband connection of at least 512/512 Kbit/s to certain groups of disabled end-users.

Sweden

The Swedish NRA 9— The Swedish Post and Telecom Agency (PTS) and service providers are together responsible for fulfilling Sweden's USO. The NRA provides services such as text and video relay, directory information and emergency services, specialist terminal equipment and accessible billing systems to persons with disabilities.

⁹ <http://www.pts.se/en-gb/>

The NRA also finances projects for devising innovative communication solutions in electronic communication that can accommodate the needs of persons with disabilities.

This includes the SMS112 project: distress calls to emergency number 112 using text a message which is in trial state. The project is evaluating the optimal use of text messaging by persons with hearing disability or speech impairments to notify an SOS alarm by calling the emergency number 112 in the case of an emergency.

Other trial projects include Audio 4 all: tools for the distribution and navigation of audio information which looks at testing flexible mediums for dissemination and use of audio information by people with reading disabilities through computers, cell phones and broadband television and digital streaming of audio books and papers to cell phones.

[Link](#)

Chile

Chile's Telecommunications Development Fund¹⁰ was established under the 1994 Universal Access Policy¹¹ of the Chilean Government. The fund recognises the stipulations of the United Nations' uniform standards on equal opportunities for persons with disabilities which states that member nations must take measures to ensure that information and documentation services are accessible to persons with disabilities.

A commission comprising disability organisations and telecom service providers was set up under Chile's Department of Telecommunications (the National Disabilities Fund), to strategise on national policy to enable and expand access for disabled users.

¹⁰ <http://www.summit-americas.org/SIRG/1999/XVI/Telecommunications-XVISIRG.htm>

¹¹ [http://www.itu.int/ITU-D/treg/Events/Seminars/2005/China/Documents/06-Christian%20Nicolai%20\(new\).pdf](http://www.itu.int/ITU-D/treg/Events/Seminars/2005/China/Documents/06-Christian%20Nicolai%20(new).pdf)

Australia

The definition of standard telephone service (STS) under Section 6 of Australia's Telecommunications (Consumer Protection and Service Standards) Act 1999 mandates the provision of alternate communication which is equivalent to voice telephony to be provided to citizens who are disabled.

Telstra¹², Australia's only universal service provider is mandated to provide an STS (or equivalent) to all people in Australia as per its universal service obligation (USO). This implies that alternative forms of communication for deaf people or persons with hearing or speech impairments such as text telewriters, volume control phones, and hands-free phones are also part of Telstra's USO with regard to STS.

Australia's USO¹³ also has a priority assistance service mandate in place. This service aims at assisting persons with diagnosed life-threatening medical conditions who depend on a reliable, home telephone service to be able to call for medical assistance should the need arise. Under priority assistance, customers who are identified for the service are entitled to faster connection and repairs on their telephone services and a greater level of reliability.

Service providers must provide connections or carry out repairs for priority assistance customers within 24 hours in urban areas and 48 hours in remote areas. Customers who experience two or more faults on their telephone service within a three months period are entitled to have their connection tested by the provider. Telstra, AAPT and Primus are among the service providers who offer priority assistance services.

[Link](#)

¹² http://www.acma.gov.au/WEB/STANDARD/pc=PC_2491

¹³ http://www.acma.gov.au/scripts/nc.dll?WEB/STANDARD/1001/pc=PC_2413

Ireland

Ireland's USP, Eircom is obligated to undertake the following measures for the benefit of users with disabilities.

- Provide a dedicated section of its website, accessible from the homepage, with information on the services which affect persons with disabilities.
- Maintain a code of practice regarding the facilitation of services for persons with disabilities which will be subject to periodic review.
- Provide inductive couplers for users who are hearing impaired so that they can connect their hearing aids to the telephone and hear incoming speech clearly. Eircom is also required to provide them with amplifier phones to increase volume of incoming speech and tele-flash visuals that can indicate an incoming call.
- Provide text relay service which will enable the receipt and translation of voice messages into text.
- Put in place rebates for text telephone calls.
- Provide push button telephone sets with speed and automatic redial buttons which will allow pre-programmed telephone numbers and hands free phones to be used by people with dexterity problems.
- Provide restricted vision telephones for people with visual impairments and provide them with Braille billing free of charge.
- Assure alternative directory enquiry arrangements free of charge