Wireless and mobile technology is playing a profound role in networking and communications, even though wire-line technology, such as fiber links, has inherent capacity advantages. The overwhelming global success of mobile telephony, and now the growing adoption of mobile data, conclusively demonstrates the desire for mobile-oriented communications. Mobile broadband combines compelling high-speed data services with mobility.

Demand of Smartphone has continuously been surging up since last couple of years, resulting in frequent shift of Global Smartphone OS market share. Due to low-priced Android Smartphones the growth of Smartphones is increasing in some emerging countries such as China, Brazil and India. Despite of Smartphone market growth, Android is the only Smartphone OS witnessing explosive adoption in these emerging markets. IDC (International Data Corporation) sees tremendous growth potential for the Indian Smartphone market in the future, as low-priced devices and affordable service plans are introduced. India's market share for Smartphone shipments stood at 2.2 percent for 2011, rising to 2.5 percent in 2012. It is expected to increase to 8.5 percent by 2016, making India one of the countries that will see the largest growth in this segment. Though the Smartphone penetration in India currently among the lowest in Asia/Pacific, the market in India seems to have great potential for future.

With the increasing use of mobile phones; people are expecting more utility applications. This kind of user base will naturally attract companies across the world to expand their market base and establish their products. Mostly Software/product based applications are developed for mobile based platform. Accessing Web Content and Services from Mobile environment requires specific challenges and engineering problems. Creating Web content that works well on mobile devices is challenging for the majority of today’s web content creators, since most of them are more accustomed to creating content for desktop devices.

**Indian Scenario**

India continues to be one of the world’s fastest-growing telecommunications market due to a progressive regulatory regime, huge capital outlays for network expansion by operators, reductions in tariffs and cost of handsets. In India, mobile market will inevitably expand due to regionalization and linguistic adaptation. As the mobile Internet user base grows, it will gradually reach an increasingly less educated and non-English speaking population.

W3C India office through its standardization efforts, is continuously working to reach out to this section by implementing mobal web solutions and seamless transmission of SMS in all Indian languages. W3C India has also set up a Web accessibility group to ensure that web reaches out to the special section of the society irrespective of the kind of platform or device used by the disable people.

Most phones sold in India come with English-language operating system software. Despite India’s reputation as an Anglophone nation, only a tenth of its 1.2 billion people count English as their first, second or third language. In any case, one out of four Indians cannot read or write. But unlike linguistically homogeneous Russia or China, India’s 22 official languages (and several hundred unofficial ones) in 12 different scripts make it a difficult market to crack.

Consider a market like China –
The innovators, the early adopters, the influencers, the decision makers, the entrepreneurs – all of them DON’T KNOW English! So innovators developed softwares, websites, products in Chinese; early adopters used Chinese products and so did the influencers, decision makers, and everyone else in China. It is as diverse as India, but all most popular versions of Chinese languages are based on standardized version of Mandarin (based on Beijing dialect). While this makes it all the more challenging to design, develop, and deliver mobile apps for the Indian market.

The three largest domains for regional apps in India are instant messaging, gaming and entertainment, and online newspapers. According to the Times of India, there are currently 45 million Indians using local language applications over their mobiles. But nearly 600 million users are limiting their mobile usage to only voice calls, as they simply cannot find enough apps in their native language. Hence, internationalization of applications is imperative to make sure that mobile is optimally utilized by all sections of society.

Localization of Mobile Applications

Since the user base is spreading fast, a number of companies who have been working in this field may consider developing localized applications to be used by large number of people. Some of these applications may be device based and others will interact through mobile web browser. They are shown below:

1. Search on mobile
2. Web applications
3. Calendars
4. System Information & events
5. User Interfaces
6. Text to Speech
7. OCR
8. Email & SMS in India language
9. Dictionaries
10. Predictive Input
11. Citizen Services
12. GPS
13. Games
**Challenges for apps w.r.t Indian languages**

There are 22 official recognized Indian languages. The Indian language scripts are mainly stems from ancient Brahmi script and perso-arabic family. The syllable formation possibilities are infinite due to large set of consonant, vowel, vowel signs. Many conjunct formed are drastically of different look from their consonant counterpart. The conjuncts formation can be either linear or vertical.

Some of the areas that need to be focused while building mobile applications in Indian languages are shown below:

1. **Presentation:** Due to limited screen size and the limited amount of material that is visible to the user, context and overview are lost.
2. **Input:** The versatility of the solution lies in the inputting of Indian languages through the limited keys available on the mobile handset. Mobile device input is often difficult when compared with use of a desktop device equipped with a keyboard.
3. **Illiteracy:** As major portion of India is consisting of the Illiterate and the Semiliterate Population, so we cannot afford to keep this vulnerable section of the population on the other side of the digital divide. In order to reach to the illiterate and semiliterate population, it is essential that the software have audio content, and use symbols and jingles to communicate the message. In other words web content should be accessible to all!
4. **Lack of standardization:** Problem of inconsistency and lack of standardization is a very big problem at least for Indic locale. For example, for a simple word 'save', people use 3-4 ways of translation. This makes whole desktop experience 'difficult' for users. Thus, standardization is required towards enabling the mobile devices in Indic languages.
5. **Fonts:** Mobile devices often have few fonts and limited support for font sizes. In order to utilize the mobile application in Indian languages the availability of Indic fonts on mobile handset is essential.

**Mobile Governance: Initiative in India**

Mobile governance (m-Governance) can be defined as the delivery of all types of public services including making payment for such services through mobile based technologies, such as SMS, USSD, browser based or direct access through GPRS/3G/ Wi-Fi/WLan, Bluetooth, etc.

Mobile governance holds tremendous potential for improving the access to and delivery of public services in India. The huge potential of m-Governance in the country arises from a number of factors:

- **Huge and Growing Base of Mobile Phone Subscribers:** A high subscriber base in India leads to tremendous opportunity for delivery of public services to all residents, especially to those in rural areas.
- **Availability of Low Cost Handsets:** Handset vendors in India are increasingly producing low cost handsets with GPRS and, in some cases, even 3G featured in them.
- **Low Penetration of Internet and Broadband:** Internet and broadband penetration is still relatively very low in India. This has restricted the access to e-governance services through the traditional medium of computers and internet. The extremely high individual ownership of mobile phones makes it possible to expand the access to public services dramatically, especially to those in the rural areas.

The mobile services ecosystem in India is at an advanced stage with multiple telecom operators, leading ICT companies and mobile application developers. The focus of various actors though has been limited to the entertainment and business applications rather than on developing applications for public services. This can be attributed to some of the issues which are sought to be addressed by the mobile governance initiative...
policy framework. The challenges are:
- First, the lack of a common service delivery infrastructure and services may lead each ministry or department to develop its own stand-alone systems. This will lead to considerable duplication of infrastructure and services while fragmenting demand.
- Second, even though there are thousands of applications offered by various mobile network operators (MNOs) and value added service (VAS) providers in the domain of business and entertainment, very few applications have been developed for public services. This has resulted in limited availability of such applications within the country.

Some Mobile Seva Subsystems

SMS Gateway:- The SMS Gateway provides common service of SMS to eGov exchange and is used to deliver SMS based services to all citizens. SMS Gateway supports both push and pull based services wherein a common informational services can be pushed to a group of people based on gender, location, community etc. States have gradually started to avail the SMS services. Goa, Maharashtra, J&K, Nagaland, Puducherry, Meghalaya, Manipur, Rajasthan, Bihar, Punjab, Gujarat, Himachal Pradesh are already connected and using the service.

USSD:- Unstructured Supplementary Services Data: USSD is a session based service unlike SMS which is a store and forward service. USSD can be used by the user to send command to an application in text format. USSD acts as a trigger for the application. Currently this service is mainly being used for balance check and the mobile prepaid recharge.

IVRS (Interactive Voice Response System): IVRS is an example of computer-telephone integration (CTI). The most common way for a phone to communicate with a computer is through the tones generated by each key on the telephone keypad. These are known as dual-tone multi-frequency (DTMF) signals.

LBS based Services:- Location based services can be very useful for the departments for customizing their services according to the location of the Citizen. There are various ways in which location of the citizens can be determined. Most popular are GPS based location which is most accurate and the cell tower based location which is not as accurate as compared GPS.

CBS based Service:- Cell Broadcasting based Services. This service is particularly relevant when certain notifications / alerts have to be passed to the citizens in a particular area. This can be very helpful in case of pre and post disaster management. MSDP platform will connect to all the telecom operators for CBS for this service and will provide a unified interface to the departments.

Mobile Payment Service:- Most of the transactional Government services involve some amount of payments to be done to Government Departments. The Mobile Payment Services can be used by citizens to make payments through their mobile phones.

Mobile Applications based on Indian languages

Indian Language Translator: (on Google Play Store)

“Indian Language Translator” is an interactive android application which can currently translate English to five Indian languages. The application is meant for businessman, tourists and foreigners who want to communicate urgent information to the local Indian people not familiar with English.

Application Features:
- Easy & intuitive user interface.
- Supports English to Bengali, Hindi, Punjabi, Malayalam and Urdu Translation.
- Additional transliterated output for user convenience.
- Automatic Text to Speech rendering of the output.
- Sample sentence database included in the application.
- System is available 24X7.
- All new sentences are stored for future reuse.
- Application works over either SMS or INTERNET.
- Storage of user preferences & settings.

C-DAC GIST Basic editor: (on MSDG App Store)

C-DAC-GIST is pleased to offer Indian language basic editor for Android devices. Currently the languages supported are Hindi, Marathi, Gujarati, Bengali and Tamil. It works on Android version 2.3 and above. The sample basic editor application is for sample editing of supported Indian language text and is useful for getting familiar with supported Indian language inputting.

On-Screen Keyboard Driver: (on MSDG App Store)

Versions: Hindi, Gujarati, Marathi, Bengali, Tamil, Urdu and Telugu.

C-DAC-GIST is pleased to offer Indian language On-Screen keyboard
driver for Android devices.

**NewsHunt: (on Google Play Store)**

NewsHunt, India's #1 mobile newspaper app brings together the News from 80+ regional newspapers in 12 languages, and the best Jobs from India. 'NewsHunt: India News is free and is used every day by millions of users around the world.

**Speak Indian Language: (on Google Play Store)**

Learn basic spoken words for all Indian languages in English. Learn Hindi, Bengali, Tamil, Telugu translation in English. Also includes the languages Kannada, Malayalam, Marathi, Urdu, Nepali, Sinhalese and much more.

**TV Guide India: (on Google Play Store)**

TV Guide India brings you schedules of over 150 TV channels that are aired in India. Channels from nearly 15 languages including Hindi, Tamil, Telugu, Kannada, Malayalam, Marathi, Punjabi and more have been covered.

**Hindi & Bollywood Songs- Saavn: (on Google Play Store)**

Listen to all your favorite Indian songs for free with Saavn Music. Saavn’s catalog of music includes Bollywood, Hindi, Tamil, Telugu, Marathi, Gujarati, Bhojpuri, Kannada, Bengali, Malayalam, and Punjabi songs. Search and play the best songs from Bollywood, Tamil, Telugu, Punjabi, bhangra, bhajans, ghazals, remixes, and more.

**Facebook for every phone**

Facebook has introduced its mobile application in Indian regional languages to attract more consumers in the Indian market. The ‘Facebook for every phone’ mobile application is now available in three new languages – Hindi, Malay and Vietnamese. Seven more local Indian languages – Gujarati, Tamil, Malayalam, Kannada, Punjabi, Bengali and Marathi – will be rolled out in a phased manner over the next few weeks.

**Panini Keypad**

Panini is a new multilingual Keypad system supporting 11 languages of India on the Mobile phone. The Panini keypad system when installed on a cell phone allows the user to type conveniently in Hindi, Bengali, Telugu, Marathi, Tamil, Gujarati, Kannada, Malayalam, Oriya, Gurmukhi (Punjabi) and Assamese. It offers statistical predictive typing (Clever Texting) - a breakthrough new technology for ergonomic typing on the mobile for Hindi.

**Google – Bharti Airtel join hands to provide “Free Zone,” which aims to put the Web in the hands of more people and empower first-time Internet users with several useful services of the Internet. It will give users access to Gmail, Google+ and Google search on their mobile phones without ringing up data charges. Under the terms of the agreement, subscribers can search the Internet via Google and access the first page of websites from the results for free. However, if they click further into a website after that, they will be directed to a page where they can purchase a data package. The service is designed to support feature-phone-friendly versions of Google’s email and Google+, Google’s social network.**

**Community Group initiative by W3C India on Mobile technologies**

W3C India Office has setup a Community Group on Mobile Web with the objective of addressing the issues concerning with the enablement of mobile with Indian Languages support, seamless SMS sending and receiving in Indian Languages, Uniform user experience on the mobile through using Indian Languages, accessing of Indian Languages websites from mobiles etc. The goal is to achieve seamless access and operation irrespective of the mobile manufacturers and service providers.

This group will help in building the eco-system for enhancing the penetration of mobiles in the country to the rural areas using the Indian Languages enablement. On similar grounds, W3C India is working in other domains such as Web Accessibility, Digital Publishing, Semantic Web Speech and Voice, and, E Governance. Through this forum we request all stakeholders in the country to join W3C and work towards internationalization of W3C standards. For more details visit: http://www.w3cindia.in/