Comments on TRAI Consultation Paper on National Broadband Plan

Rekha Jain
Executive Chair
IIMA Idea Telecom Centre of Excellence
rekha@iimahd.ernet.in

Varun Chandra
IIMA Idea Telecom Centre of Excellence
varun_iitcoe@iimahd.ernet.in

With Inputs from

Prof Sidharth Sinha,
Faculty, IIMA and member of the IIMA-Idea Telecom Centre of Excellence
sidharth@iimahd.ernet.in

Prof Rajanish Dass
Faculty, IIMA and member of the IIMA-Idea Telecom Centre of Excellence
rajanish@iimahd.ernet.in

The response to the TRAI Consultation Paper on Broadband addresses a wide variety of issues which may be divided into the following heads

1. Definition
2. Goals for Broadband
3. Institutional Mechanism
4. Funding Broadband
5. Demand Drivers
6. Infrastructure and Service Deployment

Our responses are based on the topic coverage rather than as answers to specific questions. Appendix I give the classification of all questions in the consultation paper based on the topics above. The reason why we adopted this approach was that by restricting our response to the questions only we would limit ourselves to the specific issues that are raised in the consultation paper. This would preclude us from reviewing some critical issues. While the consultation paper raises several pertinent questions, it does not explicitly highlight the linkages of other user departments and ministries, funding sources, support for R&D and standards.

We feel that for this important topic, TRAI should go beyond the telecom sector and consultation papers. It should organize nationwide workshops, create blogs, seek explicit consultation with academic institutions, user departments and ministries (education, health, banking etc.), public safety agencies etc. TRAI should therefore seek involvement of decision makers at the highest level in the country.

1. Definition of Broadband

Definition of broadband should evolve as technologies evolve. We should incorporate a periodic trigger for review of definition. The definition should involve a number of QoS parameters, including overall upload and download speeds, latency etc. Categorization based on fixed and mobile will not allow definition to be technology neutral. We need to focus on the application experience.

2. Goals for Broadband

Goals for broadband must not only be to provide broadband connectivity to all but also a channel for the developmental agenda of the government. Besides this, the goal of broadband should be to dramatically improve public safety (disasters, railways, roads, air, and ships). A framework to leverage the broadband for smart power grids also needs to emerge.

3. Institutional Mechanism

TRAI has recognized that unlike in the case of voice networks, for broadband deployment and adoption a number of institutions in a variety of fields need to come together. However, in the consultation paper there are few explicit questions related to the role of applications and content development. Content development agencies (agriculture, health education), development of innovative end user equipments**,** regulatory agencies in other sectors (health, banking), standards bodies need to come together for deployment and adoption of broadband. Capacity building for broadband exploitation is necessary as highlighted by the example of Korean broadband adoption as shown in Appendix II (by Prof Rekha Jain and Varun Chandra) Appropriate business models for broadband service delivery and adoption also need to evolve.

Therefore, for broadband deployment and adoption TRAI must envisage an institutional structure that addresses the requirements of different agencies coming together. At the minimum, DIT must be involved as a formal stakeholder as it is responsible for state level implementations of e-governance, state wide area networks and NIXI. The consultation process should raise issues in each of these areas (even though this may not be in TRAI's purview). In the current process, there is no formal mechanism to proactively seek the views of stakeholders other than through consultation papers. Stakeholders in other sectors may not be aware of TRAI's processes and consequently their level of participation may be low. If TRAI has a vision to play a leading role in broadband deployment and adoption, then it must start a broader consultation process, explicitly involving a variety of stakeholders at the highest level.

The TRAI Consultation Paper should therefore enhance its scope to look at the institutional mechanism necessary for broadband deployment in greater depth. The current consultation has limited itself to institutional mechanisms that largely focus on the supply side-fiber deployment. (pg 46-48, TRAI Consultation Paper).

All countries that have seen more successful broadband deployment have focused on a variety of institutional mechanisms to deliver broadband. This has involved a number of existing agencies across diverse fields. There have been two broad institutional approaches to broadband deployment: working with existing institutions through specific well designed programs or setting up new institutional mechanisms.

Where existing institutions have been used for broadband deployment, a key aspect has been the design of the program which builds close synergies between the ministries/departments of telecom, IT, various other departments/ministries broadcasting, phase wise implementation, reviews and performance based outcomes as in Korea, UK. Sweden, Portugal as shown in Appendix II (by Prof Rekha Jain and Varun Chandra).

On the other hand, in the USA, UK and Australia either broad scoped institution already existed or new institutions have been set up for broadband deployment. In the US, besides Universal Service Administrative Company (USAC) that provides internet and telecom services support for network roll out to high cost and low income categories, rural health care providers and schools and libraries, as a part of its broadband plan, the FCC has suggested that the executive branch should establish a "Broadband Strategy Council" to coordinate implementation of the plan. (www.broadband.gov).

In Australia and UK, the governments have set up separate legal entities to manage broadband deployment. The Australian Department of Broadband, Communication and the Digital Economy invested in a National Broadband Network Company (NBN Co). To accelerate broadband deployment, UK has set up an entity called the Broadband Deployment UK (BDUK), based on the suggestion of the report on Digital Britain, Department of Business Innovation & Skills.

We suggest that for broadband deployment, an autonomous entity say the **National Broadband Agency, India** (NBAI) be created as a Section 25 company. It should be headed by an eminent person from the private or public sector. NBAI would be an independent entity with significant autonomy to set up various administrative mechanisms to ensure broadband delivery. The board should comprise members from DOT, industry associations in the telecom sector, academic institutions, DIT, other infrastructure providers such as National Highway Authority of India, Indian Railways, Electricity Companies (network infrastructure providers), Nasscom, User Departments, and NGOs etc. The Board members must represent the diverse interest groups. The role of the agency would be to administer various programs for broadband deployment, including laying of new infrastructure. The NBAI would not make policy or regulatory decisions. The context of this agency is provided in figure 1.

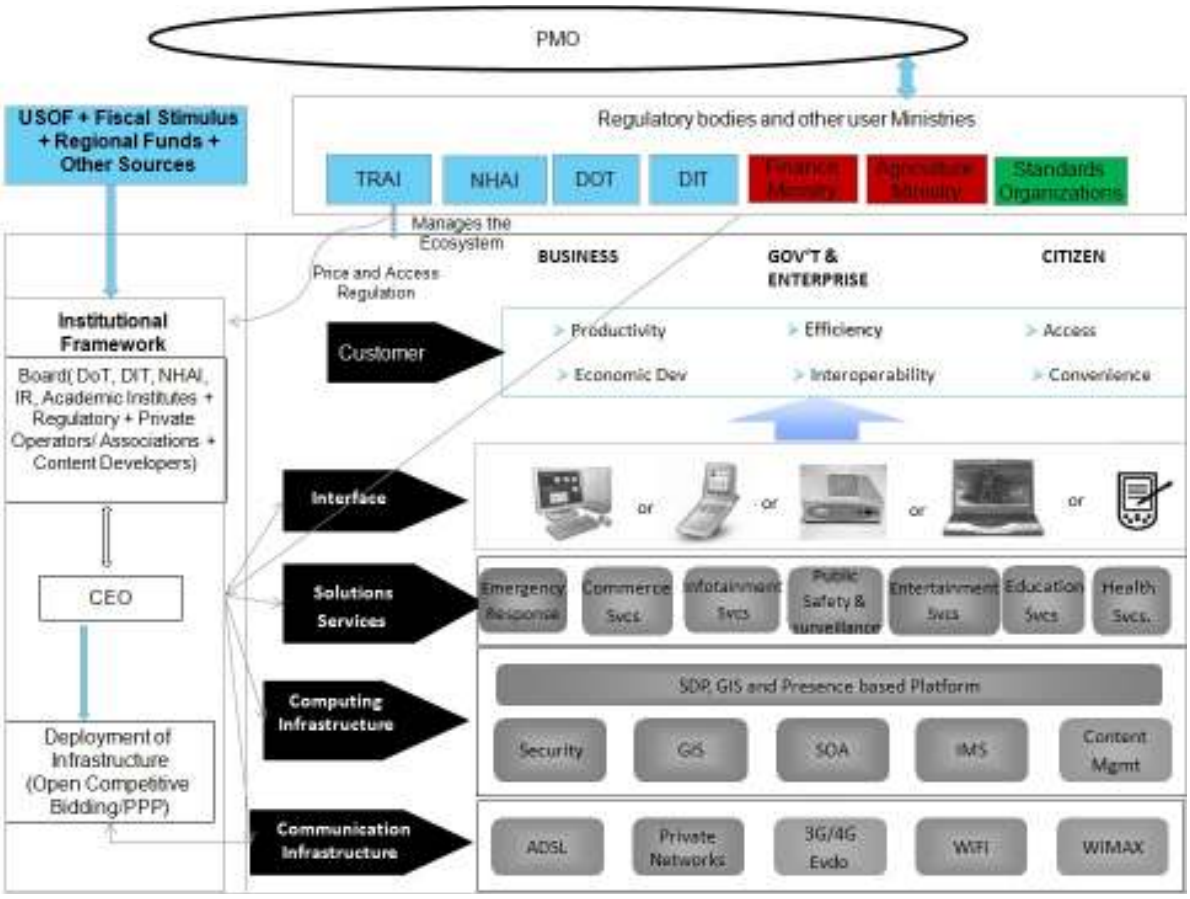


Figure 1: Institutional Mechanism for Broadband.

In this context, TRAI would be required to develop a framework for access on non-discriminatory basis to all operators at regulated rates and at subsidized rates to educational and healthcare services. TRAI would need to enforce the standards for the equipment to be deployed on this backbone and the roles and responsibilities for creation and maintenance of such a network. The background and rationale for the recommendations and details are provided in Appendix III (by Prof Rekha Jain). This suggestion should be discussed and debated to evolve a consensus or majority view.

4. Funding Broadband

Funding for broadband is intricately tied to the institutional mechanism and this should be discussed in greater detail. While TRAI has considered other sources of funding such as NREGS, it is only for fibre deployment. While TRAI has recommended USOF for broadband, it must hold consultations on the mechanism for tying up with various other additional sources of funding, including from user departments, regional development funds (Development of North East Region, funds for tribal and coastal areas), bonds, and fiscal stimulus funds.

5. Demand Drivers

Since broadband adoption is a key concern, we examine the following key demand drivers:

1. Affordability
2. Applications and Services

Affordability

Affordability is a key issue in driving broadband demand. We believe that government should not regulate prices and should leave the same to market forces. For example due to competition in EvDo cards by TTSL, Reliance Communication and few other players in 2008, led to broadband penetrations doubling in the country. The competition would intensify further given the completion of 3G and BWA spectrum auctions. We recommend government should focus on intensifying competition between industry players. The following framework will encourage market competition and investments in networks.

- *Tariff Regulation:* Tariff regulation may not result in higher penetration, and given the variety of services and associated QOS and service expectations, it would be difficult to regulate tariffs. TRAI should therefore provide a framework for interoperable services and interconnection as described below.

- *Standardization of CPE*: given the current market scenario, broadband operators have bundled CPE with their services. Cost of CPE varies from Rs. 2500 – Rs. 5000 (which operators charge as initial amount). Most of these devices only work with services provided by particular operator. We believe regulator should create policies that **make CPEs interoperable**. This should be a part of the larger interconnection mandate of TRAI and should also include CAS and DTH interoperability. This would offer more choice to users and will lower switching costs, thus increasing competition within industry. We believe Huawei or other manufacturing companies will soon start selling interoperable devices.

- Encourage manufacturing of low cost access platforms like **(Sub $150 devices that can be used in place of PC)** like Nova PC, TTSL Home Infotainment Platform, Verizon VuNow that will reduce the current prices of CPE, allowing proliferation of broadband. (Some of these products may be launched in the fourth quarter of 2010). This could be done through support of R&D and manufacturing of India specific requirements (power shortages, multi lingual support etc). There is a proposal with the DOT to support creation of Telecom Entrepreneurship Development Centre (TEDC) that would network with academic institutions, VCs, manufacturers, users, etc. The TEDC would support innovation that spurs the growth of telecom services in rural areas, possibly through USOF and other private agencies.

Applications and services

e-government, development programs, and private consumption (entertainment, education, health) are broadband adoption drivers.

e-government is considered a major broadband driver. The National E governance (NEGP) and state government plans are critical for furthering broadband. The NEGP envisages some central level projects and connectivity at village level through Common Service Centers (CSCs). However, as Appendix IV (by Prof Rajanish Dass) points out that there are major gaps in the delivery of CSCs in several states. Another study (in progress) at IITCOE also has come to similar conclusions. The issues pointed out by such studies and possibly other studies need to be addressed before rolling out such services further.

Lack of connectivity (despite BSNL having received funding for the same and its promise to provide WiMax connectivity where wired connectivity was not possible), capacity building, up gradation of IT savviness in state governments and most importantly the will to computerize and make services available to citizens and improve efficiencies and effectiveness amongst and within government departments have been cited as concerns. In this context, discussion of demand drivers should explicitly seek involvement of state IT governments and various other user ministries to develop a broadband plan.

Mobile Banking: is considered a killer application for takeoff VAS and broadband. Appendix V (by Prof Sidharth Sinha) identifies the major issues in mobile banking. These would need to be further deliberated.

Health and *Education* and other developmental programs will require similar approaches.

6. Infrastructure and Service Deployment

Various issues considered under infrastructure deployment are:

1. Local Loop Unbundling (LLU)
2. Right of Way (ROW)
3. Spectrum
4. Broadband through DTH
5. International Bandwidth/Peering Cost Reduction

Local Loop Unbundling (LLU)

Appendix IV (by Prof Sidharth Sinha) gives the details of policy and regulatory issues in LLU. Most countries still rely on unbundling to ensure sufficient competition amongst market players, Policy makers in 28 of the 30 OECD markets have adopted unbundling as a way to introduce competition into broadband markets. The

consultation paper deals with the issues of fixed line broadband penetration and regulatory issues related to local loop unbundling. The TRAI has repeatedly recommended the adoption of LLU, the government has been reluctant, perhaps based on the views of BSNL(Appendix VI by Prof Sidharth Sinha).It is important that the PPP model for LLU should be implemented and the case should be made for increased revenue for BSNL through LLU.

LLU requires close co-operation between access seekers and incumbent who are also competitor. The extent of conflicting interests in LLU is too great to be able to rely on a voluntary regulatory mechanism in the market. Therefore, adequate arbitration mechanisms are also critical for implementation of LLU. We suggest an industry based multilateral forum for resolving technical and operational issues. The amount received from LLU can then be invested in improving line condition and reducing local loop length for improved broadband access.

Franchise model is being experimented for WiMax /3G by BSNL. Adoption of the franchise model by incumbent and private operators would provide equal opportunity to a variety of enterprises to act like a franchisee and work through PPPs (Public Private Partnerships). The issues in this implementation model need to be discussed.

Right of Way (ROW)

ROW is the critical component for network deployment. It is a very important factor which dissuades service providers to venture into creation of new infrastructure. The major problem are lack of uniformity in decision making processes of public and private right of way owners, lack of detailed GIS maps, very high RoW charges, clearance from multiple bodies, longer time for clearance, and need of coordination with multiple agencies.

For the physical ROW the central government must establish low and more uniform rental rates for access to poles and other infrastructure such as government buildings and set up an expeditious process for service providers to attach facilities to poles. Since the ROW facilities are usually under state level authorities, it is important that there be collaboration between the state authorities and broadband deployment agencies. More importantly, this aspect requires coordination and guidelines at the highest levels, therefore TRAI must seek explicit involvement of other ministries and department. Financial support for central government projects should be linked to operationalization of lower fees/rates for ROW for broadband at the state level and adoption of streamlined processes for ROW. Frequent meetings with concerned authorities with the national level agency should help to sort out these issues. We believe following steps should be taken by the government to ease RoW.

Government should work with various district level municipalities to create single window clearance process and ideate a uniform process to apply for RoW at all levels as well as coordinate with operators for laying their cables. Uniform restoration charges should be prescribed.

Service providers also lay cable along the highways and at present no RoW charges are fixed. The clearance procedure is lengthy and time consuming. National Highway Authority of India and Indian Railways, Power and Gas Utilities should be funded for laying optical fibre cable which could be made available to service providers. The cost of such construction should transparently be informed to service providers and taken either on outright upfront basis or as rentals as per the business model.

Spectrum

There is a urgent need for identification of new bands, for wireless broadband, strategic management of spectrum for greater commercial exploitation and moving away from a command and control approach for atleast for some parts of the spectrum.

Specifically, since spectrum in the 700 MHz band has extremely good propagation characteristics and there is a huge demand for it (as shown by the January 2008 auction of 700 MHz in USA), a plan to exploit the "digital dividend" should be put forth at the earliest. Countries such as USA have already made this spectrum available for 3G and BWA. UK and Japan have plans to do so. The lower cost of service provision and better propagation characteristics makes it suitable for both rural (reduction in number of sites) and urban (indoor coverage).

Broadband through DTH

Another technology that can also be utilized as the medium for last mile access for broadband connections is by using Direct to Home (DTH) TV transmission. DTH is presently meant for broadcasting of TV channels (India has more than 11 million DTH subscribers) that are growing fast. However it can be utilized for downlink path for providing broadband connections also. Uplink (connectivity to the ISP equipment/ node) in this type of service would be an independent connection most likely through dial-up/GPRS/EDGE connection. Such connections will generally require allocation of fixed IP address and are capable of providing sufficiently high downlink bandwidth.

Broadband through DTH is a viable option for both urban and rural areas if broadband uplink cost is reasonable. Some telecom service providers are planning to provide broadband through DTH in the near future. Cost of uplink (dialup, GPRS, EDGE) is the main issue to determine success and popularity of this option. Availability of transponders in the Ku band is also one of the constraints to provide broadband using DTH. High attenuation during rain impacts QOS. These issues need to be considered while DTH option is explored to provide broadband.

International Bandwidth/Peering Cost Reduction

TRAI Consultation paper should also examine the issues related to peering costs. Besides bandwidth, a high cost is incurred in peering between ISPs. NIXI was set up for *"peering of ISPs among themselves for the purpose of routing the domestic traffic within the country, instead of taking it all the way to US/Abroad, thereby resulting in better quality of service (reduced latency) and reduced bandwidth charges for ISPs by saving on International Bandwidth (http://nixi.in/index.php?option=com_content&task=view&id=49&Itemid=76).*

A study on the effectiveness of NIXI and measures to further enhance the value to ISPs and reduce their costs should be undertaken.

Appendix I: Questions under Various Headers

1. Definition

- Is there a need to define fixed and mobile broadband separately? If yes, what should be important considerations for finalizing new definitions? (5.16)
- Is present broadband definition too conservative to support bandwidth intensive applications? If so, what should be the minimum speed of broadband connection (5.17)

2. Goals

- No Questions

3. Institutional Mechanism

- In order to create National optical fibre core network extending up to villages do you think a specialized agency can leverage on various government schemes as discussed in para B? (5.13)
- Among the various options discussed in Para 3.35 to 3.37, what framework do you suggest for National Fibre Agency for creating optical fibre network extending up to village level and why? (Reference Para 3.39) (5.14)
- What precautions should be taken while planning and executing such optical fibre network extending up to villages so that such networks can be used as national resource in future? What is suitable time frame to rollout such project? (Reference Para 3.39) (5.15)

4. Funding Broadband

- What other fiscal/non-fiscal measures should be considered to boost broadband penetration? (Reference Para 4.71) (5.35)
- Do you perceive need for any regulatory or licensing change to boost broadband penetration? (Reference Para 4.71) (5.33)

5. Demand Factors

- What should be done to increase broadband demand? (5.1)
- What, according to you, will improve the perceived utility of broadband among the masses? (5.2)
- What measures should be taken to enhance the availability of useful applications for broadband? (5.3)
- What measures are required to encourage development of content in Indian vernacular languages? (Reference Para 4.68) (5.32)
- Is there any specific competition and market related issues that are hindering growth of broadband? (Reference Para 4.71) (5.34)

- How can broadband be made more consumers friendly especially to those having limited knowledge of English and computer? (5.4)
- Do you agree with projected broadband growth pattern and futuristic bandwidth requirements? (5.5)
- Do you think simple and flat monthly broadband tariff plans will enhance broadband acceptability and usage? (5.21)
- Should broadband tariff be regulated in view of low competition in this sector as present? (5.22)
- What should be the basis for calculation of tariff for broadband, if it is to be regulated? (5.23)
- What measures do you propose to make Customer Premises Equipment affordable for common masses? Elaborate your reply giving various options. (Reference Para 4.64) (5.31)

6. Broadband Infrastructure

- Do you agree that existing telecom infrastructure is inadequate to support broadband demand? If so what actions has to be taken to create an infrastructure capable to support futuristic broadband? (5.6)
- What network topology do you perceive to support high speed broadband using evolving wireless technologies? (5.7)
- What actions are required to ensure optimal utilization of existing copper network used to provide wireline telephone connections? (5.8)
- Do you see prominent role for fiber based technologies in access network in providing high speed broadband in next 5 years? What should be done to encourage such optical fiber to facilitate high speed broadband penetration? (5.9)
- What changes do you perceive in existing licensing and regulatory framework to encourage Cable TV operators to upgrade their networks to provide broadband? (5.10)
- If so, is there a need to create national optical fiber network extending up to villages? (Reference Para 3.39) (5.12)
- What specific steps do you feel will ease grant of speedy ROW permission and ensure availability of ROW at affordable cost? (Reference Para 4.30) (5.18)
- How can utilization of International Internet bandwidth be made more efficient in present situation? (Reference Para 4.42) (5.24)
- How can use of domestic and international internet bandwidth be segregated? Will it have direct impact on broadband affordability? If so, quantify the likely impact. (Reference Para 4.42) (5.25)
- What steps should be taken to bring down the cost of international internet bandwidth in India?(Reference Para 4.48) (5.26)
- Do you think that bad quality of broadband connection is impacting the performance of bandwidth hungry applications and hence crippling the broadband growth? If so, please suggest remedial actions. (5.29)
- QoS of broadband, availability of bandwidth, adherence to given contention

ratio, affordability, availability and spread are some intricately linked parameters. In your opinion what should be done to ensure good quality broadband to subscribers? (5.28)

- Is there a need to define new/redefine existing quality of service parameters considering future bandwidth hungry applications, time sensitivity of applications and user expectation? What should be such parameters including their suggestive value and should such parameters be mandated? (Reference Para 4.59) (5.30)
- How can competition be enhanced in the International bandwidth sector? (Reference Para 4.48) (5.27)

Appendix II: Korean Broadband Initiative

Rekha Jain
Executive Chair
IIMA Idea Telecom Centre of Excellence
rekha@iimahd.ernet.in

Varun Chandra
IIMA Idea Telecom Centre of Excellence
varun_iitcoe@iimahd.ernet.in

In Korea, the government enunciated IT/telecom based master plans stressing the need for greater deployment of broadband backhaul, informatization in the government through a variety of applications including deployment of a nationwide government procurement system (KONEPS), promotion of technology standardization and deployment of Ultra Broadband convergence Network (UBCN) that could seamlessly integrate wired and wirelessly infrastructure. A number of regulatory measures such as local loop unbundling, significant market power regulation and access network framework was put in place. Outside the telecom ministry, the government worked to bring about building certification regulation that facilitated deployment of broadband to residences. Thus the government had well articulated, time phased programs, outcomes and reviews. However, no new institution/department was created; the program design incorporated linkages across the various departments.

Other reason for high adoption as depicted by various studies is a wide range programs by South Korea government to spur demand which includes the following:

- Digital literacy program that targets population groups that otherwise would be less likely to use the Internet. The "Ten Million people internet Education project (2000-2002)" worked to provide internet education to approximately a fourth of South Korea's citizens. Government made efforts to provide these free or subsidized training programs for groups like elderly, military persons and farmers[1]
- Subsidies to around 1000 private training institutes for the purpose of educating housewives in order to create demand in households. Under this "cyber 21" program the government offered 20 hour, week-long courses to housewives for only about $30. In just the first 10 days, 70,000 women signed up for the course[2]
- The Korean Agency for Digital Opportunity and promotion (KADO) also has a variety of program to promote digital literacy and access to computers. These

[1] Sung-Hee Joo, "Broadband Internet Adoption in Korea: A Maverick or a Model to Follow?" *33rd Research Conference on Communication, Information and Internet Policy*, (2005)

[2] Jack Schofield, "Miracle Workers: In Just Five Years, South Korea has Shown the World What the Broadband Future Looks like," *The Guardian* (London, United Kingdom) October 17, 2002, http://www.guardian.co.uk/internetnews/ story/0,7369,812943,00.html

include establishing 8,263 local information access centers where the public can access the internet for free, distributing free used personal for the disabled and to those receiving public assistance, and education and training program for the elderly and disabled[3]

- Personnel computer diffusion promotion established in 1999 aimed to provide personnel computer at low prices, partly through a personnel computer purchase installment plan using the government run postal saving system. The next year government purchased 50,000 personal computers and provided them to low-income families on a reasonable priced 4-year lease, with full support for broadband for 5 years[4]

Similar program have also been launched by other countries to spur broadband adoption including

- UK: the "Home Access" program to provide computer and broadband access to low-income families is being expanded from a pilot program to a national wide program. The program aim to benefit more than 2,70,000 household by March 2011[5]
- Portugal: it established a program to provide free laptops to 6,50,000 school age children[6]
- Sweden: the Sweden government implemented a successful program that subsidized personal computer purchase by enabling companies to provide them to their employees on a pre-tax basis. Sweden has one of the highest rates of computer ownership[7]

[3] "Introduction of KADO," available at Web site of the United Nations Online Network in Public Administration and Finance (UNPAN), http://unpan1.un.org/intradoc/groups/public/documents/UNPAN/UNPAN028063.pdf.

[4] Kenji Kushida and Seung-Yuon Oh, "Understanding South Korea and Japan's Spectacular Broadband Development: Strategic Liberalization of the Telecommunications Sectors," *BRIE Working Paper 175* (Berkeley, California: BRIE, University of California, June 29, 2006), http://brie.berkeley.edu/publications/wp175.pdf.

[5] See *Home Access*, Becta Schools, 2008, ttp://schools.becta.org.uk/index.php?section=oe&catcode=ss_es_hom_02&rid=15871 (Accessed October 20th 2009).

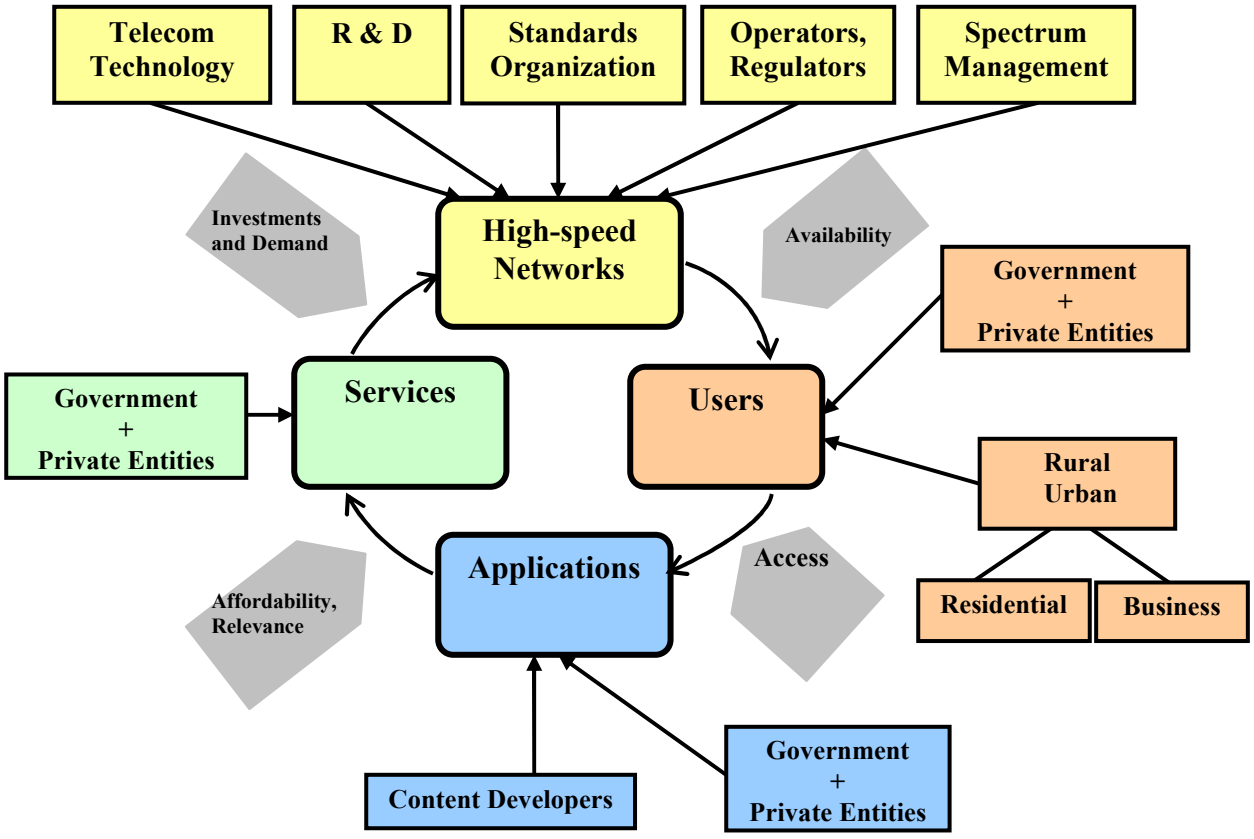
[6] "Portugal embarks on a voyage of discovery with its Magellan Initiative," *The Informed Executive* (United Kingdom) 2008, http://www.informedexecutive.co.uk/05/05-72.pdf.

[7] Robert D. Atkinson, Daniel K. Correa and Julie A. Hedlund, "Explaining International Broadband Leadership," (Washington, D.C.: Information Technology and Innovation Foundation, 2009), http://www.itif.org/files/ ExplainingBBLeadership.pdf.

Appendix III: Institutional Mechanism to Accelerate Broadband Deployment: Policy Perspective

Rekha Jain
Executive Chair
IIMA Idea Telecom Centre of Excellence
rekha@iimahd.ernet.in

Given the huge economic benefits of broadband and the public good nature of it, governments in several countries have adopted proactive measures to accelerate its growth. While broadband infrastructure penetration requires fiscal stimulus or specific funds, utilization of broadband services requires creation of an ecosystem (Figure 2) which gets a fillip from the provision of internet based core government services, wider availability of broadband spectrum, and cheaper access devices.



Source: Adapted from Building broadband- Strategies and policies for the developing world, Yongsoo Kim, Tim Kelly, and Siddhartha Raja, 2010

Figure 2: Broadband Ecosystem

While some governments, such as USA and UK began with a market led approach with respect to broadband, they found that their penetration indices were fairly low. Subsequently, there has been a move to adopt more formal mechanisms.

Institutional Mechanisms:

There have been two broad institutional approaches to broadband deployment: working with existing institutions through specific well designed programs or setting up new institutional mechanisms.

Where existing institutions have been used for broadband deployment, a key aspect has been the design of the program which builds close synergies between the ministries/departments of telecom, IT, broadcasting, phase wise implementation, reviews and performance based outcomes. In Korea, the government enunciated IT/telecom based master plans stressing the need for greater deployment of broadband backhaul, informatization in the government through a variety of applications including deployment of a nationwide government procurement system (KONEPS), promotion of technology standardization and deployment of Ultra Broadband convergence Network (UBCN) that could seamlessly integrate wired and wirelessly infrastructure

When new institutions have been set, these have emerged from ministries whose mandate is broader than management of telecom infrastructure .USA, UK, Australia are examples where broad scoped institutions already existed or new institutions have been set up for broadband deployment. In the USA, there is an existing Universal Service Administrative Company (USAC) that is the administrator for the USOF. It not only manages network roll out to high cost and low income categories, but is also responsible for the telecom and Internet services to rural health care providers and schools and libraries. Thus, besides network deployment, it has a sectoral focus.

For its broadband Plan, the FCC has suggested that the executive branch should establish a "Broadband Strategy Council" to coordinate implementation of the Plan. (www.broadband.gov).

In Australia and UK, the governments have set up separate legal entities to manage broadband deployment. The Australian Department of Broadband, Communication and the Digital Economy invested in a National Broadband Network Company (NBN Co). Details of NBNCo structure, responsibilities and funding is provided in Exhibit 1.

To accelerate broadband deployment, UK has set up an entity called the Broadband Deployment UK (BDUK), based on the suggestion of the report on Digital Britain, Department of Business Innovation & Skills. It is interesting that the broadband initiatives are undertaken by the Department of Business Innovation & Skills and the Minister for Digital Britain rather than by OFCOM, as these were seen to be having a larger scope than just impacting the telecommunication and broadcasting sector that OFCOM regulates. The BDUK efforts would involve telecom, IT, and broadcasting sector, digitalization of content, protection of copyright etc

Recommendations

To roll out broadband, the government of India needs to take a broader perspective and focus on infrastructure as well as creation and nurturing of various elements in the ecosystem. We suggest that for broadband deployment, an autonomous entity say the **National Broadband Agency, India** (NBAI) be created as a Section 25 Company. It should be headed by an eminent person from the private or public sector. NBAI would be an independent entity with significant autonomy to set up various administrative mechanisms to ensure broadband delivery. The board should comprise members from DOT, industry associations in the telecom sector, academic institutions, DIT, other infrastructure providers such as National Highway Authority of India, Indian Railways, Electricity Companies (network infrastructure providers), Nasscom, User Departments, NGOs etc. The Board members represent the diverse interest groups. The role of the agency would be to administer various programs for broadband deployment, including laying of new infrastructure. The NBAI would not make policy or regulatory decisions. The context of this agency is provided in figure 1.

In this context TRAI would be required to develop a framework for access on non-discriminatory basis to all operators at regulated rates and at subsidized rates to educational and healthcare services. The standards for the equipment to be deployed on this backbone and the roles and responsibilities for creation and maintenance of such a network will need to be established.

For rapid deployment of services, key e-government applications such as e procurement for government departments and high volume G2C applications need to be identified and mandated. An early and quick review of existing NeGP and other state level IT projects needs to be undertaken.

The government should also focus on the development of low cost, low energy consumption devices, and provide initial funding support for development of content and content based services. Capacity building activities to manage broadband networks and services will need to be provided.

The important element in this national initiative would be the design, implementation and synchronization of the various elements. We suggest that this aspect needs to be taken up at the Prime Minister's level.

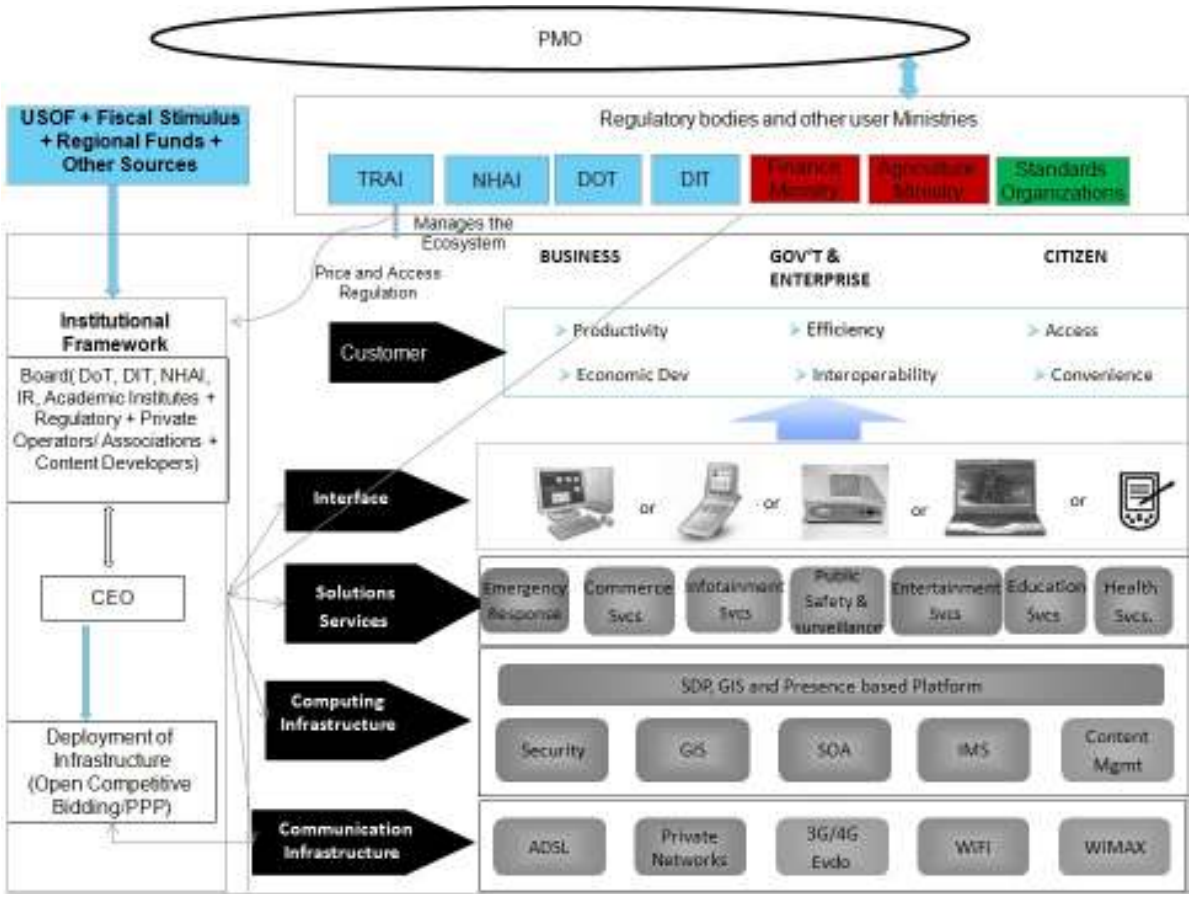


Figure 1: Institutional Mechanism for Broadband

Financing Broadband: Broadband initiatives have been funded by governments through a variety of instruments such as tax credits, regional subsidies and especially created funds. In Korea, funding was through various budgetary allocations to different programs. In the USA, besides the fiscal stimulus package of $7.2 bn, parts of which were channelized through Rural Utility Services (RUS) and National Telecom and Internet Association (NTIA), the FCC proposes additional taxes on users.

The UK government has set up a Universal Service Commitment fund with £200m from direct public funding, enhanced by five other sources: commercial gain through tender contract and design, contributions in kind from private partners, contributions from other public sector organizations in the nations and regions who benefit from the increased connectivity, the consumer directly for in-home upgrading, and the value of wider coverage obligations on mobile operators arising from the wider mobile spectrum package. The government also created Next Generation Fund to promote deployment of super-fast broadband. This fund included contributions from government and also additional fees of 50 pence per fixed copper line per month. This fund is to be given through tenders to the players deploying broadband. (Source: Digital Britain-Final Report) (www.bis.gov.uk/files/file53061.pdf *)*

The Universal Service Commitment will be delivered through the Network Design and Procurement Group, BDUK. The Australian government has invested $260 million in the NBNCo with a further $52 million committed. The government will issue private bonds to invite private sector participation.

We recommend that for broadband in India, USOF funds must be supplemented by other additional sources of funding, including from user departments, regional development funds (for example, Development of North East Region, funds for tribal and coastal areas), financing through issue of bonds and fiscal stimulus funds.

Exhibit 1: NBNCo Structure, Responsibilities and Funding

NBNCo has been entrusted with setting up of national network for broadband through FTTH and Satellite and provide wholesale services. NBN Co was established as a Government Business Enterprise (GBE). The company is wholly-owned by the Commonwealth represented by two "Shareholder Ministers" – the Minister for Broadband, Communications and the Digital Economy and the Minister of Finance and Deregulation. NBNCo would employ private companies in the construction and maintenance of the network. Government will hold 51% stake in the company for ten years while the private player will hold the rest 49% stake. After the network is ready, the government intends to sell its stake. Once the network is deployed, NBN Co would be privatized.

This effort is supplemented by a $118.6 million in 'Clever Networks Programs' that support the deployment of innovative services such as health, education, emergency etc in regional and remote areas as well as capacity building for managing and exploiting broadband services. (www.archive.dcita.gov.au/2007/.../Clever_Networks_Guidelines.pdf*)*

Appendix IV: Policy Brief on the Status of Common Service Centres

Prof Rajanish Dass
rajanish@iimahd.ernet.in

The Government of India as a part of the National E-Governance plan had decided to set up hundred thousand Common Service Centers in different states across the country. As on 30th April, 2010 a total of 77338 had been rolled out across twenty nine states and union territories.

In our study we have looked into the status of the current roll out of the CSCs from 2008 onwards given their stipulated time of completion, interim revision of the deadline for completion and SCAs managing these CSCs across various states have been looked into.

Some of the major issues for the CSC roll out being pointed out by the SCAs were that of lack of G2C services, poor connectivity, VLE recruitment with right skill sets (happening due to low literacy rates in the concerned areas) and lack of cooperation from government officials, especially at lower levels. Above these issues, lack of proper infrastructure and lack of connectivity obviously becomes the most critical issues. Without the presence of connectivity of any form, it becomes impossible to roll out online services, which, in addendum to the fact of lack of G2C services raises the very issue of the presence of these CSCs across the nation. BSNL broadband was the most desired form of connectivity as most of the centers were set up in the rural areas where only BSNL was present. Substantial funds had been released to BSNL for providing connectivity, with out any difference in the ground level reality. Also a lot of the centers are located in very remote areas with no phone lines and broadband cannot be provided there. BSNL had promised to provide WiMax in all such areas but that it still pending. The respective state governments should take the responsibility of creating a similar sense of urgency in BSNL along with a proper mechanism for addressing pending issues and monitoring of the execution.

Table 1 gives the ranking of states in terms of their level of connectivity at the common service centers and also some basic infrastructural parameters.It was imperative to study the infrastructural facilities of the states in order to understand whether the reason for delay in roll out across states was due to the existing poor infrastructure or more due to the mind set of the people involved in the project. Once the reason was identified then the respective state governments can address that issue to ensure 100 per cent implementation of the common service centers in their respective states. From the above table we see that though the states which had done well in implementing the common service centers had better infrastructure (except Jharkhand), the reverse was not true. For example Haryana ranks high in the infrastructural and has also been able to achieve an impressive connectivity percentage of its centers. Jharkhand despite having challenging infrastructure had achieved 100 per cent implementation but most of the centers were not operational because of lack of connectivity. This coupled with the lack of G2C services led to extreme de-motivation of the VLEs and non-operation of the centers.

States	Percentage of Connectivity	Rank in terms of connectivity	Rank of states in terms of percentage of electrified villages as on 31st March 2010	Rank of states in terms of Percentage of villages connected by roads as on 31st march 1997	Rank of States in terms of Rural Literacy rate as in the year 2001	Rank of States in terms of Percentage of villages with telephone connections as on 31st Dec 2005
Assam	69.9	8	12	5	8	11
Andhra Pradesh	70.8	6	1	4	14	3
Bihar	65.9	9	15	12	17	4
Chattisgarh	56.1	10	9		7	12
Gujarat	76.2	4	4	3	10	9
Haryana	91.6	1	1	2	6	6
Himachal Pradesh	42.6	12	5	14	1	1
Jharkhand	21.1	15	17		16	15
Meghalaya	42.0	13	16	13	12	17
Maharashtra	34.1	14	10	6	2	5
Madhya Pradesh	48.4	11	8	15	11	13
Orissa	70.8	7	14	10	9	7
Rajasthan	0.0	16	13	7	13	8
Tamil Nadu	71.1	5	1	8	4	10
Uttar Pradesh	78.4	3	10	9	15	16
West Bengal	79.7	2	6	11	5	2

Table 1:Ranking of some states according to connectivity status and infrastructure parameters

That lack of connectivity is not the single inhibitor for the roll out of the CSCs becomes pertinent from the fact that in Haryana despite the 100 percent roll out and connectivity being available at 90 per cent of the rolled out centers, the project progress report as on April, 2010 said that due to lack of G2C services and other financial problems only 142 out of the 1159 centers were operational.[i]

One pertinent reason for the slow roll out of these centers was the poor IT infrastructure of the states along with a poor governance mechanism and lack of a proper institutional framework for ensuring successful roll out. For example, the state governments were expected to provide premises for the setting up of these centers in their Panchayat Buildings or Block Offices. But there seemed to be scarcity of space for the same across various states. Another problem particularly in the North eastern states as well as states like Jharkhand and Chattisgarh was the geographical terrain. Some of the villages were located in such inaccessible terrain that it was impossible to set up a center in that area. This was indeed unfortunate considering that it was the people living in such areas who had a greater need for easy access to Government services.

In our study it came out that SCAs had adopted various business models in order to ensure the sustainability of their VLEs some of which have been very successful. The

capital cost sharing (or complete sponsorship) of the VLEs and the SCAs followed by Basix and NICT seems to be quite successful as that saved the VLEs from the process of applying for loans and the loan approval process that had been originally planned for.A loan would have also increased the financial burden on the VLE.BASIX even takes care of the operational expenditures in the initial few months giving VLE the time to become sustainable. These ground level innovations, interestingly, have happened with out the intervention of the state of central government to cater to the dire need for making the CSCs sustainable and attractive. Efforts should be made to disseminate this knowledge across all states so that even they can adopt some of the best practices.

Another fact that got highlighted in the interviews was that the success of this project would depend not on providing connectivity and premises for the center or G2C services but would require a change in the mind set of the people involved in the project. We saw SCAs exiting certain states saying that the project could not be successful there. However new SCAs entered these states and brought in new initiatives pointing towards the need of serious capacity building in terms of managing roll out of large and complex initiatives like this. It is true that the background of the SCA is very important factor contributing to their success in running the centers efficiently. Other SCAs could make use of this expertise through knowledge sharing. Only with an honest effort and involvement from all the stake holders of the project the common center initiative would be able to achieve what it had set out to achieve- to develop a platform that can enable government, private and social sector organizations to integrate their social and commercial goals for the benefit of rural populations in the remotest corners of the remotest corners of the country through a combination of IT as well as non-IT services. [ii]

The national broadband policy should address the connectivity concerns of the common service center initiative. Without proper connectivity the entire purpose of the project will be defeated. BSNL has already received funding in order to make broadband connectivity available at the common service centers. However most of the common service centers across states still do not have connectivity. SCAs in states complain that BSNL is not showing adequate urgency in terms of providing connectivity at these centers. And since BSNL is the only service provider in most of the rural areas the SCAs do not even have the option to approach other private service providers. The state government officials in the respective states should make an effort to create the sense of urgency in BSNL.A strict timeline should be chalked out and BSNL should be made accountable for not sticking to the timeline. More private players must be encouraged to set up shop in the rural areas. This will provide alternate connectivity options to the SCAs and also pose a competition to BSNL. In states like Jharkhand, Chattisgarh and the north eastern states most villages are located in such remote and inaccessible areas that they do not even have telephone connections. BSNL had promised to provide WiMax connectivity in all such areas. However that is also still pending.

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[i] http://www.csc-india.org/DIT/ProjectProgressReport/tabid/618/language/en-GB/Default.aspx

[ii] http://www.csc-india.org/AboutCSCProject/VisionMission/tabid/563/language/en-GB/Default.aspx

Appendix V: Mobile banking for financial inclusion

Sidharth Sinha
Faculty, IIMA and member of the IIMA-Idea Telecom Centre of Excellence
sidharth@iimahd.ernet.in

Traditional banking has a 'last mile' problem. The fixed cost of the branch network is too high for servicing low value users and low density rural areas. Traditional wireline telecommunications also has a 'last mile' problem in the form of high fixed costs of the 'local loop'. Mobile wireless telephony appears to have been successful at overcoming the last mile telecommunications problem. Even though the wireless rural teledensity of 20% is only about a fifth of the urban teledensity of 104%, it is large compared to the fixed line rural teledensity. Moreover, rural wireless teledensity is also growing fast, having doubled over the last one year. One conclusion from this experience is that mobile telecommunications can help solve the last mile problem of banking.

The earliest attempt to solve the last mile problem in banking is the ATM. This reflects the general approach to solving the last mile problem – unbundling of banking services and using technology and outsourcing to take some of the unbundled services closer to the customer at a lower cost. However, ATMs are limited in the scope of transactions that they can handle, especially in rural areas. RBI has attempted to solve the 'last mile' problem of banking by encouraging alternative distribution channels in the form of business correspondents and use of mobile phones and prepaid card technology for providing banking services. This has also been referred to as 'branchless banking'.

A number of potentially complex issues related to cash deposits and withdrawals arise in branchless banking. In a traditional banking environment, the bank branch is the focal point of this activity and is subject to many regulations which ensure, albeit in cumbersome way, security and reliability. These regulations can cover not only the physical properties of the building but also the soft infrastructure, such as levels of cash holdings and security procedures or the criteria applied to the recruitment and training of staff. The same degree of regulatory control may not be possible with business correspondents and any attempt to impose such controls may render the business unviable.

RBI's overall approach

After taking into account various issues involved, the RBI has adopted the bank-led model for mobile banking for financial inclusion.[ii] In formulating its guidelines RBI has taken the approach that m-banking should be provided by a bank-led and not Mobile Service Provider (MSP)-led model. The RBI is quite clear that banking activities should be provided exclusively by banks. Its main concern about the MSP led model is its ability to satisfactorily address issues related to money laundering and the safety and security of transactions. According to the RBI

> The customer identification processes followed in case of prepaid customers are lax as the MSPs consider this as low risk from their financial stand point. Given the large number of such cards being issued and the number of outlets through which they are issued, as a Regulator of the Payment and Settlement Systems in the country, it is difficult to contain the risk of anonymity in a MSP led model.

Even though the RBI recognizes the role of MSPs in bringing a customer base and an agent network, the RBI would prefer this agent network to be used as 'business correspondents' in partnership with MSPs for extending financial services.

Overview of regulation related to financial inclusion

One useful way to see the outcome of RBI's regulations regarding 'branchless banking' is in terms of what banks and non banks can do with cash deposited by customers.

Banks will keep the cash in a bank account and provide interest. Accountholders can transfer the cash in their account using mobile banking to anyone, including those who have no account with any bank but have a mobile phone. The receipt and disbursement of cash can happen either at bank branches, ATMs or business correspondents. The disbursal of funds can happen only after identification of the recipient. Similarly, opening of accounts and the associated KYC formalities can be done either at branches or through business correspondents Almost anyone can be a business correspondents, except NBFCs or large "for profit" companies. The accountholders will be customers of both the bank and the mobile service provider.

Non banks will receive cash and issue prepaid cards (semi closed payment instruments). Such cards can also be mobile phone based prepaid cards. The issuer will have to ensure full compliance with KYC /AML/CFT guidelines. All money received by the issuer will be deposited in an escrow account with a bank. No interest is payable on the account. The cash can be used only for making payments to the participating merchant establishment which contract specifically with the issuer to accept the payment instruments. The cards cannot be used for cash withdrawal or redemption by the holder. They can also not be used for person-to-person transfer of value.

While maintaining its position of a bank-led model of mobile banking the RBI has provided significant flexibility for small value transaction in order to encourage financial inclusion through mobile banking. Therefore, from a regulatory perspective there does not appear to be any significant problem and the RBI appears to be open to introducing more flexibility so long as it does not compromise on banking security and integrity.

Business correspondents

As is apparent the key to mobile banking for financial inclusion is the role of business correspondents.

A Working Group to Review the Business Correspondent Model, set up by the RBI, submitted its report in August 2009. Overall, the data revealed that out of 50 public sector

and private sector banks, only 26 banks reported appointing BCs, through which 88 lakh no-frills accounts had been opened as on March 31, 2009. The number of accounts opened formed only 26% of the no-frills accounts reported to be opened by banks till that date. Most of the banks had appointed Section 25 companies/ Trusts/ Societies as BCs in accordance with the original requirement of the guidelines. Further, almost all the Section 25 companies appointed as BCs had been floated by the technology service providers who had provided the smart card or biometric solutions.

The viability of the BC model has remained the most critical issue. The BC model is largely perceived as a channel for undertaking only liability side business (deposits). In many cases, banks are using the BCs for opening no-frills accounts through which the various government payments like NREGA, pensions and other social security payments are routed. As such, opening of the accounts to provide deposit services to begin with and subsequently widen the coverage of activities, with a view to making these accounts profitable, have not made the desired progress. Retaining customers after the initial transactions proves to be a big challenge, partly because of lack of adequate financial awareness. As a result a majority of no-frill accounts opened by BCs remained non-operational.

More extensive use of mobile banking could reduce the costs of the business correspondents and help them achieve viability.

Issues in mobile banking for financial inclusion

Given the flexibility in the regulatory environment, banks and mobile operators now need to design and develop suitable business models for providing mobile banking for financial inclusion. This requires banks, mobile network operators and agents to work closely with each other.[ii]

Security is critical for mobile banking and mobile operators control a key element of the security infrastructure, which is embedded within the phone. The service also needs to work under precarious conditions (people using low-end handsets in areas with unreliable wireless connectivity), making the correct technology choices critical. In fact, customer experience is determined directly by the technology platform used.

Customers are more likely to take up the service if they can easily access cash from their accounts. Banks need to find a way to provide liquidity through a network of cash-in/cash-out agents. Here again mobile phone operators have a network of mass-market prepaid card retailers who can function as bank correspondents. Of course, not all of them may be ideally suited for banking activities. The branch network of the bank would need to provide significant support and training to the bank correspondents in the initial period.

If mobile banking is to be used for financial inclusion there is a need to develop a highly efficient channel to drive awareness of the service and strong branding to overcome natural customer resistance to new technologies and the associated security fears. Banks can choose to rely on mobile phone operators to promote and even brand the mobile

banking service given the operators' credibility with and understanding of mass-market marketing techniques. Of course, banks bring their reputation of safety and trust.
Other than the financial arrangements an additional issue that may need to be resolved is that of customer ownership. Both the bank and MSP are likely to claim customer ownership especially if they incur customer acquisition costs. Given the closeness of the relationship and their mutual contribution it may be useful for them to consider arrangement such as a joint venture entity.

Initially, the bank and mobile network operator relationship may be bilateral. However, in the long term customers will benefit more and pay less if interoperable networks allow them to transact with anyone, at any time. This would require the regulator to mandate interconnection between the networks of the bank and the mobile network operator. In the initial stages there may be a need to cap interconnection charges. Of course, this would be a part of the overall business agreement between the banks and MSP.

Appendix VI: Local Loop Unbundling for Broadband growth

Sidharth Sinha
Faculty, IIMA and member of the IIMA-Idea Telecom Centre of Excellence
sidharth@iimahd.ernet.in

The Broadband market in India is small and dominated by BSNL and MTNL. As of December 2009 there were a total of 15.24 million internet connections which included 7.82 million of broadband connections. Broadband connections are defined as download speeds of 256 kbps. In terms of technology, DSL accounts for 87% of total broadband connections. BSNL and MTNL together account for 70% of broadband connections and account for 81% of total DSL broadband connections.

BSNL and MTNL account for 87% of wireline connections. Over the period April 2005 to March 2009 BSNL and MTNL together have had a net decrease in wireline connections of about 10 million. According to TRAI over 50% of all the incumbents' copper lines can handle DSL services, though not all of them will be able to provide the highest throughput levels. The quality of lines in metros is expected to be significantly better than those in rural areas. However, so far their DSL broadband connections account for only about 17% of their total wireline connections.

The overall picture that emerges is that the broadband market is dominated by BSNL and MTNL. DSL is the most prevalent technology for providing broadband and BSNL and MTNL have an advantage given their dominance in wirelines connections. However, BSNL and MTNL have not exploited the full potential of the wireline connections for providing DSL. This indicates that there may be a role for using local loop unbundling to introduce competition and increase the growth rate of broadband.

Local Loop Unbundling[ii]

The local loop refers to the telecommunication circuit, usually pairs of copper wire, between the user's premises and the telecommunications operator's main distribution frame (MDF). Local loop unbundling (LLU) refers to the process, in which incumbent carriers lease, wholly or in part, the local segment of their telecommunications network to competitors.

Unbundling, as a policy, is built on the recognition that incumbent carriers have a dominant position in the provision of local communication access by virtue of their control over the local loop. The local loop is often considered as an essential facility that cannot be economically replicated by alternative operators. This position of dominance has resulted from the many years during which incumbents had a monopoly in the provision of telecommunication infrastructure and voice telephony services. Despite liberalization of telecommunication markets, it has proven extremely difficult in most countries to reduce the bottleneck control of incumbents over the local loop and access to this loop. The market power of incumbents can vary in different geographic and service markets. Details of unbundling policies may therefore vary according to market conditions.

Although LLU began as a policy to promote competition in local telephony, recently it has received attention because of its role in stimulating broadband development in a number of countries. The emergence of Internet services highlighted the importance of access to the local loop since Internet service providers (ISPs) have to depend on local network providers to access customers. With the emergence of high-speed Internet access (broadband) based on the public switched telecommunication network – mainly asymmetric digital subscriber line technology (ADSL) – the question of access to local network infrastructures has moved to the forefront of policy agendas. ADSL technology converts pairs of copper wire telephone lines into high-speed digital lines.

Local loop unbundling can be classified into three main types:

1. Full unbundling (or access to "raw copper").
2. Line sharing or shared access.
3. Bitstream access.

The application of LLU varies across countries. For example, in the US network unbundling includes sub-loops, switching, and operations support systems (OSS), whereas European countries basically focus on loops.

According to one set of views unbundling reduces the incentives for network owners to make risky investments in new facilities or platforms because they allow entrant-arbitrageurs to drive prices quickly to costs if the platform investment is successful. If the platform is unsuccessful then the network owners suffer the losses in sunk facilities. The adverse investment incentives are considered worse in the case of mandated bitstream access because the entrant can offer advanced, broadband services with little or no investment, while line unbundling requires some investment in equipment and network facilities. Bitstream access provides the entrant with immediate and virtually unlimited ability to engage in arbitrage, bidding away high-valued customers without having to underwrite the risks of investing in network facilities.

TRAI recommendations on Local Loop Unbundling

TRAI released the results of its first consultation on Broadband in April 2004[ii]. The consultations revealed that, except the incumbents BSNL and MTNL, all stakeholders agreed that non-discriminatory local loop access is required. The TRAI concluded that

> It is important to have contribution and competition from other players for the incumbent to focus strongly on rapid roll-out of DSL services, and achieve the desired growth with the most value to consumers. Since virtually all of the copper local loops are owned by the incumbent, giving nondiscriminatory access to this bottleneck facility for use and investment by other operators becomes crucial. Introduction of competition has been adopted in nearly every nation which today has significant broadband penetration.

During the consultations it emerged that BSNL had successfully run trials of a modified version of local loop unbundling through commercial franchising arrangements in some cities. BSNL had disclosed during the consultation process that it has significant plans to pursue the franchise model. The franchise model being adopted by BSNL was a modified form of Shared Unbundling (Line sharing), where the franchisee provides and operates the equipment while taking advantage of access to BSNL's local loop. This was evidence of the technical feasibility of some form of unbundling. According to TRAI, while the franchise model provides significant opportunities to expand broadband services on DSL, it does not provide the much needed competition that ensures that DSL services grow quickly and in a way that is most beneficial to consumers.

The TRAI recommended that to promote quick growth and create immediate competition in broadband services, nondiscriminatory local loop unbundling (LLU) should be executed in a time bound manner for both Shared Unbundling (Line sharing) and Bit Stream Access. It recognized that operators should be able to earn a suitable return on any new investment in the local loop. To provide adequate incentives for new investment through fresh investment, and based on international experience in this regard, the TRAI would exempt any new infrastructure which is less than five years old from unbundling requirements. .

These recommendations were reiterated in its recommendations in 2008[ii], However, it noted that their earlier recommendation for unbundling of local loop of incumbent operators had not been accepted by DoT due to complexity in implementation.

The need for unbundling is also pointed out in a recent CII report. [ii] It makes the following recommendations

- Bundle broadband with existing wire line connections to increase the uptake of broadband.
- Infrastructure created with public money should be made sharable amongst all players in an equitable manner.
- Adoption of the franchise model by incumbent would provide equal opportunity to the operators to act like a franchisee and work through PPPs (Public Private Partnerships)

Conclusions

There is a need to give serious consideration to implementing local loop unbundling (LLU) in India. While the TRAI has strongly recommended the adoption of LLU the government has been reluctant, perhaps based on the views of BSNL. In the new environment LLU may actually be in the interest of BSNL given its falling revenues from wireline connections.