DURING THE period after independence and until much of the 1990s, telecom services remained the privilege of only a few in India. Access to telephony was considered more a status symbol than an instrument of utility, since so few others had phones. Entrenched producer interest and a closed mind set led to the familiar outcomes of the License Raj—rising inefficiencies and a stagnating state monopoly. The onset of economic reform after the 1991 crisis brought with it sweeping changes in the telecommunications sector as well. Private entry and ‘independent’ regulation resulted in unprecedented growth. Information Technology (IT), on the other hand, was unencumbered of government control to begin with. A chance event in 2000 along with a laissez-faire approach towards the sector established India firmly on the global scene. IT has also greatly benefitted from technology import (from United States and the European Union), from investments in higher education that India made decades ago, and from the close cooperation between academia and industry. India today, has become a major hub for IT and IT enabled services (ITeS) export. If China has come to be labelled the world’s factory, then India is often described as its office or outsourcing centre. In what follows we document the astonishing progress made by telecommunications and IT sectors, especially the former and outline a policy framework to leverage the ongoing convergence of telecom and IT technologies for rapid growth and inclusion.

**Telecom – State Led Monopoly**

The first telephone line in India laid in 1875 in Bombay and until the Second World War services were provided by private companies. In 1943, the government invoked its sovereign right and nationalized the three private networks that operated in Madras, Bombay and Calcutta. Earlier in 1854, a separate department was established to provide telegraph facilities to the public. Telephone services
did not grow as fast as telegraph services when they were first introduced because telephone services were unreliable over long distances and also considered to be a luxury for commercial use and prone to be intercepted. A Director General of Posts and Telegraphs was created under the British to oversee integrated development of the sector. While construction of telegraph lines continued and all the major cities and towns were linked with telephones, the number of telephones in 1948 was a paltry 80,000. The following decades exhibited slow growth; teledensity increased from 0.02 percent in 1948, to only about 1.94 percent in 1998.

In January 1985, the government separated the Department of Posts & Telegraph by setting up distinct departments for both functions. The postal service though widespread and universally used was not as profitable, forcing it to be cross-subsidized by telecom. As a result, telecom itself suffered from under investment. In 1990 the waiting list for Direct Exchange Lines (DELS) ran into millions (1.71) with a waiting list in months estimated at 48.9 months. The privileged few could skirt the long queue, but for millions of others the government was under tremendous pressure to surrender its monopoly and improve penetration, quality of service and growth in the sector.

Telecom – Process of Liberalization and Institutional Reform

The process of telecom liberalization began in the 1980s, but the “big push” in reform and liberalization occurred in 1994, with the enunciation of the National Telecom Policy (NTP). In 1986, the government corporatized a portion of its departmental monopoly by creating MTNL in Bombay and Delhi and VSNL for international trunk services. The rest of the integrated monopoly was managed by Department of Telecommunication (DoT), which besides service provision, performed multiple other functions such as policy formulation, pricing, regulation, spectrum management, and research and development, among others. The Athreya Committee set up in 1990 recommended the reorganization of DoT, specifically the separation of service provision from policy and regulation. It was not until 2000, however that this transition was to be completed with the creation of a corporatized BSNL as the service provider. Meanwhile NTP 1994 recognized the need for private participation to increase investment and quality, but failed to underscore the need for a strong and independent regulator. Interestingly when NTP was announced, India’s teledensity was merely 0.8 percent against the world average of 10 percent. The Telecom Regulatory Authority (TRAI) was eventually set up in 1997 to provide an independent regulatory framework to, inter alia, facilitate competition and protect consumer interest, but suffered persistent conflict with DoT and the incumbent public sector operators. This was not entirely unexpected because creating and establishing new regulatory institutions is a long and arduous process. The New Telecom Policy of 1999 (NTP 1999) was another dynamic statement of intent and it attempted to address some of the major gaps of NTP 1994, but it was not until 2000 when the TRAI Act was amended that the institutional structure in telecom acquired a degree of stability. The new TRAI Act created the Telecommunications Dispute Settlement and Appellate Tribunal (TDSAT), a body that was envisaged to fast track the dispute settlement process. As stated above, BSNL was also created in 2000 effectively separating service provision from policy (handled by DoT) and regulation (managed by TRAI). At least in theory, the institutional structure in Indian telecom by the year 2000 was devoid of any obvious and apparent conflict of interest. This, along with a set of pro competitive regulatory and policy changes inspired an unprecedented period of growth in Indian telecommunications.

Telecom – The Growth Phase

The beginning of the millennium marked replacement of certain burdensome regulations with market oriented practices. In September 2002, telecom tariffs were assigned to competitive forces; the requirement for service providers to obtain approval from the TRAI on tariff changes was dispensed. In 2003, the Calling Party Pays (CPP) regime was introduced, which arguably was the most important factor responsible for the explosive growth in mobile telephony. The subscriber base today exceeds 900 million and teledensity has increased to more than 75 percent and subscriber numbers are currently growing at the rate of about 5 to 7 million per month (down from 18 million in August 2010). The change in India’s telecom landscape has been spectacular and has unquestionably been driven by mobile telephony. Ownership of a phone is no longer a function of who you know, but rather conforms to the conventional forces of demand and supply. Waiting lists are down and voice calls in India are amongst the cheapest in the world. Mobile phones are ubiquitous in some Indian cities, where teledensity now exceeds 100. From a luxury when it was first introduced, the mobile service is now used every day by over 893.84 million Indians. The
Indian telecom network has become the second largest in the world after China.

**Telecom - Technology Convergence Today and Policy Challenges**

The experience of the Indian telecom sector demonstrates that competition driven network expansion, a stable institutional structure accompanied by rapid technological advancement can lead to transformative outcomes. Recognizing this, the recently announced National Telecom Policy of 2012 (NTP 2012) seeks to augment telecoms’ transformative impact by acknowledging its role in economic growth and sketching a framework for technology enabled solutions for health, education, employment generation and financial inclusion. The emerging technology trends towards convergence will require a concerted effort for the simultaneous development of electronics manufacturing, telecom and IT services. Accordingly, the **Triad of Policies to Drive a National Agenda for ICTE** announced by the government in 2011 is built on the premise that to maximize the growth impacts of IT and telecom, it is critical to develop a strong Electronics System Design and Manufacturing (ESDM) base, presently conspicuous by its absence, in India.

**Information Technology (IT) – Sunrise Sector in India**

The information technology sector found a pioneering stalwart in Dr. Vikram Sarabhai. Among others, his legendary foresight was one of the early catalysts for the growth of IT in India. Establishment of the first Indian Institutes of Technology (IITs) in the 1950s and focus on higher education during the political reign of Jawaharlal Nehru are often considered as the early stepping stones for the industry. Establishment of Tata Consultancy Services in 1968 was another milestone for the IT industry in India.

The Department of Electronics (DoE) was set up in 1970 with much awareness of the advances in digital technology across the worlds. Unlike the DoT, the DoE had fewer inhibitions against private enterprise, the former being more socialistic in nature. The Department played an enabling role in the development of the sector in the early years. Gradually, its spin-offs and associated organizations such as the National Informatics Centre (NIC), Controller of Certifying Authorities (CCA), Centre for Development of Advanced Computing (C-DAC), National Internet Exchange of India (NIXI), etc. contributed to creating capability and human resources, promoting the development of software and IT applications, and enabling the adoption of internet and broadband in India. In due course of time the Department of Electronics was renamed the Department of Information Technology and more recently the Department of Electronics and Information Technology (DeitY).

The IT industry took off during the 1980s with the emergence of Indian entrepreneurs such as Infosys and Wipro and entry of global players like GE and Texas Instruments. The government announced new policies and adopted light touch regulations to promote growth. Some of these included the scheme for software parks, policies for allied sectors such as telecom, other tax incentives etc. Turn of the millennium saw bit of a turbulence for the industry as “Y2K” engendered panic. The potential crisis proved to be a blessing in disguise for India as demand for competent English-speaking programmers began to rise. The sector has transformed from being a data entry, customer support and transaction processing off-shore unit for companies in the developed world in the 1990s to companies that provide high-end services, IT strategy and consulting to companies across the world today.

**IT - Promises for the future**

Being outward-looking, the growth of IT in India has always been dependent on external factors. Close on the heels of Y2K, was the dotcom bubble, followed by the September 2001 attack on the twin towers in the US, and recently the global crisis of 2008; most of such events temporarily shock growth in the sector. In India, the industry has demonstrated resilience and has managed to consistently outperform in spite of the challenges. The current IT sector stands at about $100 billion and contributes about 8 percent of the national GDP. The hope is to see the sector cross the $300 billion mark by 2020 and enhance its service offerings by providing product innovation, business transformation and end-to-end product development. Moreover the potential for domestic IT is also vast since at 22.39 million internet subscribers, India is one of the lowest in IT intensity, even among BRIC countries. The emergence of newer technologies such as Cloud Computing hold much promise, since it will enable even small and medium sized companies to embrace IT, thus lowering transactions cost and boosting efficiency.

Simultaneously, the government in collaboration with NASSCOM has rightly taken up several initiatives to create an ecosystem that will stoke growth. Some of these initiatives include the National Skills Registry (NSR) to create a repository of credible information about IT professionals, Data
Security Council of India (DSCI) to collate and disseminate the best practices in the security area, the National Innovation Council (NIC) to encourage and foster ‘frugal engineering’ and innovation, the National E-Governance Plan (NeGP) to promote computer literacy and adoption of internet in India.

The IT industry is entering a difficult phase from competing countries like Philippines in the BPO sub-sector, China in R&D, Eastern Europe in the KPO segment, and Brazil in animation. In order to mitigate the threat of competition and other challenges such as macro-economic instability in the Europe, unavailability of specialized talent, data security and privacy etc, the government needs to continue its support to build a credible ecosystem and at the same time continue its laissez faire approach towards regulation to boost performance.

Conclusion

The contribution of telecommunications and information technology to the social and economic development has been well established. Both sectors have achieved spectacular growth, albeit due to different reasons. IT benefitted from light touch regulation, while telecom eventually benefitted from a liberal policy environment and a revamped institutional structure. The lessons are clear. The government’s competitive advantage lies in creating a regulatory framework and credibly enforcing the rules, while letting market find ways to create value. The IT sector has shown that, as has telecom, albeit in the latter case there has been a considerable delay.

The future holds vast potential as IT and telecom come together due the convergence of technologies. The National Telecom Policy 2012 and National Policy on Electronics 2011 have both acknowledged the power of convergence. The rising adoption of mobile internet, transition to IPv6 and national broadband connectivity will enable computer, mobile phones, and a range of electronic devices to be connected to each other. This will stimulate usage of exciting applications and services with far reaching benefits in education, health and in business. The ecosystem in which the benefits of convergence can be realized can only be created by government; let’s hope the new policies practice what they preach.

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