

## **Destination R&D**

*To become a force in the global telecom space, India has to create an ecosystem and build globally competitive product companies across the value chain*

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In the last few years, market place is abuzz about India as an emerging destination for R&D due to availability of quality talent, people with knowledge of product development process moving back to India, cost arbitrage, MNC R&D centers and several other advantages. This holds true for 'offshored R&D functions' and for 'software products' to a great extent but not beyond that.

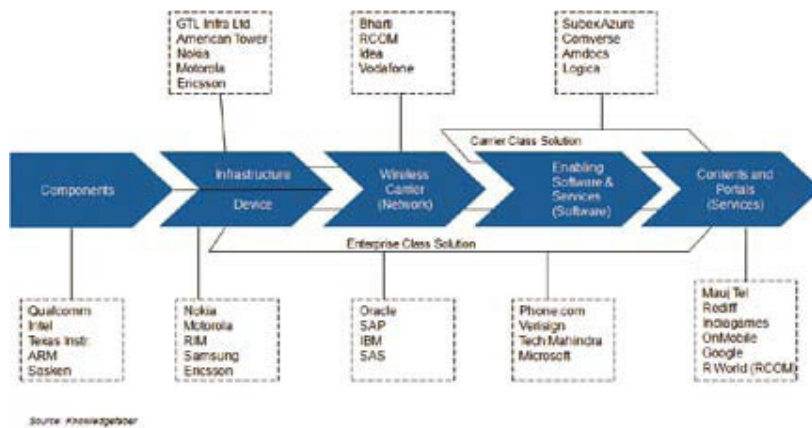
While there is some amount of work happening on the non-software front, it is limited to a few players and a few areas. For any country to be termed as an R&D hub, it needs to have companies working on 'complete product' development with several homegrown product companies/technologies. India is at par with the world when it comes to emerging technologies and products development in the 'software' field. The ecosystem for Indian software product companies and start-ups have evolved significantly during this decade. However, telecom industry in India, even though with one of the largest and fastest growing subscriber base, is far behind in terms of development of core products (including hardware) around wireless/wireline technologies or other products compared to its peers like China. China has several homegrown technologies (such as TD-SCDMA) and product companies such as ZTE and Huawei, etc. Leave aside emerging technology areas such as 3G, 4G, WCDMA, LTE, HSDPA, IPTV, etc.

## **Components**

Some of the leading companies in the component space across the world include Qualcomm, Intel, Texas Instrument, ARM, AMD, etc, and some of their products include chipsets, micro-controllers, and several others. All of them have their presence in India in terms of development centers and other functions. India lacks the presence of homegrown companies in the component space, and is dominated by the presence of foreign players. However, IT services firms like Wipro, Sasken, and other IT consulting vendors have provided R&D services to telecom product companies in the component space, with work ranging from low-end to high-end services. This includes:

- Testing of various components and products
- Development, for example, 7K chipset series boards for Qualcomm
- Large parts of product development of almost complete routers, switches, and mobile phones for leading telecom companies

Besides, India does not have any large homegrown original design manufacturer (ODM) company that can support telecom companies and OEMs. MNC's who have ODM/EMS operations in India include Flextronics, Jabil Circuit, Celestica, Elcoteq, Solectron, Hon Hai Precision Industry, Sanmina-SCI, D-Link, etc. A contrasting trend can be found in countries like Taiwan and China, which have large domestic companies in the ODM space providing manufacturing/R&D services to telecom companies. Some of these companies have grown into complete product companies and formidable brands such as HTC and BenQ. Taiwan, for instance, has large domestic companies like Quanta, Compal Electronics, Inventec, Wistron, Lite-On Technology, BenQ, and HTC in the telecom ODM space.



Value chain of wireless (mobile) telecom

### Infrastructure and Transmission

The infrastructure includes physical and transmission infrastructure. Physical infrastructure (towers, distributed antenna systems, rooftops, etc) is not a hi-tech area, and hence we are not focusing on that. On the transmission equipment (MARR systems, multichannel digital equipment, opto electronics equipment, subscriber carriage system, BTS, MSC, BSC, etc) front not many Indian companies have been able to stamp their authority on the global stage. Very few homegrown Indian companies like Tejas Networks have build world-class products in the telecom infrastructure space. Other companies like VNL (products like BTS, MSC, BSC), Kavveri Telecom (RF components and antennas), Coral Telecom (wireless infrastructure equipment), Svarn Telecom (switching equipment) have developed innovative products in the telecom infrastructure space, but these are still relatively small in size

Some of these companies are growing at a faster pace and acquiring companies around the world. Kaveri Telecom, for instance, has acquired four Canadian telecom companies and the most recent one was Trackcom Systems International (TSI). China, on the other hand, not only has presence of homegrown companies (Huawei, ZTE), but has also developed its own technology TD-SCDMA, which is an initiative by Chinese Academy of Telecommunications Technology (CATT), Datang and Siemens AG, in an attempt to create its own wireless technology, thereby reducing its dependence on western technology, and also help in developing products that can support emerging technologies.

India has over 120 telecom R&D captive centers of global telecom giants. MNC R&D centers in India are working on varied products and technologies. MNC companies like Nokia, Ericsson, Nokia Siemens, Qualcomm, Samsung, Infineon, etc, are providing high-end R&D services to their parent companies. Some of the R&D work carried out by telecom captives in the telecom infrastructure/ transmission space includes:

#### ASIC design and hardware design

- Software development for next generation packet-switched mobile technologies
- Wireless access solutions for mobile voice and messaging
- Product engineering development on IN product on various protocols

Nokia Siemens has plans of bringing in 3G specific research and development projects to its facility in Bengaluru. A couple of Indian institutions like C-DOT (Designing Telecommunication Switches) and C-DAC have purely focused on developing products from India, but have not really made a mark in the industry.

**Recommendations** Infrastructure and Government Support: Central or state government would have to take various measures for promoting hardware product development. They would have to invest heavily on infrastructure and provide financial assistance to promote entrepreneurship in the hardware product space. Taiwan is a classic example of this, government spent heavily on building infrastructure and ecosystem for developing hardware industry. Taiwan built 'Hsinchu Science Park', a hub for ODM, semiconductor, and IT companies. Japan's international trade agency Ministry of International Trade and Industry (MITI) and the Karnataka government has taken the initiative to boost hardware product development.

VC Funding: This is increasingly happening in the software product development space in India. Similarly, for complete products, VC funds focusing on hardware product development would also be required. It would encourage start-up companies focusing on hardware product space. Government of Taiwan took proactive initiatives to provide low cost bank loans, and started a 'Taiwan Venture Capital Association' to encourage companies in this space in Taiwan.

Build Risk Appetite: Indian companies haven't looked at building product companies in the hardware space purely because the 'cost of failure' is much higher. This is the primary reason why you see more product development happening on the software front because the cost/investment is much lower than hardware. However, it is important for Indian entrepreneurs to understand that taking these risks have more chances of paying higher returns in the long-run. Sloka Telecom is a classic example of Indian start-up taking risks in the niche space. Sloka is a pioneer in designing, developing, and selling compact and cost-effective base stations. It won the Nasscom's innovation awards in 2008 (awarded as the Top 8 Innovators).

Strategic Tie-ups: Indian IT services companies like Wipro, Saksen, HCL, Satyam and many other have years of experience and expertise on high-end outsourced R&D services to global telecom companies across the value chain. They have worked on several global products developed and under development from developing IP stacks, enhancing and maintaining transcoders to working on mobility management layer in 3GSM protocol stacks. Over the years, they have built expertise in working on emerging telecom product lines and technologies. They have some of the best talents which is very competitive globally to build complete products. Indian IT firms can come up and work on building their own products and also look at the opportunity of JVs or tie-ups with companies that have capabilities such as physical infrastructure, funds, product program management experience to build a globally competitive product in the telecom space.

Perhaps, there could be a platform, a combined effort of government and large Indian telecom software and services companies to start building an ecosystem for nurturing product development to compete globally in the telecom space. India has a large talent pool for complete products development that can be leveraged in creative arrangements between different companies to come up with wireless technologies, mobile devices, network elements, and others.

## **Device**

India's device (handset, customer premises equipment) space seems to see some traction, but nothing on a global scale. Indian companies have not been able to capture the domestic market and MNCs still rule the roost. Some of the Indian equipment makers have tried coming up with 'me too' and 'low cost' devices ( i-Mate, XL Telecom, Karbonn, Ray, Maxx, Byond, Spice Mobile, etc) but most of them have not been able to capture the market due to lack of R&D or QA or branding/marketing or all of these.

Comparatively, China has large domestic device manufacturers that have much stronger hold on the domestic market. They spend close to 10% of their annual revenues on R&D, and employ on an average 30% of their total workforce in R&D. Chinese companies are aggressively spending on developing handsets that can support emerging technologies and are customizing these devices for telecom operators to support emerging technologies such as 3G and others (W-CDMA and TD-SCDMA). Some of them have also started working on the next gen technologies like LTE and 4G. Indian device manufacturers can take cues from Chinese makers and focus heavily on R&D, and branding efforts.

While on the other hand R&D captives of leading global device makers like Nokia, Ericsson, Samsung, Motorola etc, have used India as a hub for R&D focusing on user centric technologies and developing devices that can be used in the domestic market. Nokia's India R&D center is working on chipsets for high-end mobile devices and is focused on next generation packet-switched mobile technologies and communications solutions to enhance corporate productivity. Ericsson's R&D center in India is involved in developing mobile prepaid, convergent charging solutions, and mediation products. Similarly, captives are doing a lot of work from China as well. Nokia, for instance, is conducting R&D on a mobile infrastructure and to develop mobile applications based on 3G and IP multimedia subsystem (IMS) for both Chinese and global markets from their Chengdu center. Motorola's China R&D Institute (MCRDI) works on value added applications, 2G, 3G technologies, and 4G (including LTE and related migration solutions).

Indian IT services firms are at the forefront of this technology space with firms like Wipro, Satyam, Infosys, HCL, MindTree, Tech Mahindra, etc, are providing high-end R&D services to telecom companies. Indian IT companies have worked with global device makers on numerous upcoming products such as Nokia on RAC (radio access configuration) for managing elements of 3G networks, for development of latest set-top boxes for companies like Motorola and numerous other projects.

A couple of Indian device makers are trying hard to compete with the global brands and coming up with products that support emerging technologies. Micromax is one such Indian company that has come up with the cheapest 3G enabled device. It has a development center in Gurgaon that works on building customized mobile phones for the Indian market. To compete with the global biggies in the long-run and build sustainable products, Micromax has plans of setting up an R&D center in Shanghai with an investment of \$10 mn by December 2009. With the establishment of a new development center in China, Micromax plans to reduce the development time of mobile phones. Initiatives like these from a few more device makers would result in Indian companies competing on the global stage.

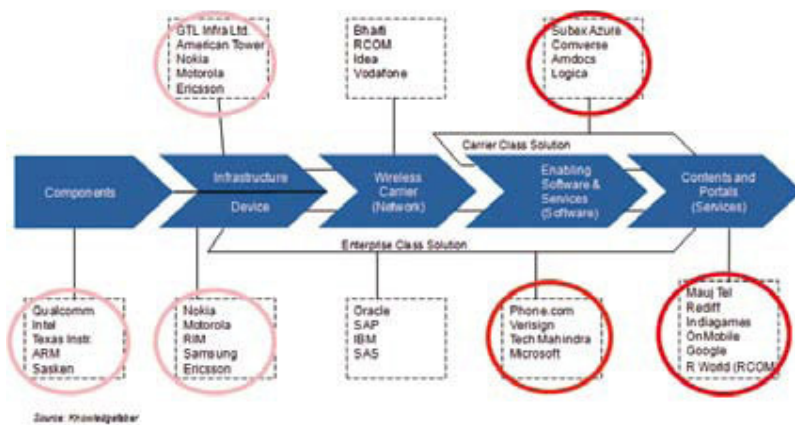
## **Wireless Carrier Network**

Globally, operators like BT, AT&T, NTT DOCOMO, China Telecom, Verizon, and France Telecom have invested in developing technologies or through technology tie-ups. Indian

telecom operators like Airtel, RCOM, BSNL, Vodafone, Idea, Tata Teleservices do not have a major technology focus. Indian telecom operators don't seem to be building on any expertise in the emerging technologies, and this could affect them in the long-run, especially when it comes to next gen technologies. Instead outsourcing is a big theme in India. Airtel has outsourced management of both their wireline and wireless networks. On the other hand, in countries like Japan and China, telecom operator have focused on technologies and aggressively initiated R&D efforts. One of the Japan's leading telecom operator NTT DOCOMO is spending heavily on R&D of LTE and 4G technology. China's leading operator, China Telecom has made significant investments in R&D space for developing mobile technology, Internet services, and the company also focuses on end customer demands and experiences.

### Enabling Software and Services

Carrier class solutions are software products implemented at the carrier/telecom operator centralized systems. These include operational support systems (OSS) to business support systems (BSS). India has witnessed a lot of innovation when it comes to OSS and BSS software applications. The number of homegrown companies have developed cutting-edge products in the OSS/BSS space that have captured market share globally. Subex Azure is one such company. It is globally recognized for its products and its clients including thirty-two of the world's fifty largest telecommunications service providers. Some of the other well known OSS/BSS solution providers from India include Suntec, Bharti Telesoft (now Comviva), Aricent, Elitecore, etc. Interestingly, Indian companies have been able to sell their products globally.



Note: Red color bubble indicates Product Development capability/innovation. Shade indicates the extent or amount of product development/innovation

Note 1: In the Indian wireless telecom market component, device, carrier class solutions space is dominated by the MNC's whereas infrastructure, wireless carrier (Network) and VAS space is dominated by the Indian players

### Content and Portal Services

India has seen tremendous growth in the mobile value added services (VAS) space in the last couple of years. A large number of Indian VAS companies have been able to come up with innovative services in the mobile VAS space. Traditionally, what started off from P2P SMS based (Bollywood and cricket) services has moved on to services like m-Search, video clips,

m-Commerce, etc, and is going from strength-to-strength. Unlike most of other components in the value chain, homegrown Indian companies dominate the mobile VAS space. But again this is a 'software space'.

Mobile VAS can be split into three categories-information, entertainment, and m-commerce. Indian VAS companies have performed well across all these categories. They have innovated and at the same time have constantly introduced customer centric services. They have also gone global and acquired companies from around the world. Indian VAS companies like Mauj, OnMobile, Cellnext, Indiatimes, Rediff, etc, have been able to develop innovative services and solutions. IMImobile developed DaVinci service delivery platform which integrates and encompasses all messaging platforms, voice and video platforms, operational support system (OSS), business support system (BSS), gateways, and administration and application interfaces. It has also come up with Ad-Ring fully integrated mobile advertising platform in which multi-format ad campaigns can be created and delivered to consumers via SMS, MMS, voice, WAP portal, CRBT and video streaming.

OnMobile has developed VAS product and solutions ranging from contest management and aggregation, m-commerce solutions to voice portals, and voice SMSs. Other companies like Rediff developed search engines on mobile phones and other value added services. This helped them increase their customer base and switch about 25% of the Rediff users to use mobile phones for Internet usage.

Again this shows Indian companies proving their mettle in the software space, but not complete products such as mobile phones and equipments.

### **Conclusion**

India has been able to drive innovation when it comes to developing 'software' products and technologies in the telecom space. But it has failed to develop complete products in the core (especially non-software technologies) in the telecom space. Now, with several years of experience in providing R&D services and gaining financial strength this is the right time for some of the large players in this field to start focusing on building a complete telecom product from India.

The telecom hardware equipment market is much bigger than the telecom software market. To stamp its authority in the global telecom market, India needs to build globally competitive companies across the telecom value chain.

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