As the key organisation responsible for research and development (R&D) in the telecom space, the Centre for Development of Telematics (C-DOT) has been instrumental in the introduction of key technologies in the country. Apart from providing solutions for current and future communication requirements, the centre is actively working to encourage domestic manufacturing of telecom equipment. Vipin Tyagi, executive director, C-DOT, talks about the role that the organisation has played in the growth of the telecom sector, the emerging technology trends, and C-DOT's vision for India's telecom future. Excerpts…

What role is C-DOT playing in making the Indian telecom industry self-reliant?

The role of C-DOT is to come out with innovative, state-of-the-art communication technologies and build a suitable ecosystem for their deployment in India. In 2009, we chalked out a roadmap to innovate and create a digital infrastructure that supported next-generation services. Since then, we have been working towards this.

Technologically, there exists a generation gap between younger people who are very comfortable with social media and video-based services, and the older generation that is accustomed to using phones for purely voice calls. Thus, next-generation services need to be convergent to satisfy the evolving communication needs of all generations.

Our second aim is to create technologies for rural India so that the technological divide between the haves and the have-nots can be bridged.

Thirdly, we believe that unless India becomes self-reliant in core technologies, we cannot meet the strategic needs of the country. A number of challenges are arising because of the widespread use of digital technologies and networks. We are, therefore, also involved in various industry interactions.

C-DOT's mission also includes encouraging the development of the country's manufacturing ecosystem. At C-DOT, we build software and design product prototypes. These prototypes are

manufactured in C-DOT's pilot production plant. After obtaining the necessary technology certifications, we transfer the technology to manufacturers for mass production. We have so far developed 16 products and have 58 transfer-of-technology agreements with 18 manufacturing partners.

What are the key recent projects and achievements of C-DOT?

A key project that C-DOT has developed is the gigabit passive optical network (GPON), which is being extensively used to connect the blocks to the panchayats under the BharatNet project. The GPON technology being used in the BharatNet project has been designed by C-DOT in India. While it is often said that India is not competitive at the global level, the reality is different. Software development in India is cheaper and the ecosystem is well developed. The need of the hour is to manufacture the highest end of the product to improve the country's competitiveness. People must understand that undertaking R&D is imperative for India.

Meanwhile, we have developed a long distance Wi-Fi system, which can provide connectivity up to 20 km and is suitable for rural India. We have deployed about 300 such systems and aim to increase the number to 7,000. We have also launched a solar-powered Wi-Fi solution. In addition, we have launched a Wi-Fi system that gives 1.7 Gbps on a single hotspot. It is compliant with 802.11ac, which is the latest industry standard. We are supporting both narrowband and broadband connectivity through our Wi-Fi products.

We are also digitising the entire network and have made available a complete portfolio of IP-based next-generation network (NGN) products for the purpose. We have created a product called Gyansetu aimed at the humanisation of technology. The product adapts itself to user needs and can be utilised even by people who are not technologically literate. Ultimately, C-DOT is looking to utilise the highest end of technology at the lowest cost.

What are your views on the evolving ecosystem and user readiness for machine-to-machine and internet of things technologies in India?

While M2M technology was present earlier as well, it is becoming all-pervasive now. In process control plants in various industries, machine communication has been used for quite some time. However, M2M is now being increasingly liberated so that there is no monopolistic control over

public infrastructure. C-DOT has collaborated with eight other standardisation bodies globally to evolve the oneM2M standard, and has built the first oneM2M-compliant platform.

We are also constantly evaluating the feasibility of completely eliminating human interaction and the problems that may arise in future once machines start talking to each other. As M2M emerges as a global technology, our vision is that India should take the lead in developing such open democratic platforms.

What are your views on the current state of broadband penetration in India? What are the key roadblocks and how can these be overcome?

When wireless services were introduced in India, we were heavily dependent on imported technology. There has been unprecedented growth in wireless technology, but it has led people to equate mobile phones with communication. That is, however, not true as mobile phones are primarily for mobility. One requires the corresponding connectivity infrastructure to enable communication.

While voice continues to be the commodity that is currently in demand, it is fast being overshadowed by data services. Therefore, we need to adopt a completely new approach towards technology deployment. The country will need next-generation services over the broadband IP network to meet future communication needs. I believe that fountainhead architecture will be the right model. Under this, broadband pipes are laid across the entire network except at the access, where the radio network is used. Moreover, the network architecture will need to be simplified and made capable for future expansion because retrofitting can be challenging.

What are the key products and technologies that C-DOT is currently working on? Who are your major clients?

C-DOT currently has a portfolio of 16 products, which have been developed over the past three to four years. We are currently working on a 100 Gbps dense wavelength division multiplexing system that can connect remote places through fibre with a very high capacity of 8-16 tbps over a single fibre. C-DOT has developed 32 Gbps WDS-PON systems so far to enhance the capacity of access networks. We have also developed a packet core that controls all long term

evolution base transceiver stations. We are coming up with next-generation products that will enable the transition from time division multiplexing to NGN.

What are your views on the current level of indigenisation in the Indian telecom space? How has the situation changed with the launch of the Make in India initiative? What should be done to encourage domestic manufacturing and uptake of indigenous products?

Domestic manufacturing means that end-to-end manufacturing should happen within the country. In India, whether it is government contracts or private sector deployments or an enterprise business, domestic products are not being demanded. Acceptance of home-grown technology will take some more time.

Currently, there is barely any value addition happening in Indian telecom manufacturing. We need to have better policies and frameworks to encourage domestic manufacturing. Policies such as preferential market access should be made friendly for those who are trying to establish manufacturing units in India based on Indian intellectual property right.

By and large, there is an upswing because of government policies that are promoting Make in India. However, we will need more specific measures to protect domestic manufacturing in the telecom sector. Make in India is an extremely positive move but the devil lies in implementation. While the initiative is encouraging foreign players to set up manufacturing units in India, it is important to see how it can help in the development of Indian talent.

What will be the key focus areas for the next two to three years? What are your long-term goals?

We are now entering the implementation phase. Technologies have been created and we will continue to upgrade them. Our next big push is to succeed on the field. We want to ensure that anybody who partners with us succeeds in the Indian environment. Our major thrust area will be the creation of broadband infrastructure using domestic technologies. Digital India and Make in India require a lot of R&D-based solutions to address typical Indian problems.

Apart from the 18 manufacturers that are our partners, we also work with various government research institutions. Overall, for C-DOT it is a great time because there is a lot of scope for R&D.

How do you see the Indian telecom industry evolving over the next five years? What opportunities does it promise for C-DOT?

Communication infrastructure will become as important as other utilities such as water and gas. Networks will become centres of all activities, going forward. With M2M gaining traction, cyberspace will get married to physical space. This interplay will result in a cross-fertilisation of ideas across different sectors and lead to the creation of new business models. Going forward, C-DOT will continue to work towards bringing rural India on board, creating a level playing field in the industry, building domestic manufacturing capability, and creating capabilities for future research in the country.

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