

Telecom R&D in India and TCOEs

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Where is the Value-ADD: iPhone as an example

USD 500 iPhone has

- \$174 components, subsystem
- \$ 7 manufacturing
- \$ 321 sales & distribution, design and IPR, profits
 - Sales and distribution would be less than \$100
 - \$221 in design / IPR and profits
 - Over time the profits and IPR will go down (commodity) as price goes down

What was the investment

- USD 500+ M or more

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India's Telecom Imports

Telecom import-bill in India is second only to that for oil

- TEC estimates Rs 225,000 Crores as investment in telecom network in 2009-10
 - Imports are about Rs 108000 Crores (in 2009-00)
- R&D, Design and IPR badly needed in India

At the same time, roughly about a third of total telecom design and development in the world would be from India

- Certainly India has the capability
- Over the last three years, **CeWIT** along with Indian Academia working with a few telecom industries have obtained
 - ~ 10% of IPRs in 4G wireless technology
- Most Designs done as services
 - do not involve IPR generation

Has TCOE made a difference?

For each TCOE

- R&D Investment allotted of Rs 2 Crore per year
 - In reality, about half the amount is really available in some TCOEs
 - Difficult to take care of infrastructure and retain staff
- Too sub-critical to deliver anything substantial

So what has happened?

- Seven TCOEs are now active
 - About hundred faculty / engineers are working
 - They have started to coordinate amongst themselves
- Industry (operator) interface is there, though weak
- Strong coordination center
 - A few small projects / technologies delivered

What should TCOE do?

Ensure that Rs 2C per year is available for each TCOE at the beginning of the year

- 50% spent on coordinated projects aimed towards technology and IPR development
 - 2 to 3 TCOEs join hand
 - Equal amount obtained as sponsored project (DIT, DST)
 - DOT to set-aside R&D funds for grants on competitive basis
 - Telecom product / service industry as partner
- 25% on short-term projects of interest to operators
 - Again advisable that 2 to 3 TCOE join hands with operators
 - For example how to get maximum value from network
- 25% on projects on blue-sky research, product development of interest to participating IIT / IIM faculty
 - Including entrepreneurship development

Further TCOE should

Work together to help create and support TSDO

- Identify India specific requirements and National priorities working with operators
- Ensure technical solutions through standardization
- Orient academic Communication Research in India towards generating IPRs useful to standards
- Participate and build consensus in standard bodies

Organize short term courses / workshops on Standards

- For industry and for R&D community
 - What would it take to build systems?
- Workshop for operators
 - How will new standards impact their network / business?

Promote Telecom entrepreneurship

- Telecom product companies and telecom services companies
- Companies on Network optimization

Work on Securing Indian Networks

- Security is a major issue where significant work is needed by several TCOEs

R&D funds from DOT

Differentiate from that of DIT / DST

- Should focus more on IPR, standards contributions and technology development
 - Avoid projects of sub-critical size
 - Timeliness should be a critical factor
 - Product-focus and partnership with industry
 - Some funding also to public / private industry partner
 - Support for patenting in India and outside
- Build up to Rs 1000 Crores per year in five years
 - First set of projects should be trend-setter

Entrepreneurship Development Fund

DOT should set aside entrepreneurship development fund

- Build up to Rs 1000 Crores per year over five year
- Combination of venture funding and low-interest loan
 - TDB model can be examined
 - Co-fund private venture fund focused on start-ups

Simulators and Test-beds

CeWiT has developed a complete 4G Network simulator

- 19 cells 57 sectors
- Runs on high-performance computing cluster
- Has been used by CeWiT, academia and industry for establishing the capability of their IPR before taking it to IEEE802.16m and 3GPP-LTE
- TCOE used it for IMT-A evaluation
- Being continuously enhanced
 - TCOE has contributed to enhancing simulator
- Offered to operators for network performance evaluation

CeWiT and IITM has built a 4G test-bed on campus

- 4 Base stations over 1 sq Km
- Funded partially by DST and connected to UK test-bed
- Physical and MAC by CEWIT, higher layers and core-network by Sasken, L&T, Tech Mahindra, WIPRO
- Being used by industry for inter-operability and performance testing by five companies in India

India will need

India needs both Simulator and test bed to be continuously enhanced

- Can be done by CeWIT / TCOE partnering with industry

At the same time would need setting up of several certification Labs with different domain expertise

- RF, Optical, protocols, core-network, service platforms, security
- Should be set-up as section 25 companies next-door to TCOEs / academic institutions with relevant domain strengths
 - Accredited by NABL
 - Significant development of cost-effective testers important
 - e.g., emission certifications done by TCE Madurai, IITM and CeWIT for COAI
 - 100% import will render the testing unaffordable