

## **Dr. AK Chakravarti**

Dr. AK Chakravarti, an alumnus of BITS Pilani and IIT Delhi, has played a key role in the conceptualization and implementation of several national IT initiatives. During his tenure as Adviser and Group Co-ordinator, Department of Information Technology, Ministry of Communications and Information Technology, Government of India, he has served various expert committees, panels and task forces of the Government of India. He started his tryst with technology in the Information, Planning and Analysis Group of erstwhile Electronics Commission of Government of India in 1972.

His portfolio in DIT as Head/Group Coordinator is the following:

1. R&D in IT Group comprising of five Divisions (IT-Emerging Areas & Coordination; Tera Scale Supercomputing; Bioinformatics Initiatives; Patents & IPR; FOSS Initiative Cell).
2. E-Commerce & Cyber Laws Group comprising of four Divisions (E-Commerce; Cyber Laws: Formulation & Enforcement; E-Security; Registry - Semiconductor ICs Layout Design).
3. R&D in Communications & Convergence and Broadband Technologies (CC&BT) Group consisting of two Divisions.
4. Group Coordinator for C-DAC; Member, Governing Council and other management structures.

Chakravarti has 36 years of experience in developing plans/programs and strategies for the country in Electronics & Information Technology; in-between, served as Director for 4 years (1986-90) on deputation to the Office of Scientific Adviser to Prime Minister (SA to PM); Adviser/Scientist `H' w.e.f. Feb. 1997 - Head of IT Group in erstwhile DOE and till reorganization in MIT w.e.f. Jan. 2001 and currently Adviser/Scientist `G' in DIT thereby having more than 17 years of experience at senior technology management level with the last 12 years in IT.

In his years of distinguished service, Dr. Chakravarti had strived successfully for the technological advancement of India by correctly understanding and applying global technology trends in the proper national perspective.

Dr. Chakravarti has authored more than 30 research publications in international journals. In addition, Dr. Chakravarti has authored / co-authored more than 100 detailed in-depth studies/analysis reports in various contemporary subjects of Electronics & Information Technology. He has also represented India in various international fora like UNESCO, WIPO, UNCITRAL, UNCTAD, OECD, and also Indo-USICT Forum, Indo-US High Tech Coop. Group etc.

In recognition of his yeomen services over the years, Dr. Chakravarti was honoured by IIT Delhi with the Alumnus Award for outstanding contribution to national development.

Dr. Chakravarti has been a mentor and an incessant source of inspiration to C-DAC. He has been a Member of the Governing Council of C-DAC for several years. He has worked actively with C-DAC in national initiatives like Information Security, Bioinformatics, Free/Open Source Software, Grid Computing, Ubiquitous Computing,

Digital Preservation etc.

Currently Dr. Chakravarti is working as Principal Advisor (R&D) to C-DAC.

### **Publications:**

More than 30 research publications in international journals of repute.

- Authored/co-authored more than 100 detailed in-depth studies/analysis reports in Microwave, Photonics & Optical Fibre Communications, R&D Models & Technology Management, Technology Forecasting, National Information Infrastructure for National Development, Software Export Strategies, E-Governance, E-Commerce & more recently M-Commerce, Online Learning, IPR, Cyber laws series to provide technical inputs leading to IT Act 2000 & now amendments to IT Act 2008, Internet Sanitization, Cyber Security & Privacy, Multi-applications Smart Card, RFID, Ubiquitous Computing, Free/Open Source Software, Bioinformatics, Digital Preservation, and other emerging areas.
- Some of the work recognized nationally to the extent of asking to represent India in various international forum like UNESCO, WIPO, UNICTRAL, UNICTAD, WTO, OECD etc; contributed in Indo-US ICT Forum, Indo-US High Tech. Cooperation Group and other bilateral forum.

### **Some Notable Achievements (starting with recent times)**

#### **1. Accelerate Financial Inclusion through Mobile Commerce (2007 - ongoing)**

- 1.1 A set of initiatives taken to promote M-Commerce: Brainstorming session with stake-holders arranged to develop action plan; international state-of-the-art/best practices analysis reports prepared; Expert Committee set-up; joined Mobile Payment Forum of India as Member, Executive Committee; Worked with RBI and MPFI to contribute in Mobile Payment Framework -Operational guidelines etc.; A set of R&D projects initiated in gap areas.
- 1.2 Initiative is being progressed further to accelerate Financial Inclusion through Mobile payment, covering, interalia, (i) Establish inter-operability amongst multiple mobile operators for money transfer from any bank to any other bank using low-cost mobile phones; (ii) Delivery of Govt. schemes to rural masses; and (iii) Focus on unbanked people.

#### **2. Accelerate Technology Innovation & Development of Entrepreneurs (TIDE) : Support Start-ups and SMEs (2007 - ongoing)**

- 2.1 For fostering innovation and sustaining competitiveness in ICT&E sector in 11<sup>th</sup> Plan, the following schemes were conceptualized, got approved and are under implementation:
  - (i) Support International Patent Protection in Electronics & IT (SIP-EIT) - a scheme designed for SMEs and Technology Start-up Units.
  - (ii) Scheme to support Technology Incubation and Development of Entrepreneurs in ICT&E sector (TIDE) at institutes of higher learning... IITs, IIITs, IIMs, NITs etc.

(iii) Multiplier Grant Scheme - to promote & support R&D collaboration between industry and academia/research.

2.2. Further activities are being formulated to cover, inter alia, (i) Create Network of TIDE Centres propel nationwide innovation based entrepreneurship development; (ii) Encourage angel/early stage venture capital investment through PPP model and policy instruments.

### **3. Towards National Digital Preservation Programme (NDPP): ( 2008 - ongoing )**

Long-term sustainable digital preservation strategies, subject of major concern today.

Working Group set-up; international state-of-the-art reports prepared; Sub-Committees set-up which are currently developing roadmap of various segments of NDPP; Chairman, Steering Committee, NDPP. Indo-US Workshop on R&D and Trends in Digital Preservation held on March 2009, which has provided significant inputs; the work is progressing.

### **4. Free/Open Source Software Adoption Framework (2005 -ongoing)**

4.1 F/OSS Initiative Cell set up. The international development analyzed; a National Resource Centre for FOSS conceptualized and implemented at CDAC, Chennai. BOSS (three versions), Indian version of Linux distribution developed, finding wide acceptance.

4.2 Beginning 2008 draft F/OSS Adoption Framework prepared, discussed & approved within DIT and its organizations (C-DAC, NIC) through a Committee structure; recently NRCFOSS Phase II got approved in line with F/OSS Adoption Framework. Further work underway, (i) Projects to ensure inter-operability among FOSS distributions; (ii) Knowledge repositories in four identified areas (viz. e-Governance, e-Learning, mobile platform and scientific applications) to facilitate large scale uses.

### **5. Ubiquitous Computing Research Initiative (2007 - ongoing)**

International developments followed; Expert Committee set-up to develop research agenda; Programme initiated which is under implementation.

### **6. Group Coordinator/Member, Expert Committee on Amendments to Information Technology Act 2000 (2005-2006)**

Series of meetings of the Expert Committee arranged; on concerned issues, global best practices analysis carried-out to draw parallel for India; the draft committee report prepared which went through various versions spread over the period April-Sept. 2005 and then finalized. After incorporating necessary feedback/comments, draft cabinet note finalised. The Cabinet approved the Information Technology (Amendment), 2006 Bill. Thereafter further follow-up work taken over by other colleagues in DIT in Nov. 2006. ITAA 2008 already approved by Parliament and gazetted in Feb. 2009.

**7. Member, Governing Council as Group Coordinator for CDAC - Ongoing/  
Chairman, Sub-Committee of CDAC Coordination Committee - CDAC:  
Focus Areas and Roadmap**

7.1 In order to give sharper focus to the activities of CDAC, a Sub-Committee was set-up. The Committee had a series of meeting and prepared CDAC: Focus areas and Roadmap. Work completed and approved. The present C-DAC activities are centred around this Report. As Member, Governing Council, TAC and CC of CDAC, contributed in the activities of C-DAC, in recent times, specifically in developing projects/programmes in Information Security, F/OSS, Grid Computing, Bioinformatics & Ubiquitous Computing.

7.2 Currently, one of the major initiative under way is to progress on Garuda Grid Computing Infrastructure for R&D, academia and users and tie-up Garuda based applications with National Knowledge Network (NKN)

**8. InfoSecurity (2002-06) :**

8.1 Co-Chairman, Working Group in InfoSecurity and E-Commerce; InfoSecurity R&D Roadmap prepared. Major initiatives on Crypt Analysis, Steganography, Cyber Forensics, Network Monitoring & Biometrics taken as part of InfoSecurity R&D initiative.

8.2 Information Security Management System/BS 7799 Project, Common Criteria Project - conceptualized jointly with STQC.

The Encryption Policy Report prepared which is now being pursued by other Group.

**9. Bioinformatics Initiative (2005- ongoing):**

Global developments & opportunities for India analysed. Bioinformatics Research and Applications Facility (BRAAF) conceptualized at CDAC and implemented. Amongst a range of initiatives, the latest being Agri Bioinformatics.

**10. Roadmap for RFID (2005-06):**

Global development in this area analyzed, participated and chaired some sessions in national seminars. A programme to develop technologies and to promote research and application development in selected area initiated.

**11. Formulating Common Standards for Multi-applications Smart Cards (2002-05)**

Evolved guidelines for multi-applications Smart Cards through a High-level Committee. Detailed technical analysis done of best practices to draw parallel for India. Test beds/technology development projects initiated. This has provided

significant inputs for now NeGP Projects.

**12. IPR Promotion Programme for Electronics & IT Sector ( ongoing )**

More than 10 state-of-the-art studies carried-out. IPR Manuals prepared and widely circulated. Member, Editorial Board, J. of IPR. A Scheme to support international patent protection in electronics & IT (SIP-EIT) formulated and under implementation. Participated in 45<sup>th</sup> Series of Meetings of the Assemblies of Member States of WIPO, Geneva, September 22-30, 2008.

**13. Convenor, Planning Commission 10<sup>th</sup> Plan (2002-2007) Working Group on Convergence and E-Governance:**

Was nominated as Convenor by Planning Commission. Arranged meetings of the Working Group. Prepared comprehensive background papers and finalised the Report, which provided framework for current ongoing National e-Governance Plan.

**14. Cyber Laws Initiative/IT Act 2000 (1997-2000 :**

Anticipating the need for Cyber laws, as Head of IT&T Group, proactive actions were taken to set-up High-Level Standing Committee to formulate Cyber laws for the country in Sept. 1997. The work of the Committee was supported by carrying-out four international state-of-the-art studies on key Cyber Laws; these were published, presented in national & international forum. Finally, the overall effort through a team work led to enacting IT Act 2000. Work recognised to get professional invitation to participate in international forum on Cyber Laws, UNCITRAL etc., as an expert.

**15. Chairman, Apex Coordination Committee, ELITEX 2002, ELITEX 2003 and ELITEX 2004:**

A major Seminar-cum-Exhibition organised to showcase DIT and DIT supported technology initiatives. The theme of Elitex 2002 (Enhancing E-Readiness) Elitex 2003 (India - A Global Destination for R&D) and Elitex 2004 (Technology Vision: 2010) had significant multiplies effects in the country.

**16. Promotion of E-Commerce (1998-2000):**

A 10 point action plan developed with Govt as Facilitator in 1999 and presented to High-Level Committee. Besides IT Act 2000, a Centre of Excellence for

Technologies for E-Commerce, CMC R&D Centre/IDBRI, Hyderabad, a series of test beds on E-Commerce initiated. Global developments, technologies, legal & regulatory frame-work followed and analysis reports prepared.

#### **17. National Information Infrastructure (NII) for National Development (1997):**

Following international developments on NII, led the conceptualisation of a major national action plan in May 1997 and processed for implementation and approval at highest level in the Government. NII Action Plan included, interalia, National High-speed Backbone Network, Internet & NII, PC penetration & localisation of Software in Indian Language, Government Computerisation, ERNET upgradation (now ERNET-India Society), Multimedia Promotion Programme, Advanced R&D, Test Beds for Technology Adoption & Flagship Applications for NII (E-Governance, Telemedicine, E-Education), Enhanced IT Uses/Investment Promotion, Electronic Commerce, Regulatory & Legal Framework and the like.

#### **18. Online learning/IT Enabled Distance Education for Higher-End HRD in ITSector**

Subject area in terms of global development studied and analysed. Participated in Conferences and presented papers with the collaborating colleagues in IT&T Group. Example, Edunet 99, Chennai, 16<sup>th</sup> Dec 1999 on Online Learning - National Initiatives. Major initiative taken in DIT involving NCST, Mumbai, IGNOU, BITS, Pilani, IITs etc.

#### **19. STPI Expansion Plan (1996-98):**

As Head of IT &T Group and as intellectual stake-holders in STPI, worked with STPI system to develop and implement STPI Expansion Plan. Mooted the concept of "More Work to India", expanded STPI infrastructure to secondary cities for employment generation in IT enabled services. Participated in various inter-departmental Committees/CII/NASSCOM forums to develop action plan for further increase Software Export from India.

#### **20. India IT Vision 2010: Action Plan (1998):**

As desired by Planning Commission, prior to setting-up of National Task Force on IT and Software Development, prepared in May 1998, a comprehensive Action Plan which helped DoE/DIT to enlarge 9<sup>th</sup> Plan activities. Subsequently participated in the deliberation of National Task Force meetings; was also member in my individual capacity in the Working Group working on IT R, D&D Action Plan.

**21. Member, Governing Councils, C-DAC, NCST, STPI, ERNET, Board of Directors, CMC Ltd at different times:**

Gave specific inputs for their growth. Notable amongst them being Expansion of NCST by way of new activities and two campuses each in Bangalore and Navi Mumbai.

**22. TIFAC led Technology Vision 2020: Coordinator of the Panel related to Electronics and Information Technology (1994-96):**

TIFAC mega effort led by Dr. Abdul Kalam, one sector was related to Electronics & IT. As Co-Chairman & Convener of the Panel, carried-out a detailed forecasting exercise for almost 2 years (1994-96). New forecasting techniques were developed jointly with IIT, Delhi to carry-out this exercise. The work was presented in International conferences, published in international journals and also got a lot of national recognition. Work on NII, Convergence opportunities were fall-out of this Tech Vision 2020 efforts. Project: TIFAC - Electronics was conceived and implemented; a TIFAC-Electronics Cell was then created in DIT to focus on the subject.

**23. Fibre-optics Technology/Photonics Development Programme of DIT (1977-86):**

Was responsible for conceptualising, developing & coordinating this initiative in the country. National Project Director, UNDP supported Fibre-optics Technology Project (FOSAPP). Almost all groups in the country, in academia, national laboratories and industry, working in the area were networked. Written a large number of international state-of-the-art reports, Member- Convenor, Panel developing Action Plan on the subject, attending national/ international conferences, study tours, organising National Seminars etc were all integrated in this effort.

Experience & knowledge of fibre-optics helped plan internet broadband network including convergence in the country.

**24. R&D Models and Technology Management: Governmental Support in Electronics & IT**

Over the years, significant efforts have been made to support R&D in academia, national labs and industry. Various international R&D support models, know-how transfer/IPR model, R&D responding to changing needs as seen globally - were studied and analysis reports prepared. Officer-in-charge, TDID, DOE. In 2003, US R&D Roadmap on InfoSecurity R&D was analysed to draw parallel for India.

**25. Studies in Microwaves (1972-77): Conceptualisation of SAMEER**

As a first assignment in IPAG (1972-75) studied the whole area from planning angle, prepared a series of state-of-the-art reports; networked, Member Secretary on Panel developing indigenisation plan for microwave components; Member Secretary, TDC WG on Radars, Sonars & Navigation Aids. All these efforts resulted into created a new organisation