

Information Technologies Landscape

Prof S Sadagopan, IIIT-B
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Agenda

- Quick snapshot of IT in US, China and India
 1. Research in IT
 2. Role of government, industry & academia in research in IT
 3. R & D & national strategies
 4. Higher education
 5. New technologies & national research strategies
 6. Intellectual Property
 7. Data needs of S & T in IT

Quick snapshot of IT in US, China & India

- US dominance continues in products, technology and services (Microsoft, Intel, Cisco; Adobe, Apple; Accenture, EDS)
- China as a “rising star” in manufacturing; local content, services, niche areas (gaming, toys, internal application) (Lenovo, Baidu)
- India as a “rising star” in services, new enterprises (entrepreneurship), niche products & services (TCS, Infosys, Wipro; iFlex, Tally; Ittiam, Persistent, Mango Technologies)
- Running at great speed for decades (US)
- Walking (China)
- Getting up to walk (India)

Quick snapshot of IT in India

- Leadership in IT services
 - SWITCH (Satyam, Wipro, Infosys, TCS, Cognizant, HCL) account for 2.4% of global IT services market of \$ 677 billion
- 1.6 million jobs in IT; 1.4 million jobs in IT-enabled services; MNC's adding 150,000 jobs in a year; SWITCH alone added more than 100,000 in 2007
- IT services around \$ 50 billion in 2007-08; 70-80% export market; growing at 20%
- MNC firms setting up large base in India; IBM / HP have 70,000 people in India; even Dell has 10,000! Huawei has 3,000 people
- All major IT companies – IBM, HP, Intel, Microsoft, Oracle, Motorola, Nokia, SAP, Huawei, Adobe, Symantec – have their R &D units in India

Quick snapshot of IT in India

- Products with local markets happening (Infosys Finacle, Tally Solutions, Core Banking Solutions); some technologies & products in the niche market are happening (Persistent licensing for Oracle, Portal Player / Impulse Soft licensing to Apple for iPod); some IP licensing happening (Ittiam for Japanese OEM, Sasken for Motorola, HiCal for Nokia)
- Broad-banding services – IT, Infrastructure management, support center; broad-banding applications – Legal outsourcing, medical outsourcing
- Local consumption of IT – banking, e-governance, telecom billing (Subex); IT going to secondary cities – Mysore, Bhubaneswar, Mangalore
- Made in India for the world; Made in India by the world; Made in India for India

Quick snapshot of IT in India

- Enabling public policy has helped IT
 - Setting up of IIT's (IIIT's in the recent past) and giving them freedom
 - STPI infrastructure, single “inspector”
 - IT / ITES Policy
 - IT Ministry in every State government & at the Central government
 - Tax incentives
 - NASSCOM interaction
- Investment by government in critical projects has helped
 - ERNET
 - NCST

1 Research in IT

- US as a legendary leader in ALL areas of ICT (Hardware, Software, Communications, services) with research of yester-years paying off handsomely; established culture of R & D
- China doing an excellent job of “catch up” with focus areas (wireless standard), “beefing up” Universities, incentives for faculty / students
- India “caught in time-wrap”; resting in 60’s laurels & IT services; questionable quality of most numbers; government strong-hold; “Inspector Raj”
- Leader (US)
- China (Great follower)
- India (Too confused)

2 Role of government, industry & academia in research in IT

- US – government & industry “utilizing” universities (both public & private); academia having delivery capability
- China – government “building” university system at great speed; academia starting to build delivery capability
- India – government has too little money, spreads it too thin, “global” industry able to use universities (MSR), “local” industry starting to learn (TCS, Infosys)
- US – has scale advantage
- China – has the advantage of focus
- India – has the advantage of “open” system but neither “focus” nor “scale” (exceptions Language technologies, Nano-technology)

3 R & D and national strategies

- USA – Research for national needs is a long standing tradition (NSF Manufacturing Centers in 80's & 90's)
- China – regimentation helps to strategize
- India – neither clout (Bhabha / Sarabhai days) nor authority in recent years (Rajiv Gandhi)
- US has been more successful in the past
- China is seeing success in some areas
- India far from “waking up”

4 Higher education

- USA – size (15,000 PhD's), scale (1,000 universities) and decades of experience (since 1960's)
- China – building size (1,000 PhD's), scaling (at least 50 world-class universities)
- India – miniscule (100 PhD's), just not scaling (7 IIT's in 60 years), “knee jerk” reaction (6 IIT's in 60 days)
- USA – great infrastructure, falling interest
- China – building formidable infrastructure
- India – refusing to “see” the reality

5 New technologies & national research strategies

- USA – tradition still working, no major initiatives in the recent past
- China – sometimes “bulldozing” with its attendant advantages & disadvantages
- India – no strategy is “sometimes” working – mobile world, telemedicine, e-governance
- US – rests on laurels
- China – great catching up
- India – muddling along

6 Intellectual property

- USA – big deal for decades (IBM alone has 40,000 patents)
- China – confusing to “outsiders”
- India – getting its act together; culture of MNC’s having a “rub off” effect; for example patent filings in in India in 2007
 - Texas Instruments (500), Cisco (450), Huawei (200), Microsoft (180), Philips (130), Infosys (119), Wipro (101), TCS (100), NXP (80)

7 Data needs of Science & Technology in IT

- USA – established channels for information collection, dissemination, longitudinal research
- China – some universities are getting their act together
- India – many government departments start and fumble (IPAG)
- USA – worthy of emulation
- China – not much to write home about
- India – need to “unlearn”

Possible takeaway for India

1. Government to “invest” in research and promote research in IT
2. Government to play ONLY “enabling” role; leverage universities to get “more bang for buck” for limited government funds; tax incentives for research investments in universities by the corporate sector
3. Create “centers of critical mass” in key areas of IT research
4. Unshackle higher education
5. Provide incentives for new technologies
6. Create an IP culture
7. Have on-going program for research study by “centers”

