



Where Electronics Begins™

“Doing Business in India”

EDAC Emerging Companies Committee Panel



November 28, 2006
Sponsors



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Agenda for Today

- **6.00 – 7.00** **Reception**
- **7.00 – 7.10** **Introductions**
- **7.10 – 7.20** **Facts about India**
- **7.20 - 8.20** **Panel discussion**
- **8.20 -** **Q&A**

The Panelists

Moderator: Vic Kulkarni, President & CEO, Sequence Design

Selling in India

Nitin Deo, VP of Marketing and Business Development, Clear Shape Technologies

Offshoring technology

Raj Dhesikan, Director of Engineering, Sanmina-SCI

Where to set up operations

Aurangzeb Khan, Corporate VP Marketing, Cadence Design Systems

Leveraging the financial and tax benefits

Suresh Shanmugham, Senior Vice President, SVB Global, India

“Doing Business in India”

□ The panel will address following important issues

- ***Do you have the knowledge to effectively do business in/with India?***
- ***Are you thinking of India as a MARKET, or as a TALENT POOL, or as a COST SAVING measure?***
 - *Or are you thinking about it because your VCs and management told you so?*
- ***Do you know the pitfalls?***
 - *Cultural and economical*
- ***The decision criteria?***





Figures and Facts about India

India Today!

□ World ranking

- 4th largest economy on purchasing power parity basis and
- 12th largest at market exchange rates

□ GDP = \$648B in '05

- Growth ~ 6%/yr over last 10 yrs/ forecast ~ 8% in '06

□ Foreign direct investments ~ \$10B/year

□ Current population ~ 1.2B

- Number of people who can write and speak English ~250M
- Number of villages ~750,000– digital world initiative underway
- Middle class ~300M, fueling economy

□ Economic liberalization began in 1991

□ Now a leading offshore destination for Fortune 1000 companies

Software Industry in India

- **India went 'digital' with the invention of ZERO in 458 A.D.**
- **From origins in call centers and code writing, India is now climbing the value chain to perform complex functions like**
 - Data management
 - Accounting software
 - Market analysis and consulting
 - Medical diagnostics
 - Semiconductor design
 - EDA
 - CAD in automotive/ aerospace applications
- **Software export**
 - ~ \$17B in '06
 - ~ \$60B in '10



Mobile Internet Café in an Indian Village



India's Semiconductor & EDA Industry

□ Semiconductor Total market

- 2005 \$ 2.82B
- 2010 \$12.67B (fcst)
- Major product categories
 - DSP, μ P, μ C, Memory, ASIC, Discrete, Analog, Sensors

□ VLSI design + BoD design + Embedded s/w market

- 2005 \$ 3.25B
- 2010 \$ 2.0B (fcst)
- Engineers employed in 2005
 - 11,000 in VLSI design
 - 3,300 in BoD design
 - 60,000 in embedded software design

□ Engineer-month cost

- 2005 \$4,300
- 2010 \$5,049

Examples of VLSI Designs Done in India

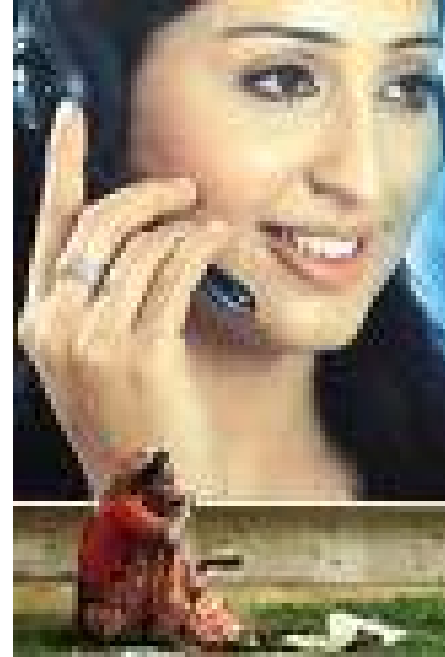
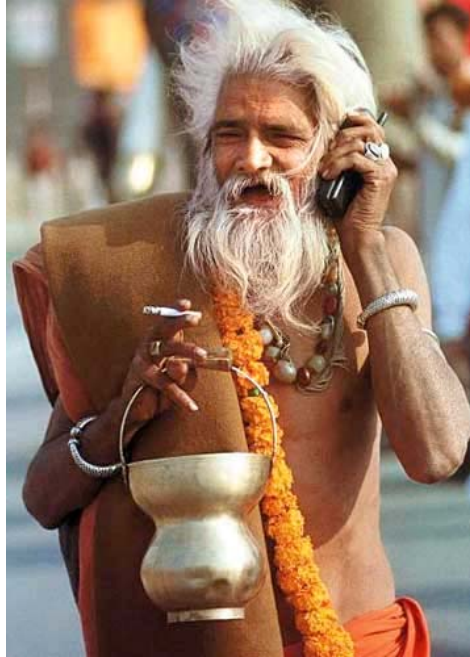
□ **~300+ design starts in 2005**

□ **Examples:**

- WiMax
- GSM chips
- Airbag controls
- Mixed-signal and analog
- DSP
- Low-power processors
- Modem chip designs for cell phones
- IP building blocks

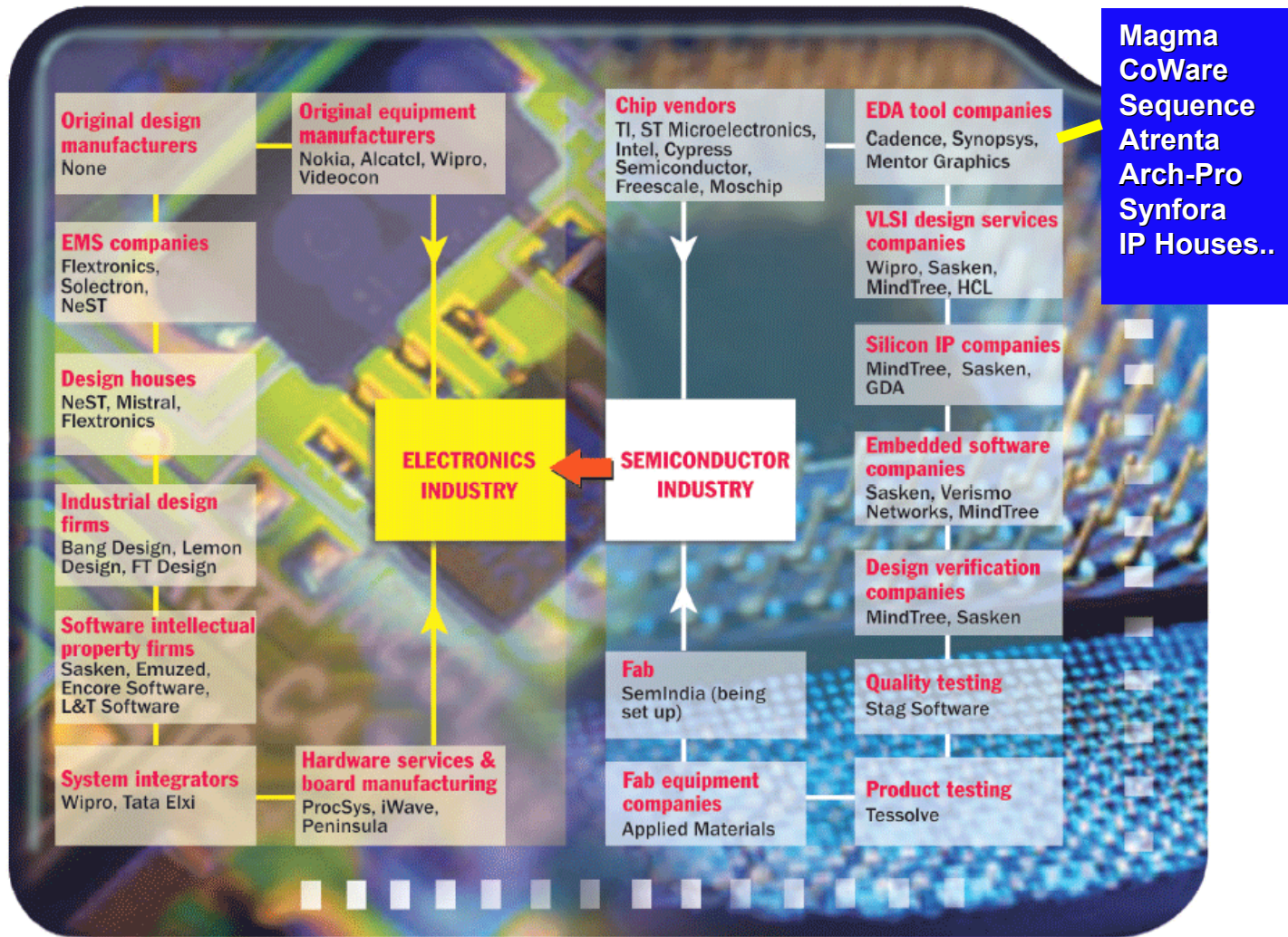
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Indian Guru and the Model Stay Connected...



..... Of course, not with each other!

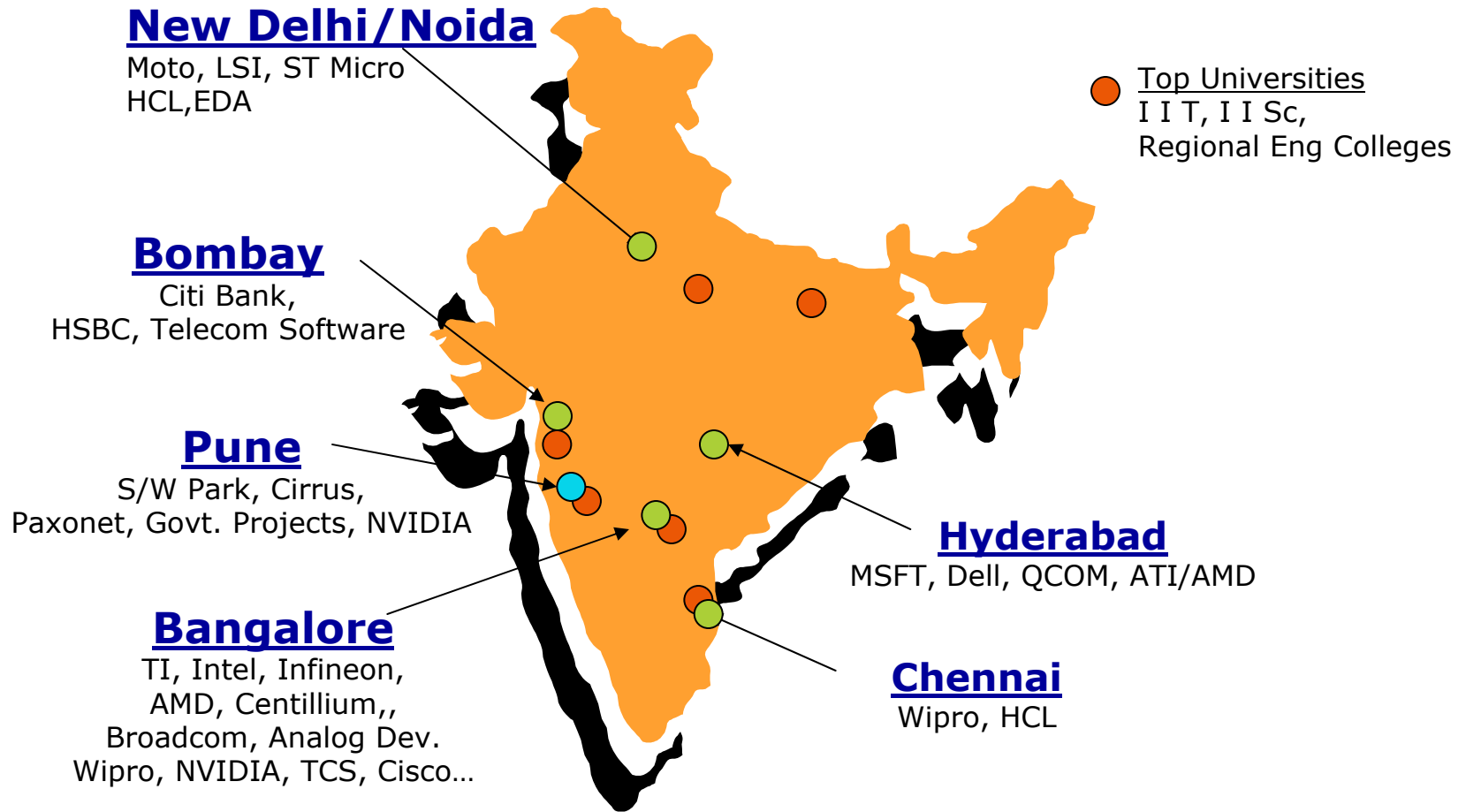
The Indian Semiconductor Eco-System



MADHUMANGAL

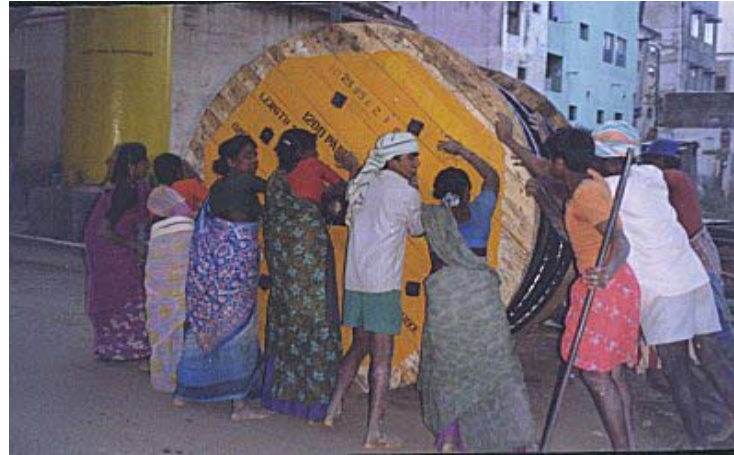
Ref: Business World Apr 2006

India's Centers of Excellence



120,000 engineers graduate with BSEE every year
40,000 engineers graduate with MSEE every year

Bangalore in the Making....



Bare Footed Laborers Rolling Fiber Cable
The Wiring of Bangalore



Typical Technology Parks Bangalore and Noida (near Delhi)





Panel Discussion

Focus Areas of Discussion

- ❑ **Selling in India**
- ❑ **Off-shoring technology**
- ❑ **Operations –Who? What? Where?**
- ❑ **Leveraging financial and tax benefits**

Shukria & Namaste!



Appendix

(slides NOT shown to the audience)

Selling in India

Nitin Deo
Clear Shape Technologies

- ❑ **How do I choose the right distributor?**
- ❑ **What are the pros and cons of doing a joint venture with my distributor?**
- ❑ **When should I migrate to direct sales?**
- ❑ **What are the phases of migration?**
- ❑ **How can I protect my IP internationally?**

Off-shoring Technology

Raj Dhesikan
Sanmina Corp

- ❑ **Offshoring vs outsourcing – What is the difference?**
- ❑ **How do you determine your objectives, financial and other?**
- ❑ **What products and what technologies are profitable to offshore?**
- ❑ **What are the hidden costs of worldwide distributed R&D?**
- ❑ **What will my costs be like over time?**
- ❑ **How do I attract employees?**
- ❑ **How can I retain employees?**
- ❑ **Is there a shortage of mid level managers?**

Operations: Where? And Who?

Aurangzeb Khan
Cadence Design Systems

- ❑ **What city should I choose? Bangalore vs Noida vs XX ?**
- ❑ **How can government bonded zone business parks help or hurt me?**
- ❑ **What are the key differences in business practices?**
- ❑ **What cultural differences should I be sensitive to?**
- ❑ **How can I minimize turnover and prevent job hopping?**
- ❑ **Is their value in relationships with universities, ISA?**

Leveraging Financial and Tax Benefits

Suresh Shanmugham
SVB Global

- ❑ **What are the legal implications of incorporating in India?**
- ❑ **Tax implications?**
- ❑ **Do I lose tax advantaged benefits if I sell and source in India?**
- ❑ **Are there patent issues?**
- ❑ **What are the plusses and minuses of incubators and where are the best ones found?**
- ❑ **What about the infrastructure in India....water for fabs, roads, electrical, communications, etc.?**

US-based Multi-Nationals

❑ Texas Instruments – Bangalore

- Cell libraries, ASIC Design flows, DSP designs, IP design, ARM designs
- >300 engineers, 15-20 designs/yr

❑ Freescale (Motorola) – New Delhi

- Motorola design center, PowerPC derivatives
- > 100 engineers, 5-8 designs/yr : 5-15M gates

❑ INTEL India – Bangalore

- Microprocessor design, uP derivatives, Design Services for Intel, Oregon
- Just invested \$6M in support center
- 15-18 designs/yr : 10-18M gates

❑ OpenSilicon Inc. - Bangalore

- Fabless ASIC vendor
- Over 50 people doing complete IC design

❑ InSilica - Bangalore and Delhi

- Fabless ASIC vendor
- Over 30 people doing complete IC designs

❑ Centillum – Bangalore

- ADSL/DSL
- 3-5 designs/yr : 10-17M gates

❑ Cypress – Bangalore and Hyderabad

- Networking applications
- Staffing up to 300 engineers by mid 2005, 15-18 designs/yr : 5-10M gates

❑ National Semi – Bangalore

- Design services for Business Units worldwide: Network & communication applications
- 5-8 designs/yr : Big Analog, small digital, 2-10M gates

Europe / Japan-based Multi-Nationals

□ Europe

- ST Micro – Delhi
 - Microcontrollers, Consumer chipsets
 - 3 divisions: ASIC, Networking, Central CAD
 - >1000 engineers
 - 15-20 designs/yr : 1-6M gates
- Infineon – Bangalore
 - DSP chips, ARM IP, Communications, ASIC flows
 - Started building 65nm design flow with 3 chips to be taped out late next year
 - Staffing up to 250 engineers and 20 designs a year by mid 2005

□ Japan

- Renesas (Hitachi): Design services partnership with KPIT (Pune)
 - Dedicated design engineers performing design, verification and ATPG
 - Software services agreement with Wipro (B'lore) and NIIT (Pune)
- Fujitsu: Software services agreement with IT consulting companies (NIIT)
 - Just started design team in Bangalore – providing design services and software services to various groups
- Toshiba:
 - Working with a local company, Socrates, for Embedded Software development

Availability of Engineering Talent

□ **Bangalore:**

- Has several multi-national companies and local companies (like Wipro, Tata, etc.)
- Lot of trained IC designers with IP and EDA experience available
- Overall cost is the highest in India
- Employee retention is difficult

□ **New Delhi:**

- Similar to Bangalore, but extreme weather conditions may impact productivity
- Temperature from April to October ranges from 30 C to 45 C

□ **Pune:**

- Emerging software center – only 100 miles from Bombay
- Overall cost is about 60% of Bangalore and New Delhi
- Employee loyalty is high
- Many universities in the local area makes it easier to recruit cost-effective, smart and motivated engineers
- Not as cosmopolitan as Bangalore and Delhi

Where in the World is *The Next Frontier*?

- As a market?
- As a source of advanced technology?
- As a low development cost basis?

Standard Time Zones of the World

