Outsourcing Engineering Development Offshore

Hot Chips 16 Panel
Moderator: John Nickolls, NVIDIA

Panel: Outsourcing Engineering Development Offshore

- John Nickolls, NVIDIA

- Ron Hira,   IEEE-USA, Rochester Inst. of Tech.
- Vinod Dham,   NewPath Ventures
- T. J. Rodgers,   Cypress Semiconductor
- Carl Everett,   Accel Partners
- Natasha Humphries,   TechsUnite Silicon Valley
- Pratul Shroff,   eInfochips

Outsourcing Engineering Development Offshore

Many technology companies are outsourcing engineering development to offshore locations, including India, China, and Russia.

The panel will discuss their experience, data, and opinions on offshoring chip design, software development, and other engineering work.

Questions

- Is offshoring a fad? Or essential to compete?
- What motivates companies to outsource?
- Are US engineering jobs lost to offshoring?
- Does offshoring work well? What goes wrong?
- Is offshored work of superior quality?
- Why not move all engineering offshore?
- Should the government restrict offshoring?
- Is "Benedict Arnold CEO" rhetoric appropriate?
- What should dislocated engineers do?

Ron Hira
IEEE-USA, Rochester Inst. of Technology

Dr. Ron Hira is an Assistant Professor of Public Policy at RIT, and is a widely quoted expert on offshore outsourcing of engineering work. He has testified before the U.S. Congress on the implications of offshore outsourcing.

Ron chairs the IEEE-USA Career and Workforce Policy Committee, and is a Senior Member of the IEEE. He is an EE experienced in control systems, with degrees from George Mason University and Carnegie-Mellon University.

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Offshore Outsourcing & Off-shoring of Technology Jobs Impacts & Policy Dialogue

August 23rd, 2004
IEEE HotChips Conference

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Overseas Engineers
Can Afford To Be Paid Less

Country	Purchasing Power Parity (PPP)	Salary
U.S.	1.0 * $70k	$70,000
Hungary	0.367 * $70k	$25,690
China	0.216 * $70k	$15,120
Russia	0.206 * $70k	$14,420
India	0.194 * $70k	$13,580

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R·I·T   IEEE★USA

How Much Work Has Moved Offshore?

- No One Knows
  - ➢ No one in government is collecting data
    - o Commerce Department has pilot study of $335k underway
  - ➢ Companies are reluctant to reveal their plans
    - o US workers unwittingly training their replacements
  - ➢ Many believe it is only 'low-level' work
    - o No data to support or refute this claim
- Estimates from Self-Interested Research Firms
  - ➢ The Forrester Report is most-cited
- **We Do Know it *is* Accelerating**

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R·I·T   IEEE★USA

Jobs Moving Overseas - Impacts

- Job Dislocation
  - ➢ *Hope* **for quick re-employment**
- Change in Mix of Domestic Occupations
  - ➢ Is it important to maintain a strong science, engineering and software workforce in the US?
  - ➢ Will the best & brightest pursue these professions?
- Unpredictable Impacts That Economic Studies Cannot Predict:
  - ➢ Future Innovation
  - ➢ Military Superiority & Homeland Security?

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R·I·T Domestic IT Labor Market IEEE★USA

Record Unemployment

(source: IEEE-USA from BLS)

Occupation	Employed (000's)	2003 Unemployment
All Managers	14,468	2.9%
Computer & Information Systems Mgrs	347	5.0%
Engineering Managers	77	3.6%
Computer Scientists & Sys Analysts	722	5.2%
Computer Software Engineers	758	5.2%
Computer Programmers	563	6.4%
Computer Support Specialists	330	5.4%
Computer Hardware Engineers	99	7.0%
Electrical & Electronics Engineers	363	6.2%

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1983-2003 Tech Unemployment Rates

Legend: All Workers — Managers & Profs — Electrical Engineers — Computer Scientists
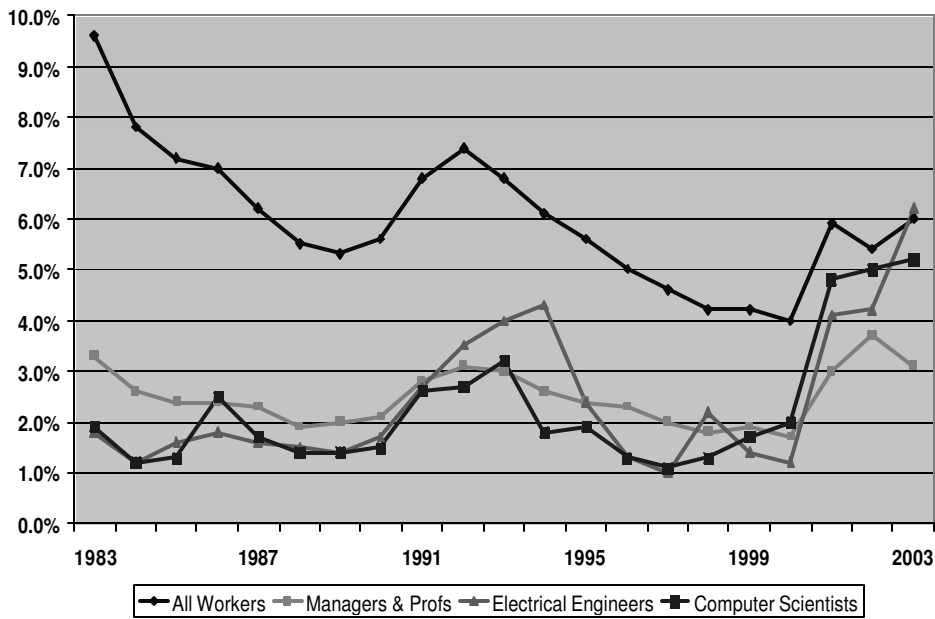
Job Dislocation During Low Job Creation

Nonfarm payroll employment (seasonaly adjusted) - Updated Aug 04
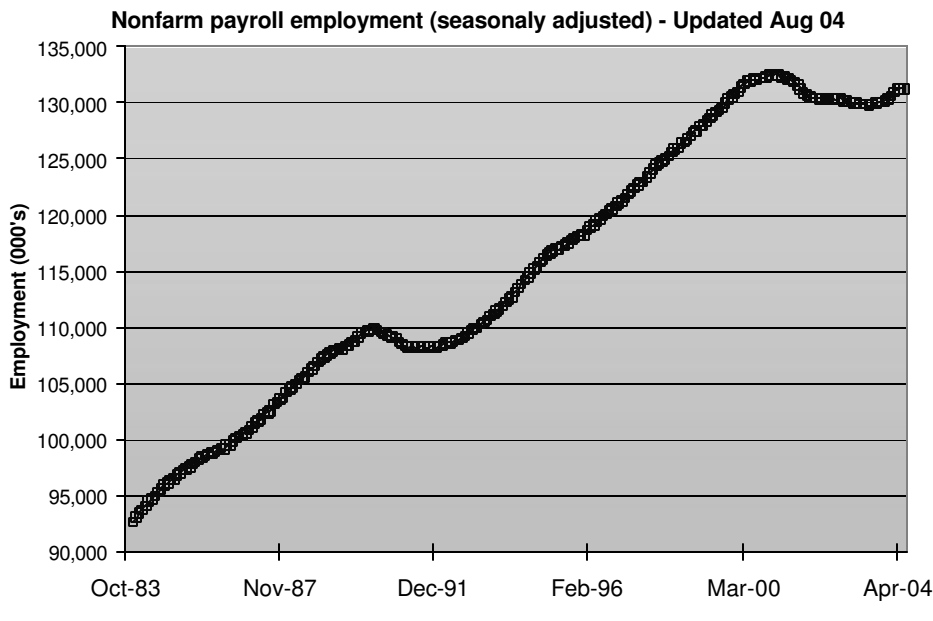
Spate of Industry Sponsored Studies: Offshoring is Great for US

- AeA, McKinsey, Institute for Int'l Economics, ITAA, US Chamber of Commerce, Business Roundtable, EIA
  - ➢ All find what they are looking for
  - ➢ None address innovation impacts
  - ➢ None can address the dynamics of off-shoring (creating future competition)
  - ➢ None show unemployment rates for technology workers - Balanced view of off-shoring impacts?
  - ➢ Attempt to change the topic towards 'competitiveness'

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What Can We Do?

- Acknowledge A Problem Exists
  - ➢ Don't know scale and scope, but do know process is accelerating
- No Villains In This Story
  - ➢ Companies acting rationally
  - ➢ Workers acting rationally
- Need To Work Cooperatively
  - ➢ American workers need strong and healthy companies that hire them
  - ➢ Do companies that sell to the US market need a healthy and vibrant US science & engineering workforce?

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What Should We Do?

- Collect Objective Data
  - ➢ Uncertainty allows too many convenient explanations
  - ➢ Identify types of jobs likely to stay
- Begin Experimenting on Workforce Retraining Programs Immediately
- Reform H-1B & L-1 Visas
  - ➢ Careful attention should be paid to Free Trade Agreements and GATS

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What Should We Do?

- Worker Notification
- Examine Potential Impacts on National Security
- Begin Planning Process
  - ➤ Cannot be done without industry support
- Keep options on the table
  - ➤ Government procurement is 19% of consumption & investment
    - o Important role in innovation – <u>Funding a Revolution</u> by National Academies

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Vinod Dham
NewPath Ventures

Vin Dham is Co-founder and Managing Member of NewPath Ventures LLC, a hybrid Indo-US venture fund. NewPath has invested in start ups that leverage India's growing talent in chip, system, and software engineering.

Vin was Chairman, President, & CEO of Silicon Spice; COO at NexGen; and VP at AMD for the K6 launch. He was VP & GM of Microprocessor Products at Intel, and managed the Pentium, 486, and 386 products. Vin was co-inventor of Intel's Flash memory technology.

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VLSI Engineering Outsourcing to India

Vin Dham

Co-Founder

NewPath Ventures

Benefits

- ☐ Large English speaking local talent pool
- ☐ Good engineering institutions
  - ■ IITs, and Regional Engineering Colleges
- ☐ 3X Lower wages vs USA/Europe
- ☐ Experienced Indians from USA increasingly willing to return to India
- ☐ Dedicated Hard working engineers with increasingly better quality

Challenges

- □ Limited availability of Senior Project/Module Leads and Physical Design experts-but growing rapidly
- □ Bangalore has large talent pool but getting pricey-as all MNCs want to ramp up quickly-retention a challenge
- □ Talent pool in Delhi, Hyderabad, Pune and Chennai still much smaller (but stable)

Challenges (Contd).

- □ Local talent wants stability-Brand name and Challenging projects
  - ■ Stock options not much valued
- □ Multi-site development requires overhead-Communication & Frequent Travel
- □ EDA support not at par with US but improving-as they set up expert local support

Observations

☐ Do big projects with large teams to get overall benefits of cost - VLSI design infrastructure cost non trivial

☐ Take long term view- put together good in-house training program

☐ Outsourcing is natural outcome of Globalization, Ease of communication and Distributed talent

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T. J. Rodgers
Cypress Semiconductor Corporation

T.J. Rodgers is founder, president, CEO, and a director of Cypress Semiconductor Corporation. He was chairman of SIA, and sits on the board of several high-technology companies.

Rodgers has testified before Congress on key semiconductor industry issues. He has been cited for his achievements supporting capitalism and freedom, and his contributions to organizations.

He earned degrees from Dartmouth and Stanford, invented VMOS technology, and intends to make exceptional Pinot Noirs.

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T. J. Rodgers
Cypress Semiconductor Corporation

Carl Everett
Accel Partners

Carl Everett is an active advisor and board member to new technology companies. He is involved with Accel portfolio companies in software, communications, and semiconductor technology.

As senior vice president of Dell Computer Corp Personal Systems Group, he was responsible for worldwide development and marketing of all desktop, workstation, and notebook product lines.

Carl enjoyed 20 years with Intel and was senior VP and GM of Intel's Microprocessor Products Group. He introduced P6 technology and Intel Inside.

Global Operations: What's New Here?

Hot Chips 2004
Carl Everett
Accel Partners

Global Operating Models
Nothing New

- Silicon Valley Created this Operating Model
  - TSMC sees US$40B Foundry Market in 2010
  - Fab/Test/Assembly Operations Dot the Globe
  - Intel, National, IBM, HP, etc. Operate International Design Centers
  - PC Manufacturing/Design Moved to Taiwan a Generation Ago

- Valley Thrives Through Global Operations!

"News" = Global Startups

- The Need
  - ~ 75 % of the Chip Market Outside the US
    - You will Fail Without Access to/Knowledge of Global Markets
  - $350 PC has few, IF ANY, Supply Chain Profit Dollars
    - Cost the #1 Issue in Technology Customer Base Globally
  - Asia/E. Europe Producing Engineering Grads at ~10:1 Ratio with US
    - Growing Imbalance in Talent Pool Intensifies Competition

- The Ability
  - Valley-driven Technologies Opened Global Operating Model to Startups
    - VoIP, Global Networking, Cheap Computers, Broadband, Web Service Architectures and More

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Valley Scales to Future Needs

- Future Designed Here, Deployed Globally
  - Emerging Economies Contribute Implementation
    - 1980s = Chip Assembly
    - 1990s = PC Manufacturing/Design
    - 2000s = Circuit Design

- Architectural Skills Rise in Value in 2000s
  - Redeploying Engineers a Core Competency

MORE New Companies WITH this Model than Without it

- Economic Advantages
  - ~ 50 % R&D Project Savings
  - ~ 100 % Net Margin Improvement
  - Faster Time to CASH POSITIVE & Organic Growth
  - More Resources for Customer-Specific Needs
- Startups MUST Catch up to Global Realities
  - Chip Designs Touch >5 Nations in Engineering Cycle
  - China = 8% of WW Tech Manufacturing & Growing
  - US 6th in R&D Spend as Percentage of GDP
- NEW Ideas, NEW Companies our Destiny...AGAIN!

Natasha Humphries
TechsUnite Silicon Valley

Natasha Humphries is a Senior Software Quality Assurance Engineer, with experience testing US and International software applications, most recently in mobile wireless communications.

She has personal insight into the effects of offshore outsourcing at high-tech companies. She testified before Congress and has been interviewed often.

Natasha serves on the Steering Committee of the Silicon Valley Chapter of TechsUnite.org, which represents the interests of displaced high-tech professionals. She studied at Stanford University.

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Natasha Humphries
TechsUnite Silicon Valley

Pratul Shroff
eInfochips

Pratul Shroff is Founder, President, and CEO of eInfochips. It is a leading provider of ASIC design services, embedded systems solutions, and IP cores, with an Offshore Development Center in India.

Pratul was on the 80186 team at Intel, and was a founding engineer at Daisy Systems. He co-founded Contech Systems, India. He holds degrees in EE and CE from BITS and Cornell.

Slide 1

eInfochips

Outsourcing Engineering Development Offshore

Pratul Shroff

Slide 2

eInfochips

1995 - 2004

Multi-project, Multi-year Deals

Large Offshore projects

2002   2003   2004

200 engineers

Small Offshore projects

2001

- Verisity OEM agreement
- Largest offshore project!

Team crosses 100 employee landmark

1999

Embedded Division launched
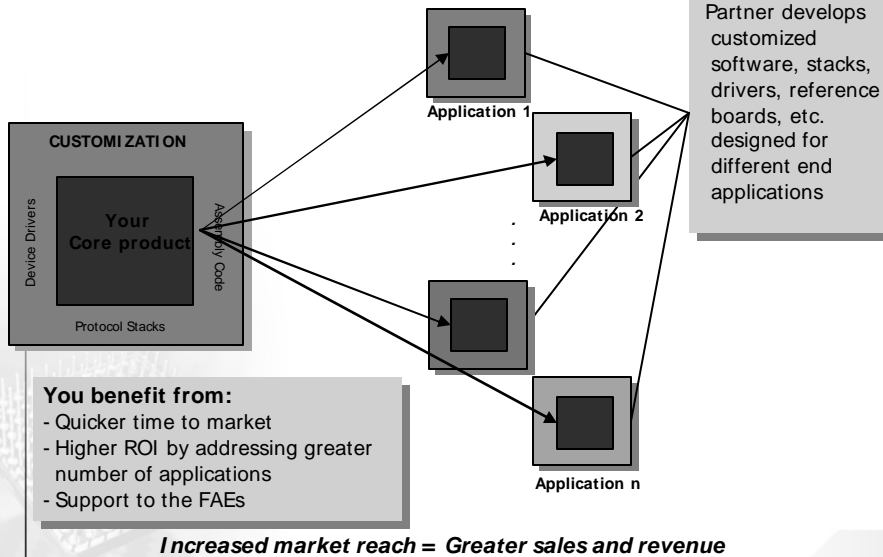
On-site consulting

1998

Solmac -> eInfochips Ltd.
Digital Yantra -> eInfochips Inc.

1997

First customer engagement for ASIC in USA
Started as "Digital Yantra" in Milpitas, USA

1995

ASIC Division Launched

- Started operations as "Solmac"
- First Customer - SemiGas

Increasing Market Potential

CUSTOMIZATION

Device Drivers

Your Core product

Assembly Code

Protocol Stacks

Application 1

Application 2

. . .

Application n

Partner develops customized software, stacks, drivers, reference boards, etc. designed for different end applications

You benefit from:
- Quicker time to market
- Higher ROI by addressing greater number of applications
- Support to the FAEs

Increased market reach = Greater sales and revenue

Critical Success Factors

Client

Onsite Champion

Offshore team

- Bridge Cultural Gaps
  - Whose "cow" is it anyway?
  - Be ware of "HO JAYEGA!"
  - Feudalistic genetic map
  - Never say NO
  - Wait till the last minute

- Leverage:
  - Emotional Capital
  - Social Capital; not an individualistic society
- Communication
  - Connotations
  - 11% of verbal

- Select a Partner – Wisely!
- "Monkey on the back"
- Define:
  - Clear Milestones
  - Deliverables
  - Acceptance Criteria
  - Expectations
- Look for well defined, yet flexible processes
- Pilot Projects
  - Non critical
  - Small , measurable success

SUMMARY: 4Ps = People, Processes, Patience, Persistence

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Audience Questions

- Use an aisle microphone
- Please give your name
- Ask the panel a SHORT question

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