TEE INDIAN INFORMATION TECHNOLOGY AND

COMMUNICATION REVOLUTION:

KEY TRENDS AND POLICIES -- IT'S JUST THE BEGINNING ...

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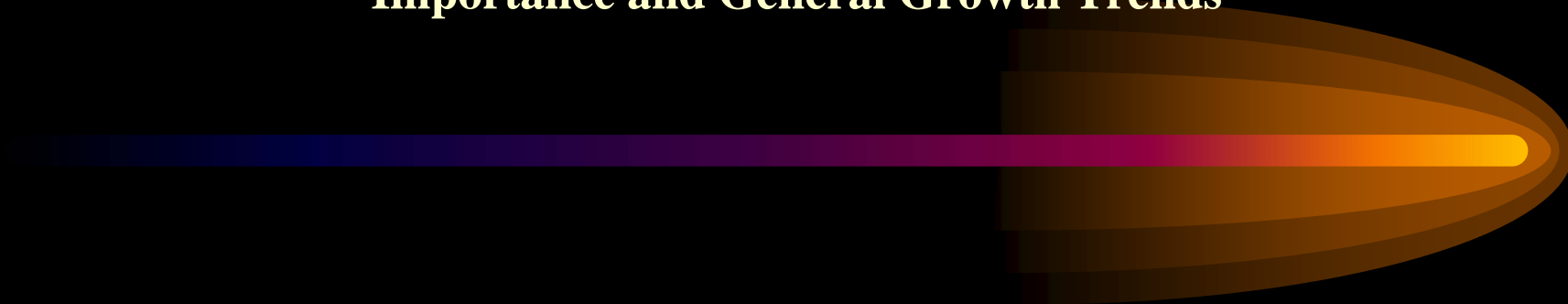
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Importance and General Growth Trends

The greater attention given to the Indian IT industry

1. Continued expansion in foreign firms owned establishments in India
2. Surge in the outsourcing business

3. IT's emergence as favorite sector for local Indian investors and talented entrepreneurs

4. Rising number of Indian firms investing in own establishments outside India

5. Listing of Indian IT firms on overseas stock exchanges - Infosys and Satayam first listed on Nasdaq

6. Surge in Indian professionals all over India seeking education and jobs in IT in India and overseas

7. Launch of the National IT Task Force in 1998 - paradigm shift in importance given to IT
   - Provide vision to make India an IT Superpower in 10 years
   - Formulate comprehensive agenda to promote IT and tackle impediments: Action plans software, hardware and long term IT reform and investment agenda in key sectors
   - Envisages collaborative partnership between government and private sector
   - Implementation to be facilitated by creation of a special Ministry of Information Technology

8. Launch of ambitions state-level IT policies and investment plans - paradigm shift attention
   - Promote private investment, develop physical infrastructure, human resource and government IT
   - Implementation to be facilitated by creation of special Departments of Information Technology (DoIT)

Conclude:
- The Indian IT industry has more than 30 years of history but it is only in recent years that is has began to emerge as a significant force in the Indian economy and internationally
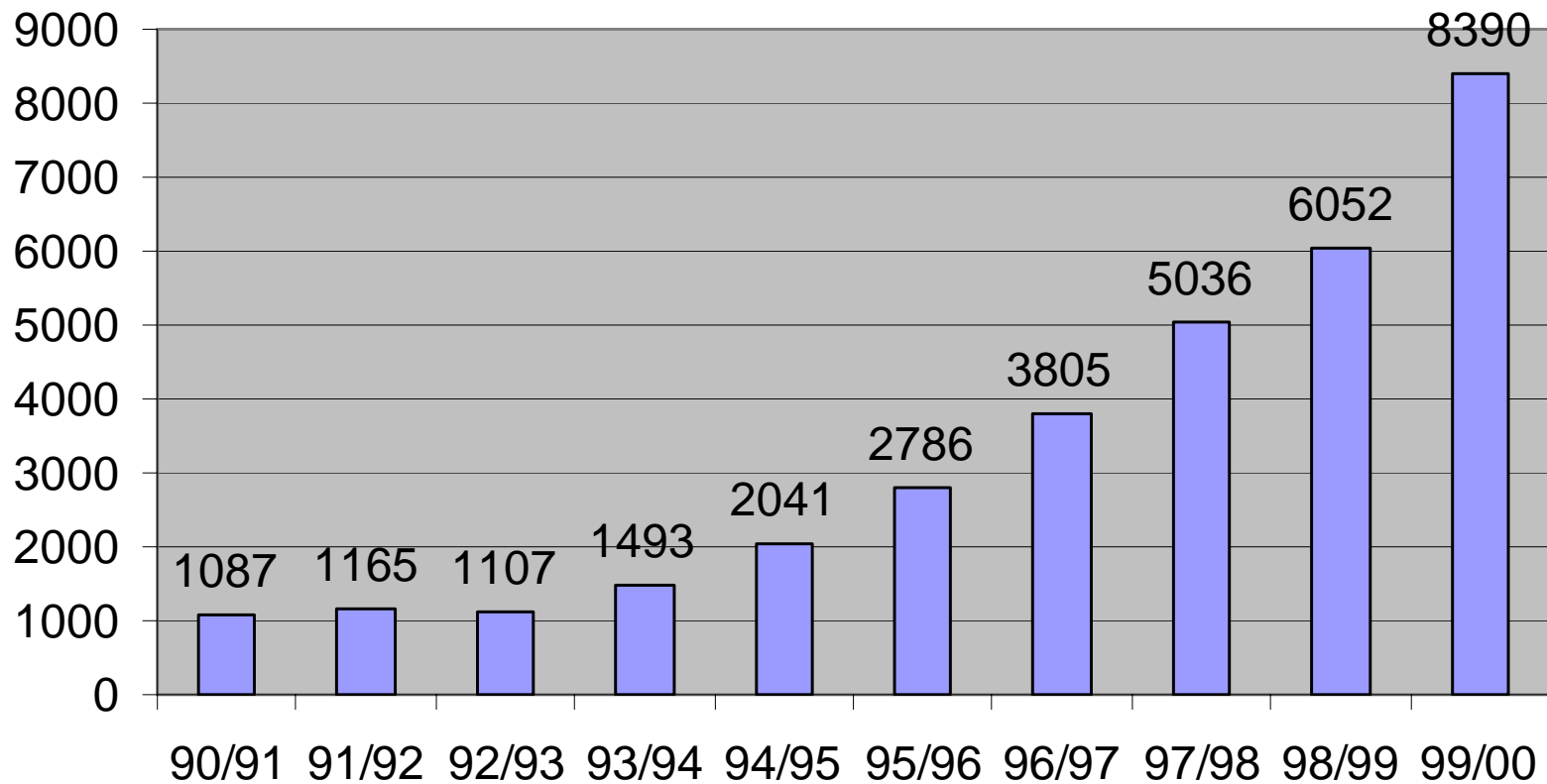
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Indian IT industry growth trends

1. IT industry growing at 40 % per annum ($US current prices 1994-99; software exports alone more than 50%

2. Earned revenue growth IT industry from $1 billion 1990 to $8 billion 2000: envisaged to reach $100 billion
   by 2008 (Nasscom)

3. Still less than 1 % in global software product & packages market but in certain segments share is 10-20 %

4. Number of IT professionals in India has grown from 6,800 to 250,00 in 1999

5. Number of IT professionals of Indian origin in America, Europe and Pacific Asia is growing fast
Conclude:
• 	Indian IT industry is still only in its very early stages of development both internationally and domestically and has strong growth potential

Indian IT: Total earned revenue software, hardware, peripherals, training, maintenance, networking and others (USD million)

Year	Revenue
90/91	1087
91/92	1165
92/93	1107
93/94	1493
94/95	2041
95/96	2786
96/97	3805
97/98	5036
98/99	6052
99/00	8390

Penetration of PCs, telephones, TV and Internet

- Lagging behind East Asia in PCs, telephony, TV and Internet per capita
    - Explained by low per capita income, various bottlenecks, etc

- Low but rising telephony density
    - Only 17.5 million telephones for 970 million population in 1998, i.e. 2 per 100 inhabitants: but telephony density and access is rising faster than before
    - Significant and expanding cable network - scope for Web connectivity
    - Wireless telephony started explode; community based connectivity solutions for the people
    - 1999 Telecom Policy: ambitious growth targets, revenue sharing and liberalization

- Low but rapidly rising PC numbers
    - Number of PCs has risen from 630,000 in 1994 to 3.2 million as of March 31 1999, out of which 820,000 sold in FY1998/99
    - TV penetration already 60 million - scope for Web-TV

- Internet explosion
    - Industry experts believe that number of Internet users will explode from about 1.4 million today to 37 million by the year 2003; VSNL state monopoly in Internet service provision has been broken

Human resources

1. Major advantage: one of the world's largest pools of graduate students including engineers and scientists

2. Number of skilled IT professionals is becoming large in absolute terms (not yet on per capita basis) implying advantages in terms of critical mass although IT specific education and experience levels differ significantly
-Strength: Number of IT professionals have grown from 6,800 in 1985 to 56,000 in 1990, 160,000 in 1997 and 250,000 in 1999 and is projected to reach more than 1.5 million by 2008
-Limitation: variation in levels of training and experience among IT professionals and large number of illiterate

3. Diaspora is growing rapidly and emerging as an important factor internationaly and for India
-Drain
-Advantages
-Role in the emerging global networked economy

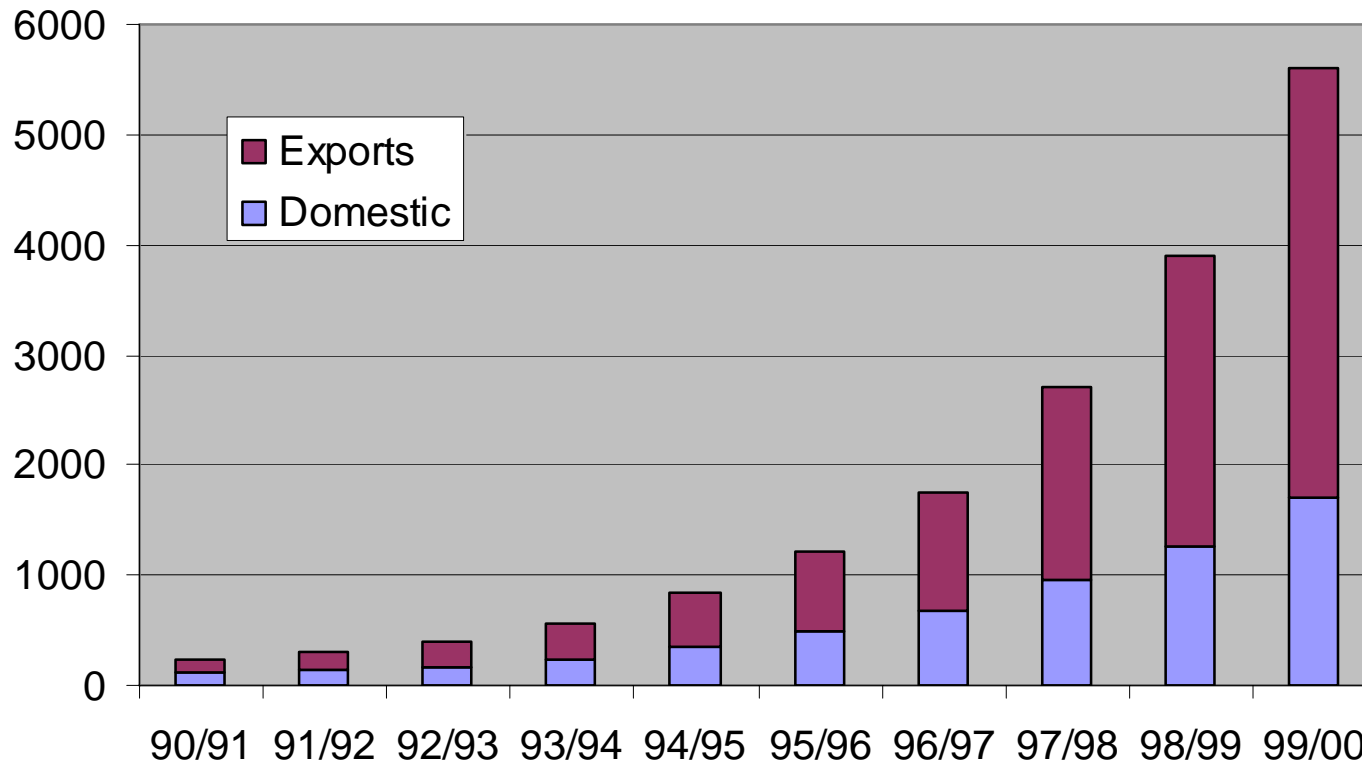## Software industry growth: domestic market and export

- Unlike some East Asian countries software exports (not hardware) has been the key driving force in the 1990s

- National IT Task Force envisages a software sector with $70 billion annual earned revenue by the year 2008 out of which:
  - $50 billion software exports, and
  - $20 billion (or more) software domestic market sales

- Exports is expected to remain key to growth but the rate of growth in the domestic market is envisaged to eventually overtake that of exports

Conclude:
- Continued strong growth is expected not only for software exports but also in the domestic market

  - see, table: source Nasscom

Software industry growth in India
(Earned revenue in USD million current prices)

Source: Nasscom

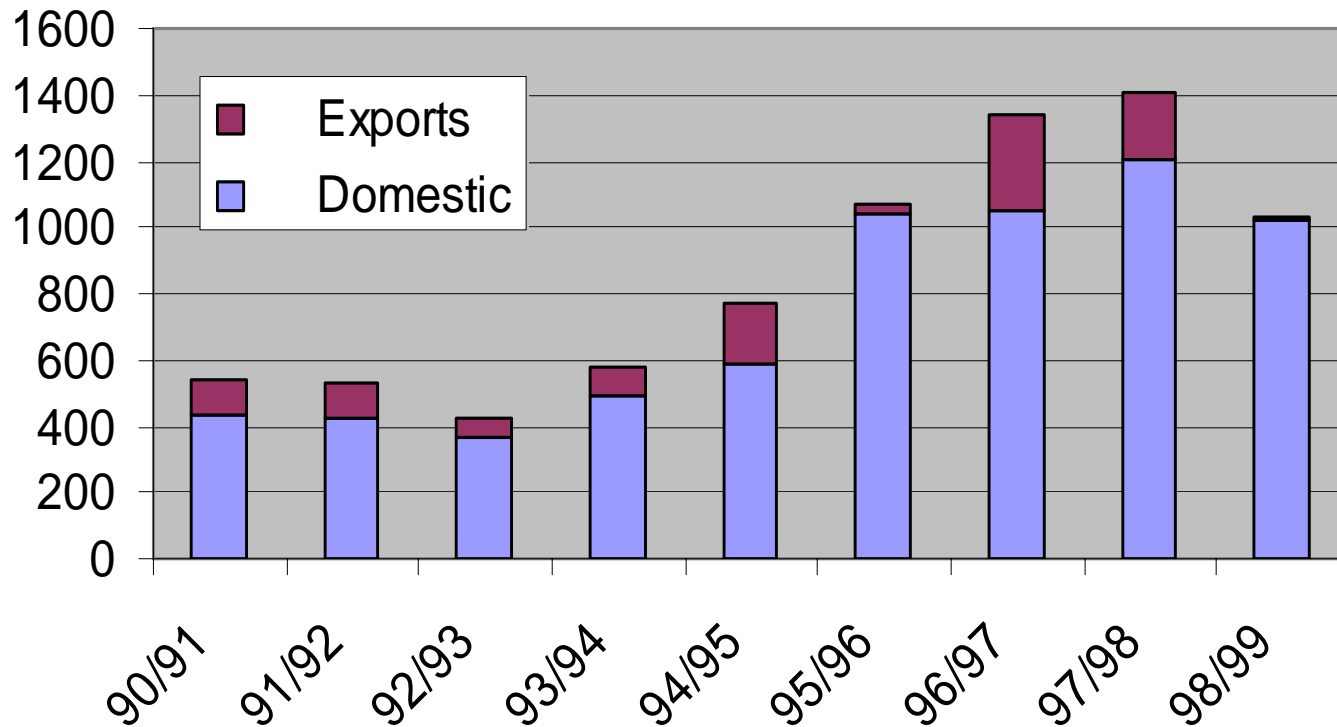## Hardware industry growth: domestic market and export

Hardware is lagging behind the software sector in growth and competitiveness

- East Asia has preformed better in developing competitive hardware sector

- Surge in domestic hardware demand including imports in 1990s, but volume still small compared to high income economies

- National IT Task Force projects that hardware sector (and other) will grow to $ 30 billion by 2008

Conclude:
- Hardware sector continue to lag behind software industry but is destined to grow and become significant in long run

- Reforms are needed to boost hardware sector growth and competitiveness

- Some argue that India has potential to develop large hardware industry both for exports and domestic markets
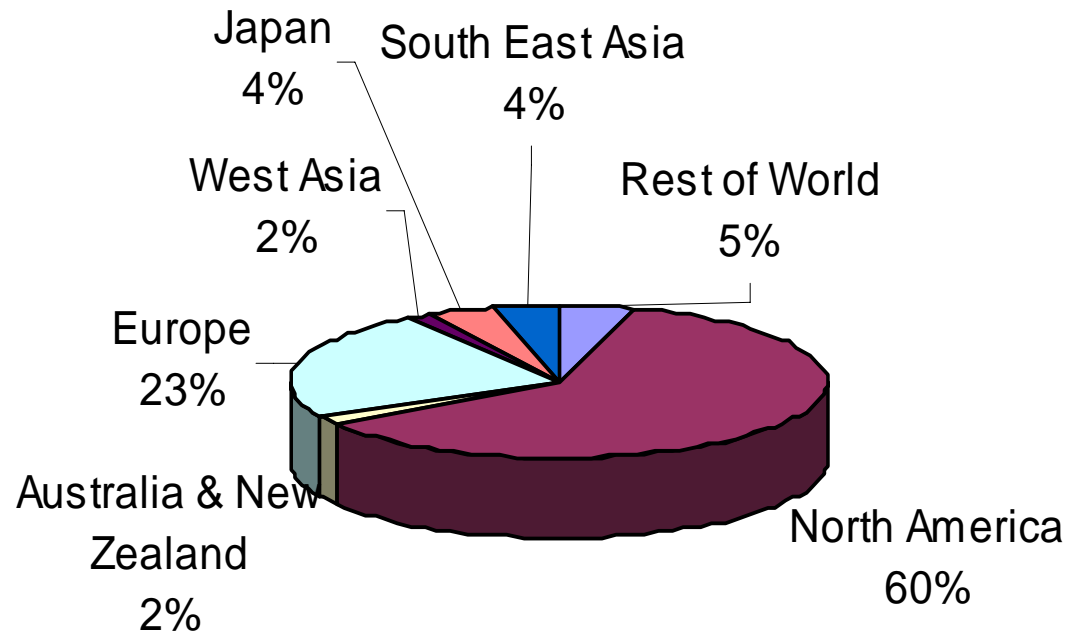
- --See tables, source Nasscom

Hardware industry growth in India
(Earned revenue in USD million: current prices)

Source: Nasscom

Indian Software Export Destination, 1998/99

Japan 4%

South East Asia 4%

West Asia 2%

Rest of World 5%

Europe 23%

Australia & New Zealand 2%

North America 60%

Conclude:
-US export market in dominating but Europe and Asia are also significant and growing
-Major scope to develop investment and trade links with Asia Pacific countries: Competition but also complementarily in hardware/software/manpower
-Parts of the Indian IT industry is developing global presence

Structural change and impact

- ## Markets: Rapid growth in both export and domestic market

  - Domestic IT industry growth rate expected to overtake export growth. Domestic IT market target of $50 billion in 2008
  - Domestic IT industry and market spread beyond few cities: not only Bangalore, Mumbai, Chennai, Delhi, Hyderabad and others areas
  - International orientation: not only US but also Europe and Asia -- towards global reach

- ## Software industry: Rapid growth and structural change

  - Growth both in lower and higher end: From low end software service – data entry and software service body shopping etc – to package development; "new" areas such as IT-enabling services and Internet related areas including E-commerce are growing rapidly
  - Growth both in onsite and offshore services: the breakdown in type of software services in 1998/99 was: 58 % onsite, 34 % offshore (i.e. in India) and 8 % products and packages. The share of offshore is increasing.

- ## Hardware industry: Gradual "catch up" in both domestic market and exports

- ## Content industry: Rapid growth in both "foreign" and local content industry

-See tables, source Nasscom

Industrial organization

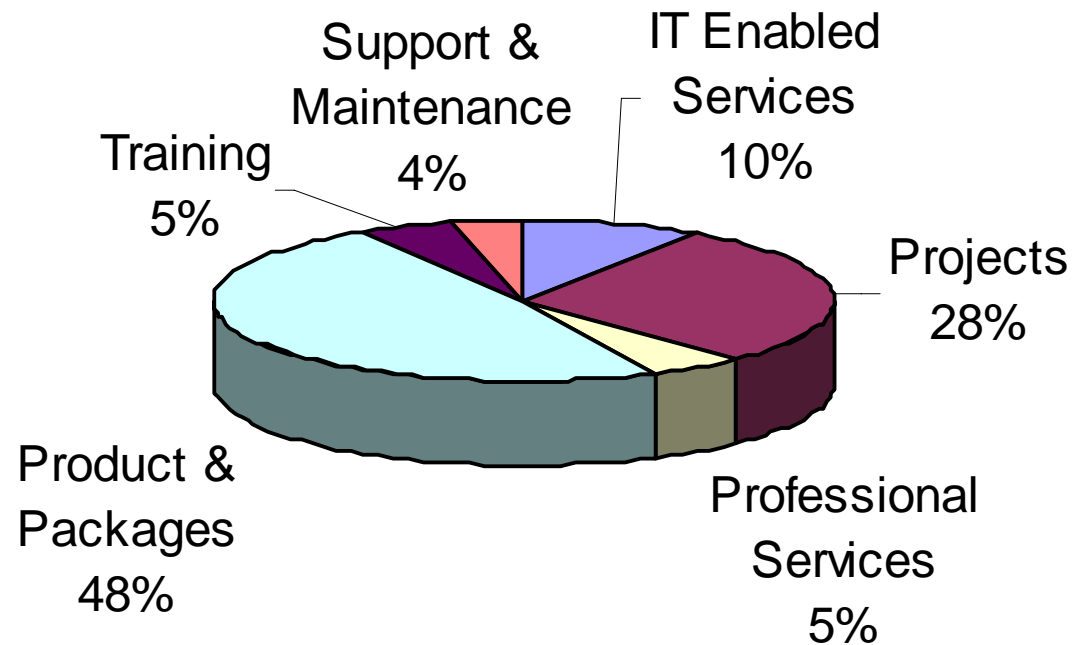**IT Industry growth resulting from rapid growth in:**
- foreign investment with 100 % equity holding,
- local Indian firms (most of which SMCs) plus
- joint ventures and marketing & technical collaboration schemes/strategic alliances between Indian & foreign firms

Evolution in industrial organization:

•Public sector led and control with few private firms (1950s-80s) to phase of liberalization and private sector led growth (1990s and onwards)

•Size and number of IT firms - emergence of few large firms and continued rise in new SMCs

•Convergence and change in industrial organization: Gradual change

•Comparative advantage and structural change by industry segments
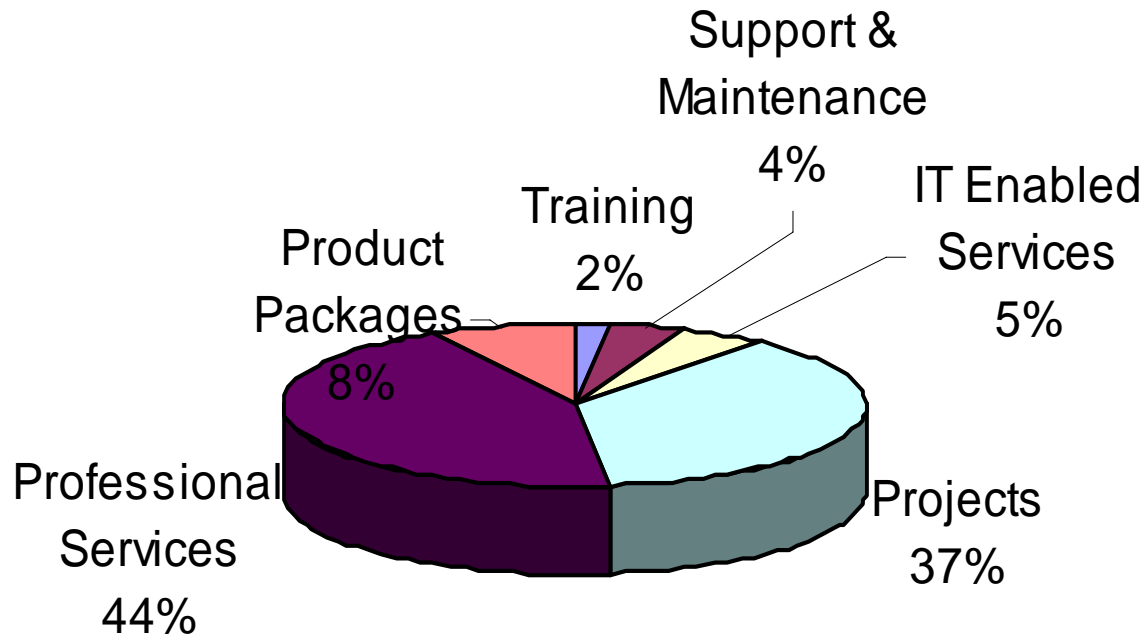
•Vendor sophistication: number and quality\

 -See tables: source Nasscom

Indian Domestic Software Industry by Type of Activity, 1998/99

Support & Maintenance 4%

IT Enabled Services 10%

Training 5%

Projects 28%

Product & Packages 48%

Professional Services 5%

Indian Software Exports by Type of Activity, 1998/99

Support & Maintenance 4%

Training 2%

IT Enabled Services 5%

Product Packages 8%

Professional Services 44%

Projects 37%

Indian Domestic IT Market by Sector, 1998/99

- Retail 2%
- SOHO 7%
- Education 3%
- Transportation 13%
- Others 2%
- Telecom 12%
- Government 28%
- Oil and Petrochemicals 5%
- Banking & Finance 16%
- Manufacturing 12%
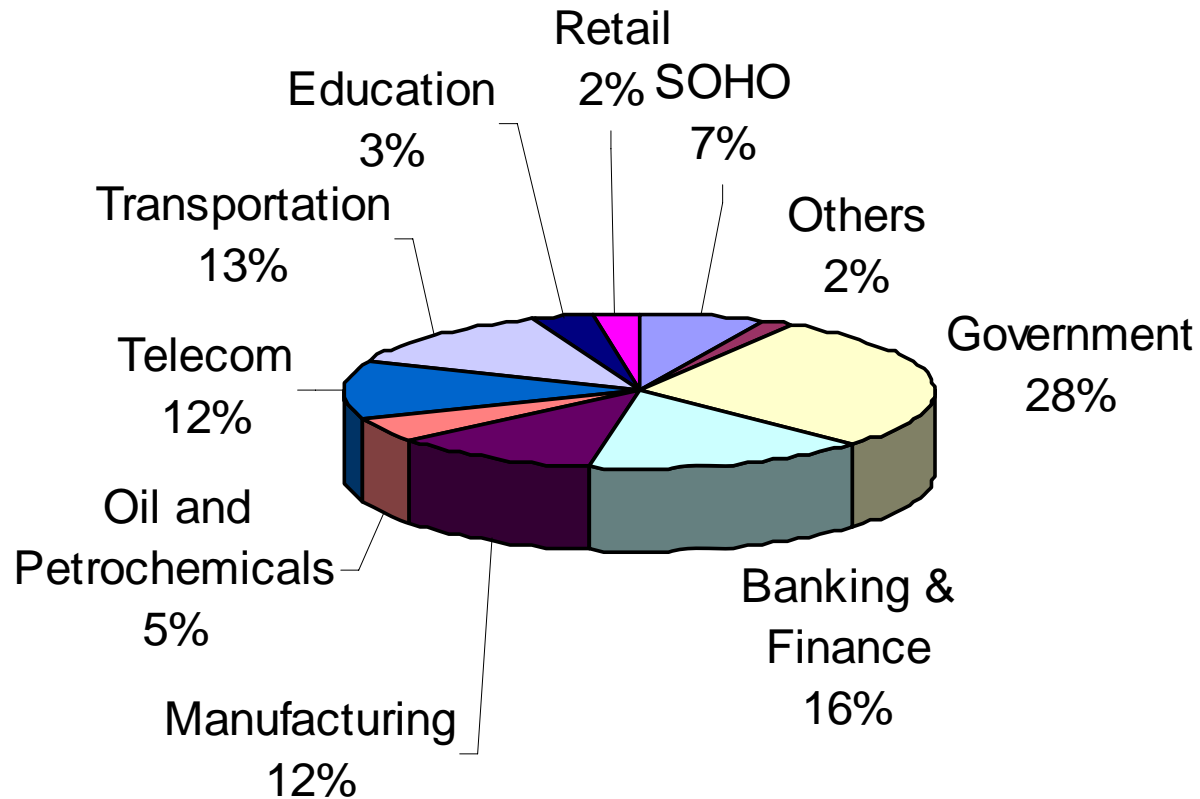
Strengths and Weaknesses

Strengths – competetive advantages

   A. Demand side: first driven by global/export demand; now also domestic demand

   B. Supply side: India has advantages in manpower, costs and vendors, etc

1. Large pool of educated and skilled manpower

3. Mobility and motivation of manpower

4. Costing advantages in manpower

5. Language, time zone, quality and other advantages

6. Vendor number and sophistication: significant pool of indigenous and foreign firms and strategic alliances

<u>Impediments – need for improvements and opportunities for investment</u>

1. Human resource development

2. Physical infrastructure, telecommunications in particular

3. Governance, legal and regulatory framework, management systems, processes

4. Finance instruments to fund both public and private sector projects

5. Affordability and technology choices

6. Private sector development limitations

End remarks

- India is likely to be an "eminent" IT power with global reach and ICT will transform Indian economy and society dramatically within the next 10-20 years.

  (The term IT superpower used to motivate; N. Murthy expressed that term eminent more appropriate as India unlikely to be a superpower in terms of market share and technology sophistication when compared to the US)

- We are only seeing the very beginning of the emergence and impact of Indian IT both domestically and internationally.

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