

Report of Task Force to suggest measures to stimulate the growth of IT, ITES and Electronics Hardware manufacturing industry in India



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**Report of Task Force to suggest measures to
stimulate the growth of IT, ITES and Electronics
Hardware manufacturing industry in India**

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Foreword

In response to the significant challenges being faced by the IT & Electronics industry in India owing to the global economic crisis, the Department of Information Technology, Ministry of Communications & IT, Government of India constituted the Task Force in August 2009 to suggest measures to stimulate the growth and development of IT, ITES and Electronics Systems Design Manufacturing Industry in the country. I was given the huge responsibility to head this Task Force, comprising esteemed members from across the Indian ICTE value chain representing various Associations and leading Companies.

This has been the first-of-its-kind of a joint DIT-Industry initiative setup in the spirit of co-operation. The task before us was to chart a vision for the industry and recommend a suitable strategy for sustaining and developing all segments of the value chain of the ICTE Sector in India for the next five years and beyond with concrete and implementable recommendations/action points as also for making the industry globally competitive.

While drafting the report, a well-rounded analysis, not just of the various verticals of the industry, but also by size of the industry i.e. small, medium and large was kept in mind. The Task Force also looked at how IT could proliferate into rural India for an inclusive growth.

We also closely looked at the multi-faceted dynamics of the industry including ensuring a healthy eco-system for the IT/electronics industry with equal focus on exports and domestic market development; focusing on social inclusion, especially the youth; changing the industry mindset from business models based on tax arbitration to one based on inherent strengths and increased value addition especially for products designed and made for India; standardising various aspects of applications and products; facilitating conducive environment for development/adoption of standards; gauging the requirements of the strategic sector for ICTE as also new products/application development; and strengthening the electronic component base as well as attracting new investments in the area.

To fructify these visions, the Task Force further constituted three sub-groups namely, Software & Services; Electronics Systems Design & Manufacturing (ESDM); and the Strategic Electronics to come out with insights on these crucial sub-sectors of the ICTE value chain, while keeping issues such as infrastructure, domestic market development, employment generation, exports, impact of international agreements & transactions particularly in mind. I must thank my colleagues Mr B V Naidu, Mr Som Mittal and Mr Kiran Karnik for providing leadership to these sub-committees respectively. Further, the contribution from all the members of our taskforce as well as several of the industry leaders has helped us put the industry issues in the right perspective. I must also acknowledge the significant contribution of M/s Ernst & Young for their efforts and support in researching and compiling the reports on ESDM as also M/s McKinsey & Company for the reports on Software and Services and the Strategic electronics. Lastly, this report could not have been completed without the guidance and support of Mr R Chandrashekhar, Secretary, Department of IT, Ministry of Communications & IT and his team of able officers.

After months of strenuous efforts of each of the Task Force members, I am happy to place in your hands the final report of the task force. I am confident that the recommendations will lead to actions by the Government and the industry alike and pave the way for India to become a dominant player of ICTE in the world in the not so distant future.

- Ajai Chowdhry, Chairperson

1 December 2009

Task Force

Task force to suggest measures to stimulate the growth of IT, ITES and Electronics Hardware Manufacturing Industry in the country

1.	Shri Ajai Chowdhry, Chairman & CEO, HCL Infosystems Ltd.	Chairman
2.	Shri Kiran Karnik	Co-Chairman
3.	Shri Som Mittal, President, NASSCOM	Member
4.	Shri B.V. Naidu, Chairman, India Semiconductor Association (ISA)	Member
5.	Shri Vinod Sharma, MD, Deki Electronics Ltd. & Past President, ELCINA	Member
6.	Shri S.S. Raman, President, MAIT & Director, TVS Electronics Ltd.	Member
7.	Shri Ravinder Zutshi, Deputy Managing Director, Samsung India Electronics Ltd. & President, CEAMA	Member
8.	Shri Sunil Vachani, Managing Director, Dixon Technologies (I) Pvt. Ltd. & President, Electronics and Computer Software Export Promotion Council (ESC)	Member
9.	Shri Ashwani Kumar Datt, Chairman and MD, Bharat Electronics Ltd.	Member
10.	Shri Josh Foulger, Head of India Sourcing, Nokia India Pvt. Ltd. and Member of Manufacturing Advisory Committee of India Cellular Association (ICA)	Member
11.	Shri Ashok Bakthavathsalam, MD, K.G. Information Systems Pvt. Ltd.	Member
12.	Shri Osama Manzar, Digital Empowerment Foundation	Member
13.	Shri Vinnie Mehta, Executive Director, MAIT	Member-Secretary

R. Chandrashekhar



सचिव

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6th January 2010

Message

The Information, Communication Technology and Electronics (ICTE) is the world's largest and fastest growing Industry. ICTE is increasingly finding applications in all sectors of the economy. Information Technology - Information Technology Enabled Services (IT-ITES) Sector has played a vital role in acquiring Brand Equity for the nation and has contributed immensely to the increase in our GDP, employment and exports. The Industry has been moving up the value chain as well. The Government has identified growth of electronics hardware manufacturing sector as a thrust area and a number of steps have been taken by the Government, on an on-going basis, for promotion of the electronics hardware Industry.

In the backdrop of the severe global economic downturn combined with a burgeoning domestic demand, the Department of Information Technology (DIT) constituted a Task Force in August 2009, to make recommendations covering strategies to augment the growth of the IT software and IT enabled services sector in the context of global developments, the steps needed to accelerate domestic demand for electronics hardware products, IT & IT enabled services and boost domestic manufacturing in electronics hardware sector.

I congratulate the Chairman and Co-Chairman of the Task Force, Shri Ajai Chowdhry and Shri Kiran Karnik and other esteemed Members of the Task Force for completing the Report well in time.

I am happy that the Task Force took a well-rounded analysis, not just of the various verticals of the Industry, but also by size of the Industry i.e. small, medium and large. The Task Force also looked at how IT could proliferate into rural India for an inclusive growth as also multi-faceted dynamics of the Industry.

The Department of Information Technology shall examine the recommendations and initiate a dialogue with various other concerned Government Ministries/Departments for appropriate implementation on a fast track basis, so that the IT and Electronics Industry in India achieves the desired targets.

(R. Chandrashekhar)

Vision

Is there a mantra to propel India to the league of developed nations?

India's technological prowess can provide the much-needed wind to her sails for the arduous economic and social transformational voyage.

While we have been very successful in IT/ITES exports, however, momentum alone does not characterize leadership. We must build on this initial success with the next level of aggressive growth in other domains of technology including electronics hardware systems and design. India needs to leverage its market size and identify market mechanisms and policy interventions for increasing its dominance of key verticals like IT hardware systems, telecom, consumer electronics, defense and strategic electronics.

- ◆ India should aspire to be a global ICTE powerhouse in its true sense.
- ◆ IT/electronics industry can be one of the largest and fastest growing industries in Indian economy and contribute significantly to the GDP and employment.
- ◆ IT/electronics exports have the potential to offset Oil import bill.

The need of the hour is to focus on building technology brands and IPs emerging out of India. We must target emerging markets and future technologies to capture market share and mindshare.

Leveraging technology for citizen empowerment can also bring about India's social transformation. One needs to ponder that in this age when success is defined by one's ability to connect with systems, people and opportunities, why are the poor really poor? Is it that the digital divide is actually denying access to education, life skills and livelihood opportunities to keep them poor in a virtual age when physical infrastructure ceases to be a barrier?

"We have to democratize learning," says C K Prahalad, Paul and Ruth McCracken Distinguished University Professor at the Ross School of Business, University of Michigan. This would happen only if we democratize access. 'Access for all', as in 'education for all' should be a fundamental right of every Indian citizen; it is only through democratisation of information that we can empower the vast majority of our people, fundamental to all this is the need to create access to broadband, which due to its inherent capability to substitute all other physical means of access across borders of every kind.

- Broadband should be available on 'tap' – like water & electricity. This should lead to
- ◆ Access to Information (Search)
 - ◆ Access to Transactions (Pay per use applications, computing etc.)
 - ◆ Access to Interactivity (Social networks, exchanges etc.)

Much of the success in IT/ITES was due to favourable government policies, and the sector's ability to actively capitalise on the business opportunities. Now, there is an opportunity to create an inflection point for each of the segments of the IT industry, to grow and to make a positive impact on the inclusive growth agenda of the country.

If we do not take decisive action today, we may miss the bus forever. In addition to the opportunity cost of potential loss of GDP and jobs, there is a huge strategic risk of dependence on competitor - nations for this high-tech and vital sector. Our success in IT/ITES would never be complete and would not touch the lives of masses without commensurate growth of electronics sector. Composite and integrated growth of both sectors - software and hardware, is the only route to make India a global technology powerhouse, which is the Vision of this report.

Vision 2020

Access	Digitization	Education	Healthcare	Energy	Security
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Executive Summary

India has a large, vibrant and fast growing economy and has a large number of ‘young people’ in the employable age, which gives it an edge over the aging economies. India also has a vast pool of trained, English-speaking personnel. It currently produces about 3 million graduates every year, out of which, approximately 500,000 are engineers and IT professionals and another 40,000 have post-graduate degrees & diplomas in business management.

We have seen remarkable success in the field of information technology and business process outsourcing over the past decade. Total export revenues earned by IT sector have grown to INR 212,500 crore (USD 46.3 billion) in 2008-09, at a CAGR of 35 per cent. IT-BPO sector too has grown to USD 12.4 billion in 2008-09, at a CAGR of 22 per cent.

Electronics and strategic electronics are at a similar point of inflexion as the information technology IT/ITES industry was a decade ago. The current demand for electronics in India stands at USD 45 billion and is projected to grow to USD 125 billion by 2014 and to USD 400 billion by 2020. Further, the exports are expected to increase from the current USD 4 billion to USD 15 billion by 2014 and USD 80 billion by 2020.

ICTE industry - electronic components, systems, telecom, software & services, and the strategic electronics sectors with its multiplier effect has the potential to play a very significant and strategic role in India’s modernization, its socio-economic transformation and safeguarding its national and energy security interests.

GDP growth is closely linked to increased exports, attractiveness of India as a manufacturing destination, FDI, competitiveness of our manufacturing units. Digitizing, IT and Internet penetration will empower the people of India to receive, absorb & act on information faster, thereby opening a plethora of opportunities for growth.

The report envisions transformation of India into a globally competitive nation with inclusive economic development by exploring opportunities in the ICTE sector and brings to light the challenges that need to be overcome.

As the world economy is poised for a transformation in the next decade driven by both global and country-specific factors, in order to examine the challenges and opportunities that exist for the electronics and IT industry in India, some key attributes have been used as a “lens” to evaluate its positioning:

- Market potential
- Industry capabilities
- World class skills
- Regulatory environment
- Infrastructure and logistics
- Strategic need

Using the above framework the report attempts to provide strategic insights into the industry and the need to reinvent business propositions and offerings, that can help penetrate the global markets not only on value and cost factors, but also customised to their needs. These offerings could be uniquely poised for the emerging markets of future like Africa, CIS, Middle East, etc.

The key recommendations of the report are:

RECOMMENDATIONS RELEVANT FOR ALL THE INDUSTRY SEGMENTS

- Ensuring a Favourable Business Policy and Regulatory Environment
- Building Adequate Basic Business and Social Infrastructure
- Harnessing technology for driving greater efficiency, transparency and monitoring of e- governance projects and developmental projects targeting inclusive growth

- Fostering a sustainable ecosystem for innovation, R&D and manufacturing
- Catalysing growth in domestic market
- Investing in education and skill development to create a sustainable pool of high calibre talent.
- Allowing access to funds for investments in R&D, Innovation and Brand India
- Encouraging ‘Made for India’ designs, solutions and devices, local value addition and IP creation especially for developmental schemes, defence and strategic needs.

ELECTRONICS

The Electronics industry in India is poised for high growth however there exist multiple challenges that need to be addressed to realize its true potential. Key among these are inadequate infrastructure, frequently changing tax structure, supply chain and logistics issues, inflexible labor laws, limited R&D focus, non-availability of funding mechanisms, limited focus on value addition and exports. Supply is not keeping pace with demand in India, resulting in ever-increasing imports from China, Taiwan, South Korea etc. Government’s long-term vision should augment the growth of domestic electronics manufacturing by special focus on this sector.

- Establish ‘National Electronics Mission’ – a nodal agency for the electronics industry within DIT and with direct interface to the Prime Minister’s Office (PMO). The nodal agency would help in the synchronized functioning of the industry through effective coordination across ministries and government departments in the centre and the states and would enhance the ease of doing business.
- Nurturing established electronics manufacturing clusters and developing them into centres of excellence, while encouraging new ones.

IT/ITES

Over the last 10 years, the technology and BPO industry has been an engine of growth for the Indian economy, however the global economic downturn has impacted the growth trajectory of the industry. The IT/ITES industry, in this phase, has demonstrated maturity by reducing costs, focusing on newer markets, investing in sales, building domain expertise, enhancing operational excellence and improving thrust on customer centricity. However, as new megatrends continue to shape the global technology and outsourcing industry, continued support from the government is critical for the industry to retain its competitiveness and build for the next wave of growth.

- Establishing India as a trusted global hub for professional services - Managing Risks effectively
- Engaging in Global Trade Development and Actively Advocating Free Trade in Services
- Providing a competitive tax regime - extending Section 10A/10B and providing parity with SEZ scheme. Ensuring incentives under Section 10A/10 B and SEZ continue after the direct tax code is introduced

STRATEGIC ELECTRONICS

Given the size of the opportunity for supplying hardware, software and services to the aerospace, defense and nuclear markets, locally and globally, there exists a huge opportunity yet to be tapped as these markets have been largely catered to by government agencies.

To leverage some of the market trends and also exploit its core competencies, India should focus on:

- Areas with higher technology intensity
- Technology areas that need to be built domestically as it is unlikely to be transferred by global players
- Areas where the private sector can collaborate and provide superior execution capabilities to Defence Public Sector Units (DPSUs) such as fabrication

A photograph of a man in a dark pinstripe suit and white shirt, sitting at a conference table. He is looking down at a small notepad or smartphone he is holding in his hands, writing with a pen. On the table in front of him is a white coffee cup and saucer. In the background, other people are seated around the table, and a large window looks out onto a bright, modern office building.

Software and Services Sector

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NOTES

Section 1 reviews the performance of the IT-BPO industry till date and highlights its contribution to the economy and the society. It also briefly summarizes the long term opportunity available to the industry apart from capturing the policy action recommendations which should be carried out on a priority basis.

Section 2 assesses the global megatrends in detail and talks about the opportunity that it presents to the global sourcing industry and specifically to the Indian IT-BPO industry. It details the redefined market/opportunity for the Indian industry in the form of new customer segments, new verticals and new geographies which if achieved has the potential to transform India.

Section 3 provides the short term, medium term and long term outlook for the industry in terms of revenue and employment.

Section 4 discusses the challenges and constraints being faced currently and there is significant future opportunity at risk if these are not addressed systematically.

Section 5 covers key areas where government policies are needed to support the industry growth and manage challenges. It provides a comprehensive view of actions needed around each area.

1. Executive Summary

1.1 BACKGROUND

India's success in the field of information technology and business process outsourcing over the past decade remains unparalleled. Total export revenues earned by this sector have grown from INR 6,723 crore (USD 1.8 billion) in 1997-98 to INR 212,500 crore (USD 46.3 billion) in 2008-09, a CAGR of 35 per cent. The domestic IT-BPO sector is showing increased traction, too, with growth from USD 1.4 Billion in 1997-98 to USD 12.4 billion in 2008-09, a CAGR of 22 per cent. India - through its unique value proposition - cost effectiveness, abundant talent and maturing service delivery, has emerged as the cornerstone for this sector, steadily increasing its market share to over 50 per cent of the global sourcing industry. It is estimated that India-based resources account for about 60-70 per cent of the offshore delivery capacities available across the leading multinational IT-BPO players.

Over the last 10 years, the technology and BPO industry has been an engine of growth for the Indian economy. Between 1998 and 2008, it quadrupled its share of India's GDP and exports to 4 per cent and 16 per cent respectively. In addition, the industry has also had a strong multiplier effect on national GDP and consumer spending by way of capital expenditure, operating expenses and expenditure by the individuals employed in the industry.

- It has offset close to 65 per cent of India's cumulative net oil imports, strengthening India's foreign reserves.
- It has helped expand tertiary education significantly; the top seven states that account for about 90 per cent of industry have founded six to seven times more colleges than have other states.
- Between 1994 and 2005, the industry contributed up to 45 per cent of incremental urban jobs - including direct and indirect employment (~22 lacs directly and ~80 lacs indirectly).
- Focused on balanced regional growth and is rapidly expanding into Tier 2/Tier 3 cities - currently operating out of 45+ locations.
- The industry has set a precedent for talent practices in India through diversity, inclusive job environment, global career growth, and encouraged entrepreneurship and driven corporate social responsibility initiatives.
- It has created career opportunities for the youth in the country (70% of workforce is between the age of 26 to 35 years). In addition, the focus has been on extensive training and development (entry level training, support for tertiary education, scholarships, sabbaticals etc).
- The industry has enhanced India's credibility as a business destination by forging relationships with 75 per cent of Fortune 500 companies, generating immense savings for customers (in 2008 alone, global sourcing savings for customers amounted to an estimated USD 20 billion), and promoting a focus on quality (65 per cent of all CMM Level 5 firms are based in India).
- It has built the global brand for India as a knowledge economy. Global leaders, media and analysts have recognised the potential for India through the brand built by this sector.
- IT enabled solutions have helped government and industry enhance governance and efficiency.

Indian IT-BPO industry revenues, Software and related services, FY98-FY09

USD Bn	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	CAGR
Exports	1.8	2.7	4.0	6.2	7.6	9.5	12.9	17.7	23.6	31.2	40.4	46.3	34.3%
Domestic	1.4	1.6	1.9	2.5	2.6	3.0	3.8	4.8	6.7	8.2	11.7	12.4	22%
Total	3.2	4.3	5.8	8.7	10.2	12.5	16.7	22.5	30.3	39.4	52.1	58.7	30.3%

Source: NASSCOM

The growth of the sector has led to tremendous pay-offs in terms of wealth creation and generation of high quality employment. Direct employment in the IT services and BPO segment touched nearly 2.2 million by the end of FY2009. This also translates to the creation of about 8 million indirect job opportunities attributed to the growth of this sector in diverse fields such as commercial and residential real estate, retail, hospitality and transportation, etc.

While the sector has maintained a CAGR of over 30 percent in the past decade, the global economic downturn has impacted the growth trajectory of the industry which has declined to single digits in FY 2010. Industry analysts have estimated that the worldwide technology spending will decline by 3-5 percent in 2009 and being an export led sector with a key thrust on banking and financial services, exports are expected to grow by only 4-7%, domestic market by 15% leading to very limited new employment creation during the year. Along with the decline in global demand, many other low-cost countries are building a significant value proposition to challenge India's leadership position aided by very enabling investment policies.

The industry in this phase has demonstrated maturity by reducing costs, focusing on new markets, investing in sales and development, domain expertise, enhancing operational excellence and thrust on customer centricity. However, continued support from the government is critical for the industry to retain its competitiveness and build for the next wave of growth.

As we look ahead, the industry recognises that the next 10-15 years will be fundamentally different from the past and driving the next wave of growth will require all the stakeholders to create an ambitious vision and focus on achieving that.

Over the next decade, several global megatrends will shape the technology and BPO industry as they reshape the global economy. NASSCOM has carried out extensive research to understand the implications of the global megatrends and the changing global IT-BPO landscape (NASSCOM Perspectives 2020 report). The objective of this research was to identify opportunities that the industry can penetrate and provide strategic insights for the industry to reinvent business models and offerings that can transform global businesses through a well-defined customer value proposition. The research also articulates a vision for the sector to transform India through economic development and ICT-enabled solutions in healthcare, education, financial services and public services, which can drive the socio-economic inclusion of 30 million citizens each year. It also throws light on the opportunity at risk for the country and details a call to action for all the stakeholders – the industry, government and NASSCOM.

Hence with increased GDP growth of emerging markets, and shrinking working age populations, these megatrends will present a new set of hitherto untapped opportunities that will include emergence of new verticals, service lines, geographic and customer segments. On the back of these trends, the addressable market opportunity for the IT-BPO sector is likely to expand from the current USD 500 billion to USD 1.5 trillion by 2020.

India is fundamentally advantaged and uniquely positioned to sustain its global leadership position, grow its offshore IT-BPO industries at an annual rate of 13-14 per cent, sustain nearly 10 million direct jobs, and generate export revenues of about USD 175 billion by 2020 and domestic revenues of USD 50 billion by 2020. Additionally, this growth can be further accelerated to USD 310 billion through deep and enduring innovation by industry participants, and focused initiatives by all stakeholders.

This represents an opportunity, capable of catapulting us into a high growth orbit. The transformational impact that this industry can achieve has the potential for India to not only achieve global leadership, but also build a truly inclusive growth environment in the country. Achieving these ambitious outcomes will require breakthrough collaboration amongst industry players, central and state governments, and NASSCOM - to ensure that appropriate actions required to maximize the global sourcing market potential and sustain India's superiority as the preferred sourcing destination are executed in a timely manner.

To that end, this note outlines the policy actions required in key areas such as 1) Developing high calibre talent pool 2) Building Adequate Basic, Business and Social Infrastructure 3) Ensuring a Favourable Business Policy and Regulatory Environment 4) Global Trade Development and Actively Advocating Free Trade in Services 5) Catalysing growth in domestic market 6) Fostering a Sustainable Ecosystem for Innovation and R&D 7) Establish India as a trusted global hub for professional services - Managing Risks effectively 8) Harnessing ICT for Inclusive and equitable growth.

1.2 RECOMMENDATIONS

While we have discussed the challenges and policy actions required in detail (section 5), there are some specific policy actions which need to be prioritized. Many of the suggestions and concerns are across various ministries within the central and state government (Finance, MHRD, Foreign Trade etc). It is important that DIT acts as the nodal agency to disseminate collaborate and coordinate with the other ministries and government departments.

	Policy Actions required
Developing a high caliber talent pool	<ul style="list-style-type: none"> ● De-regulate tertiary education-remove regulatory controls for colleges on admission fees, faculty salaries etc. ● Set up Indian Student Aid Agency (ISAA) for demand-based funding of higher education ● Launch and aggressively scale a national faculty development programme
Establishing India as a trusted global hub for professional services - Managing Risks effectively	<ul style="list-style-type: none"> ● Create a conducive policy environment that is consistent, transparent, predictable on issues related to tax, visas, labour laws. Extra effort to prove that India means business ● Build a comprehensive security strategy aided by technology that can address geo-political concern of customers and investors
Harnessing technology for inclusive growth	<ul style="list-style-type: none"> ● Program office under PMO to review and monitor e-governance. Clear directive to centre/states on implementation. Measurement to be outcome based ● Build central repository of e-governance solutions that can be used across states and other developing countries ● Broadband to be made available to 6 lakh villages over the next 5 years
Fostering a Sustainable Ecosystem for Innovation and R&D	<ul style="list-style-type: none"> ● Increase R&D spending from 0.85 to 2% of GDP. Create Centres of Excellence (CoEs) focused on high potential innovation segments (e.g., efficient energy solutions, mobile applications, healthcare)
Building Adequate Basic, Business and Social Infrastructure	<ul style="list-style-type: none"> ● Develop new hubs with well equipped infrastructure, social and education ecosystem, airports in at least 10-15 towns/cities in the country. ● Provide efficient public services – local transportation, reliable and continuous power, stable policy that can reduce industry overheads
Ensuring a Favourable Business Policy and Regulatory Environment	<ul style="list-style-type: none"> ● Need a competitive tax regime – extend Section 10A/10B and provide parity with SEZ scheme. Ensure incentives under Section 10A/10 B and SEZ continue after the direct tax code is introduced
Global Trade Development and Actively Advocating Free Trade in Services	<ul style="list-style-type: none"> ● Enhance bilateral and multilateral agreements with key and emerging markets that address issues of visas, work permits, language skill development, social security, double taxation etc
Catalysing growth in domestic market	<ul style="list-style-type: none"> ● Provide tax incentives to domestic companies for investments in technology (green, SMBs)

Concerted action is required to capture the opportunities and mitigate the risks to achieve the vision for 2020. In doing so, stakeholders (industry, NASSCOM and the government) will need to act together in an unprecedented manner. Industry and NASSCOM have already started working on the key enablers:

1. Developing a high caliber talent pool

- Providing higher level training to the recruits, focus on building specialization and language skills
- Industry academia partnerships on curriculum, faculty development
- Introduced Common assessment program to identify skill gaps and build programs for the gaps in education system

2. Establishing India as a trusted global hub for professional services

- Industry building business continuity/disaster recovery implementation strategy
- India to become leader in setting standards in data security/data privacy
- NASSCOM working with government to enhance enactment and enforcement

3. Harnessing technology for inclusive growth

- Industry leveraging PPP models and building applications for e-health, e-education, e-financial services and e-skills
- Balanced regional growth through setting up in tier 2/3 cities by the industry; rural BPOs to provide employment

4. Fostering a Sustainable Ecosystem for Innovation and R&D

- Carrying out Research and IP development both internal and sponsored
- Thrust on PhD programs and research partnership with academic institutions

5. Catalyzing growth beyond today's core markets

- Industry concentrating on developing new markets; building global viewpoint
- Industry leveraging Global workforce through offshore delivery centers - hiring best talent and participating in local ecosystem development
- NASSCOM facilitating Policy Advocacy, building coalition partners at a global level
- NASSCOM acting as the brand ambassador for global services in global forums to champion globalization of the industry and relevant imperatives (global labour flows)

2. Opportunity Assessment

Global spending on IT-BPO in 2008 was estimated at over USD 1.6 trillion. Of this, the market potential for services that may be sourced globally was estimated at USD 500 billion. The total value of IT-BPO sourced from offshore locations in 2008 was estimated at USD 89-93 billion.

Global Offshore IT-BPO Market Potential

While India holds a dominant share of the global offshore IT-BPO sector, yet, at USD 46.3 billion in 2008-09, Indian IT-BPO exports accounted for less than 2.8 percent of the global spend on IT-BPO. Over the next decade, the industry will be influenced by several global macro-economic, demographics, social, business and technological trends that will shape the face of global business. These trends include:

Macroeconomic and demographic trends

- Shifting centres of economic activity-GDP of Asia and Europe will converge
- Working age population shrinking in key developed countries (e.g., Japan, Italy, US)

Social and environmental trends

- Increased Internet and mobile connectivity transforming the way people live and interact
- Rapidly increasing consumption and associated supply gap in key natural resources (e.g., oil, water) creating need for resource efficiency and climate change solutions

Business and technology trends

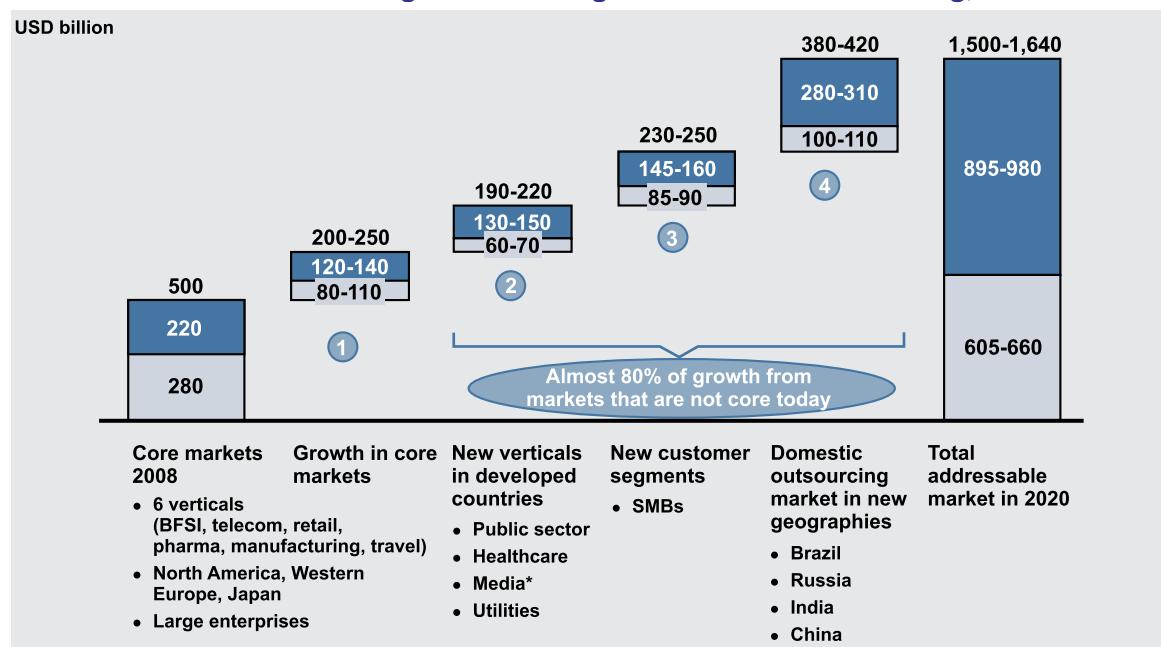
- Global economic crisis leading to major shift in industry structures and higher regulatory control
- Corporate boundaries being redefined (e.g., open innovation, extended supply chains, web of partnerships)
- Technology radically transforming the way traditional corporations and governments function

This will lead to new opportunities for companies to capture new markets largely untapped so far. So far, the prime focus of the global sourcing industry has been on core markets- large enterprises from North America, Western Europe and Japan in verticals such as BFSI, telecom, retail, pharmaceuticals, manufacturing and travel. While these core markets will continue to grow over the next 10 to 15 years, driven by growth in the cost base, the industry will be redefined along four key dimensions:

- **New services in core markets:** There is still further growth potential (beyond the cost-based growth) even in the core markets described above. The global sourcing industry has largely focused on cost reduction through replication of processes in low-cost locations. Going forward, the industry can propose additional services to these core markets in three ways: 1) offer beyond-cost services, e.g., revenue enhancement, capital avoidance; 2) suggest integrated manufacturing and services solutions e.g., end-to-end development of new auto parts; and 3) redesign and transform processes, leveraging automation.
- **New verticals:** Several verticals in developed countries, which have previously not globally sourced services, are expected to do so in the next wave of growth. Driven by the megatrends, at least four new verticals are expected to emerge by 2020 (public sector, healthcare providers, media and utilities). For example, due to increased spending requirements on healthcare and pensions as a result of aging populations, the public sector and healthcare providers will increasingly depend on technology and services providers for solutions to reduce the cost to serve. Also, energy companies and utilities will look for solutions to monitor and optimise their carbon footprint in line with emission requirements.
- **New customer segments:** Enabled by megatrends such as increased digital connectivity and the availability of new delivery platforms, the industry can expand its influence beyond large enterprises to SMBs. The emergence of new service offerings and business models (such as SaaS) will also allow players to serve smaller enterprises in an unconventional but profitable manner. The industry can also offer direct business-to-consumer services (such as financial, healthcare and travel services) to the emerging class of well-connected retail consumers.

- New geographies: As economic growth expands into new markets, Asia will bypass Europe as the second largest target market, led by India and China. On the back of greater adoption of technology and outsourcing by enterprises, BRIC markets will become a sizeable target domestic outsourcing market, with India and China accounting for almost 50 per cent of the opportunity.

Total addressable market for global sourcing and domestic outsourcing, 2020



Based on the four dimensions of growth outlined earlier, the total addressable market for domestic outsourcing and global sourcing is estimated to be USD 1500-1640 Billion by 2020, growing by 3 times over current levels. The growth in the addressable market by 2020 highlights several trends:

- An estimated 80 per cent of the growth in the addressable market will come from segments that have not been traditional markets for the industry
- The addressable market for BPO will exceed that of technology services by 2020
- The BRIC domestic outsourcing opportunity will rival that of core geographies
- Innovation can create an additional opportunity (around USD 200 billion for solutions and products in three select areas alone - namely climate change solutions, clinical research and mobile applications

	Areas of Focus	Drivers of India's advantage
Energy efficiency and climate change	<ul style="list-style-type: none"> • Smart buildings (integrated BMS linked to outside environment, e.g., weather, light, smart HVAC, occupancy-based lighting) • Smart grid solutions (user-level smart monitoring, automated T&D monitoring, load) 	<ul style="list-style-type: none"> • Growing carbon credits market • Increasing domestic demand to reduce carbon footprint (India's carbon footprint from electricity generation will grow at a CAGR of 4%, double the global average CAGR of 2% from 2010 to 2020) • Improving regulatory environment
Mobile applications	<ul style="list-style-type: none"> • Internet offerings like search, mail, • messenger on mobile platform • SMS-based searches, applications • Mobile middleware solutions, roaming applications, SMS gateways 	<ul style="list-style-type: none"> • Large domestic market • Robust local ecosystem of companies, value chain players and investors • Established IT resource pool & development infrastructure

Contd..

	Areas of Focus	Drivers of India's advantage
Clinical research	<ul style="list-style-type: none"> • Target identification & validation • Lead generation & optimisation • Clinical development & trials • Data management & statistical Analysis 	<ul style="list-style-type: none"> • Lower time-to market due to easy access to low-cost, large patient pool • Availability of talent for high quality trials, data management • Favourable regulations, domestic market and infrastructure

Source: NASSCOM-McKinsey Perspective 2020

The outsourcing opportunity in climate change, mobile applications and clinical research could add over USD 200 billion to the total addressable market. India can have a distinctive impact in these areas including clinical trials and data analysis, Internet offerings on mobile platforms and creating smart grids for energy efficiency. If India is able to capture distinctive roles in these value chains, over USD 75 billion could be added to Indian technology and BPO exports by 2020.

THE DOMESTIC OPPORTUNITY

The domestic technology and BPO industry in India is at an inflection point today. As India rapidly grows into one of the largest economies of the world, this will not only lead to the rise of personal consumption in the Indian middle class but also fuel the growth of several, large and global Fortune 500 companies of Indian origin. The increasing affluence of the Indian consumer and globalisation of Indian corporations will likely lead to increasing sophistication of domestic demand in product complexity, delivery flexibility and service levels. These trends will have significant impact in growing the size and scope of the domestic addressable market.

As Indian consumers and corporations rapidly adopt mobile phones, and Internet access and broadband connectivity expand, there is likely to be a significant increase in spend on IT hardware, software and services. Finally, the biggest domestic opportunity in most sectors (e.g., banking, insurance, retail, telecom and healthcare) lies in tapping the opportunity to serve the billions of underserved at the bottom of the pyramid. India is likely to be the laboratory for disruptive innovations to serve these underserved segments at a price and performance profile that suits these conditions.

Global megatrends	Implications for India
Macro-economic	<ul style="list-style-type: none"> • India's share of global GDP is likely to rise from 2.1% in 2008 to 3.3% in 2020 • Per capita income of Indians has doubled over last 10 years
Social and Environmental	<ul style="list-style-type: none"> • Teledensity increased 12-fold over the last 10 years from less than 2% in 1998 to around 24% by Dec 2007; likely to increase to 62% by 2013 • Internet connectivity is also likely to increase with availability of spectrum for 3G and WiMax
Business and Technology	<ul style="list-style-type: none"> • Increased use of technology and BPO outsourcing in Indian companies • Emergence of innovative business and service delivery models (e.g., SaaS, cloud computing) • Increased investment in technology and BPO by central and state governments

Source: NASSCOM-McKinsey Perspective 2020

The addressable domestic opportunity in India based on these megatrends is estimated to be USD 90-100 billion by the year 2020 and the industry has the potential to achieve revenues of USD 50 billion by the year 2020.

If the industry can achieve this vision, then by the year 2020, there will be a dramatically altered industry with more diversified customer base, broad range of services, globalised talent pool and a portfolio of multiple co-existing business models. It will also achieve a transformational impact on the Indian economy and society.

3. Industry Outlook

CURRENT MARKET SIZE

The Indian IT-BPO industry (excluding hardware) is estimated to be a USD 63 billion industry by March 2010 employing over 2.2 million people and contributing to over 4 percent of India's GDP.

On the back of the global economic recession, the growth rate for the industry for FY 2010 is estimated to decline to a low of 7 percent. The past year has witnessed a depressed demand environment with budget cuts and delayed decision making. However recent data indicates that the impact of

USD Bn	FY2008	FY2009	FY 2010 E
Exports	40.4	46.3	49
Domestic	11.7	12.4	14
Total	52.1	58.7	63

Source: NASSCOM

the recession is bottoming out, decision making is starting to happen and there will be pent up demand for IT-BPO services which companies emerging out of recession will need to leverage to compete effectively.

INDUSTRY STRUCTURE

The industry has a healthy mix of Indian providers and foreign providers, with the latter contributing to 30 per cent of total revenues. Companies operate through a range of sourcing models-

INDUSTRY STRUCTURE	Share (FY2008)
Indian Providers	65-70 per cent
Foreign Captives	15-20 per cent
Foreign Providers	10-15 per cent

1. Captive - An internal cost center or a 100% subsidiary company set up to execute IT-BPO services
2. Strategic Alliances/Joint Ventures - provider owned/joint operations transferable to the customer or provider at certain milestones/timelines
3. Outsourced/Third party - Use of a third party service provider to provide IT-BPO services

IT-BPO EXPORTS MARKET

The export industry is diversified across three major focus segments - IT Services, BPO and engineering services. While IT Services have been the mainstay of the industry, BPO and engineering services sector has built upon the India value proposition and today there exist integrated service providers across the three focus areas as well as niche providers.

SERVICE LINES	FY2008	FY2009	FY 2010 E
IT Services	23.1	26.5	28
BPO	10.9	12.7	13.5
Software products/ engineering	6.4	7.1	7.5
Total	40.4	46.3	49

IT-BPO DOMESTIC MARKET

The domestic IT-BPO segment is estimated to aggregate revenues of INR 650-670 Billion in FY10, as Indian firms increase IT adoption across verticals. The Government is expected to contribute significantly to this growth with budget allocation of US\$10 billion over the next 3 years for the National e-governance Plan (NeGP). Leading Indian firms, multinationals as well as the SMEs are gearing their products and services to tap into the e-governance opportunity.

SERVICE LINES (INR Bn)	FY2008	FY2009	FY 2010 E
IT Services	318	381	434
BPO	64	87	111
Software products/ engineering	88	101	114
Total	470	569	660

Medium to Long Term Outlook

Given the backdrop of large untapped demand potential and strong fundamentals, India is uniquely positioned to secure global leadership, grow its IT-BPO exports at an annual rate greater than 13 percent, and generate export revenues of USD 82 billion, and domestic revenues of USD 23 billion by 2014. Direct employment generation is expected to increase by 75% from FY09 levels, to 3.9 million, while indirect employment is expected to touch 12 million by 2014.

Similar growth rate for the industry will propel the Indian IT-BPO exports market revenues to USD 175 billion by 2020, while domestic revenues is expected to grow to USD 50 billion in the same period. Direct employment is expected to reach 10 million, while indirect jobs are expected to total 20 million. Industry revenue growth can be further accelerated through deep and enduring innovation by industry participants, and focused initiatives by stakeholders to generate an additional US\$125-135 billion in export revenue by 2020.

Achieving these growth aspirations will entail a significant demand not only for human capital, but also significant infrastructure and financial capital in the country. USD 175 billion in IT-BPO exports by 2020 translates to office infrastructure of 1 billion sq.ft, and direct capital investment of approximately USD 60-62 billion.

The following table illustrates the input requirements driven by the projected growth of Indian IT-BPO sector during the period 2009-2020.

DESCRIPTION	FY2009	FY2014	FY2020
Export Revenues (USD Bn)	43.6	82	175
Domestic Revenues (USD Bn)	12.4	23	50
Direct Employment Generation (Mn Nos)	2.2	3.9	10
Indirect Employment Generation (Mn Nos)	8	12	20
Office Space (Sq. ft.)	220	420	1 Bn
Direct Capital Investment* (USD Bn)	15-16	28-29	60-62

* Estimated assuming an industry average capital: revenue ratio of 1:5; and a lead of 3 years in the investment cycle

The Indian technology and BPO industry has contributed significantly to the Indian economy and society and can sustain and exceed this impact by 2020. Its contribution to Indian GDP can reach almost 10 per cent if the industry achieves its full potential. Further, it can create 30 million jobs by 2020, both in urban as well as rural and non-metro regions of the country. The industry can also foster India's development by encouraging improved infrastructure and providing technology enabled basic services far more effectively and efficiently than today's traditional models.

4. Key Constraints and Challenges

While India continues to be the dominant player in the global sourcing sector, its future will depend on how challenges to its continued competitiveness are tackled. The primary sources of risk are low employability, infrastructure constraints, rising costs, security concerns, discontinuation of fiscal incentives and a supportive policy framework and lack of an innovation ecosystem. In addition, the competition is intensifying and many countries are now positioning themselves as global sourcing destinations providing a plethora of incentives.

Risks	Implications
Rising costs	<ul style="list-style-type: none">Wage inflation at an average of 12% per annum in last few years and 10% in next 5-10 yearsPublic infrastructure development costs
Decline in talent availability	<ul style="list-style-type: none">Low employability of entry-level workforceHigh GDP growth increasing the war for talentDeclining willingness of people to work in industry
Competition from new locations	<ul style="list-style-type: none">Emergence of competing locationsTalent enhancement in countries such as China, EgyptTargeting specific segments by rival locationsInfrastructure and policy support by competitive locations
Low vendor maturity	<ul style="list-style-type: none">Indian vendors offer limited enhanced capabilities
Infrastructure constraints	<ul style="list-style-type: none">Industry concentration in few Tier I cities over-burdening infrastructure and inadequate infrastructure development in Tier II cities
Increased risk perception	<ul style="list-style-type: none">High currency volatilityIncreasing geo-political risk
Absence of innovation enablers	<ul style="list-style-type: none">R&D spend at .85% of GDP is lower than in rival locationsLack of institutional capabilities for academic research and hence low turnout of PhDsLack of enforcement of IP laws discourage research and technology commercialisation
Deteriorating business environment	<ul style="list-style-type: none">Discontinuation of fiscal policies and diminishing regulatory support

Source: NASSCOM-McKinsey Perspective 2020

The industry is putting together a number of initiatives to mitigate these risks but need sustained policy support from the government

5. Policy Actions Required

The following sections outline the policy actions required to address the concerns and challenges raised in the previous section.

5.1 MITIGATING THE IMPACT OF THE DOWNTURN

The global economic recession has created an uncertain demand environment, one where there is reduced spending on IT and BPO, but at the same time companies need to invest for the future into building competencies, expanding into new markets and focussing on innovation. Countries around the world have substantially invested in stimulus packages to support industry sectors and generate employment. The Indian government has also been supportive of the IT-BPO sector and has extended the tax incentives under Section 10A / 10B of the income tax act till March 2011. The following recommendations if implemented immediately can help the industry mitigate the impact of the downturn and contribute to India's economic and social development.

- **Fiscal Incentives:** Extend the tax holiday under Section 10A/10B of the Income Tax Act to provide parity with the SEZ scheme. This is particularly required for the SME sector and tier 2/3 cities in the country, wherein the SEZ scheme will not be viable. The SME sector in India accounts for over 6000 companies but contribute to less than 10 percent of the industry revenues. Companies in India need an enabling fiscal regime, as they face issues of enhanced competition from other countries. The extension also needs to be done for a definite period ahead, as extension by a year, while useful, does not help to promote investment. The government also needs to correct the anomaly in Section 10AA of the SEZ Act with retrospective effect.
- **Fast track domestic spending:** The National e-governance plan has allocated investments that need to be made into key mission mode projects in the centre and state. It is critical that the government can fast-track implementation of all approved e-governance projects. This will help achieve the twin objective of enabling faster access to citizen services in the country as well as allow the industry to use its workforce for these projects.
- **Address issues related to protectionism:** As unemployment has increased in the US and UK, many bills are being introduced in these countries that can possibly impact India's business. These relate to specific changes in the US H-1B and L-1 laws and immigration policy in the UK. It is imperative that the government at the highest level raise these issues and help address them.
- **Transparent and stable policy framework with defined implementation:** In the last two years, India is increasingly being perceived as a difficult place to do business. While other competing countries are enhancing incentives and creating a pull for attracting investment, India's changing or different interpretations to tax laws, labour laws, state laws is leading to a push away from India. It is imperative that a harmonious policy structure is created which is implemented uniformly across the country in a defined time-frame.
- **Expedite structural reforms in human resource development:** It is important that while the focus on primary education and 'education for all' is implemented, the government address the issue of structural reforms in higher education that relate to accreditation system, faculty salaries, curriculum changes.
- **Inclusive growth - help to develop a PPP framework:** The industry in India is keen to partner with the government to enhance inclusive growth in the country. A well defined PPP framework across education, healthcare, financial services and public services will enable the industry to develop the content, applications and process frameworks so that access for all is enabled.

5.2 REALISING THE MEDIUM TO LONG-TERM VISION

The industry has the potential to reach revenues of USD 105 billion by 2014 and USD 225 billion by 2020. While the industry will need to expand into new markets and build new competencies, it will not be demand constrained. The

constraints on the supply side will need to be urgently addressed and a well defined implementation plan is needed with clear milestones.

5.2.1. Improving the Supply and Capacity of Suitable Talent

India's large talent pool is one of the key reasons for India emerging as a premier global sourcing destination. The demographic changes over the next quarter century will lead to evolution along fundamentally different directions for some countries. Some developing countries (e.g., India) will see an increase in their working age population (from 63 per cent in 2008 to 67 per cent in 2020) driven by relatively high birth rates and average life expectancy ratios. On the other hand, many developed countries (e.g., Japan, Germany, Italy) will see a declining working age population by 2020 driven by lower birth rates (8 births per 1,000 persons in Japan versus 23 in India) and higher life expectancy (82 years in Japan versus 69 in India). Even China will have a decline in the working age population (72 per cent in 2008 to 70 per cent in 2020). Hence by 2020, India will have the largest working age population in the world and therefore has the potential to have the largest pool of skilled workers in the world. However, with current levels of quality and scale in education, this tremendous opportunity could be lost. The government should make it a priority to significantly improve the quality and scale of primary and tertiary education in the country.

Though India accounts for over 28% of the total suitable talent pool available to work in the IT-BPO sector across all the potential global sourcing low-cost locations, the proportion of graduates found suitable for employment is fairly low (quoted estimates range 10-20 percent). As a result the effective pool of employable graduates is far lower than the overall pool of people entering the working-age population.

Currently, any graduate who is hired, irrespective of the institute he comes from or his skill levels, is put through the 16-week training (in areas such as technical skills, soft skills, company orientation and process-specific domain skills) when he joins the firm. It has been estimated that the industry spends a minimum of USD 1bn annually on this entry-level training. Recruiting a trainable pool is not a sustainable option going forward. Inadequate English-language proficiency and lack of soft-skills are the key gaps in the current graduate pool, reported by the industry.

Policy Action – Talent supply

1. Introduce soft-skills program across universities in the country in partnership with the private sector.
2. Requisite skills and competencies w.r.t. all levels of employment in IT and BPO space to be mapped.
3. A credit based system for inter-operability between verticals and horizontal and vertical mobility to be introduced.
4. National standard on employability assessment. Given the varying standard of different institutes, a common nation-wide benchmark for assessing students is necessary. The inclusion of industry needs in this assessment will make it useful for recruitment. It will also ensure that colleges or training institutes include these specific elements in their curriculum. NASSCOM in partnership with the industry has created an assessment program – NAC for the BPO sector and NAC Tech for the IT sector. These assessment programs need to be adopted as a national employability assessment across the universities in the country.

5.2.2 Structurally Strengthen the Education System

The prevailing system of education in India is constrained by several factors. These include a lack of adequate capacity and number of institutions acknowledged as sources of world-class talent; poor systems of accountability and lack of pressure to perform; operational inflexibilities, bureaucratic controls and complex governance structures shared between the centre and the state; teaching/academics not considered an attractive career option, leading to constraints on faculty resources; key stakeholders (i.e. the education system and the industry) operating in silos, with limited mutual interaction/participation.

The supply of graduates in India is growing at around 5 per cent a year. With a current average employability rate of 26 per cent for engineering graduates and 10 to 15 per cent for other graduates and declining willingness to work in

the industry (from the current 80 per cent to 60 per cent in 2020 for IT and engineering graduates and 65 per cent to 45 per cent in 2020 for other graduates), the industry will face a talent shortage of over 2 million people by 2020 (1.5 million to retain current global sourcing market share, 0.8 million shortage in domestic market). The innovation market may lead to further demand of up to 1.2 million people including 300,000 PhDs. The government and the industry will have to take short-term and long-term initiatives to address the gap so that the industry is able to realise its full potential.

The Eleventh Plan allocation of around USD 6 billion (Rs 19,282 crore) for higher education is very low compared with the anticipated requirement of over USD 55 billion (Rs 212,900 crore). One way to bridge the gap would be to encourage greater private participation in higher education. The government should address this situation by removing regulatory restrictions on private investment and provide incentives to encourage investment.

Policy Action – Strengthening the Education system

1. Under Graduate and Post Graduate programs to be 'Credit' based and standardized nationally. In addition allow policy for introducing electives and add-on programs (employment oriented) in colleges affiliated to universities to be less constrained and to be executed in a shorter period of time by all BOS (Board of Studies).
2. Implement recommendations made by the National Knowledge Commission on changes in the governance structure in universities.
3. The Government has drawn up plans to establish 20 new IITs and 8 new IITs. These need to be implemented with world class faculty and in partnership with the private sector.
4. Address gap of 1,500 universities by upgrading top-performing colleges to affiliating universities and/or by establishing Greenfield universities.
5. New technologies of pedagogy, such as ICT, broadcasting, etc. must be introduced to provide wider access to high quality education, to overcome the shortage of teachers and to increase capacity.
6. All non-formal education courses/programs including apprenticeships programs, to be standardized across the country for inter-operability; from the non-formal to the formal stream and from the unorganized to the organized sectors.

5.2.3 National Faculty Development Program

1. The Technical Education Quality Improvement programme (TEQIP), a Rs. 1550 crore World Bank funded initiative, is aimed at improving the quality of technical education in the country. TEQIP will address the major issues of selected institutes, like modernisation of laboratories and workshops, faculty and staff development, curricula improvements, course flexibility, interaction with industries, research, development of management capacity and networking of institutions for resource sharing. TEQIP-II type program to be made available to all 2000 engineering colleges
2. National Faculty Development program in consultation with the industry, both for Engineering and non Engineering colleges, for the short, medium and long term to be deployed

5.2.4 Indian Student Fund Aid Agency

Encourage students and working professionals to pursue further education for skill enhancement by providing tax incentives. Set up a student financial aid agency (such as the Federal Student Aid in the US) for demand-based funding of tertiary education. The central government can set up the Indian Student Aid Agency (ISAA) on the lines of the FSA in US. This agency should be responsible for disbursing needs-based funding to students in the form of grants, loans and work-study (earn-while-you-learn) programmes. The dual objective of this scheme should be to ensure that no student is denied access to education because of weaker economic background and that enrolment in higher education reaches 40 to 50 per cent by 2020.

5.2.5 Building Domain specialisation

Further, as highly skilled talent enters the workforce, the gestation period before new employees can generate revenues (up to six months for some players) will diminish and there will be a much greater focus on ongoing development of

specialised skills and capabilities. Career paths will become specialised, not only by domain expertise, but also by role (e.g., solution architect versus client advisor versus programme manager).

While some of the initiatives targeted at building capability in students and faculty, upgrading curriculum, our long term objectives should be aimed at building skilled resources—Ph.Ds, and engineering graduates while sustaining and scaling the short- and medium-term initiatives.

Policy Action – Domain Specialisation

1. Launch and scale up technology and BPO specialisations across all vocational training institutes (Industry Training Institutes/Industry Training Centres). Industry would continue to provide vertical specific training and can carry out strategic acquisitions to facilitate that.
2. Domain specialisation needs to be built in research and education institutions; servicing the domestic demand would also lead to building specialisation.
3. Increase number of PhD holders per million population by at least 5 times.

5.3 BUILDING WORLD CLASS BUSINESS AND SOCIAL INFRASTRUCTURE

Currently more than 90 percent of the industry revenues are from 7 cities in the country (Bangalore, Chennai, Hyderabad, Pune, Mumbai, Kolkata and the NCR region). The infrastructure in these cities is heavily constrained - be it power, road, transport, residential accommodation and water supply. If the industry has to achieve the vision set up in the medium to long-term, there is a need to urgently address the infrastructure deficit in the country.

In addition, the imperative to focus on balanced regional growth will mean that locations apart from these 7 cities should account for at least 40 percent of the industry revenues by 2020 and the current hubs will need to increase by at least 2.5 times their current size.

Taking into account the above facts, we will have to promote the creation of integrated physical and social infrastructure in 10-15 Tier-II and Tier-III cities (including new township development) with high potential to serve as hubs for the industry (i.e., provide basic infrastructure, social facilities). Real-estate requirements by 2020 are estimated to be between 2,000 - 3,000 million square feet.

The growth in population will require additional power and water supply, bandwidth, public transport and international air connectivity. Power and telecom needs alone will be as follows:

- Power: Additional power of 4,000 - 6,000 MW for office and residential purposes will be required. Most cities today have a power shortage of 5 to 10 per cent in the peak season. This gap can be addressed through captive power plants in offices and by electricity generation through nuclear and wind energy.
- Telecom: There is a reasonably high supply of telecom landline and mobile connections in Tier-II cities. The supply and quality of high-speed bandwidth, which is the backbone of technology and BPO companies, will need to be improved. Increased bandwidth requirement will be 250,000 - 400,000 mbps

Pushing infrastructure development and developing new townships will call for a high level of collaboration between various stakeholders including the state and central governments and the private sector. A special nodal agency will be needed to coordinate efforts. Such an agency should be created in all states, responsible for driving infrastructure improvement in identified cities or new townships. Action will need to be taken across various fronts including: master plan development, model financial arrangements, land acquisition and auction, proper re-settlement of displaced persons, aviation and transportation planning, and educational linkages.

5.4 ENSURING A FAVOURABLE BUSINESS POLICY AND REGULATORY ENVIRONMENT

A favourable business policy and a regulatory environment are critical for the success of any sector. The Indian Government's proactive approach towards the IT-BPO industry over the past decade is showcased in initiatives such as

the IT Act Amendment, tax incentives, telecom sector deregulation etc. The role of the private sector in developing the industry and providing it world-class facilities and services is also commendable.

However, in the past year there have been concerns on the ambiguous and lack of consistent policy implementation in the country. Along with the sustained thrust from competing countries to attract investment through a plethora of incentives, there is an urgent need to address the policy environment from the perspective of investment, implementation and communication.

Key policy changes wherein support is needed are:

5.4.1 Extend tax benefits under Section 10A/10B and provide parity with SEZ scheme

The tax incentives under Section 10A/10B of the Income Tax Act have enabled a policy framework wherein new businesses in the country have been able to reinvest their profits and build for the future. The companies have invested in world class facilities, extensive talent development initiatives, disaster recovery and power back-ups, transportation many of which are costs that companies in other countries do not incur.

With the economic downturn, small and medium companies are facing issues of clients closing down, delay in payments, inability to garner working capital requirement. At the same time they need to invest more in sales and development, domain specialisation and IP development. Continuation of tax incentives will enable this sector to redeploy their profits and manage the downturn. Also, the conditions under the SEZ scheme are not conducive to the small and medium companies. The parity with SEZ incentives is needed both for building a vibrant SME sector and tier 2/3 cities in the country where SEZs are unlikely to come up.

5.4.2 Ensure implications of the Direct Tax Code to be introduced in 2011 are not counter-productive and meets its key objectives

While the draft direct tax code proposes reduced tax rates for all taxpayers, it also proposes to remove most of the tax incentives that are available. The effective tax rate for companies is reported to be 22.24%. With tax incentives withdrawn, the ETR of corporates below the average would tend to increase to 25%. The IT and BPO sector (in short “IT services”) has an unprecedented and commendable track record of earning precious foreign exchange for India and generating employment, which continue to remain vital for India, given its balance of trade and its demography. India’s exports in 2008-09 were USD 168 billion and the export of IT services accounted for an impressive USD 50 billion. India, with its talent and competitiveness, has earned the distinction of being the most preferred destination for outsourcing IT services. Being a knowledge-based services sector, more than 50% of the costs incurred are by way of salaries paid to employees and payments for outsourced services, which has features of full tax remitted through withholding and payment of taxes by individuals at rates significantly higher than average rate. In any tax policy, these rank as the most preferred features as they ensure complete economy in collection and minimum tax gap.

The method of granting Foreign Tax Credit also needs to be addressed in the Code. Further, India has not, till date, entered into treaties with developed nations like the USA and UK for elimination of dual social security levies and as a direct consequence, provision of IT services, which requires significant deployment of on-site resources, entails incurring a significant social security taxes without securing any benefit. In these circumstances, the tax incentives granted to IT-BPO services should not be viewed as a revenue loss or tax foregone considering that the sector incurs many taxes for which credit is not granted by India and it contributes incrementally to the revenue by way of withholding taxes.

Further, the new draft tax code proposes a MAT based on gross value of assets. Any tax on capital formation for productive purposes would be regressive irrespective of the positive effect it will have in mobilizing tax revenues in the near term. The MAT proposed in the Code has a cascading effect, which makes the MAT levy inefficient. For new entrepreneurs with a vision of competing with established players, it is a tax on inflation, which in itself is an economic burden. It would be more regressive if there is no MAT credit that could be carried forward and set-off against normal tax in the future years as it would add to the aggregate tax on income. The current profit based MAT is

equitable in as much as it is imposed only on profitable companies and thereby meets the test of the “ability to pay” whereas a MAT based on value of gross assets would be tax on the “ability to earn”.

Policy Action – Direct Taxes

1. Extend tax incentives Section 10A/10B and provide parity with SEZ scheme. Ensure these incentives can continue after the direct tax code is introduced.
2. Address the anomaly of Section 100 AA exemption with retrospective effect. The provisions of section 10AA of the ITA on the computation methodology should be introduced in the same form retrospectively in the Code.
3. Computation of MAT should be restored to profit based taxation.
4. The new draft tax code aims to improve the efficiency and equity of our tax system by eliminating distortions in the tax structure, introduce moderate levels of taxation and expand the tax base. However many of the clauses are creating anomalies and ambiguities and it needs a comprehensive review and addressal by the government.

5.4.3 Enabling environment – review of indirect and personal taxation; other relevant laws

Strengthening the overall policy framework is another key aspect of policy reform required to strengthen India’s IT-BPO sector. This is essential not only for strengthening India’s value proposition as a safe destination to do business, but also to encourage the growth of the industry.

Policy Action – Indirect taxes; other relevant laws

1. Union Budget for 2009-10 included provisions for creating a safe harbour regime for defining taxation for multinational companies operating in India. This needs to be implemented on a fast track basis to enable MNCs to enhance their investment in India.
2. Strengthen “offset policy norms” to include technology and BPO and leverage defence/nuclear and infrastructure spending.
3. Resolve duplicity of indirect taxes for packaged software.
4. Policies to address delays in refund of service tax.
5. Creating a regulatory environment that is relevant from a service economy point of view. The current labour laws were drawn up at a time when India was mostly an agriculture/manufacturing based economy (e.g., not allowing women to work at night, maintaining tax returns in hard copies) with large part of labour within that sector. In the services sector, specially knowledge economy, the category of employees is different and hence nature of protection needed to be provided also needs to reflect the reality.

5.5 GLOBAL TRADE DEVELOPMENT AND ACTIVELY ADVOCATING FREE TRADE IN SERVICES

Expansion of the global IT-BPO market opportunity is directly influenced by the policy and regulatory frameworks governing cross-border trade in services. Growth of cross-border trade in services is constrained not only by tariff barriers - but more so by non-tariff barriers (e.g. national treatment in cross-border supply and movement of people). India must continue to work proactively with its trading partners (through the WTO and other trade promotion agencies) to streamline trade in professional services.

India must push for the free movement of professionals engaged in delivering services on the basis of formal contracts, through a global GATS or professional services visa. It should counter protectionism by enhancing bilateral and multilateral agreements. It can pave the way for entry into the global market by proactively entering into agreements with governments in core and emerging markets to increase trade in services and the free movement of labour. At the same time, it must engage in bilateral or plurilateral negotiations on this with countries of specific interest to us. Negotiations are also needed to conclude agreements relating to exemption or refund of social security taxes paid by Indian professionals working abroad.

The medium to long-term vision of the industry envisages that 80 percent of the growth opportunities will come from the non-core markets today, If India has to capture this opportunity, it requires a fundamentally different business model and initiatives both from the government and the industry.

Increased government support in trade development programs for this sector can play an important role in expanding the market for India. Today many companies, especially SMEs are constrained in their marketing efforts to lack of funds and the size/base to drive their messages in new markets and geographies.

Policy Action – Global Trade Development

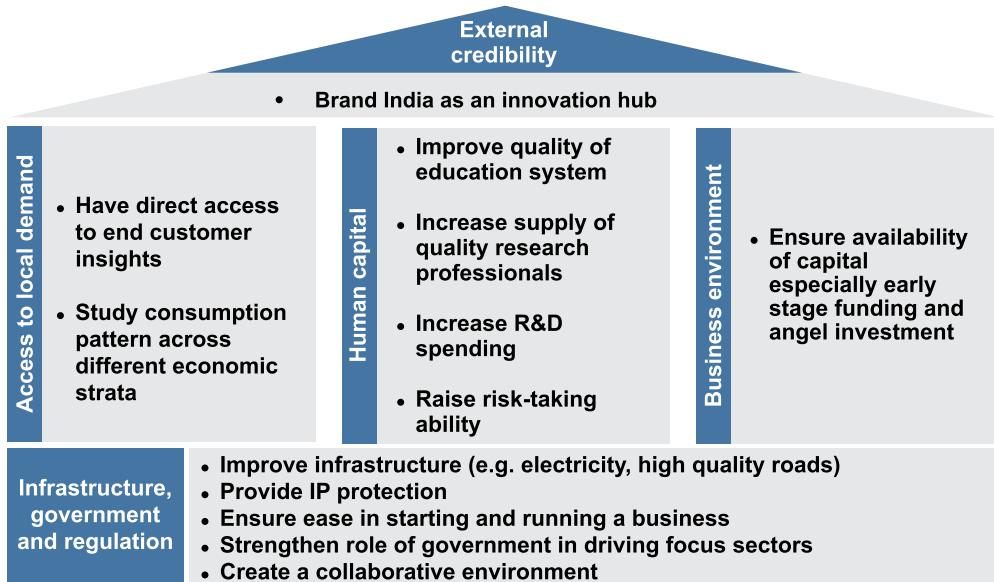
1. India must push for the free movement of professionals engaged in delivering services on the basis of formal contracts, through a professional services visa. Countries such as UK, Germany, France, Japan, already offer such visas and EU is working on short term work visa to cover entire EU territory.
2. Need to counter protectionism on sustained basis through effective negotiation with key countries.
3. Enhance bilateral and multilateral agreements (GATS) to encourage favourable immigration norms.
4. Negotiate Double Taxation Avoidance Treaty and Totalisation Treaties for a conducive tax framework.
5. Integrated communication and media campaign to promote India as a value added partner for IT-BPO services and products.
6. Ease visa norms for India and ensure that the process of getting a work visa for India is transparent and efficient.
7. Market Development Access of the government to build special thrust on emerging markets and SMEs to participate in global events.
8. Build alliances with key countries to develop language programs that can be offered as electives in colleges or specialised courses.
9. Partner with industry in building research and market access information in emerging markets.

5.6 FOSTERING A SUSTAINABLE ECOSYSTEM FOR INNOVATION AND R&D

Innovation will be a key requirement for success in the future. India has the potential to emerge as a leading hub of innovation in low-cost technology and process reinvention. To realise this potential, the government and the industry can undertake several actions to transform the eco-system and create enablers of innovation. In the medium term, the government should focus on enhancing and enforcing IPR laws to match the best in the world. India already has strong IPR laws; they need stronger enforcement to encourage companies to commercialise in-house developed technologies and processes. In 2008, the World Economic Forum ranked India 48 out of 60 countries in IPR protection.

Further the government should catalyse investment in R&D to match the best in the world. Current spending on R&D in India amounts to 0.85 per cent of GDP, lower than in China (1.44 per cent) and Russia (1.77 per cent). A comparison of the number of researchers per million people across countries shows that India is lagging behind. The number of patents granted in India per million people is also lower than that in other emerging economies such as China, Brazil and Russia.

A review of successful innovation hubs or ecosystems across the globe (such as Silicon Valley, Ireland and Israel) shows that five enablers are required for sustained growth of an ecosystem.



Source: NASSCOM-McKinsey Perspective 2020

The focus on developing an ecosystem of R&D and innovation will supplement the industry's efforts to move up the value chain in terms of business model evolution and services provided.

In addition to developmental research, it is also necessary to build capabilities in new/emerging areas that are likely to grow in importance over the next few decades. At least three such opportunities have been prioritised: 1) climate change and energy efficiency solutions; 2) mobile software applications; and 3) end-to-end clinical research. India has a head-start in these areas due to existing infrastructure (e.g., clinical research) or market maturity (e.g., mobile market), or because they are sunrise areas with no clear market leaders (e.g., climate change).

The government can improve the innovation ecosystem by focusing on the following actions:

Policy Action – Encouraging Innovation & R&D

1. 150% weighted tax exemption on in-house R&D expenditure in the Services (particularly IT) sectors.
2. The draft Innovation law proposed by Ministry of Science, Technology and Earth Sciences should be thoroughly examined by the DIT from an ICT perspective. The focus should be on the various collaborative R&D scenarios on IP ownership and revenue sharing models and using best practices, should arrive at a set of prescribed models that will be followed for each scenario. e.g for Industry-academia collaboration, industry-government collaboration etc.
3. Thematic Innovation Clusters specifically for developing new and innovative solutions for mobile applications, healthcare, climate change solutions, integrated design and manufacturing hubs for automotives. Identify 3-4 cities as emerging innovation hubs and build an integrated plan to develop and promote these.
4. International Collaboration on R&D - Enter into bi-partite agreements with foreign Government institutions to ensure that international research can be customised to an Indian content.
5. Government, in consultation with Industry and Government bodies should put in place a mechanism to ensure the rapid commercialization of (non-strategic) technologies developed in Government labs. This mechanism should ensure that companies, specifically SMEs which are developing similar/complementary technology are identified and collaborative work is facilitated.
6. Investment in innovation infrastructure - There is a huge requirement for Measurement, Standardization, Testing and Quality centres across the country. This infrastructure requires substantial capital investment which is difficult for SMEs in particular, and sometimes even the large companies to bear. The government should create and collate these with premier education colleagues and allow industry to use on a pay-per-use basis.
7. Encourage PPPs for R&D in sectors that have little private sector presence, such as defence, space and atomic energy.
8. The government must create a fund to provide grants to SMEs for global patenting and copyrights. This is an expensive process, and many SMEs do not have the funds to file global patents, thus losing their rights on the intellectual property created by them.

With rising energy costs, and a renewed consciousness towards the environment, Green IT has emerged as a strategic shift for the entire industry. As IT infrastructure across the world increases, more equipment translates to higher power consumption and space, hence if products keep consuming energy at previous levels this will have serious implications on nature. The Indian industry has responded with a set of initiatives that aim to reduce its carbon footprint, and make it more profitable at the same time.

Policy Action – Green IT

1. Standardization - There is a need for interoperable open standards for all the devices including networking equipments which is a prerogative of BEE and DIT. Need to standardize IT equipments and also set up benchmarks for Data centers is required.
2. Govt. Procurement - Government agencies should include the standards for energy consumption as the technical standards in government purchases. And with establishment of mutually agreeable standards between BEE and IT industry it should be made mandatory in all the government purchases.
3. Setting up Centre of excellence - Government of India should set up COEs (centre of excellence) in the top technical institutions and Universities. These centers can become the testing grounds and prototype/pilot evaluation stages for the Green (Clean) technologies.
4. Tax Incentives - Investing in the clean technology is a costly affair when the organisation is an early mover/ adopter. Tax incentives on the production of cleaner technologies and also for the user of the same are needed for better adoption.

5.7 ESTABLISHING INDIA AS A TRUSTED SOURCING HUB FOR PROFESSIONAL SERVICES - MANAGING RISKS EFFECTIVELY

The Indian IT BPO industry is involved in mission critical applications for its customers and is part of a globally integrated value chain. Expansion to various delivery centers across geographies, complexity of work being outsourced, strong linkages to business outcome and tighter SLAs, compliance to complex regulatory frameworks of the home and the host country, data security and asset protection at each delivery center are some of the key reasons for the industry's focus on managing its' risks. The increased concern on terrorism, geo-political risks and the already large footprint of multinational companies in India, is increasingly raising concern on the risk profile of India and what steps are being taken to mitigate these risks. Government and the industry need to reinforce India's reputation in the world markets and start positioning India as a "trusted sourcing destination".

Policy Action – India as a trusted sourcing destination

1. Develop a national security strategy and design a security organisation on lines of the US Homeland Security with appropriate systems.
2. Facilitate speedy investigation and prosecution for IP thefts, cyber crime.
3. Facilitate the development of common data centres by institutions such as STPI so that small companies can build data recovery centres at shared costs.
4. Increase capacity and upgrade skills of law enforcement agencies in India to proactively prevent, manage and investigate threats to national security.
5. Help address perceptions about 'India risk' by putting together suitable communication (eg Incredible India campaign) and helping it to reach the right stakeholder.

5.8 CATALYSING GROWTH IN THE DOMESTIC MARKET

The domestic technology and BPO industry in India is at an inflection point today. As India rapidly grows into one of the largest economies of the world, this will not only lead to the rise of personal consumption in the Indian middle class but also fuel the growth of several, large and global Fortune 500 companies of Indian origin. The increasing affluence of the Indian consumer and globalisation of Indian corporations will likely lead to increasing sophistication of domestic demand in product complexity, delivery flexibility and service levels. These trends will have significant impact in growing the size and scope of the domestic addressable market. As Indian consumers and corporations rapidly adopt mobile phones, and Internet access and broadband connectivity expand, there is likely to be a significant increase in spend on IT hardware, software and services. Finally, the biggest domestic opportunity in most sectors (e.g., banking, insurance, retail, telecom and healthcare) lies in tapping the opportunity to serve the billions of underserved at the bottom of the pyramid. India is likely to be the laboratory for disruptive innovations to serve these underserved segments at a price and performance profile that suits these conditions.

Contrary to popular perception, Indian enterprises have significant legacy assets and have systematically invested in technology over the last 10 years. Two of the largest sectors, BFSI and telecom, which together contribute close to 50 per cent of the total addressable market, have already reached significant technology spend levels. For example, BFSI companies already spend 6.5 per cent of their revenue on IT, which is not far behind developed country benchmarks (e.g., US IT spend as a percentage of revenue in BFSI is 7.6 per cent).

The central and state governments have succeeded in the adoption of IT in several departments (e.g., Ministry of Corporate Affairs, Income Tax, Land Registry). These initial successes have created significant momentum for adoption of IT and IT-enabled public services across several departments (e.g., Healthcare, Education, Public Distribution Services, Unique Citizen ID).

While the government has very well planned projects under the National E-Governance Program (NeGP), there are a number of issues that impede fast track progress on these projects. The tendering process is elongated and not

conducive to needs of small players. In addition, there is no clear roadmap on outcomes and process specifications keep changing. Also, the coordination between central and state governments is limited - same project being executed differently in different states.

Policy Action – Domestic Market

- ◆ 150% tax exemption on R&D for the manufacturing sector to be extended to Investments by that sector in IT adoption. This incentive could be extended primarily to the SMEs and for adoption of green initiatives facilitated by technology adoption.
- ◆ Program office under PMO to review and monitor e-governance. Clear directive to centre/states on implementation. Measurement to be outcome based.
- ◆ Build central repository of e-governance solutions that can be used across states and other developing countries.
- ◆ Put in place mechanisms that ensure that E - Governance initiatives are implemented faster and are outcome based. Focus on definite end points, delivery timelines and actual, demonstrable performance. Government should disburse funds in the form of a loan; once desired timelines and targets are achieved, it can be converted into a grant (e.g., restructured Accelerated Power Development Reforms Programme (R-APDRP)).
- ◆ Focus on standardisation - encourage development of centralized frameworks, templates, architectures and if needed, applications; Build evaluation committees which has the competence and domain expertise and does not need replication in each department.
- ◆ Allow reusability of solution that is developed in one state in another state.
- ◆ Empanel the right size players for specific initiatives – large size for strategic initiatives and small size for others. Train empanelled players on the centralized frameworks and guidelines.
- ◆ Ensure that the tender guidelines encourage collaboration and sub-contracting with small and medium companies.

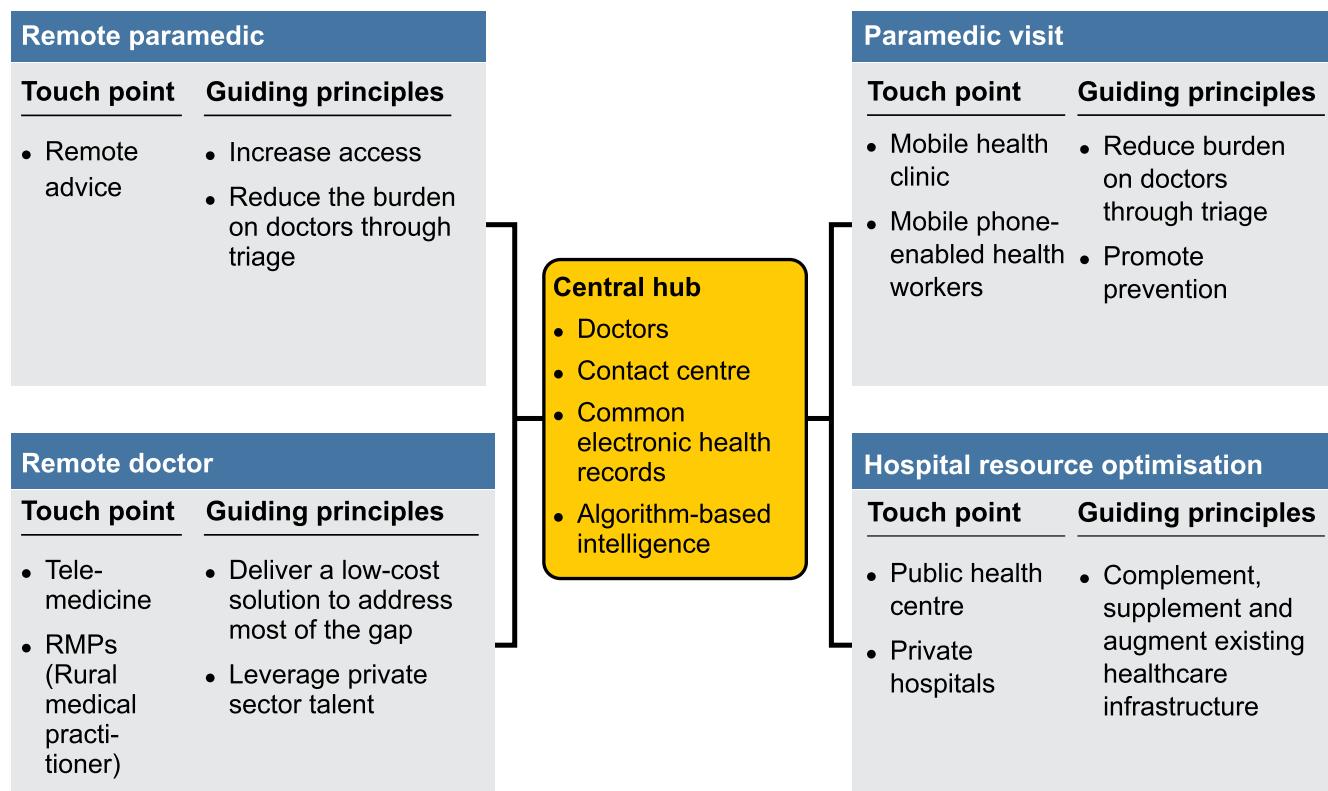
5.9 HARNESSING ICT FOR INCLUSIVE AND EQUITABLE GROWTH

Today, India has 11 million citizens in the high-income segment, 58 million in the middle-income segment and 1,090 million in the low-income group. If India's GDP continues to grow at 7 per cent a year, in 2020 the number of citizens in the high-income segment will rise to 52 million and in the middle-income segment to 372 million. The number of households in the low-income group will drop to 933 million. As a result, India has the potential to add around 4 million citizens every year to the high-income segment and 26 million citizens ever year to the middle-income segment up to 2020.

Area	Demand	Supply
1 Healthcare	<ul style="list-style-type: none"> • WHO guidelines recommend 1 doctor per 1,000 (world average of 1.5 doctors per 1,000) • India requires 3.3 beds per 1,000 population 	<ul style="list-style-type: none"> • India has 0.7 doctors per 1,000 population; in rural India, the ratio is 0.25 per 1,000 • India has 1.5 beds per 1,000 population; most are located in urban areas
2 Financial services	<ul style="list-style-type: none"> • India has over 200 million households, indicating need for at least 200 million bank accounts • Around 110 million lower income households need access to microfinance • In 2006, credit demand from this segment was around USD 11 billion-13 billion 	<ul style="list-style-type: none"> • Total number of active bank accounts is around 120 million • Only around 15 million have access to SHGs and MFIs** • Only around USD 1.3 billion was lent through SHG and MFIs
3 Education and skill development	<ul style="list-style-type: none"> • For a population of 100 million between ages 14 and 18, India requires <ul style="list-style-type: none"> – 2.5 million secondary school teachers* – 0.25 million secondary schools 	<ul style="list-style-type: none"> • India currently has: <ul style="list-style-type: none"> – 1 million secondary school teachers – 0.15 million secondary schools
4 Public Services	<ul style="list-style-type: none"> • 25% of population is below poverty line, implying demand for effective PDS (public distribution system) for at least 250 million people 	<ul style="list-style-type: none"> • Although there are 450,000 fair price shops to deliver PDS, only 42% of the subsidised grains issued from central pool reaches poor households

* Includes classes IX - XII

ICT-enabled solutions can overcome the difficulties that hamper traditional solutions. Analysis suggests that less than 10 per cent of demand for outpatient visits in rural India requires face to-face interaction with a doctor. More than 90 per cent could be addressed through a combination of trained paramedics and ICT-enabled remote sessions. ICT can enable a hub and spoke model to meet the needs of rural healthcare.



Source: NASSCOM-McKinsey Perspective 2020

The chart above depicts a hub-and-spoke model for healthcare. It consists of an integrated hub in major urban centres housing a pool of qualified doctors, a central electronic health repository and an ICT enabled mission control centre to track and monitor delivery of services through its various spokes. The spokes include a portfolio of services that help bridge the gap between urban and rural availability of infrastructure, skills and healthcare services. ICT-enabled solutions that enable remote access to remote doctors through electronic diagnostic devices and real-time video conferencing can offer not only access to quality advice but at a much lower cost to the patient (USD 1.1-1.31 per 5 minute consultation).

Traditional models in banking are based on business components that are not effective or efficient in addressing the needs of rural or low-income segments. Examples of a few business components with associated challenges include:

- Bank branches or ATMs: Too expensive to operate in sparsely populated areas
- Credit risk management systems: Not valid in data scarcity environments
- Centralised lending operations: Not possible in a low automation environment
- Management Information Systems (MIS) for transparency and accountability: Expensive investments required by small companies operating in rural and low income segments. A lack of automation also makes it difficult to implement the required MIS.

ICT enabled solutions can overcome challenges faced by traditional solutions in financial services

Challenges	ICT-enabled solutions
Higher credit risk and fraud	<ul style="list-style-type: none"> Unique ID for all citizens to track information at individual level Database on credit history of citizens with payment based sharing of data and subscription based access ICT-enabled warehousing and supply chain management systems enabling use of warehouse receipts as collateral and securitisation of loan
Prohibitive distribution cost	<ul style="list-style-type: none"> Mobile banking and remittance Internet kiosks for distribution of select financial products Low-cost ATM
Inadequate operational scale economies	<ul style="list-style-type: none"> Standardised MIS Shared services back-office infrastructure Mobile payment solutions to reduce cash and manual effort between MFIs and SHGs and lenders
Structural inefficiencies in industry	<ul style="list-style-type: none"> ICT solutions, such as an effective MIS, can reduce costs and increase transparency

Source: NASSCOM-McKinsey Perspective 2020

India has made significant progress in education with respect to access and enrolment in the past decade, largely driven by the government flagship programme in elementary education - the Sarva Shiksha Abhiyan (SSA). The number of schools increased by 40 per cent between 2002-2003 and 2006-2007, approximately 98 per cent of habitations have access to a primary school and 86 per cent have access to an upper primary school. The net enrolment ratio (NER) at the primary level stood at 92.75 per cent in 2006-2007 compared to 84.5 per cent in 2005-2006. Approximately 1.5 million teachers have been added to the system between 2002-2003 and 2006-2007. Nevertheless, five challenges remain in education in India: performance, teacher capacity, teacher quality, administration and private participation.

ICT-enabled solutions can address four of the five challenges mentioned on the previous page:

- Performance: Standardised online performance assessment of students will help in monitoring and assessing the performance of students. Graded questions of progressively increasing complexity and a focus on understanding and analytical thinking rather than on memorising facts can be created centrally and administered at rural school level.
- Teacher capacity: Virtual classroom settings in which a teacher delivers online coaching to students in an individual or group setting can help increase teacher capacity. Students can be given access to CDs containing recorded lectures by faculty.
- Quality: Teacher training by a master teacher through interactive and instructor-led methodology will help increase the quality of teachers. The quality of content can be improved by providing interactive, multimedia-based content.
- Administration: An effective MIS can help improve school administration. Also, information availability at the country level will help in planning access to education for all.

ICT can overcome challenges faced by traditional models

Area	Challenge	ICT-enabled solution
Public distribution system	<ul style="list-style-type: none"> Ineffective distribution system leading to leakage (only 42% of total disbursement reaches poor households) 	<ul style="list-style-type: none"> Targeted distribution of food using proper identification Automated warehousing and inventory management
Government to citizen services	<ul style="list-style-type: none"> Significant time taken for processes such as tax payment, land registration Lack of transparency 	<ul style="list-style-type: none"> E-government solutions, e.g., online land registration, filing of taxreturn Community service centres with broadband connectivity to provide all government to citizen services
Citizen Identification	<ul style="list-style-type: none"> No single identification card currently - multiple Ids widely differing in quality and purpose exist today (e.g., ration card, PAN card) 	<ul style="list-style-type: none"> Unique ID for all citizens

Source: NASSCOM-McKinsey Perspective 2020

India has already experienced multiple ICT-enabled solutions across all the four areas, most of which have been successful in the geographies in which they are implemented. Unfortunately, very few of these solutions have been scaled up to the national level.

Mobile and broadband and Internet connectivity are critical to increasing the reach of ICT-enabled solutions. Mobile connectivity will allow the rural population to access call centres and use telemedicine, mobile banking and public services. Broadband and Internet connectivity will enable kiosk-based delivery of healthcare, education and public services.

Policy Action – Inclusive and Equitable Growth

Offering ICT solutions for Inclusive growth

- Set up a nodal agency with the mandate to strengthen and implement ICT solutions in key sectors. Partner with the private sector to implement these solutions.
- Lead and catalyse the development of a legal framework for remote healthcare and consultation and electronic health records.
- Create a national information structure in partnership with the industry and NASSCOM (e.g., the UID initiative is a first step in this direction).

Providing connectivity and access

- Continue to provide incentives for broadband rollout (e.g., USOF*); establish stricter norms for rollout with defined timelines.
- Develop a policy framework focused on public access (e.g., inexpensive rural broadband access)
- Education
 - Empower 1.72 mn schools and colleges with broadband in urban and rural areas and ensure there is at least 1 PC per 40 students. This will enable 326 mn students to access broadband by 2014.
 - Provide each of the 7 mn government school teachers with a laptop and broadband connection as it will enable them to access quality content and also perform administrative duties much faster.
 - Incorporate broadband aided education as part of the course curriculum.
 - Encourage PPP initiatives to ensure timely maintenance of PCs/broadband connections.
 - Empower teachers via professional development training programs to enable them to impart education more effectively.

Contd..

7. Healthcare

- a. Empower 50,000 PHCs and 6,000 CHCs with broadband to enable them to provide better medical facilities.
- b. Empower all CSCs, PHCs and CHCs with telemedicine facilities to ensure high quality healthcare facilities at reduced costs in remote areas.
- c. Provide high-speed broadband connection to all rural telemedicine centers to enable doctors to access patient data (x-ray, ultrasound, etc) on real time basis.
- d. Provide all doctors and paramedics associated with PHCs and CHCs with a laptop and broadband connection.
- e. Automate all processes of PHCs and CHCs so that information technology (facilitated by laptop and broadband connection) can be used to increase the efficiency of the system e.g. via template based data entry for patients records, vaccine supply chain system that maintains the expiry date/batch numbers of the drugs supplied and a simple system that can be used to request for drugs, etc.
8. Innovative pricing models, such as prepaid broadband (on the lines of prepaid mobile) should be introduced to increase demand of broadband and a subsequent reduction in prices.
9. Promote more franchisee based models such as internet kiosks and ePCOs.
10. Tax rebate should be provided to consumers for buying computer (say, up to Rs. 50,000/- in a block of 3 years) and for Internet & broadband access up to a sum of Rs. 1000/- per month.
11. Service tax on broadband to be reduced from the current 10.3% to 5% by 2014.
12. Easy availability for educational loans to students and employees for purchase of low cost devices including netbooks etc.

Improving hard and soft infrastructure

13. Provide incentives for developing low-cost computing platforms that facilitate technology adoption in rural areas.
14. Assign the mandate and funding to build hard as well as soft infrastructure (the NII) to an existing body (such as NISG) or to a new government entity.
15. Revise policies to accelerate soft infrastructure development, focusing on: 1) overall IT literacy; 3) interoperable application standards.
16. Catalyse incorporation of basic IT literacy programmes in all primary and secondary schools in collaboration with state governments.
17. Encourage computer based educational programmes and training for teachers (by the State Boards and SCERTs).
18. Provide incentives to MSMEs in the form of tax holiday on PC rentals, 100% depreciation on all IT investments and free broadband trials for 3 months. This initiative would require an investment of Rs 8 billion by GoI.
19. Cyber cafes should be promoted as multipurpose centre points with additional facilities such as telephony, ticketing etc. The wide range of services offered would increase footfalls and with higher ARPU, the owner could give the user a discount on broadband access.
20. Encourage PPP initiatives required to provide subsidized PCs and broadband connection.
21. 256 kbps connectivity seems inadequate for CSCs to operate, at least a 2 Mbps connectivity would make it feasible for the CSCs to roll out wide ranging services, from education, healthcare to providing Government services.
22. CSCs to be set up in all 600,000 villages. (Of Rs.15 billion meant for subsidizing CSC operations, Rs. 10 billion is yet to be spent – this could be utilized immediately to add more CSCs).

Appendix

Worldwide Spending on Software and Related Services (USD million)

	2008	2009	2010	2011	2012	CAGR 2008-2012
Worldwide Services	688,134	708,679	740,821	781,279	828,956	4.7%
Worldwide Software	294,746	308,268	326,021	348,811	375,907	6.2%
Total	982,880	1,016,947	1,066,842	1,130,090	1,204,863	5.2%

Source: IDC

Glossary

BPO

BPO includes processes that may be IT-enabled, do not necessitate on-shore presence and are hence, offshore-able.

Engineering Services

Engineering services are those that augment or manage processes that are associated with the creation of a product or service, as well as those associated with maximizing the life span and optimizing the yield associated with a product or asset. This not only includes design elements of the product or service itself, but also encompasses the infrastructure, equipment and processes engaged in manufacturing/delivering them.

IT services

IT services involve a full range of engagement types that include consulting, systems integration, IT outsourcing/managed services/hosting services, training, and support/maintenance.

Infrastructure Management Services (IMS)

IMS encompass all the services that relate to monitoring, managing and enhancing performance of a client's IT infrastructure backbone. These include helpdesk services, server management, data centre management, network management, asset management, desk-side support, IT security services, maintenance services and applications operations.

Offshore

Offshore involves leveraging lower-cost regions from which to "source" IT and BPO.

On-site/On-shore

Client site.

Outsourcing

Outsourcing is a type of engagement, such as consulting and integration that can be sourced from any of the lower cost regions.

Packaged software (Software Products)

Packaged software is programs or code sets of any type, commercially available through sale, lease, rental, or as a service. Packaged software revenues typically include fees for initial and continued right-to-use packaged software licenses.

Research and Development (R&D) services

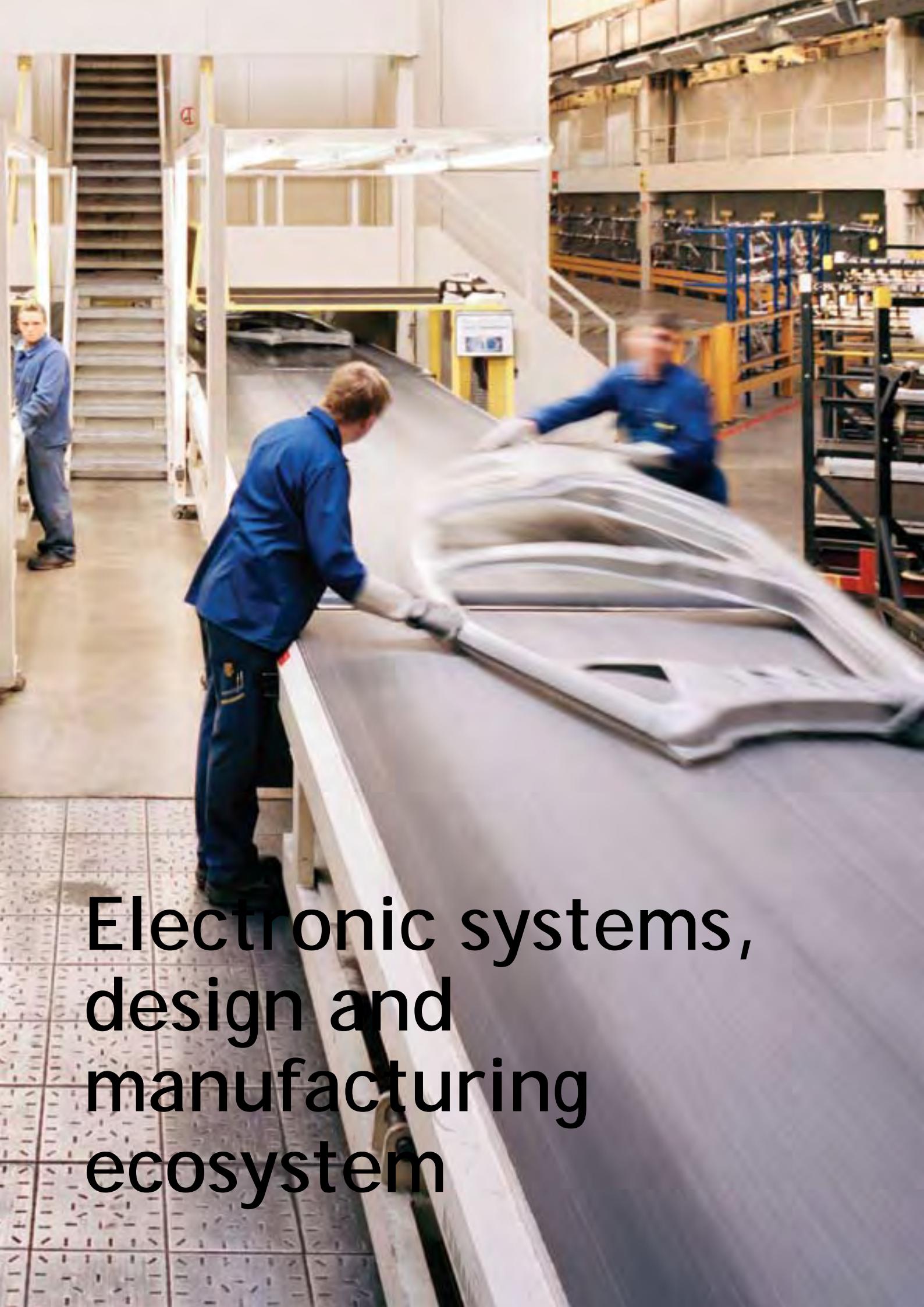
R&D services involve providing research and development for hardware and software technologies, as well as development of software running on embedded systems. This includes computer-aided design (CAD).

Remote Infrastructure Management (RIM)

All the activities specified under Infrastructure Management Services (IMS) done remotely, i.e. away from the client site.

Third-party units

Third-party units are essentially BPO service vendors that are mostly independently owned units (i.e. no single client has a controlling stake in the vendor entity). Third-party vendors also include a small section of MNC-owned independent third-party vendors, such as Convergys, SITEL, Vertex and Sykes, having a significant part of their global operations based out of India.

A wide-angle photograph of a modern industrial factory floor. In the foreground, a worker in a blue jumpsuit is pushing a long, flat metal sheet across a conveyor belt. Another worker in a blue jumpsuit is visible in the background, also working with the material. The factory has multiple levels, with a mezzanine above featuring more workers and equipment. Large windows and skylights provide natural light. The floor is made of polished concrete, and there are various industrial structures like ladders, railings, and shelving units throughout the space.

**Electronic systems,
design and
manufacturing
ecosystem**

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1. Executive summary

BACKGROUND

Electronics, reported at USD 1.75 trillion, is the largest and fastest growing manufacturing industry in the world. It is expected to reach USD 2 trillion by 2014 and USD 2.4 trillion by 2020. Currently, the demand in the Indian market stands at USD 45 billion and is projected to grow to USD 125 billion by 2014 and USD 400 billion by 2020. Further, exports are expected to increase from the current USD 4 billion to USD 15 billion by 2014 and USD 80 billion by 2020. (Please refer to table in Appendix.)

Domestic consumption is expected to grow exponentially at a CAGR of 22% for the period 2009-2020. This will be driven by a surge in income levels, the aspirational value of electronics goods, demand from a resurgent corporate sector and the government's focus on e-governance. Domestic production is at present less than 45% of domestic consumption.

There is a huge gap in the demand and supply which will widen as the demand grows and domestic manufacturing continues to slacken. Significantly most of India's electronics imports are from China, Indian government may like to reckon this from a strategic perspective.

CHALLENGES AND OPPORTUNITY

As we realize that electronics industry in India is at cusp of a large and growing opportunity, we need to be mindful that there have been some missed opportunities in past decade. So while future holds a lot of promise, there still exist multiple challenges that can shackle growth of the industry such as inadequate infrastructure, tax structure, supply chain and logistics, inflexible labor laws, limited R&D focus, funding, limited focus to value addition and exports.

Supply is not keeping pace with demand in India, which has resulted in ever-increasing imports into the country from China and Taiwan. Local manufacturers cannot match the competitive prices of imported finished goods due to the challenges mentioned above.

In terms of opportunities, the electronics industry can significantly boost India's GDP, generate employment, modernize processes and enable country's inclusive growth.

- Domestic manufacturing companies can expand the production to USD 100 billion by 2014 and USD 400 billion by 2020 with a very significant contribution to GDP, at 20% for 2020, at par with other economies.
- The electronics industry can increase employment in the country significantly, since some of its segments, such as electronic system manufacturing, are human capital- intensive. The industry employs around 4.4 million people currently and this number is expected to grow to 16.1 million in 2014 and 27.8 million in 2020.
- The electronics industry has a high potential for domestic value addition, especially in some of its segments, e.g., semiconductor design and electronics system/product design.
- Electronics can facilitate e-governance, developmental schemes and initiatives launched by the government, e.g., Sarva Shiksha Abhiyaan (SSA), Restructured-Accelerated Power Development and Reform Programme (R-APDRP) and Mahatma Gandhi Rural Employment Guarantee Act (MREGA). The government's allocation of funds for developmental schemes and initiatives is close to USD 45 billion. However, IT intervention is required to ensure the effective implementation of these schemes and initiatives.
- The government is in the process of setting up Common Service Centers (CSC) at the village level, increasing tele-density, scaling up broadband access and power availability. These initiatives aim to modernize and transform India, enable equitable and inclusive growth and make ICT relevant for everyone in the country. We may have to go many steps in that direction to a connected country with access to all, by introducing schemes such as *School-school mein computer yojna, Gaon-gaon mein computer yojna and Ghar-ghar mein computer yojna*, which

- need to be implemented to achieve this. Although these schemes require heavy investment, they offer huge opportunities for the manufacturing and design industries to create designs for products manufactured in India.
- The government's long-term vision should focus on enhancing the role of technology in key verticals, as listed below, to augment initiatives in these areas.

Vision 2020					
Information access to all	Energy	Healthcare	Education	Digitization	Security

India needs to follow the example of countries such as France, where access to the internet is a right rather than a service. The internet opens up vast avenues ranging from basic information, education and access to public services. Connectivity should therefore be integral to the Indian government's vision for 2020.

RECOMMENDATIONS

The Government of India would do well to foster a globally competitive industry.

The industry needs to focus on the following:

- Increased value addition
- Implementation of best practices
- Catering to the needs of domestic and global markets by creating innovative product designs and R&D
- Driving cost competitiveness

The government can catalyze this growth by the following measures:

1	Establish 'National Electronics Mission'	Establish 'National Electronics Mission' – a nodal agency for the electronics industry within DIT and with direct interface to the Prime Minister's Office (PMO). The nodal agency will help in the synchronized functioning of the industry. It will enhance the ease of doing business.
2	Promote existing clusters and create new ones	Create islands of excellence by encouraging and planning for the expansion of existing centers such as Sripembudur, Noida, etc. and identify more locations to set up clusters to create a complete ecosystem where all the segments of the value chain are available at one location. Provide contiguous land and Infrastructure to the industry to these clusters.
3	"Made for India" Goods	Encourage products specifically designed for India. Developmental sector can benefit from biometric readers, smart meters, micro payment devices, and low cost devices.
4	Creation of a R&D fund	A fund may be created to incentivize R&D, where the government and the industry bodies are stake holders.
5	Creation of a manufacturing value addition fund	A separate fund may also be created to provide interest linked subsidy to promote value added manufacturing and create products for India.
6	Rationalization of tax structure	Stable tax structure needs to be put in place in order to encourage long term investment by the companies.
7	Promote skill development	Government needs to focus on skill development, regulations around over-time and contracts need to be flexed.

Certain procedural intervention measures will also be imperative:

- Recommendation 1: Monitoring and auditing mechanism for government funded initiatives.
- Recommendation 2: Make the recipients of government funds accountable for efficient and timely utilization of the funds by making them time-bound.
- Recommendation 3: Initiate a multi slab investment program, linked to manufacturing value addition, through a Special Purpose Vehicle for the electronics industry.

The various segments of the electronics industry need to be given an impetus. Each segment of the electronics ecosystem varies in the extent of value addition it requires, its contribution to the economy and its future growth potential. These factors have been elaborated on in the matrix below:

Industry segment	Value addition index	Employability index	Contribution to GDP	Size of industry (USD billion)	Growth potential
Semiconductor design	H	L	M → H (Long term)	9.0	Very high
High-tech manufacturing	M	M	M → H (Long term)	0.6	Long-term impact
Electronic components	L	M	L	2.1	Very high
EMS/Assembly	L	H	L	1.0	Medium
Electronic systems design	H	M	H	27.9	Very high

L: Low, M: Medium, H: High

It is essential to have in place the right policies and regulatory environment to drive sustainable growth across the segments and create full-fledged electronic systems and a design and manufacturing ecosystem in India.

We have shared a more detailed perspective of industry-wide recommendations in this report and have also elaborated on recommendations that are specific to each of the industry segments in the following chapters.

'Electronics industry' entails electronic systems design and manufacturing which comprises semiconductor design, high-tech manufacturing, electronic components, EMS, and electronic systems design for consumer electronic products, telecom products and equipments, and IT systems and hardware. The industry may be designated as a strategic industry having a nodal agency within DIT and with direct interface to the PMO.

WAY FORWARD

Thanks to the fast pace of technology evolution, industry again has an opportunity to leapfrog some of the earlier technologies and be globally competitive.

This will require a strong push to rapidly develop the electronics ecosystem and for the industry to develop a strategy. Impetus needs to be given to the small and medium enterprises (SME) as they drive the growth in this industry.

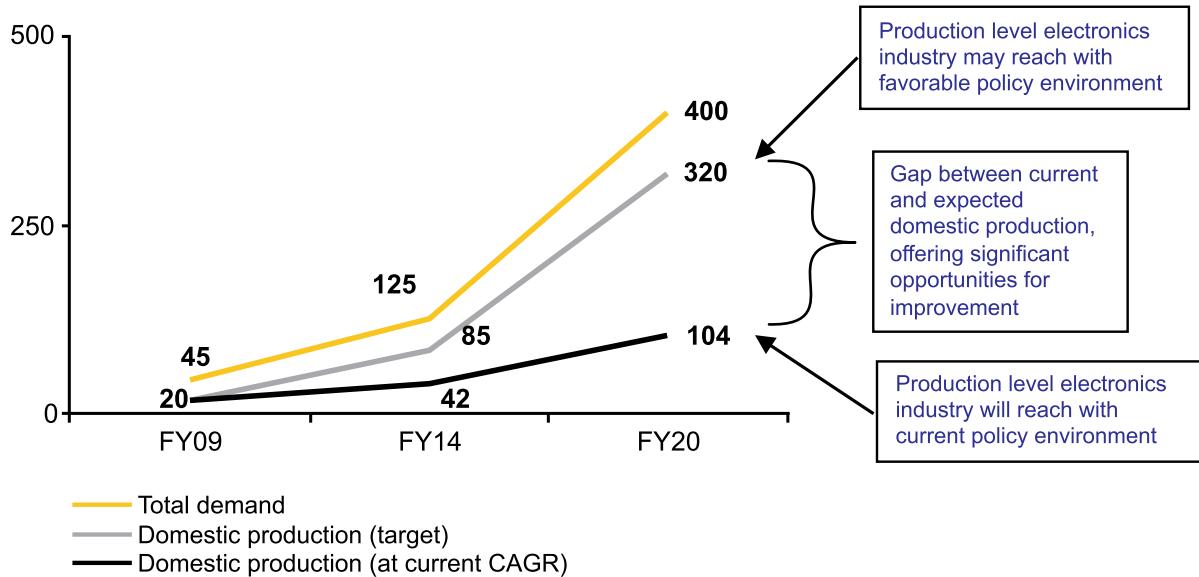
As China and Taiwan are way ahead in competition, India's focus may be on value addition. Abundant talent pool and resources could be utilized to produce high-value products, hence domestic value addition may be encouraged and incentivized. Further, tomorrow's markets are expected to emerge in the Middle East, Africa and Commonwealth of Independent States (CIS). India is uniquely positioned geographically to export to these markets as well as Europe vis-à-vis China. Establishing business relations in Africa is easier due to the Africa's openness towards India.

It will also be imperative to identify unique Indian needs and for both the manufacturing and design industry to create a designed for India, manufactured in India product strategy which can also open doors for export to large markets in developing economies with needs and demographics akin to India.

Both the industry and government need to look at this opportunity with a sense of urgency, as it can transform the face of the nation (in the same way software has achieved in some IT hubs) and propel the nation and industry players to another high growth trajectory, generate employment and augment India's branding as a technology powerhouse. India today can ill afford to miss this immense opportunity in this strategic industry and lose ground to other competitive countries.

2. Need for domestic manufacturing

Projected demand-supply gap in electronics industry (USD billion)



MARKET POTENTIAL: THE DEMAND FOR ELECTRONICS

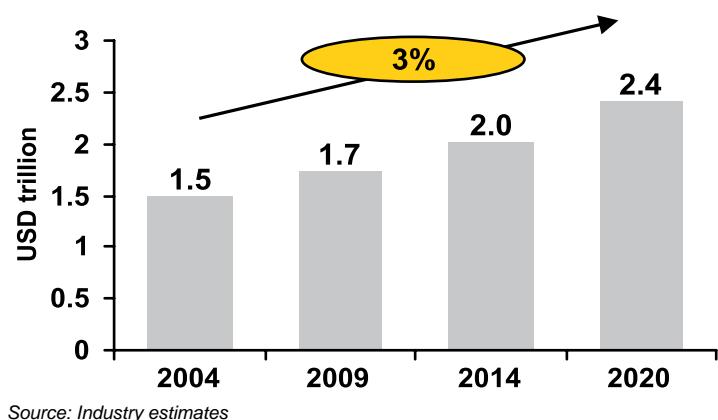
Global electronics industry

The global electronics industry is estimated at USD 1.75 trillion for 2009. It accounts for 2.9% of the global Gross Domestic Product (GDP) of USD 60 trillion.

Size of the global electronics industry vis-à-vis other major industries

- 4.40 times oil, petrol and minerals
- 2.75 times chemical and plastics
- 2.45 times food, beverages and tobacco
- 2.44 times transportation
- 2.20 times electricity, gas and water

Global production of electronics



- During the 2004-2009 period, the global industry has grown at an annual rate of 3%.
- At the current pace, global production is projected to reach USD 2 trillion in 2014 and USD 2.4 trillion in 2020.

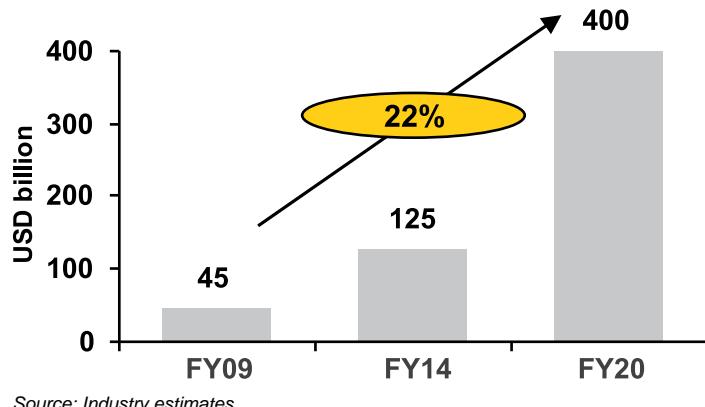
Indian electronics industry

Domestic demand

- Domestic consumption of electronics reached USD 45 billion in FY09.
- Domestic demand is expected to reach USD 125 billion in FY14 and USD 400 billion in FY20.

With the total demand projected at USD 400 billion for FY20, there is significant potential to develop an electronics ecosystem in India.

Expected domestic demand for electronics in India



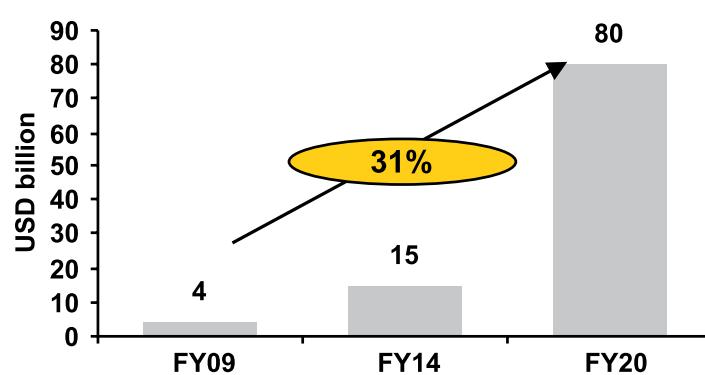
Exports of electronics

- Export of electronics from India stood at USD 4.4 billion for FY09.
- Exports in the industry are expected to reach USD 15 billion in FY14 and USD 80 billion in FY20.

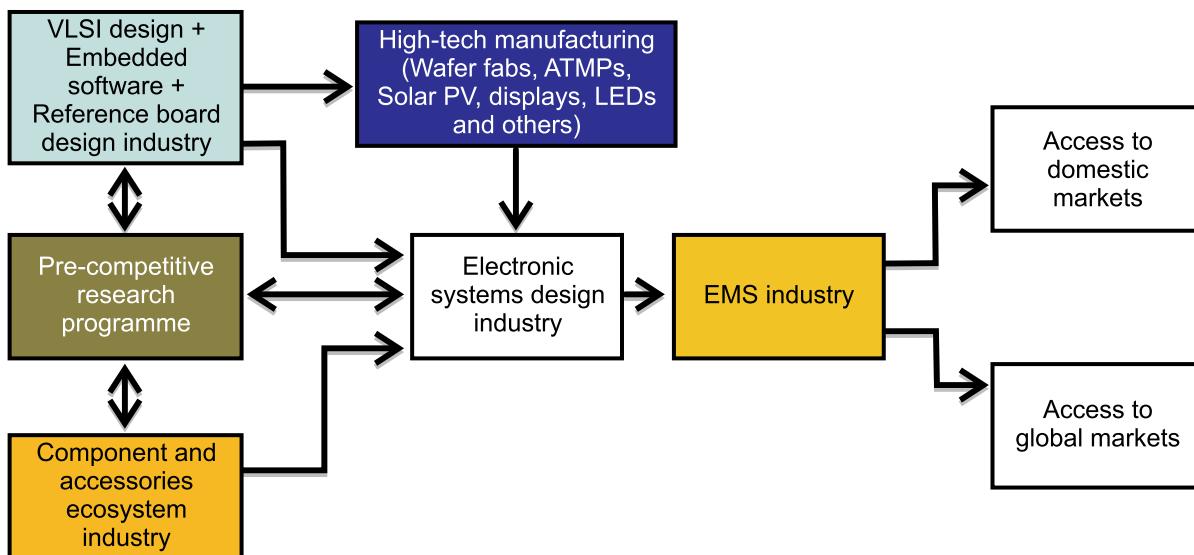
CURRENT STATE OF THE MANUFACTURING ECOSYSTEM

The electronics ecosystem

Expected exports of electronics in India



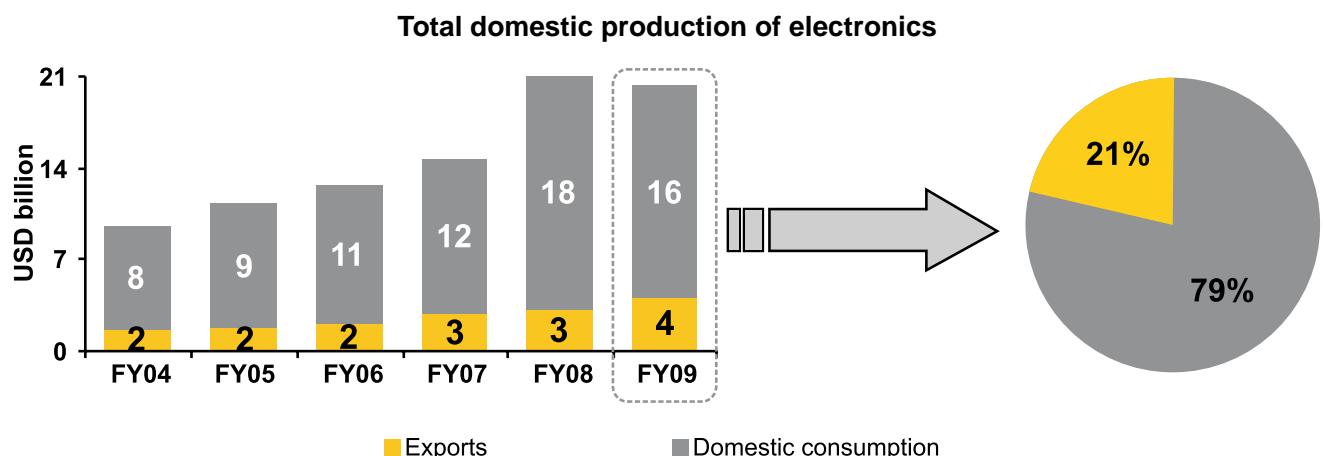
The electronics industry includes semiconductor design, high-tech manufacturing, electronic components, EMS, and electronic systems design for consumer electronic products, telecom products and equipments, and IT systems and hardware.



Domestic production

Domestic production of electronics has grown at 16% annually over the FY04-09 period to reach revenues of USD 20 billion. A significant portion of domestic production is consumed in the Indian market and only a small part of it is

exported. Export of electronics stood at USD 4.4 billion for FY09, representing 21% of domestic production. Exports have grown at 19.5% annually for the FY04-09 period.



GROWTH DRIVERS OF THE INDIAN ELECTRONICS ECOSYSTEM

The key drivers of the domestic market:

Driver 1: Growth in per capita income and corporate spend on electronics

The growth in per capita income has been the major trend driving this market. Nearly 10 million households are estimated to have income levels above USD 10,000 per annum. With an annual growth rate of 20%, this segment offers significant opportunities for electronics products. Transformation of electronics goods from an aspiration to a utilitarian need has made these products more affordable for people. Further, the quick rate of obsolescence in technology is bringing down the prices of products and making them affordable for lower income groups as well.

Driver 2: Government focus on infrastructure

The Indian government is keeping to its promises and its objective to achieve inclusive growth for all sections of society and realizes the critical role of education, rural employment and power sector reforms in the socio economic development of the country. These three sectors lay the foundation for the development of human capital and industrial growth. The government has launched a number of programs to augment growth in these sectors.

The government has also brought in major policy changes by passing the Right to Primary Education Bill to give a boost to the education sector. After the success of SSA in achieving substantial enrolment in schools, the government now aims to provide free access to secondary education in the country. Government initiatives such as MGNREGA aim to increase livelihood and job opportunities.

Driver 3: Increasing spend on IT equipment

IT and ITES industries continue to drive the demand for the IT equipment. With public and private sector firms in India adopting automation, the demand for IT equipment is increasing. Government of India has announced National e-governance Plan for effective administration with an estimated budget of more than USD 9 billion for automating processes in most of the government departments. There are 27 mission mode and several important projects being undertaken. These would generate enough opportunity for the electronic industry to grow.

Driver 4: Need for innovative products at low cost

India is a price-sensitive market and with unique socio-economic needs, it has a substantial demand for cost-effective and robust products. Products that meet basic requirements at penetration price points can create a market. A water purifier at a price point of less than USD 41, a mobile phone at a price less than USD 23, a car at a price less than USD 2,100, marketed by leading companies, have all met with a huge success.

Driver 5: Intellectual property in India

India should pave the way for encouraging conversion of its ‘intellect’ into actual ‘property’ by providing incentives to retain intellectual rights. This will not only mean more direct contribution to the country’s exchequer, but also create business opportunities and generate employment. Above all, such new opportunities can result in bridging the digital divide further. IP creation gives revenues that are at least 10 times more than the ‘creation costs’. Currently, India creates close to 90% of the value chain, yet, gets ‘credit’ for only about 10%. If the IP is ‘owned’ by India, then this entire revenue from the IP creation (i.e. 100%) is credited to India vs. the 10% in the current ‘service’ model.

DEMAND-SUPPLY GAP

The rapid growth in the demand for electronics, clubbed with the slow rate of increase in domestic production, has resulted in an increasing demand-supply gap in the industry. While the demand for electronics stood at USD 45 billion in FY09, goods worth USD 20 billion were produced in India.

Demand supply-gap projected to increase further by 2020

Total demand

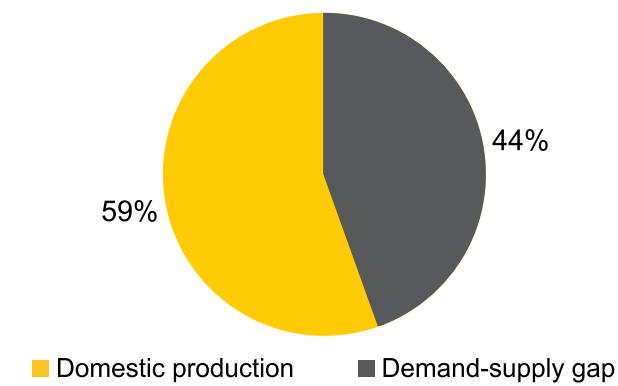
The demand for electronics is expected to increase at 22% annually during the FY09-20 period to reach USD 400 billion. This includes domestic consumption and exports.

Domestic production

At the current growth rate of 16%, electronics production is expected to rise to USD 104 billion in FY20. This will result in a significant increase in the demand-supply gap, which will rise to USD 296 billion.

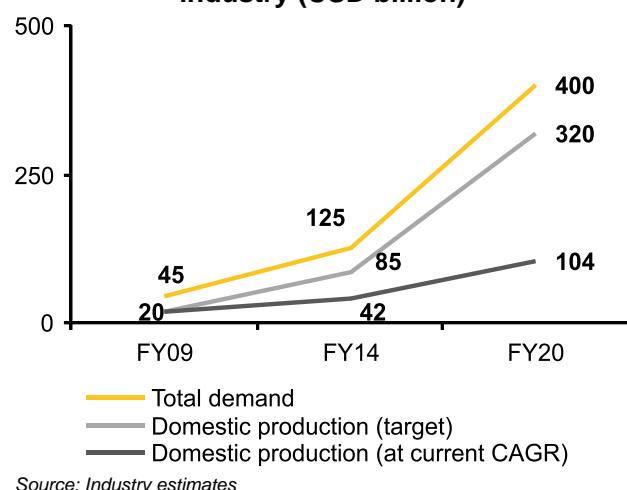
Hence, it is essential to achieve a higher pace of growth. The targeted growth rate in the production of electronics is 31% annually for the FY09-20 period, to reach a value of USD 400 billion. While USD 80 billion worth of products are expected to be exported, it is projected that USD 320 will meet the domestic demand.

Demand-supply gap in electronics hardware industry: FY09 (100% = USD 45 billion)



Source: CEHA and FICCI

Projected demand-supply gap in electronics industry (USD billion)



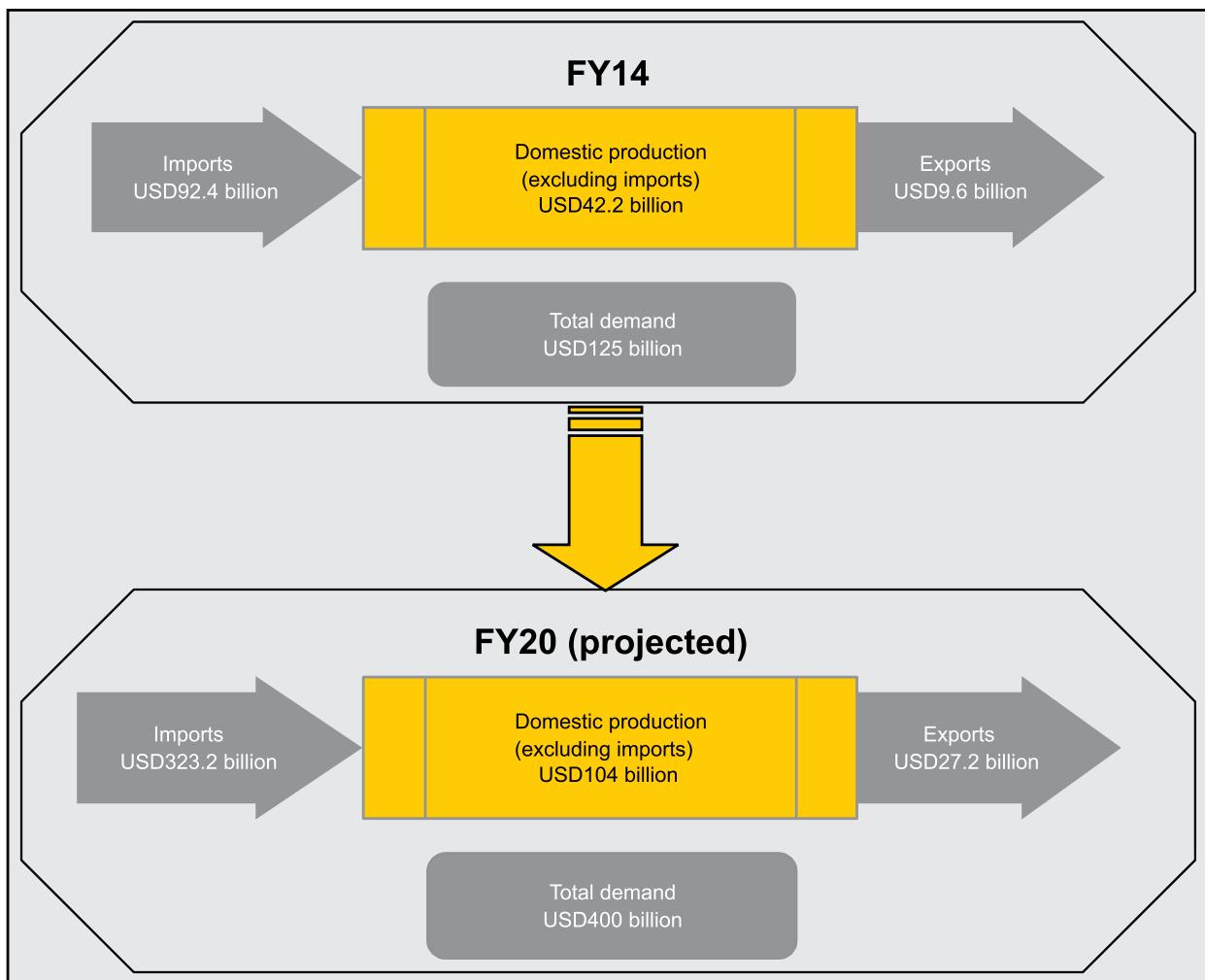
Source: Industry estimates

At the current pace, the demand-supply gap is projected to increase from USD 25 billion in FY09 to USD 298 billion in FY20.

RESULT: TRADE IMBALANCE

The trade imbalance is projected to increase to USD 323 billion by 2020.

Domestic production is unable to fulfill the demand in the market. This is fueling imports, thereby increasing the outflow of foreign exchange. The projected increase in the trade imbalance, based on the industry’s current rate of growth, is demonstrated in the following figure.



Import of electronics is expected to increase to 16% of India's GDP.

ENABLING POLICY AND REGULATORY ENVIRONMENT IN COMPETITIVE COUNTRIES

Chinese SEZ model

- China initiated its liberalization process with the formation of SEZs in the early 1980s, as compared to India, which commenced planning and setting up SEZs in 2005.
- Four of China's five SEZs are strategically located near ports and trading countries such as Hong Kong and Taiwan.
- The country decentralized power by authorizing local provinces to frame the requisite guidelines to administer the different zones.
- Benefits to business units differ across SEZs and are based on various parameters such as length of operations, use of advanced technologies, volume of export generated and others.

Malaysian growth story

The Malaysian economy, which was based on primary commodities such as tin, rubber and palm oil, has been transformed into a dynamic industrialized market. Further, the country's electronic industry has witnessed phenomenal growth in terms of its manufacturing capabilities, employment opportunities and contribution to total exports. A variety of

factors, such as the country's political and economic stability, investor-friendly policies, productive workforce as well as its robust infrastructure, have been responsible for this growth. Some of Malaysia's policies and initiatives:

Liberal equity policy: The government allows 100% foreign equity holding for investments in the new projects of companies or their investments for expansion/diversification of projects, irrespective of their level of exports.

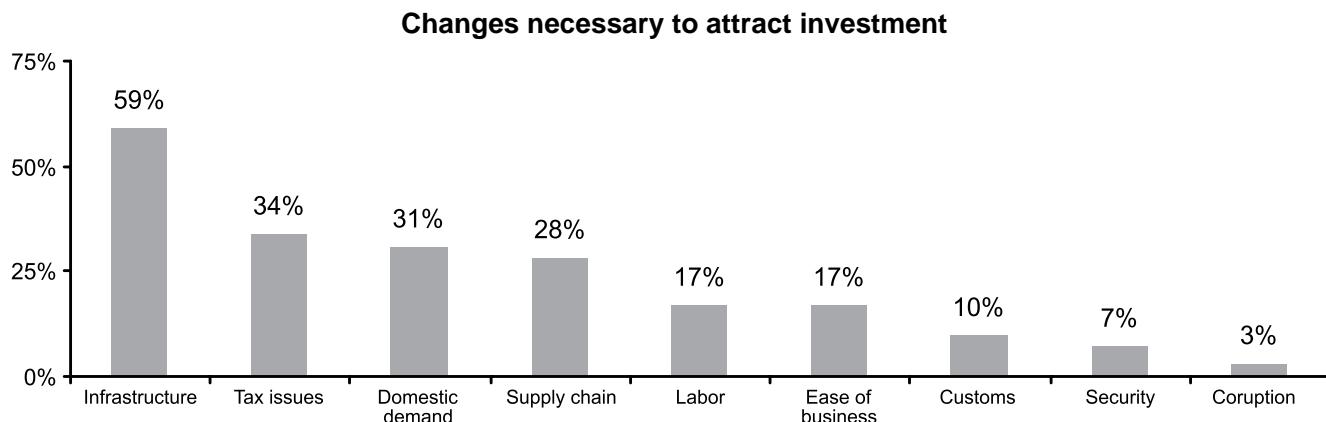
Attractive tax incentives: The country's corporate tax rate was reduced from 26% in 2008 to 25% in 2009. The government also offers other significant tax incentives such as a pioneer status, investment tax allowance, reinvestment allowance, incentives for high technology industries, as well as others for manufacturing projects under the Promotion of Investments Act 1986 and the Income Tax Act 1967.

Vietnam: Emerging manufacturing destination

- During the past 10 years, Vietnam has consistently witnessed high economic growth, which, coupled with political stability in the country, has been the key driver to attract foreign investors.
- Factors such as strong work ethics, improved infrastructure, reduced labor costs and the availability of a skilled labor pool have also been instrumental in making Vietnam an attractive destination for Electronic Manufacturing Services (EMS), semiconductors and Original Device Manufacturing (ODM).
- Another key factor that has attracted foreign direct investment in Vietnam is the country's "China plus one" model, wherein companies are opting for Vietnam to reduce their dependence on China and evenly spread their business risks in Asia.

3. Challenges faced by domestic manufacturers

According to a recent survey conducted by a US MNC, infrastructure and taxation issues are the two main factors inhibiting foreign investments in the Indian electronics ecosystem. The major factors that require immediate attention are detailed below:



The prime challenges that need to be addressed to drive growth in the Indian electronics ecosystem include:

Challenge 1: Inadequate infrastructure interrupting growth

The three elements of infrastructure posing significant challenges to Indian manufacturers are:

- **Power:** Power drives the manufacturing industry. India has a rising demand and not sufficient supply. There are leakages at the distribution level which result in losses.
- **Transportation:** Lack of adequate infrastructure is affecting the attractiveness of India as a manufacturing destination. The country's infrastructure is in a poor condition vis-à-vis China. The gap between the two countries is widening every year with China investing 20% of its GDP in infrastructure as compared with India's 6%.
- **Land:** Acquiring land to set up manufacturing facilities is a time consuming process in India. Further, there have been instances of significant delays.

These infrastructural challenges make doing business in India difficult.

Challenge 2: Tax issues

- When compared to low cost destinations such as China and Taiwan, India's current tax structure makes the final product less competitive.
- Tax structure prevalent in the country encourages low cost imports which have retarded the growth of the local manufacturing industry.
- Stability of taxation is another issue. Companies cannot plan a long-term investment in the country as the tax structure/policies keep changing.

Challenge 3: Limited preferential market access for local companies

As of now there are no preferential laws or incentives in place which enforce usage of domestic products to some extent. This results in excessive import of low cost products leaving no means of revenue generation for the local companies.

Challenge 4: Non-availability of finance at competitive cost

Small and medium industry is a growing segment and a key driver of growth for electronics manufacturing. This segment needs proper financing at competitive cost which is currently not available, hindering growth of the industry.

Challenge 5: Supply chain and logistical hindrances

In the current scenario, India has a poor component manufacturing base. Components are imported from countries such as China, Taiwan and Korea. In India, poor logistics infrastructure complicates the supply chain. The inability of domestic manufacturers to accurately predict the receipt of raw materials mandates high inventory levels to ensure uninterrupted production. This adds to the cost of production and the declining competitiveness of domestic manufacturing units.

Challenge 6: Limited R&D focus

Competitors such as China and Taiwan are way ahead of India in the volumes game. The focus area should be adding more value to the existing products and creating new products through investment in R&D. Every company should be encouraged to invest in R&D through incentives for Intellectual Property Rights creation.

Challenge 7: Inflexible labor laws

Under the current labor laws, the ability of an organization to align employee strengths with demand cycles is curtailed. Flexibility in labor laws is essential to cater to rapid seasonal variation in demand. Regulations around overtime and contracts also makes it difficult to meet the highs and lows of demand.

IMPACT ON MANUFACTURING OF ELECTRONICS IN INDIA

Impact on costs and returns

Manufacturing of electronics in India faces significant challenges. High transaction costs are the result of stringent rules and regulations, complex administrative processes and infrastructural deficiencies.

An analysis by the Federation of Indian Export Organisations (FIEO) reveals that cost disabilities, including the transaction costs borne by Indian exporters, vary and range from 19-22%. In contrast, exporters in developed economies pay only 2-3% of transactional costs.

The following table illustrates the net impact of these issues on a electronics manufacturer in India vis-à-vis one in China for a 50% value-added product with an assumed sales price of INR100:

	Impact of disabilities (INR)		
	India	China	Remarks
Sales (-CST @ 2%)	100 - 2 = 98	100	The 2% Central Sales Tax (CST) translates to a selling price of INR98.
Raw materials (+ CST@2% on 50% local supplies)	48 + 0.48	48	Assuming 50% value addition, there is an additional CST on local supplies.
Raw material support and logistics	2.5	1	This is due to the impact of logistics, power and financing costs.
Power	5	2	
Finance	5	2.5	
Marketing and other expenditure	15.5	15.5	These are assumed to be equal.
Manpower	12	12	
Investment	80	80	Initial investment is required.
Profit	9.52	19	Profitability in India is almost half that of Chinese manufacturers.
Return on Investment (ROI, %)	11.90	23.75	Low profitability results in low ROI.
Refund on VAT (17% on value addition)	0	8.5	A 17% VAT refund is available in China.
Total ROI (%)	11.90	34.4	Overall, ROI is almost one-third in India.

Due to the challenges faced by the domestic industry, the total return on investment for a manufacturer in India is ~12% as compared to ~34% in China.

4. Opportunities for the industry

THE OPPORTUNITY TO LEAPFROG

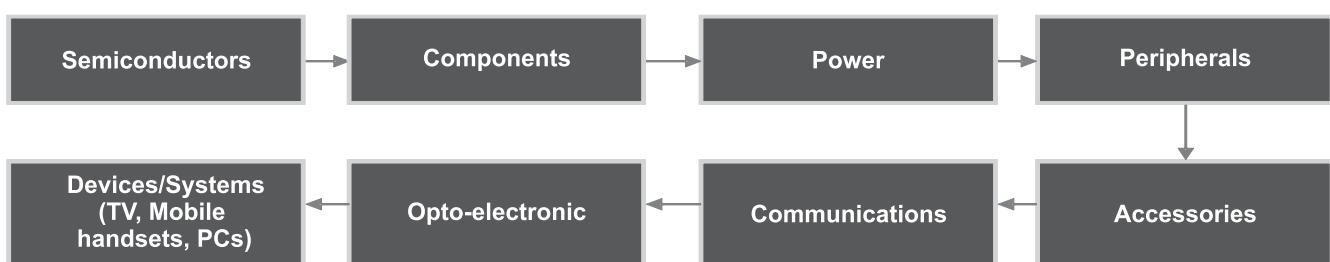
Electronics industry can play a big role in providing products and solutions for other industry verticals. Such products and solutions include low cost devices, handheld devices, bio monitoring solutions, micro payment solutions, GIS, project monitoring solutions, and smart meters to enable various developmental initiatives of the government. Technology solutions can be used to monitor and audit different processes in these initiatives.

The electronics industry has the potential to leapfrog India to next generation of technology adoption and holds immense transformational potential for various industry verticals as given below:

Industry vertical	Present state	Future potential
Access	No connectivity	Wireless
	Electromechanical meters	Smart meters (AMI)
Energy	Incandescent lighting	LEDs
	Energy shortage	Green energy/energy efficiency
Healthcare	Accessibility and cost of healthcare	Affordable devices/Telemedicine
Education	Limited education	Digital/Virtual classrooms
Digitization	Analog to digital	Electronic society/Unique ID/Digital TV, Radio
Security	Human dependence	Integrated surveillance systems
Others ,e.g., automotive	High cost, High emission cars	Low cost, Zero emission cars

OPPORTUNITIES IN THE ELECTRONICS ECOSYSTEM

While industry can choose the areas they would like to invest in, government can encourage focus on segments which are easily achievable and grab these opportunities to kick start the growth of industry.



Government focus

- Convert existing clusters such as Sriperumbudur and Noida into Centers of excellence. Build on the existing systems there and establish the entire ecosystem.
- Create a joint Government-Industry committee to market India and attract investment in India.
- Incentivizing investments in India by creating a model where the subsidy or rebate given to a manufacturer is determined on the basis of the value addition.
- R&D should be key focus areas for India as competing on volume is not feasible.
- Create a fund under the management of a working committee comprising representatives of industry bodies and government, with an equal stake to promote manufacturing, business and growth for the industry.

leading to

Opportunities for the private sector

The above government focus would lead to opportunities for the private sector in:

- Assembly of finished equipments, manufacturing of accessories and others.
- R&D and design in semiconductor design and electronic systems.
- Developing the entire value chain of manufacturing from components to creating end products in India.

5. Recommendations to drive growth in Indian electronic systems, design and manufacturing ecosystem

GOVERNMENT MUST PROVIDE IMPETUS FOR DOMESTIC MANUFACTURING

In order to drive high growth in the industry, it is imperative for the government to provide impetus to the domestic manufacturing industry. Following recommendations are aimed at the government to help create the necessary push:

Recommendation 1: Establish a 'National Electronics Mission'

Establish a nodal agency for the electronics industry within DIT and with direct interface to the Prime Minister's Office (PMO). The nodal agency may have the following functions:

- Build and promote "Brand India"
- Attract investments to India
- Facilitate doing business in India
- R&D fund management
- Manufacturing value addition fund management

The National Electronics Missions may be structured on lines of the National Solar Mission.

In order to attract investments, the nodal agency shall take India's value proposition - a world class infrastructure and rising domestic demand - to the world.

The nodal agency shall carry out the functions as that of the Foreign Investment Implementation Authority (FIIA) specific to electronics sectors.

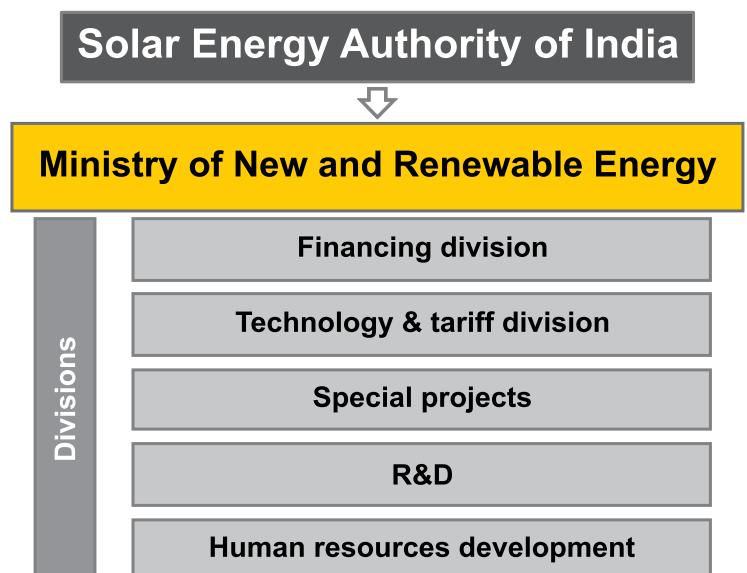
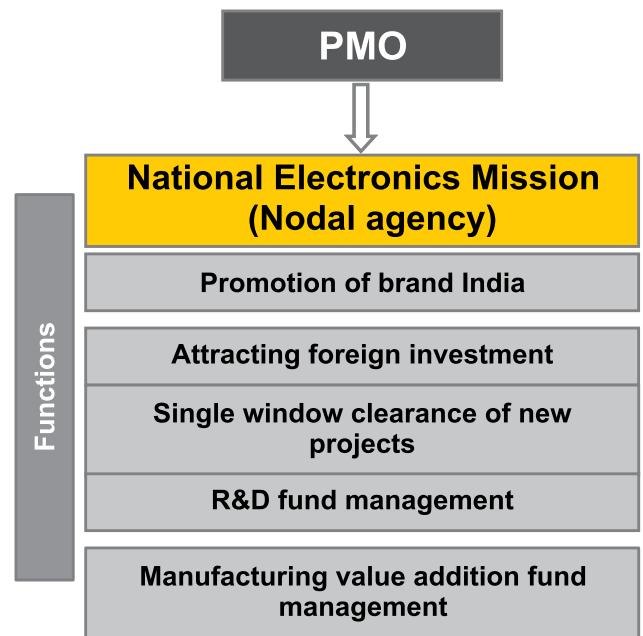
This single nodal agency shall also facilitate vertical coordination between the centre and the states as-well-as horizontal coordination amongst the various concerned ministries.

Case study: National Solar Mission

Objective: to make India a global leader in solar energy and envisages an installed solar generation capacity of 20,000 MW by 2020, of 1,00,000 MW by 2030 and of 2,00,000 MW by 2050

Implementation:

- Financial division
 - Create and manage funds
 - Oversee capital subsidy funding through banks
- Technology & tariff division
 - Monitor global and domestic technology development
 - Define tariff levels



- Special projects
 - Execute utility and rooftop demonstrating projects
 - Set up solar generation plant infrastructure
- Research and Development
 - Set-up a research council
 - Set-up a centre of excellence for solar energy
 - Involve academic institutions
- Human Resource and development
 - Involve academic institutions
 - Introduce a government Fellowship programme

Recommendation 2: Promote existing clusters and create new ones

India has created a world class manufacturing ecosystem in Sriperumbudur, which is a testimony of India's capability as a low cost manufacturing country. It is essential to take this success forward and set up world class infrastructure.

Further, the government may identify more locations to set up clusters and replicate the success of Sriperumbudur. This will bring in synergies, save costs and improve competitiveness. States should be encouraged to create electronics manufacturing clusters provided they satisfy certain basic minimum 'hygiene factors' to enable creation of end-to-end value chain with up-stream and down-stream industries in close proximity. These are:

- | | |
|--|--|
| <ul style="list-style-type: none">● State Nodal Agency for single window clearance and inter-departmental co-ordination.● Ready infrastructure, easy access to port/air-port and State-of-the-art logistics for fast track clearance and quick turn-around.● Making available land, power and other amenities within state control at concessional rates● Easy access to Financial Institutions and Commercial bank | <ul style="list-style-type: none">● Create access to talent - Infrastructure for skilled manpower, Technical/Vocational training institutions● Infrastructure for collaborative R&D and Testing● Institutional framework for market development – National and International● Soft-Infrastructure and amenities for employees – quality housing, health-care, education facilities, restaurants, entertainment avenues etc. |
|--|--|

Case study: Sriperumbudur, Tamil Nadu

In 1996, Hyundai Motor India became the first MNC to set up a manufacturing facility at Sriperumbudur in Tamil Nadu. The MNC was followed by 50 ancillary manufacturing units, which turned the area into an auto manufacturing hub. The South Korean auto major has invested USD 888 million in India.

In 2001, Saint-Gobain, the France-based glass manufacturer, followed with a USD 118 million facility, also at Sriperumbudur, and subsequently invested another USD 177 million in the project.

In 2005, Nokia set up a cell phone-manufacturing facility in its SEZ at Sriperumbudur. After this, a host of smaller companies followed suit, setting up their own manufacturing facilities in the area.

The key factor that enabled the tremendous growth in this region is its enabling bureaucracy, which expedites the processes of land acquisition and other procedures. Further, the state's single-window clearance scheme facilitates setting up of manufacturing facilities at Sriperumbudur. The availability of skilled manpower adds to the attractiveness of this cluster.

Recommendation 3: Provide preferential market access to local companies

Encourage the production of "Made in India" goods by reserving a particular share in the market for Indian products. MNCs are also setting up design centers that specifically cater to the Indian market.

This can be achieved in the following manner:

- Recommended 30% of the demand must be met by products made in India if they are technically and commercially competitive for government procurements.
- Using products made in India to execute national projects such as national knowledge network, rural broadband and Common Service Centers (CSC).
- Specifying 30% value addition for foreign investment in a specific technology if products made in India do not exist in a specific technology area.
- Using products made in India as part of bi-lateral trade and providing trade-in grants in the form of the products.

Recommendation 4: Create R&D fund for the industry

An R&D fund may be created where the government and the industry bodies are stakeholders. This may be used to incentivize research and innovation leading to growth of the industry.

Recommendation 5: Create manufacturing value addition fund for the industry

To enable the industry access funds at internationally competitive rates, a manufacturing value addition fund (in the form of interest subsidy fund) may be created to promote domestic value addition. The fund may be used to provide financial assistance in the following manner:

- Provision of interest subsidy linked to value addition.
- Provision of interest subsidy linked to increasing the local content of Bill of Material (BOM).

Recommendation 6: Rationalize tax structure

- Stable tax structure needs to be put in place in order to encourage long term Investment by companies.
- Favourable taxation rates extended under the recent fiscal incentive package should be continued and prevail long-term to make available products at affordable prices.
- The introduction of Goods and Services Tax (GST) is expected to bring rationality and transparency to the tax structure. However, challenges of Octroi, Surcharge and Entry tax need to be eliminated.

Recommendation 7: Promote skill development

It is estimated that around 16.1 million people will be directly employed in the industry by 2014 and 27.8 million by 2020, as compared to the current 4.4 million. According to the report on Manpower for electronics industry, the concentration of manpower is in the manufacturing segment followed by after sales and sales support. R&D on the other hand employs the least number of people. Regulations relating to over-time and contracts also need to be revamped to meet the highs and lows of demand. Hence, the government needs to focus proactively on skill development. The recent report on ‘Human Resource and Skill Requirements in Electronics and IT Hardware’ by the National Skill Development Mission may be referred to in this regards.

Recommendation 8: Sustainable growth and development - Green electronics & e-waste Management

To ensure sustainable growth and development of the electronics industry in India, standards for the energy efficiency for electronics products in harmonization with international standards need to be developed urgently for the Indian market. Suitable incentives will need to be offered to encourage companies to adopt such standards. Further, the issue of e-waste management needs immediate attention. The government should announce a dedicated legislation for the management of e-waste, mandating all stakeholders in the electronics value chain to execute their responsibilities and liabilities with no adverse impact on the environment. Producers/manufacturers, through effective take-back

programs, need to ensure that e-waste is recycled in an environmentally sound manner. Similarly, component manufacturers should ensure that the content of hazardous elements is minimized (RoHS).

Recommendation 9: Demand consolidation to boost manufacturing

- IT based security systems are gaining importance for protection of buildings/campuses as well as surveillance and response capabilities. By designing an effective bulk procurement system for consolidated requirements, the consequent manufacturing capabilities in IT hardware and sensors would have beneficial effects in related IT, telecom and electronics fields.
- IT equipments like computers for school are required in very large numbers for schools. Similarly, with implementation of e-governance projects underway, there is a significant requirement of IT products by the States. Suitable bulk procurement could be designed, incorporating the conditions for domestic manufacturing, to meet such demand.
- There is a strong case to move away from incandescent technology for lighting to LED-based technology directly, bypassing CFL route, since disposal of CFLs has a significant adverse impact on the environment. Creating bulk procurement program as in case of the CFL lamps, manufacturing of the LED lighting would get a boost. Further, through a similar mode, the solar PV lanterns with LED bulbs for remote village lighting under the RGGY or MNRE Scheme can also boost value addition and manufacturing of LED in India. In the long-run, efforts need to be made to make silicon chip for the PV lanterns domestically by encouraging the domestic manufacturers so that the supply chain can be complete.
- All defense and homeland security procurement of IT/electronics equipment should be progressively opened up to the private sector which shall be encouraged for Value-addition/increasing local content as specified by the said agencies. This would provide fillip to local manufacturing.

Procedural intervention measures

Apart from the recommendations given earlier in this report, certain process improvements that may drive growth in domestic manufacturing include:

Recommendation 1: Formulating and implementing a monitoring and auditing mechanism for government-funded initiatives:

- Implementation of e-governance projects should be tracked and their progress made public.

Recommendation 2: Making the recipients of government funds accountable for their efficient and timely utilization by making such funds time-bound; enforcing penalties for non-achievement of pre-determined objectives, e.g., conversion of grants to loans, as in the case of APDRP.

Case Study: R-APDRP - What was different?

- The key takeaway from R-APDRP is its execution strategy.
- The scheme has clear timeframes for execution and delivery.
- Funds are allocated in advance to the stakeholders of the policy. There are two parts to the scheme, and only if utility completes the first part, can it invest in the second.
- Moreover, in this policy, funding is directly related to the outcome within a definite period of time. If stipulated timelines are met, the government converts the loan into a grant. If the utility does not complete the project in the specified time, it has to pay back the loan.
- Further, the program tries to minimize the work required to be done on the field, e.g., preparing a shortlist of consultants, system integrators and project executors and chalks out a plan of action, which includes the list of products or applications that need to be used.

Contd..

- This scheme recognizes the importance of IT as a tool and lays emphasis on the use of technology as well as on funding.
- Most importantly, R-APDRP is the only scheme that gives incentives to people in the utility if they are able to meet loss-reduction targets.

Recommendation 3: A multi-slab, multi-threshold incentive package such as the Special Incentive Package Scheme (SIPS) should be announced to attract electronics manufacturing Investments at various levels. This is to offset the disability costs suffered by the domestic manufacturers on account of infrastructure and other handicaps. Such a package can be administered through a through a Special Purpose Vehicle where the disbursement mechanism could be linked to the proportion of domestic value addition in each of the industry segments/verticals. The Special Purpose Vehicle could be created under the proposed ‘National Electronics Mission’ or the Department of IT.

DRIVE CUSTOMIZATION WITH ‘MADE FOR INDIA’ PRODUCTS

‘Uniquely Indian products’ for ‘uniquely Indian needs’ at ‘uniquely Indian prices.’

“Made for India” products

- Government can encourage the use of products made in India for developmental initiatives such as e-governance plan, UID, SSA and R-APDRP.
- Create standards for voltage, frequency and thermal variations as well as EMC/EMI and safety, which will reduce the imports of sub-standard products into the country.
- Encourage development and deployment of bilingual (english with one or more Indian languages) software in order to address the language barrier in local markets. All computing devices procured by the Government should be enabled with local language interface.
- Create and make available product specification for government initiatives in advance. This will provide the Indian manufacturers with the lead time to create products, align production and make the necessary investments. E.g. Digitisation of broadcasting infrastructure, UID, financial inclusion and others.
- With the growing trend of convergence, it is essential to promote a ‘internet with a device’. This initiative should ideally be funded through the USO fund.
- Government procurement with higher local value addition should be encouraged.

RECOMMENDATIONS TO ENCOURAGE PRE-COMPETITIVE RESEARCH

- **Recommendation 1:** Offer R&D grants to companies that generate product revenues from the country and have substantial local value addition done from within the country.
- **Recommendation 2:** To encourage innovation in the industry, permit 300% expenditure on R&D/New Product Development/Indigenization for deduction from taxable income. Currently this is pegged at 150%.
- **Recommendation 3:** Offer tax rebates for patent filing expenses to encourage companies to innovate and gain competitive edge in their respective areas of business.
- **Recommendation 4:** Set aside a seed fund of INR2,500 million (equivalent to USD 55 million) to support technology and innovation focused start-ups in products/technology space at their seed stage.
- **Recommendation 5:** Investors making investment in qualified product/technology start-up should be given a tax credit equal to 30% of the investment value.

- **Recommendation 6:** Set aside a fund of INR1,000 million (equivalent to USD 20 million) to provide multiplier grants for collaborative research programs between industry and academia in the areas related to semiconductors and electronics.
- **Recommendation 7:** Facilitate setting up of ‘Center for Research in Embedded Systems and Semiconductor Technology’ (CREST).
- **Recommendation 8:** Government support for pre-competitive electronics collaborative research program in the areas of energy, medical, security, education and agriculture.

6. Urgency to act now

CAPITALIZING ON THE OPPORTUNITY

India is expected to create employment opportunities for up to 27.8 million people and demand valued at USD 400 billion in 2020.

- **Demand:** Demand for the electronic industry is growing and has been valued at USD 400 billion by 2020. Currently, the country is not fully utilizing its talent and capabilities in manufacturing to address this increase in demand. As such, the government can set up manufacturing plants, generate employment, lower the existing level of imports and give impetus to the economy. Exports in the industry are expected to increase to USD 80 billion by FY20.
- **Significant growth potential:** Growth in the industry will boost the economy, as this industry works as a feeder industry for other industries. Enhanced production in this industry will lead to growth in several other industries where hardware/components are required.
- **Employment opportunities:** It is anticipated that the industry can potentially employ close to 27.8 million by 2020. Employment features as one of the most important priorities on the government's agenda. This industry is labor-intensive and can employ a large number of people with standard educational qualifications.
- **Small and medium enterprises (SMEs):** The SME segment is the key growth driver of the manufacturing industry. However, the sector is cost-sensitive, and if low-cost imports from other countries are not minimized, it is likely to face challenges.
- **Nation's strategic and security interests:** Electronics used in aerospace, defense and other parts of strategic establishments are mostly imported. This can pose threats of design leakage or any other intrusion, which may hamper the country's security. Hence, such goods should be indigenized as far as possible.

7. Key industry segments

SEGMENT-WISE PROJECTIONS

Segment-wise projections of the electronics industry:

	Target (USD billion)	
	2014	2020
Semiconductor design	20.0	58.2
High-tech manufacturing	4.0	22.6
Electronic components	2.6	3.4
Electronic Manufacturing Services	1.4	2.3
Electronic systems		
IT systems and hardware	16.7	54.4
Telecom products and equipments	29.5	153.5
Consumer electronics	8.1	17.8
Others (Industrial, Automotive and others)	2.7	7.8
Exports	15.0	80.0
Total of all segments	100.0	400.0

Source: EY Analysis

SEMICONDUCTOR DESIGN AND HIGH-TECH MANUFACTURING

Semiconductor design: VLSI design, embedded software and reference board design

Overview

The semiconductor design industry primarily comprises three segments – embedded software, Very Large Scale Integration (VLSI) design and reference board design. Embedded software development contributes more than 80% of the segment's revenues and has an equivalent proportion of employees. VLSI design contributes approximately 13% to overall revenues and 11% to the overall workforce. Hardware board design constitutes the remaining 7% of total revenue.

The present and the future

The potential of the Indian design market is expected to increase to USD 20 billion by FY14 and USD 58.2 billion by FY20. The total engineering headcount for VLSI, board design and embedded software is expected to increase to 219,000 by 2010. India is expected to continue as the preferred destination for embedded design and development. The focus on intellectual property (IP) development will increase as third-party design services companies look to move up the value chain. The localization of product design and manufacturing from India will drive significant investments. The industry is likely to continue facing significant challenges to manage demand and workforce churn. The industry will have to constantly evolve, upgrade and innovate while keeping the costs down to remain competitive in the global market.

The proximity between third-party service providers and original equipment manufacturers (OEMs) for end-to-end product design is also likely to increase.

Trends

- Business models for design services are expected to shift from Time & Material and linear with people strength to risk-reward and non linear.
- The demand for local content in products sold in India is on a rise.
- India is being recognized as an design hub by foreign companies with operations in India
- Increasing business from mid-size and smaller companies are driving hardware designs to India.
- Consolidation demand will continue to evolve the dynamics of the semiconductor industry ecosystem.
- Impetus is being given to fabless product design and development initiatives in India. The government's role as a catalyst is important, as has been experienced in countries such as Japan, the US, Taiwan, South Korea and China.

Challenges

- Challenge 1: Competition from other Asian countries

China has expanded its scope in recent times and has begun manufacturing as well as designing semiconductors. As such, China's semiconductor industry has grown significantly in the past few years. The country is presently home to more than 400 fabless companies. Vietnam is also emerging as a competitor.

- Challenge 2: Incomplete ecosystem

Most companies in India are either into integrated design, embedded software or VLSI design. This has led to an incomplete ecosystem from the perspective of a semiconductor products company. Several key links, such as systems engineering, venture capital and IP protection, are currently missing from the ecosystem.

- Challenge 3: Shortage of design-aware manpower

Another issue affecting the growth of the Indian semiconductor industry is the shortage of skilled manpower at all levels of engineering projects, especially in design services. The absence of institutions imparting technical training relevant to this segment has further aggravated the situation.

Recommendations

- **Recommendation 1:** Initiatives need to be undertaken to promote innovation in R&D and product design. Creation of local IP should be encouraged.
- **Recommendation 2:** National projects (national knowledge network, rural broadband and so forth) should be executed using Indian products.
- **Recommendation 3:** The government should encourage incubating Indian start-ups. The government may set up a focused venture fund of around USD 50 million to provide seed and start-up capital for new ventures to undertake R&D and product development.
- **Recommendation 4:** The government can subsidize acquisition of EDA tools by start-ups and other SMEs in this sector. Prototype development centres with adequate fabrication facilities can be set up. Include the entire revenue earned by fabless companies for benefits under STP and SEZ policies, as long as 90% of the design is done in India.
- **Recommendation 5:** Provide special tax incentive to entrepreneurs from within and outside India setting up design and development centres in India.
- **Recommendation 6:** Extension of EHTP/STP scheme till the year 2015.
- **Recommendation 7:** Creation of a fund to provide fiscal support to SMEs and MSMEs on a continual basis.

HIGH-TECH MANUFACTURING

Demystifying semiconductor-related high-tech manufacturing

The semiconductor industry is pervasive in nature and is a key driver of the nation's economy. Semiconductors represent the convergence of many devices, systems and technologies and are widely recognized as technology enablers for the entire electronics value chain. The pervasiveness of semiconductors in other fields has become pivotal in giving the industry a competitive edge.

Semiconductor manufacturing extends beyond wafer fabs to include ATMPs (Assembly, Test, Mark and Packaging facilities (ATMPs), solar photovoltaics, displays, optical LEDs, displays, display panels, storage devices and advanced micro and nanotechnology products. These products and other semiconductor devices are used in several applications, such as telecommunications for ubiquitous accessibility, in electronics and consumer applications for product quality (e.g. PCs, mobile phones and TV sets), and in the automotive industry for safety, energy saving and driver assistance. As such, it is important that the domestic manufacture of these products be incentivized to give impetus to the Indian electronics system design and manufacturing industry.

Vision

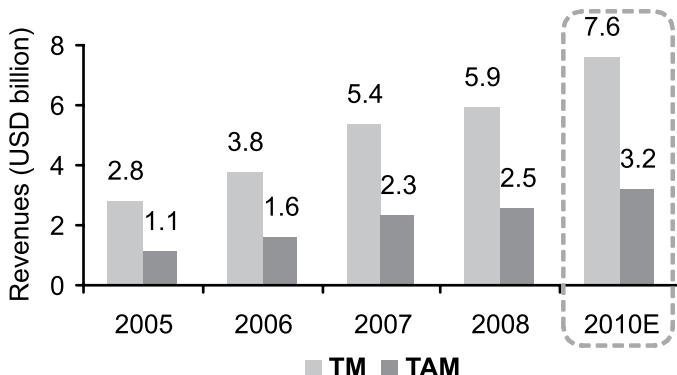
High-tech manufacturing relates to semiconductor-related manufacturing. This segment includes wafer fabs, ATMPs, solar PV manufacturing, storage devices, displays, display panels, LEDs and nano-technology products.

Projected size of the segment: USD 4 billion in 2014; 22.6 billion in 2020

The present and the future

- India has a large and growing market for electronic products, as the use of semiconductors in such products is on the rise.
- The following table illustrates the Total Market (TM) and Total Available Market (TAM) revenue trends for the segment:

Indian semiconductor industry revenue trend



Source: Aneesha Dhar, "Transfer pricing report," EY CBK, June 2009, via IRAD

Segment	TM revenues (USD billion)
IT/OA	2.5
Wireless handsets	1.7
Communications	0.8
Consumer	0.4
Industrial	0.1
Automotive	0.1
Others	0.3

Source: "India Semiconductor Market – 2008," ISA – Frost & Sullivan, January 2008

- Semiconductor fabs are capital-intensive and have a long gestation period. ATMPs, on the other hand, require much lower capex. Solar PV manufacturing offers yet another exciting opportunity - the use of solar panels, both for off-grid applications, especially, in the short to medium term, and for grid-connected power in the long term, augurs well for the growth of the domestic solar PV industry. Moreover, in line with energy conservation measures, LED manufacturing is also likely to be a high-potential area. In addition, the domestic manufacture of storage devices, displays, display panels and nanotechnology products should be encouraged.
- Production in the segment is projected to increase to USD 4 billion in 2014 and 22.6 billion in 2020.

Policy and regulatory environment

- The Indian government's announcement of a semiconductor policy is a laudable initiative. It can be considered a major step toward attracting foreign companies to set up manufacturing facilities in India.
- The policy covers wafer fabs and ecosystem units such as LCDs, storage devices, plasmas, photovoltaics, solar cells and nanotechnology products, and also includes the assembly and testing of such products.
- The government will bear 20% of the capex for units located inside special economic zones (SEZs) and 25% for units located outside SEZs.

The government has proposed a minimum investment of USD 555 million for semiconductor manufacturing (wafer fabs) plants and USD 222 million for ecosystem units. State governments may provide additional incentives to the investors. However, these incentives have not been extended to older plants with second-hand equipment.

The policy has attracted considerable interest from solar PV investors. However, in order to attract investments in wafer fabs and other ecosystem units, the following policy amendments have been proposed:

Amendments to the semiconductor policy

- Extension of the policy
Due to the uncertainty in the economic environment, it is difficult to project the year of revival of the semiconductor industry. The experts opine that the present situation for the semiconductor industry would last for at least two years. As such, it is proposed that the deadline of March 2010 be extended to March 2015. The extension will provide time, as the slowdown has severely impacted the semiconductor industry, thus leading to piling:
 - To market the policy and improve India's prospects of attracting investments
 - To highlight the importance of the domestic market to potential investors
- Appraisal process
It is also suggested that the government takes faster decisions and makes early announcements of approvals of proposals in order to send positive signals to the other investors.

Suggestions for, and amendments to, the semiconductor policy

- Lowering the threshold limit for ATMPs and other ecosystem units

The threshold limit for certain categories of ecosystem units such as ATMPs, optical LEDs, storage devices, LCD, FPD, photovoltaics, fuel cells, micro- and nanotechnology products (as defined in the Special Incentive Package Scheme, or SIPS, needs to be re-visited, as these units may not require large investments of USD 500 million. Lower threshold limits of USD 100 million for the incentives available under the policy are expected to generate interest for such categories of ecosystem units that have not been seen so far. This lowered threshold limit needs to be defined in consultation with industry professionals. The above areas required for wafer fab, form an critical part in the high-tech manufacturing value chain. Manufacturing infrastructure located in high-tech areas of the country can also serve as a pull factor to set up wafer fabs. It may be mentioned that countries such as Vietnam, China, South Korea, Singapore, and Malaysia are well on their way. In addition, the government should identify and incentivize anchor investors in areas such as ATMP, storage, LCD and LED.

- Financial closure commitment

The current policy requires investors to demonstrate the legally binding commitment of equity holders and debt financiers to provide or mobilize funding for achieving financial closure (at least 90% of the total project cost). Projects envisaging large-scale investments are implemented in phases. As the major markets for the products from fab and ecosystem units are presently targeted at exports, investors find it difficult to produce legal documentation for achieving financial closures of such magnitude from financial institutions at the time of submitting the proposal.

- Release of incentives

The current policy provides for the release of the incentive being linked to the achievement of the threshold investment. It is proposed that the payment of the incentive to investors may be advanced, although the threshold investment may not have been reached as yet. The suggested measure would provide investors with funds at an early stage, which is crucial for the project's timely implementation.

- Components of project cost

The policy is not clear with regard to the inclusion of costs on utilities, interest charges and so forth as part of the project cost. It is important that the total project cost of running the plant, including the items mentioned above, are considered for the award of the incentives.

Recommendations to promote solar PV manufacturing

- Recommendation 1: Industry size and volume of production are key issues to address the economies of scale. Scale and integration should be encouraged through the provision of higher incentives, as they reduce manufacturing costs.

- Recommendation 2: The lack of adequate financial resources, particularly at attractive interest rates, is a key barrier for the industry. The availability of funds at a less expensive rate will go a long way in attracting a large number of players in this area. The government can float tax-saving renewable energy bonds such as infrastructure bonds to collect low-cost funds from the general public.

- Recommendation 3: It is well-recognized that R&D and innovation are one of the key drivers of development in the solar PV industry. Accordingly, the following initiatives are recommended to encourage R&D in this industry in India:

- Collaborative research among government, R&D institutions and industry.
- Coordination among various government departments doing R&D in this field.
- Coordination among stakeholders, namely industries, research institutions under the Council of Scientific and Industrial Research (CSIR) and government departments such as Department of Science and Technology (DST)

- Commercialization of developed technology.
- Development of a proper framework for technology transfer and collaboration within India as well as globally to obtain the best available technology as well as provide direction to future R&D.
- Development of high-end skills for R&D to overcome the scarcity of scientists and researchers in this area.
- Recommendation 4: Equity funds/Venture funds should be created to nurture solar PV start-ups and seed funds for solar PV research projects.
- Recommendation 5: A comprehensive national policy for solar energy in India based on the recommendations made should be formulated to achieve set objectives and goals at the national level and encourage the growth of this sunrise industry. It is recommended that the growth of the solar PV industry should be implemented under Mission mode.

The semiconductor industry's growth enablers

IT/Office automation (ITOA), wireless handsets and communication are the top three contributors to the semiconductor total market and the mainstays of TAM revenue generation. The rollout of third-generation (3G) and WiMAX services can serve as the harbinger of associated infrastructure equipment. Other growth drivers include:

- Growing demand from the domestic market: The Indian market is witnessing strong demand. Increased consumer spending on entertainment and the rise in demand for related lifestyle products due to changing consumer preferences are key growth drivers.
- Growing IT industry: Growth in the IT industry is also driving the semiconductor industry. The IT segment is divided into IT systems and hardware and ITOA, which includes printers, notebooks, desktops, monitors, servers and copiers. IT/ITOA contributes 42% to TM and 46% to TAM in the semiconductor industry.
- Enabling policy environment: The government is making efforts to facilitate effective policy implementation. The semiconductor policy of 2007 received an encouraging response - 17 proposals received envisaging investment of USD 35 million.
- Growing high-tech design industry: The high-tech design industry is a high-growth segment and is expected to reach approximately USD 20 billion and USD 58.2 billion by 2010 and 2020, respectively.

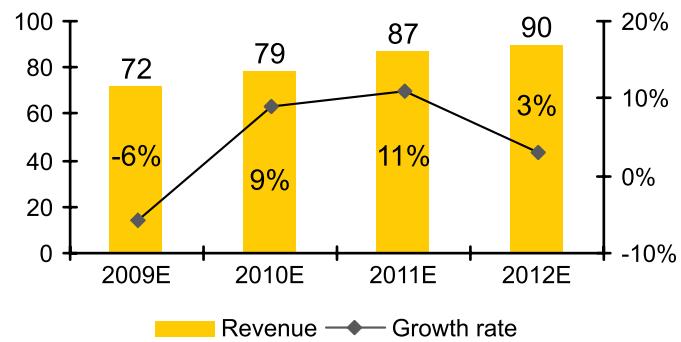
Set-top boxes (STBs), wireless handsets, 3G rollouts, WiMAX, notebooks and smart cards are expected to primarily drive the Indian semiconductor market.

Competitive landscape: China and Taiwan

- China's semiconductor market primarily consists of electronics manufacturing services (EMS) companies, original design manufacturers (ODMs), and OEMs that consume chips in China.
- The Chinese semiconductor industry's revenue in 2008 totaled USD 76.5 billion. This is expected to decline 5.8% to USD 72 billion in 2009.
- China is the largest IC market in the world, with a market scale at USD 85 billion in 2008. However, the market share of domestic suppliers was less than 7%.
- The ease of doing business between semiconductor companies in China, Hong Kong and Taiwan continues to grow.

China: future state

Expected revenue and growth rate for 2012 (USD billion)



Source: "IDC: 2009 toughest year for China's PC market," ChinaDaily.com website, <http://chinadaily.com>, accessed 2 October 2009.

ELECTRONIC COMPONENTS

Overview

The Indian electronic components segment grew rapidly during the 1980s and the early 1990s due to liberalization and the boom in the electronics industry.

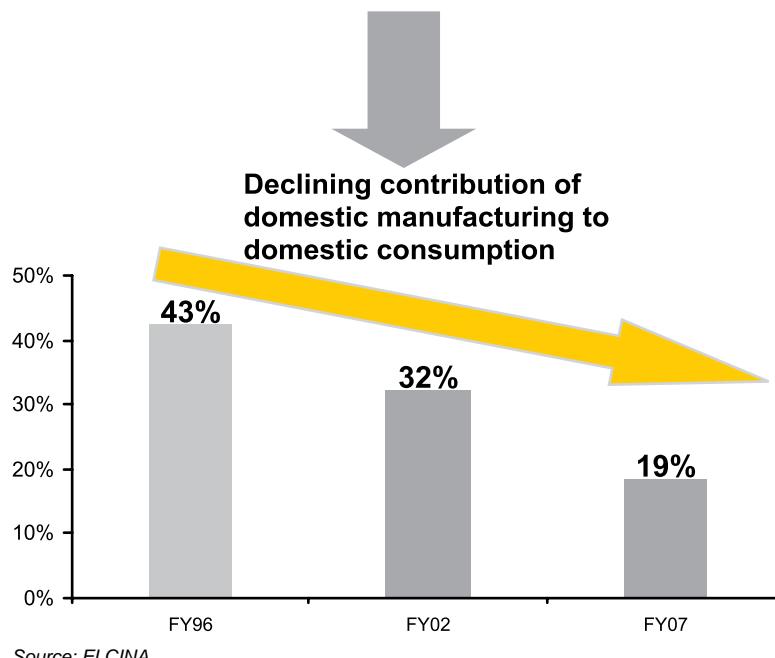
The period was marked by declining duties on finished electronic goods, which created an inverted duty structure. This spurred an increase in the import of finished goods, resulting in a steep decline in domestic production of electronic components. As a result, demand for electronic components declined significantly over the years.

The International Trade Agreement (ITA) signed at the World Trade Organization (WTO) in 1997 eliminated all customs duties on IT products, thereby creating an environment of direct competition between Indian component manufacturers and international players. Intensified competition weakened the cost competitiveness of Indian manufacturers, forcing many companies to exit the market.

Over the years, the contribution of domestic manufacturing to domestic consumption has been declining. The following table reveals that domestic component manufacturing has not been able to keep pace with the growth in demand.

Year	Production		Components exported	Domestic consumption	Total demand 0.4*(A)	Domestic usage (%)
	Equipment (A)	Components (B)	(C)	D = (B-C)	(E)	(D/E)*100
2006–07	14,933	1,956	844	1,111	5,973	18.6
2001–02	6,011	1,267	489	778	2,404	32.3
1995–96	3,864	767	109	658	1,547	42.5

Source: ELCINA Currency: USD million



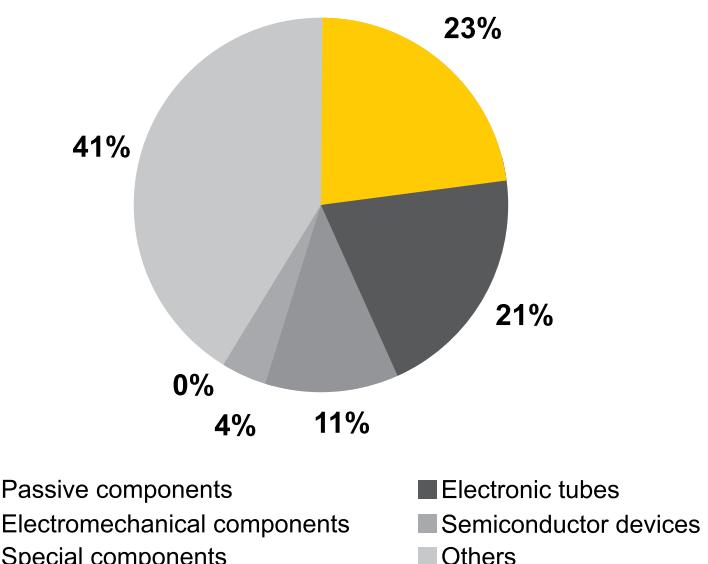
Source: ELCINA

Current State

In FY09, the Indian electronic component market was valued at USD 2.1 billion, with an 11% share of the total electronics market. The electronic components segment supplies to the consumer electronics, telecom, defense and IT verticals. The various constituents of the electronic component segment are illustrated below:

- Passive components account for the largest revenue share of 23%. The key constituents include transformers, chokes and coils, capacitors and resistors.
- Electronic tubes have the second-largest revenue share of 21%. The key constituents include TV picture tubes, X-ray tubes and cathode ray tubes.

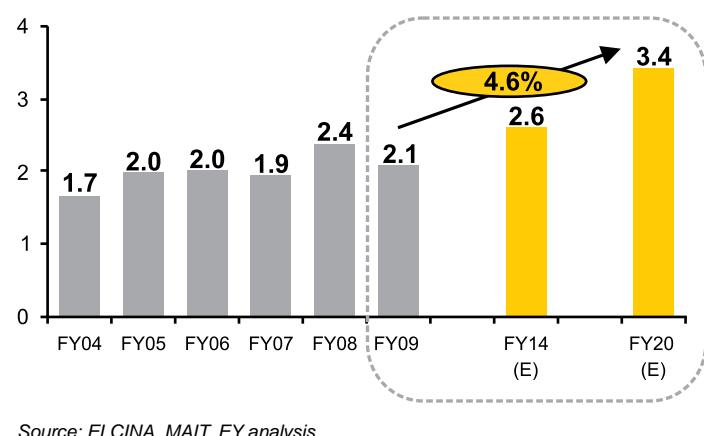
Indian electronic components' revenues: CY07



Segment size: current and projected

- The production of electronic components declined by 13.3%, from USD 2.4 billion in FY08 to USD 2.1 billion in FY09.
- For the five-year period of FY04-09, the segment grew at a CAGR of 4.6%.
- Fluctuations in growth rates and a decline in production characterized this period.
- The production of electronic components is expected to reach USD 2.6 billion in FY14 and USD 3.4 billion in FY20.

Electronic components production (USD billion)



The segment has significant potential for employment generation, with 70,000 jobs expected by FY14 and 200,000 jobs by FY20.

Growth engines of the Indian electronic components segment

- Strong demand: Strong consumer demand for products such as TVs, white goods, air conditioners and automobiles is driving the demand for electronic components.
- Availability of skilled manpower: India has an abundance of skilled manpower. Each year, around three million science and engineering graduates are added to the workforce, much higher than in China and other developed countries. The quality of Indian graduates is also ranked better than in China, Vietnam as well as Japan and the US on certain parameters.
- Rise in EMS: Currently, a number of OEMs are outsourcing their low-end product development, manufacturing and distribution to EMS companies to focus on the development of high-end products with higher margins, brand-building and marketing and sales strategies. As such, EMS companies have significant market potential. The EMS segment in India has the ability to capture 2.2% of the global EMS market, which is projected to reach USD 497 billion by 2010. The Indian EMS market has the potential to reach USD 11 billion by 2020.

- Increase in government spend on related verticals: The Indian government is increasing its expenditure on strategic verticals such as defense and aerospace, which are major users of electronic components. Significant e-governance initiatives and developmental plans, such as the UID project and MGNREGA scheme, are also increasing the demand for electronic components and devices.

Changing dynamics of the segment

- Growing consumer class: India has a growing consumer class, which comprises people with an annual income of more than USD 10,000. The group is estimated to grow to more than 80% of the total population by FY10. This concurrently reflects on the available aggregate disposable income in the economy that may be channelized to increase sales of consumer products.
- Lifestyle changes: With greater exposure to global trends, Indians now have an increased affinity for convenience and lifestyle products. This is encouraging the launch of higher-end consumer products in the market.

Challenges hampering growth of electronic components manufacturing

Challenge 1: A zero import duty regime is impacting competitiveness

- The zero-import duty structure encourages the import of finished electronic goods, leading to a decline in demand for electronic components.

Challenge 2: Rapid technological innovation mandates high capital investment

- Technology changes rapidly in manufacturing sectors. In order to compete with low-cost destinations such as China and Taiwan, India needs to keep pace with the technological innovations. As a result, the capital required to set up and maintain a manufacturing facility has increased manifold. It is even more difficult for an SME in this segment, since capital investment is high but the return on investments is almost insignificant, at around 7-9%.

Challenge 3: Inverted duty and taxation structure implies more tax

- When compared with China and Taiwan, India's current duty and taxation structure makes the final product more expensive, as there is no duty on the import of electronic components. The inverted structure has resulted in higher tax rates for products with higher value addition.

The table below denotes value addition at different stages of the electronics manufacturing value chain, quantifying the impact of disabilities on components:

Description	Investment (INR/unit)	Selling price (INR/unit)	Value addition (VA)	Share of disability (15% of VA)	Impact of disability on selling price	Impact of taxation (Avg 2% of inputs)
Finished product	100	1000	50	7.50	0.75%	19.0
Sub assembly	150	950	100	15.00	1.58%	17.0
Components	350	850	250	37.50	4.41%	12.0
Piece parts	500	600	200	30.00	5.00%	8.0
Raw material	800	400	275	41.25	10.31%	2.5
Total			875	131.30		58.5

Source: ELCINA

Therefore, value addition in the electronic components segment is second only to raw material, which results in a high-cost disability.

These disabilities are encouraging trading activities in India.

Challenge 4: Unavailability of raw material domestically

Most of the raw material required for electronic component manufacturing is not available domestically. Hence, manufacturers need to import material from countries such as China, Taiwan and Korea. The low production volumes of Indian manufacturers inhibits them to negotiate competitive rates from these suppliers, which impacts the cost of production.

Recommendations

Recommendation 1: Create hubs of excellence for component manufacturing: clusters

- Create pockets of excellence or clusters to promote the manufacture of electronic components in India. These clusters will create scale, provide R&D and testing facilities, develop skill as well as address infrastructure challenges.
- Noida and Chennai may be the pilot zones for setting up such clusters. This is because each has the following:
 - Large concentration of electronic component manufacturers
 - Presence of the buyer segments: assemblers and consumer electronics manufacturers

Recommendation 2: Encourage collaboration with international players

- Rapid innovations in manufacturing technologies require significant capital investments. The collaboration of Indian manufacturers with international players is essential to provide access to technical knowledge and capital. Such collaboration will ensure higher standards of quality in manufacturing, leading to greater acceptability in the global market.

Recommendation 3: Reduce the impact of transactional costs

- The impact on the cost-competitiveness of manufacturers due to significant transactional costs and the duty structure may be rationalized.

Recommendation 4: Focus on R&D and value-added products

- Focus on R&D and develop of value-added products to distinguish India from other countries. There is a need to identify specific products where India's cost competitiveness exists and encourage domestic manufacturing.

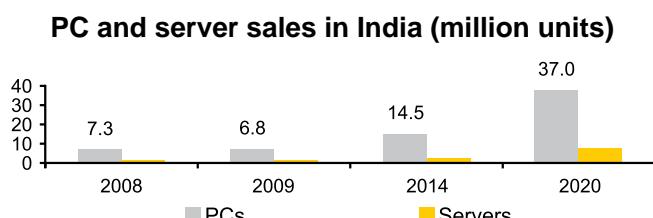
IT SYSTEMS AND HARDWARE

The global IT systems and hardware spending is estimated to have grown at 4% from USD 570 billion in 2007 to USD 594 billion in 2008. North America and Asia each accounted for 28% of the market, while Western Europe accounted for 25% of the market in 2008. The IT systems and hardware industry in India is still looking to carve a niche in the global industry. This industry has immense potential for a multiplier effect on the economy; however, due to the lack of favorable government policies, the opportunity has largely eluded India. The government needs to create a conducive environment to foster demand in this segment, which in turn, can be leveraged for manufacturing investments. The recent demand-led-manufacturing success of the mobile handset industry in India is a good example. India has experienced phenomenal growth in PC sales. The number of PCs sold in India has increased to 6.7 million units in FY09 from 3.1 million units in FY04, translating into a CAGR of 17%.

Segment size

Current and projected state

India, at 17% CAGR in FY09, is one of the fastest-growing IT systems and hardware market in the Asia-Pacific region. Nearly all the prominent global vendors and some local, have a strong presence in the Indian market. Most MNCs have their assembly units in India. With PC sales of 6.8 million units in FY09, the PC penetration stood at 2.6%. Notebooks and Netbooks have caught the fancy of the consumers while growth of desktops has stagnated.

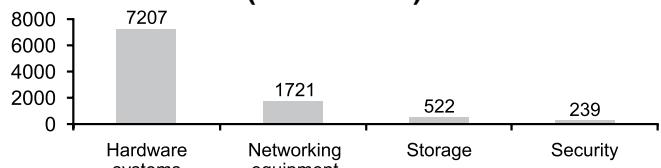


Source: MAIT FY09 Annual Report

Sub-segment wise

BFSI, telecom, ITES, manufacturing verticals, SMEs, e-governance and households are the key drivers of the IT systems and hardware market in India. With significant IT adoption plans on the anvil, the IT systems and hardware market is expected to expand rapidly in the ensuing years.

India hardware domestic revenues - 2008 (USD million)



Source: Aneesha Dhar, "Transfer pricing report – IT systems and hardware," EY CBK, June 2009, via IRAD

IT systems and hardware: employment statistics	
R&D	3%
Manufacturing	21%
Sales	25%
After-sales support	41%
Administration	10%

Source: "Manpower for electronics Industry,"MAIT, 2008

Growth of sub-segments (2006–2008) (%)

	2006	2007	2008
Servers	27.3	15.2	16.2
Workstations and single user systems	20.1	26.1	34.2
Peripherals	27.2	36.4	39.6
Others	20.1	37.3	25.1

Source: Nasscom strategic review 2009

Growth drivers

- Highly competitive domestic market: With a significant presence of MNC vendors and local players, the latest technology offerings are available to Indian consumers. Further, unique to India, an unorganized sector, with a 30% market share, caters to some of the most price-sensitive as well as geographically remote segments of the market.
- Expanding e-governance and social programs: With the government expected to spend over USD 9 billion in e-governance, including the 27 mission-mode projects, IT consumption is expected to get a significant thrust. Further, the government has announced several other social programs with significant outlays for IT to monitor and deliver these programs and set up CSCs at every village.
- Growth in telecom infrastructure: Increased access and broadband penetration is also expected to drive PC sales even in tier III cities and rural areas.

- **Small and medium businesses (SMB) segment:** The SMB market in India has remained largely untapped. SMBs in India are expected to invest approximately USD 4 billion on IT systems and hardware in FY10. Notebook PC-spending rose at 43% among Indian SMBs in FY07.
- **Awareness and affordability of technology:** The increasing purchasing power of the Indian population has significantly boosted PC penetration in the country.
- **Increasing notebook sales:** Notebook sales are expected to drive the growth of the PC market as domestic and global vendors seek to penetrate lower-income segments, smaller and medium businesses and newer regions.

Taxation/Policy

While IT systems and hardware enjoy low taxation currently, as compared to some of the other sectors, the taxation/policy has not been conducive to the growth and development of this segment historically.

The current taxation policy on IT systems and hardware:

- IT systems and hardware, covered under the IT Agreement of the WTO, does not attract any customs duty. However, a uniform 8% excise duty/CVD is levied. The current fiscal incentive of 8% must be maintained for the growth of the segment. This uniform excise rate across the entire IT value chain has mitigated the earlier challenge of unutilized CENVAT in the manufacturing of PCs due to higher excise rate on input components.
- A uniform 4% VAT is levied on IT products across all states in India. However, certain states deviate from this uniform rate or introduce taxes at their discretion, which is highly detrimental to the business.
- The introduction of GST is expected in April 2010. This will make the tax structure simple, rational and transparent and will resolve the longstanding segment issues of the refund of SAD and unfavorable abatement rates on import on certain specified IT goods. However, the challenges of local taxes such as Octroi and entry tax would continue to agonize the segment. The industry has been demanding that such taxes be abolished.

Dynamics of the IT systems and hardware segment

- **Shift from OEM to ODM:** Brands are transitioning from being an OEM to an ODM. There is a shift from manufacturing to managing consumers and maintaining brands. It has resulted in some of the leading EMS companies to set up their operations in India.
- **Branded PCs outsell assembled ones:** With key PC-manufacturing firms expanding their market in India, narrowing the price gap and providing excellent after-sales support, consumers are opting for branded PCs over assembled ones.
- **Notebook sales growth surpasses that of PCs:** Notebook sales have driven the PC market in India in 2007-08. With sales exceeding a million units in the second half of the last fiscal, the total sales of notebooks in 2007-08 exceeded 1.8 million units, growing at 114%.
- **Moving from real to virtual:** Virtualization creates a virtual version of a server or a platform. There has been a dramatic increase in the number of organizations adopting virtualization, which enhances utilization and significantly reduces costs.
- **Adoption of open standards computing:** Open standards computing is a philosophy of building IT systems. In hardware, open computing involves the standardization of plug and card interfaces and allows for considerable flexibility in the modular integration of the functions. It also helps in vendor independence. These multiple advantages are the contributing factors for the increasing demand.
- **Rising popularity of ultra-portable notebooks:** Small, ultra-portable and inexpensive sub-notebook computers are slated to be the next big thing in the consumer market. Nearly all vendors have launched ultra-portables priced at less than USD 500.
- **Growing demand for green data centers:** These are energy-efficient, high-performance data centers in which power and cooling are far less expensive and environment-friendly. These features make green data centers more viable and eco-friendly.

Challenges

- Challenge 1: Taxation - Frequent changes in taxation have resulted in companies not being able to firm up their long-term business plans, let alone make sizeable investments. It is only in the last two years that there have been no changes in the central levies. The issue is further complicated with state governments, at times, imposing new taxes or changing product classification at their own will.
- Challenge 2: Limited of incentives for investment: With no natural advantage for manufacturing and with uniform taxation across the value chain, sizable investments, especially at the components and sub-assembly level have evaded the segment. Further, due to various reasons, some of the current schemes have been unable to enthuse fresh investments in the segment.
- Challenge 3: Inadequate infrastructure/logistics: The country's lack of infrastructure, coupled with insufficient international quality logistics, poses a challenge to the growth of the segments.
- Challenge 4: Low broadband penetration: India has 6.8 million broadband connections and only 60 million internet users. Further, the quality of broadband remains much below the desired levels. This has hampered the development of a vibrant content industry, which has led to the absence of a virtuous cycle. Thus, the market for PCs/devices, without a pull factor, continues to remain limited.
- Challenge 5: Slowing growth in domestic consumption: PCs recorded a negative growth of about 7% in 2008-09. The sales of notebooks that had been growing over 100% for the last consecutive four years declined by 17%. While the sales of PCs have picked up in FY09-10, they are yet to reach the buoyancy of the earlier years.

It is estimated that IT systems and hardware segment would generate employment for 4.1 million in 2014 and 7.5 million in 2020 from existing 1.9 million in 2009

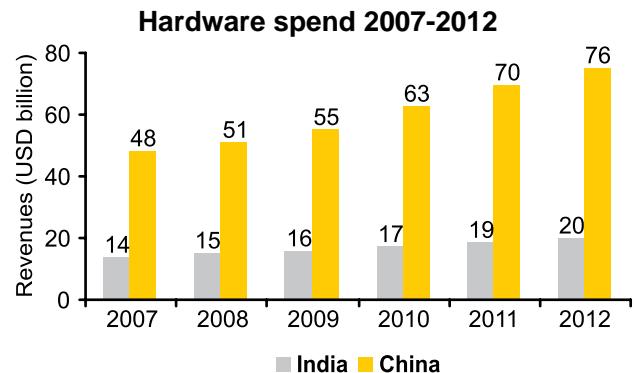
Competitive landscape: China and Taiwan

The total sales in China are projected to be only 40.61 million units in 2009. According to IDC, desktop sales are expected to record a decrease of 6% to 24.8 million units by 2012. In contrast, the laptop sales in China are projected to increase by 19% to 15.8 million units in 2009.

Recommendations

Recommendation 1: Attention must be focused on creating robust demand for IT products in the country.

- Special mission-mode projects for IT inclusion of the common man by 2014:
 - PC/device and broadband for every school with 1 PC/device per 4 student.
 - PC/device and broadband for every village with 1 PC/device per 20 people.
- and by 2020:
 - PC/device and broadband for every home.
- Making finance available for IT purchase:
 - "Priority sector status" should be accorded to IT purchase - hardware, software and broadband for SMBs and households by nationalized/PSU banks as also by NBFCs and micro finance companies. The government should develop programs for concessional loans for these sectors.
 - The Central Government as well as state governments should provide interest free loans to all their employees for the purchase of IT products. Currently, such loans are available only to officials beyond a certain ranking.



Source: "IDC: 2009 toughest year for China's PC market," *China daily*, chinadaily.com, accessed 2 October 2009

- Incentivizing the consumer:
 - 100% depreciation on capital investment in IT - hardware and applications by companies once in a block of three years.
 - The income tax rebates to individuals for the acquisition of computers once in three years, subject to a limit of INR50,000 and up to INR1,000 per month deduction from taxable income for broadband access.
- e-governance:
 - All the existing e-governance projects must be completed by 2014. There is a need to prioritize various projects of the government and track them annually. The annual financial allocation of funds for such projects should be correlated to the targets achieved, and in cases of non-satisfactory performance, the grant should be converted into loans. This should be done for each year between 2010 and 2014, both inclusive.
 - Encourage the replication of applications by creating a library/database of applications to be drawn on by the Central Government as well as the state and local governments
 - Take a pragmatic approach to standards and technology investments; focus technology decision-making on outcomes and goals rather than specific technology implementations
 - Embrace international standards, encourage interoperability and continue the policy of technology neutrality in procurement
- Mandate all cooperative banks to automate banking operations in each branch by 2014.

The above will enable digital access for all, leading to India become a dynamic digital society and economy.

Recommendation 2: The current taxation rates extended under the recent fiscal incentive package should prevail long-term to make available products at affordable prices.

Recommendation 3: A multi-slab, multi-threshold incentive package such as the Special Incentive Package Scheme (SIPS) should be announced to attract electronics manufacturing Investments at various levels. This is to offset the disability costs suffered by the domestic manufacturers on account of infrastructure and other handicaps.

Recommendation 4: The clusters of suppliers of components such as a hard disk, optical disk, CPU, motherboard, etc., should be built close to the assembling plant. A couple of pilot ITIR near Sriperumbudur in Tamil Nadu and Noida in UP could be considered for the purpose.

Recommendation 5: The IT finished goods manufacturing companies, jointly or individually, should engage in a vendor/supplier development program for encouraging local eco-system development.

Recommendation 6: The Government of India extends loans/grants to Africa/Latin America, etc., under various bi-lateral programs. All product offerings under such programs should preferably be sourced from domestic companies.

TELECOM PRODUCTS AND EQUIPMENT

Overview

Owing to phenomenal growth in recent times, India has become the fastest-growing telecom services market in the world. With 494 million telecom subscribers (wireless and fixed line) at the end of August 2009, India's telecom subscriber base is second only to China. Telecom services are significant contributors to India's GDP. There is a 1.2% addition to GDP for every 10% rise in tele-density.

This growth has also boosted the telecom electronics and equipment manufacturing segment. India has emerged as one of the fastest-growing markets for global telecom electronics and equipment vendors such as Alcatel-Lucent, Ericsson, Huawei, Motorola and Nokia.

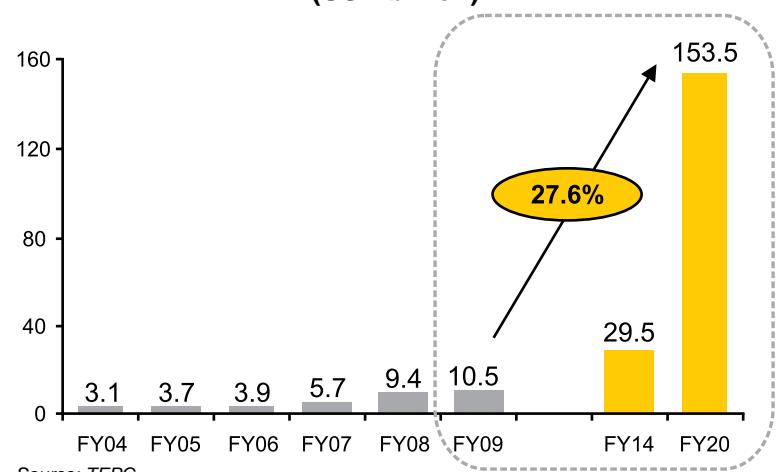
Key events in Indian telecom services space

- Initiated in 1991, the liberalization process led to the complete deregulation of telecom services.
- In 1992, the value-added services segment, including mobile services, was open to private participation.
- The New Telecom Policy, announced in 1994, permitted the entry of one private operator in each circle.
- In 1997, Telecom Regulatory Authority of India (TRAI) was established as an independent telecom regulatory body.
- In 2008, the Department of Telecommunication (DoT) announced guidelines for 3G and WiMax spectrum auctions.

Segment size: current and projected

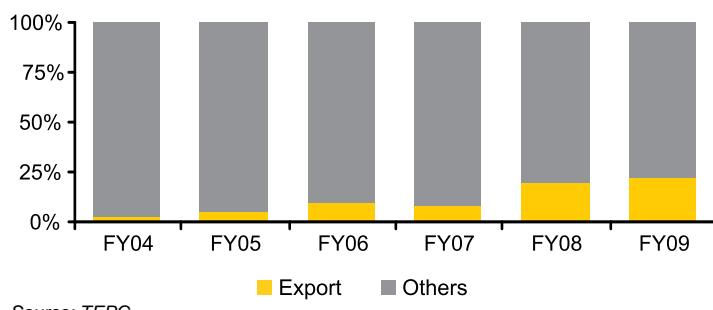
- In FY09, the production of the telecom electronics and equipment segment increased by 11.7% to reach USD 10.5 billion.
 - This growth was primarily driven by a rise in the demand for wireless services in India, which fueled demand for mobile handsets.
 - According to the DoT, mobile handset production increased from USD 2.5 billion in FY07 to USD 6.5 billion in FY08, registering a growth rate of 160%.
- The segment's production is expected to reach USD 29.5 billion in FY14 and USD 153.5 billion in FY20.

Telecom electronics and equipment production (USD billion)



The potential to increase exports of telecom electronics and equipment is significant.

Telecom equipment: share of exports



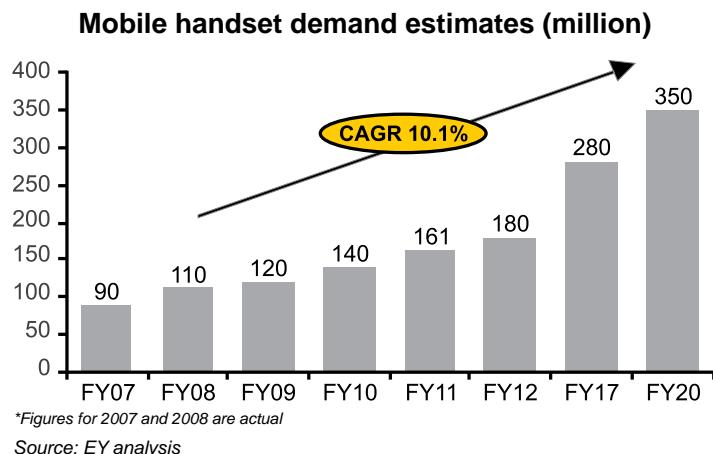
- Despite the segment's strong growth of 29.9% annually during FY04-09, only 21.2% of the total production was exported in FY09.
- China's contribution to global handset manufacturing is 50% as compared to India's contribution of 8%.

Growth drivers of the segment

- Increasing subscriber base: Despite the urban sector reaching saturation point, the growth of the wireless subscriber base is expected to continue increasing steadily. According to the TRAI, the wireless subscriber base is expected to grow from 457 million in August 2009 to 697 million by 2012. This represents a profitable opportunity for global telecom electronics and equipment manufacturers in India.
- Growth in rural mobile telephony: The rural markets are expected to drive the next phase of growth for telecom services as the urban markets reach saturation point. It is expected that by 2012, the rural subscriber base will account for nearly half of all subscribers with access to telecom services. The strengthening of the rural telecom network will create significant opportunities for telecom electronics and equipment manufacturers.
- Broadband penetration and connectivity: Broadband subscribers are expected to increase from 6.98 million in August 2009 to 27.3 million by 2012. Rising broadband penetration is expected to further drive growth in the segment. Broadband is an enabler for a wide range of applications such as e-governance, telemedicine and education. Thus, increased broadband penetration and connectivity can significantly impact job creation, innovation and the growth of the telecom electronics and equipment manufacturing industry.
- 3G/WiMax: The expected launch of 3G services in the near future, offers significant growth opportunities for telecom electronics and equipment manufacturers. The launch will create substantial demand for 3G-enabled handsets.

Entry-level mobile phones and an increasing rural subscriber base are expected to drive demand in future.

- The demand for mobile handsets is expected to increase from 110 million units in FY08 to 350 million units in FY20.
- This represents a growth rate of 218.18%, translating to a CAGR of 10.1%.
- To cater to this burgeoning demand, it is expected that the production of handsets in India will increase from 120 million in FY08 to 505 million handsets in FY20.
- Further, the average price per handset is expected to decline to USD 41.5 by FY20, indicating that lower-priced handsets will play a significant role in capturing demand.



Case for a growing domestic telecom electronics and equipment manufacturing industry

- Employment generation: Given the right impetus, growth in the segment holds the potential to triple the country's current employment base by FY14.
- Significant export potential: According to the Telecom Equipment and Services Export Promotion Council (TEPC), the segment holds an export potential of USD 10 billion by FY14, further strengthening the case for a robust domestic manufacturing industry.
- Increased competitiveness in the global market: A technologically advanced manufacturing ecosystem in India prospectively offers an international platform to Indian manufacturers. Thus, Indian players can expect to compete globally with established manufacturers in the long run and make their own mark in foreign markets.

An enabling policy and regulatory environment

- In an attempt to boost manufacturing in the segment, the Indian government has implemented a series of policy initiatives:
- The Centre for Development of Telematics (C-DOT) was incorporated in August 1984 as an autonomous body to develop advanced telecommunication technology in the country. The main objective was to establish a center for excellence in the telecom technology domain.
- The Indian government's Ministry of Commerce set up the TEPC in 2008 to promote the export of telecom equipment and services.
- The government has declared that no license was required for the import of all capital goods for manufacturing telecom equipment.
- The government has also exempted infrastructure telecom equipment from customs duty.
- No industrial license is required to manufacture telecom equipment. Instead, a simple industrial entrepreneur memorandum (IEM) needs to be filed with the Secretariat for Industrial Assistance (SIA).
- The government has made a provision of 100% FDI in telecom equipment manufacturing.

Recommendations

- **Recommendation 1: Maintain the current taxation structure.**
 - The current taxation structure for mobile handsets must be maintained for the long term growth.
- **Recommendation 2: Encourage the domestic manufacturing industry by creating a strong market pull.**
 - Incentivizing the telecom operators to buy indigenously manufactured telecom electronics and equipment keeping in view the national security concerns.
 - While awarding large contracts, preference should be given to local players.
- **Recommendation 3: Telecommunication exports should be a part of bilateral trade programs.**
 - Similar to the approach adopted by the Chinese government, telecom exports from India may be included in bilateral trade agreements with emerging markets in regions such as South Asia, Africa, Latin America, Russia and Eastern Europe.
 - Indian trade missions in these regions should proactively seek opportunities in the telecom electronics and equipment domain and facilitate business interactions.
- **Recommendation 4: Provide financial support.**
 - Create an initial fund for R&D and product development for the segment. The Universal Service Obligation (USO) fund may also be utilized for this purpose. Under this fund products can be designed and such designs be given to multiple local manufacturers to produce them for unique local requirements.
 - Set up an autonomous body, similar to the Telecom Finance Corporation, to assist Indian players in setting up a manufacturing facility and provide guidance.
- **Recommendation 5: Create a mandate for operators to buy Indian equipment.**
 - All telecom operators must be required to have multiple sources and should be required to buy at least 30% of Indian equipment, especially in areas where Indian companies already have globally competitive products.
- **Recommendation 6: Attract investments for accessories.**
 - Create a detailed program to attract investments for accessories such as batteries and chargers for mobile handsets.

CONSUMER ELECTRONICS

Consumer electronics is the largest segment of the Indian electronics industry, accounting for 27% of the total domestic production revenue.

Overview

Consumer electronic manufacturing was launched in India in the 1950s by the production of radio sets. It was followed by the production of black-and-white TV sets in the 1960s and color TV (CTV) sets in 1982.

The Indian government initiated liberalization policies for the segment in 1992, relaxing controls such as licenses and the use of brand names. In 1994, the Indian market was open to major consumer electronic manufacturing multinational companies (MNCs), such as Panasonic, Sony, LG and Samsung.

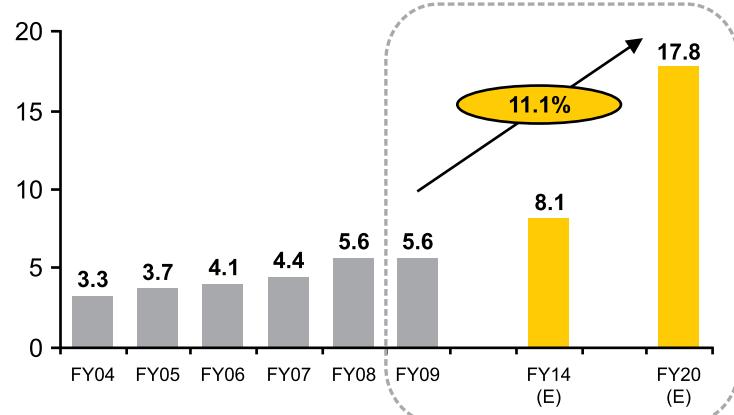
In 2001, non-tariff barriers on imports were removed, and in 2004 the Free Trade Agreement (FTA) with Thailand was implemented, resulting in the reduction of import duties on CTVs, color picture tubes, refrigerators and air conditioners. This led to increased competition with international manufacturers.

Currently, MNCs dominate the Indian consumer electronics market, which have major market share in most categories. The growing middle class offers significant market potential to these companies. The demand for premium and luxury products is rising in the urban markets due to changing consumer lifestyles. Low-end products also have a significant market, especially in rural areas.

Segment size: current and projected

- Consumer electronics is the dominant segment of the electronics industry, with a revenue contribution of 27%.
- During FY09, production in this segment was USD 5.6 billion.
- For the five-year period, the segment grew at a CAGR of 11.1%.
- Based on its CAGR, consumer electronics production is expected to reach USD 8.1 billion by FY14 and USD 17.8 billion by FY20.

Consumer electronics production (USD billion)



The segment holds significant potential for employment generation, with 2 million jobs expected by FY14 and 25 million by FY20.

Growth drivers for the consumer electronics segment

- **Digitization:** Rapid implementation of digitization in India through media such as TV and radio and the immediate rollout of the conditional access system (CAS) is likely to generate demand for new products in India.
- **Higher disposable income and availability of financing:** Disposable income is rising, and consumer financing has become easier. This increased spending on lifestyle products such as TVs, air conditioners and white goods.
- **Affordable products:** Advanced technology and increasing competition are narrowing the price gap, thereby leading to affordable products in most categories.

- Increased organized retail: Organized retail segment is increasing rapidly. Currently the segment is 5% of the total retail market but is expected to grow to 15% by 2015.
- Establishment of retail chains: The establishment of retail chains such as Croma, E-Zone and Reliance Digital, which exclusively cater to consumer goods, thereby increasing the demand.
- Shorter replacement cycle: Rising incomes and evolving lifestyles have reduced the replacement cycle from 9-12 years to 4-7 years. The trend of purchasing a second TV within a single household has also increased.

The changing dynamics of the segment

- Rising demand for CTVs: CTVs are the largest contributors to this segment. During FY09, the domestic CTV segment has been estimated to cross 13.5 million units. High-end products, particularly LCD TVs, continue to register a high annual growth rate in FY09. Estimated at 0.8 million units, the LCD market registered more than 130% growth in FY09. LCD TV manufacturing in the country has begun, and as demand increases, the production is expected to increase.
- Growth of the DVD market: Currently, the Indian DVD market is estimated at 7 million units, which is growing at 15% annually. The market size is projected to be 10 million units by 2010. This is driving the sales of DVD players and audio equipment, thus spurring strong growth in the home theater segment.
- Introduction of direct to home (DTH) service: With the introduction of direct to home services, the market for set top boxes (STB) is growing rapidly. Indigenous sources are manufacturing around 25-30% of STBs.
- Decline in demand for black-and-white televisions: The production of black-and-white TVs continues to decline. Certain medium-scale units have moved to tax-exempted regions, and these units are performing OEM work for other well-known brands.

Case study: Technology transfer in exchange for access to the domestic market

In the late 1980s, the Chinese government adopted the strategy of access to technology transfer in exchange for domestic market (TTEDM). By doing so, the government encouraged MNCs to transfer advanced technology to local manufacturing units in exchange for access to the Chinese market. This incentive, along with the low labor cost and favorable regulatory environment under the export promotion zones (EPZs) scheme, resulted in the relocation of manufacturing units of many consumer electronic companies from the US, the UK, Japan, Taiwan and Hong Kong to Singapore, South Korea and China.

The measures under TTEDM include:

- Provisions are made for the continuous transfer of advanced technology through joint venture (JV) agreements.
- The review and approval of certain electronics JVs by the Central Government are mandated to ensure compliance with industrial policies.
- A foreign direct investment (FDI) limit of 50% has been placed on local manufacturing setups.
- Labor-intensive JVs are restricted unless 100% export of output is guaranteed.
- The export of 70% of the output is mandatory.

Challenges hampering growth of manufacturing in the segment

Challenge 1: Significant cost of rural expansion

- Consumer electronics companies are setting up manufacturing operations in rural areas as land and labor costs in these areas is lower as compared to urban regions. However, expanding operations into rural markets requires significant infrastructural investments. Expenditure on the transportation of inventory to rural areas is greater

due to lack of logistical infrastructure. Even LG and Samsung, which are considered to have the largest distribution network in India, have a direct presence only in 15,000 to 18,000 of the 40,000 retail outlets in the country.

- Power is essential for the use of consumer products. The limited availability of power in rural areas is hampering the penetration of consumer electronics.

Challenge 2: Lack of skilled manpower implies training costs

- India has abundant manpower. However, the consumer electronics segment requires manpower with specialized experience in electronics. Training is, therefore, an additional investment manufacturers need to make.

Recommendations

Recommendation 1: Digitize India

- The need to digitize India is imminent. India should digitize by 2014, this will release the much needed spectrum for 3G and Wimax Services. Further, TV, radio and the immediate rollout of CAS are likely to generate demand for new products in India.

Recommendation 2: Incentivize the rural expansion of consumer electronics manufacturers

- Consumer electronics manufacturers should be offered incentives to set up manufacturing units and expand distribution networks in rural areas. This is expected to provide access to economical labor as well as increase demand for consumer electronics in India.

Recommendation 3: Encourage technology transfer and relocation of manufacturing units

- Encourage MNCs to set up manufacturing facilities in India either through JVs with local players or relocate their facilities from overseas locations through tax breaks. This will provide India with access to advanced global technologies and create a platform for higher value-added manufacturing.

Appendix

ELECTRONICS INDUSTRY STATISTICS

Demand and production statistics

	Target (USD billion)		
	2009	2014	2020
Global industry size	1,750	2,000	2,400
Domestic industry size			
Demand	45	125	400
Production for domestic consumption	16	85	320
Production for exports	4	15	80
Total production	20	100	400
Share in global production	1.2%	5%	16.6%
Value addition	< 10%	15–20%	30–40%

Source: EY Analysis

Production estimates for key segments

	Target (USD billion)	
	2014	2020
Semiconductor design	20.0	58.2
High-tech manufacturing	4.0	22.6
Electronic components	2.6	3.4
Electronic Manufacturing Services	1.4	2.3
Electronic systems		
Consumer electronics	8.1	17.8
Telecom products and equipment	29.5	153.5
IT systems and hardware	16.7	54.4
Others (Industrial, Automotive and others)	2.7	7.8

Source: EY analysis

POLICY AND REGULATORY ENVIRONMENT

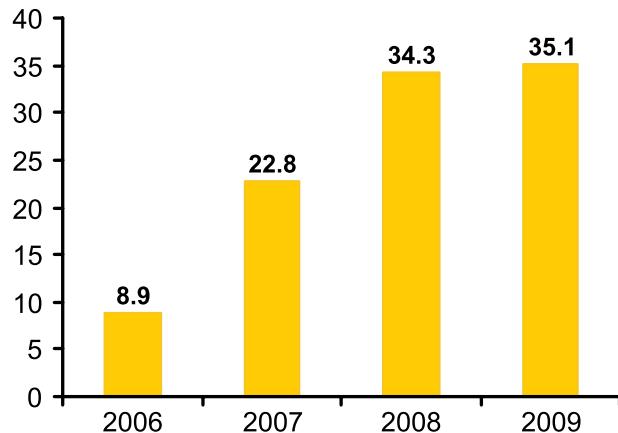
Foreign direct investment (FDI) policy

The government has established the Foreign Investment Promotion Board (FIPB) to promote foreign investments in the country through international companies, non-resident Indians and other foreign investors. The main objective of the FIPB is to ensure the early clearance of proposals, the periodic review of policies and the establishment of proper institutional arrangements and transparent procedures. Further, to provide impetus to the electronics industry and enhance its export potential, the Electronic Hardware Technology Park (EHTP) and Software Technology Park (STP) have been set up, and offer incentives such as duty free imports, income tax holidays, the exemption of excise duty and other benefits. The main objective behind the implementation of these schemes is to provide a flexible policy environment that would work to enhance the ease of doing business in India.

FDI in electronics industry

- India received a total FDI of USD 35.1 billion in FY09 as compared with USD 34.3 billion in FY08.
- The cumulative inflows of total FDI for the period from April 2000 to July 2009 stood at USD 94.5 billion.
- The cumulative FDI in the electronics industry for the period from April 2000 to July 2009 was USD 0.78 billion; representing 0.85% of the total cumulative FDI inflow.

FDI inflow in India 2006-09 (USD billion)



The electronics segment received 0.85% of the total FDI from April 2000 to July 2009.

Export promotion schemes

To make India a global player in the manufacturing space besides meeting the country's growing demand for electronics, the Government of India has initiated major economic reforms, which aim at rapid and substantial economic growth. The new governmental policies and schemes have made procedures transparent and accelerated the process of setting up a manufacturing facility. Some of these schemes initiated by the government to fulfill the above mentioned objectives are:

- Export Oriented Unit (EOU) Scheme
- Electronics Hardware Technology Park (EHTP) Scheme
- Special Economic Zones (SEZ) Scheme
- Export promotion Capital Goods (EPCG) Scheme
- Special Incentive Package Scheme (SIPS)

Features of export promotion schemes

Parameter	EHTP/EOU scheme	SEZ Scheme (SEZ Act 2005)
Fiscal		
Period	Available for a period of 10 years beginning from commencement of manufacture	Total period of 15 years from date of commencement of manufacturing, provided unit commences manufacture after 1 April 2005
	Tax holiday is available up to 31 March 2011	
Income tax holiday	100% of export profit	For units that commence manufacturing after 1 April 2005: 100% of export profits for five years, 50% for the next five years, up to 50% for the balance five years
Customs duty	Exemption available on import of capital goods, etc. (barring a few exceptions)	Exemption available on import of capital goods, etc. (barring a few exceptions)
Service tax	No exemption for input services procured and used by the STP unit	Exemption from service tax for input services procured and used by the SEZ unit
	No service tax required to be levied on taxable services exported out India as per Export of Services rule	No service tax required to be levied on taxable services exported out India as per export of services rule

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Parameter	EHTP/EOU scheme	SEZ Scheme (SEZ Act 2005)
	Further, service tax paid on input services used in rendering taxable service that are exported from India are eligible for rebate	
Excise duty	Eligible to procure capital goods and raw materials at nil rate of excise duty	Eligible to procure capital goods and raw materials at nil rate of excise duty procured from the domestic tariff area (DTA)
	Manufacture of IT software attracts nil rate of excise duty	Manufacture of IT software attracts nil rate of excise duty
Sales tax	EOUs and STPs units are eligible to claim refund of central sales tax paid to sellers subject to appropriate declaration	Inter-state sales made to SEZ units are exempt from levy of central sales tax
Others		
Location	No location restrictions	The unit should be located in the prescribed zones
Export commitment	Positive net foreign exchange (NFE) required in five years	Positive net foreign exchange (NFE) required in five years
Time limit for realising exports	Within 12 months from the date of export	No time limits

COMPETITIVE BENCHMARKING: CHINA CASE STUDY

China

SEZ policy

- Due to the concentration of firms, the infrastructure scale has been improved for the SEZ. Further, a common pool of skilled labor and specialized services are available to the firms.
- Encourages infrastructure investment by private sector, with 15-20% investments. The SEZ is open to FDI as well.
- Land allocation is managed by the government
- Power and water are supplied from local utilities. If this is not feasible, then captive units are set up.
- Private developers provide:
 - Buildings, workshops, water/power distribution, sewage, roads, railheads, ports with approval from concerned authorities, build colleges, vocation training schools
 - Construction for customs, post office, banks, insurance



Income tax incentives

- For manufacturing:
 - 100% exemption for the first two years; 50% exemption for the next three years
 - The exemption can be availed during a 10-year period from the start of operations.
 - The exemption is available from the first profit making year.
 - In addition, the profit reinvestment for five years makes the company eligible for a refund of taxes on 40% of the reinvested amount.
- For high technology zones:
 - 100% exemption for the first two years; 50% exemption for next eight years for high tech zones
 - In addition, the profit reinvestment for years in high technology makes the company eligible for a 100% refund of taxes on the reinvested amount.

COMPETITIVE BENCHMARKING: MALAYSIA CASE STUDY

Malaysia

Current scenario

- Since the early 1970s, the Government of Malaysia has shifted its strategy from being an import-driven country to an export-oriented one. This, along with conducive business conditions, has contributed significantly to the growth of the electronics industry in the country.
- In 2008, there were more than 1,500 electronic manufacturing companies that generated a total electronics export of around USD 70.2 billion.
- The export of electronic components stood at USD 29.5 billion in 2008, with semiconductor devices contributing 91.5% to the total electronic component export.
- Around 200 industrial parks and 18 free industrial zones (FIZs) have been developed to cater to the needs of export-oriented industries, which facilitate duty free imports of raw material, components and machinery required directly in manufacturing processes.



Outlook

- In line with the Third Industrial Master Plan (IMP3), 2006-2020, the Government of Malaysia plans to further strengthen its already robust semiconductor segment by:
 - Developing a semiconductor cluster value chain
 - Setting up the necessary infrastructure and training institutes
- Other policy initiatives to be implemented under the IMP3 are:
 - Promoting advanced technology products such as flat panel display, wireless communication technologies, micro-computers and photonics
 - Setting up research institutes, centers of excellence in universities to increase the availability of skilled workforce in the country
 - Encouraging M&A and strategic partnerships to integrate the Malaysian industry with global supply chain networks

COMPETITIVE BENCHMARKING: VIETNAM CASE STUDY

Vietnam

Current scenario

- Vietnam is fast emerging as Asia's next low-cost electronics manufacturing destination.
- The country's pace of economic growth is second only to China in the Asian region with the GDP growing at an average rate of 7.4% over the past few years.
- The IT and electronics industries in Vietnam, in the past few years have recorded an average growth rate of around 30% per annum.
- The country's electronics industry is aiming to achieve a production value of around USD 5.5 billion by 2010.
- Vietnam's manufacturing sector is growing nearly by 11% annually, while the services sector is also not far behind and is primarily driven by growth in the retail and tourism industries.



Outlook

- Vietnam became the 150th member of the World Trade Organization (WTO) in November 2006. This will help Vietnam open its market to foreign investors as more international companies are likely to be interested in establishing their presence in the country.
- Vietnam has a relatively younger demographic profile, with nearly 60% of the population under the age of 25 years or below. Further, the country's literacy rate in Vietnam is around 97%, almost equal to the literacy rate in the US and well ahead of India.

CURRENCY CONVERSIONS USED

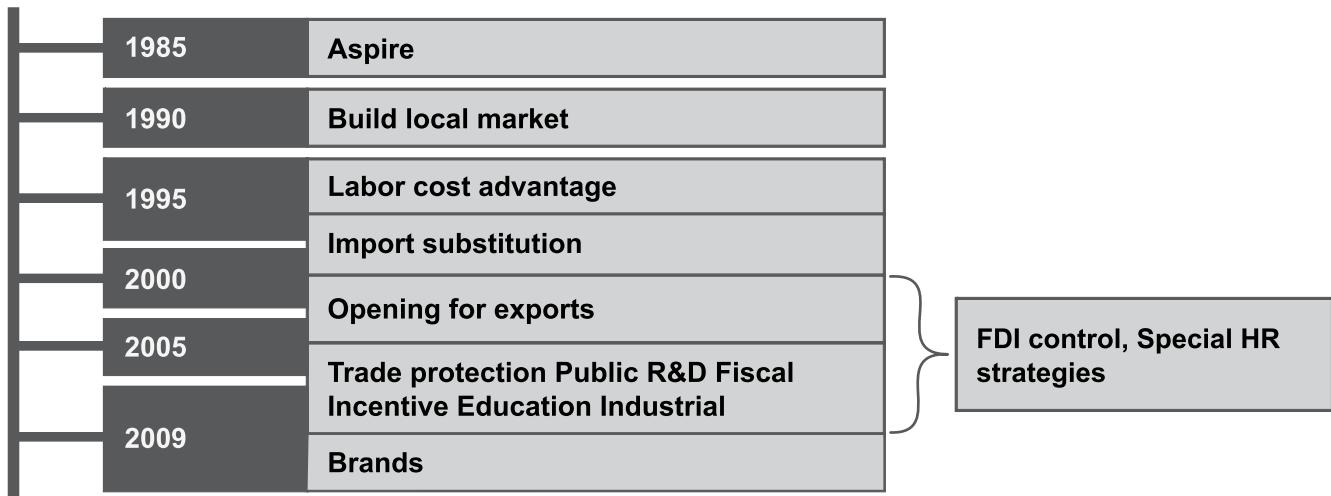
Fiscal year	INR/USD rate
FY04	46.0
FY05	44.9
FY06	44.3
FY07	45.3
FY08	40.3
FY09	46.5
Others	45.0

Case study: Taiwan

GROWTH OF THE ELECTRONICS MANUFACTURING ECOSYSTEM IN TAIWAN

Over 15 years of focused effort from the government and industry have helped establish a full-fledged ecosystem.

Key milestones in the development of the Taiwanese electronics ecosystem



Taiwan has highly developed infrastructure. A drive for an hour on the highway from Taipei to the world famous Hsinchu Science Park, spread over 632 hectares of land, a IT park that houses virtually the all the MNCs in the semiconductor and IT industry, from Acer, chipmaker United Microelectronics to AU Optronics and D Link.

The Chinese are replicating the Hsinchu Science Park model for their own IT parks. This park involved the clusters of most of the semiconductor component manufactures, thus saving on time and cost for assembly. This park includes independent wafer foundries, IC design companies, fabricators, as well as packaging and testing companies for the semiconductor industry all at one place. This allows for competition as well as cooperation and integration that is unique. It is a one-stop shop for a company looking for IC products.

The availability of high-tech professionals is available in Taiwan. The Hsinchu-based, government-funded Industrial Technology Research Institute has hordes of laboratories in which over 5,000 researchers work in close unison with local companies.

As a result of this success, more than 40 spin-off park companies have been set up, based on the research. Two universities - National Chiao Tung University and National Tsing Hua University - are sited in the park area providing companies with a regular stream of outstanding professionals.

Government policies

Even government policy is clearly aimed at assisting companies in the park. Companies here are offered bank loans at interest rates that are 2% lower than for loans to companies located in other parts of the city. Companies at the park do not have to pay duties on imported machinery or raw material. In addition, the over 179-member Taiwan Venture Capital Association offers funding. The success of the park has generated a huge corporate demand, so much so that Hsinchu is setting up four new parks spread over 600 hectares across the country for Taiwan's high tech industry. Taiwan's IT systems and hardware companies are not quite the low-cost, low-tech outfits that the world commonly perceives them as.

In a multi-pronged strategy, they are shifting manufacturing to the Chinese mainland and simultaneously drawing on Taiwan's research and development and high-tech designing skills, supported by research institutes and universities, in addition to building global brands. Notably, capital-intensive work is more prominent in Taiwan, while labor-intensive work is relatively more visible in China. Even the raw material is obtained from China. As a result, over a million Taiwanese work in China, and the two countries have a cordial work relation.

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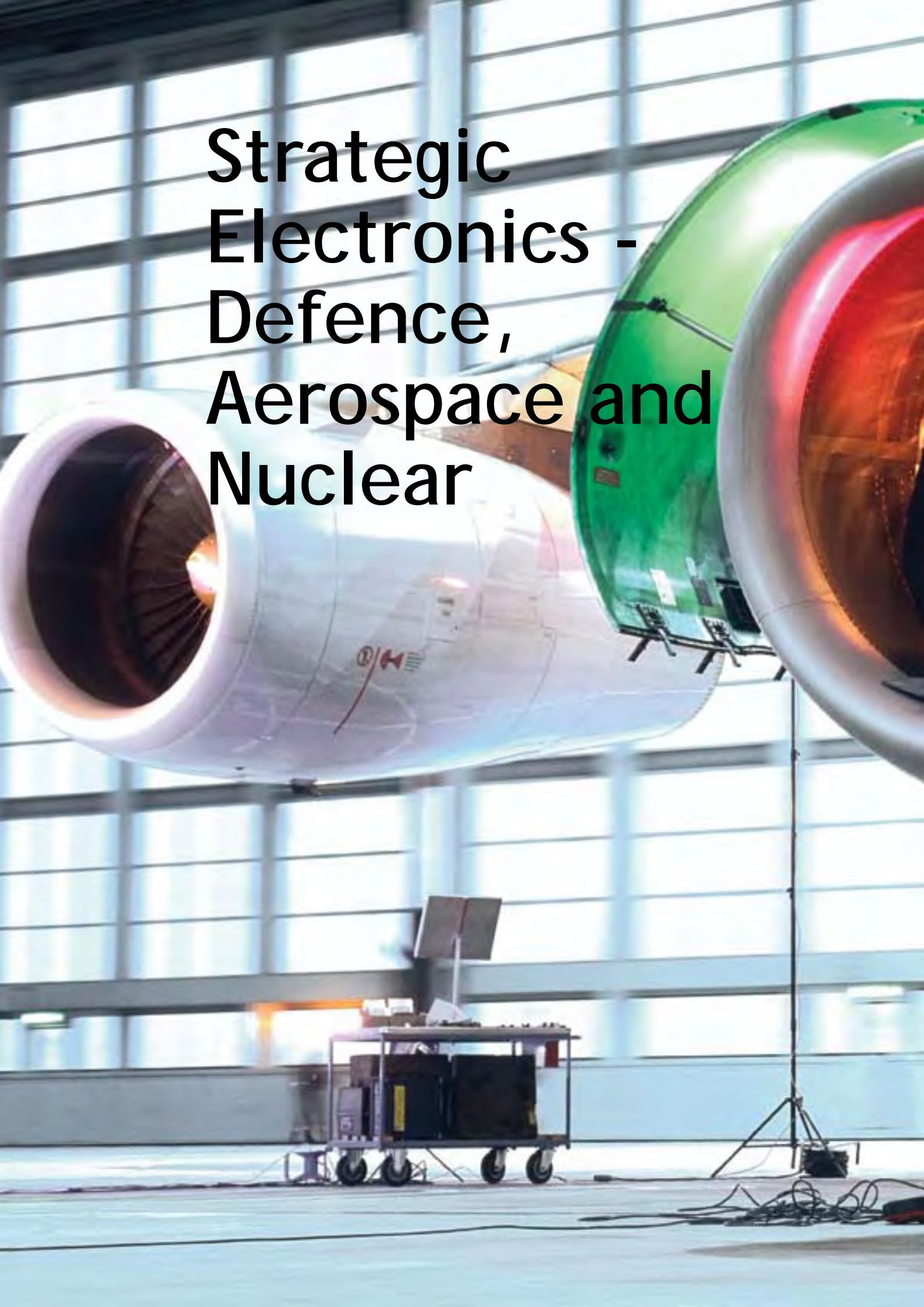
Interviews

Interviews with industry bodies such as CEHA, ELCINA, ISA, ICA and MAIT. We also interviewed key executives at leading companies in the electronic systems, design and manufacturing ecosystem.

Glossary

AMI	Advanced Metering Infrastructure	IT/OA	Information Technology/Office Automation
B&W	Black & White	ITA	International Trade Agreement
BOM	Bill of Material	JV	Joint Venture
C-DoT	Centre for Development of Telematics	LCD	Liquid Crystal Display
CEHA	Council of Electronics Hardware Associations	LED	Light Emitting Diode
CIS	Commonwealth of Independent States	MAIT	Manufacturers' Association of Information Technology
CSC	Computer Service Center	MGREGA	Mahatma Gandhi Rural Employment Guarantee Act
CSO	Chief Scientist Office	MNC	Multi-National Companies
CST	Central Sales Tax	NFE	Net Foreign Exchange
DG	Diesel Generation	OCS	Office of the Chief Scientist
DoT	Department of Telecommunication	ODM	Original Device Manufacturer
DTA	Domestic Tariff Area	OEM	Original Equipment Manufacturers
DTH	Direct To Home	PMO	Prime Minister's Office
EHTP	Electronic Hardware Technology Park	R-APDRP	Restructured - Accelerated Power Development and Reform Programme
ELCINA	Electronic Industries Association of India	ROI	Return on investment
EMS	Electronics Manufacturing Services	SEZ	Special Economic Zones
EOU	Export Oriented Unit	SIA	Secretariat for Industrial Assistance
EPCG	Export promotion Capital Goods Scheme	SIPS	Special Incentive Package Scheme
FDI	Foreign Direct Investment	SSA	Sarva Shiksha Abhiyaan
FI	Financial Institutions	STB	Set Top Box
FIEO	Federation of Indian Export Organizations	STP	Software Technology Park
FIPB	Foreign Investment Promotion Board	TEPC	Telecom Equipment and Services Export Promotion Council
FIT	Feed-in Tariff	IMP3	Third Industrial Master Plan
FIZ	Free Industrial Zones	TRAI	Telecom Regulatory Authority of India
GBI	Generation based Incentive	TTEDM	Technology Transfer in Exchange for Domestic Market
GDP	Gross Domestic Product	USO	Universal Service Obligation
GST	Goods and Services Tax	WTO	World Trade Organization
ICA	Indian Cellular Association		
IEM	Industrial Entrepreneur Memorandum		
ISA	Indian Semiconductor Association		

Strategic Electronics - Defence, Aerospace and Nuclear



Executive Summary

India's defence, aerospace and nuclear sectors are poised for substantial growth as economic growth surges and in the interest of national and energy security. A decade ago, India was at a similar inflection point in the information technology (IT) and IT enabled services (ITES) industry that has accounted for 45% of incremental job creation between 1995 and 2005. Much of this success stemmed from government interventions designed to foster growth. As geo-political factors result in India emerging as one of the top-5 markets for defence equipment by 2015, the Indian government could make strategic interventions to replicate success.

DEFENCE

Global defence equipment procurement is expected to reach approximately USD 250 billion in value in 2009 and will increase by around 30% by 2015 and India will be world's 3rd largest market for equipment. The key forces shaping the global market are:

- A shift away from traditional manned platforms to autonomous platforms in developed markets
- An increased focus on asymmetric warfare and expansion of role of IT in defence resulting from increased levels of cyber crime
- Increasing thrust on local production riding to counter relying on imports. To benefit from these trends, Indian companies can further harness their core competencies by focusing on opportunities in design and manufacturing such as:
 - Areas with higher technology intensity such as the integrated software plus hardware play in emerging areas such as homeland security, cyber warfare et al. More so IT spend is likely to be 4% to 5% of total defence expenditure by 2015.
 - Technology areas that need to be built domestically as global technology transfer is unlikely
 - Areas where the private sector can collaborate and provide superior execution capabilities to Defence Public Sector Units (DPSUs) such as fabrication

Realising this opportunity calls for implementing key recommendations from the Kelkar committee report. In particular, the complete implementation of the Raksha Udyog Ratna Scheme, and modifications to the offset clause for more effective technology transfer.

AEROSPACE

As demand for aircrafts surges India, China and Russia are expected to account for 15% of global demand over the next 15 years. Three factors are driving industry growth in emerging markets, namely rise of new original equipment manufacturers (OEMs) in emerging markets due to major commercial aircraft programmes, more global sourcing from low - cost countries, and outsourcing of R&D to emerging markets. Further, the offset requirement in India could stimulate a geographic shift of investment, approximately US\$ 16 billion by 2024 and could help build a niche for India in the aerospace sector.

- To leverage these market trends Indian players can target at least 3 opportunity areas:
 - Avionics, engineering design and software opportunities, due to its cost advantages and engineering prowess.
 - Parts and sub-systems manufacture that can supplied to Tier I/OEMs
 - Maintenance, repair and overhauling (MRO) business the demand for which is expected to triple from US\$ 600 million in 2008 to US\$ 1.6 trillion in 2018.

NUCLEAR

The increased focus on environmentally sustainable growth including the global focus on reducing greenhouse gas emissions is providing a big impetus to nuclear power development. In India, nuclear power is expected to contribute up to 25% to 50% of power generated by 2050, a massive leap from the current 3%.

The main opportunity for Indian manufacturers is collaboration with the Nuclear Power Corporation of India Limited (NPCIL) in manufacturing reactor components. Another opportunity for Indian manufacturers is supplying to global corporations. The 123 Agreement with the United States on civil nuclear cooperation will enable collaboration with leading global companies on new projects. Finally, Indian players can also participate in other parts of the nuclear power equipment value chain like commission et al which amount to 75% of power plant equipment costs

Given the sector is dominated by public sector units and other government agencies, private sector participation should be considered. An in-depth study with better involvement of the various government agencies involved in the sector should be undertaken to develop a more detailed perspective.

CONCLUSION

To achieve these opportunities the government needs to consider three immediate steps:

- Establish direct and indirect offset policies that will help bridge the gaps in domestic investment and drive technology transfer.
- Consider IT and Software capabilities as an enabling mechanism, and create an autonomous professional body to manage IT in the defence, nuclear and aerospace sectors.
- Accelerate the process by which private sector and indigenous participation occurs.

Introduction

India's defence, aerospace and nuclear sectors are poised for substantial growth on the back of economic growth and the need to maintain national and energy security. A decade ago, India was at a similar inflection point in the information technology (IT) and IT enabled services (ITES) industry. By capturing the opportunities at hand, the industry increased its contribution to GDP from 1% to 4% over the decade and created many jobs, accounting for up to 45% incremental of job creation (direct and indirect) between 1995 and 2005. Much of this success was due to government policies that helped foster growth. The expansion of this industry offers lessons on key success factors and government policy in guiding the defence, aerospace and nuclear sectors to similar success.

Driven by geo-political considerations, India is expected to be a top-5 market for defence equipment by 2015. Similarly, economic growth and a focus by commercial aircraft manufacturers on low-cost countries are expected to create growth in the aerospace market in emerging markets in general and India in particular. Finally, the civilian nuclear agreement between the US and India will enable commerce and cooperation, in particular allowing India to collaborate with global companies on nuclear projects. Transnational and multi-national co-development and co-production are on the rise and increasingly seen as critical to competitiveness. India has an opportunity to play an important role in this global phenomenon.

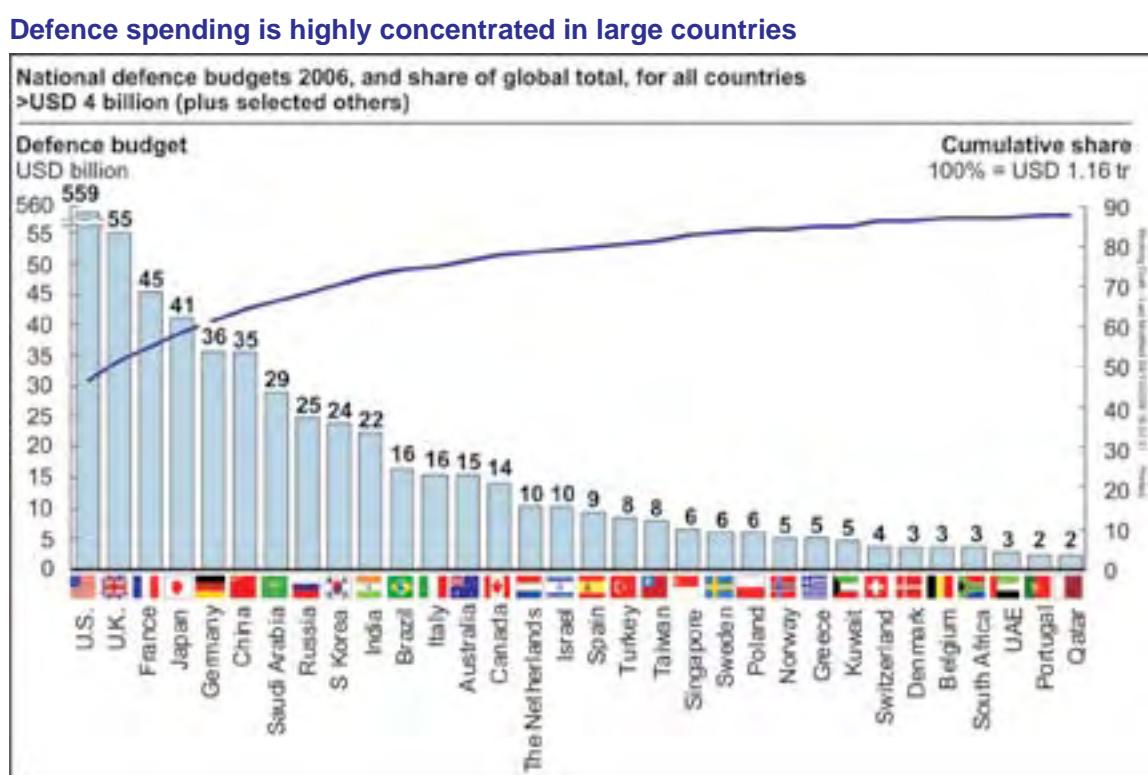
The developments described above will create attractive opportunities for the defence, aerospace and nuclear sectors in India.

The rest of this document describes the context for growth and major trends in each industry and the opportunities for Indian companies.

1. Opportunities in the Defence Sector

Defence spending has remained concentrated in developed economies, with the United States alone accounting for 50% of total global spending of USD 1.6 trillion in 2007 (Exhibit 1.1). However, the overall increase in defence spending is heavily weighted towards emerging markets. Between 2002 and 2005, defence spending by Russia and China grew at 18% and 13% respectively, compared to 9.7% in the US. Defence spending in India and Brazil was not much behind that of the US, at 8.6% and 8.3% respectively.

Exhibit 1.1



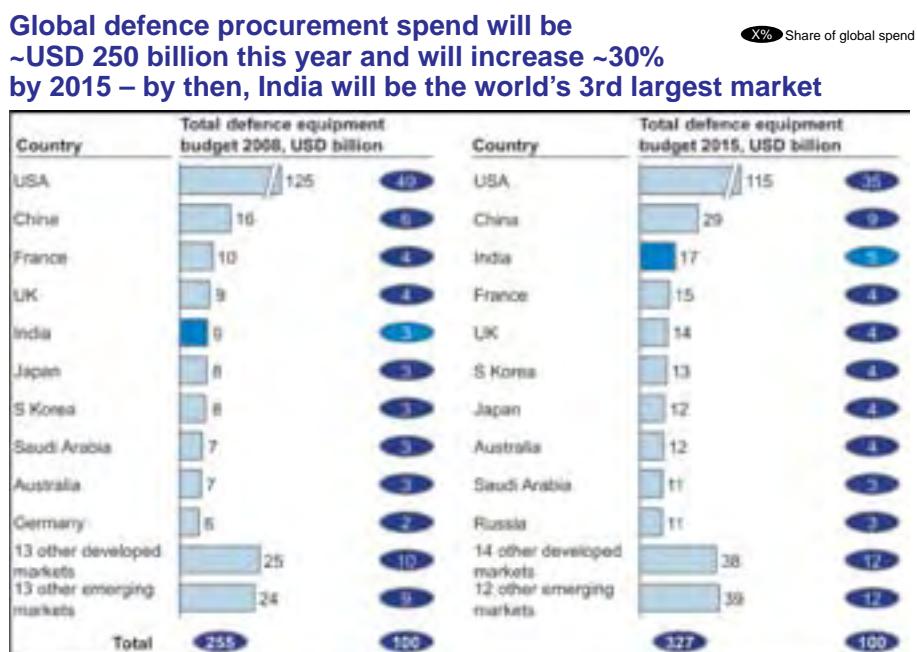
Demand in India for defence procurement is increasing and India can be a top-5 market for defence equipment by 2015. In 2008, India's budget for defence equipment was USD 9 billion; it is projected at USD 17 billion in 2015, the largest after the United States and China. Indian private sector companies can capture profitable opportunities available in the domestic market if they can tackle several challenges to growth and receive the government support required.

FORCES SHAPING THE GLOBAL DEFENCE MARKET

Global defence equipment procurement is expected to reach approximately USD 250 billion in value in 2009 and will increase by around 30% till 2015 (Exhibit 1.2). The following factors will shape demand:

- A shift away from traditional, manned platforms in developed markets: The market for traditional platforms such as aircraft, submarines and land equipment is large, mature and heavily concentrated. The spending on these traditional platforms are likely to decline by 2-5% p.a. Equipment for digital and homeland security and systems for autonomous platforms will be the highest growth areas

Exhibit 1.2

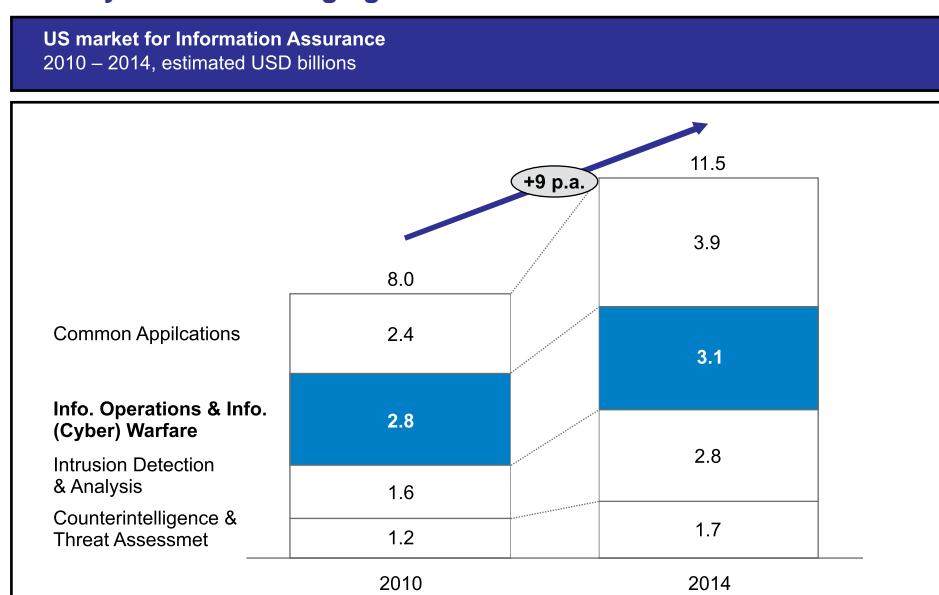


An increased focus on asymmetric warfare and expansion of role of IT in defence: ¹The increase in the number of asymmetric conflicts requires agile forces and responsive equipment. Depending on the type of threat, special military equipment is required for threat detection and asset protection including nonlethal weapons, unmanned combat air vehicles, early warning systems, vehicle protection equipment and satellites.

In addition, the role of IT in defence is expanding with the new focus on cyber security. The US is at the forefront of cyber security spending with USD 17 bn approved over the next 5 years and the global market estimate is over USD 8 bn. Defence companies have already begun to acquire niche cyber companies. (Exhibit 1.3)

Exhibit 1.3

The role of IT in defense expands, with the new market of Cyber Security/Warefare emerging



Source: New York Times, Bernstein Research, BB&T Capital Markets (June 3, 2009)

¹ War between opponents with significantly different military power, strategy or tactics particularly the indirect strategies of many weak actors.

- Move away from import to encouraging local production: India has traditionally sourced its defence requirements from other countries, particularly Russia. However, in recent years, the emphasis has been on improving indigenous defence industry capabilities through local sourcing. This has largely been serviced by the Defence Public Sector Undertakings (DPSUs) with limited private sector participation. Access to captive domestic demand is a prerequisite of success for defence companies. Other than Israel's majors, all defence players earn over 75% of revenues from home markets. Furthermore, companies that have successfully globalised with proactive government support typically source more than 70% of requirements domestically. Examples are Northrop Grumman and Lockheed Martin in the US, which earn around 90% of their revenues in their home market, EADS IN Europe (93%), Hindustan Aerospace Limited (97%), Singapore Technologies (63%) and Korean Aerospace Industries (76%).

OPPORTUNITIES IN DESIGN AND MANUFACTURING FOR INDIAN COMPANIES

To leverage some of these market trends and also exploit its core competencies, India should focus on:

- Areas with higher technology intensity-Integrated software+hardware play in emerging areas such as homeland security, C4ISR, cyber warfare, systems for UAVs
- Focus on technology areas that need to be built domestically as it is unlikely to be transferred by global players
- Areas where the private sector can collaborate and provide superior execution capabilities to Defence Public Sector Units (DPSUs) such as fabrication

Based on an extrapolation of the defence expenditure in India as per the Government of India data, the IT services spend from the defence industry is estimated to be ~\$0.4-\$0.5 billion by 2015. The assumptions include

- Defence expenditure will grow at historical CAGR of 11% per annum till 2015. As per Ministry data, the defence expenditure grew from ~INR 76,000 crores (actual) in 2004-05 to ~INR 92,000 crores (actual expenses) in 2007-08, a CAGR of 7%
- IT spend will be 4-5% of total defence expenditure
- IT services will comprise ~30% of the total IT spend. The other 70% will be spent on software and IT hardware

CHALLENGES FOR INDIAN PRIVATE SECTOR PLAYERS AND GOVERNMENT SUPPORT REQUIRED

The key challenge facing private sector companies is the lack of a “level playing field”. DPSUs have several advantages over private players. First, they have additional exemptions from select customs and excise duties. There was a move to extend this benefit to private players under the Raksha Udyog Ratna scheme, but it has not been implemented yet. Second, DPSUs enjoy a preference in pricing.

To encourage growth by attracting private investment, the government should initiate implementing the key recommendations from the Kelkar Committee Report on the following areas:

- Provide a level playing field for private players with the DPSUs by awarding the Raksha Udyog Ratna to deserving companies; removing nominations and eliminating price and purchase preference clauses for Indian defence contracts.
- Tighten offset clauses to provide for more effective technology transfer to India and enlist private sector participation in utilizing investments/business resulting from the offset clause

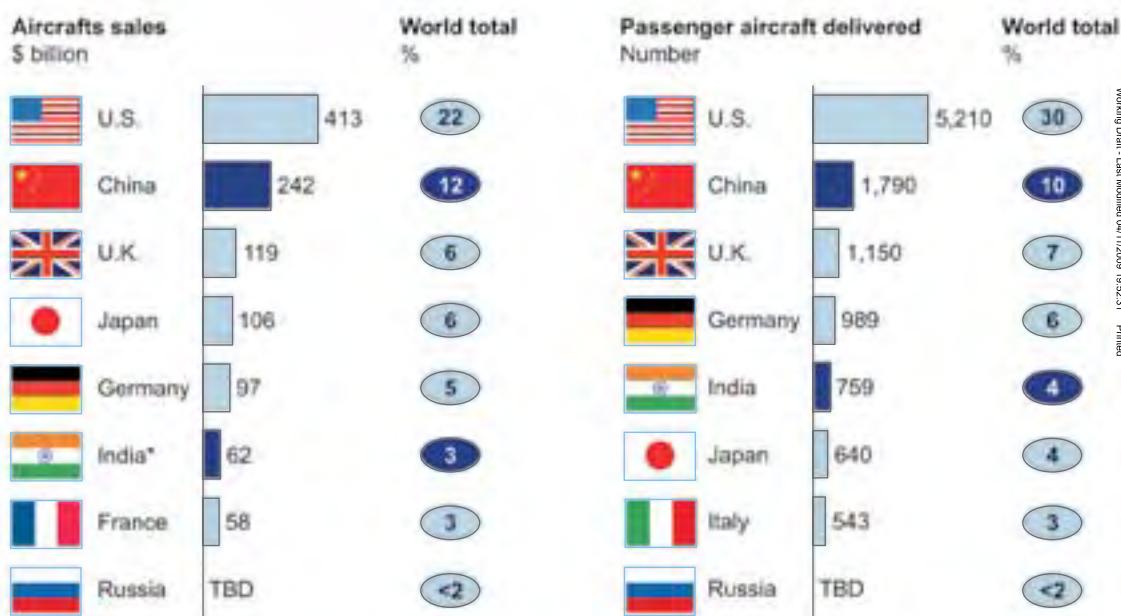
2. Opportunities in Aerospace

Demand for aircraft is surging in emerging markets; India China and Russia are expected to account for 15% of global demand over the next 15 years (Exhibit 2.1).

Exhibit 2.1

China and India will account for 15% of next 20 years aircraft sales

2004-2023

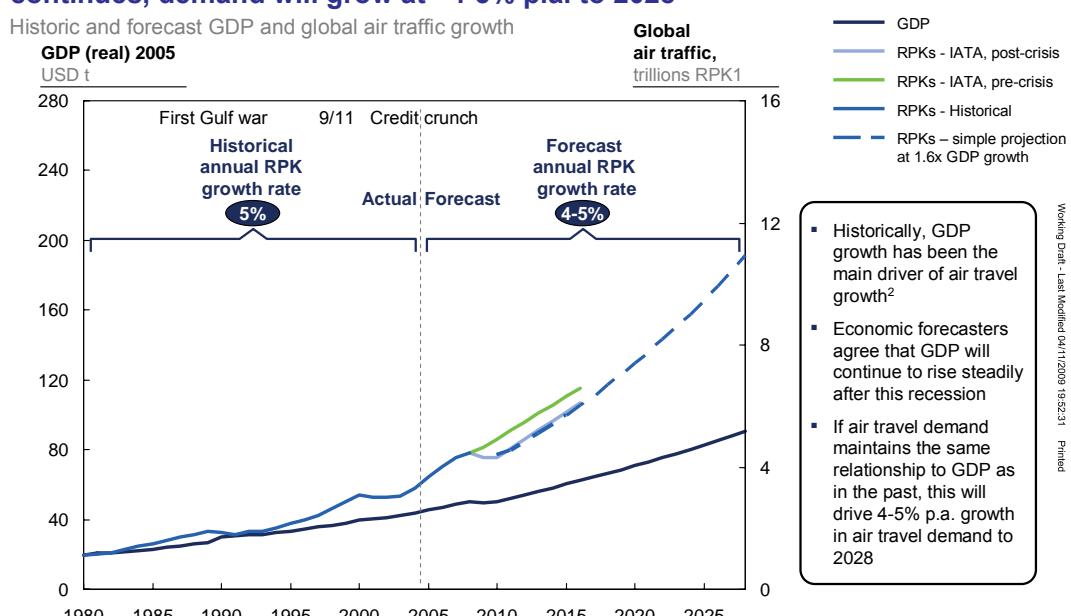


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In addition, air travel is expected to grow at 4% to 5% a year up to 2028 based on historical trends, although growth is likely to be erratic due to the cyclical nature of the industry (Exhibit 2.2).

Exhibit 2.2

Air travel demand has historically been driven by GDP; if this continues, demand will grow at ~4-5% p.a. to 2028



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- Historically, GDP growth has been the main driver of air travel growth²
- Economic forecasters agree that GDP will continue to rise steadily after this recession
- If air travel demand maintains the same relationship to GDP as in the past, this will drive 4-5% p.a. growth in air travel demand to 2028

1 Revenue passenger kilometers

2 GDP growth explains 95% of historical RPK growth, based on R2 value of regression. 1% GDP growth has historically driven 1.6% RPK growth

FORCES SHAPING GROWTH

The growth of the commercial aerospace industry will be driven by globalisation and a shift in demand towards light materials and composites.

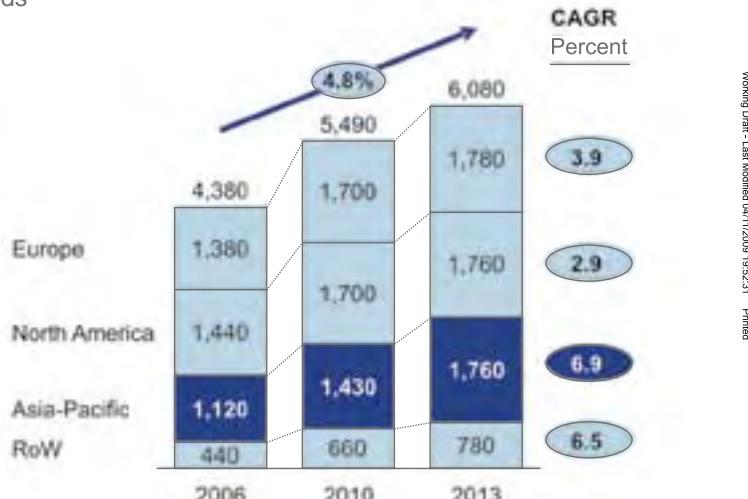
Emerging markets are expected to drive the globalisation of the commercial aerospace industry. Steady growth in passenger numbers—~5% globally mainly driven by ~7% growth in the Asia Pacific region—is expected to create strong demand for new aircraft (Exhibits 2.2 and 2.3). India's commercial fleet is expected to triple in size by 2018.

Exhibit 2.3

In the near future passenger numbers are expected to grow annually by ~5%, mainly driven by Asia-Pacific with ~7%

Airline passenger traffic forecast by region

RPKs thousands¹



¹ 1 RPK = Revenue Passenger Kilometers, typical measure for air traffic demand; numbers are rounded estimates

Source: Bernstein Research

Three factors are driving industry growth in emerging markets:

- The rise of new original equipment manufacturers (OEMs) in emerging markets due to major commercial aircraft programmes in these countries (e.g., China, Russia)
- More global sourcing and a focus on low-cost countries: Global aerospace players are increasingly offshoring engineering and manufacturing in low-cost countries. Canada's Magellan Aerospace is establishing a low-cost aerospace processing facility in India. The United States' Lockheed Martin is looking to set up a team of Indian companies providing IT infrastructure support to the company.
- Outsourcing of R&D to emerging markets: Western OEMs have been outsourcing R&D to emerging markets such as Russia and China for some time now. These countries have been meeting their requirements through their large engineering and aerospace talent pools.

Increasing ability of emerging market suppliers to serve western OEMs: China, Russia and to some extent India are able to serve the large aircraft firms Boeing and Airbus as Tier 1/2 suppliers. Many suppliers in emerging markets now have established relationships with western OEMs

As development costs are rising, OEMs and super Tier-1 suppliers have started risk-sharing partnerships. Long gestation periods of projects and cost and time over-runs increase the risks of projects. OEMs also want to reduce costs by limiting the number of direct suppliers and want suppliers to invest in design and manufacturing of large work packages. In response, super tier-1 suppliers now provide design, production and integration of major aircraft components.

Finally, the offset requirement in India could stimulate a geographic shift of investment towards India. Offset provisions in India's defence contracts are applicable to 30% of the total cost of any deal worth over USD 70 million. A foreign company is required to buy defence or other specified equipment from Indian companies. Offset requirements are expected to lead to investments worth USD 16 billion in India up to 2024 and could build a niche for India in the aerospace sector. Parts manufacturing and subcomponent assembly are strongly affected by offset regulations, auguring a possible shift in customer bases to emerging markets.

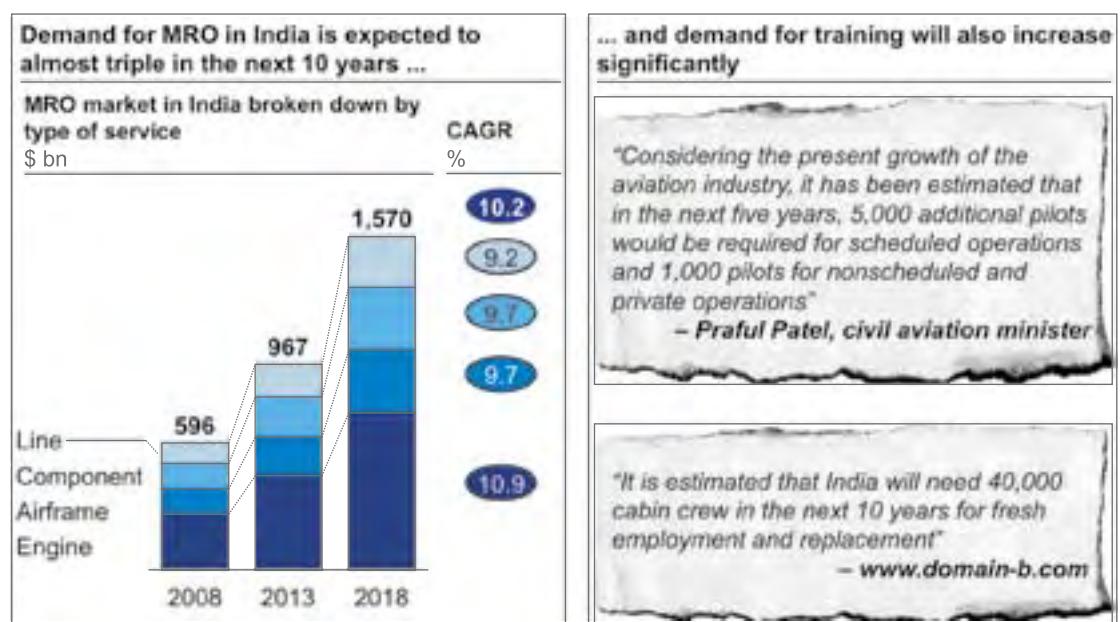
OPPORTUNITIES FOR INDIAN PLAYERS

Indian players have at least three opportunities areas:

- **Avionics, engineering design and software opportunities:** The key opportunity for India is in aerospace engineering and avionics. This involves six main activities of which a large part of detailed design, testing and software development can be done in India. With a pool of aerospace engineers and a cost advantage over companies in developed economies, India is well placed to attract capacity - and knowledge-driven offshoring. The same factors—talent pool and cost advantage—plus experience in engineering offshoring in other industries also position India well for cost-driven offshoring.
- **Parts and sub-systems manufacture:** Indian players can consider manufacturing of standard aerospace parts (e.g., aerospace grade fasteners, casting etc.) and supply them to Tier I/OEMs. In addition, they can focus on complete design, manufacture and assembly of less-complex sub-systems (e.g., cabin components)
- **Maintenance, repair and overhauling (MRO) business:** With increased outsourcing of MRO, emerging markets will become the preferred location for these services. In Asia, Japan and Korea have emerged as major locations for engine and component MRO. Vietnam, Malaysia and the Philippines have become major centres for heavy maintenance. In India, demand for MRO is expected to almost triple, from around USD 600 million in 2008 to approximately USD 1.6 trillion in 2018 (Exhibit 2.4).

Exhibit 2.4

Growth in aerospace and defense in India will result in rise in demand for after-market services like MRO* and training



* Mainrenance, repair and overhaul

Source: Aerostrategy, MRO in Asia-Pacific and Middle East (November 2006); HAMCO Website; Lundkvist Fleet database (2008); press search

Typically, IT spend comprises between 4-7% of revenues for aerospace companies. Aerospace companies are expected to increase their reliance on outsourced services to make up for technical resource shortfalls and cost reduction opportunities. These outsourcing contracts will cover hardware maintenance, application development/implementation, and data center operations. Further, outsourced IT services areas can comprise about 30 % of the total IT spend.

The addressable market for offshore delivery of IT and engineering services in civil aerospace can be \$0.6-\$1.2 billion by 2015. This is based on the following assumptions:

- The commercial aircraft industry is expected to generate \$90 billion in revenues for 2015 (from the current \$84 billion)
- Typical IT spend constitutes 4-7% of revenues while R&D spend constitutes 4-5% of revenues. The engineering design spend comprises ~30% of the R&D spend
- An estimated 75% of the IT and R&D design spend is offshoreable
- There is a 30% labor cost saving in offshoring of IT or engineering design services

It must be recognised that not all this opportunity will be captured by 2015. The industry revenues will be driven by how much of the addressable market is penetrated driven by demand, supply and industry conduct considerations.

3. Opportunities in the Nuclear Sector

The increased focus on environmentally sustainable growth including the global focus on reducing greenhouse gas emissions is providing a big impetus to nuclear power development. In India, nuclear power is expected to contribute up to 25% to 50% of power generated by 2050, a massive leap from the current 3%.

The 123 agreement between India and the United States opens the way for India to collaborate with international institutions in nuclear power projects. It is also expected to ease any limitations in the supply of uranium required for planned growth.

Significant reactor capacity additions are planned in India. They include an estimated addition of 29 new nuclear reactors representing capacity of 20 GWe by 2020. Of these, 11 are expected to be Pressurized Heavy Water Reactors (PHWRs) and 5 Fast Breeder Reactors (FBRs).

OPPORTUNITIES FOR INDIAN PLAYERS

The main opportunity for Indian manufacturers is collaboration with the Nuclear Power Corporation of India Limited (NPCIL) in manufacturing reactor components.

The domestic opportunity can be substantial. For example, an approximately 25 per cent of a nuclear power plant cost comprises precision-manufactured components (Exhibit 3.1). NPCIL spent over Rs. 3,000 crores to build each of the most recent power plants, Kaiga 3 and 4 (capacity of 220 MWe each). Indian manufacturers could provide NPCIL with reactor core components (e.g., Calandria, a tube and shell thermosiphon reboiler used for distillation or evaporation) or replacement parts (e.g., fuel rods used in fueling machines). More importantly, this represents a significant improvement in costs as a result of developing local suppliers, over 2000 crores saved for TAPS 3 and 4 projects and another 1000+ crores saved for Kaiga 3 and 4 projects.

Another opportunity for Indian manufacturers is supplying to global corporations. The 123 Agreement with the United States on civil nuclear cooperation will enable collaboration with leading global companies on new projects. France's Areva, the United States' Westinghouse Electric and General Electric, Japan's Hitachi, and Russia's atomic energy agency Rosatom are likely to be suppliers for planned projects based on light water reactor (LWR) technology.

Indian players can also participate in other parts of the nuclear power equipment value chain including commission, instrumentation, electrical and mechanical components and civil work. These amount to 75% of power plant equipment costs.

CHALLENGES FOR INDIAN PLAYERS

Indian players will need to build the following capabilities to capture the opportunities available:

- **Manufacturing excellence:** Nuclear power plant equipment has stringent manufacturing requirements due to the high safety needs and downtime cost of maintenance. Components must have tolerance levels much more precise than those required of automobile components (e.g., 0.01 micron on a 1-metre part). Meeting these requirements calls for developing manufacturing excellence on all dimensions, which few players in India meet today.
- **Measurement and testing capability:** Manufacturers with demonstrated measurement and testing capabilities or those willing to invest in developing them stand to win long-term contracts. Manufacturers will need new measuring equipment (e.g., Talylrond) and new process to perform newer non-destructive testing (e.g., acoustic emissions). Furthermore, inspections may be needed for 100% of the output compared to the sampling approach used in high-volume manufacturing. In addition, certain components take a long time to build. For example, building the entire machining process for a grid plate could take more than a year. Recognising the investments involved and the risks of poor quality, NPCIL prefers to work with a small number of trusted suppliers.

- Ability to forge long-term partnerships in a consolidated industry: An important success factor would be the ability to forge long-term partnerships with global suppliers. They operate through one of two models. The first is fully integrated manufacturing (as practised by Areva), where the firm controls end-to-end manufacturing with contract-based outsourcing to third parties. The second is an open partnership-based ecosystem (as followed by General Electric), which involves open end-to-end cooperation with third parties across all aspects of the process (from design to manufacturing to service). Indian manufacturers aspiring to participate in the nuclear component industry will need to forge these relationships. For example, GE and Areva are likely to require over 40 million fuelling pins over the next 4-5 years, all of which could be produced in India, representing a significant domestic and export opportunity.

CONCLUSIONS

Given the size of the aerospace, defence and nuclear market opportunity and current momentum among the private sector players and potential investors, the government has an opportunity to develop a highly strategic and competitive domestic IT industry. It is important to understand that the nature of competition in these industries is not perfectly competitive with significant barriers to trade based on security, economic and geo-political considerations. Industry structure plays an important role in ensuring an efficient and effective industry conduct. In the United States 22 companies were effectively consolidated into four large organizations (Lockheed Martin, Northrup Grumman, Boeing and Raytheon), similarly in Europe the merger of 21 companies resulted in the development of 5 major firms (EADS, Thales, FINMICCANICA, Dassault Av and BAE Systems) and in Russia there are now 5 as well. There is a clear need for change in several areas to take advantage of this significant opportunity. To facilitate this we suggest the government consider several immediate next steps including:

- 1) Establish Direct and Indirect Offset policies that addresses five specific areas that will help rapidly fill gaps in domestic investment and assist in technology transfer. These are: a) Co-Production (including for IT and control systems where India has clear capabilities), b) Licensing Agreements, c) Local Installation & Assembly, d) Transfer of Technology, e) Purchase of components from India (including nuclear, aerospace and defence related IT and software).

A few important considerations in implementing offset policies must be considered - offsets should be triggered above a specific RFP value; consistent with recommendations already made an offset of 30% remains reasonable; special post- contract monitoring mechanisms should be put in place (similar to the 2002 Defence Procurement Procedure) to ensure offsets are genuinely used to build new and critical capabilities.

- 2) Consider IT and Software capabilities as an enabling mechanism. Significant changes are required to reform current organization and acquisition practices and fix issues such as the mismatch between technological planning & development and R&D, production agencies and users in defence (by example). In addition to the direct role IT and Software industries can play in fulfilling R&D requirements, the industry can provide a platform to improve efficiency and coordination through fast and accurate information availability across the value chain of participants - both public and private, domestic and foreign, while ensuring security concerns are met.
- 3) Accelerate process by which private sector and indigenous participation happens. For an area such as defence it will be critical to address at least four areas: a) inclusion of private sector in “make” and “buy and make” category of equipment, b) guidelines for participation in “make” category items, c) clarify procurement procedures and d) specifically identify areas such as systems integration, monitoring and test capabilities, that leverages the well established capabilities of indigenous IT and Software players.
- 4) For IT in defence, nuclear and aerospace sectors in particular create an autonomous professional body that is involved with crafting and executing RFPs/tenders for IT-specific projects/contracts.



Consumer Electronics and Appliances Manufacturers Association (CEAMA) (formerly CETMA) is an all India body of Consumer Electronics and Home Appliances sector. The membership spectrum comprises of Domestic and MNCs, and includes large, medium & small-scale sectors. CEAMA realizes its responsibilities in the changing environment of globalization and has always given suggestions / recommendations, keeping in view the interests of the Consumers, Trade and Industry. CEAMA provides consultancy to its members on general matters related to Customs, Excise, VAT, Foreign Trade Policy, Investment Policies of Government etc.



ELCINA was established in 1967 as the first industry association supporting electronics hardware, when India's Electronics industry was still in its infancy. ELCINA actively interacts with the government and advises it on policy and business environment issues. It networks with technical institutions and business support organisations in India and abroad to enable business expansion and information dissemination on technical developments. With greater liberalisation, ELCINA's focus has shifted to professional and value-added services to the Electronics Community.



Electronics and Computer Software Export Promotion Council (ESC), sponsored by the Government of India is India's largest Electronics and IT trade facilitation organization. Under the aegis of the Council, the IT services exports have reached to over 200 countries across the world establishing the hallmark of India's quality and competitiveness. In an Industry where the degree of technological obsolescence is very high, ESC is striving hard to elevate India's position in the international trading arena of the Electronic and Computer Software.



Indian Cellular Association (ICA) is the apex body of the mobile industry comprising manufacturers, brand owners, application, VAS and solution providers, Tech-Company, distributors, retailers and eminent consumers of mobile handsets. The Association has been constituted to provide value and service to the mobile cellular industry in India by fuelling its growth, improving competitiveness, helping create a legal and ethical market and regulatory environment, thereby providing long-term benefits of mobile connectivity to the Indian masses



ISA is the leading voice for the semiconductor - driven industry and has represented it since 2005. It has around 130 members from India and outside it; and aims to establish India as the preferred global destination for semiconductor, systems and solar photovoltaic companies. ISA has played a prominent role in working with the Government of India in the formation of the Indian Semiconductor Policy 2007. More information about ISA can be found at www.isaonline.org



Set up in 1982 for purposes of scientific, educational and IT industry promotion, MAIT has emerged as an effective, influential and dynamic organisation. Representing hardware, training, R&D and associated services sectors of the Indian IT Industry, MAIT's charter is to develop a global competitive Indian IT Industry, promote the usage of IT in India, strengthen the role of IT in national economic development and promote business through international alliances.



NASSCOM is the premier trade body and the chamber of commerce of the IT-BPO industries in India. NASSCOM is a global trade body with more than 1200 members, which include both Indian and multinational companies that have a presence in India. NASSCOM's member and associate member companies are broadly in the business of software development, software services, software products, consulting services, BPO services, e-commerce & web services, engineering services offshoring and animation and gaming. NASSCOM's membership base constitutes over 95% of the industry revenues in India and employs over 2.24 million professionals.



Established in 1990, Telecom Equipment Manufacturers' Association of India (TEMA) is recognized by the Government of India as the National Apex body to represent telecom Technology Providers, Global and Indian, Private and Government owned companies. Being the official mouthpiece of Indian telecom manufacturing industry, TEMA plays the critical role of advising the government and influencing decisions relating to Indian telecom industry. TEMA also enjoys the privilege of proposing names of technical experts from the industry to various telecom committees of the Government of India and major national industry associations.