IT Hardware & Electronics: Innovative Interventions Required

Intervention 1 : Focus on cluster development for electronic components sector			
S.No.	**Tasks**	**Key Stakeholder**	**Innovation**
1	Focus on establishment of "Electronics Manufacturing Clusters (EMCs)" across the country for enhancing the competitiveness of electronics hardware manufacturing sector: Various activities that are needed for the same are: • Identify more locations to set up electronic components clusters and replicate the success of Sriperumbudur (Tamil-Nadu). • In each of the identified clusters, innovation and research centres can be established that would not only provide a ready knowledge repository providing information on best practices, technology but also act as a networking hub for exchange of knowledge and expertise. • Provide state nodal agency for single window clearance and inter-departmental coordination. • Easy access to port/air-port, Infrastructure development - land, power etc. (In case, cluster falls in inland areas, provide cash back scheme for expense incurred on shipment to the nearest port) • Set up Technical/Vocational training institutions in the cluster. • Set up Infrastructure for collaborative R&D and Testing, involving stakeholders from various players in the value chain. Common Research Facilities may be set up within the CICs to achieve this objective.	Department of IT, Ministry of Science & Technology	Knowledge Creation and Commercialization
Issues Targeted			
• Lack of economies of scale, due to inability to use our domestic market to get market access and volumes. • Land locked regions like Pune, Delhi/NCR and Bangalore etc. which contribute majority share of Indian IT hardware & electronics trade incur higher costs of transportation.			

Intervention 2 : Improve raw-material competitiveness of the sector			
S.No.	**Tasks**	**Key Stakeholder**	**Innovation**

1	Provide policy support in the form of following incentives to improve raw-material competitiveness of the industry: • Inverted duty structure should be corrected and import duty on all inputs should be made equivalent to or lower than the finished products. • Duty on inputs used in manufacturing of all the finished products importable at zero duty shall be made zero. • Assembly, Mark, Test and Package (AMTP) for integrated Chip assembly investments should be carved out from the Special Incentive Package Scheme (SIPS) to either be a subset of the overall SIPS policy with lower threshold requirement or be rolled-out under a new SIPS policy altogether thereby expanding the scope of ATMP and downstream projects, thereby encouraging the industry to participate in the SIPS program.	Department of IT, Ministry of Finance	Knowledge Creation and Commercialization
2	Set up a semi-conductor FAB with established technology to support fabrication of varieties of chips to meet the requirement of high volume products as well as the requirement of the fab-less design companies on pay per use basis. To achieve the objective, following steps are necessary: • Explore the option of acquiring an existing fab abroad or forming joint ventures with international players having experience in setting up a semiconductor fab. • Provide infrastructure support in the form of subsidized land & power to the fab facility near the green-field or brownfield electronics manufacturing cluster.	Department of IT, Ministry of Science & Technology	Knowledge Creation and Commercialization
3	Focused scheme to induce indigenous production of critical raw-materials like PCB, precious metals & alloys etc. • Compile a list of critical raw-materials which have enough demand in India but very limited domestic production to match the demand. (Some of the materials include: Putin rubber, high garden tissue paper, tin coated copper leads, copper coated steel wires, single core high temperature cables, precious metals & alloys etc.) • Identify international companies present in the above product categories and encourage these companies to collaborate with Indian counterparts to create machinery manufacturing facilities in India for the identified machinery. (Same model was adopted in China) Several measures that can be adopted for the same are : • Create a centralized fund for SMEs which could be utilized for acquisition of international companies/assets operating in various raw-material categories like precious metals & alloys, PCB etc. For the same designate an implementing agency to invite, shortlist and grant the funding to the SMEs. The CICs within the identified clusters can serve as the	Department of IT, Ministry of Finance	Knowledge Creation and Commercialization

	facilitator/ co-ordinator for such activity. • Reduce the CIT or exempt investors from India's corporate income tax rate for 5-10 years. • Provide incentives for foreign players who are ready for technology transfer to Indian players. • Provide infrastructure support to shorten time to market • Provide export subsidies for certain period (5-10 years) to these units to ensure better access to export markets. This is required to ascertain profitability & scalability of these units. • Reduce excise duty on the identified materials to encourage manufacturing & assembling units in IT hardware & electronics industry to purchase the same, and indigenous raw-materials/component manufacturers to expand their capacities.		
Issues Targeted			
• Most of the electronic components & communication equipment manufacturing machinery is imported from countries like China, Taiwan & Japan. This increases the overall cost of production. • Non-availability of precious metals, gold & palladium alloys, metals like 99.99% pure aluminium foil, cathode foil, anode foil etc. • Non-availability of other critical components like : electronic chemicals, Putin rubber, high garden tissue paper, tin coated copper leads, copper coated steel wires, single core high temperature cables etc.			

References:

1. **Taiwan Semiconductor Manufacturing Company Ltd. - Taiwan**

Taiwan Semiconductor Manufacturing Company Ltd. (TSMC) was formed in 1987 as a joint venture between the Taiwan government, which wanted to promote the development of the island's semiconductor industry, and Philips Electronics NV of The Netherlands. The company was set up by Morris Chang, who had been invited by the Taiwan government in 1985 to come to the island and help grow its semiconductor industry. Chang was born in China and educated at the Massachusetts Institute of Technology (MIT) and Stanford, where he earned a doctorate in electrical engineering. He was the president of General Instrument Corp. when he left to go to Taiwan.

When TSMC was founded in 1987, it was a major catalyst in transforming Taiwan's semiconductor industry. It provided state-of-the-art manufacturing processes that complemented Taiwan's strength in chip design. Between 1987 and 1992, TSMC gradually added to its foundry capacity by vertically integrating into related disciplines, including wafer sort testing in 1988, mask-making in 1990, and design services utilizing technology licensed from VLSI Technology in 1991. It also improved its process technology. After starting as a six-inch, 2-micron wafer-processing fabrication facility, or fab, it broke the 1-micron barrier in 1991.

TSMC originally was intended to service Taiwan's design houses, which were noted for their chip designs but did not want to get involved in manufacturing processes. TSMC, however, soon became an internationally oriented, profit-driven organization that supported the development of fabless semiconductor companies, that is, it did not own the manufacturing facilities. Fabless semiconductor

companies were strong on design, but they could not afford the large investment required to build their own fabrication facilities. By 1992, TSMC was rated as the world's top silicon foundry, producing chips for other companies. TSMC employed 250 process engineers and was on the cutting edge of process technology. TSMC accounted for 80 percent of Taiwan's production of SRAM and also produced a variety of other semiconductor chips, including DRAM and EPROM. Revenue for 1992 was around US$245 million.

Building New Facilities to Expand Capacity: 1994-96

By 1994, demand for chips was exploding with new applications in multimedia and portable computing. At the beginning of the year, TSMC announced plans to build a new eight-inch wafer fabrication facility, or fab, that would double the company's output to more than US$1 billion worth of product a year. The new plant was the company's third fabrication facility and cost about US$800 million to build. At the time, TSMC was running several different processes for both logic and memory chips, and the company was running out of capacity.

In September 1994, TSMC went public on the Taiwan Stock Exchange. Before the end of the year, TSMC announced an agreement with Advanced Micro Devices Inc. (AMD) to provide foundry services for AMD's AM486 processors. For 1994, TSMC reported sales of US$744 million and net income of US$325 million. A 60 percent increase of worldwide semiconductor sales between 1992 and 1994 resulted in a global shortage of wafer fabrication capacity. About 60 percent of TSMC's sales were to fabless semiconductor companies, with the remaining 40 percent going to companies short of manufacturing capacity. TSMC's gross margin of 49 percent was the highest in the semiconductor industry.

In March 1995, TSMC announced that it would build another eight-inch wafer fab at a cost of US$1.2 billion. The new plant, TSMC's fourth fab, was designed to operate at 0.4-micron initially and later at 0.25-micron, which was about one generation ahead of the eight-inch 0.5- to 0.35-micron plants proposed by other Taiwan semiconductor manufacturers. Construction on the new eight-inch fab began in November 1995. Some of the funding for the plant came from deposits that customers made to ensure long-term fab capacity, an option that TSMC began offering to customers in mid-1995.

Between 1993 and 1995, TSMC nearly doubled its capacity to produce six-inch (150mm) wafers, from 665,000 wafers in 1993 to 1.2 million in 1995. Its six-inch fabs, including Fab 1, Fab 2A, and Fab 2B, were running at full capacity, producing 100,000 wafers per month. Fab 3, which produced eight-inch wafers, was expected to ramp to full capacity of 22,000 wafers per month in 1997 and 35,000 per month in 1998. Fab 4 was expected to come online in 1997 and ramp to full capacity of 25,000 eight-inch wafers per month in 1998. The construction of Fab 5 in Hsinchu was announced before the end of 1995.

In November 1995, TSMC and Altera Corp. announced a joint venture to build a wafer fabrication plant in the United States. After considering sites in Oregon and British Columbia, TSMC selected Camas, Washington, for the US$1.2 billion plant. The plant was to have a capacity of producing 30,000 eight-inch wafers per month, starting with line geometries of 0.35-micron and then migrating to 0.25-micron. By mid-1996, TSMC had signed on two more joint venture partners for the plant, to be called WaferTech; they were Analog Devices and Integrated Silicon Solutions Inc. (ISSI). Altera's US$140 million investment gave it 18 percent ownership of WaferTech. Analog Devices also owned 18 percent, ISSI owned 4 percent, private investors owned 3 percent, and TSMC owned 57 percent.

At the end of April 1996, TSMC became the first Taiwanese company to be listed on the New York Stock Exchange when it raised more than US$500 million through the sale of 305 million ADR (American depository receipt) shares. At the time Philips Electronics owned about 35 percent of TSMC. For 1996 TSMC reported sales of US$1.45 billion and net income of US$718.5 million.

Intervention 3 : Foster demand & market access			
S.No.	**Tasks**	**Key Stakeholder**	**Innovation**
1	Create a national implementing agency to undertake a scheme for identifying at-least 10 champion user categories for electronic & communication equipment and develop an ecosystem for supporting manufacturing for of electronic components for these sectors. Various tasks that may be performed are: • Identify ten user categories in India who are heavy users of electronic component and compile their electronic components & communication equipment requirements. (Some of the prospective user categories can be Automobile, Set top box etc.) • Set up incubation centre to develop these components domestically with knowledge partnership with international firms. Further, invite Indian SMEs to develop expertise in these product categories. • Devise a policy framework so as to encourage Indian firms to set up units for the identified electronic products. – Zero import duty for all the components(raw-materials) that are not present in India – Tax holiday for period of 3 years. – Incentives for supplying the finished product in domestic market etc. • Devise a policy framework to ensure that Indian electronic components are procured by the user industry.	Ministry of Science & Technology, Department of IT, Ministry of Finance	Knowledge Creation and Commercialization
2	Formulate a local procurement policy for electronic components. Various aspects of the same are mentioned below: • Provide preferential market access in government procurement and procurement by government licensees (or Government aided procurement). At-least 30% preferential market access to 'Manufactured–in–India' / 'Indian Products' in procurement of Electronic Products by the Central, State Government, and PSUs and by government licensees by matching of L1 price and on satisfying the technical specifications of the tender. • For defence related procurements, the "Defence Offset Policy" should be amended to specifically take care of electronics sector. In case of procurement of items with electronics, at least 10% of the procurement price (which should gradually be increased to 15% over the next 5 years), be earmarked for 'Manufactured–in–India' / 'Indian Products' electronic products, which go into	Ministry of Heavy Industries & Public Enterprises, Ministry of Communication & IT	Knowledge Creation and Commercialization

	manufacture of that item. In case domestic electronic products relating to a particular purchase are not available, the supplier must undertake a commitment for investment for manufacture in India of any electronic product/any of the inputs such as components, sub-assemblies, design, embedded systems etc. to meet the offset obligation (in terms of value). • Provide incentives to private users (e.g., telecom operators) to use Indian products, in the form of reduced license fees		
3	Countries which have huge market opportunities for Indian IT Hardware & Electronics sector need to be examined for having Free Trade Agreements (FTAs) or Comprehensive Economic Cooperation Agreements to provide better access to Indian players in these countries. Some of the prospective countries which can be considered : Hong Kong, Philippines, EU, US, Mexico, Canada	Ministry of External Affairs	
Issues Targeted			
• No preferential access to domestic manufacturers of IT hardware & electronics manufacturers for government procurement. • Lack of economies of scale, due to inability to use our domestic market to get market access and volumes. • Very limited companies following Technology Leadership Model, i.e. IPR & Strategic control resides in India			

References:

1. **PPP partnership for trade & investment : UNCTAD & Royal Philips Electronics Corporation**

Public-private partnerships in trade and investment can promote international trade with a focus on promoting development as well as meeting global and national development priorities. In order to strengthen the participation of developing countries in new and dynamic sectors, public private partnerships will be needed. A trend-setting example in this regard is the UNCTAD-Philips initiative on the electronic/electrical sector in southern Africa. As the Philips initiative shows, moves to set up trade-related industries and FDI in sub-Saharan Africa could set an example of the corporate world undertaking responsibility for development and of creating stakes for developing countries in trade-driven liberalization and globalization. UNCTAD and Royal Philips Electronics Corporation are engaged in a project with a view to establishing energy saving light-bulb industry in the Southern African (SADC) region. The project seeks to strengthen cooperation among SADC Members by creating competitive supply capacities in energy saving light-bulb products; promoting trade among SADC countries; promoting energy saving in the SADC region to meet the challenge of rising energy costs; and improving environmental sustainability by reducing green gas emissions. The project is an example of UNCTAD's innovative approaches to promoting public-private cooperation and partnerships geared towards the development of new and competitive productive capacities in African countries, which strengthens their participation in new and dynamic sector of international trade. This in turn contributes to their industrialization whilst also serving the purpose of promoting energy security.

Intervention 4 : Develop & promote organized reprocessing for IT hardware & electronics components			
S.No.	**Tasks**	**Key Stakeholder**	**Innovation**
1	A national level scheme for development of organized reprocessing for IT hardware & electronics sector should be implemented. Specific aspects that may be covered in the scheme are: • Scheme to encourage producers and manufacturers to establish effective take-back programmes to ensure that e-waste would be recycled in an environmentally sound manner. • Incentive schemes for consumers to recycle their end of life electronic equipment • Develop distribution channels for funnelling discarded electronic equipment from various sectors to electronics recyclers. These can be: Municipal collection facilities/ transfer stations; retail chains; non-profit organizations; and public or private waste haulers. • Create a research fund for concentrated efforts on development of recycled products. • Provide tax holidays/other fiscal incentives for companies that have at-least 30% of revenues from electronic recycling.	Ministry of Communication & IT, Ministry of Finance	Knowledge Diffusion and Absorption
Issues Targeted			
• No efforts on R&D on organized reprocessing of electronic components. • Poor development of domestic components industry, due to which the industry is largely dependent on imports of the raw material.			

References:

1. **China's e-waste regulation**

CHINA - The State Council has approved a draft regulation on the management of electronic waste or WEEE (Waste Electrical and Electronic Equipment), which will tightly control the end-of life use of main consumer electrical products such as televisions and computers. . Draft Proposal on Recycling and Treatment of Waste Electrical requires mandatory recycling of, electrical and electronic appliances discarded by the consumer, elements, parts, spares and components and consumable materials discarded in the process of manufacturing [and/or] maintaining electrical and electronic appliance.

The 2008 draft Catalogue requires mandatory recycling of; Televisions of all types (CRT, LCD etc.), refrigerators, washing machines, air-conditioners, and computers – this however is listed as 'batch one' an indicator that the Catalogue is to be expanded greatly.

- Recycling shall be conducted only by operators licensed by the relevant local authority department charged with 'resource comprehensive use' – allowing for the fact that different regions or cities may have allocated different responsibilities to various departments.

- A special fund for Waste Electrical and Electronic Appliance Treatment is to be set up by these departments responsible for 'resource comprehensive use', which will come under the scrutiny of the State Council.
- Manufacturers must adopt product designs that use non-hazardous treatment of resources, select non- or minimally hazardous and toxic materials or materials that are easily recycled and reused, and meet recoverability ratio to be set. Manufacturers should also use designs that favour 'circular use'.
- They should also provide information on the product composition, recycling and treatment instructions associated with the product and materials – this overlaps with provisions in China's RoHS regulation.
- Article 10 requires manufacturers to deliver waste electrical and electronic appliances generated in the manufacturing process to qualified treatment enterprises, while waste electrical and electronic appliances must be recycled through sale and post-sale service outlets, and deliver the waste electrical and electronic appliances to licensed treatment enterprises.

Further, legal liabilities and penalties were also introduced:

- Dealers and post-sale service operators that do not take manufacturers' product to qualified treatment operators shall be punished with a fine up to US$7,300 (¥50,000).
- Used or second-hand dealers with products which have not been tested and labelled by qualified treatment operators may have used household appliances, earnings and profits confiscated and face fines of up to US$7,300 per item.
- For unauthorized dismantling, assembly and parts sales fines ranging from $700 to US$6,000 will be imposed.
- The 'chief officer' of government departments and other public servants failing to recycle e-waste shall face disciplinary action.
- Where serious losses are incurred by consumers due to the sale of waste. Or second-hand, electrical and electronic appliances, the operators may have their business licenses revoked or suspended, be subject to criminal proceedings.
- In an anti-corruption measure, the Law states, "Governmental functionaries who abuse power, trifle with duty, or practice favouritism and engage in irregularities in manners that constitute crimes, shall be subject to criminal responsibilities."

Intervention 5 : Foster institutional as well as industrial R&D in the sector			
S.No.	**Tasks**	**Key Stakeholder**	**Innovation**

1	Set up a research centre for embedded systems and semiconductor technology. Such centre can also be established within the designated clusters. Various activities that should be performed by the research centre are: • Conduct pre-competitive research in the following areas: Micro motors & step motors, discrete semi-conductors, mounted piezoelectric crystals, photosensitive semiconductor devices- solar PV cells and solar energy etc. • Encourage industry-academia co-operation for the development of technology infrastructures in the Industry. For the same, a consortium may be made that includes a number of industrial players as well as researchers from research institute. A PPP model can be adopted to encourage collaborative research between Industry and Academia. • Conduct several knowledge programs to encourage know-how transfer from the research community to the industry that may lead to the development of a defined product. • Set up technological collaborations with foreign countries for undertaking joint R&D efforts.	Ministry of Communications & IT, Ministry of Science & Technology	Knowledge Diffusion and Absorption
2	Formulate an agency to encourage and incentivize R&D efforts in the industry (On the lines of Israel's "Office of Chief Scientist' model). The major objective of the agency should be to provide R&D grants to Indian companies that create Indian Products and IPR. Some of the tasks that may be performed by the agency are: • Invite applications from prospective companies who wish to avail grant for R&D efforts. A grant application must describe the research plan, the applicant company's business, and particularly the technology intended to be developed in the context of the research plan. Significantly, the application must indicate the portion of manufacturing of products developed with the agency's assistance to be performed in India. • Provide partial grant for inventors, entrepreneurs and start-up companies for following activities: Patent preparation, construction of a preliminary prototype for the purpose of demonstration and/or proof of feasibility, preparation of a business plan and efforts to raise capital. • Develop incubation centres for providing supportive framework for the entrepreneur that enables him to turn a technological idea that has an economical-marketing potential into a product of interest for investors. • Common research facilities should be made available for SMEs within clusters to enable a cost effective mechanism for co-development of products with enhanced utility and technology, thereby ensuring sustainable development of the industry. • Collect royalties for any income accruing from the	Ministry of Science & Technology, Ministry of Communications & IT	Knowledge Creation and Commercialization

	successful commercialization of an R&D program, receiving financial support from the agency.		
Issues Targeted			
• Lack of R&D and innovation in Indian electronic components industry. E.g. Very few companies are able to manufacture newest technologies like Tandem Capacitors, Through-hole components etc. • No incentives for R&D and development of Indian products and IPR			

References:

1. **Office of Chief Scientist Model - Israel**

The Chief Scientist Office in the Ministry of Industry, Trade and Labour, Israel is mandated to execute the Government's industrial R&D support policy, by force of the Encouragement of Industrial Research & Development Law. Various modules of the model are:

- *Industrial R&D support:*

  - R&D program for developing an innovative product; the level of support is 20-50% of the approved budget.

  - R&D program in special areas: An R&D program that takes place in an area that is defined as "Development Area A" – according to the Law for the Encouragement of Capital Investments"– is eligible for an additional grant of 10% on top of the grant that was approved by the Research Committee. An R&D program which is performed in an area that is defined as a "confrontation zone" is eligible for an additional grant of 25% on top of the grant that was approved by the research committee. The submission dates vary according to the size of the requested budget. The dates are published on the website of the Chief Scientist Office. A company must submit all of its applications (regardless of the date of the commencement of the project) at a single date during the year. A complete application includes the application form, the company questionnaire and the budget file. The application should be sent via the internet. The files should be downloaded, filled-out and then be sent via the internet, as specified in the directives. Two signed copies of the declaration forms that are found at the end of the company questionnaire should be sent by mail to the Office of the Chief Scientist.

- *Support for a technology entrepreneur taking his first steps:*
  - "Tnufa" (Momentum): Support for inventors, entrepreneurs and start-up companies, taking their first steps towards the implementation of their idea. The partial grant provided by the fund involves the following area: Patent preparation, the construction of a preliminary prototype for the purpose of demonstration and/or proof of feasibility, preparation of a business plan and efforts to raise initial capital. The grant rate in this support track is 85% of the program's approved budget, up to a cap of US$50,000.
  - "Technology incubators": The incubator serves as a supportive framework for the entrepreneur that enables him to turn a technological idea that has an economical-marketing potential into a product of interest for investors, as an independent company. The Government's R&D grant rate for companies is 85% of the approved budget while the rest is provided by an outside investor.

There are currently 24 incubators throughout Israel. Some of the recent innovations in this area are: An experimental program for privatizing some of the incubators; Establishment of dedicated Biotechnology incubators, as a part of the emerging policy in this area.

- *Royalties:*
  Any income accruing from the successful commercialization of an R&D program, receiving financial support from the OCS is subject to royalty payments to the OCS. Royalty payments are generally calculated as a percentage of sales income and are paid via "KerenTemura" of the Chief Scientist Office. The precise detail of royalty rates as well as the reporting procedures are specified in the Encouragement of Industrial Research & Development Regulations (Rate of Royalties and Rules for its payment), 1996.

- *Industry-Academia cooperation for the development of technology infrastructures in the Industry*
  - "Magnet" program: This program is designed for the execution of pre-competitive R&D within the framework of a consortium that includes a number of industrial companies along with researchers from at least one academic institute. The research focuses on the development of pre-competitive (generic) innovative technologies that will be the base for new state of the art products and processes. The grant rate for the industrial company is up to 66%, and for the research institute – 80%. If a foreign company has a unique contribution for a specific consortium, it may be included in the project.
  - "Magneton": This program is designed to encourage know-how transfer from the university community to the Industry that may lead to the development of a defined product. The grant rate in this support track is 66%.
  - "Nofar" program: This program is designed to support the advanced stages of applied research which is carried out in a university laboratory, independently of any specific product, and that has raised interest within the business community. The program is for one year, with a budget of up to 420,000 NIS. This represents a grant of up to 90%, with the industry funding the difference.
  - Association of users for the distribution and adaptation of generic technologies: The program is designed to facilitate the distribution and implementation of generic technologies that were developed in Israel or elsewhere and are deemed essential for the members of the association.

- *International collaboration in industrial R&D*
  Technological collaborations with foreign companies have proven to be mutually beneficial to all of the involved parties. In addition to the joint R&D development deeper business ties often evolve. These collaborations are manifested in one of three models:
  - Bi-national funds for industrial R&D .The fund is created by means of an agreement between Israel and a foreign country where each country allocates a given sum toward the fund's operation for a pre-determined period of time. The fund encourages industrial R&D collaboration between paired companies (one from each country) and also assists in matching potential partners from each member country. The grant rate is usually 50% and it is subject to the payment of royalties to the fund. For details see the information website of the appropriate fund.
  - Participation in the European Union's framework programs: The European Framework program is a liberally endowed enterprise of the European Union that involves industrial R&D collaborations in selected fields. The program's main benefit lies in the joint work that takes place

with Europe's leading research bodies. Israel partakes in these programs through ISERD, the Israeli Directorate for the program.

- EUREKA Program: Eureka is a network uniting 31 European countries for the purpose of encouraging R&D collaborations between industries and research institutes. An Israeli company may apply for a grant to the Office of the Chief Scientist based on its approved status as a Eureka participant. A grant for an Israeli company shall be given in accordance with the Encouragement of Industrial Research & Development Law, 1984.
- Parallel-support agreements: These agreements were signed with several countries and they facilitate R&D collaboration between an Israeli company and a foreign company. Companies are given support by the bodies that are responsible for the promotion and support of industrial R&D in their respective countries. The Israeli company is entitled to receive support from the Office of the Chief Scientist. Responsibility for the implementation of these agreements is handled by the Israeli Industry Centre for Research and Development (MATIMOP) which engages, among other things, in locating foreign partners for Israeli R&D companies.

Intervention 6 : Measures to improve labour skills & productivity			
S.No.	**Tasks**	**Key Stakeholder**	**Innovation**
1	Focused scheme for skill development in high-tech manufacturing. A three-pronged approach towards skill development in high-tech manufacturing for the electronics hardware manufacturing industry is proposed: • Regional High Tech Training Centres well-equipped with state-of-art laboratory facilities should be set up at the major clusters. • Curriculum updation in engineering colleges: Major areas proposed in the curriculum include Surface Mounted Technologies (SMT), LCD technologies, semiconductors, nanotechnology, PLC and robots, and quality practices and tools. • Train the trainer initiatives: Identify large companies which have high tech manufacturing equipment and production facilities. Further, arrange for programs to train teachers from select institutes.	Ministry of Communication & IT	Knowledge Diffusion and Absorption
2	Skill development scheme for workforce at supervisory level & below and engaged in assembly operations, sales and service support For the same, specialized courses should be initiated in ITIs and other related institutes in the following areas: • Basic Manufacturing skills • CNC machines • Safety norms • Meeting pollution control laws, etc. • Reading circuit diagrams and populating boards • Awareness of shop floor, concepts of ESD • Curriculum updation in engineering colleges: Major areas proposed in the curriculum include Surface Mounted Technologies (SMT), LCD technologies, semiconductors,	Ministry of MSME, NSDC, Ministry of Communication & IT	Knowledge Diffusion and Absorption

	nanotechnology, PLC and robots, and quality practices and tools etc. The clusters and semi-conductor FABs can enter into Tie-ups with universities to incorporate courses to cater to demand of process engineers having knowledge to work on cutting edge process technology for the fab facility.		
3	Setup specialized institutes for semiconductor design with government and industry players as key stakeholders. Funding for the above schemes can be sourced through a mix of Government funded, Private funded, and Partnership funded mechanisms. Funding options available in the National Skill Development Mission may also be used.	NSDC, Ministry of Communication & IT	Knowledge Diffusion and Absorption
Issues Targeted			
• Support skills like Technicians/Engineers for repairs of imported machinery are missing. • Skill gaps exist for CNC trained personnel. Basic knowledge of precision components & their assembly is also lacking in the industry			
Intervention 7 : Develop technical standards for Indian as well as imported electronic components			
S.No.	**Framework for Innovation**	**Key Stakeholder**	**Innovation**
1	Set up a cell with participation from research agencies, industry associations and industry for setting up technical standard for products to be sold in India to ensure quality products are sold within the country. For example, EU legislation follows the "CE Mark" while China has developed its own standards titled "CCC mark". These standards ensure that no manufacturer produces sub-standard products by using cheaper components and violate the existing level playing field. The tasks of the agency should be to: • Create Indian standards for every finished electronic good (in consultation with BIS) • Development of a "quality manual and accreditation scheme" which defines the quality standards which applicants will be required to meet in order to be accepted in the program and for use of the 'Indian Certification Mark'. • Development of an SPV which would ensure the creation of database of all the companies in various levels of the value chain (Can be done with collaboration from Ministry of MSME, Ministry of Communication & IT and NSIC etc.). This agency may undertake training programs so that technological know-how and awareness is provided to enterprises willing to go for the certification • Develop a scheme through which 'Indian Certification Mark' can be awarded to domestic companies based on their performance and standing across pre-set criteria such as capacity, technology, manufacturing excellence, sales and customer satisfaction etc. on a co-payment basis. • Develop a mechanism for vetting every imported products for minimum requirements to be met as per the laid out quality standards.	Ministry of Science & Technology, Ministry of Communications & IT	Knowledge Diffusion and Absorption

Issues Targeted
• Inadequate testing & certifying labs of global standard present in India. • Lack of awareness of global standards like ROHS legislation of EU, CE certification etc.

Intervention 8 : Provide database & technology support to domestic firms			
S.No.	**Framework for Innovation**	**Key Stakeholder**	**Innovation**
1	Provide database & technology support to domestic firms in the following areas: • Quality standards followed globally for various components & products. • Technology- and innovation-related international journals from major publishers. • Country wise/OEM wise SOPs for testing the products. • Database on all critical inputs/ raw materials and their availability across the world. A list of companies manufacturing such inputs should also be included in the database. • Technology manual incorporating basic and advanced techniques in various areas such as Surface Mounted Technologies (SMT), LCD technologies, semiconductors, nanotechnology, PLC and robots, and quality practices and tools. • Database of industry experts (either retired or from the industry) who can be contacted by domestic firms for any kind of technical support required. For the same, profiles of the experts need to be invited and kept in a repository. On receipt of any request from the industry, communication can be sent to the relevant experts and the interested one's can then be suggested to the requestor.	Ministry of Science & Technology	Knowledge Diffusion and Absorption
Issues Targeted			
• Lack of awareness of global standards for among domestic firms • Limited government support for R&D. The existing labs and centres for performing tests and R&D are not well equipped and lack modernization; often the machines are old and not working.			