Telecom Equipment Manufacturing Policy
Developing an Actionable Roadmap
Executive Summary (1/2)

- Industry is aligned to the overall vision of the government in making India a centre for telecom equipment manufacturing

- Critical to separate goals of manufacturing, innovation, and security to design an actionable policy that is tamper proof, least market distorting and consistent with international commitments.

Manufacturing

- India will account for ~ 3% of the global market by 2020 (~USD 17 bn). Self-reliance is not a viable tool to drive globally competitive economies of scale; further, no country is wholly self-sufficient in such a technologically complex industry. Further, Indian manufacturing would require to grown by ~ 100% CAGR over the next 5 years to meet TRAI mandates

- Kick starting local manufacturing – aimed at global markets- calls for developing specialized telecom clusters while addressing infrastructural, fiscal and legal issues, including labor laws.

- Fiscal initiatives are key for accelerated development. Currently, the lack of a local cluster imposes an effective ~ 3% higher end cost on account of freight etc; government may wish to consider a time bound (5 years) incentive to overcome this and kick start the coalescence of a cluster in India

- Without local IC fabrication facilities, not more than ~15-20% value addition is possible in India even over the next 3-4 years. To go beyond that figure requires for India to promote the entire electronics cluster

- PMA mandate should be consistent with WTO guidelines. To the extent applicable, government may consider revising its PMA guidelines for ‘value addition’ to incorporate substantial transformation to recognize transformation activities and make policy more implementable.
Executive Summary (2/2)

Innovation:

- Encouraging foreign investment is key to transferring know-how and developing capabilities to enable end-to-end product development. Need to strengthen IP protection and infrastructure to facilitate this.
- Initiatives providing seed funds and infrastructure for early stage ventures need to incorporate global best practices.
- Lack of comparable commercial financing options costs local small players significantly in the market. This gap needs to be plugged from both supply and demand perspective
  - A fund which allows local players to offer competitive contract financing options to buyers should be established
  - Operators may be incentivized via license fee rebates
- To build the ecosystem, we need three or four independent mission mode taskforces to foster partnership between Government, industry & academia and focus on developing commercializable technologies

Security:

- Local manufacturing does not necessarily have any correlation with security. Government needs to develop a comprehensive CIIP framework across all networks under threat – financial, utilities, government etc. classifying action by critical services sought to be protected
- Basic manufacturing threats and operational attacks can be mitigated by a comprehensive certification and testing program (e.g., Common Criteria) which by design needs to run across all networks of all makes
Setting the Objectives

Promoting Manufacturing
Fostering Innovation
Ensuring Network Security
Draft NTP reiterates the government’s intention to make India a telecom equipment hub; industry is aligned to the vision.

**Overall Vision & Key Policy Pillars**

"Make India a global hub for telecom equipment manufacturing and provisioning of converged communication services.” – Draft NTP 2011

- 2011 National Policy on Electronics sets vision to promote India as ESDM manufacturing hub
- In January 2011, TRAI released policy recommendations for promoting domestic manufacturers in telecom equipment manufacturing
- DIT recently released notification highlighting preferential sourcing for Government procurement and security critical areas
- Telecom industry agrees with the Government of India, TRAI and DIT on the vision to promote hi-tech manufacturing in India
- However, recognize need to make key policy initiatives actionable to collectively enhance the competitiveness of telecom manufacturing industry

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**Sourcing**

**Funding**

**Standards & Markets**

**Market Infrastructure**

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**Governed by recent DIT Notification**

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**Area of Support**

- 2011 National Policy on Electronics sets vision to promote India as ESDM manufacturing hub
- In January 2011, TRAI released policy recommendations for promoting domestic manufacturers in telecom equipment manufacturing
- DIT recently released notification highlighting preferential sourcing for Government procurement and security critical areas
- Telecom industry agrees with the Government of India, TRAI and DIT on the vision to promote hi-tech manufacturing in India
- However, recognize need to make key policy initiatives actionable to collectively enhance the competitiveness of telecom manufacturing industry

Source: TRAI, Booz & Company analysis
TRAI recommends 80% local sourcing with 65% value addition by 2020; DIT has set a floor of 30% sourcing with 45% value addition.

TRAI Recommendations on Sourcing
% of total domestic demand

- 2012-13: 30% Domestic, 70% LVAP
- 2014-15: 45% Domestic, 55% LVAP
- 2016-17: 60% Domestic, 40% LVAP
- 2019-20: 80% Domestic, 20% LVAP

DIT Notification on Sourcing
% of total procurement

- 2012-13: 30% Domestic, 70% LVAP
- 2014-15: 30% Domestic, 70% LVAP
- 2016-17: 30% Domestic, 70% LVAP
- 2019-20: 30% Domestic, 70% LVAP

Minimum Value Addition

- 2012-13: 25% LVAP, 75% Domestic
- 2014-15: 35% LVAP, 65% Domestic
- 2016-17: 50% LVAP, 50% Domestic
- 2019-20: 65% LVAP, 35% Domestic

Note: LVAP refers to Low value Added Products, where the value added is below the stipulated percentage; Value addition refers to the value of the inputs or bill of material sourced within the country and the value of IPR (TRAI) and value of domestic BOM per DIT.

Source: TRAI, Booz & Company analysis.
Draft TRAI recommendations also include finance, taxation, funding and infrastructure

Summary of Key Recommendations

**Finance and Taxation**
- Preferential access to DMPs with turnover < INR 1,000 crores for debt finance
  - 6% for IMPs
  - 3% for IPs
- Tax rationalization/ incentives compared to imports for telecom equipment, handsets and electronic components
- Autonomous Telecom Standards Organization (TSO) to be established for carrying all works related to telecoms standards
- TCIL to be strengthened as a System Integrator for installing and operating networks in other countries using telecom equipment sourced from India
- Leverage software presence for promoting bilateral trade agreements to encourage export of telecom equipment

**Funding**
- Establish a Telecom Research and Development Council (TRDC) with dual mandate
  - Manage the Telecom Research & Development Fund with an initial corpus of INR 10,000 crores
  - Establish an R&D Park
- Create a Telecom Manufacturing Fund (TMF) with an initial corpus of INR 3,000 crores, to provide venture capital to indigenous manufacturing in the form of equity and soft loans

**Standards and Markets**
- Establishment of Telecom Research and Development Park
- Establishment of ten manufacturing clusters with adequate infrastructure
- Establishment of two wafer fab facilities:
  - Cutting edge facility with government funding and support (upto 75% funding)
  - Second fab for general purpose chip fabrication, with upto 50% financing support

**Market Infrastructure**
- Preferential access to DMPs with turnover < INR 1,000 crores for debt finance
  - 6% for IMPs
  - 3% for IPs
- Tax rationalization/ incentives compared to imports for telecom equipment, handsets and electronic components

1) Includes total incidence of excise and VAT to be limited to 12%; No CST on domestic manufacture/ 2% CVD on imports; Income tax holiday and no MAT for 10 years; deferment of Excise/ Sales tax/ VAT/ GST for 5 years at nominal interest rates; for DMPs with < INR 1,000 crores turnover; Exemption from CVD/ excise for capital equipment

Source: TRAI, Booz & Company analysis

NOT EXHAUSTIVE
Current TRAI recommendations conflate innovation, manufacturing and security, which are best dealt separately.

**Ecosystem Requirements**

**Innovation vs. Manufacturing**

**Innovation**
- Highly qualified research teams
- Education system geared to support innovation

**Manufacturing**
- Large low-medium skilled labour force
- Vocational training institutes

**Infrastructure**
- Strong environment for sharing of ideas - globally competitive university network

**Funding**
- Sustained funding in high risk venture
- Elicit private participation

**Regulations**
- Strengthen IP laws
- Get recognized as having strong IP protection - evidenced by action

**Time to Market**
- Long
- Near-term

Current policy conflates innovation and manufacturing; sets concurrent targets.

Need to be separate - difference in inherent nature; longer lead time for innovation compared to manufacturing.

Security needs to be addressed separately and comprehensively – local innovation & manufacturing do not ensure security.

Source: TRAI, Booz & Company analysis
Our work on policy analysis has drawn on extensive interviews with government, industry and academia.

**Interview Sources For Perspective Mapping on Policy**

<table>
<thead>
<tr>
<th>Government</th>
<th>Industry</th>
<th>Academia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Interviews</strong></td>
<td><strong>Secondary Data</strong></td>
<td><strong>Booz SME Network</strong></td>
</tr>
<tr>
<td>Planning Commission</td>
<td>Domestic Equipment Manufacturers</td>
<td>Booz IC</td>
</tr>
<tr>
<td>Government of India</td>
<td>Global Equipment Manufacturers</td>
<td>Booz Proprietary Models</td>
</tr>
<tr>
<td>Ministry of Communications &amp; IT</td>
<td>Operators</td>
<td>Secondary Data</td>
</tr>
<tr>
<td>Department of Information Technology</td>
<td>Industry Associations</td>
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<tr>
<td>National Manufacturing Competitiveness Council</td>
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</tbody>
</table>

Conducted interviews to engage 90% of all stakeholder types across manufacturing ecosystem.

**Other Sources of Inputs**

- Experts in global manufacturing clusters
- Experts in innovation networks
- Labor law experts
- Telecom technology experts

Source: Booz & Company analysis
While Government can aspire to achieve its multivariate objectives, resulting policy should ensure key design imperatives.

**Multivariate Objective led Policy**

*From our interactions with the Government, four objectives and select design considerations have come to the fore*

- **Preserving National Security**
  - “Ensure network security and stability”
  - Ensure network integrity and prevent external attacks

- **Generating Employment**
  - “Seek to promote job intensive activities”
  - Provide incentives to promote manufacturing and build skilled workforce for innovation

- **Ensuring Balance of Trade**
  - “Look to keep import bill in check”
  - Establish self-balancing mechanism by promoting exports

- **Fostering Innovation**
  - “Encourage product innovation and IP registration to help accrue profits”
  - Fund R&D, create innovation networks and strengthen IP laws

**Key Design Imperatives**

- Transparent and Non-subversible
- Implementable
- Relevant Over Long Time-period

Source: Interviews, Booz & Company analysis
Setting the Objectives
Promoting Manufacturing
Fostering Innovation
Ensuring Network Security

Market Overview and Key Challenges
Manufacturing Ecosystem Imperatives
Stakeholder Considerations
The Indian telecom equipment market is expected to grow at ~10% between 2011-20 to reach ~USD 37 billion by 2020.
The wireless equipment demand is expected to grow at 12.6%, primarily driven by newer technology equipment.

### India Wireless Equipment Market

#### In USD Billion

<table>
<thead>
<tr>
<th>Year</th>
<th>2G+ Core</th>
<th>3G</th>
<th>4G/LTE</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
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<tr>
<td>2015-16</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>2019-20</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

#### Market CAGR (2011-2020)

- 4G/LTE: +12.6%
- 3G: 7%
- 2G+ Core: -4%

\[ \text{CAGR} = \frac{FV - PV}{PV} \times \frac{1}{n} \]

### Market Demand Estimation Comparison

- **Booz**: 8 USD Billion
- **TRAI/Ovum**: 10 USD Billion

Note:
- 4G/LTE network rollouts are expected to begin 2015-16 and so equipment demand for 2010-11 was negligible.
- Telecom equipment demand includes telecom active equipment and excludes handsets.
- Source: TRAI, Ovum, Booz & Company analysis.

1) 4G/LTE network rollouts are expected to begin 2015-16 and so equipment demand for 2010-11 was negligible.
Broadband equipment market demand is expected to grow by ~10% to reach ~USD 10 billion by 2020

India Broadband Equipment Market
In USD Billion

- 2010-11: 4
- 2015-16: 7
- 2019-20: 10

Market Demand Estimation Comparison
In USD Billion, 2020 Forecasts

- Booz: 10
- TRAI/Ovum: 13

CAGR 2011-2020
- Broadband Equipment: 13%
- IP and Packet Switching Equipment: 11%
- Backhaul and Transmission Equipment: 4%

Source: TRAI, Ovum, Booz & Company analysis

Broadband equipment demand in this analysis includes xDSL and FTTx etc. related wire line broadband equipment demand
Despite strong forecasted growth, Indian market will be a small fraction of global demand

India Telecom Equipment Market (Excluding Handsets)

Table: Demand for Telecom Equipment-2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Market (USD Billion)</th>
<th>Share of Global</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>$47 Bn</td>
<td>18%</td>
<td>0.32%</td>
</tr>
<tr>
<td>China</td>
<td>$30 Bn</td>
<td>11%</td>
<td>0.51%</td>
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<tr>
<td>Brazil</td>
<td>$12 Bn</td>
<td>5%</td>
<td>0.43%</td>
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<tr>
<td>France</td>
<td>$8 Bn</td>
<td>3.3%</td>
<td>0.34%</td>
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<tr>
<td>India</td>
<td>$7 Bn</td>
<td>3%</td>
<td>0.57%</td>
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</table>

Note:
1) The global handsets market was valued at $263 billion in 2010 with 1.4 billion units sold which would give India a share of 3% by value and 12.5% by volume.
2) Global equipment market is as reported by TRAI at $260 billion in 2010 which gives India a 2.9% share in 2010 and $510 billion by 2020 which would keep India’s share at 3% in 2020.

Source: Bloomberg, Datamonitor, TRAI, Ovum, Booz & Company analysis
Recent Gazette notification stipulates Preferential Market Access for government procurement and on security concerns

### Analysis of Gazette DIT Notification: 15 February 2012

<table>
<thead>
<tr>
<th>Relevant Clause(s)</th>
<th>Provisions</th>
<th>Concerns</th>
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<tbody>
<tr>
<td>“...Electronic products having security implications and agencies deploying them …” Cl 2.2.1 “…..also applicable for procurement of electronic hardware as a service from managed Service providers”…Cl 2.2.4</td>
<td>Procurement on security implications for country clause being notified by concerned ministry/ ies</td>
<td>Different ministries may come with differing requirements</td>
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<tr>
<td>“percentage of procurement to be made from domestically manufactured electronic product or products but it shall not be less than 30% of the total procurement value of that electronic product or products - Para 2.2.3.”</td>
<td>Mandates floor of 30% for procurement of domestically manufactured electronic products</td>
<td>Does not specify if 30% mandate applies to each operator for each individual transaction</td>
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<tr>
<td>These electronic products shall meet the following graded domestic value-addition in terms of Bill of Material (BOM) from domestic manufacturers-Para 2.3</td>
<td>Extends to electronic hardware procurement by MSPs</td>
<td>For managed services, unclear how 30% coverage would be calculated</td>
</tr>
<tr>
<td>Individual Departments/ Ministries may provide for suitable incentives/disincentives for compliance under the policy- Para 5.3</td>
<td>Percentage of value add in terms of BOM from domestic manufacturers starting 25% in year 1 and goes up to 45% in year 5</td>
<td>Does not define role of domestic manufacturer that supplies components – could lead to a label change regime</td>
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<td>Through suitable self certification system for domestic value addition by vendor</td>
<td>Consistency of interpretation</td>
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<td>Checks to be provided by STQC</td>
<td>Does not describe recourse if no Domestically Manufactured products are available</td>
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Booz & Company
PMA mandate to source 80% locally may be challenging; requires unprecedented expansion of domestic production capacity...

India Telecom Equipment Market Demand

Key Points: 2011-15 Scenario

- Domestically Manufactured Products (DMP) would have to grow by ~40% in the next five years to meet PMA provisions
- Indian Products (IP) are estimated to be currently ~Rs 0.9 K crores by value. As per policy provisions this must be increased to ~14K crores by 2015 requiring a CAGR of 102%
- Meeting these targets would require substantial existing infrastructure on the ground to support manufacturing and innovation

Note: TRAI estimates the percentage of domestic demand being met through exports as being 12.3% in 2010. Indian Products were estimated by TRAI to be 2-3% of total demand.
Source: TRAI, Ovum, Booz & Company analysis
... especially given that currently a manufacturer imports ~90% of the product cost

Components are a large fraction of product cost.

PCB and basic components + packaging material account for ~90% of product cost.

Overheads and processing “value add” account for remaining ~10%

In order to go beyond ~20% value addition, India needs clusters encompassing multi-layered PCB boards, ATMP for custom IC, special purpose active and passive electronic components

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Source: Interviews, Booz & Company analysis
No country is wholly self-sufficient, necessitating India to unavoidably plug into the global supply chain

National Strength – Communications Equipment

No country is able to impose strict PMAs and become self-sufficient in the long run

Exports / Consumption

Imports / Production

<table>
<thead>
<tr>
<th>Country</th>
<th>Self Sufficient</th>
<th>Import Dependent</th>
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<th>Balanced Trade</th>
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</table>

Note: Bubble Size represents GDP
Source: Global Insight and Booz & Company analysis

1) ISIC Rev 3, Communication Equipment (D32): Manufacture of radio, television and communication equipment and apparatus. Includes electronic valves and tubes and other electronic components; television and radio transmitters and apparatus for line telephony and line telegraphy; and television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
Furthermore, it will mandate an impractical objective of building an end-to-end play across the value chain.

The entire manufacturing value chain and all key products would be needed domestically to enable 80% DMP.

**Key Equipment Categories**

- **Switching Systems**: 1.2 USD Billion
- **Radio/Signaling Equipment**: 2.8 USD Billion
- **Terminal Equipment**: 1.4 USD Billion
- **Transmission Equipment**: 1.9 USD Billion

**Total**: 7.3 USD Billion

**High Value**

**Low Value**

Note: Servers are included as part of Switching Systems and Radio/Signaling Equipment.

Source: Booz & Company analysis
End-to-end value chain play is infeasible - successful countries have developed expertise in select areas ...

Global Leaders Across Value Chain

Source: Booz & Company analysis
... and then plugged into the global supply chain to seamlessly support the global hi-tech industry

30 GB iPod Value Chain
Innovation & Business Networking

Apple Designs the Product
Toshiba builds Disk Drives
Toshiba & Matsushita prepares Display Modules
Broadcom integrates Video Processors
Inventec completes the Final Assembly

Apple leverages Innovation & Business network across its product life-cycle

Source: Booz & Company analysis
In summary, current manufacturing target present significant challenges – Government needs to set up water tight initiatives

No country is self-sufficient - India will need to plug into the global supply chain to achieve target growth

No country is self-reliant - India will need to assess its core capabilities across the value chain to realize its market potential

Focus on building a robust manufacturing eco-system

- Government needs to identify the optimal strategic imperatives to build a robust manufacturing eco-system
- Government needs to identify the key issues in manufacturing and design robust incentives accordingly

Design transparent / implementable policies for stakeholder qualifications

- Government needs to assess potential issues faced by all stakeholder types (manufacturers, operators, etc.)
- Government needs to define ‘value addition’ in a robust and implementable manner in order to make the policy relevant and effective

Source: Booz & Company analysis
Setting the Objectives
Promoting Manufacturing
Fostering Innovation
Ensuring Network Security

Market Overview and Key Challenges
Manufacturing Ecosystem Imperatives
Stakeholder Considerations
Kick starting domestic manufacturing calls for developing specialized telecom clusters with anchor and synergistic tenants

<table>
<thead>
<tr>
<th>Cluster Participants</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Tenants</td>
<td>Large tenants are established to provide critical mass for other tenants as either one of their primary buyers (i.e. OEMs for Auto Cluster) or suppliers (i.e. smelters for Metals Cluster)</td>
</tr>
</tbody>
</table>
| Synergistic Tenants  | Synergistic tenants are ones whose proximity to the anchor are critical for cluster’s success  
  - e.g. Auto, synergy results from optimizing of logistics flows and reduction in inventory  
  - e.g. Petrochem, synergy yielded from thermal integration and optimization of side streams  
  - On-site presence not as critical if a robust logistics system in place allows for “virtual” proximity |
| Optional Tenants     | Optional tenants may be synergistic but their presence is not critical for the cluster’s success |

“Cluster is a **geographically proximate group** of **inter-connected companies** and **associated institutions** in a particular field, linked by commonalities and complementarities”

Specialized Cluster in Taiwan

<table>
<thead>
<tr>
<th>IC Cluster</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logic Design</td>
<td>Design Houses (~260 in total)</td>
</tr>
<tr>
<td>Mask</td>
<td>IC masks manufacturers (~4 in total)</td>
</tr>
</tbody>
</table>
| Fabs | Fabrication, Wafer Probing & Dicing (~13 in total)  
  - Wafer (8)  
  - Chemicals (18) |
| Packaging | Packaging (34)  
  - PCB Boards (14)  
  - Lead Frame (4) |
| Final Testing | Testing (~34 in total) |

**Proposed by TRAI in Sec.2.93**

Source: Booz & Company analysis

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24
Government needs to adopt a comprehensive strategy for cluster development, including infrastructural, fiscal and legal initiatives.

### Cluster Development Conditions

<table>
<thead>
<tr>
<th>Factor Conditions</th>
<th>Demand Conditions</th>
<th>Context for Firm Strategy and Rivalry</th>
<th>Related &amp; Supporting Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Availability of inputs for competitive manufacturing</td>
<td>▪ Easy access to local and global markets</td>
<td>▪ Promotion of healthy competition via ownership and business policies</td>
<td>▪ Prevalence of ancillary industries required for manufacturing</td>
</tr>
</tbody>
</table>

### Government Role

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Fiscal</th>
<th>Legal</th>
</tr>
</thead>
</table>
| ▪ Provide access to  
  ▪ Power (energy)  
  ▪ Transportation  
  ▪ Skilled labor for hi-tech manufacturing | ▪ Offer time bound incentive to overcome logistics/freight costs | ▪ Build regime with favorable labor laws amenable to employer and employee |
| ▪ Promote export via zones aligned for this purpose | | |
| | ▪ Ensure certainty in policies  
  ▪ Streamline approval process (especially environmental clearances) | |
| | ▪ Access to sufficient technology infrastructure (testing facilities etc.)  
  ▪ Proliferation of component supply base | |

Source: Booz & Company analysis
Current infrastructure is a significant roadblock for manufacturing activities - strong initiatives are key to develop clusters

<table>
<thead>
<tr>
<th>Infrastructural</th>
<th>Key Issues</th>
<th>Recommendations</th>
</tr>
</thead>
</table>
| Energy          | High tech manufacturing needs uninterrupted and assured power supply  
|                 | Power supply is in-consistent and in short supply.  
|                 | Current cost of power to industry does not provide any distinct manufacturing advantages | In Section 2.93/94, TRAI recognizes need for developing infrastructure  
|                 | In Section 2.93/94, TRAI recognizes need for developing infrastructure  
|                 | Power supply is in-consistent and in short supply.  
|                 | Current cost of power to industry does not provide any distinct manufacturing advantages | However, regarding power generation for telecom manufacturing, DoT can work with Ministry of Power to set-up dedicated generation facility for clusters  
|                 | Need improved ports, road network and warehousing capabilities to build capacity for future | Prioritize road and transport network development in areas marked for clusters catering to telecom manufacturing  
|                 | Requires adequately trained manpower to meet basic manufacturing and plant management needs  
|                 | Currently low cost yet skilled labor for hi-tech manufacturing is in short supply; can be augmented | In Section 2.78, TRAI recognizes need for skilled manpower and recommends training institutes for on-demand training  
|                 | Requires good primary and secondary component supplier base  
|                 | Need centralized testing and certification agencies  
|                 | Good to have additional support services like prototyping, shared infrastructure etc. | TRAI (Section 2.93) recommends setting up of clusters for component development – industry supports this.  
| Hi-Tech Manufacturing Skills | China plugs in 9% of GDP into public works compared to 4% in India | In Section 2.78, TRAI recognizes need for skilled manpower and recommends training institutes for on-demand training  
| Transportaion | In Section 2.78, TRAI recognizes need for skilled manpower and recommends training institutes for on-demand training  
| Transportation | Need improved ports, road network and warehousing capabilities to build capacity for future | Suggest that these institutes can be co-located in/near clusters with telecom specific training (similar to NMP plan to set up ITIs in NMIZs)  
|                 | Requires adequately trained manpower to meet basic manufacturing and plant management needs  
|                 | Currently low cost yet skilled labor for hi-tech manufacturing is in short supply; can be augmented | Can establish with foreign investment and partnerships  
|                 | Requires good primary and secondary component supplier base  
|                 | Need centralized testing and certification agencies  
|                 | Good to have additional support services like prototyping, shared infrastructure etc. | TRAI (Section 2.93) recommends setting up of clusters for component development – industry supports this.  
| Technology Infrastructure | In Section 2.78, TRAI recognizes need for skilled manpower and recommends training institutes for on-demand training  
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|                 | Requires good primary and secondary component supplier base  
|                 | Need centralized testing and certification agencies  
|                 | Good to have additional support services like prototyping, shared infrastructure etc. | Can establish with foreign investment and partnerships  

Source: Interviews, TRAI, Booz & Company analysis

Booz & Company
Infrastructural disabilities lead to cost disadvantages; Government can incentivize manufacturing via lower duties and special credits

**Key Issues: Duties**

- Application of CST/ State VAT renders domestic manufacturing uncompetitive as State VAT (2-12%) is often greater than Special Additional Duty
- Underdevelopment of domestic supplier base and infrastructural handicap translate to higher cost structures for domestic manufacturers

**Recommendations**

- Institute scheme to offset infrastructural and freight disabilities, as also state VAT rates:
  - Devise scheme similar to Focus Products Scheme to include all telecom equipment and components manufacturing locally in line with DIT requirements
  - Offer Duty Credit Scrip as fixed % of exports and DTA sales for fixed period (5 years)
  - Allow for Credit Scrips to used against excise payments

---

### Impact of Disabilities on Cost Structure

<table>
<thead>
<tr>
<th>Cost Account</th>
<th>India</th>
<th>China</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Material Cost</td>
<td>85</td>
<td>85</td>
<td>Assume CST waiver</td>
</tr>
<tr>
<td>Freight Costs</td>
<td>3</td>
<td>1.2</td>
<td>Difference arises from absence of component supply base</td>
</tr>
<tr>
<td>Labor</td>
<td>2</td>
<td>2</td>
<td>Similar labor costs due to lower wages in India offset by lower productivity</td>
</tr>
<tr>
<td>Power and Overheads</td>
<td>10</td>
<td>7</td>
<td>Higher power costs and uncertain supply in India</td>
</tr>
<tr>
<td>Total Cost</td>
<td>100</td>
<td>95.2</td>
<td>~5% cost differential</td>
</tr>
</tbody>
</table>

**Note:** Assume power costs contribute to 5% of overall costs. Assume other overhead costs are same between India and China

**Source:** Interviews, DIT Task Force, Study, Booz & Company analysis
The Government needs to harmonize fiscal regulations across manufacturers and modify the current refund system

**Un-harmonized Regulations**

- Current regulations do not recognize intra-SEZ sale as foreign exchange earning transaction
- Precludes development of component ecosystem as they grapple meeting Net Foreign Exchange requirements at SEZ

**Key Issues**

- Interest loss due to difference in time between cash outflow for import duties and taxes and point of reconciliation and refunds after product sale
- Unpredictability in refund amount
- Non-accrual of balance CENVAT credit

**Government Imperatives**

Export benefits need to propagate to component manufacturers within manufacturing zone

**Induced Cash-flow Issues**

- Interest Loss
- CENVAT Loss

- Cash Outflow for import duties
- CENVAT Credit in account - no physical cash flow
- Actual point of cash outflow

Source: TRAI, Booz & Company analysis
Current recommendations do not impact labor laws – critical to modify restrictions clauses in order to develop effective clusters

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Problem Areas</th>
<th>Relevant Laws and Chapters</th>
</tr>
</thead>
</table>
| Flexibility to Scale Production Based on Demand Fluctuations | • Telecom equipment industry considered to highly seasonal with fluctuations in demand which can vary significantly based on available projects at any given time  
• Existing manufacturers restricted by lack of flexibility on labor force employment that would enable them to optimize workforce to meet demand  
• Contract labor gaining precedence in the market in a bid to bring in this flexibility | i Section 25M of Industrial Disputes Act of 1947 that covers the provisions regarding prohibition of lay-offs for factory workers  
ii Section 25G lays down the procedure for retrenchment and imposes the “last-come-first-go” principle which restricts the employers intention to keep the best workers |
| Provisions and Conditions Regarding Employment of Labor | • Provisions relating to number of permissible hours of work for during a day or week  
• Restrictions on overtime and payments deemed necessary to compensate for overtime | iii Section 51 of the Factories Act 1948, covering the maximum number of permissible hours for factory workers in week  
iv Section 54 of the Factories Act 1948, covering the maximum number of permissible hours for factory workers in day  
v Section 64 of the Factories Act 1948, covering the maximum number of working hours (including overtime) permissible under state amendments |

Source: Booz & Company analysis
Section 25M of IDA 1947 restricts manufacturers from optimizing workforce hiring to meet demand fluctuations

### Section 25M of IDA 1947: Clauses and Amendments

<table>
<thead>
<tr>
<th>Industrial Disputes Act: Section 25M</th>
<th>Amendments Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covers restrictions on lay offs of factory workers</td>
<td>Sub-Section 1 needs to be modified to allow:</td>
</tr>
<tr>
<td>No workman (other than a badli workman or a casual workman) whose name is borne on the muster rolls of an industrial establishment to which this Chapter applies shall be laid-off by his employer except with the prior permission of the appropriate Government or such authority as may be specified by that Government by notification in the Official Gazette (hereinafter in this section referred to as the specified authority), obtained on an application made in this behalf, unless such lay-off is due to shortage of power or to natural calamity, and in the case of a mine, such lay-off is due also to fire, flood, excess of inflammable gas or explosion]. - <em>Section 25M, Sub-Section 1</em></td>
<td></td>
</tr>
<tr>
<td>Where the workman (other than badli workmen or casual workmen) of an industrial establishment, being a mine, have been laid-off under sub-section (1) for reasons of fire, flood or excess of inflammable gas or explosion, the employer, in relation to such establishment, shall, within a period of thirty days from the date of commencement of such lay-off, apply, in the prescribed manner, to the appropriate Government or the specified authority for permission to continue the lay-off - <em>Section 25M, Sub-Section 3</em></td>
<td></td>
</tr>
</tbody>
</table>

Currently IDA contains 27 different forms pertaining to disputes that may arise from the Act.

Source: Booz & Company analysis
Section 25G of IDA 1947 allows for legal action against layoffs; dispute may be filed for any reason other than time of hire

**Industrial Disputes Act: Section 25G**

- Covers procedures in case of retrenchment of workers of factory workers in the

  Where any workman in an industrial establishment, who is a citizen of India, is to be retrenched and he belongs to a particular category of workmen in that establishment, in the absence of any agreement between the employer and the workman in this behalf, the employer shall ordinarily retrench the workman who was the last person to be employed in that category, unless for reasons to be recorded the employer retrenches any other workman.

  - *Section 25G*

**Amendments Proposed**

- This clause of the IDA allows for legal disputes since employer is bound to show reasons for retrenchment of any workman unless this was based on “last come first go” principle
- This clause under the IDA may be amended to allow the manufacturer to retrench without provision for dispute based on accepted criteria for determining lack of performance of a worker
Specific provisions of the Factories Act of 1948 governing overtime and permissible working hours also needs to be re-evaluated

Factories Act 1948: Clauses and Amendments

**Factories Act 1948**

- Covers provisions governing overtime and hours of employment

**Weekly Hours**

No adult worker shall be required or allowed to work in a factory for more than forty-eight hours in any week. - *Section 51*

**Daily Hours**

Subject to the provisions of section 51, no adult worker shall be required or allowed to work in a factory for more than nine hours in any day. - *Section 54*

**Overtime (State Legislative Provisions)**

The total number of hours of work in a week including overtime, shall not exceed sixty; The total number of hours of overtime shall not exceed fifty for any one quarter - *Section 64*

**Amendments Proposed**

- Overtime is an opportunity for able workers to earn extra income and so limits may be amended as current provisions of fifty hours a quarter implies less than one permissible overtime hour in a day

- Weekly, daily and quarterly working hour restrictions may need to be aligned with international labour best practices e.g., 12 hours, subject to overall existing weekly caps

Mandating shorter working hours adds significantly to transport costs, especially given the poor state of the public transport infrastructure. Malaysia currently allows 12 hours a day as permissible working limit while China has more flexible overtime limits

Source: Booz & Company analysis
There is a need for a comprehensive framework of labor laws that balances the needs and concerns of both employer and employee.

Key Elements of Recommendations on Labor Law Framework

**Wages and Benefit’s Provisions**

- **Recommendations:** Benefits distribution has to include:
  - **Single account linkage:** Any employer, irrespective of nature of contract, must deposit contributions under all labour schemes (EPF, ESI etc.) under different sub-accounts or a single account but which are linked to single AADHAR number or account.
  - **Self Declaration:** Employer and employee have to self-declare the accounts that they are paying into or receiving benefits into respectively.

<table>
<thead>
<tr>
<th>EPF</th>
<th>ESI</th>
<th>Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disability Allowance</td>
<td>Health Insurance</td>
<td>Other Payments</td>
</tr>
<tr>
<td>AADHAR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Layoff Provisions**

- **Recommendations:** Layoff provisions need to be flexible without compromising welfare.
  - **Quantitative restrictions on layoffs:** No quantitative restrictions on layoffs to allow seasonality based adjustments on hiring. This is to be uniform across industries with no differentiation based on nature of contract.
  - **Wages:** Wages on termination to be uniformly addressed as being equal to 15 days of wages for every year of employment with the employer, prorated over the duration of total employment.

**Unionization Provisions**

- **Recommendations:** Rights to association should remain; however:
  - **Employee Welfare Board (EWB):** Every employer should have a labour welfare board on which representatives of management and labour are present. Representations of proposed changes should be made to EWB.
  - **Work Stoppage Provisions:** No work stoppage unless 70% of employees vote for this using secret ballot.
  - **Wage Disputes:** Wage disputes will be effective from date referendum is passed.

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Source: Booz & Company analysis

We do not recommend any dilution of the occupational safety and employee health related provisions contained within existing labor laws.
Regulatory processes need to be streamlined in line with NMP; mechanics need to be detailed with additional considerations

<table>
<thead>
<tr>
<th>Key Issues</th>
<th>Relevant NMP Recommendations</th>
<th>Additional Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex Certification &amp; Monitoring Process:</td>
<td>- Simplified Clearances &amp; Monitoring:</td>
<td>- Clear Definition of Roles:</td>
</tr>
<tr>
<td>- Involvement of multiple agencies seen as a source of corruption and harassment</td>
<td>- Streamlined clearance procedure with official of State Pollution Control Board to be posted in zone</td>
<td>- Need to ensure proper division of roles and responsibilities with introduction of third party agencies and online processes</td>
</tr>
<tr>
<td>- Single window clearance does not work well. Often opens to multiple windows</td>
<td>- Involvement of third-party agencies to supplement Government agencies for compliance monitoring</td>
<td>- Can afford greater autonomy to third-party agencies</td>
</tr>
<tr>
<td>Lack of Transparency: No clear understanding of rules and processes that need to be fulfilled</td>
<td>- Institute web-enabled process</td>
<td>- Can institute special process for NMIZs</td>
</tr>
<tr>
<td>Long Clearance Time: Lengthy approval process delays commencement of manufacturing</td>
<td>- Well-defined Clearance Time: Defined timeline with respect to all clearances beyond which application shall be deemed approved</td>
<td>- Ensure Transparency with Online Process: Web-enabled process should target to provide greater transparency regarding approvals required, criteria to secure approval and reasons for rejection</td>
</tr>
<tr>
<td></td>
<td>- Plan NMIZs properly to reduce number of clearances required</td>
<td>- Competitive Clearance Window: Define clearance time in line with international best practices</td>
</tr>
</tbody>
</table>

Source: Interviews, National Manufacturing Policy 2011, Booz & Company analysis
Guaranteed time bound incentives that are stable over the duration of the concessions are needed to attract investment.

**Government Prior Incentive Rollbacks: Examples**

“The Union finance ministry is mooting withdrawal of the tax incentives to manufacturing units in Himachal Pradesh and Uttarakhand. The will affect the bottom-line of fast moving consumer goods (FMCG) companies like Dabur, Nestle, Hindustan Unilever. If the government does away with these subsidies, industry experts say the cost of companies in these regions could increase by anywhere between 20 and 30 per cent” — March, 2010

“Finance minister P Chidambaram had in his Budget for 2008-09 proposed an end to the seven-year income tax holiday for refineries commissioning after April 2009. The proposal would affect all proposed new refineries except that of Reliance Petroleum Ltd” — 2009

**Implications and Current Plan**

- Investor confidence needs to be built up with guarantees on length of tax incentives
- Incentive structure should allow continuation in the face of changing governments and respective policies

Central government needs detailing on current incentives to encourage companies across the value chain.

**Implications**

- Investor confidence needs to be built up with guarantees on length of tax incentives
- Incentive structure should allow continuation in the face of changing governments and respective policies

**Initiatives**

- **Tax Deferment**
  - Description: 5 year tax holiday to new companies
  - Budget: Rs 3,154 Crores
- **Tax Benefits**
  - Description: Limiting Excise and VAT to 12%
  - Budget: Rs 37,450 Crores
- **Interest Subсидies**
  - Description: 6% interest subsidy for IP and 3% for IMP
  - Budget: Rs 22,782 Crores

**TOTAL**

- Budget: Rs 63,386 Cr
Setting the Objectives

Promoting Manufacturing
Fostering Innovation
Ensuring Network Security

Market Overview and Key Challenges
Manufacturing Ecosystem Imperatives
Stakeholder Considerations
Proposed policy puts the onus on operators to drive PMA – non-optimal definition of value addition makes the policy impractical

Current Policy Stakeholder Implications

To qualify as a ‘domestic equipment manufacturer’ one has to ensure the mandated ‘value addition’ which is currently defined as percentage of local procurement

Indian Government plans to mandate operators to source a minimum of 30% of their overall BOM from ‘domestic equipment manufacturers’

Government should re-evaluate its definition of value addition in order to design a more implementable policy as well as maximize potential to plug into the global value chain

Source: Booz & Company analysis
Applying PMA to other than non-commercial Government and for security critical procurements will need WTO verification.

**Proposed PMA Quantification**
TRAI Proposal & DIT Notification

Mandate that certain percentage (quantitative requirement) of operator / Licensee procurement arises from products meeting threshold % of local value addition with value addition defined as below

\[
\text{Value Add}^1 = \frac{\text{Local BOM}}{\text{Total BOM}} \times 100
\]

1) Definition of Value Add based on DIT Notification
Source: Booz & Company analysis

**WTO Compliance for Commercial Procurement**
Relevant Clauses from GATT

**Paragraph 1:** The [Members] recognize that internal taxes and other internal charges, and laws, regulations and requirements affecting the internal sale, offering for sale, purchase, transportation, distribution or use of products, and internal quantitative regulations requiring the mixture, processing or use of products in specified amounts or proportions, should not be applied to imported or domestic products so as to afford protection to domestic production.

**Paragraph 5:** No contracting party shall establish or maintain any internal quantitative regulation relating to the mixture, processing or use of products in specified amounts or proportions which requires, directly or indirectly, that any specified amount or proportion of any product which is the subject of the regulation must be supplied from domestic sources. Moreover, no contracting party shall otherwise apply internal quantitative regulations in a manner contrary to the principles set forth in paragraph 1.*

**Paragraph 7:** No internal quantitative regulation relating to the mixture, processing or use of products in specified amounts or proportions shall be applied in such a manner as to allocate any such amount or proportion among external sources of supply.
If applicable, PMA guidelines for ‘value addition’ should be amended to incorporate substantial transformation...

### Substantial Transformation

**Definition:** Substantial transformation is said to have occurred when the article or commodity has a new name, new character or new use compared to the inputs used to produce the article or commodity.

**Tests of Substantial Transformation:** Countries measure the degree of substantial transformation using 3 tests:
- **Change in name** requires change in commercial designation or commercial identity of the product, which may be shown by trade literature, catalogues or brochures.
- **Change in character** requires change in physical aspects of the product such as change in physical dimensions, chemical composition or physical qualities.
- **Change in use** requires a product to be transformed into a product with a different use or a change of a product with many uses into a product with a single use.

**Advantages for India:** A substantial transformation measure will be:
- Compliant with WTO regulations
- Accompanied usually by significant value addition which can be used to offset the import bill

### Key Proposed PMA Amendments

- **Balance Imports Through Substantial Transformation:** Equipment manufacturers can perform substantial transformation to offset import bill for components.

- **Objective of Amendment:** As manufacturers offset imports via substantial transformation they will bring strong manufacturing skills as well as boost demand for local products.

- **Accountability:** Operators be made responsible for ensuring import balance through substantial transformation criteria is met by all its vendors.

---

Source: Booz & Company analysis
...to help Government design an implementable and robust policy to fuel local manufacturing and create jobs

Substantial Transformation - Overview

Substantial Transformation (%) = \frac{\text{Price of Product} - \text{Total Imports}}{\text{Price of Product}}

Potential Approaches to Meet Criteria

- **Foster in-house substantial transformation**
  - Build and foster key design and manufacturing activities in order to increase the value add on procured imported and local products
  - Drive transfer to technology know-how and skills as well as create significant jobs thereby meeting key Government objectives

- **Reduce value of imported components**
  - Telecom equipment manufacturers can increase adoption of local components in order to ease the requirements on in-house substantial transformation
  - Increasing demand will drive growth for local manufacturing thereby meeting key Government objectives

Source: Booz & Company analysis
Setting the Objectives
Promoting Manufacturing
Fostering Innovation
Ensuring Network Security
The innovation ecosystem typically evolves in three stages with a build up of local capability and participation levels.

**Innovation Ecosystem Maturity**

1. **Product & Services Support**
   - Perform well-defined tasks contributing to sub-part development with little or no visibility of finished end product
   - Builds basic technical capabilities
   - e.g. Smaller design projects at global R&D centers

2. **End-to-End Product & IP Development**
   - Has a view of product roadmap, defines problem and manages end-to-end product development
   - May register the IP in India
   - Builds advanced technical and innovation capabilities
   - e.g. Cisco ASR 901 BTS router

3. **Entrepreneurship & Product IP Development**
   - Product conceptualization, end-to-end development of path-breaking futuristic technology
   - Registers IP in India
   - Captures value in India most commonly via an Indian shareholder
   - e.g. Emerging ventures, JVs of Indian firms with Global Corporations

**Capability Transition**

**Capability & Ownership Transition**

**Value to Nation**

**Evolution with Time**

Source: Booz & Company analysis
Evolution provides incremental benefits to the nation; initial phase provides jobs, latter stages help drive innovation and forex

**Jobs**
- High volume of relatively lower skill jobs
- Emphasis on low volume high skill jobs
- Emphasis on high skill jobs but may support manufacturing jobs

**Innovation Capability**
- Builds basic technical capabilities
- Requires advanced technical knowledge with end-to-end product development skills
- Requires path-breaking innovation ability in emerging technologies

**Fiscal/Forex**
- Forex inflow from exporting engineering services
- Forex inflow from exports
- Forex inflow from exports
- Forex inflow from exports
- Fiscal impetus from profit accruals

Source: Booz & Company analysis
Global players are critical to drive the first two stages of evolution; they bring in large spend and transfer know-how

**Telecom R&D Spend**

**2008-09, USD Bn**

<table>
<thead>
<tr>
<th>Company</th>
<th>Spend (USD Bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nokia</td>
<td>8.2</td>
</tr>
<tr>
<td>Cisco</td>
<td>5.2</td>
</tr>
<tr>
<td>Ericsson</td>
<td>5.0</td>
</tr>
<tr>
<td>Motorola</td>
<td>4.1</td>
</tr>
<tr>
<td>Alcatel-Lucent</td>
<td>3.8</td>
</tr>
<tr>
<td>Qualcomm</td>
<td>2.3</td>
</tr>
<tr>
<td>Juniper Networks</td>
<td>0.7</td>
</tr>
<tr>
<td>Dept. of Sc. &amp; Tech, India FY 12</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**Total R&D spend in India across all sectors and Govt + Industry only slightly > large corporations**

**Investments in India**

**2009**

- **Total = ~$40Bn**
  - Offshoreable: 21%
  - Non Offshoreable: 79%

- **Total = ~$8Bn**
  - India: 30%
  - Rest of World: 70%

**Activities at India Research Centers**

- Joint research center with C-DoT (~250-500 employees)
- Provides hardware, software design and testing services
- Develops complete terminals, small cells and base stations
- Largest development center outside US
- Employs ~5000 people with ~370+ patents granted
- Perform end-to-end product development e.g. ASR 901 router for BTS; also had manufacturing support
- Large center in Bangalore with ~2500+ engineers
- Provide hardware and support for global processor development + small group focusing on end-to-end products for India

**Source:** Interviews, UNESCO, Booz & Company analysis

Large scale employment and infusion of technical knowledge helps build basic and advanced capabilities in the ecosystem
However, currently investments are limited by weak technology, IP and education infrastructure

Current Industry Concerns

- **Technology Infrastructure**
  - Need support for testing, certification and prototyping
  - Helps broaden innovation activities to include complete product development

- **IP Infrastructure & Protection**
  - Weak IP infrastructure with four offices across India
  - Sluggish process – takes ~4 years for patent grant whereas entire process takes ~2.5 years in US
  - Not recognized as a destination with strong enforcement of IP protection

- **Educational Infrastructure**
  - Engineers grapple with ramping up to speed and conceptualizing new products
  - Engineering curriculum places minimal importance on practical experience - takes ~10 months to bring Indian engineer to full productivity vs. 2-3 months in mature geographies
  - Lack of engineers with advanced degrees - Doctorate: Bachelors is 0.4% in India vs. 11.3% in US

Source: Interviews, USPTO, Booz & Company analysis

To build another Silicon Valley, India needs to create an ecosystem with adequate contract manufacturers for prototyping, product qualification and compliance labs
- Senior Executive, Global Technology Company

While the IPR regime in India consists of robust IP laws, it lacks effective enforcement, for which “least priority given to adjudication of IP matters” is often quoted as a reason
- FCCI, World IP Day, 2010

There is also a lack of talent for product conceptualization and product management for the emerging markets. Systems management for captives still continues to be driven by headquarters, so talents for this area need to be nurtured.
- Indian Semiconductor Association
To usher international investments, the Government needs to be more proactive in building an ecosystem with sound infrastructure.

**Imperatives for Government**

### Technology Infrastructure
- Policy recommendation proposes converting Telecom Engineering Centre into an autonomous testing and certifying agency (TRAI- §2.50)
- However, ecosystem needs to extend beyond testing to include shared labs, prototyping etc.
- Provide funding and extend subsidies (e.g. SEZ benefits) to promote development of SME engineering services organizations.

### IP Infrastructure & Protection
- While the Authority delves briefly on the topic in TRAI- §3.44, there are no clear steps highlighted
- Ease the IP application process using global best practices. e.g. US
- Strengthen IP protection by taking action against violators
- Reinforce India’s brand image as IP destination

### Educational Infrastructure
- Training institutes at the polytechnic level to promote manufacturing have been considered (TRAI- §2.78)
- Engineering education has not been addressed
- Upgrade engineering curriculum to include latest telecom technologies and practical know-how
- Encourage collaboration between academia, Government labs and industry; can facilitate PhD programs on specific topics at IITs and IISc with industry support

Source: Interviews, USPTO, Booz & Company analysis
In parallel, we need to start developing an ecosystem to foster entrepreneurship - typically requires much longer gestation period.

Key Steps in Evolution of New Ventures

**Stages of Evolution**

**A Early-Stage:**
- Evolution of product from concept to prototype with initial roll-out.
- **“Concept”**: Disruptive product concept based on cost and/or technology advantage

**B Growth Stage:**
- Evolution of companies from small-contract based sustenance to mature self-sustaining globally competitive levels
- **“Nascent”**: Completely developed product with patent filed
- Basic pilot runs in progress
- **“Emerging”**: Achieved break-even or profitable
- Established scale in home market or region
- Beginning to export
- **“Mature”**: Globally established player
- Drives economies of scale at global level

Source: Booz & Company analysis
Across the early stage development cycle, companies are faced with lack of VC funding and absence of adequate infrastructure.

Early Stage Development

Key Activities

- Ideation and business plan development
- Typically involves small technical team + business lead
- Refining concept
- Prototyping
- Build team to include sales, marketing, support functions
- Obtain field trial contracts from operators
- File for IP

Challenges

- Lack of seed funding to develop on concept and prototype
- Insufficient physical and support infrastructure
TRAI has proposed the TRDF to provide seed funding; detailed design is yet to be fleshed out

### Need for Funds

- Sufficient early stage VC funding is not available to cover large development costs
  - “While VCs are willing to invest a few crores in ventures, product development from basic research to commercialization requires several tens of crores” – Entrepreneur
  - With relatively low volume of funding early stage VC funding:
    - spreads too wide across sectors and..
    - lacks risk appetite to provide sustained support for product development
- As TRAI highlights, may also apply to projects within larger organizations that have long lead time and may not receive funding

### TRAI’s Proposed Incentives

- Establishing Telecom Research & Development Fund to finance R&D projects
- Fund setup with a corpus of Rs.10,000 crore and interest accruals of ~Rs.800 crore used to fund projects ($3.43)
- Plan to fund ~Rs.20 crore per project over 2 years with 40 active projects at any time ($3.41)
- Research center to bear 50% of the cost. Funding for educational institutions could be 100%
- Fund managed by government, industry and academia jointly

---

Source: Interviews, IVCA, Booz & Company analysis
Global best practices can be incorporated in program design for the seed fund

**Recommendations for Program Mechanics**

- **Structure:**
  - Based on venture capital model
  - Can be modeled along lines of DST’s Technology Development Board providing loan assistance, equity subscription and grants
  - Need to cater to start-up proprietary ventures similar to TePP

- **Design:**
  - Appropriately leverage foreign and best domestic expertise
  - Adopt strategies to raise sufficient capital without bleeding Government exchequer
  - Offer additional incentives to entrepreneurs including mentoring, additional upside from stake sale etc.
  - Utilize similar selection parameters as DST’s grants – need to measure merits comprehensively including merit, team, plans etc.

**Case Study:**

<table>
<thead>
<tr>
<th>Yozma I</th>
<th>Fund 1 (60%) Foreign VC + Fund 2 (40%) Israeli finance inst.</th>
<th>...</th>
<th>Fund 10</th>
</tr>
</thead>
</table>

- Govt. invested $8Mn each in 10 funds+ $20Mn
- Fund had to engage one foreign VC institution and well-established Israeli financial institution
- Government would invest about 40% of funds raised. $100Mn of Govt funds, called for $150Mn private funds
- Each fund had call option on Government shares at cost plus interest for 5 years
- Provided funding and risk sharing to start-ups but also upside from acquisition of Government shares

Source: Booz & Company analysis
The provisions for infrastructural support need to be more comprehensive than currently proposed to cater to early stage firms

Comprehensive Infrastructure Support

- Proposed R&D Park to co-locate innovation firms (TRAI- §3.39)
- Developing office infrastructure requires upfront capital investment
- Can mitigate the burden for select start-up firms with plug-and-play offices in proposed R&D park
- Support for IPR filing fee (TRAI- §3.45)
- Recommend this extends to access to legal support beyond filing fee reimbursement.

Technology Infrastructure

- Centralized testing agency for all companies (TRAI- §2.50)
- Provide shareable resources for basic equipment assembly and testing.
- For instance, establish shared EMI/EMC test facilities in R&D park for ongoing testing during development phase

Office Infrastructure

- No specific provision

Patent Submission

- Extend special infrastructural support to funded-ventures

Guidance

- Nurture selected firms by establishing mentoring network and facilitating periodic interactions with business and technology experts

Source: Booz & Company analysis
As they seek to attain scale, companies face challenges in offering competitive prices and attractive financing options.

**Growth Phase Development**

**Key Activities**

- Establish supply chain, manufacturing and competitive vendor contracts
- Focus on marketing and sales
- Balance supply and demand to optimize inventory levels and cash-flow
- Achieve sufficient traction in domestic/primary market to meet production threshold
- Focus on growth and increasing market share via exports

**Challenges**

- Stay competitive in pricing by balancing vendor contracts and demand
- Offer attractive financing options in line with global players

Source: Booz & Company analysis
For instance, post liberalization a large telecom PSU failed, on the lack of a sustainable advantage

**PSU – Wireless Communication Equipment**

**(1975 – 1999)**

**Since 1975**

- Preferential Access
  - Domestic manufacturers supplied telecom equipment to Defense sector
  - Failed to achieve economies of scale and upgrading the technology

**Post 1990 - 1999**

- **Liberalization**
  - Accessed Japanese technology in 1992
  - Followed broad banding
  - NTP 1994 disturbed nascent liberalized telecom sector
    - **Revenue Sharing**: License fee annually @ 17% of “Adjusted Gross Revenue” for the Metro cities & Telecom Circles
    - Resale of business / assign ability/transferability of license
  - 1998-99
    - Recorded a negative growth of ~75%
    - Net Loss of ~ 139 Cr.

<table>
<thead>
<tr>
<th>Year</th>
<th>PAT (INR M.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>-9</td>
</tr>
<tr>
<td>1997</td>
<td>-28</td>
</tr>
<tr>
<td>1998</td>
<td>-56</td>
</tr>
</tbody>
</table>

**In 2006, PSU was disinvested**

**Reasons For Failure**

- **Unfavourable Environment**
  - NTP 1994 had clauses like revenue sharing & assignability of license
  - Additionally, political instability led to decreased investor confidence

- **Failed Equity Proposals**
  - Consequently, PSU had to undergo multiple failed equity proposals:
    - 1997: Telia backed out pick up Rs. 125 Cr. of equity on adverse effects of NTP
    - 1997: AIG refused Rs. 100 Cr support because of absence of Telia

- **Cash Crunch**
  - Failed to execute the orders worth Rs. 140 Cr.
  - Faced legal issues due to non-payment short term borrowings
  - Faced legal cases for non-payment to creditors, suppliers, depositors, etc

Source: Booz & Company analysis
Facilitating competitive pricing calls for a broader strategy beyond current proposals of demand assurance and capital funding.

**Pricing Dilemma**

Start-up vendors face a chicken and egg situation....

- Telcos purchase from low cost vendors
- Vendors cannot offer scale sans telco contracts
- Component suppliers drive vendor price
- Supplier cost varies by scale offered

Vendors need:
- Upfront capital for capex investment to build capacity
- Lower prices from suppliers

**Government’s Proposed Initiatives**

- Point of Entry/Supply
  - Transformation
  - Proposed Telecom Manufacturing Fund to support need for upfront capital (TRAI – § 3.67)
- Point of Sale/Demand
  - Transformation
  - Preferential Market Access with domestic demand assurance (~80% of value to be Domestically Mfg. Products) (TRAI - §2.15)
- Domestic demand assurance may not be sufficient to drive globally competitive economies of scale
- Doesn’t address issue of lack of mid-scale suppliers to provide competitive prices at lower volumes

**Policy Recommendation**

- Government may co-invest via JV or technology transfer to bring mid-size component manufacturers to cluster
- Provide tax incentives to start-ups to enable favorable pricing
- Proposed Telecom Manufacturing Fund to support need for upfront capital (TRAI – § 3.67)
- Can incentivize operators to procure Domestically Manufactured Products or Indian Products via license fee rebates

Source: Interviews, Booz & Company analysis
Attractive credit lines will enable growth stage ventures to offer financing options in-line with large global players.

### The Credit Issue

*Global players benefit from attractive financing options provided*

- **Global Banks** + **International Vendors**

  Offer multi-billion dollar credit lines to end-buyers for purchase of telecom equipment from select vendors

  Buyers (e.g., Telcos)

  Helps reduce capex and improves cashflow

  “Huawei’s $30 Billion China Credit Opens Doors in Brazil, Mexico”

  “MTS seals €670m Ericsson vendor financing deal”

- **Government needs to help growth stage ventures in providing financing in-line with large global players – currently not addressed in policy**

### Proposed Recommendations

#### Objective

- To offer buyers comparable benefits in cash-flow management and expenses as globally prevalent credit lines

#### Structure

- Establish master fund to offer credit lines to buyers of telecom equipment from select Indian ventures
- Evaluation criteria:
  - Indian Ventures can be from among those funded by TRDF or similar Government initiatives
  - Need to evaluate credit worthiness of end player to manage risk profile of portfolio
- Credit lines to cover sale in domestic as well as international markets

#### Key Considerations

- Risk management for Government
- Value of fund provided
- Mechanism balancing operator cash flows

Source: Interviews, Secondary Research, Booz & Company analysis
Government needs to establish mission task forces for program management and to facilitate ecosystem evolution

Mission Task Force Structure and Key Objectives

- **Capability Development**
  - Provide strong mentorship to build key capabilities required to establish ventures across multiple growth stages
  - Provide access to academia and technology infrastructure

- **Networking**
  - Facilitate strong networking opportunities to broaden the reach and success potential of the venture
  - Introduce venture to relevant platforms to access necessary talent/knowledge

- **Program Management**
  - Provide program management assistance across different growth stages building on proposed TRDC
  - Help control finances in development, integration and testing phases

Can have 3-4 nodal groups working with SDO to create commercializable technologies influencing global development activities and standards like 3GPP

Source: Booz & Company analysis
Setting the Objectives
Promoting Manufacturing
Fostering Innovation
Ensuring Network Security
Security is on-going issue; countries have been struggling to come up with a comprehensive policy

### Key Issues in Telecommunications Equipment – National Security

<table>
<thead>
<tr>
<th>Country</th>
<th>Key Issues</th>
<th>Few Initiatives</th>
</tr>
</thead>
</table>
| US      | • Dependence on foreign innovation and manufacturing for critical components (ICs embedded in routers, switches & hubs & fiber networks)  
• Growth of foreign MNCs & related M&A deals with domestic players shifting the greater control to foreign nations (Merger of Huawei & Symantec – providing critical internet security) | Restrictive role played by CFIUS on Telecom mergers & other deals |
| Canada  | • Complete access to design standards for telecom equipment & software for legal surveillance yet to be met  
• Potential information interception from signal intelligence (SIGINT) which carries certified national data | Established common criteria to set-up technical standards & configurations |

**Source:** Booz & Company analysis
Security threats can undermine several critical activities by acting on a network component; can be stimulated at multiple stages

Telecommunications Network Ecosystem

Wireless Technologies

- PDA w/ Type 1 inline encryptor (802.11 connection)
- Public Hot Spot
- Internet
- Public Hot Spot
- Mobile PC w/ Type 1 inline encryptor
- Crypto (HAIPIS Compliant)
- Guard
- Router
- Firewall
- Switch
- SIPRnet
- Premise router

- Routers forwards data packets between computer networks
- Interception can jeopardize entire network
- Firewall protects networks from unauthorized access
- Breaking firewalls makes classified data vulnerable to modification / theft

Critical Components

Security threats can be implanted across stages

- Design Threat
- Manufacturing & Logistics Sabotage
- Network Operation Threat
- Supply Cut-Offs

Security threats can be targeted across multiple functions of a telecom network operations – each type of security threat can be planted across multiple stages of product lifecycle (development, sourcing, operations, etc.)

Source: Telecom Security Policy, Booz IC and Booz & Company analysis
Security threats can be classified into six distinct types - each one can be stimulated at multiple stages

### Type of Security Threats vis-à-vis its Form

<table>
<thead>
<tr>
<th>Types of Security Threats</th>
<th>Description</th>
<th>Vulnerabilities</th>
<th>Stage of Stimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Leak</td>
<td>Unauthorized access can lead to leak of critical information which could be personal, commercial or classified</td>
<td>Existence of Spyware, Remote Access, Physical Access</td>
<td>Design, Manufacturing &amp; Logistics, Network Operations</td>
</tr>
<tr>
<td>Service Denial &amp; Degradation of Service</td>
<td>Intended to disrupt the service either by crashing the complete network or flooding it with unnecessary traffic</td>
<td>DoS / DDoS, PDoS, LDoS, ICMP, SYN Floods</td>
<td>Network Operations</td>
</tr>
<tr>
<td>Abuse &amp; Fraudulent Use of Telecommunication Resources</td>
<td>Illegal access to CPEs due to poor protection (both soft &amp; hard)</td>
<td>Theft, Modification of data, information or network software</td>
<td>Manufacturing &amp; Logistics, Network Operations, Supply</td>
</tr>
<tr>
<td>Technology Dependence</td>
<td>Complete dependence on imported equipment renders critical component vulnerable because of the complete developer’s control</td>
<td>Non-supply, Remote Access, Kill Switches</td>
<td>Design, Network Operations, Supply</td>
</tr>
<tr>
<td>Natural Disaster</td>
<td>Infrastructural damage</td>
<td>NA</td>
<td>Manufacturing &amp; Logistics, Logistics &amp; Supply</td>
</tr>
</tbody>
</table>

Source: Booz & Company analysis
These security threats can be targeted across multiple stages – Network Operations are most vulnerable

### Various Forms of Security Threats – Telecommunications Ecosystem

<table>
<thead>
<tr>
<th>Security Threats Across Stages</th>
<th>Description</th>
<th>Ease of Interception</th>
</tr>
</thead>
</table>
| **Design Threats**                              | • Alternate circuit schematics renders the equipment vulnerable  
• Interception needs expert skill set and ill-intentions at the vendor’s design labs  
• Damages the entire network, difficult to diagnose & requires complete infra replacement                                           | 2                    |
| **Manufacturing & Logistics Sabotage**          | • Interception at the hardware level  
• Tampering via direct access & could be executed subject to the security around the equipment  
• Recovery through maintenance services / complete replacement                                                                                   | 3                    |
| **Network Operation Attacks**                   | • Interception by malicious spywares  
• Attackers access the network remotely and NetOps attack is common as could be executed from anywhere  
• Recovery through more efficient algorithms and procuring certified critical components                                                             | 4                    |
| **Supply Cut-Offs**                            | • Supply cut-offs of critical component disrupts services & makes the network vulnerable to further soft attacks  
• Depends on suppliers, international relations, etc.  
• Complete cut-off freezes entire network and causes substantial damage                                                                            | 1                    |

Source: Booz & Company analysis
A comprehensive CIIP framework can be designed and implemented to arrest security threats types across all stages.

Map of Security Threats

<table>
<thead>
<tr>
<th>Stages of Threat</th>
<th>Types of Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Information Leak</td>
</tr>
<tr>
<td>Manufacturing &amp; Logistics</td>
<td>Service Denial &amp; Degradation of Service</td>
</tr>
<tr>
<td>Network Operation</td>
<td>Abuse &amp; Fraudulent Use of Telecommunication Resources</td>
</tr>
<tr>
<td>Supply</td>
<td>Technology Dependence</td>
</tr>
<tr>
<td></td>
<td>Natural Disaster</td>
</tr>
</tbody>
</table>

Critical Information Infrastructure Protection

- Robust methodology to tackle all the national security threats
- Mechanism to identifying security critical areas & designing well monitored roadmap for its execution
- Policy Levers for nation wise impact

GOI has proposed establishment of NTNSCB to formulate the telecom security policy and telecom equipment security framework.

Source: Booz & Company analysis
CIIP program design involves three stages – approach definition, evaluation criteria selection and operator engagement assessment.

Key Components of Various National CIIP Approaches

<table>
<thead>
<tr>
<th>Approach &amp; Scope Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes generally begin with identifying cross-sector “services” (key functions, vital societal functions, critical sectors like financial services, government utilities etc.) supported by ICT services or operators</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective:</td>
</tr>
<tr>
<td>– Population affected, financial loss, environmental impact, public order, restoral time, psychological (Services Dependent)</td>
</tr>
<tr>
<td>– Redundancy, revenue, employment, coverage, number of subscribers (Operator Dependent)</td>
</tr>
</tbody>
</table>

| Subjective: Evaluation commonly made on experience, sensibility, and stakeholder consensus rather than quantitative matrix |

<table>
<thead>
<tr>
<th>Operator Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>All approaches involve national operators at some point, but not all label them “critical” operators</td>
</tr>
<tr>
<td>Risk Assessment usually performed by operators</td>
</tr>
<tr>
<td>Private operators are in the best position to determine which physical infrastructures support key services</td>
</tr>
</tbody>
</table>

Elements of National Approaches to CIIP

- Approach & Scope Definition
  - How does the national approach define the whole set of objects (services, operators, infrastructures, …) to be evaluated for “criticality”?

- Evaluation Criteria
  - What criteria should be used to determine which subset of objects and services are “critical”?

- Operator Engagement
  - How does the national authority manage its relationship with owners/operators to ensure/improve the protection of critical infrastructures?

Source: Booz & Company analysis
While implementing this program in the EU, each country decided its own approach and scope; few chose the asset-oriented approach.

Elements of National Approaches to CIIP

- **Service-Oriented Approach (A)**: CI are identified starting from vital services/functions and then looking at supporting infrastructures.
- **Asset-Oriented Approach (B)**: CI are identified by categorizing the existing infrastructures and evaluating their impact on supported services.
- **Operator-Oriented Approach (C)**: Identify critical operators and then ask the operators to identify their own CI.
- **Mixed Approach (D)**: Combination of the approaches listed above and/or other alternatives.

Approach & Scope Definition and Evaluation Criteria

- **Objective Criteria (E)**: Quantitative analysis of estimated impacts across various categories (population affected, financial loss, ...)
- **Subjective Criteria (F)**: Consensus-based opinion that can be difficult to estimate accurately (interdependency, alternatives)

Recommended Risk Management

- **Cooperation-based** operator engagement model involving awareness raising and suggested approaches to risk management.

Legislation-based operator engagement model with specific mandated requirements, timelines, and reporting procedures.

Mixed Approach

Source: Booz & Company analysis
Finland and UK, for instance, adopted a service oriented approach; security critical services served as infrastructure evaluation criteria.

**CIIP Running Programs**
Country Examples

**FINLAND**
- Service-Oriented Approach
- Objective Criteria
  - Geographic area affected
  - # of users / subscribers affected
  - Redundancy
  - Function of the component
- Mandated Risk Management

**UK**
- Service-Oriented Approach
- Objective & Classified Criteria
  - Economic impact (from loss of essential service)
  - Impact on delivery of the national's essential services
  - Impact on life (arising from loss of essential service)
- Mandated Risk Management

**Regulatory Bodies**
- FICORA has established priority ratings against which telecom operators must evaluate their components
- Self-evaluations are then communicated to FICORA, and each component is designated a position somewhere along the priority ratings scale, depending on the results of the evaluation
- The criteria are geographic area affected, number of users or subscribers affected, redundancy, and the function of the component

**Source:** Booz & Company analysis
Implementing CIIP program yields an exhaustive list of security critical infrastructure

CIIP – Identifying Security Critical Infrastructure

Data Collection

Organizational Structure
Identify the manner in which Critical Infrastructure Protection, and CIIP specifically, is organized nationally, if any

Policy
Identify existing policies on identification of critical infrastructure, if any and potential future development, areas covered, and their evolution

Methodology
Identify existing methodologies, if any, for the identification of Critical Information Infrastructure

Cross-Border Aspects
Identify how cross border aspects are considered, if existent, that how cross-border failures would impact CII

CII Selection Procedure

Tailored CIIP Approach

Security critical functions of relevant network components and architecture by service-type and operator

Example – Mixed Approach (Service & Operator Oriented)

1. Identify “critical” services
2. Identify associated service providers
3. Identify relevant infrastructure (geography & type)

Review Cycle

Source: Booz & Company analysis
Indian Government can leverage CIIP program to identify security critical functions of relevant network components and architecture.

Prioritization of Focus Areas for Security Sensitive Components

1. **Identify "critical" services**
   - Exhaustive list of key services hampering national security
   - Specific examples vital to most of society
   - Why they might be critical
     - Supports constitutional rights

2. **Identify associated service providers**
   - Related Service Providers after mapping the identified services
   - Specific examples of related operators
     - Service Provider A: DNS hosting "in TLD"
   - Why they might be critical
     - One of few operators offering this particular service
     - Relocating the service to another operator would take a long time

3. **Identify relevant infrastructure (geography & type)**
   - Key Infrastructure
   - Related vulnerable Infrastructure
   - Specific examples of infrastructure of operator
     - Service provider A: Server 34, SDH Ring Alpha 1
   - Why they might be critical
     - Limited redundancy of a specific system
     - Limited capacity of backup systems overwhelmed during multiple system outages

Review should be done at least once to obtain concordant results.

Source: Booz & Company analysis
Upon identification, a comprehensive certification mechanism should be mandated based on the Common Criteria

Key Founding Countries and Organizations – CC

- NIST & NSA
- CESG
- CSE
- BSI
- SCSSI
- NLNCSA

Mandating CC could ensure security level of international standards

Discussion

- **Key Objectives Achieved**
  - Assurance that the products meet a minimum set of functional criteria
  - Demonstration of interoperability with existing network equipment
  - Demonstration of product performance under specific conditions in specific configurations

- **Specified Evaluation Assurance level (EAL)**
  - Government can incorporate security imperatives by customizing EAL criteria suitably
  - Recommend that the Government enter into mutual agreements with other countries to harmonize Protection Profiles and EAL criteria
  - EAL can be made stringent in a phased manner once domestic manufacturing picks up

- **Assigning Certification/Validation Bodies**
  - Government has selected few CABs/CBs with TEC, DoT as designating authority
  - Should expand CBs to include international labs and labs established domestically via PPP

Note: CAB- Conformity Assessment Body CB – Certification Body

Source: Booz & Company analysis
Common Criteria will help ensure security compliance of various level; India could adopt a phased approach for certification

**Evaluation Assurance Levels**

*Common Criteria*

- **EAL – 7**
  - Formally Verified Design & Tested
  - Comprehensive analysis using formal representations & formal correspondence and comprehensive testing

- **EAL – 6**
  - Semi-formally Verified Design & Tested
  - Structured representation of implementation, architectural structure, improved configuration management, etc.

- **EAL – 5**
  - Semi-formally Designed & Tested
  - Validation of covert channel analysis
  - Assurance of no tampering during development

- **EAL – 4**
  - Methodically Designed, Tested & Reviewed
  - Independent vulnerability analysis demonstrating resistance to penetration attackers with a low attack potential

- **EAL – 3**
  - Methodically Tested & Checked
  - Assurance of the security functions at the design stage using functional & interface specification

- **EAL – 2**
  - Structurally Tested
  - Testing security functions, confirming test results and checking against vulnerabilities
  - Developer assistance in handing over details

- **EAL – 1**
  - Functionally Tested
  - Ensure correct operation of TOE
  - Conducted w/o assistance from the developer

---

- India, currently, provides certification up to EAL4
- India could ramp up the certification level (4+) mandates with the capability building of domestic players

**Note:**

- **TOE:** Target of Evaluation

**Source:** Booz & Company analysis
Appendix
Current duty structures and fiscal policies do not favor domestic manufacturing of finished goods and components

### Comparative Tax Structure-Imports and Exports

<table>
<thead>
<tr>
<th></th>
<th>On Imports</th>
<th>On Domestic Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customs</td>
<td>0%</td>
<td>NA</td>
</tr>
<tr>
<td>CVD</td>
<td>10% (may vary)</td>
<td>NA</td>
</tr>
<tr>
<td>SAD</td>
<td>4% (adjustable)</td>
<td></td>
</tr>
<tr>
<td>Excise (or CENVAT)</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>State VAT</td>
<td>4-14%</td>
<td></td>
</tr>
<tr>
<td>CST</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Octroi (State)</td>
<td>As applicable</td>
<td>As applicable</td>
</tr>
<tr>
<td>Other Taxes (entry, local area development)</td>
<td>As applicable</td>
<td>As applicable</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>14%</strong></td>
<td><strong>16% - 26%</strong></td>
</tr>
</tbody>
</table>

TRAI recognizes and illustrates the case for tax disadvantage of 2-12% faced by domestic manufacture of equipment in India.

### Key Issues

- Inconsistent duty structures across imports and domestically manufactured products rendering domestically manufactured products uncompetitive
- Lack of incentive for component ecosystem development as incidence of tax and computation for suppliers is different
- Need to streamline process for obtaining refunds and CENVAT credit accrual

---

1) Total excluding applicable Octroi and other taxes

Source: TRAI, Booz & Company analysis
While the Government currently provides some direct and indirect tax benefits, these need to percolate across the ecosystem.

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Direct Taxes</th>
<th>Indirect Taxes</th>
<th>Other Clauses</th>
</tr>
</thead>
</table>
| Special Economic Zones | ▪ Export profits 100% tax exempt for first 5 years, 50% for next 5 years and 50% of ploughed back export profit for next 5 years  
▪ Sale from SEZ to DTA considered deemed exports and hence, tax exempt  
▪ No Dividend Distribution Tax and MAT | ▪ Duty free imports of components  
▪ Companies usually have special agreements granting multi-year concession benefits on Central Sales Tax and Local VAT as applicable  
▪ Typically instituted by State and may also include service tax benefit  
▪ Can be in form of refund or soft loans |  |
| Electronics Hardware Technology Park/ Export Oriented Unit | ▪ Export profits 100% tax-exempt | ▪ 100% excise exemption for purchases of capital goods and components from DTA  
▪ Central Sales Tax is fully refundable  
▪ Cenvat credit on service tax  
▪ DTA sales of upto 50% of FOB of exports subject to concessional duties (50% BCD)  
▪ In case of DTA sale of goods manufactured by EOU/EHTP/STP/BTP, where basic duty and CVD is nil, such goods may be considered as non-excisable for payment of duty | ▪ Needs to be a positive Net Foreign Exchange earner  
▪ ITA1 supplies to DTA will be counted for NFE calculations |
| Special Geographic Areas | ▪ 100% income tax exemption for 5 years and 25-30% thereafter | ▪ 100% excise duty exemption for 10 years from date of commercial production | ▪ Concession for Uttarakhand, HP, J&K, Gujarat, etc. |

- **1. Allow duty drawback to domestic manufacturing linked to value add for a limited period to overcome freight costs**
- **2. Provide export benefits to inter-se transactions within telecom clusters**

Source: Booz & Company analysis