Draft Terms of Reference for
Manufacturing Technology Partner -
General Engineering (MTP-GE)

1. Background

1.1. Manufacturing Sector in India

India is one of the world’s largest and most dynamic emerging markets with vast economic potential. The objective of the Government of India’s, 12th Five-Year Plan (FY2013–17) is to return to Gross Domestic Product (GDP) growth rates in excess of 8 percent, with a strong emphasis placed on the manufacturing sector. Manufacturing has long been recognized as an essential driver of economic development for most countries, as it has an important economic and employment multiplier effect. The manufacturing sector will have to play an important role in taking the Indian economy to a high growth rate trajectory and achieving the planned objectives.

Despite a strong potential, India’s manufacturing performance has not been encouraging. The share of manufacturing in India’s GDP has stagnated at around 16 percent, compared to more than 30 percent (and growing) in some of the other Asian countries. India’s manufacturing sector has had to face other challenges, such as low value addition, low productivity, and less-than-desirable up scaling. However, there also exist world-class production units that compete in the international market, as observed in the automotive sector.

To realize this potential, the Government of India has set the objective of enhancing the share of manufacturing in India’s GDP from its current level of 16 to 25 percent within a decade and creating 100 million additional jobs in the National Manufacturing Policy 2011.

1.2. Micro, Small and Medium Enterprises (MSME) Sector: Overview

The Micro, Small and Medium Enterprises (MSME) sector contributes significantly to manufacturing output, employment and exports of the country. MSME sector accounts for:

- MSME output contributes to 8% of the national GDP.
- Micro, Small and Medium enterprises employ an estimated 69 million persons in over 26 million units throughout the country.
- With over 6000 products ranging from traditional to high-tech listed items.

In order to achieve the National Manufacturing Policy target of 25 percent of GDP share for the manufacturing sector, substantial support will be required by MSME sector for accelerated growth as it accounts or 45% of manufacturing output. MSME sector plays a key role in the realising the National Manufacturing Policy goal.

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1 The Manufacturing Plan - Strategies for Accelerating Growth of Manufacturing in India in the 12th Five Year Plan and Beyond
2 Ministry of Micro, Small & Medium Enterprises, Annual Report 2012-13
3 Ministry of Micro, Small & Medium Enterprises, Annual Report 2012-13
Growth and competitiveness of MSMEs are majorly constrained due to factors such as, difficulties in accessing markets (including within India); difficulties accessing finance and infrastructure deficiencies; difficulties for MSMEs to access technology and lack of skilled manpower. These constraints impact the competitiveness of MSMEs operating in both upstream and downstream manufacturing industries.

1.3. MSME Industries

Upstream industries, such as the tooling industry, that consists of developing and manufacturing dies, moulds, casts, as well as testing and prototyping, serves as the interface between product design and product manufacturing. The right tools help increase throughputs, reduce material waste, improve product quality, time to market and thus improve competitiveness. The importance of the tooling industry increases with accelerating technological developments, product sophistication/innovation/customization and decreasing time to market. Despite this tooling is a local industry (more than 60 percent of tools in the world are locally produced and consumed – including in India) dominated by MSMEs (more than 80% of firms in India, Europe, US and Japan). As in other countries, the private tooling industry in India has grown hand in hand with the manufacturing industry. The turnover of the Indian tooling industry is approximately US$3 billion, with more than a thousand firms employing over 120,000 workers (TAGMA 2011). The constraints to the growth and competitiveness of the Indian tooling industry mirror the ones affecting manufacturing as a whole, as articulated above. The scarcity of skilled workers and problems related to their retention, as well as the lack of access to a high-quality design and prototyping facility, has hurt growth.

In the downstream industries, such as automotive, electronics, fragrance and flavours, agro and allied industries, glass, leather, toys etc. also, there is a shortage of skilled labour and limited access to advanced technologies. These industries include large numbers of MSMEs, often working as part of supplier networks of larger enterprises and subject to intense international competition in the connected world.

In order to support both downstream and upstream MSME industries Technology Centre (TCs) provide both technical support and training to MSMEs. Technology Centres (TCs) facilitate MSMEs in becoming more competitive by acquiring improved technology (latest and innovative technologies) and providing training to create a pool of easily employable and better skilled workers.

1.4. MSME: Skilled Workforce

While India stands to benefit from an immense demographic dividend, with the largest youth population in the world (around 66 percent of the total population is under the age of 35), it has an overall employment rate of 4.7 percent (under usual principal status approach) and an overall labour force participation rate of 50.9 percent⁴. For the country to gain from this demographic dividend, skilling and up-skilling its youth are key priorities for the Government of India (GoI).

Out of the 470 million labour force in India, less than 10 percent has received any kind of skills training, either through formal or informal means. About 13 million young people enter the labour force annually. Despite the huge expansion of skills training provision during the 11th Five-Year Plan, the country’s skills development system requires massive up scaling. In its 11th and 12th Five-Year Plans, India recognized that skills development is critical to achieving faster, sustainable, and inclusive growth, on the one hand, and to providing decent employment opportunities to the growing young population, on the other. According to the National Skill Development Policy published in March 2009, India has set a target of skilling 500 million people by 2022.

Global experience shows that a workforce with higher schooling and skill levels leads to higher productivity and personal income. A 2011 study showed that students who attended three-year vocational training courses at the Industrial Training Institute (ITI) earned 25 percent more than two-year course students, who earned 14 percent more than did one-year course students. These results confirmed a 2007 study showing that the returns on vocational training in India have been found to be 8 percent, almost equivalent to the 8.4 percent related to an additional year of education. The same study showed that, increased educational attainment by one year is associated with 5.8 percent higher firm-level productivity in India.

Against this backdrop, the Technology Centres System Program, a National Program that seeks to develop the technological and skill base of MSMEs and increase their business opportunities through new market linkages in selected manufacturing industries, via upgraded and new Technology Centres (earlier called Tool Rooms [TR] and Technology Development Centres) has been envisaged.

1.5. Technology Centres (TCs): Overview

Ministry of Medium, Small and Micro Enterprises (MSME) is the apex government body responsible for ensuring orderly and robust growth and development of MSMEs and through this continue to strengthen the role of MSMEs as an engine of growth for the Indian Economy.

The MSME Ministry, through the Office of the Development Commissioner (O/o DC, MSME), currently operates Eighteen (18) Technology Centres (TCs): ten for the tooling industry and eight for other industries such as ESDM (electronics system design and manufacturing), designer & decorative glass, footwear & leather and fragrance &flavour etc. Half of these eighteen TCs are located in Low Income States (Uttar Pradesh, Madhya Pradesh, Odisha, Jharkhand and Assam). The list of the existing TCs is given below:

Existing Technology Centres of the Office of the DC, MoMSME

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name</th>
<th>Focus sectors and services offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Central Tool Room &amp; Training Centre (CTTC), Bhubaneswar (Odisha)</td>
<td>Tooling, Precision Manufacturing and Training</td>
</tr>
</tbody>
</table>

111th and 12th Five Year Plan
5Vocational Training in the Private Sector (Goyal 2011)
8The Knowledge Economy and Education and Training in South Asia (world Bank 2007)
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name</th>
<th>Focus sectors and services offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Indo Danish Tool Room (IDTR), Jamshedpur (Jharkhand)</td>
<td>Tooling (specialization in Automotive) &amp; Training</td>
</tr>
<tr>
<td>3</td>
<td>Central Tool Room &amp; Training Centre (CTTC), Kolkata (West Bengal)</td>
<td>Tooling, Precision Manufacturing, ESDM &amp; Training</td>
</tr>
<tr>
<td>4</td>
<td>Tool Room &amp; Training Centre (TRTC), Guwahati (Assam)</td>
<td>Tooling &amp; Training</td>
</tr>
<tr>
<td>5</td>
<td>Indo German Tool Room (IGTR), Aurangabad (Maharashtra)</td>
<td>Tooling (specialization in Automotive) &amp; Training</td>
</tr>
<tr>
<td>6</td>
<td>Indo German Tool Room (IGTR), Indore (Madhya Pradesh)</td>
<td>Tooling (specialization in Automotive and Plastics) &amp; Training</td>
</tr>
<tr>
<td>7</td>
<td>Indo German Tool Room (IGTR), Ahmedabad (Gujarat)</td>
<td>Tooling (specialization in Automotive and Plastics) &amp; Training</td>
</tr>
<tr>
<td>8</td>
<td>Central Tool Room (CTR), Ludhiana (Punjab)</td>
<td>Tooling &amp; Training</td>
</tr>
<tr>
<td>9</td>
<td>Central Institute of Hand Tools (CIHT), Jalandhar (Punjab)</td>
<td>Tooling (specialization in hand tools and agriculture implements)</td>
</tr>
<tr>
<td>10</td>
<td>Central Institute of Tool Design (CITD), Hyderabad, (Andhra Pradesh)</td>
<td>ESDM, Precision Manufacturing</td>
</tr>
<tr>
<td>11</td>
<td>Institute for Design of Electrical Measuring Instruments (IDEMI), Mumbai, (Maharashtra)</td>
<td>ESDM</td>
</tr>
<tr>
<td>12</td>
<td>Electronics Service &amp; Training Centre (ESTC), Ramnagar (Uttarakhand)</td>
<td>ESDM and Training</td>
</tr>
<tr>
<td>13</td>
<td>Process and Product Development Centre (PPDC), Agra (Uttar Pradesh)</td>
<td>Foundry &amp; Forging and Training</td>
</tr>
<tr>
<td>14</td>
<td>Process cum Product Development Centre (PPDC), Meerut (Uttar Pradesh)</td>
<td>Sports Goods and Training</td>
</tr>
<tr>
<td>15</td>
<td>Central Footwear Training Institute (CFTI), Agra (Uttar Pradesh)</td>
<td>Leather Footwear &amp; Training</td>
</tr>
<tr>
<td>16</td>
<td>Central Footwear Training Institute (CFTI), Chennai (Tamil Nadu)</td>
<td>Leather Footwear &amp; Training</td>
</tr>
<tr>
<td>17</td>
<td>Fragrance &amp; Flavour Development Centre (FFDC), Kannauj (Uttar Pradesh)</td>
<td>Fragrance and Flavours&amp; Agro and allied industries &amp; Training</td>
</tr>
<tr>
<td>18</td>
<td>Centre for Development of Glass Industries (CDGI), Firozabad (Uttar Pradesh)</td>
<td>Designer and Decorative Glass and Training</td>
</tr>
</tbody>
</table>

These Technology Centre are largely self-sustaining entities that have been providing:

- Technical and vocational training programs to more than 1,00,000 trainees annually. Some of these include training programs certified by the All India Council for Technical Education (AICTE) and National Council for Vocational Training (NCVT).
- They also provide design and manufacturing support to entrepreneurs alongside technical consultancies.

*Technology Centres (TCs) primarily focus on improving access to technologies and providing technical advisory support for entrepreneurs in the given industry cluster they serve. TCs also serve workers and youth by offering opportunities for hands-on technical training and skill development in varied trades with a view to improve employability and livelihood opportunities.*
The key services offered by the existing TCs focusing, broadly consists of:

(i) Design & Manufacturing
   a. Design & manufacturing of tools, dies, moulds and precision components
   b. Product development

(ii) Skill Development
   a. Long & short term training programs
   b. Areas include CAD, CAM, CNC, automation, RPT, mechatronics etc.
   c. International, modular and customised programs
   d. Student profile varies from HSC/SSCI/Oth passed outs, ITI passed outs to diploma holders and graduate engineers

(iii) Consultancy
   a. Inspection, calibration facilities and quality systems facilities
   b. Turnkey assignments
   c. Course curriculum developments
   d. Engineering solutions for component manufacturing and process development

All services are offered by Technology Centres are on fee basis at market/cost rates. In addition, the Government of India offers various schemes/programs to subsidize the cost of services offered by the TCs to MSMEs.

Of the existing 18 Technology Centres (TCs), 4 TCs have been set-up with assistance from German Government; 3 TCs with assistance from Danish Government under bilateral agreement and 10 TCs have been set-up through support from United Nations Industrial Development Organization (UNIDO). The existing 18 TC’s have been set-up between 1967 and 1999. These Technology Centres have undergone incremental transition with support from O/o DC MSME over the last decade. However, in order to support growth in MSME sector, in terms of technology advancement, expansion in geographical coverage and capacity to support more number of MSMEs, there is a need to set-up additional/ new Technology Centres (TCs).

2. Technology Centre Systems Program (TCSP): Overview

Technology Centres Systems Program (TCSP) has been envisioned to help MSMEs in key industries become more competitive by acquiring improved technology and employing better skilled workers. This will be done directly through the services provided to them by the TCs, as well as indirectly through their linkages with larger firms (e.g. as part of the supplier network of an OEM), which will have access to the services of the TCs under the condition that it benefits their suppliers. The TCs will contribute by providing inputs to MSMEs on manufacturing technology & business advisory and by improving the skills of workers/ skill seekers who can gain better employment opportunities. The program will therefore benefit the MSMEs, students and workers and help establish systems of Technology Centres in the country, where each centre will gain from the specialisation and experience of the other countries and improve the competitiveness of MSMEs.
For this purpose Technology Centre Systems Program (TCSP) intends to upgrade and expand the network of Technology Centres which have as their mission to improve the competitiveness of MSMEs in key manufacturing industries across India-- with a special emphasis on Low Income States. The Program will increase the capacity and incentives of TCs to support private sector actors (as opposed to competing with them) and will consult regularly with the private sector to ensure it is not being crowded-out.

Technology Centres provide an integrated suite of services to MSMEs on a fee basis, ranging from technical and management advisory to technical training of workers. The Proposed Program will reinforce the technical capability of the Technology Centres as well as their governance, by further increasing the participation of the private sector in key decisions at both the national and local levels. In particular:

a. TCSP Program seeks to establish 15 new TCs and upgrade technology capabilities of 18 existing TCs and develop linkages with Indian and international research institutes, leading manufacturers. The Program will connect leading practices that will contribute to innovation advanced technology, knowledge and innovation that can be transferred to MSMEs served by each TC, thereby creating an ecosystem that fosters manufacturing competitiveness through a national system of technology centers across the country.

b. TCSP focusses on building on the main strength of the current TCs, the proposed Program will complement and reinforce hundreds of public and private providers of vocational training (e.g. the ITIs, the Polytechnics and the ATIs), helping them to improve their curricula and training their trainers by placing more emphasis on learning and problem solving skills, and being more practical and adapted to local conditions and needs. To that end the proposed program will develop linkages between the TCs and the Training Institutes being set up by other ministries (e.g. Ministry of Labor). The development of such synergies and linkages will also be supported by existing World Bank programs aimed at improving vocational training in India.

c. The program will leverage and complement other programs supporting MSMEs and manufacturing clusters being implemented by various organizations in public and private sector.

Technology Centre Systems Program (TCSP) is partly financed through an IBRD Loan and State Governments will contribute land for setting up new TCs. Technology Centre Systems Programs (TCSP) includes the following three components:

(i) **Component 1: Technical assistance to the existing and new Technology Centres**

a. **Sub Component 1.1:** Manufacturing Technology Partner
b. **Subcomponent 1.2:** Cluster Network Manager
c. **Subcomponent 1.3:** National Portal Service Provider (NPSP)
(ii) **Component 2:** Investments to develop new and upgrade existing Technology Centres

a. **Sub-component 2.1:** Buildings/other infrastructure  
b. **Sub-component 2.2:** Equipment/Software  
c. **Sub-component 2.3:** Operating costs of new Technology Centers

(iii) **Component 3:** Technical assistance to the MSME Ministry for Program implementation and Monitoring and Evaluation

a. **Sub-component 3.1:** Project Management Unit  
b. **Sub-component 3.2:** Small dedicated program management team  
c. **Sub-component 3.3:** Other technical assistance to the Office of DC-MSME and the MSME Ministry

**Component 1: Technical assistance to the existing and new Technology Centres**

Objective of this component is to ensure that TCs have access to technical assistance that will help them serve their cluster of MSMEs better. This will be achieved through internationally competitively recruited Manufacturing Technology Partners (MTPs), Cluster Network Managers (CNMs) and an IT Platform service provider.

**Sub Component 1.1: Manufacturing Technology Partner**

Manufacturing Technology Partners (MTPs) for each system of TC will specialize on specific industries/technologies and provide inputs to the TC on leading practices and techniques in proven and latest manufacturing technologies that can be adapted to the Indian MSME context.

Manufacturing Technology Partners (MTPs) will work closely with the TCs in engaging with the MSME cluster(s) served by TCs including OEMs and large manufacturing enterprises, in shaping the future technology road map.

Manufacturing Technology Partner (MTP) in conjunction with other stakeholders of the TCSP shall identify and define globally competitive technological capabilities which are also locally adaptable and sustainable as respective cluster requirements. MTPs will also assist the TCs in building this capability by planning and handholding the roll-out under this sub-component of TCSP.

MTP will support in identifying equipment, machinery and technical requirements to upgrade the existing 18 TCs and in fitting out the 15 new TCs. It is expected that the MTP with its international experience shall help the TC in augmentation of its service portfolio keeping in view the identified/focused technologies including updating existing offerings for training, skill development, production, equipment utilization and technical advisory. MTP will also support TCs increase efficiency and competitiveness through planned initiatives.

Under Technology Centre Systems Program (TCSP), O/o DC MSME is in the process of selection of 8 Sector-specific Manufacturing Technology Partners (MTPs). For the purpose of procurement, MTPs have been divided into 8 Packages based on sector specialization across geographies*. The Technology Centre (TCs) specialization sectors are automotive, general
& precision manufacturing, ESDM, fragrance & flavor, footwear & leather and designer & decorative glass sectors.

The following 8 packages have been designed for procurement of the MTPs to support the existing/new TCs*.

<table>
<thead>
<tr>
<th>Package #</th>
<th>MTP’s focus</th>
<th>TC locations to be served</th>
</tr>
</thead>
</table>
| P1        | Automotive manufacturing                        | Existing: Ahmedabad, Aurangabad, Indore, Jamshedpur  
New: 2-3 locations |
| P2        | ESDM                                            | Existing: Ramnagar, Mumbai, Hyderabad         
New: 2-3 locations |
| P3        | Precision Manufacturing and General Engineering | Existing: Kolkata, Hyderabad, Bhubaneshwar     
New: 2-3 locations |
| P4        | General Engineering - Foundry and Forging       | Existing: Kolkata, Jalandhar, Agra            
New: 1-2 locations |
| P5        | General Engineering                             | Existing: Ludhiana, Guwahati, Meerut           
New: 3-4 locations |
| P6        | Fragrance and Flavor                             | Existing: Kannauj                              
New: 2-3 locations |
| P7        | Footwear and Leather                            | Existing: Agra, Chennai                        
New: 1-2 locations |
| P8        | Designer & Decorative Glass                     | Existing: Firozabad                            
New: 1-2 locations |

**Subcomponent 1.2: Cluster Network Manager**

Cluster Network Managers (CNMs) for each System (or sub System) of TCs will specialize on specific geographic cluster(s)/industry(s). The Cluster Network Manager (CNM) will build capacity of the TC to enhance economic development cooperation amongst key stakeholders to improve the competitiveness of the cluster. This will include strengthening market linkages of the TCs with the MSMEs in the cluster it serves, trade and industry associations, academia, educational institutions, applied research institutions, service providers, other government support institutions, workers and skill seekers.

CNM would seek to increase competitiveness of supply chains of large firms by enhancing quality, reliability and productivity of MSME suppliers by offering services of the TC, thus also helping in meeting revenue targets of the TC.

CNM will enhance the competitiveness of the cluster business environment by establishing a network of service providers which will address the needs of the MSMEs not served by the TC e.g. access to a network of financial services. CNM will also facilitate closer cooperation between the TC and MSMEs with key innovation stakeholders such as applied research institutes, autonomous institutions such as IISc, CSIR, academia, skill seekers, and students etc. to enhance product and process innovation.

*The procurement packages for Manufacturing Technology Partner (MTP) may be realigned by the O/o DC, MSME at a later stage in the project.
TC’s capacity will be further enhanced through closer cooperation amongst skills development and labour market stakeholders to increase the number of workers/trainees from TCs finding long term employment to improve their livelihood.

Under Technology Centre Systems Program (TCSP), O/o DC MSME has initiated the process for selection of 5 Cluster Network Managers (CNMs). Cluster Network Managers (CNMs) for the purpose of procurement have been divided into 5 Packages, focused on specific geographic cluster(s)/industry(s) across TCs, as shown in the table below:

<table>
<thead>
<tr>
<th>Package #</th>
<th>TC Location to be served</th>
<th>TC focus areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Existing: Indore, Ahmedabad, Aurangabad New: 3-4 locations</td>
<td>Automotive, General Engineering</td>
</tr>
<tr>
<td>M2</td>
<td>Existing: Jamshedpur, Bhubaneshwar, Kolkata, Guwahati New: 2-3 locations</td>
<td>General Engineering, Automotive, Precision Mfg. and Foundry &amp; Forging</td>
</tr>
<tr>
<td>M3</td>
<td>Existing: Jalandhar, Agra, Ramnagar New: 3-4 locations</td>
<td>Foundry and Forging, Hand Tools, ESDM and Agricultural Implements</td>
</tr>
<tr>
<td>M5</td>
<td>Existing: Mumbai, Hyderabad, Chennai Potential New: 3-4 locations</td>
<td>ESDM, Precision Mfg., Advance Welding, Leather &amp; Footwear</td>
</tr>
</tbody>
</table>

**Subcomponent 1.3: National Portal Service Provider (NPSP)**

This component will support a National Portal (NP) for MSMEs, with the vision of “creating a vibrant, interactive, self-sustainable technology platform for the needs of stakeholders of MSME for collaboration, information dissemination, and transactions”.

The platform will act as a common platform for information dissemination, services and support across many aspects of business that will be required by an MSME from the start of their business, to successful operations and growth e.g. access to regulatory services for entrepreneurs, assistance for financing, access to list of suppliers etc. Through the National Portal, users will also be able to access (virtually) to most of the technical information and training services provided by the TCs.

This platform will extend the reach of the program to beneficiaries well beyond the TCs’ physical location through access to e-learning solutions, B2B service & product market place, e-recruitment portal and e-governance services (grievance redressal forum). In addition the National Platform will also include the Monitoring and Evaluation Platform for the TCSP program and ERP solutions for the Technology Centres.

**Component 2: Investments to develop new and upgrade existing Technology Centres**
TCSP will finance the development of 15 new TCs and upgrade the 18 existing TCs under the responsibility of the MSME Ministry. The development of new TCs will be phased with the first new TC development likely to commence in 2014 and construction of all new TCs likely to complete by 2018.

The investments in upgrading and building new would be based on the DPR prepared by the Program Management Unit on behalf of the O/o DC, MSME with inputs from stakeholders including the Manufacturing Technology Partners and Cluster Network Managers. The DPR will be approved by the PSC and will be informed to the World Bank by updating the procurement plan.

The land for the new centers will be provided by the State Governments and many State Governments have already responded positively to this program.

Sub-component 2.1: Buildings/ other infrastructure

The physical facilities of the TCs will be upgraded and developed with the following objectives in mind:

- Eco-friendly design
- Cost optimization
- Flexibility with respect to usage and future expansion/contraction
- Ensure a healthy and safe environment and user-friendly buildings for the people who work or get trained

The construction is expected to start in the second year and likely to complete by the fourth year of program implementation. A typical new TC may have the following pattern:

- Main institute building (including manufacturing, training, administration and other facilities): 15,000 sqm
- Hostel and residential facility (for around 600-700 students): 5,000 sqm

Sub-component 2.2: Equipment/Software

The equipment required to upgrade the existing TCs and develop the new ones will be purchased based on the DPRs prepared by the Program Management Unit with input from the Manufacturing Technology Partner and Cluster Network Manager and also inputs of concerned sector JWG. The advice/vetting of the Technical Partners and Cluster Network Managers will be taken once they are on board/contracted.

One of the key considerations would be to identify equipment and software that is in line with the technology roadmap the TC plans to embark to support its cluster. Adequate attention needs to be provided to upgrade and build technology capabilities for the future but should be proven and fit the context of the cluster and its geography at the same time.

Sub-component 2.3: Operating costs of new Technology Centers

The Government of India (through TCs and the MoMSME) will finance 100% of the operating costs of the 15 new TCs to make them fully operational and financially self-sustainable expected within four to five years of their launch, depending on the location and sector of the TC.
Component 3: Technical assistance to the MSME Ministry for Program implementation and Monitoring and Evaluation

Sub-component 3.1: Project Management Unit

The program will be implemented with a support of a dedicated Project Management Unit

Sub-component 3.2: Small dedicated program management team

A dedicated team consisting of the National Program Manager, a Procurement Expert, and a Financial Management Expert will be appointed during the program implementation phase. Based on the suggestions of the PMU, it has also been agreed that an Information Technology Expert will be part of this team that supports the National Program Manager. This team will report into the Program Coordinator of the O/o DC, MSME and will act as the interface between the Program Management Unit and the Program Coordinator. The Program Coordinator, the PMU and the National Program Manager and his team will form the Program Implementation Unit (PIU).

Sub-component 3.3: Other technical assistance to the Office of DC-MSME and the MSME Ministry

This will include capacity building and change management for the O/o DC, MSME and support to carry out in-depth impact evaluation studies, by O/o DC, MSME in consultation with the World Bank. Other technical assistance for the program, as and when required, will be provided under this sub-component. The M&E system will include in particular independent surveys of customers and stakeholders (including potential private competitors to the TCs) to conduct the impact evaluation and assess the transformative impact of the program as well as to ensure there is no significant crowding-out of the private sector.

The overall TCSP program governance structure is illustrated in Figure 1. Three tiers serve the different roles of: Strategic inputs, Implementation and Execution.
Terms of Reference

Figure 2: Technology Centre Systems Program: Governance Framework
3. Terms of Reference for Manufacturing Technology Partner (MTP – GE) for serving the General Engineering Sector focused TCs

The current scope of work is for the Manufacturing Technology Partner-General Engineering (MTP-GE) who will facilitate support for each system (or sub system) of TCs specialized in the General Engineering sector. In total, eight out of the existing 18 TCs concentrate on the General Engineering sector namely:

- Central Tool Room & Training Centre (CTTC), Bhubaneswar (Odisha)
- Central Institute of Tool Design (CITD), Hyderabad, (Telangana)
- Central Tool Room & Training Centre (CTTC), Kolkata (West Bengal)
- Central Institute of Hand Tools (CIHT), Jalandhar (Punjab)
- Central Tool Room (CTR), Ludhiana (Punjab)
- Process cum Product Development Centre (PPDC), Meerut (Uttar Pradesh)
- Tool Room & Training Centre (TRTC), Guwahati (Assam)
- Process and Product Development Centre (PPDC), Agra (Uttar Pradesh)

The following map identifies the location of TCs focused on General Engineering sector that are included in the package for the Manufacturing Technology Partner in the current scope of work.

Figure 1: Existing Technology Centres focused on General Engineering sector
In addition to the existing TCs (List of existing TCs given in Section 7, Clause 1.5) mentioned above, Technology Partner shall also support any other existing TC that may have a secondary focus on General Engineering sector (1-2 additional TCs) and the 4-6 new TCs which will also focus on the same sector.

The duration of assignment for the Manufacturing Technology Partner will be up-to maximum of five years with the last year focused on handholding and handover.

For the purpose of this ToR the definition of, ‘General Engineering Sector’ technologies is as classified below:

- **Technologies and Techniques:** Precision Machining & Rapid prototyping, Tool Design (Dies and Molds), Metrology and Calibration, Heat treatment, Foundry and Forging etc.
- **Product-wise:** Sports Goods and Leisure Time equipments, Hand Tools, Agricultural Implements, Press tools, Jigs & Fixtures, Gauges and other precision components etc.

Unless otherwise specified in this ToR, ‘General Engineering Sector’ will include the above technologies for relevant products and industries.

**1.1 Role of the Manufacturing Technology Partner**

The Manufacturing Technology Partner (MTP) is required to enhance the capability and service offerings of TCs such that they transform to become models of manufacturing excellence for MSME. They need to become a trusted partner for MSME to learn how to attain manufacturing excellence and attain associated excellence in skills development. The services of the TCs include having insights to the potential impact of new and relevant technologies, trainings on use of technologies/equipment, providing access to latest equipment, developing and testing new products and patenting.

The key role of the MTP includes:

- In conjunction with other stakeholders of the TCSP, identifying and defining the globally competitive technological capability required by TCs in the area of General Engineering sector, assisting in their execution and providing handholding during their roll out.

- Supporting the up gradation of the existing TCs and establishment of new TCs for the General Engineering sector

- Augment services being offered by the TCs in the context of identified technologies and clusters with respect to training, production assistance (including optimization of equipment utilization) and technical advisory, resulting in increase in revenues of TCs.

- Support TCs to increase productivity and competitiveness of MSMEs that focus on General Engineering sector through
  - Exposure to existing and expected future manufacturing technologies
  - Skilling and training of skill seekers in the nearby clusters
Offering advice/recommendations to MSMEs (clients) including those who directly or indirectly supply to large OEMs

All investment decisions (technological & other) and work prioritization in TCs must be intrinsically connected with the market place and efficiently translate market needs to products and services that (satisfy these needs), and will be enabled by technology and enriched by global knowledge & expertise of the Manufacturing Technology Partner.

The Manufacturing Technology Partner will provide the necessary facilitation support for each system (or sub system) of TCs under the following 4 tracks:

- **Track 1: Technology development** – Identification of existing and expected future manufacturing technologies for roll out at the TCs and development of a detailed strategy/roadmap and capacity building plan so that the MSMEs in General Engineering sector can take advantage of these cutting-edge/competitive technology inputs.

- **Track 2: Human skill development** – Develop a skilling roadmap for each TC to address the skill gap in the MSMEs in the General Engineering sector and evaluate existing training programs and develop new training programs for roll out at the TCs.

- **Track 3: Advisory to TCs on their technical set up** – Advise on the equipment and software required to upgrade existing TCs or establish new TCs. This would include providing procurement ready specifications and support in drafting the terms of reference for the selection of suitable vendors and monitoring their progress.

- **Track 4: Businesses Advisory on technology matters** – Assisting TCs provide technical advice to their key clients (e.g., industrial clusters or leading manufacturing firms/OEMs with large networks of MSME suppliers or MSMEs).

### 1.2 Detailed Scope of Work

As discussed in the section above, the scope of work envisaged for the Manufacturing Technology Partner under TCSP has been divided into four (4) tracks, namely:

1. **Track 1: Technology Development**
2. **Track 2: Human Skill Development**
3. **Track 3: Advisory on Technical up gradation of existing TCs and set-up of new TCs**
4. **Track 4: Technical Advisory**

The scope of work and activities to be undertaken under each track has been elaborated below.

#### 1.2.1 Track 1: Technology Development

**Activity 1: Identification & Selection of existing and expected future technologies in the General Engineering sector**
Manufacturing Technology Partner should have an in-depth understanding of the leading
global technologies, manufacturing techniques, latest innovation such as design, technology
or manufacturing processes in General Engineering sector. Manufacturing Technology
Partner shall:
i. Identify state-of-art/ leading and tested global technologies, manufacturing techniques
and innovations (in terms of process, technology and product) in the General
Engineering sector (in developed/ developing countries).
ii. Examine suitability, replicability, scalability, ease of adoption and implementation of
the above, i.e. technologies, process, techniques etc. in the Indian Context in General
Engineering sector. This would be based on engaging with local industry and MSME
units in the country and associated clusters supported by TCs.
iii. Insight into current state of global General Engineering industries from technology
development perspective in developed and developing countries.
iv. Assessment of Technology Centre and General Engineering sector focused MSMEs
vis-à-vis global MSME market in General Engineering sector.
v. From technology development perspective, assess the impact of these technologies,
processes and techniques etc. on Indian General Engineering sector. Impact
assessment should also include brief on impact on competitiveness of MSMEs with
respect to MSMEs from other countries, skill requirements to bridge gap for wider
adoption, target markets and growth focus for MSMEs on adoption of these
technologies.
vi. Prepare framework for selection and shortlisting criteria for selection of technologies
for TCs and MSMEs. In the selection framework, MTP should consider sustainable
and resource efficient technologies (in terms of Energy consumption, carbon and
water footprint etc.) in order to reduce its impact on the environment. The selection
framework and shortlisting criteria would be approved by O/o DC, MSME.

Selection criteria shall also include cost/benefit analysis, ease of implementation,
environment impact etc. MTP shall apply this framework to select a minimum of 10
new and relevant technologies for adoption by Technology Centres (TCs) and for
MSMEs in General Engineering sector on annual basis. The objective will be to
increase capacity of Technology Centre to provide best in market service to MSMEs,
to increase competitiveness and accelerated growth of MSMEs in General
Engineering sector.
vii. Develop and Compile White Paper along with recommendations on adoption of
technologies in General Engineering sector.
viii. Quality of the white paper should be ensured so that the same is released and
published in journals, industry forums etc. annually by the MTP on behalf of
Technology Centre or O/o DC MSME. This white paper should form the basis on
which industry consultation should be undertaken for Technology Roadmap in order
to ensure that it is relevant to the industry.
ix. White paper should include but not limited to the following:
   a. Insight into global General Engineering industry and provide future direction
to Technology Centres (TCs) and MSMEs in General Engineering sector.
   b. From technology development perspective, provide insight and future
direction to TCs in order to enable them to provide best-in-market service to
MSMEs for increasing their competitiveness globally and for accelerated
growth of MSMEs in General Engineering sector.
   c. Provide an implementation roadmap and business case for any investment in
for Technology Centres and MSME sector at large
Recommend a minimum 10 new and relevant technologies annually for both TCs and MSMEs with detailed cost/benefit analysis, ease of adoption and implementation roadmap, environment impact etc.

Track 1, Activity - 1: Key Deliverable:

1. White paper to be compiled and published annually through Technology Centre (TCs) in General Engineering sector.

Activity 2: Development of a Detailed Technology Roadmap and Implementation Plan for TCs

Manufacturing Technology Partner shall prepare Technology Roadmap and Implementation Plan for existing Technology Centres (TCs) and new Technology Centres (TCs) (as and when planned) for General Engineering sector. Manufacturing Technology Partner shall:

i. Assess existing Technology Centre (TCs) from a technology development perspective, in terms of current technologies with TCs, YoY revenue generation, operation scalability, productivity and impact on MSMEs in General Engineering sector.

ii. Develop framework for selection of new and relevant technologies for the Technology Roadmap for each TC and provide recommendations in Technology Roadmap based on cost/benefit analysis, technology readiness and ease of implementation, impact of adoption by MSMEs in General Engineering sector, impact in terms of Environmental, Health and Safety (EHS) requirements etc.

iii. Develop Technology Roadmap for Technology Centres (TCs) on an annual basis for existing, new and relevant technologies. The Technology Roadmap should include implementation plan with details on key initiatives, capacity building requirement and plan for each TC, business plan for the implementation of new and relevant technologies along with timelines for roll-out etc.

iv. Manufacturing Technology Partner shall work in close collaboration with O/o DC-MSME, General Managers (GMs) of Technology Centres (TCs), Industry leaders, Academia/ Research Institutes and Industry Associations for preparation of Technology Roadmap and Implementation Plan for roll-out of the same.

v. Technology Roadmap and Implementation Plan prepared for each TC should be endorsed by relevant Industry Associations/Industrial Chambers through Stakeholder Workshops, Sessions and/or Meetings conducted by MTP and facilitated by TCs.

vi. Manufacturing Technology Partner shall provide technical advice, assistance and handholding for implementation of technology roadmap and implementation plan, including rollout of the new and relevant technology.

vii. Develop plan to increase awareness amongst stakeholders on Environmental, Health and Safety (EHS) requirements, including those related to reducing health/pollution risks, increasing resource efficiency (reducing resource consumption, like energy, oil, water etc.) and regulatory requirements.

Track 1, Activity - 2: Key Deliverable:

1. Technology Roadmap and Implementation Plan for roll-out of new and relevant technologies duly endorsed by Industry Associations/Industrial Chambers and accepted by TC and O/o DC, MSME for each TC annually.
2. EHS Plan to increase awareness amongst stakeholders on Environmental, Health and Safety (EHS) requirements.

Activity 3: Development of knowledge sharing framework and organization of workshops and training programs for knowledge sharing amongst TCs

Manufacturing Technology Partner shall play the role of a knowledge partner for Technology Centres (TCs). MTP shall enable and facilitate knowledge sharing and collaboration within TCs for existing/new technologies, leading manufacturing practices and other activities related to technology adoption critical for all TCs along with the systems (and sub systems). For this manufacturing technology partner

i. Conceptualize and develop Knowledge Sharing Framework for existing and new TCs.

ii. Prepare calendar of events for Knowledge Sharing programs such as workshops/seminars/training programs on annual basis and upon approval of O/o DC, MSME, organize these events for complete period of engagement.

iii. Collaborate with National Portal Service Provider (NPSP) and facilitate design and development of Knowledge Sharing Portal which is a sub-component of the Nation Portal for MSMEs

Track 1, Activity - 3: Key Deliverable:

1. Knowledge Sharing Framework for existing and new TCs
2. Detailed Knowledge Sharing Plan and Event Calendar of events for knowledge sharing activities (on annual basis)
3. Organize knowledge sharing workshops/seminars/training programs
4. Concept note on Knowledge Sharing Portal and roll-out strategy

Activity 4: Capacity building of TCs to ensure support to MSMEs

MTP shall be responsible for the training and capacity building of the TCs for the use of identified new technologies, equipment, manufacturing processes and techniques, identified improvements in Environment Health and Safety requirements etc. to enhance support provided by TCs to MSMEs. For this the Manufacturing Technology Partner (MTP) shall:

i. Develop skill mapping framework and undertake skill mapping exercise for employees of TCs.

ii. Undertake detailed Training Need Assessment and Training/Capacity gap assessment for TC employees and staff.

iii. Based on the above, develop training content and structure delivery documents for employees of TCs.

iv. Prepare yearly calendar of workshops, training programs which should be approved by O/o DC, MSME, aimed at improving the capacity of the TCs.

v. Organize workshops/training programs for the employees of the TCs as per approved calendar through a system of certified Training of the Trainers program. These programs will be organized at venues provided by the respective TCs.

vi. Batch training of select TC employees at the Manufacturing Technology Partner’s own facility/premise (at least once in a year)

vii. Develop and implement processes at TCs to provide production and design support to MSMEs. MTP shall also provide training and documentation for support on new processes developed.
viii. Develop and implement processes at TCs to provide technical advisory on designing, prototyping, testing & calibration and applied research. In addition the MTP will also provide training and documentation for support on the new processes developed.

ix. For key EHS issues, develop a plan for implementation of mitigation measures while adhering to the industry standard and the regulatory requirements.

**Track 1, Activity - 4: Key Deliverable:**

1. **Training Need Assessment report** (including training requirements, gap analysis, recommendations etc.)
2. **Capacity Building Plan for the TCs** (including capacity building framework, training schedule etc.) The plan should include training and capacity building calendar (along with details of training initiatives such as conceptualization, pre and post training assessment details, roles and responsibility for TCSP stakeholders)
3. **Training content and structured delivery document for employees of TCs**
4. **Training of TC employees as per the agreed training calendar**
5. **Batch training of TC employees at the Manufacturing Technology Partner’s own facility/premise**

**Activity 5: Facilitate exposure to global leading MSMEs**

MTP shall facilitate the exposure of Indian MSMEs to world’s leading MSMEs. All activities for engagement with Indian MSMEs will be facilitated by TCs.

i. Prepare a Technology Adoption framework for benchmarking the current status of MSMEs in relevant sector (in terms of technology, quality, integration with national and global value chains etc). This benchmarking framework, from technology perspective will be utilized by Cluster Network Manager to collect and assess the current technology state of the associated MSMEs.

ii. MTP shall factor in specific recommendations by Cluster Network Manager (CNM) as provided through their cluster benchmarking activities.

iii. In close collaboration with CNM provide recommendations for adoption of new and relevant technologies by MSMEs. Based on findings from benchmarking exercise by CNM and assessment of identified technology, MTP shall prepare an engagement plan for exposure of Indian MSMEs to leading global MSMEs.

iv. MTP shall organize specialized technical workshop and focus group based workshops on leading practices, emerging market trends, issues and challenges in the current system to sensitise them on the changing trends in the sector.

v. Prepare a detailed Study Tour plan long with details on the technologies, practices, processes or innovation planned for observation during the study tour. Study Tour shall be undertaken in developed/developing countries with leading General Engineering industries for relevant TC officials and Indian MSMEs to help gain insights on the leading practices. Study Tour should be planned based on suitability, replicability and ease of adoption and relevance to Indian MSMEs. MTP shall organize and conduct a post-visit workshop. Expenses for TC officials including travel, lodging, and boarding will be borne by the client while expenses for MSMEs will be borne by the MSMEs themselves.

vi. Engage with Cluster Network Manager (CNM) in promotion of technical collaboration between MSMEs in India and MSMEs in the developed countries based
on assessment of technical capabilities of the Indian MSMEs. MTP shall provide technical assistance for joint product development facilitated through concerned Technology Centre and also assist CNM in promotion of joint product development ventures. Engagement with CNM shall be facilitated through concerned Technology Centre.

**Track 1, Activity - 5: Key Deliverable:**

1. *Benchmarking framework for technology adoption by MSME units in the General Engineering sector along with recommendations on technology development perspective.*
2. *Engagement plan for exposure of Indian MSMEs to leading global MSMEs*
3. *Organization of specialized technical workshop and focus group based workshops for Indian MSME leaders (on a bi-annual basis)*
4. *Organize Study Tour on annual basis in developed/developing countries with leading General Engineering industries for TC employees. It may be provided to Indian MSMEs on fee basis*
   a. *Study Tour Plan*
   b. *Organize and facilitate Study Tour Visit*
   c. *Conduct post-visit Workshop for capturing the learnings, leading practices, leading technologies etc. as observed during the visit.*

**Activity 6: Monitoring and Evaluation of Activities**

Through the M&E framework prepared by Project Management Unit (PMU), MTP shall be responsible for regular reporting on the Result Framework. The same shall be monitored by PMU and the O/o DC, MSME,

i. *Report based on Result Framework Document (RFD) deliverables (such as number of technology strategies developed and endorsed, number of leads supported by MTP to create incremental advisory service revenue for the TC, number of new skill development / training curriculum developed) outlined in Clause 4 of this ToR.*

ii. Regular monthly input and activity reporting

iii. *Report preparation for the TCs and O/o DC, MSME:*
   a. *Monthly input and activity reporting,*
   b. *Quarterly input, activity and output reporting, and*
   c. *Annual input, activity, output, outcome and impact report*

iv. *Attend project governance meetings such as Implementation Committee, Project Steering Committee, Joint Working Group etc. as and when required by the O/o DC-MSME.*

**Track 1, Activity - 6: Key Deliverable:**

1. *Monthly reporting against RFD deliverables*
2. *Monthly reporting on input and activity progress*
3. *Monthly, quarterly and annual reports for TCSP and cluster governance structure.*

**1.2.2 Track 2: Human Skill Development**

**Activity 1: Strategy and roadmap to address skills gap**
Within the overall Technology Centre Systems Program (TCSP), it is envisioned Cluster Network Manager shall undertake skill/competencies assessment for identifying skill/competencies required by Indian MSME sector and current/prospective MSME employees in General Engineering sector. (i.e. study will provide detailed insight on skills of the workers and students related to General Engineering sector). Based on assessment carried out by CNM and input received Technology Centres, the Manufacturing Technology Partner shall undertake the following activities:

i. Develop strategy and roadmap for introduction of new/augmented training programs related to the General Engineering sector to address the skill gaps identified by the CNM. The roadmap should also include business plan for training programs along with detailed implementation plan.

For the above, MTP should take into account skill/competency training required for identified technologies as part of the Technology Roadmaps developed as in Track 1.

ii. Assess and identify gaps with regards to equipment and software available at the TCs with respect to training program requirements. MTP shall provide technical advice and assistance for preparation Bill of Material (BoM) for hardware, equipment and software requirements for Technology Centre enhancement to address the skill gaps identified.

**Track 2, Activity - 1: Key Deliverable:**

1. **Strategy and roadmap for new/augmented training programs (including implementation plan, business case etc.)**
2. **Preparation of BoM required implementation of existing and new training programs to address skill gap**

**Activity 2: Enhancement of existing training programs and development of new training programs**

Existing Technology Centers provide training programs which have already been developed by Technology Centers and are operated as modular training programs. MTP shall assess and evaluate existing training programs for augmentation and enhancement required to transform them into world-class or international certificate level programs. Based on its assessment MTP should also recommend and implement new training for existing as well as new TCs as identified in the skill development roadmap. This will entail the following sub-activities:

a) Assessment and evaluation of the existing training modules offered by Technology Centres in relevant sector

b) Recommendations for curricula enhancement of existing training programs including training course, syllabus, lesson plan, instructor manuals, student manuals, exercise manuals, questions banks, examination/validation/certification systems etc.

c) Recommendations for development of curriculum for new training programs including training course, syllabus, lesson plan, instructor manuals, student manuals, exercise manuals, questions banks, examination/validation/certification systems etc.

d) Detailed Implementation Plan and business case for enhancement of existing training programs and new training programs for technologies identified in technology Roadmap from a training perspective. Implementation plan should also contain rollout strategy and plan including scalability of training programs.
e) Undertake evaluation and validation of the examination systems and provide recommendations so that the examination systems are at par with the best in the world.

f) Based on the above, prepare a skill development roadmap (including the evaluation report and implementation plan)

g) Preparation of training program framework for existing and new training programs and training of trainers from TCs, Vocational Training Institutes/ITIs/Polytechnics etc.

h) Preparation of training content and material for enhanced existing training programs and new training programs.

i) Preparation of training content and material for Training of Trainers (TCs, Vocational Training Institutes/ITIs/Polytechnics).

j) Providing static content for development of e-learning modules for existing as well as new training programs. The conversion of static content to e-learning content will be undertaken by the IT partner (i.e. NPSP).

k) Organization of pilot training for enhanced existing training programs and new training programs.

l) Refinement and modification of training program content based on the assessment of feedback received. Support TCs in engagement with institutions and statutory bodies (such as AICTE, Universities, state technical education boards etc.) for appropriate certification of the courses.

m) Facilitate in development of Faculty Exchange Program including process document (governance structure, MoUs, agreements etc.) and identification of international universities and institutes for the program

n) Assist the TCs in collaborating with international institutions to develop joint training programs

o) Develop guidelines for the instructors and students to better understand and implement the EHS requirements

p) Provide regular training for continuous capability enhancement

q) Support TCs in developing the courses which can help MSMEs to be part of hi-quality global supply chain (international quality requirement)

Track 2, Activity - 2: Key Deliverables:

1. **Skill Development Roadmap along with Evaluation Report and Implementation Plan** (along with recommendations for enhancement current training modules and new training modules for identified technologies with detailed roll-out plan and business case for each)

   Evaluation Report should also include assessment of examination system along with recommendations for transforming training programs equivalent to world-class programs

2. **Training curricula and training content/material for existing training programs at TCs**

3. **Training curricula and training content/material for new training programs**

4. **Organize pilot trainings for enhanced existing training programs and new training programs**

5. **Static Content for e-learning modules of existing and new training programs**

6. **Training of Trainers plan and training content/material**

7. **Process document and list of potential partners for Faculty Exchange Program**

8. **Module informing instructors and students of EHS guidelines and its implementation**
1.2.3 Track 3: Advisory on Technical up gradation of existing TCs and set-up of new TCs

Activity 1: Gap analysis manufacturing process/procedures for existing TCs and development of manufacturing process/procedures for new TCs

MTP shall undertake current state assessment of the manufacturing processes/procedures in existing TCs to evaluate and provide recommendation to increase the efficiency of the TCs and ensure that there is optimal utilization of the existing/new technology. In addition they would be responsible for development of manufacturing processes/procedures for the new TCs. Following is a list of activities to be undertaken:

- a) As-is assessment of the manufacturing processes and techniques for all service offerings of the existing TCs
- b) Undertake gap analysis for manufacturing process & techniques and EHS requirements with respect to leading practices and global industry standards
- c) Provide recommendations for improving manufacturing processes and techniques to help increase efficiency, productivity and quality of the existing TC’s outputs keeping time and cost effectiveness in mind
- d) Analyze and provide recommendation on Standard Operating Procedures for existing TCs.
- e) Develop manufacturing processes & techniques and Standard Operating procedures for new TCs
- f) Develop and implement standard processes to provide production and design support for MSME for existing and new TCs.
- g) Develop and implement standard processes to provide technical advisory on designing, prototyping, testing & calibration and applied research for existing and new TCs.
- h) Evaluate the requirement for relevant quality certifications for the TCs and assist the TCs in undertaking the relevant quality certifications
- i) For key EHS issues for the relevant sector, develop a plan for implementation of mitigation measures while adhering to the industry standard and the regulatory requirements
- j) The MTP will also provide training and documentation for support on all new processes developed for existing and new TCs.

Track 3, Activity - 1: Key Deliverables:

1. Assessment and Gap Analysis Report for existing TCs
2. Recommendation on manufacturing process and techniques for existing TCs and development of manufacturing processes and techniques for new TCs along with training and documentation
3. Standard Operating Procedures for existing/new TCs along with training and documentation
4. Process for TCs to provide production and design support for MSME along with training and documentation
5. Process for TCs to provide technical advisory on designing, prototyping, testing & calibration and applied research along with training and documentation
Activity 2: Selection of equipment, software & hardware provider for existing and new TCs

MTP will be responsible for developing list of machines and equipment (as part of the Bill of Material) and preparing vendor neutral specifications and support the selection of equipment, software & hardware providers for the modernization and up gradation of the existing and establishing new TCs as and when the procurement is undertaken by the O/o DC, MSME. This will include the following activities:

a) Undertake as-is assessment of the technology infrastructure at the existing TCs and perform a gap analysis based on the technology roadmap developed
b) Prepare a list of new equipment and Bill of Material (BoM) for up-gradation of each existing TCs and setup of new TCs based on the market requirement, technology roadmap developed for the TC and need identified by the CNM.
c) Prepare cost estimates for proposed Bill of Material and validate the viability of the investment so that the investment proposed can be recovered in the next 3-5 years
d) Provide inputs on the Technical infrastructure and Technical Investment Plan sections in the Detailed project Report of each TC
e) Assess & advise existing TCs regarding obsolescence of plant & equipment for condemnation.
f) In conjunction with the IT partner, provide domain knowledge for setting up of ERPs and MIS for the technology centers
g) Market research and analysis for preparing vendor neutral specifications.
h) Define Terms of Reference for the vendor
i) Define Minimum Technical Requirements and Service Level Agreement for vendors after undertaking a market analysis for establishing the criterion for selection
j) Guidance on the design layout / Infrastructure requirement for the machinery and equipment for existing and new TCs:
   - Production Facility Dimensions including structural requirements
   - Training Room Dimensions
   - Classroom Dimensions
   - Tool Trying out facility
   - Utilities facility including the specification for tenders (HVAC, Gen Sets, Water, Compressed Air, Safety, Fire Fighting etc.)
   - Waste disposal process
   - Assembly layout
k) Assist in addressing vendor queries and techno-commercial evaluation of proposals

Track 3, Activity - 2: Key Deliverables:

1. Bill of material for each existing TC and each new TC along with cost estimates
3. Technical Specification for the equipment, software and hardware requirement (including Minimum Technical Requirements and Service Level Agreement) for vendors
4. Design layout / Infrastructure requirement for the machinery and equipment for existing and new TCs
5. Addressing vendor queries and technical & commercial evaluation of proposals

Activity 3: Assistance and monitoring the installation, trial, quality testing & commissioning and approval of the new equipment and technology setup.
MTP shall be responsible to assist TC for the installation and commissioning of the new machines, equipment and technology setup at the TCs and implementation of new manufacturing processes along with the vendor wherever applicable. Therefore the MTP will need to undertake the following activities:

a) Facilitate and Monitor installation and commissioning of the new and relevant technology infrastructure
b) Undertake trial and testing of the new hardware/software and equipment installed in the TCs
c) Provide approval for the commissioned hardware/software and equipment so that payments may be processed by the TCs.
d) Undertake capacity building for TC employees on procured equipment/software so ensure high utilization
e) Assist TCs for implementation of recommended manufacturing processes and provide handholding during the initial roll-out.

Track 3, Activity - 3: Key Deliverables:

1. Testing and Approval report for installation and commissioning of all new machinery/equipment and software
2. Certification of bills for processing payment by TCs
3. Capacity Building of TC employees on procured equipment/software

Activity 4: Assistance in Operations and Maintenance

MTP should provide assistance in the operations and maintenance of the TCs with reference to the new technology infrastructure installed

a) Support senior management in TCs in manpower planning for the newly installed equipment and identification & cross-skilling of existing manpower to gain new expertise:
   - Design Expertise (Product / Process)
   - Manufacturing Process including Quality Assurance Expertise
   - Training Expertise (Practical & Theory)
   - Functional or Technical Expertise
b) Development of training plan & recommendation on the curriculum and training to be imparted to workers and students on new technology
c) Development of the Standard Operating Procedures and EHS guidelines for the production process.
d) Establishment of the production cost estimates for appropriately pricing the services at the TCs
e) Establishment of Maintenance Department (including maintenance schedules) in the context of the newly identified technology
f) Assist TCs in the enforcement of AMC for newly installed equipment and introduction of TPM (Total Productive Maintenance) concept at the TC.

Track 3, Activity - 4: Key Deliverables:

1. Manpower Plan for newly identified technologies and installed equipment planned/installed.
3. Production cost estimates
4. Maintenance schedule

1.2.4 Track 4: Technical Advisory

Activity 1: Strengthen the capabilities of TCs to provide Technical Advisory Services to their clients

MTP shall assist the TCs to provide technical advice to their key clients (e.g. industrial clusters or leading manufacturing firms/OEMs with large networks of MSME suppliers) and also support in capacity building of TCs to provide such advisory on a long term basis. The key activities under this track will include:

a. Support market opportunities for TCs to provide a bouquet of technical advisory services (in products, process, layout and implementation) to MSMEs approaching TCs for technical assistance in the area of general engineering and precision manufacturing (e.g. aerospace, capital goods, consumer goods etc.) for
   - Product design
   - Manufacturing processes and techniques,
   - Selection of cost effective technology including life cycle costing
   - Quality assurance
   - Plant layout
   - EHS requirements and guidelines
   - Applied research and development
   - Setting up new enterprises from technology or global value chain perspective
   - Sources for specialized raw material for manufacturing assignments
   - Development of patents for General Engineering sector etc.

b. For the period of the engagement, the MTP will provide specialized skilled resources on short term basis with subject matter expertise in the precision and general engineering manufacturing sector such as tooling, advanced welding etc. for assisting in any technical advisory project undertaken by the respective TCs.

c. In conjunction with CNM establish access to specialized skilled resources with subject matter expertise in the subject matter expertise in the above mentioned areas based on the requirement of the respective TC

d. Assist TCs in providing advice to MSMEs on cost effective technology including life cycle costing.

e. Support TCs in providing consultancy to prospective entrepreneurs for setting up new enterprises

f. Undertake capacity building exercises for creating Subject Matter Experts in the TCs to ensure that greater number of leads may be supported by the TC. This will be achieved through development of Training content and structured delivery document for Employees of TCs and undertake training for TC employees

Track 4, Activity - 1: Key Deliverables:
1. Technical advisory for MSMEs approaching TCs for assistance in the area of General Engineering sector
2. Deployment of specialized skilled resources on short term basis with subject matter expertise in the precision and general engineering manufacturing sector such as tooling, advanced welding etc.
3. Training modules for capacity building of MSMEs in General Engineering sector
4. Capacity building of TC employees to provide technical advisory in the area of General Engineering sector
## 2. Indicative Key Result Indicators

Following are the key result indicator that the Manufacturing Technology Partner for General Engineering Sector will be expected to deliver on.

<table>
<thead>
<tr>
<th>#</th>
<th>Result Indicator</th>
<th>Reference to Scope of Work</th>
<th>Unit of Measure</th>
<th>Baseline</th>
<th>‘15</th>
<th>‘16</th>
<th>‘17</th>
<th>‘18</th>
<th>‘19</th>
<th>‘20</th>
<th>Frequency</th>
<th>Data Collection</th>
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<tbody>
<tr>
<td>1</td>
<td>Number of technology strategies/roadmaps for each TC developed by MTPs and endorsed by Industry Associations and IC</td>
<td>Track 1 – Activity 2</td>
<td>#</td>
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<td>1</td>
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<td>Annual</td>
<td>MTP Progress Report</td>
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<td>Number of leads supported by MTP to create incremental advisory service revenue for the TC</td>
<td>Track 4 – Activity 1</td>
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<td>20</td>
<td>25</td>
<td>30</td>
<td>50</td>
<td>6 Month</td>
<td>M&amp;E team’s interview with TCs GMs/TC’s Financials</td>
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<td>3</td>
<td>Number of new skill development/training curriculum developed and endorsed by industry associations, and/or certifying agencies</td>
<td>Track 2 – Activity 2</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Annual</td>
<td>NTP Progress Report and M&amp;E Team Report</td>
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<td>Number of trainers trained (including other institutions) in new skills content</td>
<td>Track 2 – Activity 2</td>
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<td>400</td>
<td>900</td>
<td>1300</td>
<td>1500</td>
<td>Annual</td>
<td>M&amp;E Team’s interviews/field Visits of TCs GMs</td>
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<td>Result Indicator</td>
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<td>Unit of Measure</td>
<td>Baseline</td>
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<tr>
<td>5</td>
<td>Number of process improvement plans suggested to increase capacity utilization that are adopted by TC</td>
<td>Track 3 – Activity 1</td>
<td>#</td>
<td>0</td>
<td>NA</td>
<td>5 5 5 5 5 6 Month</td>
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<tr>
<td></td>
<td>YoY reduction of the rejection of products (internally or by client) by providing process improvement plans</td>
<td>Track 3 – Activity 1</td>
<td>%</td>
<td>NA</td>
<td>NA</td>
<td>5 5 5 5 5 Annual</td>
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<td>7</td>
<td>On-Time Delivery of the products/services</td>
<td>Track 3 – Activity 1</td>
<td>%</td>
<td>NA</td>
<td>NA</td>
<td>95 95 95 100 100 Annual</td>
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Component 2 - Investment to upgrade existing and develop new TCs

<table>
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<tr>
<th>#</th>
<th>Result Indicator</th>
<th>Reference to Scope of Work</th>
<th>Unit of Measure</th>
<th>Baseline</th>
<th>Targets</th>
<th>Data Collection Method</th>
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<tr>
<td>8</td>
<td>Number of new Technology Centers built as models of excellence in respective sector</td>
<td>#</td>
<td>NA</td>
<td>NA</td>
<td>0 1 1 1 1 0 -</td>
<td>Endorsement protocol to be defined</td>
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