

Draft Detailed Project Report

New Technology Centre, Rohtak
(General Engineering)

Technology Centre Systems Program
(TCSP)

Report No: 2015-Delhi-0387

Submitted

To

The Office of Development Commissioner - MSME
Ministry of MSME, Govt. of India
Maulana Azad Road, New Delhi -110108



Building a better
working world

01 June 2016

Director (Tool Room)

Office of Development Commissioner, MSME

Ministry of MSME

Nirman Bhawan, Maulana Azad Road,

New Delhi -110108

Dear Sir,

As part of our engagement to provide Consulting services for establishment of Program Management Unit (PMU) for designing the project, undertaking the pre-project activities and providing implementation support during the course of the Technology Centre Systems Program (TCSP), we hereby submit the Draft Detailed Project Report for setting up of Technology Centre at Rohtak, Haryana for your kind perusal. The deliverable has been prepared in accordance with our engagement agreement dated 07 November 2013, and our procedures were limited to those described in that agreement.

This Detailed Project Report is based on inquiries of and discussions with:

- ▶ O/o DC MSME
- ▶ PSC
- ▶ Industry experts
- ▶ World Bank Mission
- ▶ Industries and Ancillary units
- ▶ Government Institutes and Industry association
- ▶ Secondary Research

We have not sought to confirm the accuracy of the data or the information and explanations provided by the O/o DC MSME. Our work has been limited in scope and time and we stress that more detailed procedures may reveal other issues not captured here. The procedures summarized in our Draft Detailed Project Report do not constitute an audit, a review or other form of assurance in accordance with any generally accepted auditing, review or other assurance standards, and accordingly we do not express any form of assurance. This Draft Detailed Project Report is intended solely for the information and use of the Office of DC-MSME and is not intended to be and should not be used by anyone other than this specified party.

We appreciate the cooperation and assistance provided to us during the preparation of this report. If you have any questions, please contact the undersigned.

Very truly yours,

Amar Shankar, Partner - Advisory Services

Disclaimer

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Abbreviations

AICTE	All India Council for Technical Education
CAD	Computer-Aided Design
CAE	Computer-Aided Engineering
CAM	Computer-Aided Manufacturing
CCNA	Cisco Certified Network Associate
CDGI	Centre for Development of Glass Industries
CEMILAC	Centre for Military Airworthiness & Certification
CFC	Common Facility center
CFTI	Central Footwear Training Institute
CIHT	Central Institute of Hand Tools
CITD	Central Institute of Tool Design
CNC	Computerized Numerical Control
CNM	Cluster Network Manager
CSIR	Council Of Scientific And Industrial Research
CTR	Commercial Tool Rooms
CTTC	Central Tool Room & Training Centre
DC	Development Commissioner
DRDO	District Rural Development Authority
EDM	Electrical Discharge Machining
ESDM	Electronics System Design And Manufacturing
ESTC	Electronics Service & Training Centre
FFDC	Fragrance & Flavour Development Centre
FRP	Fibre Reinforced Plastic
GDP	Gross Domestic Product
GIZ	Gesellschaft für Internationale Zusammenarbeit
Gol	Government of India
IDCO	Industrial Infrastructure Development Corporation
IDEMI	Institute For Design of Electrical Measuring Instruments
IDTR	Indo Danish Tool Room
IGTR	Indo German Tool Room
IISc	Indian Institute of Science
IMFA	Indian Metals and Ferro Alloys
ITI	Industrial Training Institute
ITSP	IT Service Provider
KPI	Key Performance Indicator
LCA	Light Combat Aircraft
LRU	Line-Replaceable Unit
MOU	Memorandum of Understanding
MSME	Ministry of Micro, Small & Medium Enterprises
NCVT	National Council for Vocational Training
OEM	Original Equipment Manufacturer
PDO	Program Development Objective
PMC	Project Management Consultant

PMU	Program Management Unit
PPDC	Process and Product Development Centre
RFD	Result Framework Document
SMED	Single Minute Exchange of Dies
TAGMA	Tool & Gauge Manufacturers Association of India
TCs	Technology Centres
TCSP	Technology Centres Systems Programme
TDC	Technology Development Centre
TP	Technology Partner
TR	Tool Room
TRTC	Tool Room & Training Centre
UNIDO	United Nations Industrial Development Organization
VLSI	Very Large Scale Integration

Revision History

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Executive Summary

Objective of DPR: Evaluate the feasibility of the proposed Rohtak TC.

Key Components

- Opportunity and need assessment
- Social and Environmental assessment
- Technology & Skillset requirement
- Investment & Return

Opportunity and need assessment

Key clusters in Haryana

- Fasteners cluster in Rohtak
- Footwear park in Bahadurgarh
- Scientific instruments in Ambala
- Auto ancillary clusters in Gurgaon & Faridabad

Potential Market opportunity in Rohtak

- Training on Tool & Die making, Advanced Welding & Industrial Process Automation
- Production of small size plastic mould work

Stakeholder discussions



Key Stakeholders

- O/o DC-MSME,
- Government of Haryana,
- MSME-DI Karnal
- HSIIDC
- OEMs, Tier I & II suppliers,
- Industrial Association
- Government Institutes
- MSMEs

Key Training Requirement

- Skilled manpower in CNC operation
- Quality workforce
- Stable Workforce

Key Technology Requirement

- Mould design and production
- Job work for complex parts

Financials

Total Capital Expenditure: INR 128.70 Cr

Training Machines: INR 27.35 Cr

Production Machines: INR 12.28 Cr

Construction Cost Inc. contingency: INR 82.24 Cr

Other Infra. and Pre-Operative cost: INR 6.83 Cr



IRR: 4.9%
Positive income after depreciation is projected to be registered in 9th year

Location Overview



- 3 National Highways (NH10, NH71 & NH71A)
- 2 State Highways (SH16 & SH18)



- Railways connectivity
- Connectivity with other districts in Haryana and neighbourhood states
- Electrified double track between Delhi-Rohtak



- Indira Gandhi International Airport at Delhi

Industrial goods Production In Haryana

52% of escalators

80% of cranes



50% Of passenger cars

20% Of scientific instruments

Focus area of the Technology Centre

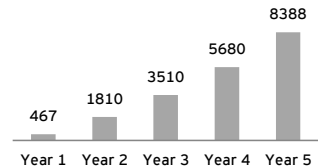
1 Training

Key Training Area

- Tool Room Courses
- CNC manufacturing
- Maintenance
- Advanced Welding
- Electronics and IT
- Industrial process automation

Over 65% of total revenue

Number of trained students



2 Production

- Production of Moulds & Dies
- Advance CNC machines

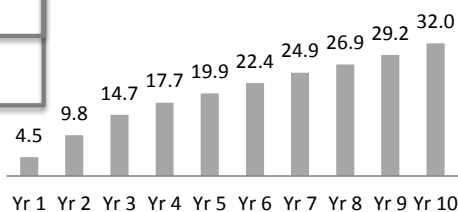
3 Consultancy

- Design Support
- Productivity improvement
- Support to training colleges

4 Other areas

- Productivity and Quality Clubs
- Entrepreneur development cell
- TP and CNM support

Revenue (INR in Cr)



Introduction



1 Introduction

1.1 Background and project rationale

India is one of the largest and dynamic emerging markets with vast economic potential. India's GDP in 2012 was USD 1,872,000 Million ranking 10th amongst all countries¹. The objective of the Government of India's, 12th Five-Year Plan (2012-2017) is to return to GDP growth rates in excess of 8 percent, with strong emphasis 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 to take Indian economy to a high growth rate trajectory and achieve the planned objectives. MSMEs play an essential role in the overall industrial economy of the country and account for over 45% of India's manufacturing output².

Despite strong potential, India's manufacturing performance has not been encouraging. The share of manufacturing in India's GDP has stagnated at around 16 percent³, compared to more than 30 percent (and growing) in some of the other Asian countries. India's manufacturing sector has been facing challenges, such as low value addition, low productivity, and less-than-desirable up scaling. However, world-class production units that compete in the international market are observed in the automotive sector.

The major constraints in the growth and competitiveness of India's manufacturing sector are:

- ▶ Difficulties in accessing markets (including within India),
- ▶ Difficulties in accessing finance (especially for MSMEs),
- ▶ Infrastructure deficiencies and
- ▶ 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.

Upstream industries, such as the tooling industry, which consists of developing and manufacturing of dies, moulds, castings, as well as testing and prototyping, serves as an 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 reducing time to market. Tooling is a specialized but local industry (more than 60 percent of tools in the world are locally produced and consumed - including in India)

¹ <http://unstats.un.org/unsd/snaama/dnItransfer.asp?fID=2>

² <http://www.dnb.co.in/Nashik2013/PDF/MSMEsInIndia.pdf>

³ The Manufacturing plan - Strategies for accelerating growth of manufacturing in India in the 12th Five Year Plan and beyond

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 INR 13,000 crores, with more than a thousand firms employing over 120,000 workers (TAGMA Report 2011) [Reference ??]. 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 downstream industries such as automotive, electronics, fragrance and flavours, glass, leather, toys etc., there is 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 increase international competition.

1.1.1 Demographic overview and challenges

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).

India has a labour force of about 470 million, of which less than 10 percent has received skills training, either through formal or informal means⁵. 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 skill development is critical to achieve faster, sustainable and inclusive growth on one hand, and to provide decent employment opportunities to the growing young population, on the other hand. According to the National Skill Development Policy published in March 2009, India had set a target of skilling 500 million people by 2022⁶. This program will play a bigger role in the country's plan by setting a target of skilling 150 lakh people within the next 6 years.

Global experience shows that a workforce with higher education and skill levels leads to higher productivity and personal income. A 2011 study showed that students who attended three-year vocational training courses at ITIs earned 25 percent more than two-year course students, who

⁴ Report on the Third-Annual employment & unemployment survey (2012 - 2013) of the Ministry of Labor, Government of India.

⁵ 11th and 12th Five Year Plan

⁶ <http://labour.nic.in/upload/uploadfiles/files/Policies/NationalSkillDevelopmentPolicyMar09.pdf>

earned 14 percent more than did one-year course students⁷. These results were confirmed in 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 India⁸.

1.1.2 Country's manufacturing objectives

Development of Indian manufacturing sector calls for deepening and recalibrating of economic reforms that would strengthen the sector and make it grow faster and become an engine of inclusive growth. To realize the potential of the manufacturing sector, Government of India had announced National Manufacturing Policy in 2011 with the objective of enhancing the share of manufacturing in GDP to 25% within a decade and creating 100 million jobs. It also seeks to empower rural youth by imparting necessary skill sets to make them employable. Sustainable development is integral to the spirit of the policy and technological value addition in manufacturing has received special focus.

The National Manufacturing Policy has six objectives:

- ▶ Improve manufacturing sector growth rate to 12-14% over the medium term to make it the engine of growth for the economy. The 2 to 4 % differential over the medium term growth rate of the overall economy will enable manufacturing to contribute at least 25% of the National GDP by 2022.
- ▶ Increase the rate of job creation in manufacturing to create 100 million additional jobs by 2022.
- ▶ Creation of appropriate skill sets among the rural migrant and urban poor to make growth inclusive.
- ▶ Increase domestic value addition and technological depth in manufacturing.
- ▶ Enhance global competitiveness of Indian manufacturing through appropriate policy support.
- ▶ Ensure sustainability of growth, particularly with regard to the environment including energy efficiency, optimal utilization of natural resources and restoration of damaged/ degraded eco-systems.

1.1.3 Recommendations of 12th plan working group & Parliamentary Standing Committee

⁷ Vocational Training in the Private Sector (Goyal 2011)

⁸ The Knowledge Economy and Education and Training in South Asia (World Bank 2007)

At present, the Office of Development Commissioner [O/o DC (MSME)], Ministry of Micro, Small and Medium Enterprises, operates 10 TRs and 8 TDCs (both hereinafter called as TCs) spread across the country. The TCs have been providing technical and vocational training programmes to more than 1, 00,000 trainees annually including AICTE and NCVT approved certification. They also provide design and manufacturing support to entrepreneurs alongside technical consultancies. The TCs' primary focus is to improve access to advanced technologies, provide technical advisory support to entrepreneurs and workers, and offer opportunities for technical skill development to the youth at varying levels. The variance in levels of training itself is demonstrative of a wide spectrum of technical sophistication in training inputs.

Considering the performance of existing TCs, the Department related Parliamentary Standing Committee on Industry, in its 235th report submitted to Rajya Sabha on 04th May 2012 have recommended as follows:

- i) "The committee is impressed with the performance of the TRs established by the MSME Ministry. These enable the youth to improve their skills and get employment opportunities. The success of such TRs inspires confidence that establishment of more such institutions will equip the young people with necessary ability useful in the expanding market and manufacturing sector".
- ii) "The Committee strongly recommends that more funds must be allocated for establishment of TRs across the country. It is understood that MSME Ministry is also approaching the concerned organizations within Government to get loan from International Financial Institutions. If Planning Commission and Finance Ministry cannot allocate more funds for this purpose, the necessary permission to MSME Ministry to get access to borrowings from international banks may be given without delay. However, it is strongly recommended that we must use our own resources for this cause, which is good for the youth of our country and MSME sector".

The evaluation of existing ten TRs was undertaken under GIZ-MSME Umbrella Programme during 2011. The experts have appreciated the performance of the existing TCs and have recommended expansion of skill development activities and introduction of newer technologies in the TCs.

Hon'ble Finance Minister on 28th Feb 2013, in his budget speech 2013-14 has made following announcement:

Para 75: "TRs and TDCs set up by the Ministry of MSME have done well in extending technology and design support to small businesses. I propose to provide with World Bank assistance, a sum of Rs.2200 crores during the 12th Five Year Plan period to set up 15 additional Centres".

In pursuance of (i) the Finance Minister's announcement through his Budget speech (2013-14), (ii) the recommendations of the Department Related Parliamentary Standing Committee on Industry in its 235th Report submitted to Parliament (Rajya Sabha) on 4th May 2012, and (iii) the recommendations of the experts after evaluating the performance of existing TCs, it was proposed to implement "Technology Centre Systems Programme (TCSP)" at an estimated project cost of Rs.2,200 crores including World Bank assistance of USD 200 million by setting up 15 new TCs and to modernize / upgrade existing TCs by introducing latest machinery / technologies.

1.1.4 Technology Centers System Program

The Technology Centers System Program, a national program, seeks to develop the technological and skill base of MSMEs in selected manufacturing industries, via upgraded and new TCs (currently called TRs and TDCs) has been envisaged. The TCs' mission would be to improve the competitiveness of MSMEs across India - with a strong emphasis on low income states.

This will be achieved by providing an integrated suite of services to MSMEs on a fee basis, ranging from providing them access to technology, access to skills and access to business advisory services. TCSP will reinforce the technical capability of the TCs as well as their performance, by further increasing the participation of the private sector in key decisions at both the national and local levels.

The TCs shall support industry clusters across manufacturing value chains, both upstream (tooling industry) and downstream (key industries exposed to global competition close to the technology frontier, such as the automotive and electronics sectors, as well as industries evolving through indigenous innovations, such as fragrance and flavour, glass, leather, toys etc.).

The PDO has been defined to enhance the competitiveness of MSMEs by improving their access to technology and business advisory services as well as skilled workers through systems of financially sustainable TCs. The program seeks to establish 15 new TCs and upgrade technological capabilities of the existing TCs and develop linkages between MSMEs, Indian and international research institutes and leading manufacturers. The program will connect leading practices that will contribute to advance technology, knowledge, skilling and innovation that can be transferred to MSMEs served by each TC.

The competitiveness of MSMEs is impacted by various factors such as entrepreneurial drive of the leader, market and customer dynamics, their access to technology, finance & business advisory and availability of skill manpower. The TCs will shape the outcomes of the program by providing MSMEs access to technology, business advisory and skilled manpower. So it would be possible to measure

the success of this program by measuring the off-take of these paid services of the TCs by MSMEs. Therefore, the key indicators that will be measured are;

- ▶ Number of enterprises paying for the services of the TCs.
- ▶ Number of long term trainees employed by industry, including MSMEs, within six months after being trained at TCs.
- ▶ Profit of TCs before depreciation and land.

In addition, intermediate result indicators are designed to monitor critical progress towards achievement of the PDO with primary emphasis on market-tested outputs of the TCs supported by TP and CNM. Examples of such indicators include capacity utilization of machines; trainees trained access to services by MSMEs, number of technology strategies / roadmaps developed by TPs and endorsed by industry associations and value of TCs' businesses generated with support of CNMs.

This program will help MSMEs in key industries to 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 Indian MSMEs, students and workers and help establish systems of TCs in the country where each center will gain from the specialization and experience of the other and improve the competitiveness of MSMEs.

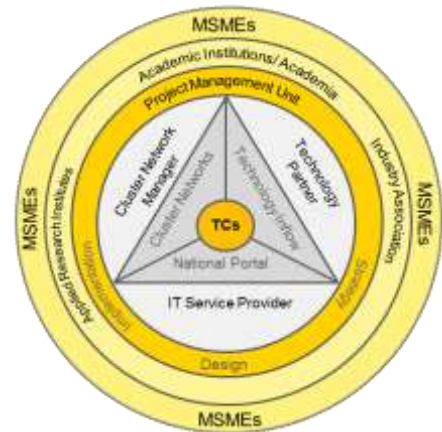
1.1.5 Key TCSP stakeholders

TCSP has multiple stakeholders who will need to work together to achieve the objective to enhance the competitiveness of MSMEs by improving their access to technology and business advisory services as well as skilled workers through systems of financially sustainable TCs. The key players who will participate in the program include:

▶ **Beneficiaries**

MSME units will be the prime beneficiaries of the program and the overall objective of the program centers around providing them with access to modern technology, business advisory services and skilled workforce. Workers, job and skill seekers will also gain from this program with access to short term and long term training/ skill development courses which will help them in improving their career prospects and finding livelihood.

Figure 1: TCSP eco-system



▶ **Office of Development Commissioner, Ministry of MSME (DC-MoMSME)**

The program would be designed and implemented under the aegis of the O/o Development Commissioner MSME, Government of India.

▶ **Technology Centres**

The TCs will act as the medium through which the services of the MSMEs - integrated suite of services on a fee basis, ranging from providing them access to technology, access to skills and access to business advisory services. The program will focus on upgraded select existing TCs and 15 new TCs that support or will support industry clusters across manufacturing value chains, both upstream (tooling industry) and downstream (key industries exposed to global competition close to technology frontier, such as automotive electronics, as well as industries evolving through indigenous innovations, such as fragrances and flavours, footwear, glassware, toys etc.).

▶ **Industry associations, academia, applied research institutes and others**

Strategic collaborations between TCs and various other organizations will be critical to foster research and development, idea incubation and strengthen the TCs with regard to manufacturing services, business advisory and training capabilities. These include:

- Regional / sectorial industry associations representing MSMEs.
- Regional / national level engineering/ academic / vocational training institutions.
- Applied research institutes.
- Local regional colleges.
- Autonomous institutes such as IISc, CSIR.
- Academia.

Leading practices from around the world for similar program suggest and underscore the importance of establishing such linkages. In the Indian context, there are many research oriented projects and concepts that can provide competitive advantage to Indian industry once the early state research emanating from applied research institutes and academia can be validated and implemented at the TC through such collaborations. The TCs will provide a unique environment of bringing the country's leading academics, engineering and industry professionals together to develop and demonstrate new technologies on an industrial scale. This will allow the clients of TCs to develop new manufacturing processes in a safe, neutral setting, reducing the associated financial risks.

▶ **Program management unit (PMU)**

The PMU will assist the O/o DC MSME in designing and implementing this program. This will include developing framework for identifying sites/sectors for the new TCs, developing Detailed Project Report (DPR), support in procurement of services and Environmental Protection and Compliance (EPC) contracts; developing and implementing environment and social safeguards, monitoring and evaluation, manage the roll out of the national portal, deployment of subject matter expertise and overall program management for TCSP over 6 years. EY LLP has been appointed as the PMU for the TCSP by the O/o DC MSME.

▶ **Technology partner (TP)**

The TP will help enhance the supply side of the TC by augmenting the technologies at the TCs, assist in their capacity building with respect to the identified technologies and clusters and provide greater support to the services being offered to the MSMEs by the TCs. These services include being exposed to the potential impact of new and relevant technologies, learning how to use new technologies/equipment, providing access to cutting-edge equipment, developing and testing new products, consultancy, training and deploying efficient techniques and practices that improve the competitiveness of the MSMEs being served.

▶ **Cluster network manager (CNM)**

The CNM will assist the TCs on the demand side by enhancing the economic development cooperation of key stakeholders to improve cluster competitiveness. This includes strengthening the market linkages of the TCs with the MSME cluster it serves, trade and industry associations, the academia, educational institutions, business development service providers, other government support institutions, workers and skill seekers.

▶ **IT service provider (ITSP)**

The IT Service provider will be responsible for designing, developing, setting up, operating and maintaining the IT platform for MSMEs. The IT platform will act as a common platform for services that will be required by an MSME from the start of their business, to successful operations and closure e.g. access to regulatory services for entrepreneurs, assistance for financing, access to list of suppliers etc. The platform will extend the reach of the program to its remote beneficiaries well beyond the TCs' physical location through access to e-learning solutions, B2B service and product market place, e-recruitment, assistance for financial services and e-governance services (forum to address grievances, automation of customer facing operations of the O/o DC MSME) on paid basis.

▶ **Construction Management Consultant**

The Construction Management Consultant (CMC) shall be responsible for design, supervision of work and final closure of construction works for the TC. CMC will prepare concept plans and subproject appraisal reports, carry out contract planning and detailed engineering designs, prepare schedules of quantities and specifications. It will support the PMU in preparation of procurement packages, bid documents, invitation, receipt and evaluation

of bids etc. CMC will supervise the construction, manage the contract, monitor construction activities and will certify contractor's progress claims, carry out quality control, testing, and prepare progress and monitoring reports, and certify bills.

1.1.6 RFD of TCSP













For monitoring the program outcomes, RFD has been defined; which tabulates the results indicators at the PDO level and intermediate outcome level together with the baselines and targets over the life of the program. Intermediate results indicators are designed to monitor critical progress toward achievement of the PDO with primary emphasis on market-tested outputs of the TCs and other stakeholders of the TCSP (viz. TPs, CNMs and ITP service provider).

Active participation of Managing Director/ General Manager of CTTC will be essential to steer the operationalization of TCSP in line with the envisioned mandate. The key success parameters of the Managing Director/ General Manager include:

- ▶ Revenue earned: Production, training, consultancy and others,
- ▶ Recovery ratio: Revenue/ recurring expenditure (cash) in percentage,
- ▶ Profit before depreciation,
- ▶ Profit after depreciation,
- ▶ No of trainees trained - Long term, short term,
- ▶ No of enterprises assisted,
- ▶ No of MSMEs out of above total enterprises,
- ▶ Present technical publications showing successes delivered and how it has aided industry.

TCSP's objective is to enhance the productivity of MSMEs by improving their access to technology, business advisory services as well as skilled workers through systems of financially sustainable TCs. The table below depicts the result indicators which form a part of the RFD.

Table 1: Result indicators of the RFD

Program development objective indicators	 Number of enterprises paying for the services of TCs	
	 Number of long term trainees employed by industry, including MSMEs, six months after graduating from the TCs	
	 TCs' gross profit before depreciation (not including land)	
Intermediary Results		
Component 1- Technical assistance to the existing and new TCs	Access to technology	 Revenue of TCs from access to technology activities (production support and consultancy)
		 Capacity utilization of machines in TCs
		 No. of technology strategies/roadmaps developed by TPs and endorsed by industry associations and IC
	Access to skilled workforce	 Number of trainees trained (direct program beneficiary)
		 Number of skills development contents (e.g. curricula, standards, certifications) developed and adopted by industry associations, and/or certifying agencies
	Access to business advisory	 Number of needs assessment and business plans developed by CNMs and endorsed by Industry Assocs.
		 Value of TCs' businesses generated with support of Cluster Network Managers
		 Number of users of IT Platform
	Component 2-Investments to upgrade existing and develop new TCs	 Number of new TCs built

The program will have direct and indirect industrial and economic outcomes to the country, such as enhanced manufacturing competitiveness, improvement in the overall employment rate and increased GDP growth.

1.2 Existing MSME TCs and feedback on other TRs

Out of the currently operational eighteen TCs & TRs, ten are for the tooling industry and eight are for other industries such as ESDM (electronics system design and manufacturing), glass, footwear, and fragrance and flavour industries etc. Half of these eighteen TCs are located in low income states (Uttar Pradesh, Madhya Pradesh, Odisha, Jharkhand and Assam). The TCs are self-sufficient institutions that provide training, manufacturing and consulting services to MSMEs and OEMs. They have created a niche in the market in various fields such as hand tools, plastics, automotive, lean production etc.

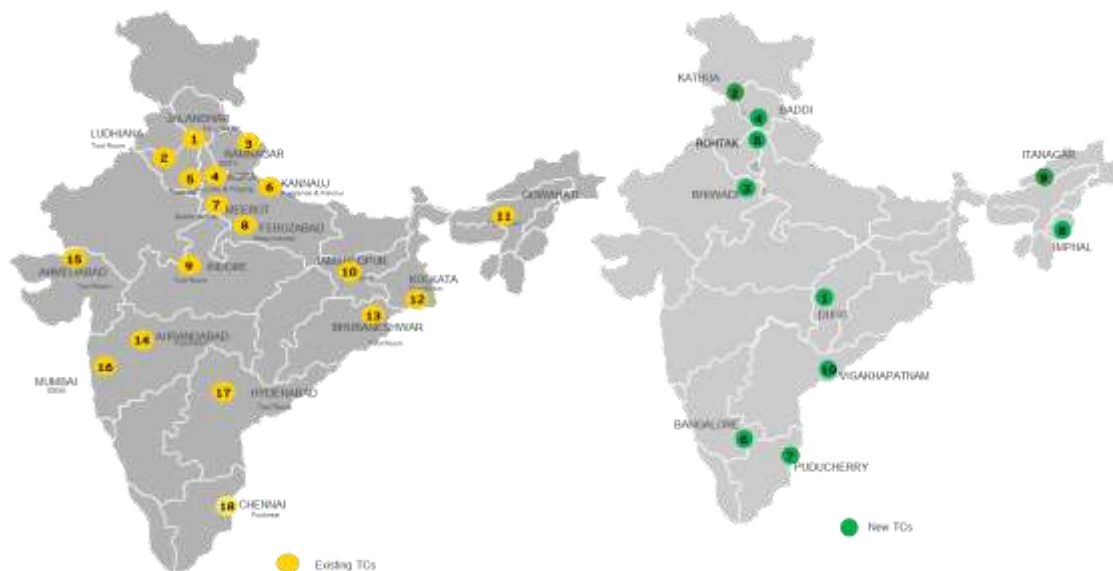
The list of the existing TCs & TRs along with their specializations is given below:

Table 2: Existing TCs & TRs along with their specializations

S. No.	Name	Specialization
1	Central Tool Room & Training Centre (CTTC), Bhubaneswar (Odisha)	Tooling, precision manufacturing and training
2	Indo Danish Tool Room (IDTR), Jamshedpur (Jharkhand)	Tooling (specialization in automotive) & training
3	Central Tool Room & Training Centre (CTTC), Kolkata (West Bengal)	Tooling & training
4	Tool Room & Training Centre (TRTC), Guwahati (Assam)	Tooling & training
5	Indo German Tool Room (IGTR), Aurangabad (Maharashtra)	Tooling (specialization in automotive) & training
6	Indo German Tool Room (IGTR), Indore (Madhya Pradesh)	Tooling (specialization in automotive and plastics, contributing to medical) & training
7	Indo German Tool Room (IGTR), Ahmedabad (Gujarat)	Tooling (specialization in plastics, contributing to automotive) & Training
8	Central Tool Room (CTR), Ludhiana (Punjab)	Tooling & training
9	Central Institute of Hand Tools (CIHT), Jalandhar (Punjab)	Tooling (specialization in hand tools)
10	Central Institute of Tool Design (CITD), Hyderabad, (Andhra Pradesh)	Tooling & training
11	Institute for Design of Electrical Measuring Instruments (IDEMI), Mumbai, (Maharashtra)	ESDM, tooling and training
12	Electronics Service & Training Centre (ESTC), Jamnagar (Uttarakhand)	ESDM and training
13	Process and Product Development Centre (PPDC), Agra (Uttar Pradesh)	Foundry & forging and training
14	Process cum Product Development Centre (PPDC), Meerut (Uttar Pradesh)	Sports goods and training
15	Central Footwear Training Institute (CFTI), Agra (Uttar Pradesh)	Leather footwear & training
16	Central Footwear Training Institute (CFTI), Chennai (Tamil Nadu)	Leather footwear & training

S. No.	Name	Specialization
17	Fragrance & Flavour Development Centre (FFDC), Kanauji (Uttar Pradesh)	Fragrance & flavours and training
18	Centre for Development of Glass Industries (CDGI), Firozabad (Uttar Pradesh)	Glass and training

Figure 2: Location of existing TCs and New TCs



Several of these were set up through support from German and Danish Governments and under bilateral agreements with the UNIDO. These TCs 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 certificate training programs certified by the AICTE and NCVT. They also provide design and manufacturing support to entrepreneurs alongside technical consultancies.

The existing TC's, were set up between 1967 and 1999, with primarily focus on improving access to technologies and providing technical advisory support for entrepreneurs in the given industry cluster they serve. These 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 TCs mainly include:

a) Design & manufacturing

- ▶ Design & Manufacturing of Tools, dies, molds and precision tools,
- ▶ Process Development,
- ▶ Product Development.

b) Skill development

- ▶ Long & short term training programs,

- ▶ Areas include Tool and die making, Computer Aided Design (CAD), Computer Aided Machining (CAM), CNC (**Computer Numerical Control.**) ,Robotics and machine shop automation, Rapid Prototyping (RPT), mechatronics, welding etc.,
- ▶ International, modular and customized programs,
- ▶ Varies from school drop outs, SSC / HSC / pass outs, ITI pass outs, diploma holders and graduate engineers.

c) Consultancy

- ▶ Inspection & calibration facilities,
- ▶ Turn-key assignments,
- ▶ Course curriculum developments for ITIs and other institutions

Over the last few years, financial performance of the TCs has markedly improved. Most of them have experienced strong revenue growth (mostly due to training activities) and have achieved financial sustainability (before depreciation and land costs).

Some of the preliminary findings from the analysis show:

- a) **High profitability in recent years:** There has been an improvement in recovery ratio of these TCs, thus allowing them to progress towards their self-sustainability mandate. Each of these 8 MSME TRs has become profitable in the last two years. From our discussions, we understand that IGTR Indore and CTR Ludhiana were not profitable in recent years; however, these centres have also corrected their recovery rates in 2012-13. In addition to these institutes, some of the other institutes are yet to reach the recovery ratio of 100%.
- b) **Skewed / Tilted towards training:** Training and skill developed services have been a key revenue sources for the TCs. The scope of manufacturing needs to be up-scaled to achieve a balance in operations and revenues from each TC. Ideally, revenues should be balanced between the two main sources of income for the TCs. Only IGTR Aurangabad is found to be closely balanced. CITD Hyderabad and CTTC Kolkata, although profitable, need to perhaps enhance their production activities.
- c) **Focus of production activities is more towards job work or component production:** It was found that the utilisation of machines in the production area was focused on component production and facilities for designing, die casting or tooling were not being fully utilized. CTTC Bhubaneswar and IDTR Jamshedpur focus on component production while CTR Ludhiana on job work and IGTR Indore and CTTC Kolkata on jigs and fixtures. Only IGTR Aurangabad and CITD Hyderabad were found to focus on specialization in production, including designing, such as die casting and sheet metal or press tooling.

- d) **Training capacity is well utilized:** As reflected in the sources of revenue generation, the scale of training activities has been growing. All TCs initially reviewed, demonstrated an increase in training numbers from 2013-14 to 2014-15. The highest increase was observed at PPDC Agra while the least was observed in CITD Hyderabad. The staff at these TCs needs to focus on production and maintain a balance between these two activities, while also up scaling other activities like consultancy and product testing. The centres should also seek avenues for taking advantage of government sponsored schemes and subsequently train more technicians in welding, machining and in automation

1.3 Evaluation study of TCs and recommendations of the experts

A study of selected MSME TRs in India on '*Strategic Assessment and Recommendations*' has been submitted under the '*Micro, Small and Medium Enterprises Umbrella Programme*'. The purpose of the study was to make comparison of the TRs with international TR programmes. An integrated set of ten recommendations have been made to increase the impact of the TR programme - reducing constraints to manufacturing MSME growth which are as follows:

- ▶ **Scale up training to meet market demand** - TCs should contribute trainees in greater numbers. The gap in the supply of advanced manufacturing skills will systematically reduce.
- ▶ **Support private tooling sector to mature to excellence** - Besides 10 government TRs, hundreds of private TRs contribute to increased manufacturing MSME competitiveness by providing more complex tools at lower prices.
- ▶ **Speed up absorption of advanced manufacturing technology** - Increased numbers of MSMEs will be able to access advanced technologies which enables them to secure larger contracts at better margins.
- ▶ **Engage in strategic partnerships** - Partnerships with large manufacturers can help realise large scale opportunities for manufacturing MSME. TCs can benefit from large scale and long lasting demand for services and increased revenue.
- ▶ **Systematically build and leverage networks of capacities** - The TCs should build a network of collaborating stakeholders to support the TCs to unlock more opportunities. Sub-contractors can enable TRs to expand the scale and scope of their services.
- ▶ **Re-organise "business model" of government TRs**- the TCs should function as autonomous business units with increased powers and accountability, increase job enrichment and control over own wellbeing. These teams are likely to become more motivated, innovative, leaner and more responsive to customers.
- ▶ **Map out the TRs role in the local innovation system** - TCs can benefit from integration with the local innovation system. Increased opportunity will result from increased stakeholder awareness and support.
- ▶ **Move away from hierarchy to network governance** - TCs will benefit from more autonomy which enables them to respond better to opportunities.

- ▶ **Establish a strategic framework** - TCs should utilise a coherent strategic framework which clearly articulates programme goals, sound economic development principles and good practices. Revised KPIs should promote sound strategy that result in greater, sustained development impact.
- ▶ **Establish a strategic facilitation capacity** - TCs should learn faster to achieve greater development impact. TCs should be at an international level of competitiveness.

During our discussion with TCs, it was conveyed that several studies have been undertaken by O/o DC MSME to analyze the technology capabilities and governance framework established at the existing TCs. The key findings from these studies are summarized as follows;

A study was undertaken to analyze the technology, organization and training at select MSME TRs, including CTTC Bhubaneswar in November 2012. The key findings of the analysis for CTTC Bhubaneswar are as follows:

▶ **Technology**

- The average milling machine age is a higher compared to the reference groups,
- Multiple machine work is not accomplished limiting the potentials in productivity,
- The number of unproductive machines is significantly lower compared to other MSME TRs,
- The share of set-up times is conspicuously low and is therefore subject to review,
- The technology relevance distribution is different to other TCs, as the turning technology is an important technology for the component production,
- The grinding technology shows potential for higher performance particularly with regard of high precision machining for aeronautical components,

- ▶ The technology analysis shows machinery characterized by a high machine performance

Organization

- Towards the customer this is compensated by a large portion of products being delivered early, - 4 out of 5 orders will reach the customer on time,
- Late orders occur infrequently and are in line with the international competitive standard,
- The experience, process quality, and customer focus is also represented by high customer satisfaction,
- High manpower in the quality management department ensures the high quality of the products,
- Quality assurance is also exercised by the departments individually to operate with process orientation,
- The customer group can be considered focused by the standard of the other MSME TCs,
- A short average job tenure is an indicator for future sustainability and a stable process structure,

- CTTC Bhubaneswar successfully exploits the benefits of customer focus and product portfolio - The next step has to be undertaken by adding an electronic planning and control system

▶ **Training**

- The development of further courses on automation and systems should be continued,
- Even though an advanced process understanding is existent in manufacturing it is not sufficiently transferred to training,
- The analysed courses comprehensively attend to the necessary key know-how of machine operators, programmers, and designers in the mid-term format.

The key recommendations made in the report were as follows:

▶ **Technology**

- Holding the high machinery performance level with the help of machine investments - large size milling machines and grinding machines,
- Rationalization and standardization of all manufacturing processes,
- Reduction of in-machine set-up times using zero-point clamping systems and pallets,
- Efficiency improvements by reduction of electrode milling and sink-EDM machining time by shifting to graphite electrodes.

▶ **Organization**

- Definition of requirements to improve planning and control of the order fulfilment process by developing an electronic planning and control system.

▶ **Training**

- Development of a link between manufacturing competencies and course offerings by setting-up of course offerings addressing organizational capabilities and component manufacturing,
- Establishment of modular course structure for advanced training of industry professionals.

All of the above recommendations are valuable not only for the improvement of the existing TCs but also it serves as an important input for conceptualizing and planning for the new TCs.

DPR Objective and Approach



2 DPR objective and approach

2.1 Objective

Technology Centre in Rohtak has been proposed with the underlying fact and review of the catchment area which has some of the leading units in Automobile, General Engineering, Leather goods and footwear. Further a number of transformational infrastructure projects such as Kundli-Manesar-Palwal (KMP) Expressway, Regional Rapid Transit Service and various industrial projects are proposed and the TC can facilitate and support the MSME units coming up across this region. The TC at Rohtak will play an important role in enhancing the competitiveness of the MSME Units in the area. TC will focus on providing skill up-gradation, improving access to technology, and offering advocacy support to the MSMEs with high growth potential. The long term vision is to ensure competitiveness of the MSMEs in the eco-system by strengthening their linkages to the mainstream manufacturing sector in the region.

The objective of this DPR is to evaluate feasibility of proposed MoMSME TC at Rohtak. This includes assessment of the market need in the region, technology and skillset requirement, amount of investment required, construction needed, its layout and subsequent requirements for implementation of the green field TC at Rohtak. This DPR has been prepared in consultation with relevant stakeholders including O/o DC-MSME, Government of Haryana, World Bank, OEMs, Tier I & II suppliers, industry association, Government Institutes and some ancillary units in the region. This DPR would facilitate the implementation plan of proposed TC at Rohtak.

2.2 Approach

To start with, a comprehensive secondary research was carried out to understand the tooling and technological requirements of the General Engineering Sector and in particular of the Rohtak region. To validate the facts, the team conducted a detailed primary research that included meetings with various key stakeholders including O/o DC-MSME, Industrial Associations and General Engineering units in the catchment and others as explained below.

Discussions with various stakeholders were carried out to develop better understanding of the requirements and expectations from the proposed TC. Leading players were met in this region to discuss and understand the various insights with respect to the tooling & other technological requirements during the preparation of the DPR. Telephonic discussions with some of the General Engineering component manufacturers and suppliers across various regions (such as Hyderabad, Bengaluru, Chennai, Aurangabad and Ahmedabad) were carried out. The objective of this primary research was to understand their business requirements, issues, challenges, and future requirements to develop a deeper understanding of the requirements that can be served by the TCSP in future.

Based on the outcomes and the results of the discussions, market opportunity assessment was undertaken to understand the tooling & technology demand in General engineering sector across various stages of manufacturing.

Way forward: Post completion of the DPR for the proposed TC at Rohtak under TCSP, the on-boarding of 3 main partners would be very much required to achieve the envisaged outcome in the defined time frame.

- ▶ Construction Management Consultant - For the development of the new facility
- ▶ Technology Partner - Procurement of machines and adoption of new technologies
- ▶ Cluster Network Manager - Marketing the centre and development of cluster with the right mix of products and services

Location/Cluster/ Industry Selection



3 Framework for Selection of Industry/ Clusters/ Systems/ Location for New TCs

3.1 Location selection framework

With the objective of establishing 15 new TC's to support industry clusters, there was a need to prioritize and identify high potential growth industries based upon certain selected parameters. Hence, one of the most challenging and critical aspect of the TCSP was selection of the Industry/Clusters/Systems/Locations. This required careful consideration of parameters and consultation with the stakeholders. Preliminary meetings with the O/o DC-MSME were held to discuss the concept and approach. Subsequently three distinct approaches were finalised to identify the locations:

a) **Manufacturing Competitiveness approach:** Key idea for this approach was to identify location for TC at a place where it can create the most impact on improving the manufacturing competitiveness. The steps involved were:

- ▶ Listing major manufacturing industries creating value across country
- ▶ Identifying the clusters which can be catalyst to the manufacturing competitiveness for respective industry

One key limitation of this approach is that it will select the clusters which are already established and are among the most competitive across the country. A TC at such location will further improve the competitiveness of this location.

b) **Inclusive Growth approach:** Approach is based on the assumption that the state which has higher Net State Domestic Product has significant growth and hence the states with lower per capita state domestic product should be supported. A TC in such states would become a catalyst to improve the manufacturing growth in the state. Following steps were followed:

- ▶ Identification of bottom 15 Low Income states on the basis of per capita Net State Domestic Product⁹
- ▶ Identification of major manufacturing Industries in the selected states
- ▶ Identification of the major clusters for the identified major industries in the state

One of the key drawbacks of this approach is that clusters identified will not be the most competitive for the industry in the country. It is possible that by investing in a TC at such a location might improve the competitiveness of that cluster but this may not lead a world class centre TC.

⁹ 2011-12 Current prices

c) **Alignment of Major Economic Projects:** Since a TC will create value for many years¹⁰ and there are some mega projects in progress which will be completed in the next 10-15 years. This approach aims to incorporate the possible future growth areas on the basis of these mega projects. Considering that such economic growth is based on future development, these areas may not get covered in the above two approaches. The steps included are:

- ▶ Identification of major Economic projects & timelines (which have been ratified by the Government)
- ▶ Listing the States & Industries that are getting impacted
- ▶ Identifying the emerging clusters for the top industries

Above three approaches resulted in the first list of locations. It was important to create a common framework to choose the most appropriate location. In this context “systems approach” was applied. Systems approach takes in to account the presence of entire ecosystem for a TC in the catchment area¹¹ and a **Location Attractiveness (LA) Index** was created.

A Technology Centre will perform better in achieving its objectives if it is established at a location with better LA Index.

Construct of LA Index:

$$\text{LA Index Score} = \text{Catchment Score} * \text{Presence of TC Score}$$

Catchment Score = $f \times$ (MSME Unit Score * ITI/PT Score * Presence of Major Firms Score * Presence of Leading Technical Institute Score)

Presence of TC Score= Presence of state/private technology center in the catchment area

Following data prints were captured and analysed:

- ▶ Number of MSMEs, Number of ITIs /Polytechnics, Number of Major Firms, Leading Technology Institutes for R&D
- ▶ Existence of TCs in the Catchment area (inclusive of DC-MSME, State Government , and Private Tool Rooms)

MSME Units: This reflects the concentration of MSME and it is envisaged that larger the number of units more opportunity for TC to impact the competitiveness.

¹⁰ Existing Technology Centers are more than 25 year old.

¹¹Catchment Area = District of the location and all neighbouring districts (transcending state boundaries) it is assumed that maximum value creation will be in the immediate surroundings of the Technology Center.

Number of ITIs/Polytechnics: This reflects the availability of population seeking skill development courses. It has also been observed that students from ITI and polytechnic form a large group of students seeking vocational training at TCs due to lack of such facilities at their respective institutes.

Number of Major Firms: It has been observed that often larger firms take the initiatives to go for technology upgrades and performance improvements. This leads to cascading effect and firm's suppliers, competitors follow up these initiatives in order to stay competitive. If a TC has larger number of such major firms in the vicinity it will have more opportunity to do technology collaborations and thus impact the entire ecosystem.

Leading Technology Institutes: Each TC can play a vital role to establish an Industry- Academia partnership. It has been found that while there are researched ideas available at the academia but they have difficulty in commercializing same. On the other hand the industries are looking for the fresh ideas to improve upon their competitiveness in the market. Unfortunately this linkage does not happen as industry has the need for ideas where the proof of concept is ready but unfortunately academia does not go beyond research. TC can play a role of bridging this gap and create the platform to link industry and academia.

State/Private TC: TC can play a vital role in mentoring and improving the performance of the state government or private sector TCs (tool rooms). If there are such opportunities in the vicinity of the MoMSME TC it can further increase the reach of TC to improve the competitiveness of MSMEs.

The weightages assigned to each parameter were as below:

Figure 3: Weightage assignment

100				30				20		10		20	
Catchment Area Parameters				Major Firms				Tech Inst.		Presence of state/pvt TR			
State	Industry	Location	Net Score	Units	Unit Score	ITI/IPT	ITI/IPT Score	Number	Score	Number	Score	TC of State Govt/ Pvt Tool Room	TC-State Govt/ Pvt Score

In order to further refine the list of locations arrived using the above approach, following additional criteria for shortlisting the industries were incorporated:

- ▶ **Prior experience:** These are the sectors where O/o DC-MSME has experience of operating TCs, such as General Engineering, Automotive, Electronics/ESDM, Leather & Footwear, Glassware, Sports Goods, and Fragrance & Flavours
- ▶ **Concentration of MSME's:** These are sectors where O/o DC-MSME has limited prior experience of operating TCs, however there exist a large number of MSMEs in these industries. Such as Food processing, Textiles (including Handlooms & Handicrafts), Pharmaceuticals, Wood/Paper/Pulp, and Rubber & Plastics.
- ▶ **Emerging Sectors:** These are upcoming sectors that may be at the forming stage, but will become major sectors in the near future, such as Bio-technology, Nano -technology, etc.

The sector in which DC-MSME has prior experience has been taken on priority. These sectors are: auto components, ESDM, general engineering, fragrance & flavour, leather & footwear, glass. Later the scope can be expanded to include other sectors pertaining to ministries other than MoMSME, if needed. Such sectors include food processing, pharmaceutical, packaging etc. where presence of MSMEs is considerable.

The list of locations arrived by the above was further refined and finalised with respect to the following additional considerations;

During these discussions additional considerations emerged:

- ▶ **State Classification:** The states were classified into two categories as unserved states and served states. All states of the country were distributed between Un-served states where O/o DC-MSME did not have an operating TC and served states where an operating MoMSME TC existed.
- ▶ At first unserved states were considered for the new TC in order to spread the coverage of MoMSME TC which would help in supporting more MSMEs across the country. With the approval of locations for the unserved states, served states would also be considered for the technologies for which existing TC cannot support.
- ▶ On the basis of MSMEs concentration in prior experience sectors, leading clusters were identified in each unserved state. This resulted in identifying the industry wise potential locations in each of these states.
- ▶ Some of the unserved states took proactive approach and have allocated or identified land for the purpose of TC. These locations were mapped to the locations identified in the step above. Accordingly technology focus was selected for these locations.

3.2 Selection of Rohtak location for setting up of new TC

As per the location selection framework and subsequent approval in the 4th PSC meeting held on 15th May 14, Rohtak was selected as the location for setting up of new General Engineering TC focus. Rohtak region has been found suitable from multiple perspectives:

- ▶ Rohtak is a part of the National Capital Region (NCR) which provides various immediate benefits for the district.
- ▶ Rohtak has very good connectivity with other key districts in Haryana and other states. There are 3 National Highways including NH10 which connects it to Delhi. The nearest airport is Indira Gandhi International Airport in New Delhi.
- ▶ MSME units present in Rohtak region operates in sectors such as automobiles, general engineering (fasteners, machined components, hinges, pipes and steel furniture etc.), repairing and services leather and wooden furniture etc.
- ▶ Industrial projects proposals entailing investment of INR 3,000 crore are planned for Rohtak. These include projects from Suzuki and Amul. Footwear park in Bahadurgarh will be supported by the TC as there are large shoe manufacturing units operate from the park.
- ▶ There are various clusters around Rohtak such as footwear and plastic cluster in Jhajjar, Auto ancillary clusters in Gurgaon & Faridabad, scientific instrument cluster in Ambala, Foundry cluster in Panipat and Agriculture implements in Karnal etc. which can be supported by the TC.

4 Location brief

4.1 Regional overview

Rohtak is located in south east of Haryana state. at 28.89°N 76.57°E. It is bound by Jind and Sonapat districts on the north, Jhajjar district on the south, Jhajjar and Sonipat district on the east and Hisar and Bhiwani districts on the west side.

Rohtak is a part of the National Capital Region (NCR) which provides immediate benefits for the district as it can secure loans for infrastructure development at cheaper rates from the NCR Planning Board (NCRPB). The nearest airport is the Indira Gandhi Airport at New Delhi at a distance of about 76 Kms and the nearest railway station is Rohtak Junction. Rohtak IMT (Industrial Model Town) is located on NH 10. It is also accessible by NH 71 and the Rohtak - Sonipat Road. It is about 80 kms from Gurgaon, 80 kms from Delhi, 86 kms from Ghaziabad, 93 kms from Hissar, 190 kms from Ambala and 231 kms from Chandigarh.

The existing NH 10 is being upgraded to a six lane from Rohtak to New Delhi. A Greenfield cargos airport at Meham Village has received an in principle consent from AAI (Airport Authority of India)

Figure 4: Location of Rohtak

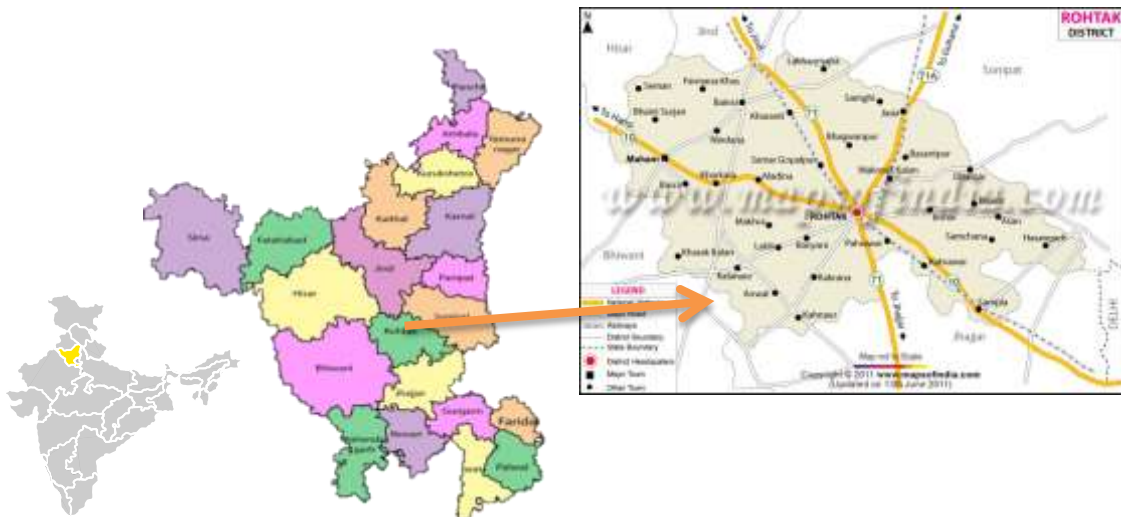


Table 3: Rohtak district snapshot¹²

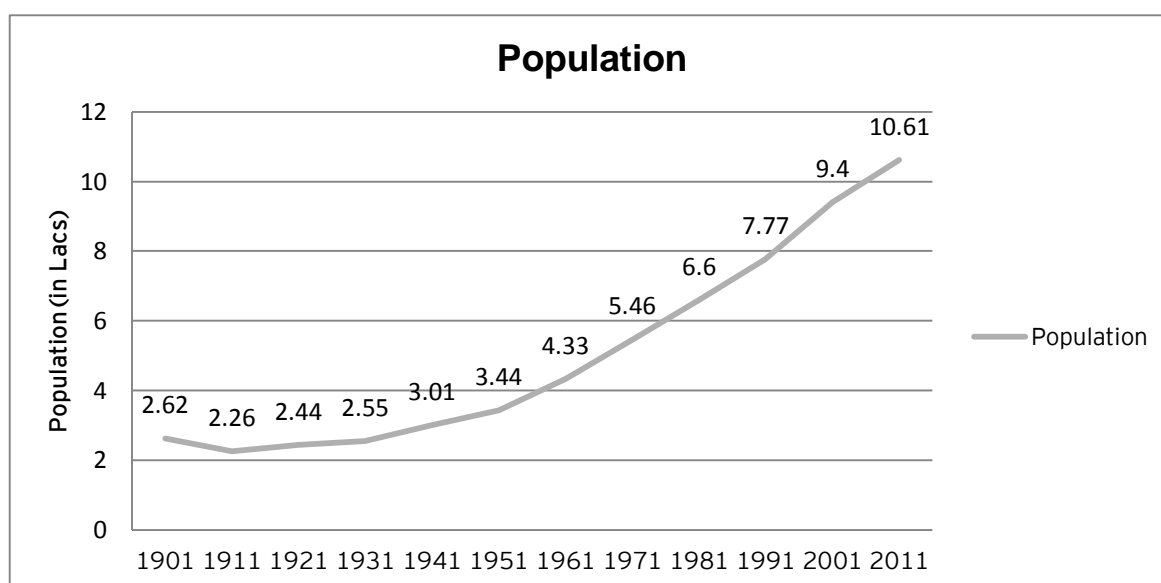
Section	Quantity/Value
Area	
Total geographical area	1,668 sq kms
Administration	
Sub Districts	3
Villages	144
Land use pattern	
Total cultivable area	142 sq kms
Total irrigated area	111 sq kms
Population (census 2011)	
Total population	10,58,683
Men	5,66,687
Women	4,91,975
Literacy (except 0-6) age	
Total literate	80.22 %
Men	87.56%
Women	71.72 %
Infant mortality rate (2005 - 2010)	53.1
Energy	
Electrified villages	144

¹² Source : Census 2011, Ministry of Health & Family Affairs, DIP Data, Ministry of MSME

4.2 Demographic profile of the district

- ▶ **Population growth:** The total population of Rohtak district is 10, 58,683 (census 2011). The growth of population in Rohtak district was 12.88% during the last decade (year 2001-11). Out of the total population as of 2011, around 53.56% (approximately 5.68 lakhs) are men and 46.43% (4.92 lakhs) are women. The density has increased from 563 people per square kilometres in year 2001 to 636 in year 2011. The graph depicts the growth of population over the decades of Rohtak district.

Figure 5: Growth of population in Rohtak district



Source: Census of India

- ▶ **Rural-urban population composition:** Rohtak district has an urban population of around 42% (approximately 4.4 lakhs) and a rural population of around 58% (approximately 6.1 lakhs) as per census 2011. In rural area, males constitute around 54% (approximately 3.3 lakhs) of the population and women constitute for around 46% (approximately 2.8 lakhs) of the population. In urban area, males constitute around 53% (approximately 2.3 lakhs) of the population and women constitute 47% (approximately 2.1 lakhs) of the population.
- ▶ **Sex Ratio:** The sex ratio at the district level is 868 females per thousand men (year 2011).
- ▶ **Literacy Rate:** The literacy rate of Rohtak district is around 71%. Among male and female this rate is 77.5% and 63.1% respectively.
- ▶ **Education Level:** The pass percentage for class 10 in Haryana was 41.2% in 2014-15. The pass percentage for girls in the secondary examination is 64.5%, while the boys have recorded a pass

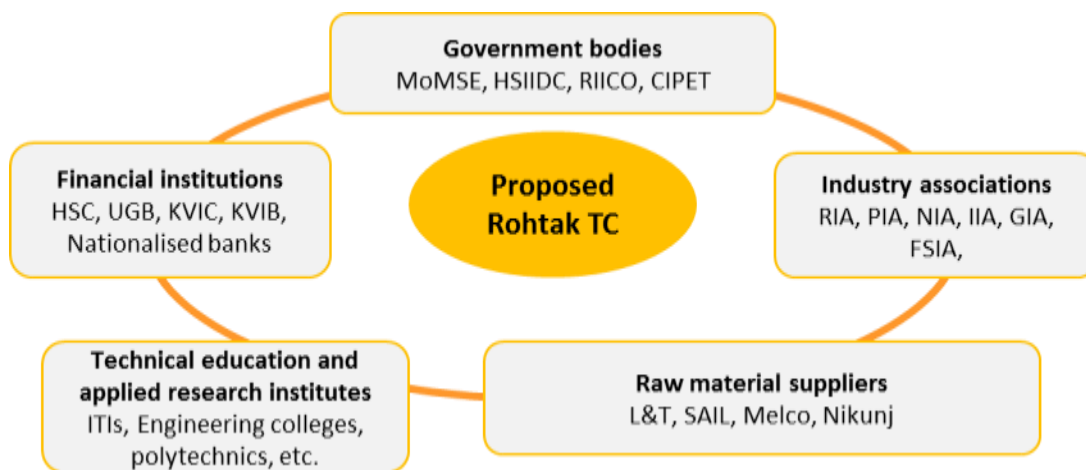
percentage of 45.88%. 848254 students appeared for the secondary Level exams while 624784 students appeared for the higher secondary level examination¹³.

4.3 Regional stakeholders

Regional Industry associations, leading manufacturers, training institutes, applied research institutes, academia, thought leaders and above all MSMEs would play an important role in providing the guidance on key aspects including (but not limited to) designing capabilities, technological requirements, skillset requirement and cluster development.

Key stakeholders for Rohtak TC would include; Government bodies, industry body associations, manufacturers and suppliers (e.g.; OEMs, tier 1 and MSMEs etc.), financial institutions, technical and vocational training institutes, applied research institutes etc. in the catchment area. Rohtak and its catchment area include Ambala, Gurgaon, Faridabad, Noida, Mathura, Neemrana and Patiala. The following figure depicts the stakeholders of the Rohtak TC;

Figure 6: Stakeholders of Rohtak TC



4.3.1 Government bodies

► Haryana State Industrial & Infrastructure Development Corporation (HSIIDC)

The catchment area of Rohtak includes districts of Haryana especially Faridabad, Gurgaon and Ambala. Accordingly, HSIIDC, the nodal agency for development of Industrial Infrastructure in the state of Haryana, is an important stakeholder. It has developed model industrial townships, industrial estates and industrial clusters (theme parks) and has framed guidelines for their governance. Key role of HSIIDC is:

- Preparation of detailed plan for land development and execution of development works like roads, water supply, sewage, drainage and power supply.

¹³ Lok Sabha Unstarred Question No. 4966

- Development of support infrastructure like STP/ CETP, development of plantation/ green belts, commercial and institutional sites, common parking facilities etc.

The organization, through its regular activities, will create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **Rajasthan State Industrial Development & Investment Corporation (RIICO)**

RIICO administers land development and provides associated infrastructure like power, water supply, road linkages and other basic social infrastructure for industrial areas. It has a strong regional presence throughout 27 regional offices in Rajasthan and has already developed 323 industrial areas over 70,000 acres with 32,500 industries in production. RIICO is also a facilitator in the development of industry specific special purpose industrial parks across the state with respect to the availability of related resources such as raw material, labour etc. The Key role of RIICO is:

- Site selection and acquisition of land.
- Financial assistance for projects.
- Technical consultancy for project identification and technical tie ups.
- Facilitation of government clearances.
- Merchant banking and financial tie -ups.
- Extending incentives and concessions according to the policy of State Government

The organization, through its regular activities, will create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **Punjab State Industrial Development Corporation (PSIDC)**

Punjab State Industrial Development Corporation (PSIDC) was established in the year 1966 to promote planned industrial development in the organised sector and to speed up industrialisation in the state of Punjab. Today, PSIDC'S name is synonymous in the corporate world and it is engaged in the promotion of large and medium scale projects. PSIDC is responsible for making major projects happen in the new economic environment. The key role of PSIDC is:

- Promotion of industrial and infrastructure projects in the Assisted and Joint Sector.
- Extending of term loan assistance under IDBI Refinance Scheme to projects promoted by private sector.
- Providing of escort services to projects initiated through private sector

The organization, through its regular activities, will directly and indirectly create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **UP State Industrial Development Corporation (UPSIDC)**

Uttar Pradesh State Industrial Development Corporation, the premier industrial promotion and infrastructure development undertaking of the State Government has been the driving force behind scores of industrial ventures since 1961. Its major promotional and development activities are:

- Development of Industrial Areas equipped with the necessary industrial infrastructure.
- Identification and promotion of infrastructure-related and industry specific projects.
- Execution of civil construction works for govt. and public sector organisations on deposit basis.
- Acquisition of land on demand for large projects.
- Development of integrated Infrastructure Industrial Townships.

The organization, through its regular activities, will directly and indirectly create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **Central Institute of Plastics Engineering & Technology (CIPET)**

CIPET is a premier institution devoted to Academic, Technology support & Research (ATR) activities for the growth of polymer & allied industries in the country. It has 16 centres across India which have state of art infrastructural facilities in the areas of design, CAD/CAM/CAE, tooling & mould manufacturing, plastics processing, testing and quality control to cater to the needs of polymer & allied industries.

- In the region, CIPET has one centre in Murthal (Haryana) with full- fledged design wing, tool room, processing division and plastics testing centre to cater to the industry through managerial and supervisory manpower, training, testing, consultancy, advisory and development services.

The proposed TC at Rohtak can collaborate with CIPET with the objective to strengthen its expertise in tool manufacturing, research and development etc.

4.3.2 **Industry associations**

▶ **Rohtak Industries Association (RIA)**

It is one of the most well recognised Industries Association in Haryana and adjoining areas besides NCR. Its main object is to promote and help industrial sector in the entire front and update them with the latest Government laws and other obligations from time to time.

- Escalate all issues of the industry association members to the appropriate government body. Coordinate and respond to government surveys.
- Facilitate improvement of infrastructure in the industrial area
- Provide advisory services to loan seekers from Industrial lenders

RIA will play a key role in providing industry specific requirements to TC which will enable the TC to develop customized courses and technology competencies.

▶ **Ambala Scientific Instruments Manufacturers' Association(ASIMA), Ambala**

ASIMA is a key association Micro, Small and Medium Enterprises involved in manufacturing of scientific instruments for education institutions and industrial applications. ASIMA organize training programs, practical workshops, visits to various institutes of national importance, visits to large scale industries etc. ASIMA connects MSMEs to local science degree colleges, engineering colleges, medical colleges and arrange interaction with the faculties.

The organization, through its regular activities, will directly and indirectly create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **Indian Industries Association (IIA), Delhi**

IIA (Delhi, HQ-Lucknow) is an apex representative body of Micro, Small and Medium Enterprises (MSME) with a strong membership base of about 5000 Micro, Small and Medium Enterprises (MSMEs). IIA has an extensive network of more than 40 chapters spread in most of the industrialized districts of U.P and surrounding region including Noida, Greater Noida, and Ghaziabad etc. IIA works for creation of enabling environment for industrial growth especially for MSMEs. The objective of IIA includes;

- Fostering co-operation and support for the promotion of Micro, Small & Medium Enterprises.
- Disseminating valuable information on legal & technical aspects, latest development in industry & market, about latest Government policies, procedure and laws etc.

IIA will play a key role in providing industry specific requirements to TC which will enable the TC to develop customized courses and technology competencies.

▶ **Patiala Industries Assosiation (PIA)**

Patiala Industries Association (PIA), was founded in 1983 with an objective to provide a common platform to industrial units in Patiala (Punjab) to share their concerns, problems and discuss their vision for the future. The association has served as the valuable conduit between the Government and the Industry.

- Regular dialogue with various Central & State Government departments related with Industry.
- Seminars and Exchange of ideas session with prominent public figures to discuss issues affecting the Industry.

- Presentations with focus on equipping the members with knowhow about the latest Industrial and Business practices.

▶ **Industry Association of Uttarakhand - Haridwar Chapter (IAU)**

Industries Association of Uttarakhand (IAU) is an Apex body of Micro, Small & Medium Scale Industries of Uttarakhand. Its strong membership base covers wide products and services spread through length and breadth of Uttarakhand. With exclusive focus on Uttarakhand, IAU is committed to the development of the State and its entrepreneurs. The thrust and focus of the Association is always on making efforts to help the existing industry and to attract the new industry in Uttarakhand. This is done by building and maintaining grass root level interaction with all concerned including Government, trade and industry.

- Identifying new business opportunities specially relevant in fast changing liberalized economy.
- Technology & quality upgradation search, Interface with foreign delegations for know-how, export & imports.
- Organizing state-level conventions, Trade Fairs & Buyer-Seller Meets.
Enhancing entrepreneurial & managerial skills.

The organization, through its regular activities, will directly and indirectly create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **Gurgaon Industrial Association (GIA)**

GIA represents around 400 organizations and Works to create and sustain an environment conducive to the growth of industry in Gurgaon partnering with the government through an advisory and consultative process. The key activities are:

- Provision of a platform for making entrepreneurs more innovative and efficient to gain a competitive edge.
- Conduction of seminars, workshops and conferences on subjects of importance.

GIA, through its regular activities, will directly and indirectly create opportunities for the TC in terms of technology, skill and advisory support to MSMEs in the catchment area.

▶ **Faridabad Small Industries Association (FSIA)**

Established in 1977, it facilitates MSMEs to recover delayed payments under the new MSME Act through the Haryana state MSE facilitation council. Other key activities are:

- Provision of guidance and advice to small units free of cost through its help centre.
- Organization of workshops for promotion of industrial products.
- Provision of free services to new entrepreneurs for the initial 2 years.

FSIA will play a key role in providing industry specific requirements to TC which will enable the TC to develop customized courses and technology competencies.

4.3.3 Leading manufacturers

▶ OEMs and Tier 1 players

The Rohtak region houses some of the largest industries in the auto and fastener sector. Key OEMs and Tier 1 players in the region include Laxmi Precision Screws Limited, Escorts Ltd. In The proposed Rohtak TC would develop capabilities in manufacturing of tools required to support these enterprises. It would also play an important role in the supply of skilled manpower.

▶ MSME Units

Rohtak and other districts in its catchment area like Ambala, Faridabad, Gurgaon, Gautam Budh Nagar, Mathura and Patiala house approximately 20,000 MSME units in manufacturing across key focus sectors¹⁴. An overview of the spread of MSMEs in this region has been provided in the need assessment section.

4.3.4 Raw material suppliers

Some of the well-known suppliers of raw material to industries/TC are as follows;

Table 4: Key suppliers of raw materials

Raw material	Major suppliers/ brands
Mild steel	SAIL, TATA Steel, Jindal Steels
Tool & die Steel	ASSAB Sripad Steels, Buderus Edelstahl Gmbh, Bohler Uddeholm
Copper & copper wires	Nikunj Eximp Enterprises, Birla Copper
Casting	Melco (Faridabad)
Others	Sandwik Asia, Birla Kena Metal, L&T

4.3.5 Financial institutions

Major financial institutions across the region are as follows;

Table 5: Prominent financial institutions in the region

District name	Financial institutions
Rohtak	Haryana Financial Corporation and Commercial Banks
Patiala	Punjab Financial Corporation
Faridabad	Commercial banks in Faridabad and State Financial Corporation
Gurgaon	Nationalised Banks, NSIC, HFC, KVIC & KVIB

¹⁴Source: DIP Data, Ministry of MSME for focus sectors : automotive, electrical, foundry & forging, general manufacturing, glassware, IT & electronics

Mathura	Uttar Pradesh Financial Corporation
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4.3.6 Technical education institutions and vocational training

The details of technical and vocational training institutes supplying skilled man-power in the catchment have been given as follows;

- ▶ **Technical education:** More than 2 lakhs (year 2011-12) students enrolled in approximately 624 technical institutions in

the State. Haryana houses many prestigious academic institutions for higher education. Some of the key institutes are IIM Rohtak, YMCA College of Engineering, Ashoka Univeristy and NIT Kurukshetra.

Table 6: Intake capacity at technical institutions in Haryana

Type of institutes	No. of institutions	Intake Capacity (2011-12)
ITI	258	64424
Engineering	169	80720
Polytechnic	197	67084
Total	624	2,12,228

Source: Government of Haryana & AICTE

- ▶ An extention of the IIT Delhi campus is proposed at Rajiv Gandhi Education City, Sonapat.

Haryana has a total of 624 technical institutions with a total intake capacity of 2,12,228 students.

- ▶ **Vocational training:** Government of Haryana established the Department of Industrial Training & Vocational Education to address the

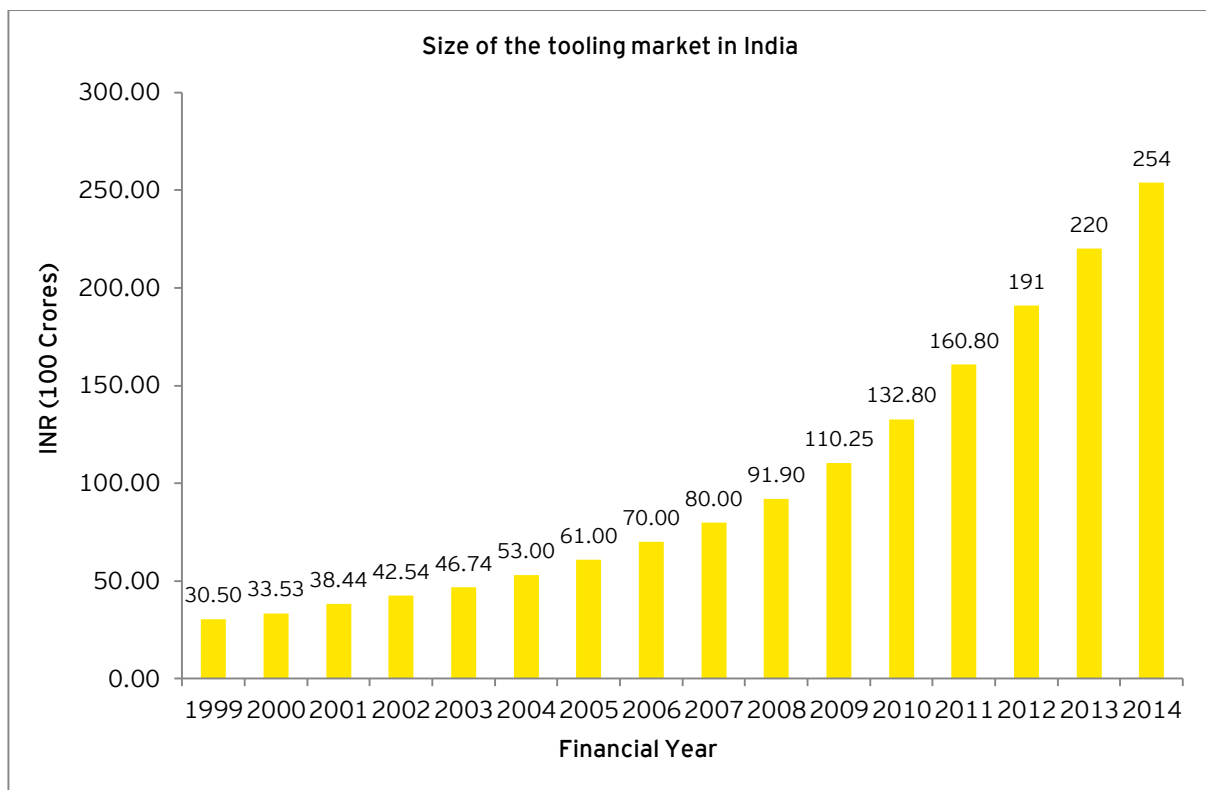
challenges of unemployment and to ensure gainful and sustainable employment. DITVE formulates strategies to promote and facilitate large scale livelihoods. The ITIs offer 72 types of trainings. The quality of training in ITIs is being upgraded regularly by improvement in curriculum, training methodology and training of trainers. New trades are being introduced as per demand of the market.

There are around 18 ITI colleges in Rohtak district. Out of these, 8 Government ITI colleges have 230 units and over 3500 intake capacity.

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. Growth of these manufacturing related industries, therefore, drives the growth in demand for tooling. The constraints to the growth and competitiveness of the Indian tooling industry mirror the ones affecting manufacturing as a whole. 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.

The trend of growing demand for tooling market is illustrated in the figure below. (source: TAGMA)

Figure 7: Size of the tooling market in India

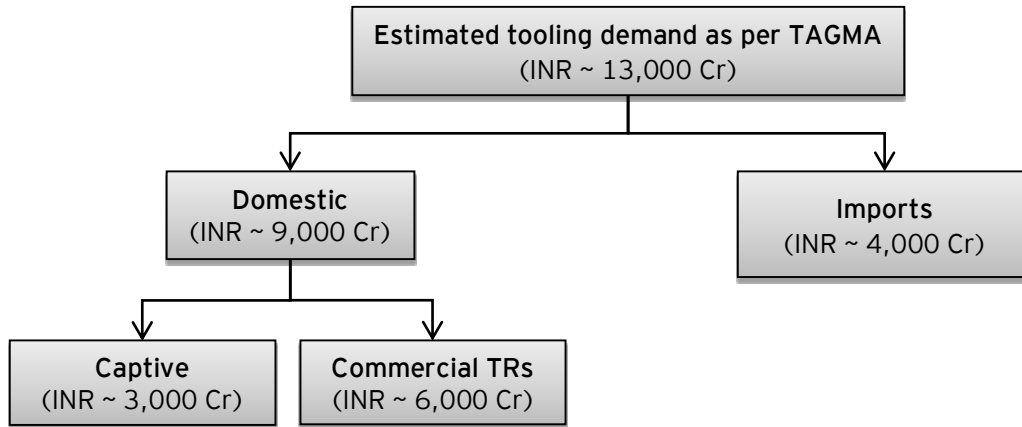


*Projections based on CAGR of 15.2%

Indian Tool Room industry size is estimated at ~INR 13,000 Cr. (2010-11)¹⁵ which can be divided into two key segments - domestic (captive and commercial) and imports. Domestic Tool Rooms market is estimated at INR 9,284 Cr out of which INR 3,129 crores is generated from captive tool rooms and commercial tool rooms (CTRs) account for INR 5,955 crores. Imports are to the tune of INR 4,150 Cr. In order to arrive at the addressable market for MSME TCs, a further analysis of the above three segments has been carried out.

Figure 8: Structure of tooling market

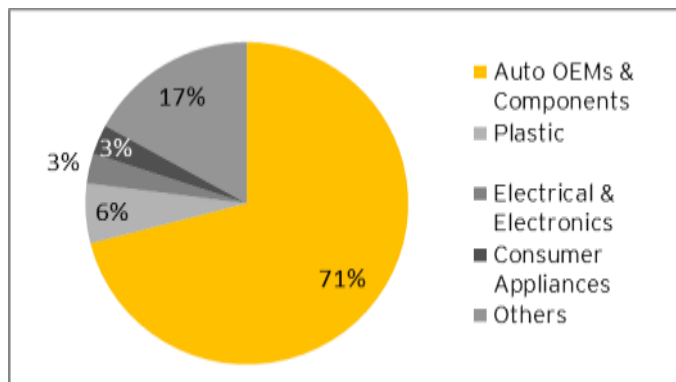
¹⁵ Indian tool room industry report, TAGMA (2011)



In-house (Captive) Tool Rooms: Captive

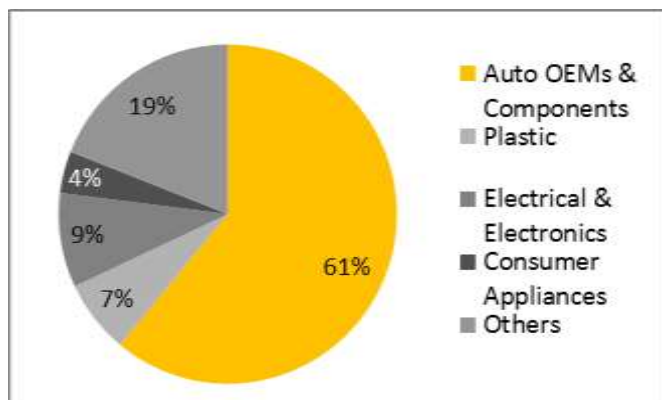
Tool Rooms mainly belong to the large and medium scale companies that develop tools for in house requirement, e.g. auto component, plastic, packaging etc. Such Tool Rooms have state of the art equipment to meet the internal requirements. Auto components and OEMs constitute around ~70% of this

Figure 9: Composition of captive segment



segment. Quality tooling is critical to produce high quality finished components and such companies perceive that quality of the components can be maintained only by developing tools in house or through imports from their foreign counterparts which also ensures steady supply as per requirement. Another major reason for captive tool making is that these companies don't want to share their designs of tools to safeguard intellectual property of the company. Nearly ~ 70% of auto and auto component companies except from Indian manufacturers, primarily import their tooling or have a captive Tool Room mainly due to lack of raw material quality and IP content. Indian Commercial Tool Rooms suffer from capacity constraint causing an increase in the lead time for manufacturing the tools to meet the demand of the end users. Thus, captive segment does not present a significant opportunity that can be targeted by MSME tool rooms.

Figure 10: Composition of CTPs segment



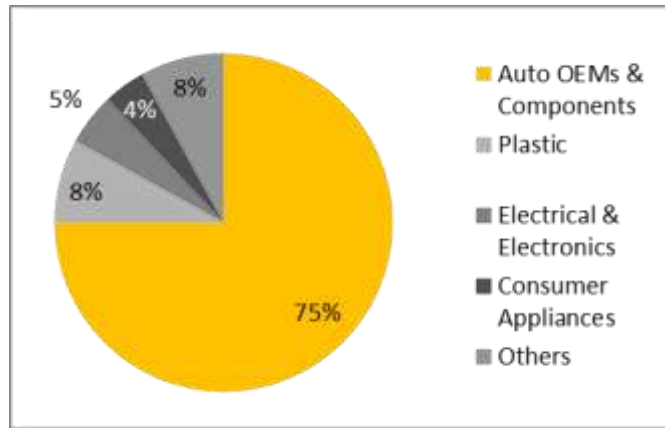
Commercial Tool Rooms (CTRs): Commercial Tool Rooms account for ~ 46% of the total tooling market. Commercial Tool Rooms supply tooling on a commercial basis to a variety of industries and operate as independent companies. Besides manufacturing tooling, some Commercial Tool Rooms also undertake precision machining and component manufacturing. This segment with an estimated

market size of the ~6,000 crores (in year 2011) is the immediate low hanging fruit which can be addressed by MSME TCs by supporting Commercial Tool Rooms. It has been observed that Commercial Tool Rooms have insufficient capacity that leads to an increase in lead time for manufacturing of tools.

Imports: Imports account for ~ 31% of the total tooling market which is around INR 4,000 crores. As per TAGMA report and our discussions with some of the Private Tool Rooms, key reasons for tooling imports are;

- ▶ **Quality:** Better surface finish, lower turnaround time and higher degree of accuracy by ability to meet the tolerance range.
- ▶ **Capacity:** Insufficient capacity of Indian tool rooms to meet domestic demand and lack of infrastructure to make certain types of tools also results into imports.
- ▶ **Cost:** Higher price, non-availability of materials at par with the international standards, use of out dated technology due to absence of advance machinery compromises the quality of commercial tool rooms leading to demand for imports. In Countries like China and Taiwan, the tooling cost is lower than India.
- ▶ **Design:** International companies based in India prefer procurement of their tooling from their parent company to maintain design standards across the globe e.g. LG & Samsung import most of their tooling from Korea.

Figure 11: Composition of imports segment



Auto OEMs and components segment account for around 75% of the total imports in tooling. International companies like Volkswagen, General Motors and Siemens etc. still prefer international tool makers for superior quality. The rest 25 % i.e. accounts for tooling requirements from other sectors which can be addressed by MSME Tool Rooms. This pushes the customers to look outward to fulfil their requirements.

Total addressable market for MSME Tool Rooms is about INR 7,000 crores (6,000 for Commercial Tool Rooms + 1,000 crores imports, especially those imports which take place as a result of insufficient capacity of domestic Commercial Tool Rooms.

To start with, the primary focus could be addressing the capacity constraint in the domestic tool room industry in the short run. However, a focused approach towards specialised tool production in the long run can help capture a part of imports which is being replaced by domestic supply from

Commercial Tool Rooms. This would require additional support to Tool rooms just more than financial support and assistance. In the long run - MSME TCs can address rest of the market by,

- ▶ Increase in specialisation,
- ▶ Process standardisation,
- ▶ Safeguards to protect IP,
- ▶ Sharpen focus on quality and reduction in lead times

5.1.1 Primary Research

As a part of preparing the DPR, we had discussions with some auto component manufacturers and suppliers in the catchment region (such as Manesar, Faridabad, Gurgaon, Delhi, Noida). The objective of the primary research was to understand their business requirements, issues, challenges, and future requirements to develop a deeper appreciation of the requirements that the Technology Centre Systems Program of the O/o DC MSME can serve in the future. The research also included the support requirements of these players' w.r.t designing, training, manufacturing and consultancy.

Detailed telephonic discussions as per the questionnaire were conducted with 22 players¹⁶ to understand their needs and potential areas of support. 60% of the companies had turnover of up to INR60 crores and rest 40% had turnover of more than INR 100crores.

Key inferences drawn from the primary research are as follows:

- ▶ The main items produced were die cast products including use of moulds. Other important products include sheet metal products, rubber products and plastic parts.
- ▶ The main manufacturing processes in use were moulding, welding, die casting, forging, hydraulic pressing processes, CNC (Computer Numerical Control) such as VMC. There weren't many issues in the current processes
- ▶ 55% of the companies have in-house facilities of production of tools,
- ▶ 60% of these companies procure tools from domestic suppliers and rest 40% import tools.
- ▶ Approximately 25% of the companies face problems in tool quality and availability, high cost of tools. Industries such as RICO Auto Industries, SKH Auto components, Bony Polymers, Machine Polymers highlighted the same.
- ▶ Only 10% of the companies have sought the support of MSME tool rooms previously (such as SKH auto components)
- ▶ Approximately 65% of the auto component suppliers are ready to accept the support of MSME tool rooms/ TC's w.r.t. tool designing, manufacturing and training.
- ▶ There is scope for MSME's in making moulds, dies and sheet metal tools.

¹⁶ Details provided in the Annexure

- ▶ The main managerial manpower requirements of these companies are engineering (B. Tech engineering/ diploma engineering and tooling engineering) with project management skills and manpower handling skills. The machine operators are generally ITI graduates in the respective field of manufacturing.
- ▶ Approximately 20% of the companies face human resource problems w.r.t. project management skills, leadership and motivational skills, manpower management skills, less availability of workforce, disciplinary issues and industrial training.

Further similar kinds of inferences were also observed during telephonic discussion with 19 players¹⁷ across the country in Hyderabad, Karnataka, Chennai, Aurangabad and Ahmedabad w.r.t. support requirements of these players for designing, training, manufacturing and consultancy carried on. There is a need to position the MSME tool rooms to support the commercial tool rooms to strengthen their design capabilities and capacity to manufacture complex tools. Further, there is also a need to create more awareness of new technologies and opportunities among private tool rooms to enable them to serve that market.

Key challenges faced by players:

a. At the industry level

- ▶ **Absence of or limited automation in the manufacturing process in India;**
 - Leads to low machine utilisation of around 50-55% on an average (best in India is around 70-75%) compared to 95-99% abroad in China where a single operator manages 5-6 machines.
 - Main reason is lack of knowledge/ awareness of low cost automation technologies.
- ▶ **Lack of standardisation**
 - Limited or very small number of standardised components for mould design in India cause delay in the production process. For every mould to be developed, designing is done from scratch to finish. In China & Malaysia the standardised component usage is very high and therefore concentration is more on core & cavity design of the mould resulting in better quality and faster production
 - Use of Standardised components helps to deliver moulds in 1 week in China compared to 4 weeks required in India.
- ▶ **Lack of availability of skilled workers** & high attrition/ job hopping, shortage of trained manpower at machine operator level.
- ▶ **Low capacity and lack of capability** to develop heavy and precision machines requiring a high proportion of the CNC machines to be imported (2/3rd of the total CNC machines) mainly because of the capital intensive nature of investment.
- ▶ **Others**

¹⁷ List of players contacted is attached in the annexure

- **Limited/ slow adaptability of technology** by domestic TRs due to perception of quality about domestically developed products
- **Dispersed/ unorganised industry structure.**
- **High cost of inputs** makes Indian machines costly to users as compared to those imported.

b. Other macroeconomic factors

- ▶ **High interest rates** of borrowing (~14%) which discourage investments by compromising viability.
- ▶ Spree of free trade agreements (FTAs) / preferential trade agreements (PTAs) leads to a situation of **inverted duty structure** for Indian manufacturers. Customs Duty is reduced to zero levels and therefore Imports become more attractive that does not encourage transfer of technology and local manufacturing and / or value addition.
- ▶ Export efforts constrained by **high cost** of maintaining a presence in overseas markets.
- ▶ Government **tender terms** place Indian manufacturers at a disadvantage against imported machine tools.
- ▶ **Skill erosion** in machine tools is a serious constraint; yet, no academic course exists in mechanical engineering or even vocational training as a stream for machine tools at any level.

5.1.2 Challenges faced by Indian TCs

An analysis of the existing MSME TRs in India reveals that limited efficiency in production has caused the loss of some clients to private Tool Rooms or cheaper options from other countries. One of the key reasons identified has been the generic nature of tool development by MSME Tool Rooms rather than catering to a specialised category.

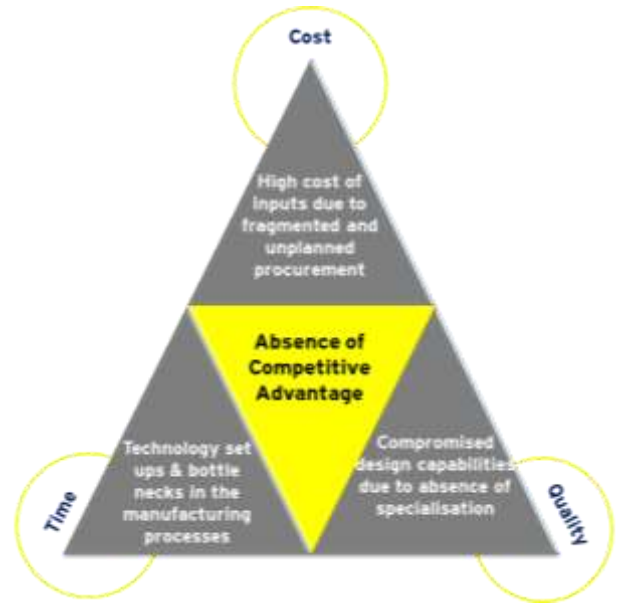
Generalised Tool Rooms are the norm in India due to;

- ▶ high capital investment requirement,
- ▶ to cater to a larger market,
- ▶ low volumes in specific categories,
- ▶ better risk management and
- ▶ absence of specialisation

Whereas these Tool Rooms produce a variety of tools, they lack competitive advantage in any of the categories due to lower efficiencies mainly due to the technology used. Time taken for delivery of the product is longer due to;

- ▶ technology set ups and bottle necks in the manufacturing processes,
- ▶ high cost of inputs due to fragmented and unplanned procurement,
- ▶ lower design capabilities due to lack of specialisation

Figure 12: Absence of competitive advantage



All these factors result in escalated costs and a further loss of competitive advantage. This reflects in the low volumes of tool production orders, which prevents the industry in tapping into the advantages of large scale production and economies of scale.

If MSME Tool Rooms specialise in a particular tool or tool production for a specialized sector, chances of developing competitive advantage become very high. In Germany, a Tool Room of Zitzmann Inc. specialises in particular type of mould development required for manufacturing glass bottles. It has got substantial competitive advantage in the production of such tools. Similarly, in China a Tool Room of China Taoshi Mould has more than 120 machines ranging between 40,000 - 75,000 rpm that specialises in a particular type of moulds whereas for the Indian counterpart the machines range between 12,000 to 20,000 rpm. For instance, on an average, procurement of a certain type of mould from China takes one third of the time it takes to be procured from within India. This is mainly due to low productivity and non-standardised use of tooling components in India.

Specialisation in the production process leads to some degree of standardisation enabling the Tool Room to maintain inventory levels which subsequently reduce the turnaround time for procurement. Another important aspect is the absence of design facilities/ good designers in the MSME Tool Rooms. Non alignment of the compensation structure for designers as per that of the market makes it difficult to retain the designers in the long term.

Case studies - Specialised tool rooms in the world

Zitzmann GmbH & Co.KG, Germany

- ▶ Zitzmann glass mould is a large supplier of high quality moulds for the leading glass companies in Germany.
- ▶ Specializes in manufacturing of moulds for complex container designs such as;
 - **High quality perfume flacons.**
 - **Medicine bottles, tins, jars.**
 - **Shaped bottles 3ml - 4250ml.**
 - **Block moulds, solid blank mould.**
- ▶ Its production portfolio includes complete mould sets, semi-finished parts, accessories in normal casting, special casting steel or bronze, vacuum full profile coating as well as flame spraying full profile coating.
- ▶ It's in house facilities include latest technologies and production methods like;
 - **CAD/CAM design using Catia V5.**
 - **The latest CNC machines in the turning and milling sector.**
 - **Full profile welded moulds.**
 - **Induction heat treatment and additional plasma welding.**
- ▶ It has around 120 highly skilled technicians producing more than 30,000 moulds per year.

China Taoshi Mould, China

- ▶ A well-known and one of the biggest plastic mould designing and manufacturing enterprise.
- ▶ Manufacturer of moulds, specializing in plastic moulds for automobiles, house electric equipment, electronic products, motorcycle, and other daily-used pieces etc.
- ▶ In house facilities include;
 - **Large-size CNC equipment including high speed CNC and EDM machines etc.**
 - **Advanced CAD/CAM/CAE system.**
 - **Workstation and software of PRO/E, FFCAE, CIMATRON, etc.**
- ▶ It has more than 600 employees including middle/high administrators and around 180 technicians.

5.2 Market opportunity

The fastener and auto ancillary segment has seen large scale investments in and around Rohtak. Traditionally it has been a prominent base for auto parts and screw manufacturing.

- ▶ The district of Rohtak is spread across 1668 sq kms and has an existing Industrial Area spread across 68 sq kms
- ▶ An Industrial Model Town (IMT) has been established along NH 10 by HSIIDC. Maruti Suzuki has set up a state-of-the-art R&D facility. Industries like Asian Paints and Nippon Carbide have also put up large scale plants.

Rohtak is located in the heart of Haryana and is a part of NCR and is around 70 km from Delhi and 250 km from state capital Chandigarh. The Rohtak Industrial Area is has growth opportunities and in past received various packages for Industry Development in the state budget almost every year. Key advantages of Rohtak are.

- ▶ Availability of labour and proximity to NCR helps in accessing industrial labour, cheaper loans from National Capital Region Planning Board (NCRPB) and managerial talent.
- ▶ Absolute control of the administration on the law and order situation in the area
- ▶ Availability of basic amenities such as piped water supply, schools, transportation, hospitals, telecom networks, banks etc.

Rohtak has an edge due to its location. Besides Haryana, industrialists from Delhi, Punjab and Rajasthan and other parts of India can set up their enterprises here.

Figure 13: Catchment area for Rohtak TC

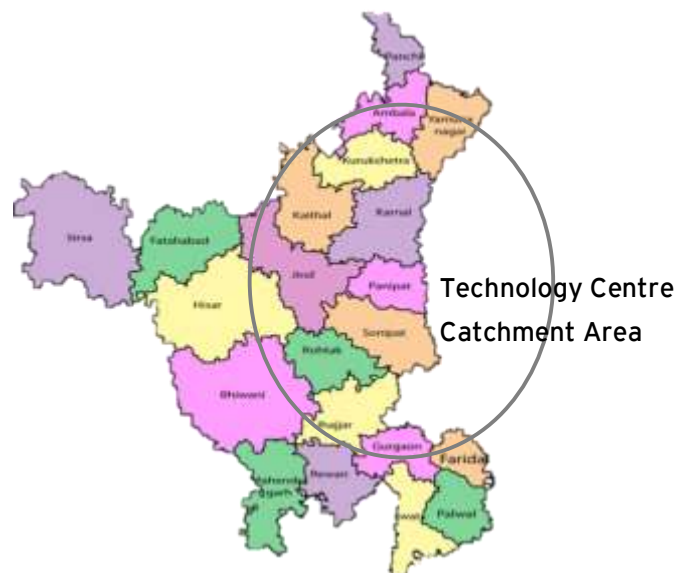
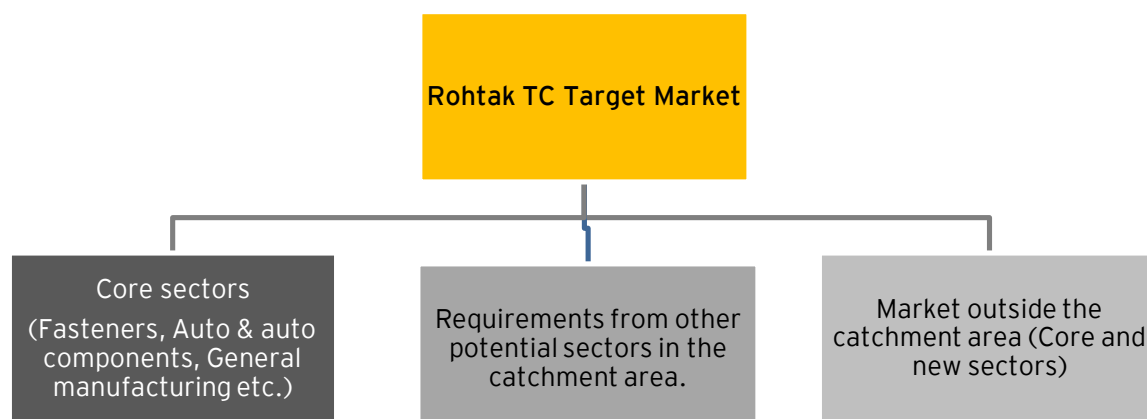


Figure 14: Target market structure of Rohtak TC



5.2.1 Market in core sectors in the catchment

Haryana is amongst the front runners of the industrial development in India that is showcased with its leading position in production of number of industrial/consumer goods i.e. nearly¹⁸ 52% of escalators, 80% of cranes, 50% of passenger cars, 37% of two wheelers, 15% of tractors, 20% of scientific instruments are manufactured in India. One out of every four bicycles in the country is manufactured in Haryana. The state has more than 1,347 big and medium industrial units and 80,000 small scale industrial units. Haryana leads in terms of manufacturing of original equipment and replacement items. Out of about 250 large and medium original equipment manufacturing units in the country, about 50 are located in Haryana.

There are over 1450 Micro and small and 17 medium & large units in Rohtak¹⁹. These units operate in the area of engineering (fasteners, turned components, Hinges, pipes and steel furniture), repairing and services and wooden furniture etc. Key players such as Laxmi Precision, Asian paints, Maruti Suzuki, Lotte India Corporation and Aisian and Footwear Design & Development Institute. are already present in the Rohtak. Near Rohtak there is a footwear park in Bahadurgarh where there are more than 500 units. Footwear players like Action Shoes, Liberty, Relaxo and other units which make shoes for Adidas and Nike.

In Ambala which is around 200 km from Rohtak, there are 1300-1400 scientific instrument manufacturing units. Total revenue of the industry is approx. 1400-2000cr per year. 50% of the revenue comes from export of scientific equipment's whereas 35% from supply of scientific equipment to educational institutes in India and rest 15% from industry. There are around 15-12 Mixer-grinder manufacturers in Ambala.

¹⁸ <http://www.haryanainvest.org/general-information.php>

¹⁹ District Industrial Profile-Rohtak

In Faridabad, there are more than 15,000 small, medium and large industries in this complex providing direct and indirect employment to nearly half a million people and ranks 9th largest industrial estate in Asia. The combined turnover is estimated to be about Rs. 1500 billion. The major industrial productions in the district are tractors, motorcycles, tyres, switch gears, steel rerolling, scientific instruments, power looms, agriculture implements, JCB cranes, consumer durables, footwear etc. Many international/ multinational companies like Whirlpool, Goodyear, Larsen & Toubro, Asia Brown Boveri, GKN Invel, Woodward Governor, Castrol besides Escorts, Eicher, Cutler Hammer, Hyderabad Asbestos, Nuchem are operating in this belt.

In Gurgaon, There are more than 17500 registered MSMEs which are providing employment to more than 67000 employees. There are more than 4000 Micro small and medium units in the area of engineering works and steel fabrication. Besides automobiles and auto ancillaries, major units in the district are involved in manufacturing of telecommunication equipment, light engineering goods, electrical goods, software development, hardware, sports goods, rubber and plastics products, readymade garments, pharmaceuticals, terry towels, food items, air conditioners, shoes, pesticides, insecticides, agro based and food processing, leather etc. Maruti Suzuki, Cast Master, JNS, Munjal Showa, Suzuki Metal, Hero Motors, Cosco India and Mag Filters are the key large players.

Close proximity to the NCR region also allows for easy access to the existing auto component supplier network and required logistics facilities. The following table enlists the prominent players in and around Haryana in auto and fastener sector.

Table 7: Composition of major auto players in the catchment and region (NCR)

Type	Key auto players ²⁰
OEMs	<ul style="list-style-type: none"> ▶ Escorts Limited, Faridabad ▶ Eicher Tractor limited, Faridabad ▶ Yamaha Motor, Faridabad ▶ Minda Auto Industries, Sonapat ▶ Eicher Motors, Gurgaon ▶ HMSI - Gurgaon ▶ Maruti Suzuki, Gurgaon ▶ Harley Davidson, Gurgaon
Transmission, steering parts and other components	<ul style="list-style-type: none"> ▶ Yamaha Motor - Faridabad ▶ GKN Invel Transmission, Faridabad ▶ Hyderabad Industries, Faridabad ▶ Denso India, Greater Noida

²⁰ Source : CII Summary Report on Haryana State

Type	Key auto players ²⁰
	<ul style="list-style-type: none"> ▶ Hongo India, Greater Noida
Suspension, brakes & tyres	<ul style="list-style-type: none"> ▶ Goodyear India - Faridabad ▶ Kobe suspension - Faridabad
Electricals/ Others	<ul style="list-style-type: none"> ▶ Hindustan Wires - Faridabad ▶ Delphi India - Gurgaon ▶ Nuchem - Faridabad ▶ Delphi Automotive Systems - NOIDA

Table 8: Key Players in Fastener industry in the region

Key Fastener Player
<ul style="list-style-type: none"> ▶ Laxmi Precision Screw Ltd, Rohtak ▶ Mehindera Fastener Ltd, Rohtak

Table 9: Key Players in Fastener industry in the region

Key Scientific Instrument Manufacturers in Ambala
<ul style="list-style-type: none"> ▶ RA Instruments, Ambala Cantt ▶ Edison Ambala Cantt. ▶ Oxford Instruments, Ambala Cantt ▶ Starlac Industries, Ambala Cantt ▶ Acculab Industries, Ambala Cantt

Table 10: Sector-wise spread of MSMEs in key districts

State	District	Engineering	Foundry & forging	Repair and maintenance	Engineering machinery and transport equipment	Grand total ²¹
Haryana	Rohtak	420	NA	350	NA	770
	Ambala	650	964	NA	150	1764
	Faridabad	3675	2072	2675	430	8852
	Gurgaon	2000	1035	760	28	3823
Delhi	Delhi	73	83	85	151	392
Punjab	Patiala	1000	700	449	185	2334
Uttar Pradesh	Mathura	1	19	127	NA	147
Total		7819	10884	4446	994	18082

Source: DIP Data, Ministry of MSME

Districts expected to be served by the proposed Rohtak TC would be Rohtak and its catchment area including Ambala, Faridabad, Gurgaon, Patiala Mathura and Delhi. Key highlights of the catchment area have been presented in the table below;

²¹ Total number of MSMEs in major sectors of focus for TCSP like Automotive, Electrical, Foundry & forging & General Manufacturing

Table 11: Catchment area profile

District (total MSMEs)	District Profile	Units in general engineering and automobile & auto components	Key highlights
Rohtak (4758 ²²)	<ul style="list-style-type: none"> ▶ There are 2 industrial areas in the district Rohtak Industrial Area and Industrial Model Town, Rohtak (IMT) ▶ Existing clusters of MSMEs in the district mainly manufacture nuts, bolts, screws, fasteners and auto parts. ▶ Key products include; Nut & Bolts, Screws, shock absorbers, tool & dies, industrial fastener, meta phenoxi benzal, dehydrated chloripyriphos, 	<ul style="list-style-type: none"> ▶ Rohtak district has over 700 MSMEs in auto components, fasteners, and general engineering sectors apart from other sectors. ▶ The government has not identified any particular industry cluster but a number of MSMEs work for works as ancillary units for key automobile OEMs. 	<ul style="list-style-type: none"> ▶ Rohtak District is part of the NCR. ▶ The Industrial Model Town set up by HSIIDC is being seen as game changer and five industrial projects proposals entailing investment of INR 3,000 crore at Rohtak have been received by HSIIDC.
Ambala (3536)	<ul style="list-style-type: none"> ▶ There are 3 industrial areas in the district namely Ambala Cantt., Saha Phase I, Saha Phase II. ▶ The existing small scale industries have a total turnover of around INR 600 crore. 	<ul style="list-style-type: none"> ▶ Ambala District has around 650 engineering units over 150 electrical equipment manufacturing which can directly supported by Rohtak TC. <ul style="list-style-type: none"> ▶ The prominent large units among these are RA Instruments, 	<ul style="list-style-type: none"> ▶ Ambala's location and proximity to Chandigarh & Delhi and its industrial infrastructural base makes it a sought after location for industries

²² DIP- Rohtak Cumulative No. of registered units since 1985

District (total MSMEs)	District Profile	Units in general engineering and automobile & auto components	Key highlights
	<ul style="list-style-type: none"> ▶ Key products include; scientific instruments, agricultural equipment, paper products, woollen & silk thread, cotton textile, wooden furniture, steel products etc. 	<p>Edison Instruments, Oxford Instruments, Starlac Industries, and Acculab Industries etc.</p> <ul style="list-style-type: none"> ▶ The government has identified at Scientific Instruments Cluster at Ambala Cantt. It has over 900 functional units with a turnover of 600 crores (approx.) employing 11000 persons 	<ul style="list-style-type: none"> ▶ Scientific instrument clusters is highly reputed cluster in Haryana and earns 50% of its revenue from export.
Faridabad (22,491)	<ul style="list-style-type: none"> ▶ Existing MSMEs in the manufacturing sector across the district Faridabad surged due the setting up of big industries. The top 3 industry segments catering to 60%²³ of the overall number of units present in Faridabad are the automobile parts (35%), sheet metal components (14%) & fabrication (11%). 	<ul style="list-style-type: none"> ▶ Faridabad district has over 6,000 MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors. ▶ 10 of the 15 industrial segments in Faridabad cater to the automobile market. ▶ Key OEMs served by the industrial units in Faridabad are Escorts, Mahindra, Eicher, Yamaha, Maruti, Honda Siel Cars, New Holland etc. 	<ul style="list-style-type: none"> ▶ Tooling requirement arises from the type of products manufactured like; spring leaves, clutch plates, steel tubes, bumpers, all kinds of metal auto parts, cranes, fans, exhaust systems, heat exchanger etc.

²³ Cluster Profile Report Faridabad - Mixed Engineering Cluster (2012); funded by the Small Industries Development Bank of India (SIDBI)

District (total MSMEs)	District Profile	Units in general engineering and automobile & auto components	Key highlights
	<ul style="list-style-type: none"> ▶ Key products include auto parts, tractors, shoes etc. 		
Gurgaon (17,186)	<ul style="list-style-type: none"> ▶ The manufacturing cluster around Gurgaon originated with Maruti establishing its base here and it has been instrumental in establishing a supplier base for its cars. ▶ Key products include; Cars, scooters, motorcycles, auto parts, readymade garments and plastic parts etc. ▶ With most of the OEMs being Japanese manufacturers or their collaborations, a high percentage of suppliers in this cluster have Japanese origins, equity or technical inputs. 	<ul style="list-style-type: none"> ▶ Gurgaon district has over 4,500 MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors. ▶ Auto parts manufacturing and auto rubber parts are among the prominent manufacturing activities in the region. ▶ Automobile manufacturing is strength of the region with presence of Maruti-Suzuki, Hero-Honda, Honda Motors, Escorts which further led to the development of a large number of ancillaries in this sector. ▶ The leading suppliers in this area include Asahi Glass, Krishna Maruti, Sona Koyo, Jai Bharat Maruti (JBM), Omaxe and Bharat Seats. 	<ul style="list-style-type: none"> ▶ Gurgaon-Manesar-Bawal region has been identified as an Auto hub by the Government of India. ▶ A number of auto & auto component units have already set up base in this hub. ▶ Tooling requirement arises majorly from the large OEMs and tier 1 players in the district.
Delhi (960)	<ul style="list-style-type: none"> ▶ There are thirty two industrial areas in Delhi. 	<ul style="list-style-type: none"> ▶ Major Investment for MSME are in the sector of Rubber, Plastic and petro based 	<ul style="list-style-type: none"> ▶ Delhi being the National Capital, the major thrust is being given on encouraging

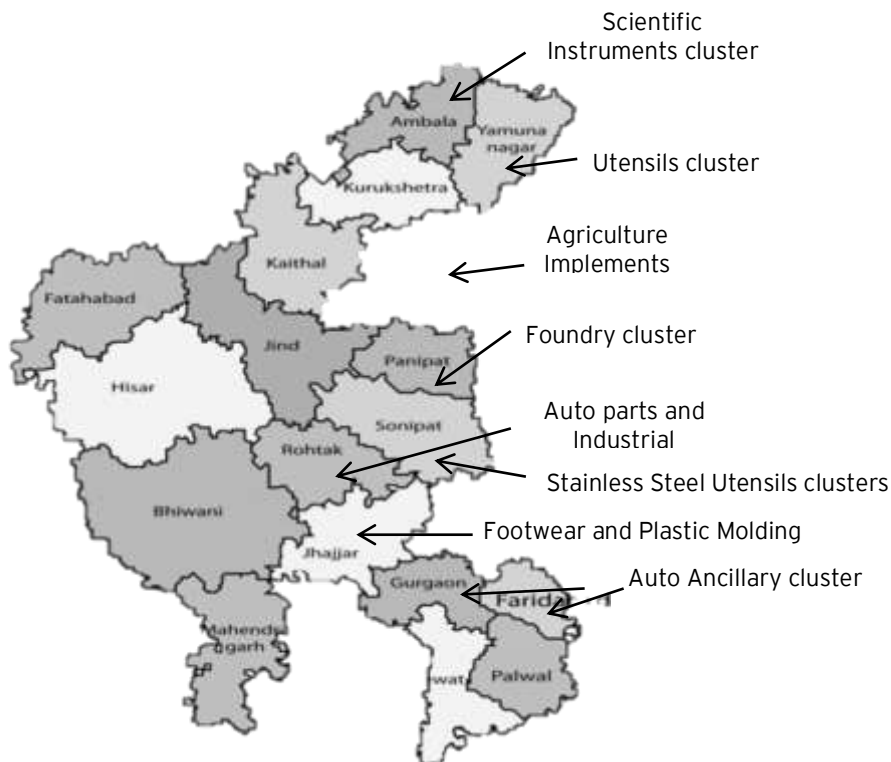
District (total MSMEs)	District Profile	Units in general engineering and automobile & auto components	Key highlights
	<p>▶ No large scale industries exist in Delhi in manufacturing sector. However, there are some power plants such as Badarpur thermal Power station, Rajghat Power station which are managed by Public Sector.</p>	<p>products, Electrical Machinery and transport equipment, Repair and servicing, Engineering Units Etc.</p> <p>▶ There are Micro Small and Medium Enterprises that are working for Maruti Suzuki, Tata and Mahindra Companies.</p>	<p>modern Hi-tech, sophisticated, export oriented, and non-pollutant small-scale industries in the region.</p> <p>▶ The following are the sectors in which MSMEs have opportunities in Delhi</p> <p>Electrical Home appliances, plastic products, invertors and batteries, CFL lamps, leather goods ,steel fabrication etc.</p>
Patiala (8009)	<p>▶ There are five key industrial areas in Patiala namely; Industrial Estate Patiala, Industrial Area Rajpura, Focal Point Rajpura Focal Point Nabha, Focal Point Patiala.</p> <p>▶ Key manufacturing activities include Fabricated Metal Products, Leather Products, Electrical Machinery & Apparatus, Wood Products etc.</p>	<p>▶ Over 2,000 MSMEs operate in metal fabrication, electrical machinery, repair and maintenance and other general engineering products.</p> <p>▶ Key players include Hindustan Unilver, Harman Milk Food, Diesel Loco Modernization Works (DCW) Indian Railway, Markfed Modern Rice Mill, Smith Kline Bee Chem, Vardhman Industry Ltd etc.</p>	<p>▶ The district of Patiala is located close to the state capital Chandigarh and has seen substantial investment in industry over the years.</p> <p>▶ There is a potential for development of the Cutting Tools Cluster and Combine & Combine Part Cluster</p>

District (total MSMEs)	District Profile	Units in general engineering and automobile & auto components	Key highlights
Mathura (4476)	<ul style="list-style-type: none"> ▶ There are ten industrial areas in Mathura District including Mathura City, Barai, Maant and Kosi ▶ Over 21000 people are employed in Mathura's industries. Key manufacturing products include Petroleum Products, Rugs etc. 	<ul style="list-style-type: none"> ▶ The district has over 4000 MSMEs engaged in manufacturing Petroleum bi-products Fabric, Yarn etc. ▶ The Indian Oil Corporation's Mathura Refinery is the major player with a capacity of 8 MMPTA (enhanced) in petroleum industry. 	<ul style="list-style-type: none"> ▶ Mathura is located close to Delhi and rest of NCR. The presence of big players like Indian Oil have brought investment & employment to the region

Source: District Industries Centre, District Industrial profiles-MSME

The following diagram represents the key manufacturing clusters in and around Rohtak region.

Figure 15: Key manufacturing clusters in Haryana



5.2.2 Market in other potential sectors in catchment area

Going forward, in addition to the MSMEs in existing sectors (auto, fasteners, general engineering etc.), Rohtak TC can also focus on MSMEs in other sectors e.g. food processing, chemicals, plastic etc. Typical opportunities for TC within the catchment in existing and new sectors would be amplified due to existing and proposed major projects in the area like;

- a) **Kundli-Manesar-Palwal (KMP) Expressway:** The alignment of the expressway takes off from NH-1 near Kundli, crosses NH-10 at Bahadurgarh, crosses NH-8 near Manesar, and joins NH-2 near Palwal. It passes through Gurgaon, Mewat, Rohtak, Jhajjar and Faridabad, which are among the prominent fast growing urban centres in NCR.

Figure 17: Kundli-Manesar-Palwal Expressway



To boost industrial development along the corridor, specialized industrial estates have been planned at strategic locations. They include;

- ▶ Footwear and leather-garments parks at Bahadurgarh
 - ▶ Food park at Kundli in Sonapat
 - ▶ Gems and jewellery park at Udyog Vihar in Gurgaon and
 - ▶ Two apparel parks, one in Gurgaon and another at Barhi in Sonapat
- b) **Delhi - Sonipat - Panipat Regional Rapid Transit Service (RRTS):** The National Capital Region Planning Board (NCRPB), in order to enhance the connectivity within the NCR, has proposed to connect urban, industrial (SEZs/industrial parks), regional and sub-regional centers through a fast rail based Regional Rapid Transit System (RRTS). The objective of this system is to reduce dependence of commuters on road based transportation. The NCRPB conducted a study on Integrated Transportation Plan for NCR projecting figures for 2032 and has identified eight rail based rapid transit corridors to enhance the efficacy of the

transportation system in the NCR. In addition to the rail system there will also be provisions made for facilities including road network enhancements.

The eight identified RRTS corridors are:

- ▶ Delhi - Gurgaon - Rewari - Alwar [DGRA - Project Corridor]
- ▶ Delhi - Ghaziabad - Meerut
- ▶ Delhi - Sonipat - Panipat
- ▶ Delhi - Faridabad - Ballabhgarh - Palwal
- ▶ Delhi - Bahadurgarh - Rohtak
- ▶ Delhi - Shahadra - Baraut
- ▶ Ghaziabad - Khurja
- ▶ Ghaziabad - Hapur

The NCRPB has decided to implement RRTS in the following three corridors on priority:

- ▶ Delhi - Gurgaon - Rewari - Alwar;
- ▶ Delhi - Sonipat - Panipat; and
- ▶ Delhi - Ghaziabad - Meerut.

c) **Delhi - Mumbai Industrial Corridor (DMIC):** The Government of India (GOI) is establishing a Dedicated Freight Corridor (DFC) between Delhi and Mumbai, with terminals at Dadri in the National Capital Region of Delhi and Jawaharlal Nehru Port near Mumbai, covering a length of nearly 1500 kilometers. As a strategy towards development of the project, Nodes/Cities have been identified within the Corridor as Investment Regions (IRs) and Industrial Areas (IAs).

- ▶ Manesar-Bawal Investment Region (Phase-I A)
- ▶ Kundli-Sonepat Investment Region (Phase-II A)
- ▶ Faridabad-Palwal Investment Area (Phase- I B)
- ▶ Rewari-Hisar Investment Area (Phase-II B)

It covers 66% of the area of Haryana across 14 districts with an influence area of 29,362 sq kms. The value of output in the DMIC sub region of Haryana is estimated to grow by 15 times over the 30 years period (2010-2040)

Figure 18: Region of DMIC Influence in Haryana



Source: HSIIDC

- d) **Cargo Airport:** The Government intends to set up an International Cargo Airport in the National Capital Region (NCR). Site for the project has been identified at Bhaini Maharajpur & Bhaini Bhairon village in the state which is in the NCR. The Airport Authority of India has undertaken site feasibility study and given its principle clearance for the proposed site. A formal application has been filed with the Ministry of Civil Aviation, Government of India for formal approval to the project, which is under active consideration.
- e) **Manesar- Bawal Investment Region (Haryana):** Sixteen industries have been identified as target industries for development in the MBIR. The same have been classified into five broad clusters as follows;
- a. **Engineering cluster:** Automobile, auto components, engineering, downstream iron and steel
 - b. **Consumer products cluster:** Food processing, ready-made garments, plastics - downstream and building materials
 - c. **Technology cluster:** Telecom equipment, consumer durables and IT/ITES
 - d. **Future technology cluster:** Nuclear equipment, pharmaceutical R&D. bio technology
 - e. **Services cluster:** Higher education and hospitality
- f) **Industrial projects in Rohtak:** Haryana has received five industrial projects proposals entailing investment of INR 3,000 crore at Rohtak, which is set to become the new

industrial hub after Gurgaon. HSIIDC has developed IMT Rohtak which is spread over 2,700 acres of land. Maruti Suzuki plans to develop state-of-art R & D center over an area of 600 acres with an investment of Rs.1000 crores at IMT Rohtak. Suzuki Motorcycles India has proposed to set up a new manufacturing unit over an area of 50 acres with an investment of Rs.1800 crore with a manufacturing capacity of 20 lakh units per year. The project would provide employment to 4000 persons. Sabarkantha Co-operative, a unit of Amul Dairy, will be investing 92 crores for setting up a milk processing plant over an area of 14 acres.

- g) **Indian Oil Corporation Ltd. R&D project at the IMT Faridabad:** IOCL will invest about Rs 300 crore in the next two years and about Rs 900 crore by 2019. Out of 59.32 acres of land allotted to IOCL, the company will utilise 43.74 acres of land for setting up a demonstration scale manufacturing plant, including pilot plants based on their technology and CARE facilities viz. solar plants, gasification plants, bioenergy-related units etc. The land measuring 15.58 acres will be used for laboratories, research facilities, administrative facilities, visitors' centre and academic activities.
- h) **Logistics Park at Sonipath:** CONCOR would set up its project with an investment of Rs 350 crores for ICD/dry port, domestic container terminal and a rail freight terminal with a warehousing complex in the Sonipat-Gannaur-Panipat area falling on the Delhi-Ambala-Kalka section of Northern Railway to facilitate reduction in logistics costs of industry in the area and provide EXIM trade faster and cheaper access to the north-western and western gateway ports.

5.2.3 Market outside catchment area

- a) **Industrial parks/ zones in Rajasthan:** Industrial infrastructure developed by RIICO are as follows;
 - ▶ Four **agro food parks** in Kota, Jodhpur and Alwar for development of agriculture based industries with an investment of INR 61.41 crores (US\$ 13.6 million). The State is India's largest producer of oilseeds (rapeseed & mustard), seed spices (coriander, cumin and fenugreek) and coarse cereals. Also, it is a major producer of soybean, food grains, gram, groundnut and pulses. Rajasthan's vibrant agriculture sector offers various opportunities for the successful establishment of potentially profitable agro-processing units.

The food park in Alwar district is spread across 185.94 acres and Government has allocated INR 14.44 crores (including RIICO's contribution of INR 10.44 crores) as on 31st March, 2011). A total of 203 plots have been planned out and 172 have been allotted so far. Out

of the allotted plots, production is already going on in 19 plots and in 25 plots in construction has been started.

- ▶ **Export promotion industrial parks (EIPs)** at Sitapura in Jaipur, Neemrana in Alwar and Boranada in Jodhpur. The EIP in Jaipur is the largest export park in northern India. The EIPs have been planned to accommodate the best possible facilities for manufacturing activities in: Gems and Jewellery, Electronics, Garment, Handicrafts, Engineering, Leather goods, IT Park etc.

b) **UPSIDC Industrial Parks** : Industrial infrastructure developed by Uttar Pradesh Government are as follows

- ▶ **Apparel Park, Tronica City, Ghaziabad**

The project has been set up on 146 acres of land on Delhi-Saharanpur State Highway just 12 km. from I.S.B.T. Delhi. Facilities like Training Centre, Fashion Design Centre, CETP, etc. for textile units in the area has been set up in the project. Development of infrastructure facilities such as Road, Drain and Culverts, Internal Electrification, Police Outpost, Overhead Tanks and Water Distribution Pipe Line etc. has been completed.

- ▶ **Export Promotion Industrial Park, Greater Noida**

EIP Greater NOIDA has been developed at about 35 km from Delhi on 200 acres of land at a cost of 2000 lacs with infrastructure facilities at par with international standards. The Park has been assured high quality power with excellent backup services through a private sector RPG Group Company. In this park, it is proposed to provide the infrastructure facilities to the units to boost-up the export of various commodities and services. This will help in increasing the foreign exchange reserves in India. Units in EIP will have a minimum export commitment of 33% of their production. 169 units have started Production and exports. 36 units have started construction of factory building.

- ▶ **Special Economic Zone, Moradabad**

It is situated in district Moradabad at 6 KM on both sides of Pakbara-Dhingarpur road at 8k.m. milestone of NH-24. This is a sector Special Economic Zone for handicraft products. Provision for infrastructure facilities such as: - greenbelt, boundary wall, internal development, security system, power substation, CETP, inland container depot, design and training center, helipad, school, canteen has been made. 422 acres of land has already been developed under Phase- I of the project.

5.3 Opportunities associated with other proposed mega projects in Haryana

Following are some additional upcoming mega projects planned in the near future in Haryana.

- ▶ Indian Oil Corporation and Container Corporation of India are setting up a Research and Development Project of Indian Oil Corporation Ltd. (IOCL) at Industrial Model Township (IMT), Faridabad and Rail Linked Multi Modal Logistics Park (MMLP) of Container Corporation of India Ltd. (CONCOR) in Industrial Estate Barhi, near Ganaur. Both these projects would entail a total investment of Rs 1250 crore and generate employment for 7100 persons.
- ▶ About 26 acres of land has been allotted to Pepsico India at Barwala/Manakpur for setting up a bottling unit for non-alcoholic beverages. The project would be set up with an investment of Rs 1,000 crore.
- ▶ Foreign companies like AISIN, Nippon Carbide and Asti of Japan; Kerry of Ireland and Pepsico of USA, Indian companies such as Luminous, Lumax, Century Metal, Roulound Brakings, JD engineering, and Toyo Springs have also been allotted around 100 acres of land. These 19 projects will involve an investment of about Rs 2000 crore.
- ▶ Indian Oil Corporation's largest oil firm, plans to invest about Rs 15,000 crore in raising capacity at its Panipat refinery in Haryana by 34 per cent to 20.2 million tonnes (MT) by 2020
- ▶ Bio D Energy India Private Limited has been allotted 4 acres land in Industrial Model Township (IMT) Bawal for manufacturing of bio-diesel from waste product. The estimated cost of this project is Rs.56.00 crore
- ▶ Banaskantha District Co-operative Milk Producers is setting up a mil processing plant in Industrial Model Township at Faridabad (Amul - The Taste of India). The estimated cost of this expansion project is Rs.104.13 crore.
- ▶ The Haryana government has announced to develop an integrated multi-modal logistic hub (IMLH) as part of the Delhi-Mumbai Industrial Corridor (DMIC) project. For the purpose of funding the acquisition of 1,200 acres land, the HIDB took a decision for equity investment amounting to Rs 900 crore for the project. Additionally the Industrial Model Township at Bawal has also been expanded to cover an area of 2,400 acres. Manesar Bawal Industry Region (MBIR) is expected to provide direct and indirect employment to 1.6 million people by year 2040 and triple the

These mega projects will provide significant opportunities in key sectors like automobile, electronics, food processing etc. for the proposed TC in the long run.

Social and Environmental Safeguards

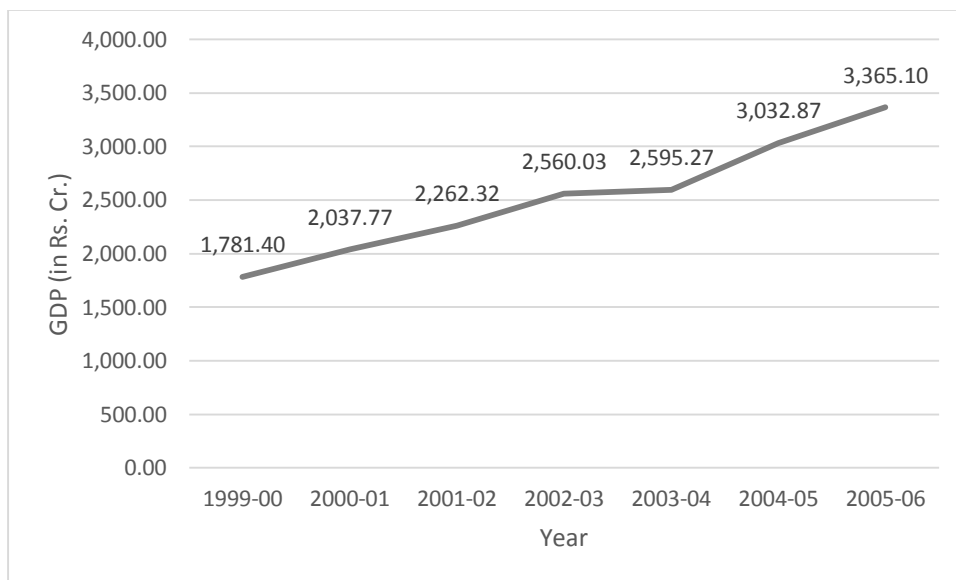


6.1 Socio-economic profile of district

- ▶ **Composition of workforce:** The economy of the Rohtak district is primarily agriculture i.e. agrarian economy. About 51.89% of the total workers are engaged in agriculture and allied activities, 7.68% in cottage & household industries and the rest are engaged in other activities.²⁴
- ▶ **Sector composition:** Per capita income²⁵ of Rohtak district was INR 30,058 (2004-05²⁶) compared to that of INR 32,712²⁷ in Haryana (INR 33,843 in India) for the same period). The following graph depicts the growth of domestic product of Rohtak district over the years.

The sector wise composition of domestic product in the district over the years has been given in the following figure.

Figure 19: Region of DMIC Influence in Haryana



Source: data.gov.in

²⁴ Brief Industrial Profile of Rohtak, MSME

²⁵ All Per Capita income mentioned are at Constant (2004 - 05) prices

²⁶ Haryana skill gap report, National Skill Development Corporation 2013

²⁷ Haryana skill gap report, National Skill Development Corporation 2013

Primary Sector: This sector accounts for approximately 24%²⁸ in the total district domestic product with major contribution from agriculture.

Total geographical area of the district is 1745 square kilometres which is about 3.9% of the State. The net irrigated area as a ratio of net sown area in Rohtak at 79.8 % is much below the average for the state which is 82.1 %. The major sources of irrigation are canals and tube wells.²⁹

The district of Rohtak has also grown in the Horticulture field with financial and technical help available from the National Horticulture Mission. The net area under fruits and vegetables is 12,564 hectares and the production is 11,27,691 MT.

- Bajra/ Jawar/ Guar, Paddy, Cotton and sugarcane are the major crops in kharif season.
- Wheat, Mustard and Sugarcane are the major crops during Rabi season.
- Bajra/Jawar and Guar are distributed evenly in the sandy part while the paddy is mostly concentrated in eastern and western parts.
- Sugarcane and Cotton are concentrated in western part of the district.

Dairying is an important allied activity for the region to which Rohtak belongs. The area of Rohtak/ Sonipat/ Mahendragarh/ Rewari/ Bhiwani/ Jhajjar together procure 422.42 lakh litres of milk and also has 1 milk plant and four milk chilling centres with an average capacity of 0.7 lakh litres per day. Rohtak also has the largest 804 hectares of stocked area reserved for fishing.³⁰

Secondary Sector: This sector accounts for approximately 29% of the total district domestic product with major contribution from manufacturing activities. There are 3 industrial areas in the district.

- There are 4761 registered industrial units in the district. Rohtak has 15 medium and large units.
- Rohtak exports Nut & Bolts, Screws, shock observer, tool & dies, industrial fastener, meta phenoxi benzal, dehydrated chloripyriphos etc. to Germany, New Zealand, England, Holland, South Africa, Italy, Sweden, Australia. Canada, Denmark, France, Ghana, Switzerland, Singapore etc. Approximate value of export during the 2010-11 was INR 135 Crores.
- 1425 MSME's are in Rohtak. Engineering units form larger part of the investment being INR 56.70 Crores (64%), out of total investment of INR 88. 55 Crores.³¹
- The medium and large scale units employ 2820 workers.
- Among Small Scale Industries; agro based, leather based, wood based, cotton textile, repairing

²⁸ Haryana skill gap report, National Skill Development Corporation 2013

²⁹ Haryana Statistical Abstract 2011 - 12

³⁰ Haryana Statistical Abstract 2011 - 12

³¹ Haryana Statistical Abstract 2011 - 12

service, engineering units and chemical based industries enjoy the highest investment and employ the maximum number of people.

Tertiary Sector: Tertiary sector accounts for approximately 47.03% of the total district domestic product. Trade/Hotels, other services, public administration, transport and business services are key services activities in Rohtak they enjoy a large share in the GDDP.

- ▶ **Education:** Rohtak's status in literacy was marked higher (80.22%) than the state average (76.64%)³². At the Intermediate college level, courses are available in the area of science, arts and commerce. The following table gives information regarding the number of educational institutions present in Rohtak district;

Table 12: Educational Institutions in Rohtak District

Education	Number
Primary Schools	464
Middle Schools	199
Secondary / Senior Secondary Schools	336

Source: Haryana skill gap report, National Skill Development Corporation 2013

- ▶ **Health:** Rohtak is ranked third district in the HDI for Haryana. The Human Development Index is 0.603 in year 2001. The following table gives an overview of health infrastructure in the district during 2010-11.

Table 13: Health infrastructure in Rohtak district

SN	Type	Numbers
1.	Allopathic hospitals	8
2.	Beds per allopathic hospitals	1688
3.	Ayurvedic hospitals	27
4.	Community health centres	6
5.	Primary health Centres	21
6.	Dispensaries	12
7.	Sub health centres	113

Source: Brief Industrial Profile of Rohtak district, Ministry of MSME (2011)

³² Haryana Statistical Abstract 2011 - 12

Tribal population: Scheduled caste population in the district is significant, occupying a share of 19.10% of total population which is lower than the state average of 19.35 %. There are no Scheduled tribes in Rohtak.

6.2 Social and environmental screening

Environmental and social screening enables the envisaged risks to be addressed at the very beginning of designing and conceptualizing the implementation of the expansion or the green-field development. The two main objectives of environmental and social screening are to:

- ▶ Enhance the environmental and social sustainability of a proposed project. This aspect of screening focuses on the environmental and social benefits of a project.
- ▶ Identify and manage environmental and social risks that could be associated with a proposed project. This aspect of screening focuses on the possible environmental and social costs of an intervention and may point to the need for environmental and social review and management.

6.2.1 Social screening

As per World Bank guidelines TCSP has a two-tier approach³³ to Social Screening Process (SSP) as defined by World Bank which is as follows;

- ▶ **No Social Screening Process (NSSP)** is applicable if,
 - Expansion/modernization of an existing TC takes place within its existing complex/campus and/or within an established and operational sites such industrial estates, industrial parks, export promotion zones etc.
 - New TC is to be established within established and operational sites such as industrial estates, industrial parks, export promotion zones etc.
- ▶ **Full Social Screening Process (FSSP)** is applicable if a new TC is to be established on land acquired from private title holders and/or on Government land under different tenure systems provided by the Government to establish a new Centre
- ▶ **Indigenous People's Social Screening Process (IPSSP)** will be undertaken
 - If a new TC is to be established in an area with high indigenous population comprising tribal populace and
 - If the area is covered by Govt. Policies and Plans such as Tribal Sub Plans and Panchayati Raj Extension to Scheduled Areas

Further, Resettlement Policy Framework (RPF) applies to all components of Technology Centre Systems Program that requires acquisition of private land and transfer of Government/public land and that are likely to have adverse social impact including involuntary resettlement.

³³ As per TCSP Environmental management framework - Draft (9 December 2013), MoMSME

In context of Rohtak TC;

- ▶ The identified site for the proposed TC at Rohtak;
 - The 19.8 acres of land is located at IMT Rohtak.
 - The land has been allocated by HSIIDC to O/o DC MSME on 2nd September 2013 for the development of the TC by O/o DC-MSME.
 - Declaration has been received from the state government to go ahead with the TC development.
- ▶ Clearances received from the department for being free from any kind of encumbrances and squatter settlements. Further during site visit by PMU and World Bank consultants the same has been verified.
- ▶ The allocated site for the proposed new TC at Rohtak is in a developed Integrated Industrial Estate (IIE). So, FSSP would not be applicable as 'the land for the establishment of the TC is not acquired from any private title holders and/or on Government land under different tenure systems'.
- ▶ Hence, in this case NSSP will be applicable since the new TC is to be established within an established and operational site of IIE
- ▶ Also, the proposed location of the TC is not established in an area with high indigenous population comprising tribal populace and the area is not covered by any Govt. Policies and Plans such as Tribal Sub Plans and Panchayati Raj Extension to Scheduled Areas. Hence, this rules out the undertaking of IPSSP.

The responsibilities related to social management will ultimately reside with the respective TC. The PMU will facilitate, support the implementation of the Social Management Plans and prepare a six-monthly report on all aspects of Resettlement Policy Framework and Process.

6.2.2 Environmental screening

TCs are like mini industries; hence planning, development and management of the TCs involve several critical environmental, health and safety obligations. Good environment practices and processes are required to be an integral part of any expansion or development of any green-field TC. The foremost and most essential stage of environment management is to conduct an environmental screening that highlights appropriate level and type of Environmental aspects and their likely associated environmental impact. The screening process aims to quickly identify those projects in which no potential environmental and social issues exist, so that only those with potential environmental and social implications will undergo a more detailed screening process. As a consequence, the outcome of the screening process will be a categorization of the project into one or more of the following categories:

- ▶ **Category 1:** No further action is needed, either because no significant environmental impact and risks were identified, or because sufficient environmental review has already been conducted and environmental management recommendations have been incorporated into the project;
- ▶ **Category 2:** Environmental sustainability elements need to be integrated into project design because there are possible environmental and social benefits, impact, and/or risks associated with the project (or a project component) but these are limited in nature, predominantly indirect or very long-term and so extremely difficult or impossible to directly identify and assess.
- ▶ **Category 3:** Further environmental and social review and management is needed because potential environmental and social impact or risks are associated with the project (or a project component) and it is possible to identify these with a reasonable degree of certainty. In some cases, determining the significance of these impact or risks will require environmental and social assessment which, in turn, will lead to the identification of specific environmental and social management measures that need to be incorporated into the project.
 - ▶ The methodology for screening includes desk study, site visit and study of available literature.
- ▶ **Desk study** involves collection and review of the secondary data available in the public domain. This may involve the seismic activity of the area where new TC is proposed, soil type, land use pattern, etc. This will enable one to decide the methodology and level of Environment assessment and distributing the responsibility amongst the team members.
- ▶ **Site visit/s** is/are conducted to collect first hand data/information about the new site. This enables a cross check of the secondary data available during the desk review and assessing the likely environmental aspects and health and safety hazards. Also, this involves interaction with different stakeholder in the region to gauge any possibility of conflict related to TC.

During the study phase the team conducted a site visit and held discussions with MSME and HSIIDC officials. Based on the discussion, the checklist used to conduct environment screening at the selected site in the Rohtak is given below:

Table 14: Checklist for environmental screening

SN	Issues	Yes/No	Remarks
1	Will the expansion or new tool room affect the land use pattern?	No	The allotted land is in a designated industrial zone (HSIIDC) and is earmarked for commercial activity. The land has been already allotted to MSME. Therefore, setting up of the tool room will not lead to any effect on the land use pattern.
2	Will the development include significant land disturbance or site clearance?	Yes	The land allocated for TRTC has some wild grass, shrubs apart from 7-8 trees. However, all the trees are on the boundary of the allotted land. The development of TRTC shall require clearing of only the wild grass. The trees may not be required to be cut and the same shall be taken care while developing the layout of the TRTC.
3	Will the project involve acquisition of land from private players?	No	The land has been allocated to MSME by the HSIIDC. Therefore, does not involve acquisition of land from private players.
4	The selected site is defined as industrial / commercial / residential?	Yes	Industrial zone
5	Is there any protected area or biodiversity sensitive area in the vicinity which is likely to be affected by the operations of the tool room?	No	There is no biodiversity sensitive or protected area in the vicinity which is likely to be affected by the operations of the tool room.
6	Is there any archaeological or cultural/heritage structure in the vicinity of the site?	No	There is no archaeological or cultural/heritage structure in the vicinity of the site.
7	Is there any group of indigenous people in and around the selected site?	No	There are no indigenous people in and around the selected site
8	Will the construction activity affect the surrounding around the tool room?	Yes	The allocated land has state highway on one of its side and Asian Paint factory on other side. As such construction and operation of the Tool Room is not envisaged to have any impact of the surrounding area. However, care may be exercised to minimize dust emissions from the construction activity.

SN	Issues	Yes/No	Remarks
9	What is the source of water available at the site (Ground water, surface water, municipal supply, etc.)? Is the water requirement envisaged to put additional pressure on the water sources?	No	The water works facility is situated adjacent to the TRTC which draws water from the treated water from canal (4-5Kms) from the facility. The treated water can be used for drinking purpose as well.
10	Will the project lead to increased air emissions in the region?	Yes	The TC is envisaged to have insignificant dust emissions during the construction period. Care may be exercised to minimize dust emissions and its impact, if any, on the adjoining industry. Also, during the operation phase appropriate measures shall be undertaken to minimize air emission in case D.G set is used for electricity backup.
11	Will the project lead to increase in noise levels in the area?	Yes	Increase in noise level is not envisaged in the area due to TC. However, care like acoustic enclosures for D.G set, in case installed, construction only in day time, etc. may be practiced.
12	Will the Tool room involve use of chemicals and/or solvents?	No	The envisaged TC will only use diesel (in case D.G set is installed). However, in case any chemicals are used appropriate measures shall be undertaken to manage and store the chemicals.
13	Will the project involve handling, storage and disposal of hazardous waste? If yes, what are the different types of waste envisaged from the TC?	No	The envisaged TC will not use chemicals. However, in case, chemicals and any other hazardous materials are used measures shall be undertaken to manage the associated waste.
14	Is the project located in the area of seismic faults? In case yes, in which seismic does the location lie?	Yes	Yes, the region has experienced history of earthquakes. The TC location falls in the Seismic zone-4.
15	Is there any record of natural calamity in the area in the past? If yes, what is the probability of the same effecting the operations of TC in the future?	Yes	Yes, the region has experienced history of earthquakes. Although, so far the intensity of the earthquake was not high, however, mild tremors were felt. The probability of such incidences in future and the same effecting operations of TC is not predictable but appropriate measures shall be undertaken to ensure minimal / no damage in case of such natural calamity.

Apart from this, in case of an expansion of the further data/information may be collected so as to identify the existing issues and plan appropriate measures to address the same in the brown-field development. A tentative checklist that may be used for the same is enclosed as Annexure - 18.1.

- ▶ Also, publically available literature review on the issues in the envisaged industrial sectors should be kept in mind. This may further help in a robust screening of the possible EHS impact of upcoming TC and may provide opportunity to MSME to have measures in place to mitigate the same.

After the initial screening, **Detailed Site Assessment** for the proposed TC may be conducted using the environmental assessment checklist as annexure 18.2 so as understand the existing issues and the environment feasibility with respect to the proposed development.

6.3 Gender equity and social inclusion strategy

Gender, Equity and Social Inclusion Plan (GESIP) is an important aspect of the social management framework. TCSP also aims to create more choices for young people entering labour force (including women and those who belong to vulnerable sections of society) in terms of providing opportunities for hands-on-technical skills development at varying levels and types through TCs. This is in accordance with Government of India's focus on inclusive growth focusing on poverty reduction and group equality and also with World Bank's Country Partnership Strategy with emphasis on engagement, transformation and inclusion.

GESIP will be formulated for the proposed Rohtak TC, during its operational phase which would not only be an outcome of the participatory process but also be rooted in the national and state policies for gender and social inclusion. Areas to be considered while preparing GESIP will also be in line with the RFD of the programme and would comprise the following (but not limited to):

- ▶ Criteria for admission into vocational education and training for skills development
- ▶ Increased opportunities for employment to women trainees
- ▶ Timings of training
- ▶ Ease of Location of TC
- ▶ User friendly campus infrastructure esp. for differently abled sections. While developing the infrastructure for training and production sections, special care would be taken to include facilities for comfort/ ease of access for disabled persons such as;
 - Ramp for wheelchairs
 - Elevators
 - Toilets for disabled
 - Parking space
- ▶ No. of women rest rooms
- ▶ Training Aids and infrastructure
- ▶ Any other component

The PMU will prepare and monitor the strategy to help with the preparation and implementation of a GESIP with particular emphasis on inclusion of young women as well as those who belong to weaker and underprivileged sections of society. For example, those who belong to SC/STs, backward castes, minorities and those who are differently abled. Good practices coming out of the GESIP will be documented and replicated/scaled up further in new TCs.

GESIP Strategy roadmap (Suggestive)

- ▶ Develop a module/ guidance notes for preparing TC specific GESIPs covering the following aspects:

- Gender gaps
 - Importance of gender
 - Identification of gender specific issues and constraints that hinder the implementation of GESIP (human capital, access to information, access to finance, institutional factors, socio-cultural norms, structural factors, political/ legal)
 - Use of gender-disaggregated data to analyse the business environment
 - Identify communication channels to reach intended program beneficiaries
 - Useful links and tools
 - Case studies/ best practices
 - Core questions and indicators
-
- ▶ Capacity building of TC focal points identified to work on GESIP. Analysis of existing pool of potential trainees and their eligibility in terms of gender and social inclusion and in terms of eligibility criteria as set out in national and State policies
 - ▶ Hand holding support for planning and implementing GESIP
 - ▶ Setting up institutional arrangements at TC level for transparent and accountable implementation and monitoring of GESIP based, among others, on specific and measurable indicators. Develop reporting and monitoring formats to assess progress every 6 months
 - ▶ Organize and facilitate monthly meetings (for 6 months) for GESIP coordinators to identify issues and best practices and synthesize learning's' within and across sectors

6.4 Sample monitoring and reporting template

The monitoring of environmental parameters would be undertaken on quarterly basis. The responsibility of the same would lie with the concerned TC and a copy of the consolidated performance will be sent to the O/o DC MSME for their records and recommendations. The suggestive template for monitoring and reporting for the same to be adopted by the TC's is given below. Further, during operation and maintenance of the TC, a number of potential EHS impact may be expected based on the kind of activities undertaken. These possible aspects are delineated in the EHS section of this DPR.

Table 15: Sample monitoring and reporting template

SN	Parameter	Frequency of monitoring and reporting
1	Water consumption	Quarterly
2	Water Cess Report	Quarterly
3	Energy consumption	Quarterly
4	Waste generation and disposal - Municipal Solid Waste - Hazardous waste - Non-hazardous waste - Other categories	Quarterly
5	Safety records Near Misses First Aid cases	Quarterly
6	Training No of students and other trained	Quarterly
7	Air pollution and Noise pollution	6-monthly
8	Internal audit report	Quarterly
9	Update of legal register	6-monthly

7 Clearances required and respective authorities

The proposed TC at Rohtak is one of the first Greenfield projects proposed under TCSP. This would include development of physical infrastructure including facilities like production, training, administration, hostel, canteen, utilities etc. keeping in view the long-term sustainability. The same would require clearances at different levels during construction such as approval of layout plan, environmental clearance, electricity and water supply connection, health and safety clearance and other associated clearances. Obtaining these clearances would be crucial for timely completion of the project and therefore needs to be planned well in advance. The following table gives indicative details of the various clearances along with the respective approving authorities and the tentative time required. However, considering that land has already been allotted to O/o DC-MSME for development of TC, some of these regulations may not be applicable.

Table 16: Clearances required and respective authorities

S. No	Required clearance/ approvals ³⁴	Department /agency	Tentative time limit for approval (days)
1.	Registration under VAT Act	Commercial Taxes Department	24 hours
2.	Registration under CST Act	Commercial Taxes Department	24 hours
3.	Tax Clearance Certificate	Commercial Taxes Department	1 day in case of non-default of tax payment
4.	Land conversion - Conversion of land use	Revenue Department	30 days for up to 10 hectares 60 days for above 10 hectares
5.	Land Allotment	Revenue Department	30 days if allotment is to be made at the District Level 60 days in case Government's approval is required
6.	Allotment of plots in Industrial Areas	HSIIDC/ State department	30 days
7.	Issue of NOC to the authority concerned regarding conversion of land use	HSIIDC/ State department	15 days
8.	Environmental Clearance (Consent of Air and Water Pollution)	Ministry of Environment and Forests	Site/environment clearance: 90 days, NOC to establish: 45 days,

³⁴ Indicative list of clearances/ approvals

S. No	Required clearance/ approvals ³⁴	Department /agency	Tentative time limit for approval (days)
			NOC to operate: 30 days, Renewal of consent: 30 days
9.	Electricity Connection	HSI IDC/ State department	Loads up to 60 HP: 66 days, Loads above 60 HP and up to 300 KW: 90 days, Loads above 300 HP and up to 3000 KW: 180 days, Load above 3000 KW and up to 33KV: 375 days
10.	Water connection	HSI IDC / State department	NA
11.	Fire safety	HSI IDC / State department	NA
12.	Approval of place and for permission to construct building under the Factories Act)	HSI IDC / State department	NA
13.	Approval of factory layout plan under factories Act, 1948	Labour and Employment Department - Factories and Boilers Inspectorate	30 days
14.	License for running the factory	Labour and Employment Department	45 days
15.	Registration of shops and commercial establishments	Labour and Employment Department - Labour Department	10 days
16.	Permission to establishments having more than 50 labours under Industrial Employment	Labour and Employment Department - Labour Department	45 days
17.	Lift	HSI IDC / State department	NA
18.	Borewell	Central Ground Water Authority	NA

S. No	Required clearance/ approvals ³⁴	Department /agency	Tentative time limit for approval (days)
19.	Society registration	Indian societies registration act 1860	NA

8 Manpower and Human Resource development

The success of an institute or an organization majorly depends upon the skill set and experienced human resource available with them. Hence, it's planning, recruitment and development is one of the most important aspects while designing a new Technology Centre. As a part of the study we have analysed organizational structures of some of the existing Technology Centres to understand the major functional areas, number and level of employees, contractual staff and other related aspects. In continuation, we have also discussed the same with O/o DC-MSME and some of the heads/GMs of the existing TRs.

As per the existing structure, there are following functional areas/streams in a TR:

- ▶ Production
- ▶ Design
- ▶ Training
- ▶ Consultancy and Marketing
- ▶ Administration and Accounting

The level of employee heading a particular Functional area/stream/department varies in some of the TCs. In an Indo German TC Administration and Accounting is headed by a Manager while in Indo Danish TCs this is being headed by a Senior Manager. Sanctioned employee strength in these existing TCs typically varies from 110-120.

8.1 Proposed organization structure

While analysing the existing organizational structures and designing the new one, we have taken some considerations into account which have been discussed and validated with the O/o DC-MSME. Some of the key considerations are as below:

- ▶ As per the decision taken in the Empowered Finance Committee, the total sanctioned strength for any new TC would be 60 in contrary to the existing ones which have total sanctioned strength of 110-120.
- ▶ In the proposed organizational structure for Rohtak TC, the main revenue streams are Training, Production and Design & consultancy. These departments will be headed by Senior Managers who would directly report to GM/DGM.
- ▶ In contrary to the existing structures and target of sanctioned employee strength of not more than 60, we have proposed only 7 levels as compares to the existing structures which have 9 levels in the hierarchy. Below these levels, the resources will be hired as contractual employees on need basis.
- ▶ In the existing structure consultancy and marketing department were clubbed into one, but in the proposed structure for Rohtak TC it has been proposed to have marketing as a separate department and consultancy be clubbed with the design department. This has been done after having discussions with some heads/GMs of the existing MSME TCs and understanding the

customer requirements to meet the technical experts while pitching for any consulting assignment. Moreover, production projects' catering to component manufacturing or tool designing requires consulting. Most of these projects are mutually exclusive with less replicability across designs.

- ▶ The other two departments namely, Marketing and Administration and Accounting are proposed to be headed by Manager level position and they will directly report to GM/DGM. This has been done as the administration and accounts department is lean and a manager level employee would be able to manage the same. Also, as stated above, the total sanctioned strength cannot exceed 60.
- ▶ Consistent efforts will have to be made to optimize the revenue from training, production and business advisory. With this in mind, the design and consulting department have been strengthened with a sanctioned strength of 7 experts which will mainly work in the areas of Design support, Quality systems support, Product development and engineering solutions, Project consultancy in setting up of TR, training centre and others. These experts will be supported by internal production team and external experts on need basis.
- ▶ In contrary to the sanctioned strength (4-5 employees) in marketing department of many existing TCs, the sanctioned employee strength in the proposed structure has been reduced to 2 only (1 Manager and 1 officer sales). This has been proposed keeping in mind that the GM or Deputy General Manager will devote his/her significant time in marketing and sales. Also, the respective departmental heads (Senior Managers) will be responsible for the sales and marketing efforts of their departments. Moreover, above all TCSP aims to hire Cluster Network Manager to facilitate all the market linkages for the proposed TC. The role of CNM for marketing would be very crucial and it will act as an additional arm of the marketing wing of the proposed TC. Considering all the above factors into account, a lean marketing department has been proposed for the proposed Rohtak TC.
- ▶ The maintenance manager though will be a part of the production department but will have an added responsibility to support the maintenance of machines in the training department as well. He/she will be supported by 1 Senior Engineer and 2 Senior Technicians.
- ▶ Based on our discussions with the O/o DC-MSME and heads of the existing MSME TCs, there was a need for dedicated manager for the short term trainings. In the structure for Rohtak TC, we have proposed separate manager for mechanical, electronics and short term trainings. Keeping in mind the scale and the number of trainees in the short term courses (both mechanical and electronics), the manager short term would mainly be responsible for administration, planning, quality control, issue of certificate to trainees, fee collection and others. Even one of the managers (from mechanical and electronics) would be additionally responsible for placement of students which will include industry interaction, managing training and placement, delivering presentations etc.
- ▶ While estimating the numbers we have considered the following considerations:

- The final semester trainees of Tool Design and Manufacturing course would also work with the design and consultancy department. This will help them in getting the hands-on experience and will also provide support the department
- In continuation to the above, even the final semester trainees of Diploma in Tool & Die making, Post Diploma in Tool Design, Post diploma in Tool Manufacturing and CNC Machinist would work in the production department depending upon the skill set and interest area.
- In addition to the regular employees, the training department will have the maximum number of contractual faculty in the form of guest faculty and full time contractual faculty. The figure for number of contractual faculty have been arrived at by taking various factors into account namely - existing employees in training and production, the number of courses vis-à-vis the number of trainees, trainee to teacher ratio, projected revenue numbers over the years, number of shifts in production vis-à-vis the utilization and others. The TC will sub-contract the assistants in the administration, accounts and stores department for providing the support to the departmental team on day to day basis.
- The requirement of staff for the house-keeping and security will be outsourced to a third party agency on yearly contract basis

Based on the considerations stated above, the organisational chart in figure 19 demonstrates the target organizational structure to be achieved in 5 years (by 2021-22) from inception. Though, we have provided the figures till 2026-27 since we are estimating the revenue and expenditures for next 10 years.

As highlighted above, the proposed Technology Centre at Rohtak will be divided into five functional areas/departments. These are:

- ▶ Production
- ▶ Training
- ▶ Design and consultancy
- ▶ Marketing
- ▶ Admin and Accounting

It is recommended that the GM and the DGM divide these five areas/departments between them, depending on competency, work-load and previous experience. Overall GM would be responsible for the management and financial health of the TC.

The chart consists of 5 levels in addition to the General Manager (GM) and the Deputy General Manager (DGM).

- ▶ The third level consists of Senior Managers as the departmental heads of design and consulting, production and training. They will report directly to either the GM or the DGM, depending upon the division of departments within them.

- ▶ The fourth level will consist of Managers who will be supporting Senior Managers in their respective domains. But for marketing and admin and accounting department, as explained above manager will head this department and directly reporting to GM or DGM.
- ▶ The fifth level consists of senior engineers (Sr. Engg.) and Sr. Officers. Level six consists of engineers (Engg.) and officer / foreman.
- ▶ The final level consists of senior technicians with requisite operational level expertise.

The responsibilities of each position and qualifications required to fulfil roles are covered in the following section. Hence, the recommended final organisational structure for the proposed TC is based on experience from established MSME technology centres, discussions with O/o DC-MSME and heads of some of the existing TCs, expert opinion and knowledge and experience with organisational planning.

Table 17: Sanctioned strength of key resources

S. No.	Designation	Proposed Sanctioned Strength
1.	General Manager	1
2.	Deputy General Manager	1
Department		
3.	Administration and accounting	7
4.	Design and consultancy	6
5.	Production	18
6.	Training	25
7.	Marketing	2
	Total	60³⁵

In addition to the above sanctioned strength, we have recommended additional employees as contractual employees. Based on the requirement, we have estimated around 171 contractual employees (159 in training & 12 in production) by end of FY 2026. The figure for number of contractual employees have been arrived at by taking various factors into account namely - existing employees in training and production, the number of courses vis-à-vis the number of trainees, trainee to teacher ratio, projected revenue numbers over the years, number of shifts in production vis-à-vis the utilization and others.

While considering the ratio for trainee to teacher, we have used the following assumptions after discussion with existing GMs and O/o DC-MSME.

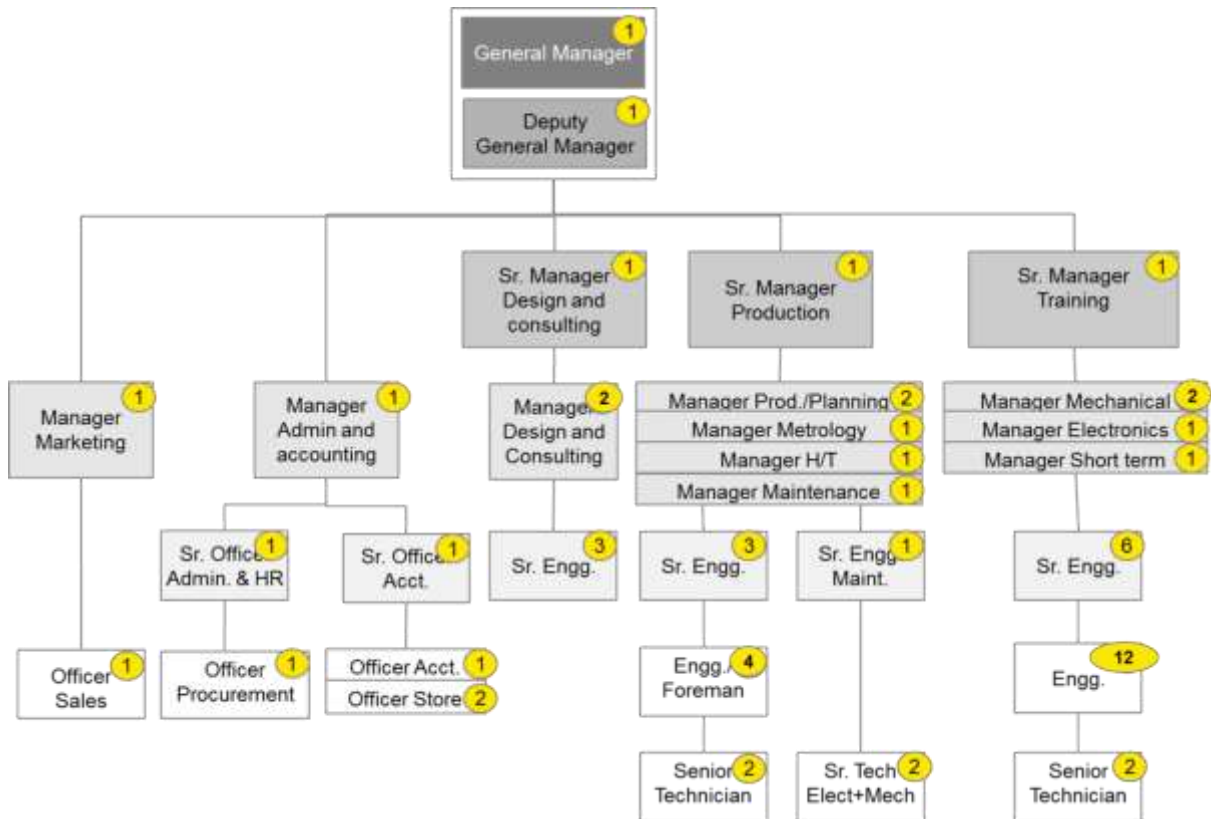
- Trainee to teacher ratio for theory classes - 60:1; with theory classes conducted for 20% of time

³⁵ The details and basis of number of employees is provided in the next section

- Trainee to teacher ratio for practical classes - 20:1; with practical classes conducted for 80% of time

After calculating the weighted average of the above ratios we got the overall trainee to teacher ratio of 28:1. Post discussions, we have considered trainee to teacher ratio of 25:1 for calculating the number of employees in the training department (regular and contractual faculty) keeping in mind the employees who will be on leave at any given point of time.

Figure 20: Proposed organisation structure



8.2 Phase wise induction of human resources

As discussed in the above sections, the proposed TC will have 60 employee as sanctioned strength and the target structure will be achieved within 5 years from 2016-17. Therefore due care has been taken during the study to phase the recruitment of employees. On the same lines, initially some positions have been proposed to be vacant when establishing the organisational structure of the TC. This has been proposed keeping in mind the time it will take to be fully operational. Vacant positions will also create incentives for high performers to obtain higher positions when the time comes for fulfilling these.

The phase wise estimated staffing over next few years as part of human resource planning has been done through the identification and analysis of the various types of activities and skill sets required for smooth and efficient functioning of the proposed TC. Multiple rounds of discussions with industry

experts, World Bank, O/o DC-MSME and heads of some of the existing MSME TCs have been undertaken to arrive at the requirement of human resources needed to meet the business objectives in the short and long term of the proposed TC.

The following provides the details of recruitment in various phases over next few years. This phasing is suggestive and can be modified based on the need and revenue generating capabilities of the TC during operations. Some of the considerations which have been taken into account while recommending the phasing of employees are as below:

▶ **Year 2016-17: 2 staff members**

- GM will be involved in project implementation and work out the strategy for marketing, training, production and consultancy with the help of CNM and TP. GM will also monitor the progress of construction and procurement of machines etc. GM will also be responsible for planning of recruitment of required manpower.
- Manager - Administration & Accounts will be responsible to get statutory registrations like sales tax and PF, opening of TC's bank account, getting power and water connection etc. Manger will also support GM in recruitment of people in the coming years.

▶ **Year 2017-18: 20 staff-members**

- Three senior managers will be recruited to further recruit staffs in respective departments. These would also be responsible for orientation and training of respective staff members.
- Senior officer - administration & HR will be recruited to support the GM and manager - administration and accounts for further recruitment of staff and forming of systems to conduct day to day administrative activities
- The first long term training programme will commence this year and one senior engineer, one engineer and one senior technician will be recruited for installation of machines and conducting theory and practical training
- By second half of this year, production and design staff will be recruited. The respective senior managers would be responsible for orientation and training of these staff members. These staff will undergo training (preferably at another Tool room at Aurangabad and/or Ahmedabad) for a period of 3-6 months to make them fully trained before start of the operations of the proposed TC
- Manager - maintenance and senior technicians will be recruited to install and commission machines for production and training. They will also be responsible for installing the power supply system
- Stores and accounts officers will be recruited to maintain statutory records and support the operations

▶ **Year 2018-19: 42 staff- member**

- Production will commence during this phase and hence more engineers and senior engineers will be recruited. The number of staff has been decided based on estimated number of machines commissioned during this phase and number of shifts in production
- This year some short term training courses will commence along with the starting of the second year of the long term course.
- Officer sales will be recruited to support manager marketing for preparation of detailed marketing plan of the TC. The staff would be engaged in various marketing activities for wider reach of the proposed TC across the region. This would be crucial for promotion of the TC and would help departments increase their revenue
- The Design and Consultancy department has been planned to commence its commercial services during this year and hence manager and senior engineers will be recruited to meet the requirement.

► **Year 2019-20 52 staff members**

The proposed TC would be fully operational by this period with activities in production, training, design and consultancy etc. Additional staff will be recruited for smooth undertaking of the gradual increase in the activities across all the departments.

It is recommended to leave the position of the DGM vacant initially. The position of the DGM can be filled by a high performing senior manager within design and consulting, production or training depending upon the requirement, skill set and experience.

Rest of the positions will be filled gradually as TC activity escalates and the manpower requirements increase. The tables below summarise the phasing of the organisational completion within each area; Administration and Accounting, Design and Consulting, Production, Training and Sales and Marketing, in addition to the positions of the GM and DGM. The numbers represent the numbers of employees within the specific position at a given point in time. The timeline spans from 2015 to 2026.

Table 18: Summary of phase wise induction of resources

Year	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Full time employees											
Total	2	20	42	52	57	60	60	60	60	60	60
Contractual employees											
Total	-	3	21	44	75	108	119	131	144	151	159

Below tables depicts the hiring of number resources in every department every year starting from 2016-17 to 2025-26. In the year 2021-22, the TC is recommended to hire the complete sanctioned strength of 60 employees.

Table 19: Department wise induction of fulltime resources

General Manager							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
General Manager	1	1	1	1	1	1	1
Total	1	1	1	1	1	1	1
Deputy General Manager							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
Deputy GM	-	-	-	-	-	1	1
Total	0	0	0	0	0	1	1
Administration and Accounting							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
Manager Admin. and Accounting	1	1	1	1	1	1	1
Sr. Officer HR	-	-	-	-	-	1	1
Sr. Officer Accounting	-	1	1	1	1	1	1
Officer Procurement	-	-	1	1	1	1	1
Officer Store	-	1	1	2	2	2	2
Officer Admin	-	1	1	1	1	1	1
Total	1	4	5	6	6	7	7
Design and Consulting							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
Senior manager		1	1	1	1	1	1
Manager			2	2	3	3	3
Sr. Engg.			2	3	3	3	3

Total	0	1	5	6	7	7	7
Production							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
Senior Manager	-	1	1	1	1	1	1
Manager Pr./pl.	-	-	1	1	2	2	2
Manager Metrology	-	-	1	1	1	1	1
Manager H/T	-	-	1	1	1	1	1
Manager Maintenance	-	1	1	1	1	1	1
Sr Engg. Maintenance	-	-	-	-	1	1	1
Sr Engg. Production	-	3	3	3	3	3	3
Engg. / Foreman	-	2	4	6	6	6	6
Senior Technician	-	1	2	2	2	2	2
Senior Technician Maintenance (Mech + Elect)	-	1	1	2	2	2	2
Total	0	9	15	18	20	20	20
Training							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
Senior Manager	-	1	1	1	1	1	1
Manager Mechanical	-	-	1	1	1	1	1
Manager Electronics	-	-	1	1	1	1	1
Manager (S. Term)	-	-	-	-	-	1	1
Sr. Engg.	-	1	5	6	6	6	6
Engg.	-	1	4	8	10	10	10
Senior Technician	-	1	2	2	2	2	2
Total	0	4	14	19	21	22	22
Sales and Marketing							
Year	16-17	17-18	18-19	19-20	20-21	25-26	26-27
Manager Marketing	-	1	1	1	1	1	1
Officer Sales	-	-	1	1	1	1	1
Total	0	1	2	2	2	2	2

8.3 Roles and responsibilities

While conducting the study, we had series of discussions with the O/o DC-MSME and some heads/GMs of existing MSME TRs on the prospective roles and responsibilities of the employees for the Rohtak TC. Below is summary of the suggestive roles and responsibilities (including the minimum qualification levels) of the individual employees which can be referred to while recruiting.

Table 20: Roles and responsibilities of proposed positions

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
General Manager	B.Tech (Mechanical) with MBA or M.Tech	15 Years with 8 years in similar role	<ul style="list-style-type: none"> ▶ Tool Manufacturing/Design/ Product development/ Training. ▶ Experience in Project Implementation will be preferred 	<ul style="list-style-type: none"> ▶ Over all responsible for the administration and financial health of the TC ▶ Key responsibility areas include (but not limited to); Marketing, Administration, HR, Accounts, Production, Design & consultancy etc. ▶ Responsibility for achieving the target KPIs set by the GC
Deputy General Manager	B.Tech (Mechanical) with MBA or M.Tech	12 Years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Tool Manufacturing/Design/ Product development/Training. ▶ Experience in Project Implementation will be preferred 	Head of Production, Design, Consultancy and Training
Manager - Admin. and Accounting	CA/ICWA or MBA with bachelor's degree in Commerce/ Accounting / Finance	8 Years with 3 years in similar role	<ul style="list-style-type: none"> ▶ Experience in the area of Administration, HR and Accounting ▶ The Manager must also have basic knowledge of government laws, regulations and state specific compliances ▶ Familiarity with ERP/accounting softwares 	Head of Accounts, Administration and HR: <ul style="list-style-type: none"> ▶ General housekeeping of TC ▶ Bookkeeping, accounting and finance including financial analysis ▶ TC security ▶ Payroll ▶ Procurement management and store keeping
Sr. Officer - Admin. & HR	MBA or Equivalent	5 Years	<ul style="list-style-type: none"> ▶ Experience in the area of HR and Administration ▶ Familiarity with Industrial laws and compliances 	<ul style="list-style-type: none"> ▶ Housekeeping of TC ▶ Security systems operation ▶ Transport System and management ▶ Payroll

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Sr. Officer - Accounting	Bachelor's degree in commerce/Accounting / Finance with M.Com. or MBA	5 Years	<ul style="list-style-type: none"> ▶ Experience in accounting and Tax ▶ Should be familiar with latest accounting software 	<ul style="list-style-type: none"> ▶ Bookkeeping and accounting ▶ Financial analysis
Officer - Accounting	M. Com. or MBA or Equivalent in Accounting	3 Years	<ul style="list-style-type: none"> ▶ Experience in accounting and Tax. ▶ Should be familiar with latest accounting software 	<ul style="list-style-type: none"> ▶ Bookkeeping and accounting ▶ Handling of Cash, Banking etc.
Officer Store	Diploma in Mechanical or Equivalent	3 Years	<ul style="list-style-type: none"> ▶ Experience in Store keeping, including inventory management ▶ Experience in Computer systems / software for store keeping operation 	<ul style="list-style-type: none"> ▶ Managing store ▶ Issue of consumable and non-consumable stores and keeping records
Officer Procurement	M. Com. or MBA or Equivalent	3 Years	<ul style="list-style-type: none"> ▶ Experience in Procurement processes ▶ Knowledge of Govt. Procurement rules and processes will be desirable 	<ul style="list-style-type: none"> ▶ Procurement ▶ Vendor Development
Senior manager - Design & Consultancy	M.Tech in Mechanical engineering.	10 Years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Experience in product modelling, design, tool design ▶ Proficiency in one of the areas in Tool Design, either Sheet metal press tool or Plastic mould ▶ Practical Experience in use of CAD/CAM/CAE in product and tool design ▶ Experience of Tool trial ▶ Experience of assembly and inspection of Jigs and Fixtures ▶ Knowledge of Quality systems ▶ Experience in technical consultancy will be preferred 	<p>Responsible for designing tools, moulds and die casting w.r.t.</p> <ul style="list-style-type: none"> ▶ New product development planning and its execution ▶ Quality systems ▶ Value engineering ▶ Tool try outs and proving ▶ Consultancy to MSMEs <p>In charge of Incubation centre</p> <ul style="list-style-type: none"> ▶ Helping members of Incubation centre in getting orders and execution of the same

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Manager- Design & Consultancy	B. Tech in Mechanical engineering.	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience in product modelling, design, tool design ▶ Proficiency in one of the areas in Tool Design, either Sheet metal press tool or Plastic mould ▶ Practical Experience in use of CAD/CAM/CAE in product and tool design ▶ Knowledge of Tool trial ▶ Experience of Jigs and Fixtures ▶ Knowledge of Quality systems ▶ Experience in technical consultancy will be preferred 	<ul style="list-style-type: none"> ▶ Designing tools, moulds and die casting ▶ Product development ▶ Quality systems ▶ Value engineering ▶ Tool try outs and proving ▶ Consultancy to MSMEs: Deliver functional consulting on assigned areas to ensure MSMEs are able to successfully use the solutions
Sr. Engineer- Design & Consultancy	B. Tech in Mechanical engineering	5 Years	<ul style="list-style-type: none"> ▶ Experience with designing sheet metal tools, plastic moulds or die casting ▶ Knowledge of high end CAD software, analysis software and metrological instruments ▶ Experience of consultancy in the areas of product development, quality systems and value engineering 	<ul style="list-style-type: none"> ▶ Designing tools, moulds and die casting ▶ Product development ▶ Quality systems ▶ Value engineering ▶ Tool try outs and proving ▶ Consultancy to MSME
Sr. Manager Production	M. Tech. in Mechanical Engineering	10 Years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Experience with tooling or manufacturing and at least 3 years of leadership experience ▶ The Sr. Manager should have experience in metal or plastic mould and/or die casting ▶ The Sr. Manager should also have hands on experience with CAD and CEM software, and programming of CNC machines ▶ Experience to debug tool, analyse problems, root causes & take corrective improvement actions when tool is not able to produce as per part specifications 	<ul style="list-style-type: none"> ▶ Overall responsible for Production, production planning and control, including quality assurance of Tools and components, Tool trials etc. ▶ Overall responsible for relevant software CAD/CAM/CNC ▶ Overall responsible for machine maintenance and upkeep ▶ Ensuring on-time deliveries ▶ Deliver budgeted quantities as per required quality standards ▶ Manpower deployment and controlling manpower costs as per target

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Manager- Production	B. Tech in Mechanical Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with tooling or manufacturing ▶ Knowledge of metal or plastic mould and/or die casting ▶ Hands on experience with CAD and CAM software, and programming of CNC machines ▶ Experience to debug tool, analyse problems, root causes & take corrective improvement actions when tool is not able to produce as per part specifications 	<ul style="list-style-type: none"> ▶ Production ▶ CAD/CAM/CNC programming and operation ▶ Responsible for timely delivery of tools and components ▶ Responsible for Tool Trial ▶ Responsible for Consultancy to MSMEs ▶ Should have good knowledge of Quality and inspection
Manager- Production planning	B. Tech in Mechanical Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience in tooling or manufacturing ▶ Experience in metal or plastic mould and/or die casting. ▶ Experience in CAD and CAM software, and programming of CNC machines ▶ Knowledge of ERP software 	<ul style="list-style-type: none"> ▶ Preparation of stage wise / machine wise scheduling in co-ordination with head of production team ▶ Production Planning and Control, and further despatching of jobs ▶ Estimate & manage to get raw materials and component requirements ▶ Responsible from issue of raw materials to despatch of final product to customers including routing
Manager- Metrology	B. Tech in Mechanical Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Practical knowledge and experience of handling CMM and measuring Instruments ▶ Knowledge of Quality assurance and systems 	Head of QC and metrology section with in production
Manager- Heat treatment (HT)	B. Tech in Metallurgy/Mec hanical Engineering	8 Years with 3 years in a similar role	Practical Experience in heat treatment of engineering products including tool steel	Head of heat treatment section and responsible for heat treatment operation

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Manager- Maintenance	B. Tech in Mechanical/ Electrical/ Electronic Engineering	8 Years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Knowledge of Installation and commissioning of machines and equipment ▶ Practical experience in preventive and repair maintenance of machines and equipment ▶ Practical experience of maintaining utility equipment like sub-station, UPS, water treatment plant, DG set etc. 	<ul style="list-style-type: none"> ▶ Head of Machinery maintenance including preventive maintenance, repair etc. of machines and equipment ▶ Responsible for Power supply, energy conservation water system in the campus
Senior Engineer- Production	B. Tech in Mechanical Engineering	5 Years	<ul style="list-style-type: none"> ▶ Knowledge and experience in tool manufacturing, metal cutting through CNC programming and operation ▶ Experience of precision components ▶ Tool assembly ▶ Tool trial 	<ul style="list-style-type: none"> ▶ CNC machine programming and supervision of machining and assembly of tools ▶ Machinery maintenance ▶ Quality assurance ▶ Team work
Engineer- Production	Diploma in Tool & Die Making or Equivalent	3 years	<ul style="list-style-type: none"> ▶ Knowledge and experience in tool manufacturing, metal cutting through CNC programming and operation ▶ Tool assembly ▶ Tool trial 	<ul style="list-style-type: none"> ▶ CNC machine programming and operation ▶ Assembly and trial of Tools
Foreman	Promotion from Senior Technician	3 years as Sr. Technician	<ul style="list-style-type: none"> ▶ Knowledge and experience in tool manufacturing, metal cutting through CNC programming and operation ▶ Tool assembly ▶ Tool trial 	<ul style="list-style-type: none"> ▶ CNC machine programming and operation ▶ Assembly and trial of Tools
Senior Technician (Electrical maintenance / Mechanical maintenance/ tool assembly & manufacturing)	Diploma/ ITI in respective areas	1 year after Diploma or 5 Years after ITI in respective areas	<p>Experience in Maintenance of machines and equipment (electronics or mechanical)/</p> <p>Experience in CNC machine programming and operation/</p> <p>Experience in Tool assembly and trial</p>	<ul style="list-style-type: none"> ▶ CNC machine programming and operation ▶ Assembly and trial of Tools ▶ Also work as Maintenance Technician in Mechanical/ Electronics

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
Senior Manager- Training	M. Tech. in Mechanical engineering	10 Years with 5 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems ▶ Experience with designing curriculum and preparing lecture plans and course material for long term and short term training and teaching 	<ul style="list-style-type: none"> ▶ Overall responsible for planning and executing training activities ▶ Overall responsible for designing curriculum and preparing lecture plans and course material ▶ Responsible for Quality and Certification in training
Manager Training- mechanical/ Electronics	B. Tech. in Mechanical or Electronics or Electrical Engineering	8 years with 3 years in a similar role	<ul style="list-style-type: none"> ▶ Experience with tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems ▶ Experience with designing of curriculum and preparing lecture plans and development of course material for long term and short term training and teaching 	<ul style="list-style-type: none"> ▶ Planning and implementing of training activities in manufacturing and tooling, Mechatronics, IT etc. including market assessment to discover training demand ▶ Evaluation of training activities and identify improvements ▶ Curriculum design ▶ Lecture plans and course material
Senior Engineer- Training	B. Tech. Mechanical or Electronics/ Electrical	5 Year	<ul style="list-style-type: none"> ▶ Experience with tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems ▶ Experience with designing curriculum and preparing lecture plans and development of course material for long term and short term training and teaching experience ▶ Knowledge of CAD/CAM/CNC 	<ul style="list-style-type: none"> ▶ Undertake training courses in manufacturing/ tooling and related courses
Engineer- Training	Diploma in Tool & Die Making/Electro nics	3 Years	<ul style="list-style-type: none"> ▶ Experience in tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems and teaching 	<ul style="list-style-type: none"> ▶ Undertake training courses ▶ Demonstrate practical skills to trainees ▶ Deliver theory lectures
Manager- Sales & Marketing	M. Tech. in Mechanical Engineering	10 years with 5 years in similar role	<ul style="list-style-type: none"> ▶ Marketing of TC product range ▶ Supporting Sr. Managers of respective departments to acquire orders 	<ul style="list-style-type: none"> ▶ Plan and evaluate marketing activities towards all stakeholders ▶ Stakeholder analysis ▶ Sales according to targets

Profile/ Designation	Minimum Qualification	Minimum Experience	Other Skill set/ requirements	Key Responsibilities
	preferably with MBA		<ul style="list-style-type: none"> ▶ Follow up with prospective and existing customers 	
Sales Officer	BE/B. Tech Mech. with MBA or Equivalent	3 years	<ul style="list-style-type: none"> ▶ Marketing of TC Products ▶ Customer Follow-up & Complaints ▶ Should be familiar with Computerised accounting procedures ▶ Feed Back, Dues Collection 	<ul style="list-style-type: none"> ▶ Execute marketing and sales activities ▶ Sales invoicing, taxes etc.

8.4 Governance structure

8.4.1 Selection of the Governance Model for the new TCs

All the existing 18 TCs have been set up under the Societies Registration Act, 1860. The management of affairs mainly rest with the Governing Council constituted by MoMSME, Government of India with the Additional Secretary and Development Commissioner of Ministry of Micro, Small and Medium scale Enterprises (DC-MSME) acting as the President of the Society and Chairman of the Governing Council (GC).

This arrangement has proved effective as most TCs have supported local MSMEs well and have performed financially. Each TC has a separate society and has very decentralised authority and governance structure. DC, MSME being chairman and other two members Director -Tool Room and representative of IF-wing of MoMSME are common members in all 18 GCs.

During the study and preparation phase of this DPR, we analysed different governance models for the new TCs. Under Indian law, there are three legal forms that exist for non-profit organisations. Mainly two forms are relevant for the purpose of the TCSP Program.

- ▶ Society as per society Registration Act, 1860
- ▶ Section 25 companies as per Companies Act, 1956

The two forms mentioned above have distinguishing features as per their respective acts.

Table 21: Comparison of Society Registration Act and Companies Act

Features	Registered Society	Not-for-profit Company u/s 25
Setting up and running cost	Nominal	Comparatively more than the society & trust
Formation	Simple	Takes 2-3 months, required to comply with provisions of Companies Act
Jurisdiction	Registrar of society	Registrar of companies
Meetings	Annual Meeting As per Law. Governing Body meeting as per the rules of Society.	Quite Extensive as per the provision of Company Law
Governance	Vests with governing body as per the rules framed by them. Law specifies no rules & regulation	Vests with Board of directors & management committee. Specific provisions for quorum, adoption, ratification and compliance
Membership transfer	Impossible	Free or control as per desire
Statutory Regulations	Limited	Exhaustive
Transparency	Transparent (As society act is not so exhaustive requiring statutory	Fully Transparent (The Companies Law is quite exhaustive requires specific

Features	Registered Society	Not-for-profit Company u/s 25
	compliance for each and every step of business operation)	compliance in each activity of business operation)
Perception commercial lenders	Less comfortable	More comfortable
Interest of commercial lenders	Less secured, as Act doesn't provide any rules regarding how the interest of lenders can be settled in the case of bankruptcy	More secured, as exhaustive provisions in companies act about how the interest of lenders can be secured by distributing the assets of the company in case of liquidation
Accountability	More (Can be established, if the rules, regulation and by-laws of the Society are framed in manner to fix accountabilities)	More, (As per the statutory regulations)
Financial Management & Disclosures	Best practices can be adopted through framing regulations. However, Act doesn't provide anything specific on this	Exhaustive provisions in Companies Act providing for financial management and disclosure policies
Modification of Objects	Easy Legal Procedure	Complicated legal procedure
Penalties	Lesser	Higher
External audits	Subject to lesser audit requirement. As Act doesn't provide for various kind of audits of the Society. However, generally the society provide for audit regulations and compliance to audit observations as part of their bye-laws and rules and regulations	Greater degree of control through Auditing framework as per companies Act. E.g. Statutory Audit, tax audit, cost audit etc.
Basic Document	Memorandum of Association Articles of Association with rules & regulations	Memorandum of Association Articles of Association

The Table above outlines difference in the two prominent governance structures. Generally, Companies are construed as more reliable legal entity in the commercial world or to attract private participants because the transparency inherits from the statute itself under which it is incorporated.

However, a society may also bring forward discipline by framing rules and regulations of the society through the governing body. This fact together with the minimal cost of setting up and running and simplicity in its formation makes the society a popular model in the case where purpose is not to finance the cost of the project but optimise the cost and delays.

The existing 18 TCs formed as per society model have made it proven model because of the following facts:

- ▶ Very clear cut authority flow and ownership by other GC members and GMs (as permanent member secretary). It instils competition among individual TCs to excel.

- ▶ The Incentive schemes work better in small groups (individual TCs). It also allowed better performing and surplus generating TCs to retain surplus fund and deploy them best suited to them.
- ▶ Rules and regulation framed by the societies fix the accountability of various authorities in organisation.
- ▶ Delegation of financial power has been developed which fix the authority of each of the officer in management body.
- ▶ Well established system for procurement is being followed as per GoI guidelines and GFR, 2005
- ▶ Matters have been identified on which decision can be taken only by the Governing Body.
- ▶ Annual accounts are audited by the statutory auditors well in time and audit report is placed and adopted by the Governing Body in its annual meeting
- ▶ Compliance to audit observations are strictly complied with and observed by the O/o DC-MSME

Overall the present system is working well and at this stage raising fund is not the sole purpose, it is recommended to continue with the societies for proposed Rohtak TC with following few minor modifications

- ▶ Governing council can make provision for more membership from OEMs
- ▶ Provision of membership from state technical University who controls most private Engineering colleges
- ▶ One more sector expert in the GC
- ▶ GC usually meets once in six months only and it is suggested to have one executive committee or advisory committee consisting of local MSME/Cluster association members, sector experts and other stakeholders who can meet quarterly and can advise TCs and can also be delegated with powers higher than GMs

8.4.2 Composition of the Governing Council

As mentioned above, the proposed TC will be set up under the Societies Registration Act, 1860. The management of affairs primarily rest with the Governing Council constituted by MoMSME, Government of India with the Additional Secretary and Development Commissioner, Ministry of Micro, Small and Medium Enterprises (DC-MSME) acting as the President of the Society and Chairman of the Governing Council of each TC.

The Governing Council of TC will comprise four types of members as explained below:

Table 22: Governing Council of Rohtak TC

Representation in the Governing Council	Suggestive recommendations
(i) Ex-officio members	
<p>Representative from Government of India</p> <ul style="list-style-type: none"> ▶ Development Commissioner, Ministry of MSME as Chairman, ▶ Industrial Advisor or Director of TR or Program Coordinator, ▶ Director DI-MSME of the respective States, ▶ Representative from Integrated Finance Wing of the Ministry of MSME. <p>Representative from State Government</p> <ul style="list-style-type: none"> ▶ Official from concerned industry department, ▶ Official from concerned department of technical education/training. 	<ul style="list-style-type: none"> ▶ Secretary, Industries ▶ Commissioner/Director, Technical Education & Training
(ii) Institutional members	
<ul style="list-style-type: none"> ▶ Representative of state level industrial promotion body ▶ Representative of association of small scale industries ▶ Representative of the local chambers of commerce and industries/ Industry Promotion Institution/NSIC. 	<ul style="list-style-type: none"> ▶ Rohtak/ District MSME association ▶ Haryana State Industrial and Infrastructure Development Corporation (HSIIDC)
(iii) Professional and other members	
<ul style="list-style-type: none"> ▶ One expert representing the fields of finance & accounts/ law/management, ▶ One representative of small scale tool producers, ▶ One representative of OEM, ▶ One representative of major manufacturers in the region ▶ Representative of Technical University of the state which governs engineering colleges 	<ul style="list-style-type: none"> ▶ To be nominated by O/o DC-MSME ▶ To be decided by O/o DC-MSME
(iv) MD/Executive Director/GM/PD of the Society	
On his appointment, the Executive Director or General Manager of the Society shall automatically become ex-officio member of the Governing Council during the tenure of his office, as <i>Member Secretary</i> .	

▶ Role of the governing council

The Governing Council will discharge such duties and responsibilities, exercise such powers and undertake and carry out such activities as considers essential with a view to attain the aims and objectives as per the Memorandum of Association of the Society, with particular reference to the following;

- To prepare and execute plans and programmes for the establishment of the TC based on the plan of operation and to carry on its administration and management after such establishment.
- To prepare, consider and approve the policies and strategies of the Society and to reconsider and amend the said policies and strategies whenever appropriate.
- To receive grants and contributions and to have custody of the funds of the society.
- To prepare, consider and approve the budget estimates of the society every year.
- To prepare and maintain accounts and other relevant records and annual statement of accounts including the balance sheet of the society.
- To open, conduct and prescribe courses of study, training and research in tool management and allied subjects.
- To fix and receive such fees and other charges from persons undergoing training as may be necessary.
- To prescribe rules and regulation for the admission of candidates to the various courses of training.
- To lay down standards of proficiency to be demonstrated before the award of diplomas, certificates and other distinctions to the trainees.
- To institute and award scholarships, prizes and medals.
- To provide for and supervise the residence, health, discipline and the well-being of the trainees in the Society.
- To create subject to the provisions of Rule 68 supra technical, training, research, administrative, ministerial and other posts under the Society and to make appointments thereto on such terms and conditions as deemed appropriate.
- To co-operate with any other organisation in the matters of education, training, management and allied subjects.
- To enter into arrangements for and on behalf of the society.
- To sue and defend all legal proceedings on behalf of the Society.
- To appoint committee or committees for the disposal of any business of the Society or for advice in any matter pertaining to the Society.
- To delegate to such extent it may deem necessary any of its power to any officer or committee of the Governing Council.
- To consider and pass such resolution on the Annual Report, the annual accounts and the financial estimates of the Society as it thinks fit.
- To make, inform, adopt, amend, vary or rescind from time to time rules and by-laws for the regulation of and for any purpose connected with the management and administration of affairs of the Society and for the furtherance of its aims and objectives.
- To make, adopt, amend, vary or rescind from time to time rules and by-laws for
 - For the conduct of the business of the Governing Council and the committee(s) to be appointed by it,

- For delegation of its powers,
 - For fixing quorum.
- To sell, lease, mortgage or exchange and otherwise transfer all or any portion of the properties of the Society.
- To establish a provident fund for the benefit of the employees of the Society.
- To perform such additional functions and to carry out such duties as may from time to time be assigned to it by the Society.
- To establish procedure in respect of services and technical advice to be rendered to the industry by the Society and the levy and collection of charges for the same.
- To delegate its powers as may be deemed fit and appropriate but not the powers for:
 - Altering, extending or abridging the purposes of the TC within the meaning of the Societies Registration Act, 1860.
 - Amalgamating the TC either wholly or partially with any other TC having similar aims and objectives.
 - Altering, extending or abridging the Rules and Regulations of the TC within the meaning of the Societies Registration Act, 1860.
 - Shifting the existing location or altering the capacity of the TC.
 - Making capital investment exceeding the approved budget.
 - Borrowing money except for working capital exceeding the approved budget.
 - Transferring by way of mortgage, pledge, hypothecation or otherwise any assets, moveable or immovable, except as security for working capital.
 - Appointing bankers and auditors.
 - Generally anything extraordinary and of major importance.

▶ **Roles and responsibilities of the member secretary (GM/PD/MD)**

- Plan, direct, co-ordinate, organize and supervise day-to-day work of the society.
- Implement policies, strategies and such programs of the society and attend to all statutory requirements imposed thereon.
- Prescribe the functions, duties and responsibilities for all officers and staff of the society, give them appropriate instructions and exercise such supervision and disciplinary control as may be necessary.

▶ **Roles and responsibilities of the O/o DC-MSME in management of the TCs**

- Support DC-MSME in executing the responsibilities as the Chairman of the Governing Council of all TCs.
- Support in implementation of strategic projects and policies from the central to the TC levels.
- Act as the nodal point of coordination between the TCs and the DC-MSME.

9 Marketing plan of Rohtak TC

The marketing plan of Rohtak TC would require specific actions to engage with potential customers and clients in the catchment area. A series of activities is therefore required to be planned for effective marketing of Rohtak TC to promote its business, product or services. A broad suggestive framework for marketing of Rohtak TC would include the following;

Figure 21: Suggestive framework for marketing of TC



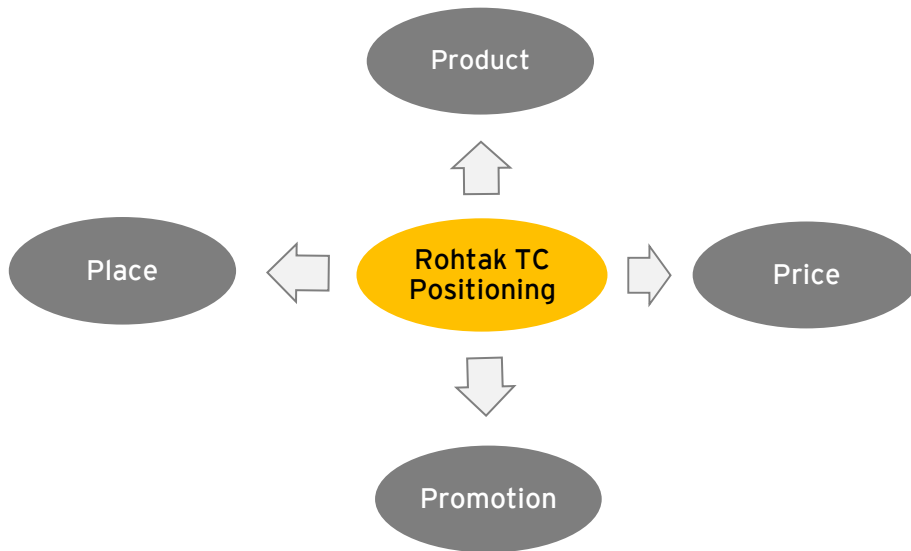
In line with the above suggestive framework, a detailed Go to Market plan of the proposed TC will be prepared subsequently by the Cluster Network Manager (CNM) along with the GM and marketing team of the TC. The role of CNM for marketing would be very crucial and will act as an additional arm of the marketing wing of the proposed TC. It will further strengthen its market linkages with the MSMEs in the cluster it serves. CNM will also market the TC within the trade and industry associations, academia, educational institutions, applied research institutions, service providers, other government support institutions, workers and skill seekers.

As part of the marketing initiative, CNM would work closely with MSME clusters in the region to understand their needs and requirements and involve OEMs/ large players in the region. Based on the observations, the marketing strategy of the TC would be customized targeting various focus groups including technical and training institutes. Further, the CNM would be part of the consolidation of the results and recommendations of the diagnostic into a strategic plan for cluster development. The CNM would also represent the TC in various industry oriented outreach programmes and workshops. This would help in two ways; promoting the TC and understanding industry perspective and future areas of focus. The same will help to identify key areas of focus for the TC and align the future marketing strategies accordingly.

Hence, the CNM would promote the TCs in among the newly developed partnerships for mutual benefit around identified programmes / initiatives.

The plan should clearly position the proposed TC's marketing mix with respect to its four Ps - product, price, place and promotion. The suggestive points which needs to be taken care while designing the Go to Market Plan for the Rohtak TC has been highlighted below:

Figure 22: Positioning of marketing mix for proposed TC



Product

A General Engineering TC is proposed to be developed at Rohtak based on the presence of large engineering focused units (in Auto ancillary, Fasteners, Scientific instruments, Footwear, Metal fabrication, repair and maintenance etc.), analysis of the industry and market. The product and service offering of the proposed TC therefore has been carefully derived keeping in view the existing gaps to address specific requirements of this sector. Further the shortlisted specializations and respective courses to be offered by the proposed TC have been done keeping in view the shortage in the availability of required skill sets in the labour force across the industry.

The summary is provided below:

The key offerings of the proposed TC will be; manufacturing of tools, training for skill development with respect to various specialisations, consultancy services in general engineering. Focus areas would include:

- Long and short term training programmes in CNC/ CAD/CAM, advance welding, industrial and process automation etc.
- Manufacturing of moulds, jigs and fixtures etc. for general engineering
- Consultancy services in the field of product and tool design, manufacturing etc. for improved quality and productivity.

Price

As per the study and discussions with GMs of some of the existing TCs, the proposed TC should adopt the cost plus pricing approach for its products and services during its initial years of operation and thus ensuring operating profit for sustainability. Most of the existing MSME TCs follow the cost plus pricing approach only for all of their products and services

As a differentiator from the existing MSME TCs, it is proposed that once the TC strengthens its brand and credibility in the market it should gradually move towards market-based pricing with defined margin levels (margin based costing). Then, the TC will have to work towards optimisation of its processes and operations to sustain its margins in the competitive environment.

The above mentioned pricing models are suggestive and will depend on the detailed analysis while preparing the Go To Market Plan with the support of the CNM.

Promotion

Promotion of TCs products and services is one of the most important components of the Go To Market Plan for a new set-up. Hence, below are some of the suggestive points which might be considered while making the final Go To Market Plan for the proposed Rohtak TC.

► Increasing visibility to external audience

- Encourage and execute early communication and promotion of activities by TC which are relevant to key external audiences including industry, media, technical media etc.
- Producing a steady, reliable stream of quality outbound communications that highlights;
 - Research innovations and technology evaluations coming from the TC and its partnerships.
 - Special events and conferences hosted or supported by TC.
- Working with industry partners to identify projects for joint publicity.
- Develop Facebook/ LinkedIn/ Twitter/ YouTube presence to connect to students.
- Ensure current marketing message is being maintained with all social media platforms administered by these TC.

► Engaging internal stakeholders

- Conduct media and website training on a regular basis for all interested faculty and staff.

- Leverage active partnerships with the industry and community, inviting departmental and staff participation.
 - Ensure department faculty and staff are informed of the progress of the TC with respect to each goal.
- ▶ **Other Activities**
- **Website:** Develop a website showcasing all highlights of the TC.
 - **TC fast facts:** Fast fact can be a two-page information sheets describing the highlights of TC. It can be made available online and increase the visibility to external audiences.
 - **TC online email newsletters:** Preparation and delivery of high-quality email newsletters from TC to industrial units, associations and other partners with the latest research announcements, news and more of engaging and interesting information to these external audiences.
 - **High quality print promotions:** High quality print promotions coordinated by TC communications, which maintains the Rohtak TC as a brand to be utilised in outreach efforts.
 - **Industry tie-ups:** Partner with Industries and other technical education institutes to increase the visibility of TC. Explore opportunities to participate in publications and other co-branding opportunities with these partners from time to time.
 - **Maintain consistent social media presence:** Ensuring consistent, exciting messaging is posted on active social media platforms including the TCs Facebook page, Twitter account, YouTube channel and others. Promote the presence of TC on these platforms to students, alumni and supporters while acting as a social media hub for internal departments

Place

Rohtak is strategically located at the centre of Haryana has significant advantage of its proximity with Delhi. It falls under National Capital Region (NCR). Automobile ancillary, footwear, scientific instruments, agriculture implements, and other engineering firms operate in the region. Further, the Haryana Government is also planning to invest in the district in order to make it next industrial hub in Haryana.

As a part of developing the go to market plan GM would work with the CNM, during the final stages of the construction, to prepare a detailed marketing plan keeping in view the focus areas of the TC. This team, with support from CNM, would be responsible to conduct the suggestive activities as mentioned in the promotion component and lead the marketing initiative for the TC.

In view of the above broad framework the following would be undertaken for marketing of the TC during its inception to start with. It is proposed to keep aside an initial one time marketing budget for completing most of the below mentioned activities through third party vendors:

Table 23: Suggestive marketing activities, ownership and timeline

Phases	Activity	Ownership	Timeline
<u>Preparation of promotional materials</u>	<ul style="list-style-type: none"> • <u>Designing brochure of TC (through outsourcing)</u> • <u>Short video film of TC infrastructure and facilities available (through outsourcing- post completion of the infrastructure/construction)</u> • <u>Development of TC website (through outsourcing)</u> 	<u>Marketing team, GM and CNM</u>	<u>Construction and Post construction phase</u>
<u>Pre marketing activities</u>	<ul style="list-style-type: none"> • <u>Preparing list of industrial association bodies in the Rohtak catchment, district and state.</u> • <u>Preparing list of industries in consultation with DIC.</u> • <u>Shortlisting of perspective players' with respect to product range and process.</u> • <u>Design a brief questionnaire.</u> • <u>Preparing list of engineering colleges, ITIs, polytechnics, in the catchment area.</u> 	<u>CNM and GM</u>	<u>Construction phase</u>
<u>Targeting the manufacturing units</u>	<ul style="list-style-type: none"> • <u>Send the brochure along with cover letter and short questionnaire to the shortlisted industries.</u> • <u>Seek time from large industries and industry body associations to give presentation on the capability statement of Rohtak TC with respect to manufacturing of tools etc.</u> • <u>Send representatives to get the filled questionnaire or fill the questionnaire circulated earlier.</u> • <u>Analyse the questionnaires received with respect to production, consultancy, training requirements of industries.</u> • <u>Meeting the key industrial units identified in the analysis to further understand their needs with respect to tool manufacturing, production support, training of employees etc.</u> • <u>Organise as well as participate in industry oriented outreach programmes/ seminars/ workshops/ boot camps etc.</u> 	<u>GM, Manager Marketing, CNM and TP</u>	<u>During installation and commissioning of machines for manufacturing</u>

Phases	Activity	Ownership	Timeline
Targeting OEMS	<p>OEMs are important because they involve many industries including MSMEs in the manufacturing of a product. The TC will plan for targeting the same through the following:</p> <ul style="list-style-type: none"> • <u>Take appointment and meet the OEMs in the region to understand their specific needs with respect to support required in tool manufacturing and training of employees etc.</u> • <u>Presentation on the capability statement of the TC with respect to manufacturing of tools, training etc.</u> • <u>Get their vendor details and understand their portfolio of product requirement at various levels</u> • <u>Plan to Increase product portfolio to cater to the OEMs and their vendors</u> 	GM, Manager Marketing, CNM and TP	During installation and commissioning
Targeting technical and vocational training institutes and high schools	<ul style="list-style-type: none"> • <u>Meet the principle/ HoD of the institutes and present on the capability statement of Rohtak TC with respect to training infrastructure, faculty, real time learning with on job learning etc.</u> • <u>Seeking permission and presenting the same to final and pre final year students</u> • <u>Getting permission to display the brochure of TC on the notice board of these institutes.</u> • <u>Organise as well as participate in industry oriented outreach programmes/ seminars/ workshops/ boot camps etc.</u> 	Marketing team (GM) and CNM	During installation and commissioning of machines for training

10 Focus area for Rohtak TC

The proposed TC in Rohtak will be focused on General Engineering with facilities such as; Training, Production support and Advisory Services. Out of the three areas, skill development/training will be the key driver of TC's operations. The details of these facilities are explained below.

10.1 Training

The TC at Rohtak will provide professional training in various courses with focus on general engineering. The TC will be able to produce highly skilled technical workforce, with greater career prospects in the General engineering industry. The duration of courses will be both short and long term, ranging from 1 month to 48 months in various specializations like; Tool Room & CNC Manufacturing, CAD/ CAM, Advance Welding , Electronics and IT, Industrial and process Automation, etc. The batch size; number of batches per annum and respective fee have been decided on the basis of capacity of existing TCs and NCVT norms. A soft skill lab for training in English language and communication facilities will also be established in the TC. Soft skill module will be an integral part of all the medium to short term courses. The TC will start training activity from the first year of its operation across all specializations. The total capacity intake is expected to reach around 8,400 trainees over 5 years. The detail of courses in various specializations is given below:

Table 24: Details of specialization, courses, duration and capacity intake

No.	Specialization	Course name	Duration (months)	Batch size	No. of Batch/ year	Annual intake
1	Tool Room & CNC Manufacturing, CAD/ CAM	Advanced Diploma in Tool & Die making	48	60	1	60
		Certificate course in Machinist	24	30	1	30
		PG in Tool Design & CAD CAM	18	30	2	60
		Post Diploma in Tool and Die Manufacturing	12	30	2	60
		Post Diploma in CNC-Prod & Op	12	30	2	60
		Post Diploma CAE (manufacturing)	12	30	2	60
		Adv. Certificate Course in Tool Design & CAD/CAM	12	30	2	60
		Adv. Certificate Course Tool & Die Manufacturing	12	30	2	60
		Certificate Course in Tool & Die Making	12	20	2	40

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No.	Specialization	Course name	Duration (months)	Batch size	No. of Batch/year	Annual intake
		Master of CAD/CAM/CNC	6	30	6	180
2	Maintenance	Machine Maintenance-mech	3	20	4	80
		Certificate Course in Machine Maintenance	12	30	4	120
		Maint. Technician	3	20	4	80
		Machine Maintenance-mech (Part Time)	6	20	2	40
		Maint. Technician (Part Time)	6	20	2	40
3	CNC Manufacturing, CAD/ CAM	Adv. Certificate Course CNC Machining (L,M,WC,EDM)	12	30	2	60
		Certificate Course CNC Machining (Turn & Milling)	12	20	2	40
		Certificate Course in Metrology & QC	12	30	4	120
		Master Certificate Course in Computer Aided Tool Engineering	6	30	6	180
		CNC lathe programming and operation (Full Time)	2	30	12	360
		CNC lathe programming and operation (Part Time)	4	30	12	360
		CNC Milling Prog and Operation (Full Time)	2	30	12	360
		CNC Milling Prog and Operation (Part Time)	4	30	12	360
		CAD/CAM/CNC Programming (Full Time)	2	30	12	360
		CAD/CAM/CNC Programming (Part Time)	4	30	6	180
		CAD Modelling with different softwares (Full Time)	1	30	24	720

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No.	Specialization	Course name	Duration (months)	Batch size	No. of Batch/year	Annual intake
		CAD Modelling with different softwares (Part Time)	2	30	24	720
		Computer Integrated Manufacturing (CIM)	1	30	24	720
4	Advance Welding	Basic Arc and Gas welding (Full Time)	3	20	4	80
		Basic Arc and Gas welding (Part Time)	6	20	4	80
		TIG welding (Full Time)	1.5	20	4	80
		TIG welding (Part Time)	3	20	8	160
		MiG welding (Full Time)	1.5	20	8	160
		MiG welding (Part Time)	3	20	8	160
		Spot Welding (Full Time)	1.5	20	2	40
		Spot Welding (Part Time)	3	20	4	80
		Stainless Steel & Aluminum welding (Full Time)	1.5	10	2	20
		Stainless Steel & Aluminum welding (Part Time)	3	10	4	40
		Welding-NCVT	12	20	1	20
6	Electronics and IT	Basic computer and Hardware (Part Time - 4 hrs)	2	20	20	400
		Advanced Hardware & Networking (Part Time - 4 hrs)	4	20	10	200
		Solar energy system technician	3	12	4	48
7		Industrial Hydraulics	1	20	12	240
		Industrial pneumatics	1	20	12	240

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No.	Specialization	Course name	Duration (months)	Batch size	No. of Batch/year	Annual intake
	Industrial and process Automation	PLC Programming	1	20	12	240
		Automation Technician	4	20	3	60
		Industrial automation design	4	20	3	60
		Post Diploma in Mechatronics	12	30	2	60
		Diploma in Mechatronics	36	30	1	30

Table 25: Details of courses

No.	Specialization	Course Name	Fee / Student (INR)	Annual Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						Number	Area	Number	Area	Number	Area
1.	Tool Room & CNC Manufacturing, CAD // CAM	Advanced Diploma in Tool & Die making	1,40,000	60	10th pass	4	300	3	162	1	756
		Certificate course in Machinist	40,000	30	10th pass	2	150				
		PG in Tool Design & CAD CAM	1,05,000	60	Degree			1	54		
		Post Diploma in Tool and Die Manufacturing	50,000	60	Dip/Degree			1	54		
		Post Diploma in CNC-Prog & Op	25,000	60	Dip/Deg			1	54		
		Post Diploma CAE (manufacturing)	60,000	60	Dip.						
		Adv. Certificate Course in Tool Design & CAD/CAM	60,000	60	ITI/Diploma						
		Adv. Certificate Course Tool & Die Manufacturing	60,000	60	ITI/Diploma						
		Certificate Course in Tool & Die Making	40,000	40	ITI						
		Master of CAD/CAM/CNC	20,000	180	Degree/Diploma			1	54		
		Certificate Course in Machine Maintenance	30,000	120	ITI						
		Machine Maintenance-mech		80	Diploma			1	54		

No.	Specialization	Course Name	Fee / Student (INR)	Annual Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						Number	Area	Number	Area	Number	Area
		Maint Technician	10,000	80	ITI-FIT/TUR/Mach			1	54		
		Machine Maintenance-mech (Part Time)	18,000	40	Diploma						
		Maint Technician (Part Time)	12,000	40	ITI-FIT/TUR/Mach						
		Adv. Certificate Course CNC Machining (L,M,WC,EDM)	60,000	60	ITI/Diploma						
		Certificate Course CNC Machining (Turn & Milling)	40,000	40	ITI/Diploma						
		Certificate Course in Metrology & QC	30,000	120	ITI						
		Master Certificate Course in Computer Aided Tool Engineering	40,000	180	ITI						
		CNC lathe programming and operation (Full Time)	9,000	360	ITI	1	75	2	108	1	756
		CNC lathe programming and operation (Part Time)	10,000	360	Pursuing ITI/Industrial workers						
		CNC Milling Prog and Operation (Full Time)	10,000	360	ITI			2	108		

No.	Specialization	Course Name	Fee / Student (INR)	Annual Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						Number	Area	Number	Area	Number	Area
		CNC Milling Prog and Operation (Part Time)	10,000	360	Pursuing ITI/Industrial workers						
		CAD/CAM/CNC ENGINEER (Full Time)	10,000	360	DIP/Deg			2	108		
		CAD/CAM/CNC ENGINEER (Part Time)	12,000	180	Pursuing DIP/Degree/ Working						
		CAD Modelling with different softwares (Full Time)	6,000	720	DIP/Deg			2	108		
		CAD Modelling with different softwares (Part Time)	7,000	720	DIP/Deg						
		Computer Integrated Manufacturing (CIM)	7,000	720	Deg						
2.	Advanced Welding	Basic Arc and Gas welding (Full Time)	10,000	80		1	75			1	756
		Basic Arc and Gas welding (Part Time)	12,000	80	Pursuing ITI/Industrial workers						
		TIG welding (Full Time)	5,000	80	ITI/Basic course						
		TIG welding (Part Time)	6,000	80	Pursuing ITI/Industrial workers						

No.	Specialization	Course Name	Fee / Student (INR)	Annual Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						Number	Area	Number	Area	Number	Area
		MiG welding (Full Time)	5,000	160	ITI/Basic course						
		MiG welding (Part Time)	6,000	160	Pursuing ITI/Industrial workers						
		Basic Arc and Gas welding (Full Time)	10,000	160	10th	1	75			2	756
		Basic Arc and Gas welding (Part Time)	12,000	160	Pursuing ITI/Industrial workers						
		TIG welding (Full Time)	6,000	160	ITI/Basic course						
		TIG welding (Part Time)	6,000	40	Pursuing ITI/Industrial workers						
		MiG welding (Full Time)	6,000	80	ITI/Basic course						
		MiG welding (Part Time)	6,000	20	Pursuing ITI/Industrial workers						
		Spot Welding (Full Time)	8,000	40	ITI/Basic course						

No.	Specialization	Course Name	Fee / Student (INR)	Annual Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						Number	Area	Number	Area	Number	Area
		Spot Welding (Part Time)	8,000	80	Pursuing ITI/Industrial workers						
		Stainless Steel & Aluminium welding (Full Time)	8,000	20	ITI/Basic course						
		Stainless Steel & Aluminium welding (Part Time)	8,000	40	Pursuing ITI/Industrial workers						
		Welding-NCVT	24,000	20	10th						
3.	Electronics and IT	Basic computer and Hardware (4 hours per day)	8,000	480	10th/ITI/12th	1	75	2	108		
		Advanced Hardware & Networking (4 hours per day)	12,000	320	12th/DIP/Degree						
		Solar energy system technician	8,000	48	ITI Electrician/ Electronics			1	54		
4.	Industrial and Process Automation	Industrial Hydraulics	6,000	120	ITI/Dip/Deg	1	75	1	54		
		Industrial pneumatics	6,000	240	ITI/Dip/Deg			1	54		
		PLC Programming	6,000	240	Dip/Deg			2	108		

No.	Speciali- zation	Course Name	Fee / Student (INR)	Annual Intake	Minimum Qualification	Classrooms		Laboratories		Workshops	
						Number	Area	Number	Area	Number	Area
		Automation Technician	12,000	240	ITI			1	54		
		Process automation design	15,000	60	Dip/Deg						
		Diploma in Mechatronics	1,20,000	180	10th	1	75	2	108		

The TC will have adequate installed infrastructure like machines, software, computers etc. required to provide training to the proposed number of students under various specialisations. The estimated cost of these machines is approximately INR 25.56 Cr. The following table provides the details of the same;

Table 26: Proposed list of machines for training

S.No.	Training Machines	Nos	Value (lakhs)	Total
Advanced Machines				
1.	Machining center	5	50	250
2.	CNC-Milling	15	30	450
3.	CNC-Lathe	15	20	300
4.	CNC Wire EDM	1	25	25
5.	CNC EDM Die Sinking	1	40	40
6.	CMM+ metrology lab equipment	1	50	50
7.	3-D Printing, Scanner etc.	1	10	10
Conventional Machines				
8.	Conventional Milling-V-H-U	20	10	200
9.	Conventional Lathe	20	5	100
Labs and Supporting machines				
10.	Welding workshop	1	75	75
11.	Maintenance Lab	1	50	50
12.	Solar Energy Lab	1	20	20
13.	CNC Milling & Lathe Simulation Modules	30	2	60
14.	Computers for Computer Labs	400	0.5	200
15.	Basic Instrumentation Lab	1	25	25
16.	Automation Lab for 20	1 set	200	200
17.	IT Hardware & Networking labs (2 labs)	2	20	40
18.	Teaching aids (Audio Visual)	20	1	20
19.	Teaching aids (Smart Board)	10	1 lot	10
20.	CAD/CAM software License	200	0.5	100
21.	Tooling and Tooling Systems	@10%		150
22.	Surface Grinding	10	5	50
23.	Cylindrical grinding	5	10	50
24.	Pedestal Grinding	10	1	10
25.	Drilling Machines	15	1	15

S.No.	Training Machines	Nos	Value (lakhs)	Total
26.	Tool & Cutter Grinder	1	20	20
27.	Work benches and Kits	30	0.5	15
28.	Furniture for labs	30	1 lot	30
29.	Classroom Furniture @ 60 seats	8	5	40
	Misc, Unforseen & Contingency 5%			130
	Total			2,735

10.2 Production

On the basis of focus sector for the proposed TC, following are the machines identified for production/ manufacturing activities at the proposed TC. The list will be further validated by technology partner for finalisation and to initiate procurement. The budgetary cost (landed cost) of these machines is approximately estimated at around INR 12.28 Cr. The TC will provide plastic mould support to shoe manufacturers in the catchment area and machining support for fasteners and auto ancillaries. The growing concerns related to climate change, energy security, scarcity of natural resources and increasing environmental regulations is putting more emphasis on sustainable production activities in manufacturing process. Due care therefore has been taken during the identification of machines for production systems and associated services, processes, plants and equipment in the TC. This will make the TC environmental friendly and energy efficient and would be better equipped to manufacture more products with less material, energy and waste.

Table 27: Proposed list of machines for production/ manufacturing activities

S.N.	Machine	Size	Number	Value (lacs)	Total Cost
Advanced Machines					
1	CNC VMC-3 axis	0.8mx0.6mx0.5m	2	75	150
2	CNC Lathe	Dia 250x600mm	1	35	35
3	CNC Wire EDM	500x500x400 mm	1	100	100
4	CNC EDM Die Sinking	500x500 mm	1	75	75
5	Injection Moulding machine	200 T	1	50	50
6	Additive Manufacturing/3D printing/RPT	200 T	1	50	50
7	CNC Coordinate Measuring Machine	800mmx600 mm	1	100	100
Conventional Machines					
8	Conventional Milling	1.2mx0.5mx0.4 m	2	25	50
9	Conventional Lathe	Dia400x1200mm	2	20	40
Supporting machines and Labs					
10	Radial drill machine	63mm	1	10	10
11	Surface Grinding	800x400 mm	2	30	60
12	Cyl Grinding	Dia 200x750mm	2	40	80
13	Hydraulic press	100 T	1	50	50
14	Tools & Tooling Systems				60
15	Work Benches with Bench Vices & Assembly Kits		10	1	10
16	Auxiliary Eqpts (Drill m/c, Bench grinder, Surface Plates etc.)		1 lot	20	20

S.N.	Machine	Size	Number	Value (lacs)	Total Cost
17	Matl. Handling Eqpt.- EoT crane, Jib Crane, Trollies	5 Tonne & 2 Tonne	1+2	100	100
18	Metrology Lab Eqpt.		1 lot	100	100
19	CAD-CAM Software CATIA,UG etc. and Analysis Software		5 Seats	3	15
20	Scanning/Drafting/Printing		1	5	5
21	CAD-CAM Workstations		10	1	10
22	Misc and Contingency		5%		56
	Total Production Machines & Eqipt.				1,228.5

10.3 Consultancy

MSMEs are plagued with bottlenecks and inefficiencies that compromise their competitiveness and presence in the market. Handholding is required to enable MSMEs to develop competencies in the areas of product & process development, operation improvement, streamlining and standardization of processes through adoption of international norms, new technologies and capacity enhancement. Quality and technical relevance of products need to be maintained by supporting product development, component manufacturing, precision engineering, process automation and adherence to quality norms.

Therefore, the Rohtak TC would have a dedicated professional wing to assist MSMEs by providing consultancy services in the field of Design Support (incl. Product Design), Engineering Solutions (Development of Jigs & Fixtures for Machining, Welding etc., Quality System Support, Project Consultancy (curriculum development, community colleges, trainers etc.), Low cost Automation Solution support, Productivity Improvement. The support of TP will be taken wherever required. Consultancy will be provided in the following areas:

- ▶ Product development and engineering solutions
- ▶ Project consultancy in setting up of private TRs, training centre etc.
- ▶ Design support
- ▶ Quality systems support
- ▶ Productivity improvement through cluster approach
- ▶ Maintenance support to institutes like ITIs, polytechnics and specialised machines of MSMEs
- ▶ Curriculum development, Course material development and lesson plan to ITIs, Polytechnic, Community Colleges and other institutes
- ▶ Trainers training to ITI, Polytechnic and Community Colleges
- ▶ Lean manufacturing

- ▶ Designing of Automation solutions
- ▶ Seminars/Workshops for MSMEs, Colleges
- ▶ Support to Community College of central university
- ▶ Business incubation services
- ▶ Other consulting projects

Since providing consulting services requires the expertise in specific domain, the TC would hire the required resources to increase the in-house capability. Illustrative phasing of the areas/domains where the TC can provide consulting services has been suggested below. This has been designed keeping in mind the resource planning and future revenue projections as well.

The designing and consulting department will be equipped with high-end workstations, CAD/ CAM software, and analysis software. The design and consulting department is recommended to have 7 experts. The consulting team will also be supported by the production and training departments on need basis. In addition to the above, 30 trainees of final semester tool design course will also work with design department in shifts on daily basis. It is also proposed to have tie-ups/ collaborations with other MSME TCs in specialised areas of project consultancy as and when needed. The table below represents the projected revenue estimates for 10 years, keeping in mind the impetus on the consulting services for the proposed TC. The revenue estimation has been done using the average machine hour rate.

Table 28: Areas of consulting and estimated revenue

S. No	Consulting Areas	Suggestive Rev Year 1	Suggestive Rev Year 2	Suggestive Rev Year 3	Suggestive Rev Year 4	Suggestive Rev Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
						50%	30%	30%	30%	30%	30%
1.	Design Support (incl. Product Design)	4,00,000	6,00,000	9,00,000	13,50,000	20,25,000	30,37,500	45,56,250	68,34,375	1,02,51,563	1,53,77,344
2.	Engineering Solutions (Development of Jigs & Fixtures for Machining, Welding, etc.)	1,00,000	1,50,000	2,50,000	3,50,000	5,00,000	8,00,000	12,00,000	17,00,000	26,00,000	38,50,000
3.	Quality System Support	1,00,000	1,50,000	2,50,000	3,50,000	5,00,000	8,00,000	12,00,000	17,00,000	26,00,000	38,50,000
4.	Project Consultancy (curriculum development, community colleges, trainers, etc.)		2,00,000	3,00,000	4,50,000	6,75,000	10,12,500	15,18,750	22,78,125	34,17,188	51,25,781

S. No	Consulting Areas	Suggestive Rev Year 1	Suggestive Rev Year 2	Suggestive Rev Year 3	Suggestive Rev Year 4	Suggestive Rev Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
						50%	30%	30%	30%	30%	30%
5.	Low cost Automation Solution Support		1,00,000	1,50,000	2,25,000	3,37,500	5,06,250	7,59,375	11,39,063	17,08,594	25,62,891
6.	Productivity Improvement		1,00,000	1,50,000	2,25,000	3,37,500	5,06,250	7,59,375	11,39,063	17,08,594	25,62,891
Total		6,00,000	13,00,000	19,50,000	29,25,000	43,87,500	65,81,250	98,71,875	1,48,07,813	2,22,11,19	3,33,17,578

*The suggestive revenue from design support during 2018-19 has been estimated on the basis of usage of CAD Software like CATIA, UG or other analysis software etc. The TC is provisioned to have 5 numbers of such software packages which with an average estimated rate/hour of INR 200. So with installed capacity @ 750%, the revenue from this stream during one shift of operation is estimated to be around $5 \times 8 \times 70\% \times 200 = \text{INR } 5,600$. Assuming 25% capacity utilisation for 300 days during 2nd year (2018-19), the total estimated revenue from CAD Software like CATIA, UG packages is INR 4.2 lakhs. Hence, the total estimated revenue from design support is around INR 4 lakhs for year 2018-19.

Table 29: Proposed areas of consulting

Consulting Stream	Focus Area (Recommended)
Design Support (incl. Product Design)	<ul style="list-style-type: none"> ▶ Tool design in the field of sheet metal, press tool and plastic moulds. ▶ Support MSMEs in designing products to be supplied to OEMs. This will require 3D modelling and may include reverse engineering etc.
Engineering Solutions (Development of Jigs & Fixtures for Machining, Welding etc.)	<ul style="list-style-type: none"> ▶ Designing the machining processes involving jigs and fixtures design, cutting tool selection, machine selection, cycle time and tack time selection and achieving the final shape and quality
Quality System Support	<ul style="list-style-type: none"> ▶ Supporting MSMEs in establishing quality systems, quality improvement and acquiring necessary certifications
Project Consultancy (curriculum develop, community colleges, trainers etc.)	<ul style="list-style-type: none"> ▶ Supporting training institutes in curriculum develop, community colleges, trainers etc. ▶ This may also involve setting up of Tool Rooms and vocational training centres on turnkey basis for various companies under CSR initiatives and for Government
Productivity Club	<ul style="list-style-type: none"> ▶ To handhold MSMEs in improving productivity on a long term basis (1-3 years) on a membership basis
Low cost Automation Solution support	<ul style="list-style-type: none"> ▶ Solutions to automate process for increasing efficiency at various stages of manufacturing

Based on the focus areas recommended above, revenue estimation has been done for the identified consulting streams. These estimations are purely based on the historical data, prevailing market rates and discussions with the existing TRs.

Table 30: Estimated revenue from consulting

Consulting Stream	Approximated Revenue Estimation
Design Support (incl. Product Design)	<ul style="list-style-type: none"> ▶ Revenue estimation from CAD Software like CATIA, UG etc. - 5 Nos. and hourly rate of Rs 200. This is initially estimated to run in

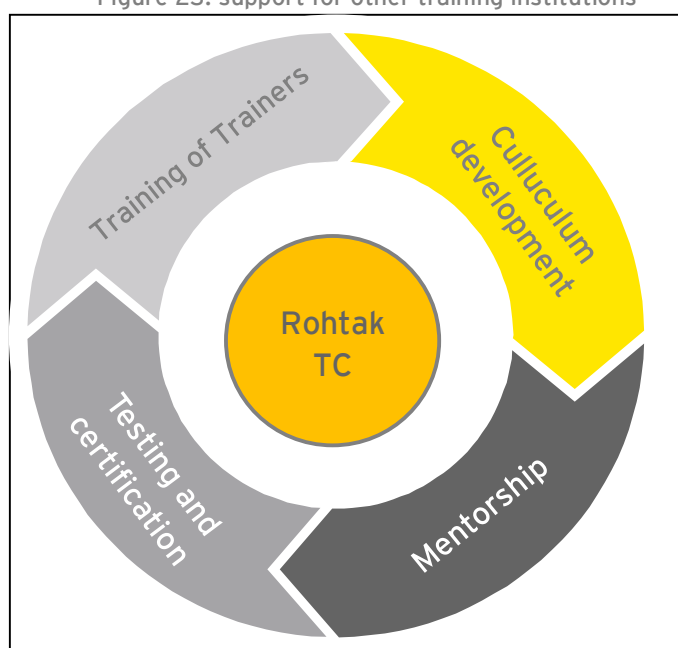
Consulting Stream	Approximated Revenue Estimation
	<p>1 shift (8 hrs.) at 25% capacity. The installed capacity assumed to be 70% running for 300 days a year. Therefore the calculation would be, $25\%[(10 \times 100 \times 8 \times 300) \times 80\%]$ = INR 4,20,000 per year</p> <p>▶ Revenue from other Engg. Analysis software like ANSYS, mouldflow, autoform etc. estimated to be INR 48,000</p>
Engineering Solutions	<p>Rate of INR 250/hr with an estimation of minimum requirement 100 hours per product. We have estimated initially at least 4 products in first year. Therefore, $4 \times 250 \times 100$ = INR 1,00,000/year</p>
Quality System Support	<p>Estimated rate of INR 50,000 per unit. We have estimated serving at least 2 units in the first year. Therefore, $50,000 \times 2$ = INR 1,00,000/year</p>
Project Consultancy (curriculum develop, community colleges, trainers etc.)	<p>Revenues from these assignments vary significantly depending upon the nature of the assignment. We have estimated a range of INR 1-4 lacs per assignment with 5-6 assignment per year</p>
Productivity Club	<p>To start with, fee of INR 20,000 per from 5 units per year. Therefore, $5 \times 20,000$ = INR 1,00,000</p>
Low cost Automation Solution support	<p>To start with, fee of INR 1,00,000 per from 1 units per year. Therefore, $1 \times 1,00,000$ = INR 1,00,000</p>

10.4 Centre of excellence for manufacturing skill development

Haryana represents a key industrial hub of the country with presence of more than 20% of total large and medium OEMs. In order to supply skilled manpower to this hub and other states, The TC is going to play a vital role. It shall work as a nodal skill development centre. It shall not only provide advanced training in manufacturing technology but also work as a key facilitator for existing ITIs and polytechnic institutions in the catchment area. The following services shall be provided by the TC in order to increase competitiveness of ITIs and Polytechnic institutions.

- ▶ **Curriculum Development Support:** The TC shall assess curriculum of these institutions and provide support in developing modular training program which are latest and high on demand by the local industry. Based on the assessment of utilization of the existing infrastructure, the TC shall advise new courses for the institute.
- ▶ **Mentorship for new institution:** The TC shall work as a mentor and provide support in setting up new ITI and small skill development sector in manufacturing field.
- ▶ **Testing and certification of the skill:** The TC will work as a nodal organization to provide common platform to test and certify the skill level of the trainees.
- ▶ **Training of Trainers:** The TC shall provide access to new and advanced technology for the trainers of these institutions and shall provide necessary training to upgrade their skill set.

Figure 23: support for other training institutions



10.5 Proposed support system to enable private TRs tap the market

A collaborative approach with private TRs can help to augment capacity to support MSME.

- ▶ **Productivity and Quality club:** To form a productivity and Quality Club where engineering units in a cluster under MSME may join the club on a reasonable annual fee. The value to the MSMEs

would be as follows; MSME TC needs to earmark one expert (with support from TP if required) for the cluster for a period of 12 months with minimum 12 assured visits. The expert would mentor the MSME units individually towards improvement of their system and process to increase the productivity of the unit and quality of its product. These members may also enjoy preferential treatment in other services of the Tool Room e.g. designing and testing, CAD/ CAM etc. The club will facilitate for;

- **Partnerships and collaborations:**
 - Develop better partnerships with corporations located in the state and in the catchment.
 - Collaborations with academic and applied research institutes to commercialise new technology/ innovations.
 - **Facility Sharing:** Sharing the Tool Room facility like high end design, analysis, intricate machining etc.
 - **New Market:** Jointly exploring potential new markets/ programs and execution the same.
 - **Innovation:** Promote emerging technological and knowledge-based innovative through seminars and clinics.
- ▶ **Partnering with small tool rooms and MSMEs to make them competitive:** The objective of the same is to carry out activities with potential to develop competitive advantage over time. Rather than two or more Tool Rooms in the catchment producing similar kind of products, a group of Tool Rooms can specialise in selected jobs which would further improve the focus on factors such as quality, costs and time.

Case Study - Consortium with MSMEs - CTTC Bhubaneswar

In 2013, CTTC Bhubaneswar has formed a consortium with 15 MSMEs from different industries in Odisha.

Objective

To obtain jobs/ work orders from customers for the consortium. These jobs, once received will be executed by different members of the consortium according to their capabilities and capacity.

The majority of the work will be performed by the consortium members. In the initial period, CTTC will support the MSMEs to undertake final machining and inspection for the products.

Over the period, as MSMEs equip themselves and develop in-house capabilities to independently execute the jobs, CTTC's support will reduce. Further, the number of MSMEs in the consortium is

expected to increase, which would in turn strengthen the existing consortium and its capability to pitch for more specialised jobs.

CTTC has jointly pitched for jobs for consortium with its clients like

- Ordnance factory, Balangir
- HAL Koraput

Key Benefits

- As part of the consortium, the MSMEs can pitch for bigger and long term jobs and plan their investments in a better way. This will in turn encourage formation of new MSMEs and strengthening of existing MSMEs in Odisha
- Currently for some of the jobs, CTTC has to reach out to MSMEs outside Odisha. Over the period as MSMEs in Odisha get better equipped, these jobs can be performed by them.
- Gradually CTTC will move up the technology curve and would provide support mainly for higher end technologies and so on.

10.6 Technology collaboration

The TC at Rohtak will venture into multiple new areas and to facilitate technology transfer and improve market linkages, role of TP and a CNM has been planned under TCSP.

▶ The TP will help identify and define globally competitive technological capabilities required in the cluster and assist proposed TC in building this capability through planning and handholding over a period of six years. The Technology Partner (TP) 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 MSMEs to learn how to attain manufacturing excellence and attain associated excellence in skills development. The services of the TCs include being exposed to the potential impact of new and relevant technologies, trainings on use of technologies/equipment, providing access to cutting-edge equipment, developing and testing new products and patenting. The key objectives of the TP include:

- In conjunction with all stakeholders of the TCSP identify and define the globally competitive technological capability required by TCs, assist in their execution and provide handholding during their roll out.
- Supporting the up gradation of the existing TCs and establishment of new TCs for the manufacturing sector
- Augment services being offered by the TCs with respect to 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 focused at the manufacturing sector
- Support TCs to increase productivity and competitiveness of general engineering focused MSMEs by
 - Exposing them to existing and expected future technologies
 - Develop skills of the workers and students in the identified technologies and clusters
 - Offering advice/recommendations to MSMEs (clients) who directly or indirectly supply to large players or component manufacturers.

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), & will be enabled by technology and enriched by global knowledge & expertise of the various stakeholders including the TP, empowered by global networks and people.

▶ The CNM will be appointed for a period of six years to facilitate cluster and market development to realise improved competitiveness. The CNM will work closely with the MSME clusters to

understand their needs and requirements and get OEMs/ buyers involved in the program. The CNM will strengthen market linkages of TC 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. Existing research institutions which could be potential collaborators for specific technologies etc. The CNM would work towards the following key objectives:

- Increase of business opportunity for MSMEs through new market linkages.
- Increase competitiveness of supply chains of large firms by enhancing the quality, reliability and productivity of MSME suppliers.
- Increase the number of MSMEs utilizing the services of TCs resulting in increase in revenues of TCs
- Enhance competitiveness of the cluster business environment:
 - Increase access by MSMEs to a network of business development services (BDS) which address needs not in the domain of TC expertise
 - Increase access by MSMEs to network of financial service providers
 - Increase awareness of opportunities in the public sector to contribute to a more competitive business environment.
- Establish closer cooperation of key innovation stakeholders to enhance product and process innovation. This would include linking the research agendas of applied research and education institutes/organizations to industry and market requirements and promoting joint research and development projects.
- Facilitate 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.
- Establish a business model which ensures financial self-sustainability of the CNM as before the end of the TCSP funding window.

All investment decisions (technological and 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 and expertise of the various stakeholders including the CNM, empowered by global networks and people.

10.7 Entrepreneur Development Cell

Promoting emerging technological and knowledge-based innovative ventures that seek to nurture ideas from entrepreneurs is important for development MSMEs. Such entrepreneurial ideas not only provide a career option for students but also have a multiplier effect on employment generation. In

order to encourage more and more students to become entrepreneurs, it is necessary to create awareness, motivate, educate and support the students. The development of an entrepreneur includes inculcating the entrepreneurial skills into a common person, providing the needed knowledge, developing the technical, financial, marketing and managerial skills, and building the entrepreneurial attitude among the applicants.

The Objective of EDC is to

- ▶ Act as an institutional mechanism for providing various services including information on all aspect of enterprise building to budding MSME entrepreneurs
- ▶ Create Entrepreneurial culture in the Institution and other institutions in the region and to promote entrepreneurship programmes related to women and weaker sections of the society
- ▶ Train the entrepreneurs in management of manpower, machine, material, taxes, legal aspects, finances and cash flow of a MSME
- ▶ Foster better linkages between the Parent Institution, Industries and R&D institutions in the region and other related organisations engaged in promoting Small & Medium Enterprises (SMEs) and Non-Government Organisations (NGOs).
- ▶ Catalyse and promote development of enterprises and promote employment opportunities in the innovative areas
- ▶ Respond effectively to the emerging challenges and opportunities both at national and international level relating to SMEs and micro enterprises

10.7.1 Entrepreneur Development Cell at Rohtak TC

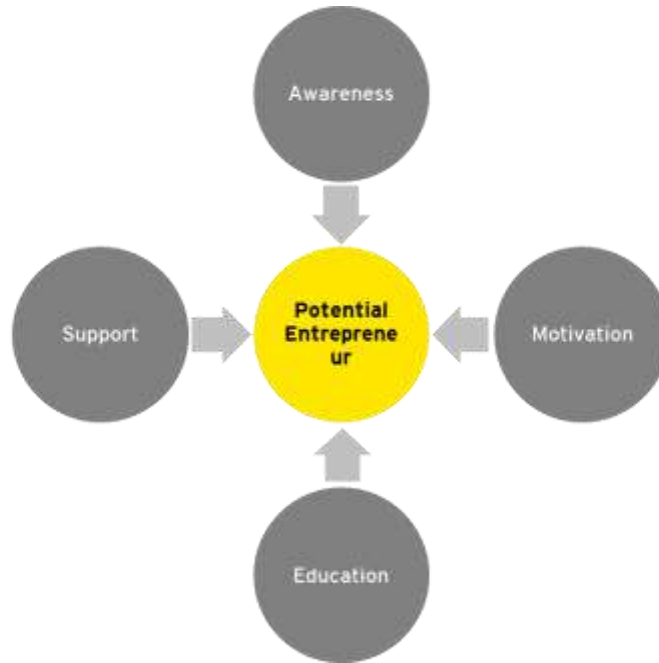
Entrepreneur cell at the TC shall consist of student and faculty (in house and visiting), adapt a systematic approach to guide students to become a leader to take global challenges and opt for self-employment. Following activities shall be taken up by the entrepreneur cell to accomplish its vision.

- ▶ Sensitize students on entrepreneurship at induction stage & orientation to the students.
- ▶ Conduct awareness programmes in house
- ▶ Enhancing industry institute interaction through guest lectures and industry visits
- ▶ Conduct programmes on idea generation & business plan preparation
- ▶ Conduct training programmes In the field of entrepreneurial skill development
- ▶ Market assessment for the entrepreneur opportunities
- ▶ Provide guidance and facilities to first time entrepreneurs particularly in raising funds and firm registration
- ▶ Support for entrepreneurship in curricula at diploma and degree levels

Collaborate with various institutes such as Entrepreneur Development Institute of India, Ahmedabad, and Entrepreneur Development Institutions (National Institute for MSME Hyderabad, Indian Institute

for Entrepreneur (IIE) Guwahati, and National Institute for Entrepreneurship and small business development Noida) etc. to promote entrepreneurship. A close link will be made with leading bank and DIC/industry department to support the ecosystem.

Figure 24: Key areas of incubation support



11 Quality system

The new TC would further aim to obtain various process certificates to enhance its competitiveness like;

Table 31: Indicative certifications of quality systems

Name of certification	Area	Details
ISO 9001	Quality Management System	<ul style="list-style-type: none"> ▶ This would help to monitor, control, and improve quality of products and services offered by the TC ▶ It is a series of standards that define, establish, and maintain a quality assurance system for manufacturing and service industries ▶ ISO 9001 deals with the requirements that organizations wishing to meet the standard must fulfil
ISO 14000	Environmental Management System	<ul style="list-style-type: none"> ▶ Will help to address various aspects of environmental management of the TC ▶ It provides practical tools to identify and control environmental impact and constantly improve their environmental performance ▶ These standards call for analysis of the entire life cycle of a product, from raw material to eventual disposal and focus on awareness of the processes and procedures that can affect the environment
ISO 29990	Learning services for non-formal education and training	<ul style="list-style-type: none"> ▶ For quality professional practice, performance and enhance transparency ▶ Allows for comparison on a worldwide basis of learning services, and management standards in the field of non-formal learning
ISO 50001	Energy management systems	<ul style="list-style-type: none"> ▶ Gives requirement for energy management systems ▶ Establishes framework for industrial plants; commercial, institutional and government facilities and entire organisations to manage energy usage
OHSAS 18001	Occupational Health and Safety standard	<ul style="list-style-type: none"> ▶ Is an internationally-applied British Standard for occupational health and safety management systems ▶ It provides for the elements of an effective safety management system which can be integrated with other management systems and help organizations achieve better occupational health and safety performance and economic objectives

- ▶ The TC will essentially adopt the 5S technique for process improvement to clean and organise its workspace to improve the workflow. Further trainees will be trained and exposed to 5S process improvement technique. This would require the TC to do the following;
 - **Sort:** To de-clutter the workspace and prioritise tools and materials used frequently, the TC will sort everything in the work area so that unnecessary items (tools, parts, equipment, storage bins, etc.) can be removed and either discarded or stored elsewhere.

- **Straighten:** This will involve creating storage solutions that would facilitate orderly work flow of everything in the TC by placing more frequently used items for quick and easy access.
- **Shine:** This will require efforts in the initial phase involving painting and installing better lighting to make the workspace clean and tidy. Further during ongoing activities at the TC, the work space and equipment will be cleaned and restored to their proper place at the end of each shift. Basic preventative maintenance tasks like tightening, oiling, restocking will also be part of this. The workstation would then be ready for the next user (or the next day) and the order created in the first two steps will be preserved.
- **Standardize:** The objective of the same would be to make everyone in the TC familiar about the current steps in order to follow and establish expectations. TC would conduct training, create documented procedures, work instructions, use visual guides, checklists, and/or photos for easy understanding of any changes made. Standardised ways will increase efficiency and be user friendly for TC employees and others.
- **Sustain:** Sustaining the processes would be important to ensure that focus doesn't drift away from 5S. TC would adopt strategies like daily meetings, mini-audit and ongoing continuous improvement efforts to sustain the 5s.

Infrastructure and Facilities



12 Infrastructure and facilities

The infrastructure of the proposed TC at Rohtak has been developed based on the requirements, recommended norms, capacity data of the existing TCs capacity, discussions with key stakeholders and the experience of the team in providing professional advice on similar projects. The team has studied the applicable AICTE/ NCVT norms for development of infrastructure facilities for engineering and technology institutes and detailing out the infrastructure provisions for the proposed TC (attached as Annexure 16.4 for reference) in view of the same. Also leading practices from international training institutes have also been considered. The TC will be built on area of around 20 acres and the layout will have following blocks with required infrastructure.

- ▶ **Production Block:** The highest priority has been given to the allocation of space for installation of machines for production activities. Depending on the space required by the machines, the area for manufacturing should be demarcated which would also include other facilities like toilets, washrooms and change rooms, adequate space for their mobility, clean drinking water in their vicinity etc. This block will also have metrology section which can be accessed by industry directly.
- ▶ **Training Block:** This area will have classrooms, labs, conference hall, faculty rooms and facilities for training / seminars/ workshops etc. Welding Workshop shall be separated from other blocks.
- ▶ **Administrative Block:** This block will have GM and DGMs Office and secretariat. It will also house office and desk space of all management, professional staff, administrative and support staff, library and other amenities such as conference room with video conferencing facility, meeting rooms etc.
- ▶ **Utilities Block:** The utilities block comprises of areas that will house main electrical meter, VCBs, HT panel, distribution panel and power back up DG plant. The utilities block will also house water pumps, purification plant and chilling plant, water treatment plant etc. The open areas around the building will also have some utilities provision such as rain water harvesting pits and panels for the operation of external lighting. Utility will also include sewage treatment plant at an appropriate location.
- ▶ **Hostel and staff accommodation:** The hostel blocks will comprise of accommodation for the students (separate for males and females). A few staff quarters (for driver, security officer, wardens - boys and girls hostel, Maintenance staff etc.) will also be constructed to house some of the emergency staff or on need basis.
- ▶ **Open Areas:** The open areas comprise of drive way, rain water harvesting pit and landscaped areas including the facade and main entry of the TC. The size of the open area will depend on the design strategy adopted by the CMC.
- ▶ **Others:** This will include canteen, parking, security room etc.

- **Basic amenities:** Apart from the above facilities the campus will have basic amenities with provision for;
- Drinking water
 - Toilets
 - Dining room as a hygienic area and place away from the work environment for rest breaks and the consumption of food
 - Change rooms to enable employees to change (e.g. uniforms or dirty work clothing) with privacy and security. Such facility helps to reduce employee exposure to and potential spread of contaminating substances used in work processes
 - Personal storage for the secure and clean storage of personal belongings or clothing, lockable where necessary
 - Immediate availability of doctors, health supervisors and ambulance and sufficient first aid kits
 - Fire safety with smoke alarms to protect people against death and injury from fires. Providing fire safety awareness to employees and conduct fire drill from time to time
 - Fire assembly area in case of fire or natural calamity
 - Dustbins with proper colour coding in green for organic, yellow for glass, white for paper, grey for metal, blue for plastic, red for hazardous products

Table 32: Details of proposed infrastructure

Details	Nos.	Total Area (Sq. mt.)
Production Block		3876
Stores		178
Trial Room		267
Machine Shop incl. Maintenance Block		1466
Production Office (Cabins, Documentation & others)		192
Innovation & Design Office		192
Toilet Block		80
Prog. Room		52
Meeting Room		33
Future Expansion		544
Circulation, Stairs and wall areas		872
Training Block		7642.09
Sr. Manager/HoD Room	1	52.5
Training Office		
Manager Room	1	24
Reception & Counselling		95.25
Faculty Room		196
Library with learning facility	1	365
Multi-purpose hall for examination/drawing/reading room	1	196
Classrooms	8	612

Details	Nos.	Total Area (Sq. mt.)
Labs	16	1142
Workshops, including incubation centre	3	2683.73
Toilet		91.61
(Placement Cell, VC, Tool Store, Electrical Panel, House Keeping, Circulation)		268
Circulations, Stairs and wall etc.		1916
Admin Block		465.06
GM Office & Sect		63
DGM Office		40
Purchase Officer cabin		55.75
Accounts cabin		
HR & Admin		
Marketing		40.06
Reception Area		94
Record Room		37.5
IT Dept/Server Room		52
Manager Admin Cabin		43.5
Toilet Block		39.25
Conference Rooms		1244.85
Conference Hall 1 (for 30 people)	1	195.5
Conference Hall 2 (for 150 people)	1	291.6
Toilet		36.25
Lunch Area		67
Green Room, Back Stage		51.75
Meeting Room		7.5
Office		43
Conference Room		25.25
Pantry		7.25
Store		10
UPS, Electrical, Fire Control Room		32.25
Circulation, Lobby, Staircase, wall etc.		477.5
Others		2289
Canteen (incl. toilets, kitchen, store etc.)		1394
Utilities Room - DG Set, Transformer, UPS		686
Security Room (incl toilet)		180
Bank Counter		29
Total		15517

- ▶ **Hostel and staff accommodation:** The hostel block will comprise of accommodation for students enrolled under fulltime courses along with the hostel warden. Based on calculations, it has been estimated that around 2,200 trainees will be in fulltime courses at any given point of time. Further, on the basis of study conducted and discussions with heads of some of the

existing MSME TCs, the provisioning of hostel facility has been done for approximately 7% of the above mentioned capacity. Therefore, it is proposed to develop the hostel capacity for around 150 trainees and out of which 36% (around 54) will be reserved for female trainees. The hostel building has been planned to be G + 2 structures with provision for further vertical expansion depending on future requirements. Part of the ground floor of the hostel building will be reserved for use as hostel office, other common facilities etc. The space on rest of the floors will be developed as rooms for accommodation of students. The details of proposed hostel infrastructure have been given in the following table. An executive Hostel with capacity of 8 persons is also proposed. Additionally, eight emergency staff quarters will also be constructed to house some of the key management officials as per requirement. Initially the staff quarters block will be a G+1 structure with a provision of further expanding it vertically depending on future requirements.

Table 33: Details of proposed infrastructure for hostel and staff quarters

Hostel	Category	Floors	Trainees per Room	Number of trainees	Area per trainees (sq. mt.)	Total Area (sq. mt.)
Hostel No.1	Boys	G+2	4	96	12	1158
Hostel No.2	Girls	G+2	3	54	15	820
Hostel No.3	Executive	G+1				320
Total						2298

		Number	Area (sq mtrs)
Staff Qtrs	G+2 (60sqmt/quarter)		
		150	578
	Total	10	578

As per the details of proposed infrastructure given in above two tables, the construction of the Rohtak TC will include development of 18393 {15517 + 2298 +578 (Hostels and staff Quarters)} square meter of built up area in total. Per square meter cost of construction has been estimated to be INR 34,481. Further, the tentative cost for development of external services -underground water tank, rain water harvesting system, storm water drainage network, water treatment plant, sewage treatment plant, street lighting, development of internal roads, landscaping and grey water treatment plant including UPS, water treatment plants, AC plant etc. for entire campus has been estimated to be around INR 1200 lakhs. Towards development of boundary wall an estimated cost of INR 290 lakhs has been provisioned. The detail for development of campus infrastructures is as follows;

Table 34: Cost for development of campus infrastructures

SN	Hostel	Cost (in INR lakh)
1.	Cost of development of build-up area @ 34481 per sq. mt. for 18393 sq. mt.	6,342
2.	External Services-Underground water tank, rain water harvesting system, storm water drainage network, water treatment plant, sewage treatment plant, street lighting, development of internal roads, landscaping and grey water treatment plant and boundary wall, UPS, Transformer, AC plant etc.	1490
3.	Total	7,832
4.	Contingency @ 5%	392
Grand total		8,224

Further provisioning towards establishment of other associated infrastructure will be done for the planned capacity and is listed in the following table;

Table 35: Details of other infrastructure

SN	Other Infrastructure	Nos.	Budgeted Cost (INR lakhs)	Total Cost (INR lakhs)
1	Office & Storage Furniture	60	0.5	30
2	Hostel Furniture	400	0.25	100
3	Canteen and Hostel Dining hall furniture	20	0.6	12
4	Kitchen equipment	2	20	40
5	Other Office equipment	50	1	50
6	Laptop	20	0.6	12
7	Desktop	40	0.5	20
8	Photocopier cum printer	3	2	6
9	Vehicle	2	12.5	25
10	Air Compressor 125 CFM (each) Including piping and accessories	2	10	20
11	Preliminary expenses	1	40	40
12	Others (Miscellaneous)	1	50	50
	Contingency 5%			20.25
Total				425.25

Above all, the development of campus infrastructure will be done keeping the following guidelines in mind;

► **Campus Layout/ Plan:** Campus layout is crucial for successful performance of the TC. At least 30% green area will be maintained and landscaping will be done to improve aesthetics of the surrounding while maintaining habitats conducive to natural fauna. Also, efforts will be made to conserve existing vegetation and other rich biodiversity in the premises as well as vicinity. Apart from this, there will be the following considerations while planning the campus layout:

- **Site drainage:** Existing drainage pattern of the available site will be studied and the drainage system required for the TC will be constructed in line with the drainage pattern. Storm water drain will be constructed separately so as avoid mixing of the fresh and the waste water.
- **Heat island effect:** Site will be planned properly to mitigate the heat island effect (Thermal gradient difference between developed and undeveloped areas) by following measures:
 - At least 40% of the non-roof impervious surfaces on the site (including parking lots and walkways) will be shaded
 - Pavements and walkways should be painted in light colour (solar reflectance index > 0.5)
- **Boundary:** The campus will be provided with boundary wall in all the directions to avoid encroachment, theft and safety.
- Trees will be planted in large numbers to provide natural shade in the open areas. This helps to reduce the temperature on campus in comparison to the vicinity
- Efforts will be made to utilize natural light to the maximum possible extent and provision should be made for natural ventilation
- Green building codes may be adopted while designing the building layout so as to ensure following environmental safeguards;
 - Renewable energy in terms of solar water heater, solar panels, solar street light may be used
 - LED/CFL lights will be used within the premises to reduce the energy consumption
 - Provisioning of water treatment and recycling facility to reduce water consumption
 - Water harvesting arrangement to recharge the ground water and/or reduce dependency on ground water
 - Provisioning of waste management including practices to minimize waste generation, etc.
- Criteria mentioned in the National building code will be followed so as to ensure that all the safety precaution like escape routes/emergency exits, setting of machinery providing appropriate working space, etc. is maintained
- Hazardous material like asbestos sheets should be avoided in any part of the structure
- Substitutes to natural resources will be encouraged in appropriate ratio so as to decrease natural resource consumption while maintaining the required strength (example: Fly ash may

be used in small percentage instead of cement for construction, composite material may be used construction of doors instead of wood, etc.

- Provision of toilets for both men and women will be made in appropriate number so as to ensure comfortable and hygienic working conditions
 - Energy efficient products like 5 star rated air conditioner, refrigerator, energy efficient motors, etc. will be used in the TC's
- ▶ **Detailed building plan preparation:** The building design is crucial for sustainable performance of the TCs. A number of factors including energy efficiency, materials of construction, natural light and ventilation, insulating, etc. must be kept in mind in order to maintain eco-friendly operations. Also, adherence to aspects related to safety like, resistant to earthquakes, proper evacuations, etc. will ensure successful operations of the TC.
- ▶ **Construction management:** Construction at the site involves a number of activities. These activities may lead to certain EHS impact on the existing natural settings and therefore, appropriate mitigation measures will be required to be put in place so as to minimize or avoid this impact. A snapshot of the issues with the basic principles to be kept in mind during construction is given in the EHS section of this DPR.

13 Expenditure pattern

13.1 Capital expenditure

Total capital expenditure will be to the tune of around INR 128.7 Crore for setting up of new TC at Rohtak. Summary of the Capital Expenditure is provided as below:

Table 36: Capital expenditure

Capex(Inc. Contingency @5%)	Cost (INR Lakhs)
Production Machinery and equipment	1,228
Training machines and equipment	2,735
Building and construction	8,224
Other infrastructure	425
Pre-Operative Expenses	258
Total Capex including contingency	12,870

13.1.1 Plant and machinery

Total expenditure on machines to the tune of around INR 3,963 lakhs is envisaged for the setting up of new TC at Rohtak.

Table 37: Plant & Machinery

Capex	INR Lakhs
Total Plant and Machinery including Contingency @ 5% of capex	3,963

The capital cost estimate for the proposed modernisation project has been prepared jointly by O/o DC-MSME and EY team based on inputs from the following:

- ▶ Technology workshop at Bhubaneswar; 2 day detailed sessions led by Dr. Clive Hickman on 'Future Manufacturing Technology Trends',
- ▶ Market opportunity assessment by EY team
- ▶ Validation of technology needs by detailed discussions and site visits to key manufacturing organisations
- ▶ Site visits and discussions with local industry and industry associations.
- ▶ Inputs from Office of DC MSME
- ▶ Inputs as per the World Bank Environment and Safety requirements

13.1.2 Building cost

Rohtak has around 20 acres of land available for setting up of the facility of the TC.³⁶

Table 38: Building cost

SN	Hostel	Cost (in INR lakhs)
1.	Cost of development of build-up area @ 34481 per sq. mt. for 18393 sq. mt.	6,342
2.	External Services-Underground water tank, rain water harvesting system, storm water drainage network, water treatment plant, sewage treatment plant, street lighting, development of internal roads, landscaping and grey water treatment plant and boundary wall, UPS, Transformer, AC plant etc.	1,490
3.	Total	7,832
4.	Contingency @ 5%	392
Grand total		8,224

13.2 Operating expenditure

The operating expenditure for the TC has been classified into variable operating expenditure and fixed operating expenditure.

13.2.1 Variable operating expenditure

Variable operating expenditure has four key heads. Expenditure under each head has been identified for the key income streams:

- a) **Raw materials**
 - ▶ Raw materials for finished goods
 - ▶ Raw materials for training
- b) **Consumable tools**
 - ▶ Consumable tools for finished goods
 - ▶ Consumable tools for training
- c) **Consumable stores**
 - ▶ Consumable stores for finished goods
 - ▶ Consumable stores for training
- d) **Utilities (electricity and water)**
 - ▶ Utilities for finished goods
 - ▶ Utilities for training

³⁶ Dy. Director of Industries Rohtak

Table 39: variable cost assumptions

Description	Unit	Norms
Variable operating cost		
Raw material		
RM for Finished goods	% of FG	20.6%
RM for Training	% of Trg	1.0%
Consumable tools - FG	% of FG	2.5%
Consumable tools - Trg	% of Trg	1.0%
Consumable stores - FG	% of FG	2.0%
Consumable stores - Trg	% of Trg	0.6%
Utilities		
Electricity & water		
FG	% of FG	6.5%
JW	% of JW	6.5%
Training	% of Trg	4.9%

13.2.2 Fixed Operating expenditure

Fixed operating expenditure has four key heads. Expenditure under each head has been identified for the key income streams:

a) Salary and wages/ establishment expenses

The salary expenses include salary for employees of proposed TC at Rohtak. There will be 60 employees on regular contract and ~ 170 will be on temporary contract/honorarium visiting.

b) Repairs and maintenance (R&M)

Cost of repair and maintenance has been calculated for

▶ Plant and machinery installed

R&M for plant and machinery has been taken as a percentage of the gross block in an operating year.

▶ Buildings

R&M for plant and machinery has been taken as a percentage of the gross block in an operating year,

c) Training expenses

Training expenses primarily comprise of expenses incurred for external faculty visiting to the TC from time to time as part of Short term and Long term trainings. These expenses typically include faculty fees, hotel and transportation.

d) Other production and administration expenses

These include expenditure on heads like transportation/entry tax/ freight, Vehicle expenses, Printing and stationery, traveling and conveyance, audit, consultancy, advertisement, publicity, marketing, telephone, internet, bank charges, miscellaneous expenses. Expenditure under each head has been identified for the key income streams- Finished goods and Training

e) Insurance of new plant and machinery

Insurance expense for new plant and machinery includes the insurance cost for the new machinery to be installed. The same has been calculated as a percentage of the gross block of new machines.

Table 40: Fixed Operating Cost assumptions

Description	Unit	Norms
Fixed Operating Cost		
Salaries & Wages	Detailed assumptions given in a separate table	
R&M (Plant & Mach)	% of Plant	1.0%
R&M (Building)	% of Building	1.7%
Training Expenses		10%
Other Prdnn. & Admin. Exps	%of income	8%
Insurance cost (New P&M)	% of P&M	0.5%
Marketing expenses (1st year)	Rs. Lakhs p.a	25
Marketing expenses (2 year onward)	Rs. Lakhs p.a	15

► **Manpower and salary cost**

Manpower numbers have been designed in line with the expansion plan of the TC and ramp up of the production, training and consultancy. Manpower salary numbers are in line with the salary structure of existing TCs

Table 41: Manpower and salary assumptions

Top Management	Designation	Monthly salary (INR)	Nos.											
	GM	1,53,861	1	1	1	1	1	1	1	1	1	1	1	1
	DGM	1,29,327						1	1	1	1	1	1	1
Sub Total			1	1	1	1	1	2	2	2	2	2	2	2
Management and Support staff														
Administration and accounting	Manager Admin. and Accounting	69,204	1	1	1	1	1	1	1	1	1	1	1	1
	Sr. Officer HR	62,371						1	1	1	1	1	1	1
	Officer Procurement	35,744			1	1	1	1	1	1	1	1	1	1
	Officer Store	35,744		1	1	2	2	2	2	2	2	2	2	2
	Officer Admin	35,744		1	1	1	1	1	1	1	1	1	1	1
Design and consultancy	Senior manager	86,857		1	1	1	1	1	1	1	1	1	1	1
	Manager	82,777			2	2	3	3	3	3	3	3	3	3
	Sr. Engg.	64,806			2	3	3	3	3	3	3	3	3	3
Production	Senior Manager	86,857		1	1	1	1	1	1	1	1	1	1	1
	Manager Prod./Planning	82,777			1	1	2	2	2	2	2	2	2	2
	Manager Metrology	82,777			1	1	1	1	1	1	1	1	1	1
	Manager H/T	82,777			1	1	1	1	1	1	1	1	1	1
	Manager Maintenance	82,777		1	1	1	1	1	1	1	1	1	1	1

Top Management	Designation	Monthly salary (INR)	Nos.											
	Sr. engg. Maintenance	64,806					1	1	1	1	1	1	1	1
	Sr. Engg. Production	64,806		3	3	3	3	3	3	3	3	3	3	3
	Engg. / Foreman	34,240		2	4	6	6	6	6	6	6	6	6	6
	Senior Technician	29,512		1	2	2	2	2	2	2	2	2	2	2
	Senior Technician Maintenance (Mech + Elect)	29,512		1	1	2	2	2	2	2	2	2	2	2
Training	Senior Manager	86,857		1	1	1	1	1	1	1	1	1	1	1
	Manager Mechanical	82,777			1	1	1	1	1	1	1	1	1	1
	Manager Electronics	82,777			1	1	1	1	1	1	1	1	1	1
	Manager Short term	82,777						1	1	1	1	1	1	1
	Sr. Engg.	64,806		1	5	6	6	6	6	6	6	6	6	6
	Engg.	34,240		1	4	8	10	10	10	10	10	10	10	10
	Senior Technician	29,512		1	2	2	2	2	2	2	2	2	2	2
Sales and marketing	Manager Marketing	82,777		1	1	1	1	1	1	1	1	1	1	1
	Officer Sales	35,744			1	1	1	1	1	1	1	1	1	1
Total (Mgt & Support staff)				1	19	41	51	56	58	58	58	58	58	58
Number of employees on temporary contract														
	Training	15,000	.	3	21	44	75	108	119	131	144	151	159	159

Top Management	Designation	Monthly salary (INR)	Nos.											
	Contractual Employees (Production)	10,000			4	10	10	10	12	12	12	12	12	12
employees on temporary contract				3	25	54	85	118	131	143	156	163	171	171

Financial Analysis



14 Financial analysis

14.1 Key assumptions

Project construction and commencement of operations

The project construction is expected to start in the financial year 2016-17. It is assumed that, the construction period and installation of machines shall be completed in 15 months. Full-scale operations will commence at the end of the construction period of 15 months.

Table 42: Key assumptions

Start of Project	1-April-16
Construction period (Months)	15
Commencement of operation, date	1-July-17
Number of years, useful life of machines and equipment (as per depreciation rules)	10
Maximum days of operation in a year	300

14.1.1 Income assumptions

► Production

Table 43: Production assumptions

S.N.	Machine	Estimated Machine Rate/Hour*	Shift	Hours
Advanced Machines				
1	CNC VMC-3 axis	1500	3	24
2	CNC Lathe	500	3	24
3	CNC Wire EDM	1500	3	24
4	CNC EDM Die Sinking	750	3	24
5	Injection Moulding machine	750	2	16
6	Additive Manufacturing/3D printing/RPT	750	2	16
7	CNC Coordinate Measuring Machine	2500	2	16
Conventional Machines				
8	Conventional Milling	250	3	24
9	Conventional Lathe	200	3	24
Supporting machines and Labs				
10	Radial drill machine	150	2	2
11	Surface Grinding	400	2	8
12	Cyl Grinding	400	2	16
13	Hydraulic press	800	2	16
14	Metrology Lab Eqpt.	800	2	16

S.N.	Machine	Estimated Machine Rate/Hour*	Shift	Hours
15	CAD/CAM Softwares CATIA, UG etc	500	2	16

Machine utilisation	Year	
2 nd year of production	2019-20	25%
3 rd year of production	2020-21	40%
4 th year of production	2021-22	50%
5 th year of production	2022-23	60%
6 th year of production	2023-24	70%
year on year increase in machine utilisation and machine hour rate 7 th year onwards	2024-25	10%

► Training revenue assumptions

Table 44: Training revenue assumptions

N o.	Specialisation	Course name	FEES In '000	Durati on (mont hs)	Batc h size	No. of Batch/ year	Annual intake
1	Tool Room Processes	Advanced Diploma in Tool & Die making	140	48	60	1	60
		Certificate course in Machinist	40	24	30	1	30
		PG in Tool Design & CAD CAM	105	18	30	2	60
		Post Diploma in Tool and Die Manufacturing	50	12	30	2	60
		Post Diploma in CNC-Prog & Op	35	12	30	2	60
		Post Diploma CAE (manufacturing)	60	12	30	2	60
		Adv. Certificate Course in Tool Design & CAD/CAM	60	12	30	2	60
		Adv. Certificate Course Tool & Die Manufacturing	60	12	30	2	60
		Certificate Course in Tool & Die Making	40	12	20	2	40
	CNC Machining	Master of CAD/CAM/CNC	20	6	30	6	180
		Certificate Course in Machine Maintenance	30	12	30	4	120
	CAD/ CAM/CAE	Maint Technician	10	3	20	4	80
	QC & Metrology	Machine Maintenance-mech (Part Time)	18	6	20	2	40
		Maint Technician (Part Time)	12	6	20	2	40
	Automati on	Adv. Certificate Course CNC Machining (L,M,WC,EDM)	60	12	30	2	60
		Certificate Course CNC Machining (Turn & Milling)	40	12	20	2	40
		Certificate Course in Metrology & QC	30	12	30	4	120
		Master Certificate Course in Computer Aided Tool Engineering	40	6	30	6	180
		CNC lathe programming and operation (Full Time)	9	2	30	12	360
		CNC lathe programming and operation (Part Time)	10	4	30	12	360
	CNC Milling Prog and Operation (Full Time)	10	2	30	12	360	

N o.	Specialisation	Course name	FEES In '000	Durati on (mont hs)	Batc h size	No. of Batch/ year	Annual intake
		CNC Milling Prog and Operation (Part Time)	10	4	30	12	360
		CAD/CAM/CNC ENGINEER (Full Time)	10	2	30	12	360
		CAD/CAM/CNC ENGINEER (Part Time)	12	4	30	6	180
		CAD Modelling with different softwares (Full Time)	6	1	30	24	720
		CAD Modelling with different softwares (Part Time)	7	2	30	24	720
		Computer Integrated Manufacturing (CIM)	7	1	30	24	720
2	Advance Welding	Welding (NCVT recognised course)		12	24	1	24
		Basic Arc and Gas welding (Full Time)	10	3	20	4	80
		Basic Arc and Gas welding (Part Time)	12	6	20	4	80
		TIG welding (Full Time)	6	1.5	10	4	40
		TIG welding (Part Time)	6	3	10	8	80
		MiG welding (Full Time)	6	1.5	10	8	80
		MiG welding (Part Time)	6	3	10	8	80
		Spot Welding (Full Time)	8	1.5	10	2	20
		Spot Welding (Part Time)	8	3	10	4	40
		Stainless Steel & Aluminum welding (Full Time)	8	1.5	10	2	20
		Stainless Steel & Aluminum welding (Part Time)	8	3	10	4	40
						-	
3	Electronics and IT	Basic computer and Hardware (Part Time - 4 hrs)	8	2	20	20	400
		Advanced Hardware & Networking (Part Time - 4 hrs)	12	4	20	10	200
		Solar energy system technician	8	3	12	4	48
		Power plant instrument mechanic	8	3	12	4	48

N o.	Specialisation	Course name	FEES In '000	Duration (months)	Batch size	No. of Batch/year	Annual intake
4	Industrial and process Automation (Mining & Mineral Processing)	Industrial Hydraulics	6	1	20	12	240
		Industrial pneumatics	6	1	20	12	240
		PLC Programming	6	1	20	12	240
		Automation Technician	12	4	20	3	60
		Industrial automation design	15	4	20	3	60
		Post Diploma in Mechatronics	60	12	30	2	60
		Diploma in Mechatronics	120	36	30	1	30

► **Consultancy revenue assumptions**

Revenue from consultancy is expected to start in 2nd year of operation i.e. 2019-20 when the TC is fully operational and all infrastructures are in place.

Table 45: Consultancy revenue assumptions

S. No	Consulting Areas	Suggestive Rev Year 1 (INR lacs)	Suggestive Rev Year 2 (INR lacs)	Suggestive Rev Year 3 (INR lacs)	Suggestive Rev Year 4 (INR lacs)	Suggestive Rev Year 5 (INR lacs)	Suggestive Rev Year 6 (INR lacs)	Suggestive Rev Year 7 (INR lacs)	Suggestive Rev Year 8 (INR lacs)	Suggestive Rev Year 9 (INR lacs)	Suggestive Rev Year 10 (INR lacs)
1.	Design Support (incl. Product Design)	4	6	9	13.5	20.25	30.37	45.56	68.34	102.52	153.77
2.	Engineering Solutions (Development of Jigs & Fixtures for Machining, Welding, etc.)	1	1.5	2.5	3.5	5	8	12	17	26	38.5
3.	Quality System Support	1	1.5	2.5	3.5	5	8	12	17	26	38.5
4.	Project Consultancy (curriculum development, community colleges, trainers, etc.)		2	3	4.5	6.75	10.12	15.18	22.78	34.17	51.25
5.	Low cost Automation Solution Support		1	1.5	2.25	3.37	5.06	7.59	11.39	17.89	25.62
6.	Productivity Improvement		1	1.5	2.25	3.37	5.06	7.59	11.39	17.89	25.62
Total		6	13	19.5	29.25	43.87	65.81	98.71	148.08	222.12	333.18

14.1.2 Project cost and financing

The project construction will be undertaken in a phased manner. The initial phase will be of about 7 months and final phase will be of about 8 months. Phase 1 is expected to be completed in 2016-17, while phase 2 is expected to get completed by 2017-18. In the initial phase, construction of infrastructure for basic training courses is planned along with procurement of basic machines.

Table 46: Project cost and financing

Project cost and phasing		In lakhs
Particulars	2016-17	2017-18
Project Cost	2,162	10,708
Total		12,870

14.1.3 Other financial assumptions

Terminal value assumptions:	
Discount rate	9.25%
Growth rate in perpetuity	5.0%
Cost of equity	9.25%

Repair & maintenance (of P&M)	1.0%
Repair & maintenance (of Building)	1.7%
Post commissioning Insurance cost of new P&M (of P&M & building)	0.5%

Working Capital Assumptions		
Cash in Hand	Days	60
Accounts Receivables	Days	90
Suppliers Credit (A/P)	Days	30
Finished goods Storage	Days	30
Inventories (RM, Consumables)		
Finished goods	Days	90
Training	Days	90

Inflation (Salary etc.)	10%
-------------------------	-----

Depreciation Rates			
Asset Class		WDV	Max Depreciation
Tangible Assets			
	Plant and machinery	13.91%	95.00%
	Buildings	10.00%	95.00%

Working capital and cash flow statement

Overall net working capital requirement for the TC is expected to grow from about INR 28 lakhs in 2018-19 to INR 399 lakhs by year 2026-27.

Figure 25: Net working capital requirement

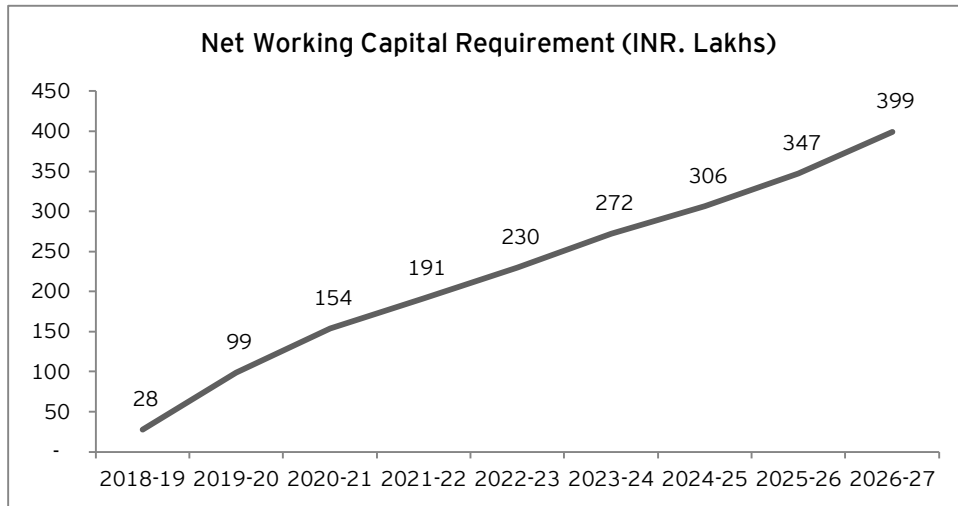


Figure 26: Cash flow closing balance

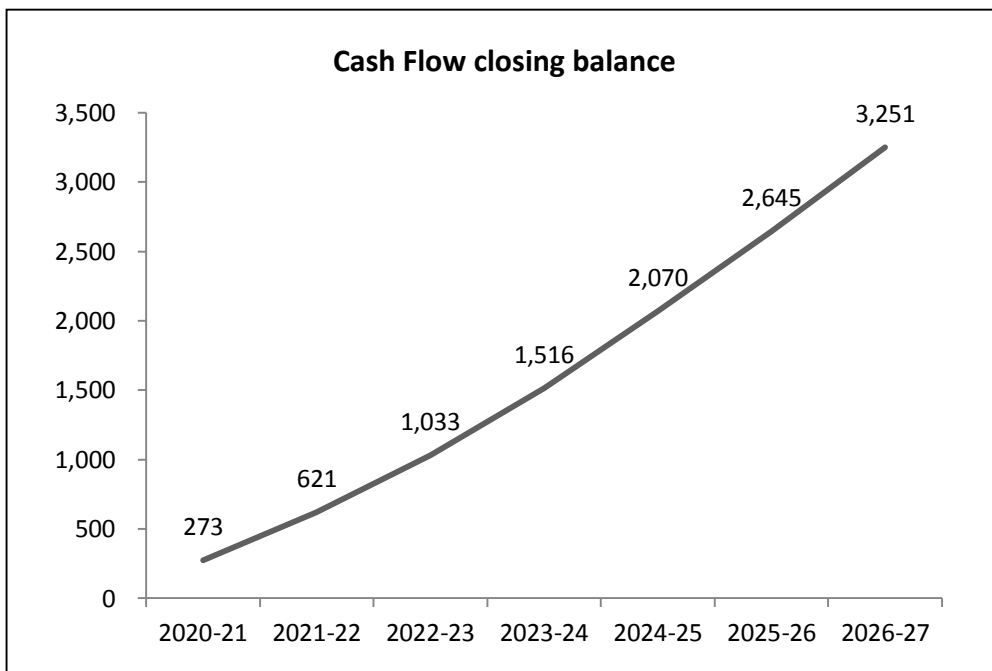


Table 47: Working capital schedule

Working Capital Schedule - With TCSP											
Years	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
											INR Lakhs
Raw Material Storages											
Finished goods	-	3	11	18	23	27	32	35	39	43	47
Training	0.37	1	2	3	4	5	5	5	6	6	6
Consumable tools											
Finished goods	-	0	1	2	3	3	4	4	5	5	6
Training	0.37	1	2	3	4	5	5	5	6	6	6
Consumable stores											
Finished goods	-	0	1	2	2	3	3	3	4	4	5
Training	0.21	1	1	2	2	3	3	3	3	3	4
Finished Product Storages											
Finished goods	-	5	19	30	37	44	52	57	63	69	76
Accounts Receivables	0.33	17	63	100	126	153	183	210	242	284	338
Gross Working Capital	1.29	28	101	161	202	243	287	324	367	420	488
Suppliers Credit	0.32	0	2	7	10	13	15	17	19	21	23
Net Working Capital Requirement	0.97	28	99	154	191	230	272	306	347	399	465

Table 48: Cash flow statement

Cash Flow												
Years	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
												INR Lakhs
Income post Depreciation	-27	-274	-1,635	-1,182	-779	-596	-419	-247	-97	7	117	271
Add: Depreciation		216	1,410	1,249	1,106	981	870	772	685	609	541	481
Inflow from capital fund	2,162	10,708										
Capital fund to balance -ve cash flows, if any	27	59	252	5								
Total Cash Inflow	2,162	10,709	27	71	328	385	451	525	589	616	658	752
Investment in Assets	2,162	10,708										
Net Change in WC		1	27	71	55	37	39	42	34	41	52	66
Total Cash Outflow	2,162	10,709	27	71	55	37	39	42	34	41	52	66
Opening Balance					0	273	621	1,033	1,516	2,070	2,645	3,251
Surplus/Deficit				0	273	348	412	483	554	575	606	686
Closing Balance				0	273	621	1,033	1,516	2,070	2,645	3,251	3,937

14.2 Income & expenditure statement

The focus of Rohtak TC will be skill development for providing skilled worker to MSMEs. The income to the proposed centre from training will start accruing from year 2017-18 with completion of phase 1 (basic training infrastructure and procurement of basic machines) and start of basic courses. Initially an income of around INR 122 lakhs is expected in year 2017-18. Once the overall construction is complete, the TC revenue is expected to grow from INR 453 lakhs in 2018-19 to INR 3,202 lakhs by year 2027-28.

Table 49: Income and expenditure

Income and Expenditure												
Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
INR Lakhs												
Income												
Training Income		121	396	774	1,140	1,347	1,481	1,629	1,792	1,882	1,976	2,075
Sale of Finished goods			46	185	296	370	445	519	570	628	690	759
Sale of Scrap		1.1	5	11	17	20	23	26	28	30	32	35
Consultancy Income		-	6	13	20	30	44	67	100	148	223	333
Total Income		122	453	983	1,473	1,766	1,992	2,240	2,491	2,687	2,921	3,202
Expenditure												
Variable Operating expenditure												
Raw materials		1	14	46	73	90	107	123	136	148	162	178
Finished goods			10	38	61	76	92	107	118	129	142	156
Training		1	4	8	12	14	15	17	18	19	20	21
Consumable tools		1	5	13	19	23	27	30	33	35	38	41

Income and Expenditure												
Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Finished goods			1	5	7	9	11	13	14	16	17	19
Training		1	4	8	12	14	16	17	19	20	21	22
Consumable stores		1	3	8	13	15	18	20	22	24	25	27
Finished goods			1	4	6	7	9	10	11	13	14	15
Training		1	2	5	7	8	9	10	10	11	12	12
Utilities (Electricity & water)		6	22	50	75	90	102	114	125	133	142	151
Finished goods			3	12	19	24	29	34	37	41	45	49
Training		6	19	38	56	66	73	80	88	93	97	102
Variable Operating expenditure		9	45	117	180	219	253	287	316	341	368	397
Fixed Operating Expenditure												
Salary & Wages/ Establishment expenses	27	146	336	432	524	678	772	878	1,001	1,121	1,258	1,384
Repairs and Maintenance			180	180	180	180	180	180	180	180	180	180
P&M			40	40	40	40	40	40	40	40	40	40
Buildings			140	140	140	140	140	140	140	140	140	140
Training Expenses			40	77	114	135	148	163	179	188	198	207
Other Prdnn. & Admin. Exps			35	76	114	137	154	174	193	208	226	248
Marketing expenses		25	25	15	15	15	15	15	15	15	15	15
Insurance of new machines			19	19	19	19	19	19	19	19	19	19
Fixed Operating Expenditure	27	171	634	799	966	1,163	1,288	1,428	1,586	1,731	1,896	2,053
Total Expenditure	27	180	678	916	1,145	1,382	1,541	1,716	1,902	2,072	2,264	2,450

Income and Expenditure												
Year	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Income (Gross income)	(27)	(58)	(225)	66	328	385	451	525	589	616	658	752
Depreciation	-	216	1,410	1,249	1,106	981	870	772	685	609	541	481
Income post Depreciation	(27)	(274)	(1,635)	(1,182)	(779)	(596)	(419)	(247)	-97	7	117	271

14.3 Balance sheet

Table 50: Balance sheet

INR Lakhs

Balance Sheet												
Years	1-Apr-16	1-Apr-17	1-Apr-18	1-Apr-19	1-Apr-20	1-Apr-21	1-Apr-22	1-Apr-23	1-Apr-24	1-Apr-25	1-Apr-26	1-Apr-27
Liabilities												
Capital fund	2,162	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870
Capital for -ve cashflow	27	85	338	343	343	343	343	343	343	343	343	343
Reserve and Surplus	(27)	(301)	(1,936)	(3,118)	(3,897)	(4,493)	(4,912)	(5,159)	(5,256)	(5,248)	(5,131)	(4,860)
Total	2,162	12,655	11,272	10,095	9,317	8,720	8,301	8,054	7,957	7,965	8,082	8,353
Fixed Assets												
Gross Block	2,162	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870	12,870
Less: Accumulated Depreciation	-	216	1,626	2,874	3,981	4,962	5,832	6,604	7,289	7,898	8,439	8,919

Net Block	2,162	12,654	11,244	9,996	8,889	7,908	7,038	6,266	5,581	4,972	4,432	3,951
Current Assets												
Cash	-	-	-	0	273	621	1,033	1,516	2,070	2,645	3,251	3,937
Other Current Assets	-	1.0	28	99	154	191	230	272	306	347	399	465
Total	2,162	12,655	11,272	10,095	9,317	8,720	8,301	8,054	7,957	7,965	8,082	8,353

14.4 Profitability

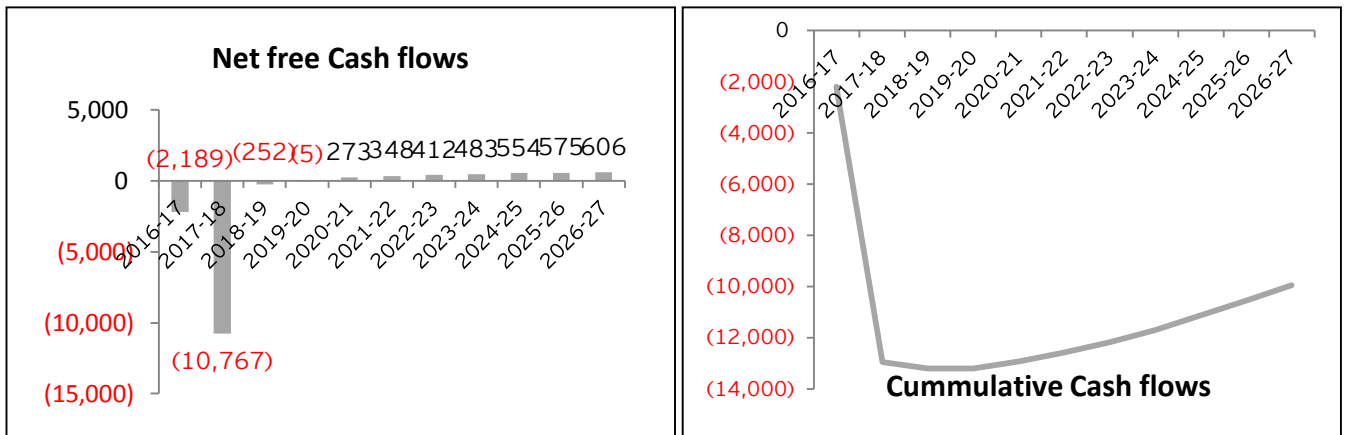
Overall project profitability has been estimated considering phased investment in plant & machinery and infrastructure. The full-fledged operations are expected to start from the year 2018-19. Hence the project IRR for a period of 12 years till 2027-28 is 4.9%.

Table 51: Profitability with investment plant & machinery

Project IRR	4.9%
Payback period	>11 years

The project is expected to generate positive net free cash flows starting year 2019-20.

Figure 27: Net free Cash flows and Cumulative Cash flows



14.5 Sensitivity analysis

Sensitivity analysis of Project IRR has been carried out with respect to the key project parameters.

- ▶ Project cost
- ▶ Revenue from Training
- ▶ Revenue from production
- ▶ Revenue from Consultancy

The project IRR is most sensitive to changes in training revenue, followed by changes in project cost, production revenue and consultancy revenue.

Training forms majority of revenue for the TC followed by production and consultancy.

5 percent increase/decrease in training revenue increases / decreases the project IRR by about 1.17%.

5 percent increase/decrease in project cost decreases/ increases the project IRR by about 0.53%

5 percent increase/decrease in production revenue increases / decreases the project IRR by about 0.36%.

Consulting being the lowest contributor to revenue has the lowest impact on project sensitivity. 5 percent increase/decrease in consultancy revenue increases / decreases the project IRR by about 0.20%.

Table 52: Sensitivity of IRR

		Construction period (15 Months)		Construction period (15 Months)
Increase in Project cost	-5%	5.5%	Increase in Consultancy revenue	10.9%
	0%	4.9%		4.7%
	5%	4.4%		4.9%
	10%	3.9%		5.1%
Increase in Training revenue	-7.5%	2.7%	Increase in Production revenue	4.2%
	-5%	3.5%		4.6%
	0%	4.9%		4.9%
	5%	6.2%		5.3%
	10%	7.4%		5.6%

Environment, Health and Safety



15 Environment, health and safety

Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations at various levels during project implementation. It is proposed that World Bank EHS guidelines will be followed to adhere to the desirable performance levels and measures while developing the TC.

15.1 Environment

15.1.1 Air emissions

The expected manufacturing processes in the proposed TC with air emissions would be sintering, metal cutting, grinding and / or forming (including forging, wire drawing, pressing, stamping, among others), quenching, annealing and other general treatments, abrasive treatments (e.g. shot, sand blasting), solvent degreasing and emulsion, alkaline, and acid cleaning, welding, anodizing, chemical conversion coating, electroplating, painting and other metal finishing techniques (Including polishing, hot dip coating). To counter the problems, the following techniques will be used:

- ▶ **Volatile Organic Compounds (VOC)** emissions management strategies will be used which include:
 - Installation of refrigerator coils (or additional coils) above the degreaser vapour zone
 - Application of an air flow over the top of the degreaser that should not typically exceed 40 m / minute
 - Rotation of parts before removal from the vapour degreaser, including:
 - Installation of thermostatic heating controls on solvent reservoirs and tanks
 - Installation of in-line filters to prevent particulate build- up
 - Use of solvent recovery to reduce emissions of VOC from curing ovens
 - Use of activated carbons to recover solvent vapours
 - In order to reduce emissions during welding and coating, metal surfaces would be carefully cleaned
 - Coatings would be removed from the base metal before welding preferably using mechanical cleaning (for example blasting with CO₂-pellets) instead of solvents.
- ▶ **Dust:** Dust emissions management strategies will be used which include:
 - Installation of in-line aspirators with filters or scrubbers. Electrostatic precipitators (ESP) will also be employed
 - Where possible, maintaining wetness on the metal surface in order to prevent or minimize dust production
- ▶ **Acid / Metals Content in Mists and Fumes:** Management strategies for acid / metal content in mist and fume emissions will be used which include:
 - Use of fume suppressants as additives to electroplating baths to reduce air emissions of

electroplated metals (e.g. chromium)

- Installation of in-line aspirators with filters to eliminate acid compounds
- For metals or metal oxides abatement, installation of filters capable of handling complex metals
- Welding fumes (a mixture of metals, oxides, and smoke from burning off oil) would be controlled by removing coatings from base metals

15.1.2 Wastewater and liquid wastes

Typical sources of wastewater discharged from product manufacturing process in the proposed TC would include water-based cleaning and rinsing streams, cooling water, alternative cleaners, wastewater generated from cutting, blasting, deburring and mass finishing activities and water-based metalworking fluid operations. To counter the problems, the following techniques will be used:

▶ Oil-based Effluents

- Effluent separation from wastewater, and special disposal will be done if recycling is not possible
- Standardization of use of oil types, and efficient scheduling of processes that require use of varying oil types
- Extension of the life of cooling liquid through use of centrifuges, introduction of periodical analyses, use of biocides and ultrafiltration, and removal of oils by disk or belt skimmers.
- Appropriate housekeeping techniques to prevent cutting oils from being contaminated with solvents will be used
- Oil quench baths would be recycled by filtering out metals
- Metal-working fluids would be recovered using collection (or drip) pans under functional machinery;
- In cold forming or other processes where oil is used, automatic oilers would be used to reduce grease accumulation. A stamping lubricant suitable for conditions leading up to thermal treatment processes would be taken into consideration.

▶ Solvent and Water-based Effluents

- Solvents would be carefully managed to prevent spills and fugitive emissions
- Less hazardous degreasing agents (e.g. petroleum solvents, vegetable cleaning agents, VCA, supercritical CO₂ or alkali washes) would be considered, in addition to the use of counter current solvent cleaning (two-stage: first cleaning with dirty solvent, followed by fresh solvent); Aqueous non-VOC-containing alkali washes would be used for metal cleaning whenever possible. Some of these can be regenerated by microfiltration
- Spent-degreasing solvents would be recycled on site, reusing batch stills and waste solvents
- Cold cleaning with recycled mineral spirits would be implemented before final vapour degreasing

- Acids in wastewaters would be recovered through evaporation;
- Rinse contamination would be reduced via drag-out by optimization of part operation, using surfactants and other wetting agents;
- Mechanical cleaning techniques would be used instead of chemicals where possible (e.g. a vibrating abrasion apparatus for brass rather than acid pickling; mechanical scraping instead of acid solution to remove oxides of titanium; and rotating brush machines with pumice to clean copper sheets);
- Concentrations of dissolved metal ions would be controlled and reduced (e.g. molybdenum concentration reduction through reverse osmosis / precipitation systems; use of non-chromate solutions for alkaline etch cleaning of wrought aluminum; use of sulphuric acid / hydrogen peroxide dip instead of cyanide and chromic acid dip for copper- bright dipping process)
- Acid or alkaline pickling solutions would be replaced, if possible, with alternative cleaning agents (e.g. use of caustic wire cleaner with biodegradable detergent and use of linear alcohols instead of sulphuric acid to pickle copper wire, provided that adequate safety and fire prevention is implemented)
- Flow restrictors / control meters would be installed and a foot pump (or photo sensor for automatic lines) would be used to activate rinse
- Process wastewaters would be treated and recycled, using ion exchange, reverse osmosis, electrolysis, and electro dialysis with ion exchange.

▶ **Surface Treatment / Finishing Wastewater:**

- Strong agents and toxic surfactants would be substituted by less hazardous alternatives;
- Anodizing and alkaline silking baths would be regenerated by recuperation of metallic (e.g. aluminum) salts through use of hydrolysis of sodium aluminate;
- Stocks of finishing material would be limited with short shelf lives;
- Painting jobs (light to dark) and the selection of spraying techniques would minimize wastewater production (e.g. use of a spray gun for particular applications, use of an electrostatic finishing system instead of conventional air spray);
- The use of chlorinated solvents would be avoided and substituted (including carbon tetrachloride, methylene chloride, 1,1,1- trichloroethane, and perchloroethylene) with non-toxic or less toxic solvents as cleaning agents;
- Chromic acid and trisodium phosphate would be substituted by less toxic and non-fuming cleaners (e.g. sulphuric acid and hydrogen peroxide), and cyanide cleaners would be substituted by ammonia;
- Less toxic bath components would be used (e.g. zinc in place of cadmium in alkaline / saline solutions; nitric or hydrochloric acids in place of cyanide in certain plating baths; zinc chloride in place of zinc cyanide);

- Drain boards, drip guards, drip bars, and dedicated drag out tanks would be installed, after process baths.
- ▶ **Metals in Wastewater:**
 - The management of water consumption is crucial, as it also reduces the usage of raw materials and their loss to the environment. Good process control and drag-out reduction are key factors to reduce the consumption of hazardous raw materials;
 - Wastewaters with recoverable metals would be separated from other wastewater streams. Metals would be recovered from solution (e.g. using electrolytic cells or hydroxide precipitation);
 - Used metal pickling baths would be sent to a continuous electrolysis process for regeneration and metal recovery;
 - Metals from bright dipping solutions would be recovered using suitable processes (e.g. ion exchange system for copper, or segregating phosphates from treatment of aluminum based alloys);
 - Solutions containing cyanide salts (e.g. for hardening processes) would be replaced with solutions using a fluidized bath of nitrogen and corundum;
 - Hexavalent chromium would be substituted for plating. If this is not possible closed loops and covered vats would serve to minimize emissions.
- ▶ **Process Wastewater Treatment:** Since general manufacturing operations, including metals, plastics and rubber products use a myriad of raw materials, chemicals and processes, wastewater treatment will require the use of unit operations specific to the manufacturing process in use. Techniques for treating industrial process wastewater in this sector include source segregation and pre-treatment of concentrated wastewater streams. Typical wastewater treatment steps include:
 - Greasing of traps, skimmers, dissolved air floatation or oil water separators for separation of oils and floatable solids
 - Filtration for separation of filterable solids
 - Flow and load equalization
 - Sedimentation for suspended solids reduction using clarifiers
 - Biological treatment, typically aerobic treatment, for reduction of soluble organic matter (BOD)
 - Biological nutrient removal for reduction in nitrogen and phosphorus
 - Chlorination of effluent when disinfection is required
 - Dewatering and disposal of residuals in designated hazardous waste landfills.

15.1.3 Waste water management

Wastewater management would include water conservation, wastewater treatment, storm water

management, and wastewater and water quality monitoring.

- ▶ **Industrial Wastewater:** Industrial wastewater generated from industrial operations includes process wastewater, wastewater from utility operations, runoff from process and materials staging areas, and miscellaneous activities including wastewater from laboratories, equipment maintenance shops, etc.

Process Wastewater: Adequate treatment technology will be used to achieve the desired discharge quality and to maintain consistent compliance with regulatory requirements. The design and operation of the selected wastewater treatment technologies will be done to avoid uncontrolled air emissions of volatile chemicals from wastewaters. Residuals from industrial wastewater treatment operations will be disposed in compliance with local regulatory requirements or will be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources.

- ▶ **Wastewater from Utilities Operations:** Utility operations such as cooling towers and demineralization systems in the TC may result in high rates of water consumption, as well as the potential release of high temperature water containing high dissolved solids, residues of biocides, residues of other cooling system anti-fouling agents, etc. Water management strategies for utility operations will be used which include:
 - Adoption of water conservation opportunities for facility cooling systems
 - Use of heat recovery methods (also energy efficiency improvements) or other cooling methods to reduce the temperature of heated water prior to discharge to ensure the discharge water temperature does not result in an increase greater than 3°C of ambient temperature at the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity among other considerations;
 - Minimize use of antifouling and corrosion inhibiting chemicals to ensure appropriate depth of water intake and use of screens. Least hazardous alternatives would be used with regards to toxicity, biodegradability, bioavailability, and bioaccumulation potential. Dose applied would accord with local regulatory requirements and manufacturer recommendations;
 - Testing for residual biocides and other pollutants of concern would be conducted to determine the need for dose adjustments or treatment of cooling water prior to discharge.
- ▶ **Storm Water Management:** Storm water includes any surface runoff and flows resulting from precipitation, drainage or other sources. Typically, storm water runoff contains suspended sediments, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons (PAHs), coliform, etc. Rapid runoff, even of uncontaminated storm water, also degrades the quality of the receiving water by eroding streambeds and banks. In order to reduce the need for storm water treatment, the following principles would be applied:

- Storm water would be separated from process and sanitary wastewater streams in order to reduce the volume of wastewater to be treated prior to discharge
 - Surface runoff from process areas or potential sources of contamination would be prevented
 - Where this approach is not practical, runoff from process and storage areas would be segregated from potentially less contaminated runoff
 - Runoff from areas without potential sources of contamination would be minimized (e.g. by minimizing the area of impermeable surfaces) and the peak discharge rate would be reduced (e.g. by using vegetated swales and retention ponds)
 - Where storm water treatment is deemed necessary to protect the quality of receiving water bodies, priority would be given to manage and treat the first flush of storm water runoff where the majority of potential contaminants tend to be present;
 - When water quality criteria allows, storm water would be managed as a resource, either for groundwater recharge or for meeting water needs at the facility;
 - Oil water separators and grease traps would be installed and maintained as appropriate at refueling facilities, workshops, parking areas, fuel storage and containment areas.
 - Sludge from storm water catchments or collection and treatment systems will contain elevated levels of pollutants and would be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety , and conservation and long term sustainability of water and land resources.
- ▶ **Sanitary Wastewater:** Sanitary wastewater from industrial facilities includes effluents from domestic sewage, food service, and laundry facilities serving site employees. Miscellaneous wastewater from laboratories, medical infirmaries, and water softening etc. can also be discharged to the sanitary wastewater treatment system. Sanitary wastewater management strategies will be used which include:
- Segregation of wastewater streams to ensure compatibility with selected treatment option (e.g. septic system which can only accept domestic sewage)
 - Segregation and pre-treatment of oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems
 - If sewage from the industrial facility is to be discharged to surface water, treatment to meet national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater would be met
 - If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges will be done.
 - Sludge from sanitary wastewater treatment systems would be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety , and conservation and long term sustainability of water

and land resources.

15.1.4 Solid waste management

The TC will establish waste management priorities at the outset of activities based on the understanding of potential Environmental, Health, and Safety (EHS) risks and impact and considering waste generation and its consequences. The TC will do the following with respect to the same;

- ▶ Establish a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes.
- ▶ Avoid or minimize the generation of waste materials, as far as practicable
- ▶ Minimize, recover and reuse waste where waste generation cannot be avoided
- ▶ Treat, destroy and dispose waste in an environmentally sound manner where waste cannot be recovered or reused

The manufacturing and related operations (e.g. wastewater treatments or fume reduction) will generate solid waste at the TC. Its management measures will include:

- ▶ Separating metal dust or scrap by type to promote recovery and recycling
- ▶ Reducing and treating slags from welding, forging, machining, and mechanical finishing, which may contain metal ions
- ▶ Proper management of metals removed from wastewaters for recovery or disposal; disposal of sludge from surface finishing processes (e.g. galvanizing, painting, hot dip)
- ▶ If reuse or recycling is not possible, the waste would be disposed of according to industrial waste management recommendations in the General EHS Guidelines

15.2 Occupational health and safety

The TC is proposed to implement all reasonable precautions to protect the health and safety of employees and students as per the World Bank norms. Although the focus will be placed during the operation of TC, much of the occupational health and safety guidance will also be followed during the construction and decommissioning activities. Preventive and protective measures will be introduced according to the following order of priority:

- ▶ Eliminating the hazard by removing the activity from the work process e.g. substitution with less hazardous chemicals, using different manufacturing processes, etc.
- ▶ Controlling the hazard at its source through use of engineering controls e.g. local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc.
- ▶ Minimizing the hazard through design of safe work systems and administrative or institutional control measures e.g. job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc.
- ▶ Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

The application of prevention and control measures to occupational hazards will be done based on comprehensive job safety or job hazard analyses. The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards. The general EHS guidelines: occupational health and safety will be followed with respect to the following;

- ▶ **General facility design and operation**
 - Integrity of workplace structures
 - Severe weather and facility shutdown
 - Workspace and exit
 - Fire precautions
 - Lavatories and showers
 - Potable water supply
 - Clean eating area
 - Lighting
 - Safe access
 - First aid
 - Air supply
 - Work environment temperature
- ▶ **Communication and training**
 - OHS Training

- Visitor Orientation
- New Task Employee and Contractor Training
- Labelling of Equipment
- Area Signage
- Communicate Hazard Codes

- ▶ **Physical Hazards**
 - Rotating and Moving Equipment
 - Noise
 - Vibration
 - Electrical
 - Eye Hazards
 - Welding / Hot Work
 - Industrial Vehicle Driving and Site Traffic
 - Working Environment Temperature
 - Ergonomics, Repetitive Motion, Manual Handling
 - Working at Heights

- ▶ **Chemical Hazards**
 - Air quality
 - Fire and explosions
 - Corrosive, oxidizing, and reactive chemicals
 - Asbestos Containing Materials (ACM)

- ▶ **Biological and radiological hazards:** Biological agents represent potential for illness or injury due to single acute exposure or chronic repetitive exposure. Radiation exposure can lead to potential discomfort, injury or serious illness to workers. Appropriate strategies as per the guideline will be taken for Prevention and control of such hazards.

- ▶ **Personal protective equipment (PPE)** to provide additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems.

15.2.1 Monitoring

Occupational health and safety monitoring programs would be undertaken to verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health, and safety hazards, and the implementation of prevention and control strategies. The monitoring program would include;

- ▶ Safety inspection, testing and calibration
- ▶ Surveillance of the working environment

- ▶ Surveillance of workers health
- ▶ Training

15.2.2 Monitoring accidents and diseases monitoring

The TC will,

- ▶ establish procedures and systems for reporting and recording
 - Occupational accidents and diseases
 - Dangerous occurrences and incidents
- ▶ enable and encourage employees to report management all
 - Occupational injuries and near misses
 - Suspected cases of occupational disease
 - Dangerous occurrences and incidents
- ▶ Investigate of all reported incidences with the assistance of a person knowledgeable/ competent in occupational safety

15.3 Addressing potential EHS issues

The key possible issues with respect to Environment, Health and Safety (EHS) for establishment of the new TC at Rohtak during the construction phase, operation and maintenance phase and tool manufacturing are as follows;

15.3.1 Construction phase

The activities and anticipated EHS issues during the construction phase are highlighted in the following sections:

Table 53: Activities and anticipated EHS issues during construction phase

Activity	Associated impact	Recommendation for mitigation
Clearing of land (before initiating the construction work, clearing of the shrubs and bushes shall be carried out)	Soil erosion	<ul style="list-style-type: none"> ▶ It would be ensured that the construction activity immediately follows the clearing of land to avoid soil erosion.
Excavation, drilling and levelling for the construction of foundation and base of building and roads	Air pollution	<ul style="list-style-type: none"> ▶ Water sprinkling at regular intervals during excavation and drilling activities would be practiced to avoid generation of dust. ▶ The excavated soil would not be stored in the direction of the wind and covers to be provided for loose construction material. ▶ Activities like digging and filling will be avoided in conditions of very high wind. ▶ Construction machinery will be properly maintained to minimize exhaust emissions of CO. SPM and Hydrocarbons.
	Soil erosion/ Loss of Top soil	<ul style="list-style-type: none"> ▶ Effort would be made to use the overburden within premises for landscaping. ▶ During levelling, gradation across the land (If any) would be reduced to the extent possible.
	Noise pollution	<ul style="list-style-type: none"> ▶ Regular maintenance of plant equipment will be carried out. ▶ Noise prone activities will be undertaken during day time and shall be avoided, to the extent possible, during night time. ▶ Personal protective equipment will be provided for workers performing drilling at site.
	Occupational health hazards	<ul style="list-style-type: none"> ▶ Provision of adequate personal protective equipment like safety helmets, face masks, safety shoes, safety goggles etc. for the safety of workers. ▶ The excavated area would be provided with a visible boundary (Usually created using a tape and sticks) to ensure safety at site. ▶ Training will be imparted to workers on occupational safety and technical aspects of job undertaken by them.
	Disposal of debris and other wastes	<ul style="list-style-type: none"> ▶ The waste and debris would be disposed of at an identified place preferably wasteland and appropriate approval should be taken for the same from land owner or revenue authorities. ▶ The disposal site would be at least 1000 meters away from the areas including notified forest land, water bodies and productive lands.

Activity	Associated impact	Recommendation for mitigation
<p>Establishing labour camp (Provision of civic amenities for construction labour and movement of truck drivers for transporting construction material shall be provided at the site. The labour camps at the project site will be temporary in nature)</p>	Health Risks	<ul style="list-style-type: none"> ▶ Provision of separate mobile toilet facilities for men and women will be made. ▶ The domestic effluent will be properly disposed of in soak pits. ▶ Contractor will provide garbage bins to all workers' accommodation for dumping wastes regularly in a hygienic manner in the area. ▶ First aid box would be provided at every construction campsite and under the charge of a qualified person to provide first aid. Availability of such person should be ensured at all time. The first aid box would contain the following in case of less than 50 workers at the site; <ul style="list-style-type: none"> i) Twelve small sterilized dressings. ii) Six medium size sterilized dressings. iii) Six large size sterilized dressings. iv) Six large size sterilized burn dressings. v) Six (1/2 oz.) packets sterilized cotton wool. vi) One (2 oz.) bottle containing a 2 per cent alcoholic solution of iodine. vii) One (2 oz.) bottle containing sal-volatile having the dose and mode of administration indicated on the label. viii) One roll of adhesive plaster. ix) One snake-bite lancet. x) One (1 oz) bottle of potassium permanganate crystals. xi) One pair of scissors. xii) One copy of the first-aid leaflet approved by the Chief Inspector of Factories.
	Chances of spread of sexually transmittable diseases like AIDS	<ul style="list-style-type: none"> ▶ Awareness programmes will be conducted regularly for workers on AIDS, and other health related issues. ▶ Health check-up facilities for employees and contract workers.
	Water pollution	<ul style="list-style-type: none"> ▶ Separate mobile toilet facilities will be made available for male and female workers. The domestic effluent will be properly disposed of in soak pits. ▶ Adequate drinking water facilities, sanitary facilities and drainage in the temporary sheds of the construction workers would be provided to avoid the surface water pollution.
	Land contamination	<ul style="list-style-type: none"> ▶ Basic sanitary facilities will be provided for the workers staying at the labour camp and at the project site. ▶ Dustbins will be provided at the camp by the contractor.

Activity	Associated impact	Recommendation for mitigation
Movement of vehicles (Vehicle movement shall prevail at the site to transfer the material and workers at site. Apart from this, third party vehicles delivering the material and equipment shall also be there.)	Air pollution	<ul style="list-style-type: none"> ▶ All the vehicles entering the site will be asked to have updated PUC (Pollution under control) certificate. ▶ Vehicle speed will be restricted to 15km/hour at site. ▶ Trucks/dumpers will be covered by tarpaulin sheets during off site transportation of friable construction materials and spoil. ▶ Maintenance of vehicles will be carried out regularly. ▶ Sprinkling of water will be practiced at the site.
	Soil contamination	<ul style="list-style-type: none"> ▶ Proper maintenance of vehicle will be carried out to avoid any leakage of oil or grease.
	Water contamination	<ul style="list-style-type: none"> ▶ Proper maintenance of vehicle will be carried out to avoid any leakage of oil or grease.
	Safety risks	<ul style="list-style-type: none"> ▶ Vehicle speed will be restricted to 15km/hour at site. ▶ Necessary safety trainings will be provided to the drivers of construction vehicles for speed restrictions and dos' and don'ts will be followed during movement of construction vehicles.
Use of D.G set (D.G sets shall be used at site to provide electricity to labour camps in the night time. Also, in case of non-availability of power from grid, D.G sets shall be used to provide electricity at the site for construction activity)	Air pollution	<ul style="list-style-type: none"> ▶ D.G will be optimally used with proper orientation and adequate stack height. ▶ Stack monitoring will be carried out on regular basis. ▶ Proper maintenance of the DG will be carried out on regular basis.
	Noise pollution	<ul style="list-style-type: none"> ▶ Acoustic enclosures will be provided with the D.G sets to minimize the noise levels.
Storage of diesel (Diesel shall be stored on-site so as to ensure availability for D.G sets)	Soil contamination	<ul style="list-style-type: none"> ▶ A covered area will be defined for storage of HSD with concrete flooring
	Safety risks	<ul style="list-style-type: none"> ▶ The diesel storage area will not be in proximity of the labour camps. ▶ Inflammable substance will not be allowed at the project site.
Handling of waste (During construction phase there may be generation of both hazardous and non-hazardous waste which needs to be carefully handled to ensure environment safeguard)	Land contamination and Water contamination	<ul style="list-style-type: none"> ▶ Waste will be stored at designated place after segregation on the basis of category (hazardous and non-hazardous). ▶ Hazardous waste will be disposed of to the authorized vendors only. ▶ A waste management plan will be chalked out to properly dispose the debris generated from the site.
	Safety risks	<ul style="list-style-type: none"> ▶ Adequate PPE's will be identified and provided to the workers at site.
Installation and operation of concrete mix plants and batching	Noise pollution	<ul style="list-style-type: none"> ▶ Noise shielding will be used where practicable and fixed noise sources will be acoustically treated for example with silencers, acoustic louvers and enclosures.

Activity	Associated impact	Recommendation for mitigation
plants (In case, these are installed on temporary basis at the project site)		<ul style="list-style-type: none"> ▶ Provision of make shift noise barriers near high noise generating equipment will be made to minimize horizontal propagation of noise in case of residential area in the vicinity.
Construction labour management	Child labour and forced labour	<ul style="list-style-type: none"> ▶ Provision of clause in contractor's agreement will be made that bans child labour and forced labour at project site. ▶ Adequate procedures to avoid or prevent hiring/entry of child labour at the project site will be undertaken; ▶ Random check will be undertaken at the site.
	Health and safety risks for children of workers	<ul style="list-style-type: none"> ▶ Temporary crèche facility will be provided in case of migrant labourers children residing in the camps to ensure safety.
	Water wastage	<ul style="list-style-type: none"> ▶ Emphasis will be given on optimization of water usage and supply of potable drinking water for labour camps.
	Pressure on forest produce	<ul style="list-style-type: none"> ▶ Fuel will be made available to construction workers so as to reduce pressure on forest produce or local fuel wood resources.

15.3.2 Operation and maintenance

There are a number of environment aspects and health and safety hazards which may arise during operations and due to negligence towards appropriate maintenance work in a TC. A snapshot of potential aspects and hazards are as follows:

Table 54: Potential hazards during O & M phase

Potential impact	Recommendation for mitigation
Deterioration of the structure over the period of time	<ul style="list-style-type: none"> ▶ Maintenance and repair work would be carried out on regular basis to slow down/mitigate the deterioration of the structure. ▶ A structural stability certificate would be taken from a chartered engineer every 5 years. ▶ Any change in the layout of the equipment, bringing heavier machinery in place of a small one or putting more number of machinery in a particular place, would be approved by the chartered engineer to ensure that the modification in layout is not going to impact the stability of the structure.

Water contamination	<ul style="list-style-type: none"> ▶ Cleaning of the terrace of the building would be practiced so as to ensure that the rain water collected through water harvesting is not contaminated. Alternatively, first rain harvest would be washed through the storm water drain in case of rain abundant area.
Fire risk	<ul style="list-style-type: none"> ▶ Fire extinguishers will be checked for pressure on annual basis. ▶ Fire hydrant system would be checked once in six months to ensure it is operational. ▶ Electrical wiring in the premises would be regularly checked and repair should be undertaken wherever required.

15.3.3 Manufacturing

Table 55: Potential hazards during manufacturing phase

Activity	Associated impact	Recommendation for mitigation
Hand tool manufacturing		
Hammering during forging process	Noise pollution and hear loss over longer period of time	<ul style="list-style-type: none"> ▶ Ear plugs/muffs would be provided to the employees and students working in the hammering process. ▶ Level of noise would be monitored on regular basis so as to ensure that the noise level is within specified limits. ▶ Hammering would not be carried out during night time. ▶ Regular audiometric test of employees would be carried out in order to understand if any person is susceptible to hearing loss and in case such situation is encountered the person would be shifted to other department and provided with medical facility.
	High vibrations	<ul style="list-style-type: none"> ▶ Monitoring of the vibration will be conducted on regular basis.
Heat treatment	Air pollution	<ul style="list-style-type: none"> ▶ Ventilation would be provided in work shop to avoid concentration of the fumes.
	Burn injury	<ul style="list-style-type: none"> ▶ Employees would be provided with Apron while working in the workshop. ▶ Workplace safety training will be provided on regular basis. ▶ Eye wash and shower facility would be provided in the facility. ▶ Appropriate PPE including, gloves, safety shoes, goggles, etc. would be provided to employees and the students.
	Heat stress	<ul style="list-style-type: none"> ▶ Heat stress monitoring of the employees will be conducted once a year to ensure safe and appropriate working conditions.
Non-maintenance of clean premises	Injury due to trips	<ul style="list-style-type: none"> ▶ Cleaning schedule will be developed for the site. ▶ Proper demarcation of the storage area for waste material will be done according to the different type of waste material.

Activity	Associated impact	Recommendation for mitigation
Handling of waste (Hazardous and non-hazardous waste generated during day to day operations to be carefully handled to ensure environment safeguard)	Land contamination and Water contamination	<ul style="list-style-type: none"> ▶ Waste will be stored at designated place after segregation on the basis of category (hazardous and non-hazardous). ▶ Hazardous waste will be disposed of to the authorized vendors only. ▶ A waste management plan will be chalked out to properly dispose the debris generated from the site.
	Safety risks	<ul style="list-style-type: none"> ▶ Adequate PPE's will be identified and provided to the workers at site.
Use of D.G set (D.G sets shall be used at site to provide electricity in case of power failure)	Air pollution	<ul style="list-style-type: none"> ▶ D.G set will be optimally used with proper orientation and adequate stack height. ▶ Stack monitoring to be carried out on regular basis. ▶ Proper maintenance of the D.G set to be carried out on regular basis.
	Noise pollution	<ul style="list-style-type: none"> ▶ Acoustic enclosures will be provided with the D.G sets to minimize the noise levels.
Storage of diesel (Diesel shall be stored on-site so as to ensure availability for D.G sets)	Soil contamination	<ul style="list-style-type: none"> ▶ A covered area will be defined for storage of HSD with concrete flooring.
	Safety risks	<ul style="list-style-type: none"> ▶ Inflammable substance will not be allowed in the premises.
Specialised Tool manufacturing		
Designing of components	Depletion of natural resource (paper)	<ul style="list-style-type: none"> ▶ Paper would be recycled for rough work.
Machining activities	Land contamination due to waste oil and waste coolant	<ul style="list-style-type: none"> ▶ SOP would be formulated for handling and storage of waste oil and coolant. ▶ A designated area would be identified to store these wastes under the shed. ▶ The hazardous waste will be disposed of to an authorised recycler and shall not be used internally for any purpose until prior permission is sought from SPCB.
	Water contamination due to waste oil and waste coolant	
	Noise pollution due to pressing and	<ul style="list-style-type: none"> ▶ Ear muffs / Ear plugs will be provided to officials working on these activities.

Activity	Associated impact	Recommendation for mitigation
	shearing activities	<ul style="list-style-type: none"> ▶ The metal scrap would be collected appropriately and stored in a designated area before being disposed of/sold to a third party.
	Land contamination due to metal scrap	
	Cut/injury due to metal scrap lying unmanaged	
Use of D.G sets	Noise pollution	<ul style="list-style-type: none"> ▶ Acoustic enclosures would be provided to avoid noise pollution.
	Land contamination	<ul style="list-style-type: none"> ▶ Diesel would be poured in D.G set using funnel. ▶ Concrete flooring would be made near the D.G set.
	Air pollution	<ul style="list-style-type: none"> ▶ Chimney with appropriate height would be provided to minimize air pollution and compliance with the legislation.
Storage of hazardous waste like empty printer cartage, waste coolant, oil soaked cotton waste, etc.	Land and water contamination due to leakage and/or spill over	<ul style="list-style-type: none"> ▶ The storage area of the hazardous waste will be cemented in order to avoid land contamination. ▶ Proper demarcation of storage area for hazardous waste will be done to avoid chances of spill over during handling. ▶ All the waste will be stored under a shed so as to avoid contamination and washing away of waste in nearby water stream or ground water in case of rain
	Water contamination due to leakage and/or spill over	<ul style="list-style-type: none"> ▶ All the waste will be stored under a shed so as to avoid contamination and washing away of waste in nearby water stream or ground water in case of rain.

The protection of public health, safety and general welfare will also be ensured through adherence to the building codes since these are related to the construction and occupancy of buildings and structures.

15.4 Provisioning of site services

The following section outlines the details of the essential measures to be designed as per regulatory requirements relating to maintenance such as;

- ▶ Fire alarm and firefighting system,
- ▶ Rain water harvesting,
- ▶ Water treatment and sewage treatment,
- ▶ Ventilation system.

15.4.1 Fire alarm and firefighting system

a) Fire alarm system

- ▶ Automatic Fire alarm system will be provided in all buildings of the campus excluding student hostels and emergency staff quarters.
- ▶ The system will have appropriate provisioning of smoke detectors and beam detectors with respect to the sensitivity and probability of fire.
- ▶ Fire alarm panels will be provided at appropriate locations with easy and convenient accessibility for manual activation of alarm in case failure of automatic system.
- ▶ A control panel will be provided at control station with a repeater panel in security cabin to activate, deactivate and reset the fire alarm system.
- ▶ The instrumentation, panels, sensors and equipment used will be of certified make confirming to relevant standards.
- ▶ Smoke detectors and beam detectors will be installed above and below false ceiling as applicable.

b) Firefighting system - overview

- ▶ Firefighting system comprising of sprinklers, yard hydrants and pumping station will be provided.
- ▶ Sprinklers system will be provided in the production area (above and below the false ceiling), training block, administrative building (all floors) and other buildings etc.
- ▶ Yard/ field hydrant system will be provided throughout campus with hydrant posts at appropriate locations having operating valve and hose reel provided in hose reel boxes as per standards.
- ▶ Staircases in all buildings will be provided with wet risers.
- ▶ The piping network will have suitable size/ diameter MS pipes welded at joints or connected with socket and threaded joints as per the regulations.

- ▶ All pipes will be painted in red colour as per the standards.
- ▶ The hydrant and sprinkler system will be connected to piping network and will be continuously charged with water at appropriate pressure as per applicable standards.
- ▶ All equipment and items used in firefighting system will conform to relevant codes of practice, standards, rules and regulations applicable.
- ▶ Fire water tank of minimum 2000 Cum capacity/ one hour supply will be provided.
- ▶ The tank will be placed overhead/ above ground so that the pumps operate in negative suction and with required level of water even when they are off.

c) Pump room

- ▶ The pumping station will be located near the fire water tank to store adequate volume of water for firefighting as per rules and regulations set by local fire authority and guidelines by NBC.
- ▶ Both the sprinkler system and hydrant system will be fed with common electrically driven pump, backed with a diesel engine driven pump of adequate capacity to maintain required pressure in the pipe line.
- ▶ Electrically driven jockey pump of adequate capacity will be provided in the pumping station, which will be positioned and programmed in such a way that jockey pump starts first in case there is any loss of pressure in the fire pipe line.
- ▶ The pumps will be automatically operated and control panels with required switchgear, logic will be provided to control the pumps.
- ▶ Necessary arrangements for power supply will be done for the fire pumps.
- ▶ The power and control cables used for fire pumps will be fire rated and conforming to relevant applicable standards.
- ▶ The pumps will be placed on adequate foundations/ pedestals with adequate support to the piping.
- ▶ The pump room will be covered with canopy roof in steel structure and pre-coated sheets.
- ▶ All electrical fittings and accessories in pump room will be of weatherproof category IP55.

d) Sprinkler system

- ▶ The sprinkler pendants/ heads provided will be of appropriate category as per the hazard category and water required to extinguish fire. This will be governed by appropriate design standards and regulations of local fire authority.
- ▶ At least one test sprinkler will be provided in each area for periodic testing of the system.
- ▶ The density of sprinklers will be as per applicable regulations.

e) Hydrant system

- ▶ The hydrant system will comprise of ring main and other circuits around all buildings in the campus, thus making it possible to reach to any corner in case of fire.
- ▶ Hydrant system will have hydrant posts at appropriate locations.
- ▶ The hydrant post will have hose reel box with hose reel of appropriate length with nozzle as per applicable regulations.
- ▶ The hydrant posts and the hose reels will be easily accessible.
- ▶ Appropriate valves will be provided on the hydrant posts to operate the hydrant and connect hose reel whenever required.
- ▶ Sufficient valves will be provided in each loop of the hydrant system to enable maintenance of any portion of line without draining the firefighting system and releasing pressure in remaining portion.
- ▶ 4 way valves will be provided at appropriate places allowing connection with external fire tenders mounted on truck.
- ▶ Wet risers will be provided in every staircase of each building with suitable reel drum having rubber hose of adequate length fit with suitable nozzles.
- ▶ The hydrant network pipes will be placed above ground and only the crossings will be underground wherever required.

f) Fire water tank

- ▶ Water tank with adequate capacity will be provided to store water for firefighting purpose.
- ▶ Arrangement will be done in such a way that the water sourced will first be filled in the primary fire water tank and the excess overflow from this tank will be put in to domestic and other water tanks.
- ▶ The tank will be site assembled with FRP or other panels using appropriate technology and will be placed above ground.

15.4.2 Rain water harvesting

- ▶ The campus will be divided in to 4 or 5 areas and the storm water from the roof top of each building in each area will be collected in the specified area.
- ▶ The storm water outlets on building roofs will be checked for adequacy with respect to size considering maximum rainfall intensity in past 100 years.
- ▶ Additional outlets will be provided to the building roof, in case the existing outlets are found to be insufficient.
- ▶ The outlets will be provided with vertical down take pipes, which will be connected to the existing underground storm water lines through nearby chambers.

- ▶ Suitable locations for ground water recharge pit will be identified in each area as mentioned above.
- ▶ Considering geology, ground water tables, applicable rules and regulations and available space, ground water recharge pits with bore holes and pipes will be designed with adequate capacity.
- ▶ The ground water recharge pits will be connected to the storm water line through nearest chamber to fetch storm water (collected on roof) to the pit.
- ▶ Overflow will be provided to the ground water recharge pit at suitable level, to take off excess water back to the storm water network and discharge off.
- ▶ The ground water recharge pits will be protected with fence around to prevent ingress of people, animals etc.
- ▶ Suitable provision will be made to cut off and on the flow to the ground water recharge pits.

15.4.3 Water treatment plant

- ▶ Water treatment plant with 2 types of treatment will be provided on campus;
 - Water softening (1,50,000 ltrs/Day).
 - Water purification with suitable RO and UV (25,000 Ltrs/Day).
- ▶ The water treated with softening plant will be used for general domestic purpose except for drinking.
- ▶ The drinking water will be treated using water purification plant with RO and UV technology.
- ▶ Adequate piping network conforming to applicable rules, regulations and standards will be provided for supply of drinking water at various locations within the facility.
- ▶ The softened water will be supplied through existing water supply network to various locations in the premises.
- ▶ The existing water supply network will be inspected for leakages, damages for appropriate repairing.
- ▶ The equipment provided for water treatment will be standard and approved/ certified by appropriate government bodies certifying such equipment.
- ▶ Arrangements for power connection including laying cables and necessary switch gears at both ends at main supply point and machine point will be provided.
- ▶ Adequate drainage will be provided for regeneration of both treatment plants, while connecting the same to primary and secondary effluent treatment.

15.4.4 Sewage treatment plant

- ▶ Sewage Treatment plant with integral effluent treatment will be provided for primary and secondary treatment with capacity of 60 Cum/day.
- ▶ The primary treatment will be through the use of septic tanks of adequate capacity, located at various places near the toilet blocks on campus.

- ▶ The septic tanks will have adequate manholes for cleaning and maintenance purpose and will also have gas vents rising above the highest level of the buildings to avoid foul smell.
- ▶ Overflow outlets of the septic tanks will be connected to secondary treatment achieved through properly designed constructed wet land system with sub-surface flow.
- ▶ The constructed wetland will consist of locally available species of wetland trees, bushes and shrubs.
- ▶ Collection tank of adequate capacity will be provided on the upstream of the constructed wetland to take care of incidental heavy flows.
- ▶ The constructed wetland will be located suitably in the premises allowing adequate sunlight for growth of plants throughout the day.
- ▶ Provision will be made to allow rejection and regeneration discharge from water treatment plant by dissolving high TDS water suitably.
- ▶ Necessary de-odouring and chemical dosing will be provided at the end of wetland before the water obtained is reused.
- ▶ All equipment used and the design, arrangement will be in compliance with applicable rules and regulations as laid down by town planning authority, central pollution control board and other local authorities.

15.4.5 Ventilation system

a) Internal buildings

- ▶ The TC premises will have provision for sufficient ventilation. This will be done keeping in view the amount of space in the TC, number of people expected to occupy the space, type and amount of machines/equipment, and overall size of the space. The designing will be done keeping in view proper distribution of air for ventilation throughout all occupied spaces across the TC.
- ▶ Natural ventilation - The premises will have adequate openings, such as doors, windows and/or vent opening to clean environment. Roof vents would be placed wherever applicable to reduce the reliance on air conditioning systems and also reduce CO₂ emission in the building.
- ▶ Mechanical ventilation - Mechanical parts would be installed to provide air to building occupants at a comfortable temperature and humidity that would be free of harmful concentrations of air pollutants.
- ▶ Provision for adequate supply of outdoor air in the indoor environment will be provided to dilute pollutants released by equipment, building materials, furnishings, products, and people. The building's ventilation system will be properly installed with filters to trap such particles.
- ▶ Air input, smoke exhaust will also be installed and maintained for proper ventilation.

- ▶ Hybrid ventilation systems are popular in industrial buildings which predominantly use natural ventilation along with mechanically driven fans to improve predictability of performance over a wider range of weather conditions. Provisioning of the same will be taken into account wherever applicable during designing the ventilation system.

b) Manufacturing/ Production area

- ▶ Precision machining and QC areas will be provided with central air conditioning.
- ▶ Air quality in production area will be checked for vital parameters such as concentration of CO₂, CO and other relevant gases during operations.
- ▶ In case the parameters above are not acceptable as per relevant standards, adequate capacity fresh air system will be designed and provided for production area to improve quality of air.
- ▶ The fresh air supply system will consist of an external air handling unit of adequate capacity with suitable grade filters on inlet side.
- ▶ The outlet of the air handling unit will be connected with duct system supplying air inside the production area at various places.
- ▶ The fresh air will be discharged in the production area by providing suitable diffusers.

c) UPS room

- ▶ Appropriately designed ventilation system will be provided to the UPS room.
- ▶ The ventilation system will mainly comprise of air conditioning units providing cold air at lower temperature and exhaust system taking out hot air coming out of the UPS.
- ▶ The system will be designed to maintain adequate temperature around the UPS equipment as per manufacturer's requirements/ specifications.
- ▶ Humidity will be controlled to the desired level as directed by the UPS manufacturer by controlling inflow of fresh air.
- ▶ Proper ventilation will be provided to battery racks with adequate number of air changes as per applicable rules and regulations.

16 Key risks and mitigation

The key risks associated with implementation of the project along with possible mitigation measures are summarized in this section. It must be noted that risks universe is dynamic and is likely to change periodically. It is recommended that frequent analysis is carried out and mitigation plans are drawn. Below are risks that may impact this project;

Table 56: Risks & mitigation

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
Project Planning	Risk of inadequate planning of time, effort and resources required to complete the project	<ul style="list-style-type: none"> ▶ Adequate time and cost buffer to be kept to deal with contingencies. ▶ Appointment of CMC for detail design and project management during construction of the TC 	✓	✓	✓
Approvals and Clearances	Risk of delay in clearances from local authorities like <ul style="list-style-type: none"> ▶ Plan Sanction - Town Planning Authority/ Local Body ▶ Commencement Certificate - Town Planning Authority/ Local Body ▶ Fire NOC - Provisional and Occupancy - Local Fire Authority ▶ Plinth Checking Certificate - Town Planning Authority/ Local Body ▶ Building Completion Certificate - Town Planning Authority/ Local Body ▶ Consent to Establish and Operate - Pollution Control Board ▶ MAP Approval and Factory License - Directorate of Industrial Health and Safety ▶ Labour License - Labour Commissioner ▶ Fuel Storage - Chief Controller of Explosives 	<ul style="list-style-type: none"> ▶ Appointment of PMC firm. ▶ Timely application of approvals for relevant authorities by CMC ▶ Monitoring of status of Approvals. 		✓	

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
	<ul style="list-style-type: none"> ▶ Tools, Tackles, Pressure Vessels, Hoists - Competent Engineer ▶ Electrical Systems - Electrical Inspector 				
Environmental risk	Loss of top soil	<ul style="list-style-type: none"> ▶ Top soil excavated from the site should be carefully handled. It should be collected separately and stored as a heap which is appropriately covered. The heap should not be put in the direction of wind to avoid dust generation ▶ Maximum effort should be made to utilize the top soil for landscaping within the site 	✓		✓
	Air pollution due to digging and levelling activities	<ul style="list-style-type: none"> ▶ Water sprinkling shall be practiced ▶ Construction machinery shall be properly maintained to minimize exhaust emissions of CO, SPM and Hydrocarbons ▶ These activities shall be avoided in very high wind and cover should be provided for loose construction material 	✓		✓
	Water contamination and health risks associated with setting labour camp for construction	<ul style="list-style-type: none"> ▶ Toilet shall be earmarked for both men and women contractual workers ▶ Adequate drinking facilities shall be provided at the construction site; ▶ Temporary crèche facility may be provided in case of migrant labourers children residing in the camps to ensure safety 	✓		✓
	Land and water contamination due to waste generated at site	<ul style="list-style-type: none"> ▶ Waste shall be stored at designated place after segregation on the basis of category (hazardous and non-hazardous) ▶ Hazardous waste shall be disposed of to the authorized vendors only 	✓		✓
	Air pollution due to use of D.G set.	<ul style="list-style-type: none"> ▶ D.G set to be optimally used with proper orientation and adequate stack height ▶ Stack monitoring carried out on regular basis 			

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
		<ul style="list-style-type: none"> ▶ Proper maintenance of the DG Set should be carried out on regular basis ▶ Acoustic enclosures are to be provided with the D.G sets to minimize the noise levels 			
Construction	Delay in construction due to cost overrun, management of building contractors.	<ul style="list-style-type: none"> ▶ Appoint a PMC for a design and build contract for managing construction. ▶ Strict timeline will be made and agreed with PMC. ▶ Regular M&E, Built in mechanism for penalty for delays and incentive for timely completion, ensuring timely payment based on milestones. 	✓	✓	
Deviation in project scope	Change in project scope <ul style="list-style-type: none"> ▶ initiated by MoMSME, ▶ Machinery supplier constraints ▶ Product discontinuation 	<ul style="list-style-type: none"> ▶ Clear buy in on project plan and execution planning. ▶ Identification of Machinery suppliers based on the top current suppliers and technology available. 	✓	✓	✓
Maintaining World Class Construction quality	Construction quality may not be up to the mark.	<ul style="list-style-type: none"> ▶ Appointment of third party Government quality assurance agency. 			
On-boarding of Key players	Delay in on boarding of key project stakeholders <ul style="list-style-type: none"> • Technology Partner • Construction Network Manager • Construction Management Consultant Quality Assurance 	<ul style="list-style-type: none"> ▶ Clearly defined scope and incentives for stakeholders. ▶ Timely contracts with the project stakeholders. 		✓	✓
Procurement of machinery	Delay in procurement of machines and goods due to high Lead time and time taken for clearances	<ul style="list-style-type: none"> ▶ Machines and equipment chosen should be standard and popular models available in market. Early release of order confirmation and advance if any. ▶ Appointment of efficient and pre-approved Clearing & Handling Agency (CHA) to ensure timely clearances and transportation of machines. 		✓	

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
	Variation in Equipment required and finally procured. Too stringent specs may lead to high price and low competition, loose specs may lead to low price but low quality	▶ Neutral specifications to be drafted based on thorough research on TC requirements and current models available.	✓	✓	
Trained resource availability	Availability of trained manpower for operation of new machines	▶ Machine specific training programmes to be conducted for training of key personnel and knowledge sharing.			✓
Market	<ul style="list-style-type: none"> ▶ Change in product mix ▶ Change in customer mix ▶ Change in technology ▶ Change in product pricing ▶ Competition from Govt./Public tool rooms ▶ Lack of cluster development in the target region 	<ul style="list-style-type: none"> ▶ Expansion of product base. ▶ Increase in customer base. ▶ Develop a backup plan for retiring of obsolete machines. 			
Policy	Change in Government Policy/ Schemes for <ul style="list-style-type: none"> ▶ Training ▶ key sectors E.g. Change in Government space programme, increase in imports may affect orders from major clients	<ul style="list-style-type: none"> ▶ Increase existing customer base. ▶ Diversify into new sectors. 	✓		✓
Taxation	Change in service tax policy on training may adversely affect training revenue	▶ Institute should keep abreast with policy changes and the same should be considered while designing the course and fee structure.	✓		
Human resource	<ul style="list-style-type: none"> ▶ Labour availability ▶ Retention of key employees (Flight of key talented people can make it difficult to achieve centre's growth plans) 	<ul style="list-style-type: none"> ▶ Planning for holidays and lean periods. ▶ Good incentive scheme and career development plans. 	✓		✓
Management risk	Lack of capable management to run the TC	<ul style="list-style-type: none"> ▶ Leadership training. ▶ Succession planning. 			✓
Maintenance risk/ spares - Availability of spares & services	Delay in availability of spares and service support at a reasonable cost	▶ Procure models that are likely to continue for at least next 5 yrs. to ensure better availability of spares and services.	✓		

Key broad area	Risk	Mitigation	Impact on		
			Cost	Time	Resources
Performance of key stakeholders	Poor performance of Outsourced agencies like TP, CNM and PMC	<ul style="list-style-type: none"> ▶ Establishment of KPIs ▶ Periodic review of performance. Suitable penalty clauses to be added in the ToRs. 			✓
Weather	Delay in construction due to monsoon season	<ul style="list-style-type: none"> ▶ Planning for lean periods and periods of low construction activity. 	✓	✓	

17 Conclusion

The proposed TC at Rohtak will focus on General Engineering. The proposed TC will aim to support and strengthen MSMEs and help them improve competitiveness through training, production support and advocacy. Training, Tool manufacturing and consultancy / advisory streams would be the prominent activities to be undertaken by the TC. Besides providing training to students, the TC will also provide support to other training institutions. It shall provide services like curriculum development, initial setup support, certification services and training of trainers to these institutions. TC shall also support MSME clusters in technology and engineering solutions and for improvement of their quality systems and productivity. The TC will make a concerted effort in reaching out to MSMEs for these works. For improvement in productivity, TC would initiate design clinics, training in lean manufacturing and project based consultancy. The TC would further put greater emphasis to equip itself to provide consultancy services to MSMEs in the field of product design and development, tool design, manufacturing and innovations in process and productivity.

TC will contribute towards skilling youth to make them employable in industry by designing courses relevant to them. The focus areas for the proposed TC are in line with objectives of the program. This will be further be complemented by the proposed initiatives like;

- ▶ TC shall work as a key skill development centre. It shall not only provide advanced training in manufacturing technology but also work as a key facilitator for existing ITIs and polytechnic institutions in the catchment area. It will provide curriculum development support, training for trainers, mentoring to new institutions, and testing and certification services to increase competitiveness of ITIs and Polytechnic institutions.

- ▶ The new TC will take steps to form consortium with MSMEs including TCs to jointly cater to the focus sectors. Once formed, the TC would further formalise and institutionalise the consortium. The TC should provide handholding/ support and special machining & testing facility to members of this consortium and prepare a road map for the next 3-5 years to ensure that these MSME can develop the required expertise and become more competitive

- ▶ The TC will form Productivity and Quality club for cluster of engineering industry and support them for a period of 12 months in which each cluster club of about 10 MSMEs will be assigned a mentor (Sr. Engineer Production/ Design/ Training and above). The mentor will make periodic visits to the MSMEs. He will plan and handhold in the execution of the plan at the MSMEs so as to have a visible improvement at the end of 12 months period. Membership can be for a nominal fee. Quality club and Productivity club may be formed separate and the KPI of mentors will be decided based on the results achieved by MSME units. .

All these initiatives of the TC would not only strengthen the expertise of MSMEs in manufacturing but also help to develop a sustainable ecosystem for MSMEs in the region in the long run. On the same line, even investments have been proposed keeping the focus area and adherence to EHS guidelines in mind.

Above all, TCSP program will enable TC to showcase the best practices not only in the adoption of new technologies and skilling the youth but also managing all the associated environmental and social aspects.

18 Annexure

18.1 Checklist for social screening for establishment of new TCs

In RPF, particular attention will be paid to the needs of vulnerable groups among the affected especially those living Below the Poverty Line (BPL), the landless, the elderly, women and children. The Entitlement Matrix that is a part of this RPF has provisions for compensation and resettlement assistance to all Project Affected Persons as categorized above in broad terms. This Resettlement Policy Framework and its Entitlement Matrix are based on World Bank's social safeguard policy that consists of OP 4.12 - Involuntary Resettlement and OP 4.10 - Indigenous Peoples and also Government of India's The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, (RFCTLAR&R Act) 2013.

- ▶ The World Bank's Social Safeguard Policy consists of OP 4-12 – Involuntary Resettlement and OP 4.10 – Indigenous Peoples. The OP on Involuntary Resettlement has clearly stated policy objectives, impact covered, mitigation measures and eligibility criteria. It also has guidelines for preparing Resettlement Policy Framework and this RPF is in accordance with these guidelines.
- ▶ As far as OP 4.10 – Indigenous people are concerned; it uses the term Indigenous people in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing certain characteristics in varying. The RPF uses the term Scheduled Tribes (ST) rather than Indigenous people.
- ▶ The social screening process as set out in this document would help to determine whether or not Bank's social safeguard policy either on Involuntary Resettlement or Indigenous Peoples will be triggered.

18.2 Checklist for environmental assessment

Name of the site	Rohtak
Brief on upcoming Tool Room and Technology Centre (TRTC)	The planned TRTC in Rohtak shall be focusing on General engineering.
Latitude and Longitude of the site	
Date of the site visit	1 st December 2015
Name of the officials conducting site visit	Akash Mokhriwale (EY) & Shagun

During the study phase the team conducted a site visit and held discussions with MSME and HSIIDC officials. Based on the discussion, the checklist used to conduct environment screening at the selected site in the Rohtak is given below:

SN	Issues	Yes/No	Remarks
1	Will the expansion or new tool room affect the land use pattern?	No	The allotted land is in a designated industrial zone (HSIIDC) and is earmarked for commercial activity. The land has been already allotted to MSME. Therefore, setting up of the tool room will not lead to any effect on the land use pattern.
2	Will the development include significant land disturbance or site clearance?	Yes	The land allocated for TRTC has some wild grass, shrubs apart from 7-8 trees. However, all the trees are on the boundary of the allotted land. The development of TRTC shall require clearing of only the wild grass. The trees may not be required to be cut and the same shall be taken care while developing the layout of the TRTC.
3	Will the project involve acquisition of land from private players?	No	The land has been allocated to MSME by the HSIIDC. Therefore, does not involve acquisition of land from private players.

SN	Issues	Yes/No	Remarks
4	The selected site is defined as industrial / commercial / residential?	Yes	Industrial zone
5	Is there any protected area or biodiversity sensitive area in the vicinity which is likely to be affected by the operations of the tool room?	No	There is no biodiversity sensitive or protected area in the vicinity which is likely to be affected by the operations of the tool room.
6	Is there any archaeological or cultural/heritage structure in the vicinity of the site?	No	There is no archaeological or cultural/heritage structure in the vicinity of the site.
7	Is there any group of indigenous people in and around the selected site?	No	There are no indigenous people in and around the selected site
8	Will the construction activity affect the surrounding around the tool room?	Yes	The allocated land has state highway on one of its side and Asian Paint factory on other side. As such construction and operation of the Tool Room is not envisaged to have any impact of the surrounding area. However, care may be exercised to minimize dust emissions from the construction activity.
9	What is the source of water available at the site (Ground water, surface water, municipal supply, etc.)? Is the water requirement envisaged to put additional pressure on the water sources?	No	The water works facility is situated adjacent to the TRTC which draws water from the treated water from canal (4-5Kms) from the facility. The treated water can be used for drinking purpose as well.
10	Will the project lead to increased air emissions in the region?	Yes	The TC is envisaged to have insignificant dust emissions during the construction period. Care may be exercised to minimize dust emissions and its impact, if any, on the adjoining industry. Also, during the operation phase appropriate measures shall be undertaken to minimize air emission in case D.G set is used for electricity backup.
11	Will the project lead to increase in noise levels in the area?	Yes	Increase in noise level is not envisaged in the area due to TC. However, care like acoustic enclosures for D.G set, in case installed, construction only in day time, etc. may be practiced.

SN	Issues	Yes/No	Remarks
12	Will the Tool room involve use of chemicals and/or solvents?	No	The envisaged TC will only use diesel (in case D.G set is installed). However, in case any chemicals are used appropriate measures shall be undertaken to manage and store the chemicals.
13	Will the project involve handling, storage and disposal of hazardous waste? If yes, what are the different types of waste envisaged from the TC?	No	The envisaged TC will not use chemicals. However, in case, chemicals and any other hazardous materials are used measures shall be undertaken to manage the associated waste.
14	Is the project located in the area of seismic faults? In case yes, in which seismic does the location lie?	Yes	Yes, the region has experienced history of earthquakes. The TC location falls in the Seismic zone-4.
15	Is there any record of natural calamity in the area in the past? If yes, what is the probability of the same effecting the operations of TC in the future?	Yes	Yes, the region has experienced history of earthquakes. Although, so far the intensity of the earthquake was not high, however, mild tremors were felt. The probability of such incidences in future and the same effecting operations of TC is not predictable but appropriate measures shall be undertaken to ensure minimal / no damage in case of such natural calamity.

18.3 Budgetary estimates of some machines

Machine	Make	Model	Specification	Price			Price (INR) @20 Escalation
				Euro	USD	INR	
5 AXIS MILLING	HAAS	VF-6/40TR	1626X813X76 2		204815	1,22,88,900	1,47,46,680
	HAMLEY	C60U	1200X1300X9 00	864840		7,00,52,040	8,40,62,448
	DMG MORI	DMV 270 P	2700X2700X1 600	1684210		13,64,21,01 0	16,37,05,21 2
	RAMBAUDY		3000x2000x1 500	12,00,00 0.00		9,72,00,000	11,66,40,00 0
3 AXIS VMC	HAAS	VM3	1016X660X63 5		117215	70,32,900	84,39,480
	DMG MORI	CTX450 (TURN MILL)	650X465 C AXIS	107190		86,82,390	1,04,18,868
	DMG MORI	DMF260	2600X700X70 0	310440		2,51,45,640	3,01,74,768
	RAMBAUDY		2500x1500x1 500	10,00,00 0.00		8,10,00,000	9,72,00,000
	HARTFORD	HSA323	3000X2200X7 80		2,40,00 0	1,44,00,000	1,72,80,000
	HARTFORD	HEP 2150	2250X1500X7 80		170000	1,02,00,000	1,22,40,000
CNC LATHE	DMG MORI	CTX450 V1	650	90900		7362900	88,35,480
	HAAS	ST-40	648X1118		157155	94,29,300	1,13,15,160
	JOBBER	JOBBER JR CNC	1875X1740X1 720			47,92,15,08 0	57,50,58,09 6
Grinder	KENT	KGS920AHD	2000X900		124275	74,56,500	89,47,800
	KENT	KGS925AHD	2500X900		137270	82,36,200	98,83,440

Machine	Make	Model	Specification	Price			Price (INR) @20 Escalation
				Euro	USD	INR	
Cylindrical Grinder	PAC	PACGRID Z3040X8/1	1000X200			850,000	10,20,000
Radial drilling machine	PAC	PACDRIL Z3040X8/1	240			450,000	5,40,000
Radial drilling machine	PAC	PACDRIL Z3050X16/1	1250			750,000	9,00,000
Injection moulding machine	PAC	ESM 60 TON SERVO SRIVE	600 TON		140000	84,00,000	1,00,80,000
UPS	AIRCOM	ht series3:3	20kva,5min 20X20 battery				2,32,920
	AIRCOM	ht series3:3	40kva,5min 12x20battery				2,32,920

18.4 Key questions asked during telephonic discussions

1. What are the key types of tools/ products manufactured?
 - a.
 - b.
 - c.
 - d.

2. What are the key sectors catered?
 - a.
 - b.
 - c.
 - d.

3. Have you ever taken any support from MSME Tool room? If yes, in which field?
 - a. tool design
 - b. tool manufacturing
 - c. Training
 - d. Consultancy

4. Would you be interested to take support from MSME Tool room? If yes, in which field?
 - a. tool design
 - b. tool manufacturing
 - c. Training
 - d. Consultancy

5. Can you mention key areas/ products you plan to venture in future, where MSME tool rooms can support?

6. Would you be open to formation of consortium with MSME Tool Rooms and for manufacturing?

7. What are the key manufacturing technologies/ processes currently in use?

8. What are the key issues and challenges faced in current processes/ technologies to cater to current requirements?
9. What are key technologies that are required but currently not available?
10. What are key skills required for managerial manpower and machine operators?
11. Existing gaps in skills required for Managerial manpower and Machine operator level?
12. Additional skills required to cater to new requirements

18.5 List of MSMEs/other manufacturers contacted in primary survey

SN	Name of the Unit	Region	State	Contact
Discussion over telephone				
1.	Abbott toolfast private limited	Faridabad	Haryana	Mr. Pawan Abbott, 9810033948
2.	Meneta automotive components private limited	Sonipat	Haryana	Mr. Rajender Singh, 0130 6991768
3.	Modern metals India Private limited	Faridabad	Haryana	Mr. Ankit Gupta, 9910012626
4.	Stitch overseas private limited	Gurgaon	Haryana	Mr. Parveen Satija, MD, 0124 4755400
5.	RIYA electrodes private limited	Faridabad	Haryana	Mr. Alok Mishra, 9990803660
6.	JBM auto limited	Gurgaon	Haryana	Mr. H.R. Saini, ED, 9811322081
7.	Marposs India private limited	Gurgaon	Haryana	Mr. Sarabjit Singh, 9871900871
8.	Nagata India private limited	Gurgaon	Haryana	Mr. Praveen Rao, 9810223466
9.	Star wire (India) limited	Faridabad	Haryana	Mr. P.N. Singh, 9350150755
10.	Indian machine tool manufacturers' association	Gurgaon	Haryana	Mr. Srinjay Dash, 9560333553
11.	Agie charmilles (south east Asia) private limited	Bengaluru	Karnataka	Mr. Sureh Peter, 8888775522
12.	Customised technologies private limited	Bengaluru	Karnataka	Dr. R A Narayanan, 9880022700
13.	Acme toolings	Hyderabad	AP	N Satish (Production), 9701346793, 9701346790
14.	Nebashi CNC automation private limited	Hyderabad	AP	Mr Srinivasan 040 - 66622095, 40038721
15.	Vasantha tool crafts private limited	Hyderabad	AP	Mr Giri (Production & Marketing) 040 44613333, 040 44613330
16.	Ferromatik milacron India private limited	Ahmedabad	Gujrat	079-25890081, 25890133, 25830063
17.	Global special springs private limited	Ahmedabad	Gujrat	Mr. Rajesh Samal, Manager, 9898594269

SN	Name of the Unit	Region	State	Contact
18.	Assab sripad steels limited	Chennai	Tamil Nadu	Mr. P.N Krishnaswamy, (Technology) , 93241 50695
19.	Chennai CNC servotronics private limited	Chennai	Tamil Nadu	Mr. D. Subramanian ,MD, 98410 21334
20.	Omax auto limited	Gurgaon	Haryana	Mr Sahu, 9953628953, Mr Umed Singh , 9540800820
21.	Agrim components limited	Faridabad	Haryana	Mr Rajkumar , 01294173174
22.	Arvind engineering	Faridabad	Haryana	1292234359
23.	Bony polymers limited	Faridabad	Haryana	Mr Jabbar Ali Khan, 9650922844
24.	Continental engines limited	Bhiwadi	Rajasthan	Mr Mahesh, 9810305566
25.	DM enterprises	Gurgaon	Haryana	9911225512
26.	Forgewell limited	Faridabad	Haryana	Mr Shyam Khandelwal, 9810038448
27.	Horizon industrial products Private limited	Manesar	Haryana	Mr Abhi Bhatti , 9268567207
28.	M/s Indo alusys India limited	Bhiwadi	Rajasthan	Mr B.S.Trivedi, 9672991453, 01493306500, 01143758100
29.	Kiran udyog	Gurgaon	Haryana	toolroom2@kiranudyogindia .com, 01244365095
30.	M.R.A metal private limited			Mr Ajay, 01302367585
31.	Machino polymers limited	Gurgaon	Haryana	Mr Vikas Arora , 01244684200
32.	Mytex polymers India private limited	Manesar	Haryana	Mr Manoj Kumar Shyam , 9251012179
33.	Paracoat products private limited	Bhiwadi	Rajasthan	Mr Arvind Haldia , 9351006102
34.	Prime polymers	Faridabad	Haryana	01292233794
35.	Rasandik engineering	Gurgaon	Haryana	Mr Monty, 9812431693
36.	RICO auto industries	Khandsa	Haryana	Mr Ram Millen Verma , 9810854803

SN	Name of the Unit	Region	State	Contact
37.	SKH auto components	Faridabad	Haryana	9650004227
38.	SRS die casting	Gurgaon	Haryana	Mr Vineet Ahuja, 9899290883 Mr Pawan kumar, 9999012015
39.	Tokai engineering private limited	Manesar	Haryana	Mr Pardeep, 9899119508, pardeep.design@tokaiengineering.com
40.	Uttam strips private limited	Bhiwadi	Rajasthan	Mr Ravinder, 7891005931 Mr Rajiv Malhotra, 7891005884
41.	Vikram fabricators	Faridabad	Haryana	Mr Malik - 98 10 060740, 9312260031
42.	Tata Motors	Jamshedpur	Jharkhand	Mr. Kahli, Manager Tool Room, Tata Motors Jamshedpur
43.	Tata Motors	-	-	Mr. Santosh Raout, Tool Procurement Manager (Nano), TATA motors
44.	Renault Nissan	Chennai	Tamil Nadu	Mr. Nitin Solanki and Mr. Prasana, Tool Procurement Managers
45.	General Motors	Bengaluru	Karnataka	Mr. Venkatesh M, Development manager (tooling)
One to One discussion meeting				
46.	Maruti suzuki	Gurgaon	Haryana	Mr M.K.Gupta, GM, 9811158136 Mr S.K.Sharma, Manager (MSTA), 01242341416 Mr Bhupendra Singh Rana, Dy. Manager (Training academy), 9811743255
47.	Nagata India private limited	Gurgaon	Haryana	Mr Mittul Soni, MD 9810312809, Mr Rajiv Sharma, Manager (Design), 9810603608 Mr U.K. Singh , GM (Operations), 9818897900

SN	Name of the Unit	Region	State	Contact
48.	JBM auto limited	Faridabad	Haryana	Mr Rakesh Chandra Kushwaha, Dy GM, 9711209656
49.	Hero motocorp	Dharuhera	Haryana	Mr Sandeep Wadhvani , Senior manager (Engineering) - 9466080065, Mr M.M.Singh, Dy GM (Human resources), , Mr Sudhansu Sekhar (Product trainer and 9868142186Senior manager human resources), 9311806958
50.	Neel metal products limited	Gurgaon	Haryana	Mr Anuj Agarwal, VP (Corp. projects), 9999211288
51.	Motherson automotive technologies and engineering	Gurgaon	Haryana	Mr Sanjeev Sharma, AVP, 9650566500
52.	CIPET	Gurgaon	Haryana	Mr. Sisir Kumar, Regional Head, CIPET, Gurgaon
53.	Munjal Showa	Gurgaon	Haryana	Mr. Rakesh Atre, Associate Vice President, Business Excellence
54.	Indian Machine Tool Manufacturers Association	Gurgaon	Haryana	Mr. Srinjoy Das, Director and Head- North Region,9560333553
55.	Shriram pistons and rings limited	Alwar	Rajasthan	Mr. Devendra Mishra, ED & Head, Pathredi works, 8094018032
56.	Motherson sumi systems limited	Bhiwadi	Rajasthan	Mr. S.R. Unnithan, Dy. GM, 8696926880
57.	Hi Tech gears limited	Bhiwadi	Rajasthan	Mr. Akhilesh Agarwal, GM, 9717522663

18.6 Key discussion during primary survey

Name	Key points of discussion
Nagata India, Manesar (Japanese tool room)	<ul style="list-style-type: none"> ▶ Suggested, to start with new auto TC can be sheet metal focussed as within auto sector, sheet metal accounts for major chunk out of 4 key sub segments - Sheet metal, Plastic, Forging tools, Pressure die casting. There is about INR 600 cr of sheet metal business for tool rooms in each car model. ▶ There is a huge demand for operators, die fitters/ makers for sheet metal operations. ▶ Need for manpower trained in CNC, CAD/CAM/CAE. ▶ Rapid prototyping/ 3d printing will not be of much use in short term (at least 5-10 yrs away from now) for sheet-metal parts.
Motherson (tier 1 supplier of plastic parts to OEMs, has a captive tool room)	<ul style="list-style-type: none"> ▶ Suggested that auto TC should be sheet metal and plastic focussed as these account for majority of auto components. ▶ Trained manpower in tool design, machine operators are in short supply.
JBM auto tool room and training centre	<p>Key industry trends and requirements-</p> <ul style="list-style-type: none"> ▶ Overall there is a shortage of trained manpower at machine operator level in auto sector ▶ Requirement of skilled manpower in upcoming areas like mechatronics and automation ▶ One of the key current industry trends in automotive manufacturing is light weighting. Auto manufacturers have moved from use of low tensile strength steel sheet (~290-300) to high tensile strength steel sheet (600-700). Hence need for products made of high tensile steel strength of 590 ▶ Also emphasized that going forward, <ul style="list-style-type: none"> • Technology centres should focus equally on both production and training. Training in high end simulation (die design) should be provided to engineering graduates ▶ Tool room should focus on Technologies that are futuristic and currently not available in India
Hero Motors Corp, (Plant Dharuhera)	<ul style="list-style-type: none"> ▶ Trainees from existing tool rooms lack practical knowledge especially in areas like mechanical maintenance, electrical

	<p>maintenance, automated paint shops, assembly jobs, supply and quality assurance (SPC & SQC, PFMEA, Six sigma)</p> <ul style="list-style-type: none"> ▶ Key capabilities sought in skilled workers and areas of development <ul style="list-style-type: none"> • Training in Automated paint shops • Injection and spot welding • Assembly line training • Mechanical & electrical maintenance
<p>Mr. Kahli, Manager, Tool Room, Tata Motors Jamshedpur</p>	<p>Discussion on the tooling requirements in the commercial vehicle. Major outcome of the discussion were:</p> <ul style="list-style-type: none"> ▶ The tooling requirement in sheet metal for a commercial truck is in the range of 50-60 crore. ▶ The usage of plastics is increasing in the newer models. ▶ There is a need of mid-size sheet metal TC to cater to a large market.
<ul style="list-style-type: none"> ▶ Mr. Santosh Raout, Tool Procurement Manager (Nano), TATA motors. ▶ Mr. Nitin Solanki and Mr. Prasana, Tool procurement managers, Renault Nissan, Chennai. ▶ Mr. Venkatesh M, Development manager (tooling), General Motors, Bengaluru. 	<p>Major outcomes of these discussion were mainly the following:</p> <ul style="list-style-type: none"> ▶ The tooling requirement for 4 wheeler is estimated to be around 600-700 crore. ▶ There is a need for mid-size to large size sheet metal TC for 4 wheeler segment. ▶ Mostly, major plastic moulds required for the 4 wheeler are imported mainly because of cost effectiveness and quality as compared to Indian moulds. ▶ There is a need of mid-size capacity in the plastic mould at least in comparison with the Korean manufacturers.

18.7 AICTE norms for engineering and technology institutes

a) Land requirement for technical institutions

Other than Rural Places			Rural Areas		
UG Programs	Diploma	Standalone PG Programs	UG Programs	Diploma	Standalone PG Programs
2.5	1.5	2.5	10	5	10

Land area requirements in acres

- ▶ Land Area Requirements:
 - Land area shall cover hostel facilities, if any
 - Land shall be in one continuous piece
 - Considering hilly nature of land in North Eastern States, land may be made available in 3 pieces which are not away from each other by more than 1 Km
- ▶ Number of students generally allowed per acre land available when FSI = 1 is 300.
- ▶ Built up Area Requirements
 - The Institution area is divided in, Instructional area (INA, carpet area in sq. m.), Administrative area (ADA, carpet area in sq. m.), Amenities area (AMA, carpet area in sq. m.)
 - Circulation area (CIA) is equal to 0.25 (INA+ADA+AMA).
 - Total built up area in sq. m. is equal to (INA+ADA+AMA) + (CIA)

► Instructional area (carpet area in sqm)

	Number of Divisions (UG class of 60)	Duration of course (in yrs)	Class Rooms (C)	Tutorial Rooms(D) PG class rooms (H)	Laboratory	Research Laboratory	Work Shop	Additional WS/Labs for Category X courses	Computer centre	Drawing Hall	Library and Reading Room	Seminar Halls
Carpet area in sqm per room			66	33	66	66	200	200	150	132	400	132
Engineering/ Technology (Degree Institute)												
Number of rooms required for new institution	A	4	C=A	D=C/4	10	-	1	-	1	1	1	1
Total number of rooms (UG)	A	4	C=Ax4	D=C/4	10/Course*	-	1	2/Course (Max 4)	1	1	1	1/Course
Total number of rooms (PG)	F	2	-	H=Fx2	1/Specialization	1/Specialization	1	2/Course (Max 4)	1	1	1	1/Course
Where,												
<ul style="list-style-type: none"> Category X of courses: Mechanical, Production, Civil, Electrical, Chemical, Textile, Marine, Aeronautical and allied courses of each. 												

	Number of Divisions (UG class of 60)	Duration of course (in yrs)	Class Rooms (C)	Tutorial Rooms(D) PG class rooms (H)	Laboratory	Research Laboratory	Work Shop	Additional WS/Labs for Category X courses	Computer centre	Drawing Hall	Library and Reading Room	Seminar Halls
<ul style="list-style-type: none"> Classrooms, Tutorial rooms and Laboratories required for 2nd, 3rd and 4th year may be added progressively to achieve total number as stated. Additional Library (Reading room) area of 50 sq m / per 60 student (UG+PG) intake beyond 420. UG laboratories if shared for PG courses shall be upgraded to meet requirements of PG curriculum Progressive requirement, 2nd year onwards shall be calculated as 3+3+2 labs/course Additional 5 Labs/Course when number of divisions are more than 2/course. Round off fraction in calculation to the next integer. 												
Engineering/ Technology (Diploma and Post Diploma Institute)												
Carpet area in sqm per room				66	33	66	200	200	150	132	400	132
Number of rooms required for new institution	A	Y	C=A	D=C/4	06	1	-	1	1	1	-	
Total number of rooms	A	Y	C=AxY	D=C/4	06/Course*	1	2/Course (Max 4)	1	1	1	1	
Where;												

	Number of Divisions (UG class of 60)	Duration of course (in yrs)	Class Rooms (C)	Tutorial Rooms(D) PG class rooms (H)	Laboratory	Research Laboratory	Work Shop	Additional WS/Labs for Category X courses	Computer centre	Drawing Hall	Library and Reading Room	Seminar Halls
<ul style="list-style-type: none"> • Category X of courses: Mechanical, Production, Civil, Electrical, Chemical, Textile, Marine, Aeronautical and allied courses of each. • Classrooms, Tutorial rooms and Laboratories required for 2nd, 3rd and 4th year may be added progressively to achieve total number as stated. • Additional Library (Reading room) area of 50 sq m / per 60 student (UG+PG) intake beyond 420. • Progressive requirement, 2nd year onwards shall be calculated as 2+2 labs / course • Round off fraction in calculation to the next integer. 												

b) Duration and Entry Level Qualifications for the Technical Program (Engineering and Technology Programs/ Degrees)

SN	Diploma/ Degree	Duration	Eligibility
1	Under graduate degree program (full time)	4 years	<ul style="list-style-type: none"> ▶ Passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of the Chemistry / Biotechnology / Biology ▶ Obtained at least 50% marks (45% in case of candidate belonging to reserved category) in the above subjects taken together
2	Diploma Programs (full time)	3 / 4 years	<ul style="list-style-type: none"> ▶ Passed 10 std. / SSC examination ▶ Obtained at least 35% marks at the qualifying examination
3	Post diploma programs	1.5 years/ 2 years	<ul style="list-style-type: none"> ▶ Passed Diploma examination ▶ Obtained at least 50% marks (45% in case of candidate belonging to reserved category) at the qualifying examination.

c) Norms for Intake & Number of Courses / Divisions in the Technical Campus

Diploma/ Degree	Intake per division	Maximum Number of UG/PG courses and/ or divisions allowed in the new division (single shift working)	
		Divisions	Intake
Diploma/ Post diploma level	60	5	300
Undergraduate level	60	5	300
Post graduate degree and post graduate diploma level	18	6	108

New technical campus in Engineering and technology shall necessarily opt for courses from the following:

- ▶ Applied Electronics & Instrumentation
- ▶ Chemical Engineering/Technology
- ▶ Civil Engineering/Technology, Construction Engineering Computer Science, Computer Science and Engineering, Computer Science & Information Technology
- ▶ Computer Technology Electrical Engineering or Electrical & Electronics Engineering
- ▶ Electronics and Communication Engineering
- ▶ Information Technology
- ▶ Instrumentation and Control Engineering
- ▶ Mechanical Engineering
- ▶ Production Engineering

d) Norms for Essential and Desired requirements for Technical Campus (Marked as essential need to be made available at the time of the Expert committee visit)

SN	Details of requirement	Provisioning
1.	Language Laboratory The Language Laboratory is used for language tutorials. These are attended by students who voluntarily opt for Remedial English classes. Lessons and exercises are recorded on a weekly basis so that the students are exposed to a variety of listening and speaking drills.	Essential
2.	Potable Water supply and outlets for drinking water at strategic locations	Essential
3.	Electric Supply	Essential
4.	Backup Electric Supply	As required
5.	Sewage Disposal	Essential
6.	Telephone and FAX	Essential
7.	First Aid facility	Essential
8.	Vehicle Parking	Essential
9.	Institution web site	Essential
10.	Barrier Free Built Environment for disabled and elderly persons including availability of specially designed toilets for ladies and gents separately	Essential
11.	Safety provisions including fire and other calamities	Essential
12.	General Insurance provided for assets against fire, burglary and other calamities	Essential
13.	All weather approach road	Essential
14.	General Notice Board and Departmental Notice Boards	Essential

SN	Details of requirement	Provisioning
15.	Medical and Counselling Facilities	Essential
16.	Public announcement system at strategic locations for general announcements/paging and announcements in emergency.	Desired
17.	Enterprise Resource Planning (ERP) Software for Student-Institution-Parent interaction	Desired
18.	Transport	Desired
19.	Post, Banking Facility / ATM	Desired
20.	CCTV Security System	Desired
21.	LCD (or similar) projectors in classrooms	Desired
22.	Group Insurance to be provided for the employees	Desired
23.	Insurance for students	Desired
24.	Staff Quarters	Desired

e) Norms for Faculty requirements and Cadre Ratio for Technical campus

▶ Diploma

Diploma	Faculty: Student ratio	Principal/ Director	Head of the Department	Lecturer	Total
		A	B	C	D
Diploma/ Post diploma	1:20	1	1 per department	S/20	A+B+C

S = Sum of number of students as per Approved Student Strength at all years

▶ Degree

Degree	Faculty: Student ratio	Principal/ Director	Professor	Associate professor	Assistant professor	Total
		A	B	C	D	A+B+C+D
Undergraduate	1:15	1	$(S/15 \times R) - 1$	$(S/15 \times R) \times 2$	$(S/15 \times R) \times 6$	$S/15$
Postgraduate	1:12	-	$(S/12 \times R)$	$(S/12 \times R)$	$(S/12 \times R)$	$S/12$

Note:

For undergraduate: S = Sum of number of students as per Approved Student Strength at all years, R = (1+2+6)

For Postgraduate: S = Sum of number of students as per Approved Student Strength at all years *R = (1+2), [#]R = (1+2+6)

18.8 Minute of stakeholders meeting at Rohtak

Date	25-28 August 2015	
Time	All day	
Location	Rohtak, Ambala, Manesar, Faridabad	
	Name	Designation
MSME-DI Personnel	D. K. Tyagi Mukesh Verma Sanjay Nigam	Assistant Director Assistant Director Assistant Director
EY Personnel	Dinesh Kumar Pradhan Rajkumar Deegwal Samrendra Singh	Adviser Senior Consultant Senior Consultant
Agenda	<p>Discussion on the following points</p> <ul style="list-style-type: none"> ▶ Overview of industry sector-wise ▶ Key requirements/ Challenges of Associations/MSMEs <ul style="list-style-type: none"> ▶ Manufacturing technologies ▶ Key skills ▶ Current trends ▶ Insights on potential sectors for growth in terms of production and training 	
Sr. No.	Industry Representative	Key points discussed during the meeting
	Name Designation	
Meeting at Rohtak on 25 August 2015		
1.	Anshul Kumar Narwal	President Rohtak IDC Industries Association
2.	R P Jain	MSME Chamber of Commerce
3.	Rajesh Khera	Distt. Industries Centre, Rohtak
4.	Sandeep Munjal	M.D., Kazuki Munjal Automotive Ltd
5.	Anil Jain	President, Jind Road Industrial Associations
6.	Vinod Jain	Director, A. V. Wores (P) Ltd
7.	Rakesh Ahuja	Director Punch Ratna Fasteners private Limited
		<ul style="list-style-type: none"> ▶ There are around 1000 micro/small and 07 large units. ▶ Key large players include Asian paints, Hi-tech Plast, Blow Packaging, FDDI, Laxmi Precision Screws, Nippon, Lotte, etc ▶ Rohtak is known as a city of fasteners. ▶ Besides fasteners, Rohtak has significant numbers of Critical auto component manufacturers which include automotive turned components, forged component and gears manufacturers. ▶ These Auto parts manufacturers provide parts for OEMs like Maruti, GM and Eicher Tractor etc. ▶ Mainly Lathe machining products, jogs fixtures and sheet metal components are manufactured in the region ▶ There are around 500-700 CNC machines in the region

			<ul style="list-style-type: none"> ▶ Skilled CNC operators are in great demand. ▶ Defence firms are planned to start manufacturing plant in Rohtak which will be a great opportunity for MSMEs. ▶ Low cost Automation training and chemical/mechanical/metallurgy lab facility at proposed TC will support the MSMEs in the region. ▶ Looking at the significant number of retired Army personnel, as industry readiness training can be offered by the TC to utilise their talent. ▶ Maintenance facility and training courses would help the TC in overcoming day today maintenance issues.
Meeting at Ambala on 26 August 2015			
1.	Rakesh Gupta	President, Ambala Scientific Instruments Manufacturers' Association (ASIMA)	<ul style="list-style-type: none"> ▶ Key industries in Ambala are Scientific Instruments and manufacturer of mixers. ▶ No. of scientific instrument manufacturing units is approximately 1300-1400 ▶ Total revenue of the industry is approx. 1400-2000cr per year. ▶ The firms have latest lathe milling and painting machines. There are around 40-50 CNC machines in Ambala. ▶ 50% of the revenue comes from export of scientific equipment's. 35% from supply of scientific equipment to educational institutes in India and rest 15% from industry. ▶ Quality measurement centres such as ITDC were present earlier but presently manufacturer themselves test quality of their products with secondary calibrated equipment. Hence presence of Quality marking centres may increase value of the export oriented products. ▶ Most of the units manufacturing scientific equipment do not have access to latest technology but they have skilled manpower who have been involved in this work from generations. ▶ Sector does not show the capacity to predict latest trend in the industry and they generally do
2.	Gyan Chand Agrawal	President, scientific Appratus Manufacturers Association (SAMA)	
3.	Umesh Gupta	Alcon Scientific Industries	
4.	Ajay Aggarwal	President MiXi Association	

			<p>reverse engineering on the model and design supplied by the consumer in order to meet their requirement.</p> <ul style="list-style-type: none"> ▶ CNC Machine operators are required in the sector as there is limited number of CNC operators in Ambala. ▶ There are only 15-20 mixi manufacturers left in Ambala but these units are providing employments to around 10000 people. ▶ There is requirement of skill development in the field of motor manufacturing i.e. hose taping, balancing and binding ▶ Mould for mixi bodies, container dies are ▶ Currently they source mixi blades but the same can be provided by any local firm.
Meeting at IMT Manesar on 28 August 2015			
1.	Suman Chawla	GS, Manesar Industries Welfare Association	<ul style="list-style-type: none"> ▶ There are around 50 sheet metal part manufacturers and around 40 leather goods manufacturers in IMT Manesar ▶ There is a requirement for die and mould facility to cater die and mould requirements of sheet metal fabricators. ▶ Leather goods manufacturers has a demand for electroplating, testing facility and mould for non-leather components ▶ The industry faces big challenge in getting component for repair and maintenance job. ▶ The printing industry also has demand for die and punch for printing machines. ▶ The ITI students can be directly hired by the industry for further training on the job. ▶ There is no local facility for component manufacturing for repair and maintenance. ▶ Progressive tooling is an area where the industry needs support.
2.	Sanjay K Aggrawal	Founder RDC Steel and Allied Service Pvt Ltd	
3.	Rajeev Kumar	GM Adven Biotech Pvt Limited	

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