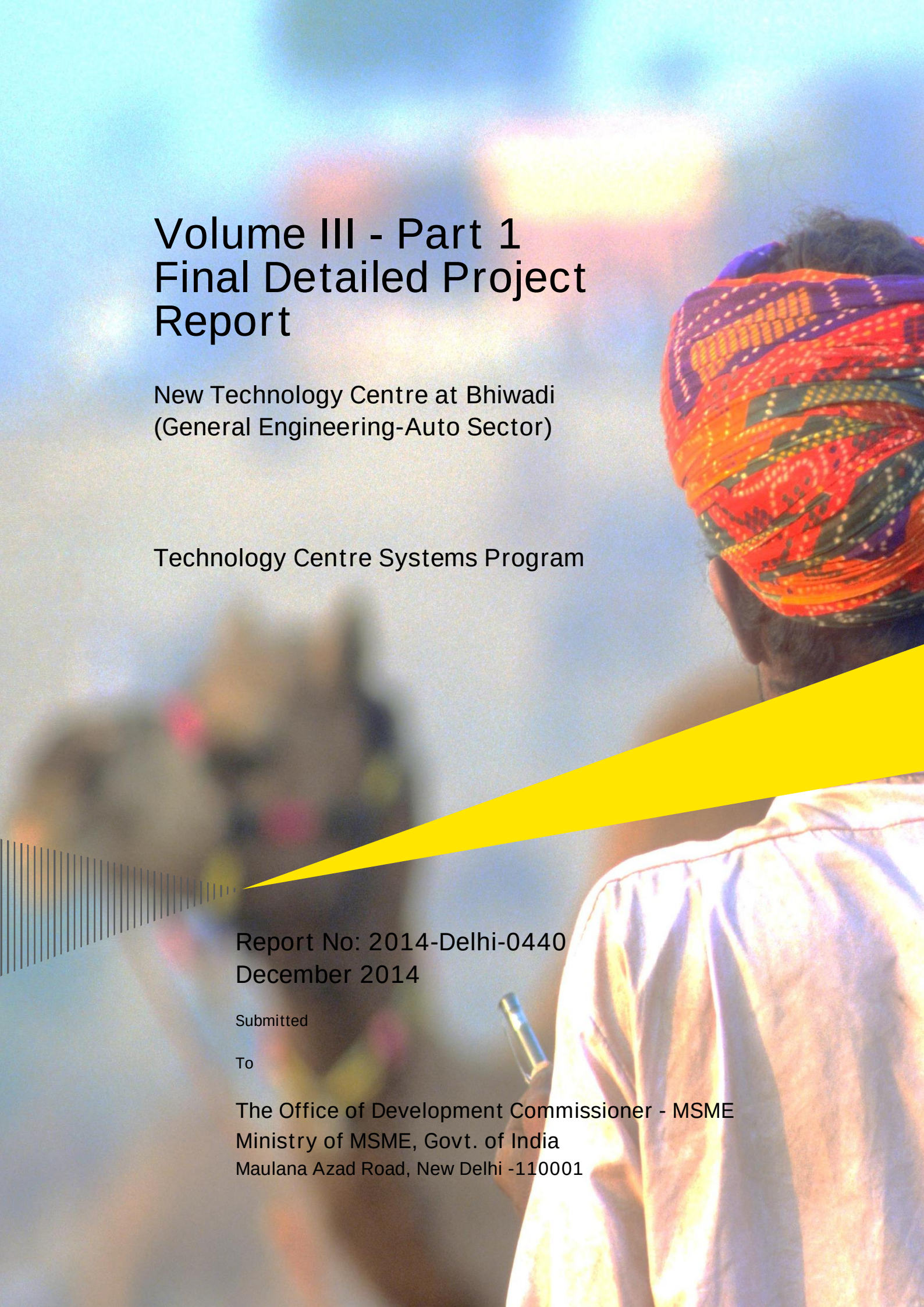
# Volume III - Part 1
# Final Detailed Project Report

## New Technology Centre at Bhiwadi
## (General Engineering-Auto Sector)

Technology Centre Systems Program



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To

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Ministry of MSME, Govt. of India
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28 Nov 2014

Director (Tool Room)
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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 Final Detailed Project Report for setting up of Technology Centre at Bhiwadi 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
- Auto firms 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 Final 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 Final 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,

Guru Malladi, Partner – Advisory Services

# Disclaimer

This Final Detailed Project Report for development of technology centre at Bhiwadi as part of consulting services to establish a Programme 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) has been prepared by Ernst & Young LLP (hereinafter referred to as 'EY' or 'Ernst & Young' or 'Us') and delivered to the 'Office of Development Commissioner - Ministry of Micro, Small & Medium Enterprise (O/o of DC-MSME)' (hereinafter referred to as 'the Client').

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Also, we must extend our sincere thanks to all the stakeholders like OEMs, Tier I & II suppliers, industry associations, Government Institutes and ancillary units who gave us their valuable time and insights with respect to various dimensions of the tooling industry and its support requirements. Without their help, capturing of the industry insights would not have been possible.

# Abbreviations

| | |
|---|---|
| ACMS | Auto Components Manufacturer Samiti |
| AICTE | All India Council For Technical Education |
| BCCI | Bhiwadi Chamber Of Commerce and Industry |
| BMA | Bhiwadi Manufacturers Association |
| CAD | Computer-aided design |
| CAE | Computer-aided engineering |
| CAGR | Compound annual growth rate |
| CAM | Computer-aided manufacturing |
| CDGI | Centre for Development of Glass Industries |
| CETP | Common effluent treatment plant |
| CFC | Common facility centre |
| CFTI | Central Footwear Training Institute |
| CIHT | Central Institute of Hand Tools |
| CITD | Central Institute of Tool Design |
| CMC | Construction management consultant |
| CNC | Computerized numerical control |
| CNM | Cluster network manager |
| CSIR | Council of Scientific and Industrial Research |
| CST | Central sales tax |
| CTR | Commercial tool rooms |
| CTTC | Central Tool Room & Training Centre |
| DC | Development Commissioner |
| DIC | District Industrial Centre |
| DMIC | Delhi Mumbai Industrial Corridor |
| DNGIR | Dadri Noida Ghaziabad Investment Region |
| EDM | Electrical discharge machining |
| EPIP | Export promotion industrial parks |
| ESDM | Electronics system design and manufacturing |
| ESTC | Electronics Service & Training Centre |
| EY | Ernst and Young LLP |
| FFDC | Fragrance & Flavour Development Centre |
| FRP | Fibre reinforced plastic |
| FSIA | Faridabad Small Industries Association |
| FSSP | Full social screening process |
| FTA | Free trade agreement |

| | |
|---|---|
| GDP | Gross domestic product |
| GESIP | Gender, equity and social inclusion plan |
| GIA | Gurgaon Industrial Association |
| GIZ | Gesellschaft für Internationale Zusammenarbeit |
| GoI | Government of India |
| HDI | Human development index |
| HFC | Haryana Financial Corporation |
| HMSI | Honda motorcycle and scooter India |
| HSC | Higher secondary certificate |
| HSCIL | Honda Siel cars India |
| HSIIDC | Haryana State Industrial & Infrastructure Development Corporation Limited |
| IDEMI | Institute for Design of Electrical Measuring Instruments |
| IDTR | Indo Danish Tool Room |
| IGTR | Indo German Tool Room |
| IISc | Indian Institute of Science |
| IP | Internet protocol |
| IPSSP | Indigenous people's social screening process |
| ITI | Industrial training institute |
| ITSP | IT Service Provider |
| JBM | Jay Bharat Maruti |
| JETRO | Japan external trade organization |
| KBN | Khushkhera-Bhiwadi-Neemrana |
| KPI | Key performance indicator |
| KVIB | Khadi and Village India Board |
| KVIC | Khadi and Village Industries Commission |
| L&T | Larsen and Toubro |
| LLP | Limited liability partnership |
| MICO | Motor industries company limited |
| MIG | Metal inert gas |
| MIWA | Manesar Industries Welfare Association |
| MoMSME | Ministry of Micro, Small & Medium Enterprises |
| MOU | Memorandum of understanding |
| MSME | Micro, Small & Medium Enterprises |
| NCR | National capital region |
| NCVT | National Council for Vocational Training |
| NEPZ | Noida Export Processing Zone |
| NIA | Neemrana Industries Association |

| | |
|---|---|
| NPSP | National portal service provider |
| NSIC | National Small Industries Corporation |
| NSSP | No social screening process |
| O/o of DC-MSME | Office of Development Commissioner - Micro, Small & Medium Enterprise |
| OEM | Original equipment manufacturer |
| OP | Operational Policy |
| PDO | Program's development objective |
| PMU | Program management unit |
| PNB | Punjab National Bank |
| PPDC | Process and Product Development Centre |
| PTA | Preferential trade agreement |
| PVC | Polyvinyl chloride |
| RFC | Rajasthan Financial Corporation |
| RFD | Result framework document |
| RIICO | Rajasthan State Industrial Development and Investment Corporation |
| RPT | Rapid prototyping |
| RSLDC | Rajasthan Skill and Livelihood Development Corporation |
| RSLDC | Rajasthan Mission On Skill and Livelihoods |
| SAIL | Steel Authority of India limited |
| SDC | Skill Development Centre |
| SFC | State Financial Corporation |
| SSC | Senior secondary certificate |
| STP | Sewage treatment plants |
| TAGMA | Tool & Gauge Manufacturers Association of India |
| TCs | Technology centres |
| TCSP | Technology Centres Systems Programme |
| TDC | Technology Development Centres |
| TIG | Tungsten inert gas |
| TP | Technology partner |
| TR | Tool room |
| TRTC | Tool room & training centre |
| UNIDO | United Nations Industrial Development Organization |
| UPS | Uninterruptible power supplies |
| VAT | Value added tax |
| VLSI | Very-large-scale integration |
| VMC | Vertical Machining Centre |

# Revision History

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# Executive Summary

# Executive summary

The proposed Technology Centre (TC) under Ministry of MSME's Technology Centre Systems Programme (TCSP) at Bhiwadi in Alwar district of Rajasthan will play an important role in enhancing the competitiveness of MSME units in the region. It will focus on improving access to technology, providing skill up-gradation and offering advocacy support to the MSMEs with high growth potential.

Bhiwadi is strategically located between Delhi and Jaipur within the National Capital Region. It has been identified as an investment region under DMIC and a number of mega industrial projects are coming up in this region. Bhiwadi scores high on the location attractiveness index[1]. Moreover, Bhiwadi and the region around it have presence of several Global Auto giants and tier 1 & 2 OEMs. Hence, a General Engineering TC with focus on Auto sector is proposed to be developed at Bhiwadi. This is also based on discussions with O/o DC-MSME and domain experts, major firms in the region and analysis of publicly available data.

The objective of this DPR is to evaluate feasibility of the proposed new MSME TC at Bhiwadi. This includes assessment of the market need in the region, requirement of technology and skillset, requirement of investment and regulatory approvals etc. for developing a green field TC at Bhiwadi. This DPR has been prepared in consultation with relevant stakeholders including O/o DC-MSME, Government of Rajasthan RIICO, OEMs, Tier I & II suppliers, Bhiwadi Manufacturers Association (BMA), industry associations, Government Institutes and ancillary units in the region.

1 STAKEHOLDER DISCUSSION: Discussions with various stakeholders were carried out to develop a better understanding of the requirements and expectations from the proposed Technology Centre. Market opportunity assessment was undertaken to understand the tooling demand in automobile sector across segments in the various stages of manufacturing. Leading players were consulted in the Bhiwadi region to discuss and understand the sector and gain insights with respect to the tooling requirements during the preparation of the DPR. Also several brainstorming sessions were carried out with the O/o DC-MSME, World Bank and domain experts in order to identify the focus sectors for the proposed TC. Also, a workshop with Bhiwadi Manufacturers Association was organised in which representatives from more than 50 key industries within Bhiwadi participated. Their suggestions and views were also taken into consideration during the preparation of this DPR.

[1] Location attractiveness index is a measurable index that compares different locations on the basis of multiple parameters estimating the attractiveness of those locations, in relative terms with other locations in the index (details can be referred in Section 3).

2 OPPORTUNITY ASSESSMENT: The auto ancillary segment has seen large scale investments and Rajasthan has become a prominent base for auto manufacturing with the establishment of a growing auto cluster in Alwar district.

- Bhiwadi region is spread over approx. 5,300 acres and comprises of 3 industrial areas - Bhiwadi, Chopanki and Khushkera
- A special auto & engineering zone has also been developed in the Pathredi industrial area and another special zone is being planned

The market opportunity for this region has been assessed with respect to three major areas including market in core sectors in the catchment, market in other potential sectors (incl. processing, sheet metal components, plastic components, engineering components etc.) in catchment and market outside catchment area.

3 SOCIAL AND ENVIRONMENTAL SCREENING: For the proposed TC, environmental and social screening has been conducted to address the risks at the very beginning of designing and conceptualizing the implementation. Also preparation and implementation of a Gender Equity and Social Inclusion Plan (GESIP) during operational phase with particular emphasis on inclusion of young women as well as those who belong to weaker and underprivileged sections of society has been proposed. .

4 FOCUS AREA FOR THE TC: The tooling requirement for the automobile industry (two wheelers & four wheelers/cars) primarily can be divided into four categories: plastic moulds, pressure-die casting, sheet metal and forging tools. Sheet metal and plastic mould in automobiles comprise majority of the tooling requirement and would be the focus areas for the TC.

## (A) Production

- The requirement of sheet metal dies for passenger cars is categorised as small, medium and large. Existing commercial tool rooms and MSME TCs in India have enough capacity to develop small size sheet metal tools. There are commercial and captive TRs catering to mid-size sheet metal tooling. As per industry estimates, around 60% in this segment are imported from countries like Korea, Taiwan and China. However, capacity is almost non-existent in large size sheet metal tooling. Considering the volume in the big size tooling

market, the viability to develop capacity in India isn't feasible at present. Therefore, it is proposed that the new TC should focus on mid-size sheet metal tooling.

- Similarly, plastic moulds are another major area of tooling in two and four wheelers. Plastic moulds (mainly small size) and pressure die casting together comprise majority of the tooling requirement for two wheelers.

Addressable tooling market for 2 & 4 wheelers during 2015-2020 is expected to be around INR 2,800 – 4,100 Cr & INR 19,500 Cr respectively[2]

The importance of sheet metal and plastic mould tooling requirements in four and two wheelers has also been further validated during various discussions carried out by our experts and team with various stakeholders in this region.

Since, the Bhiwadi region has concentration of two and four wheeler units like Maruti, HSCIL, HMSI, Ashok Leyland, Eicher, JBM, Shriram pistons & rings, Motherson Automotive Tech & Engineering etc; hence it was narrowed down for development of an auto TC focussing on medium size sheet metal work and small size plastic mould work.

### (B) Training

The TC will provide professional training in various courses with focus on auto and general engineering. The TC will contribute towards skilling youth (around 17,000 to 18,000 trainees in next five years) to make them employable in industry by designing courses relevant to them. Major specialisations includes: Tool making and metal cutting, Maintenance, CNC Manufacturing, CAD/ CAM, Advance Welding, Car/bike service training, Information Technology, Industrial and process Automation.

### (C) Consulting

Going forward, revenue is proposed from consultancy / advisory streams including support to MSME clusters in technology and engineering solutions and for improvement of their quality systems and productivity. The TC will have a dedicated professional wing to assist MSMEs in the field of tool design, manufacturing, quality/ productivity improvement and innovation.

### (D) Other Areas

[2] Source: Based on discussion with industry experts and commercial TRs, EY analysis

The objective of the proposed TC is to provide support to commercial TRs and MSMEs. For this in addition to the above mentioned areas, the TC will also form consortium with MSMEs including commercial TRs to jointly cater to the focus sectors, provide incubation support to trainees for their start-up ventures and form Productivity and Quality club for cluster of engineering industry and support them.

To achieve these goals the TP and CNM will assist the TC for providing technology support and facilitating market linkages respectively.

5 FINANCIALS: The revenue and cost projections have been made for a period of 10 years. The total capital expenditure for the proposed TC is estimated at about INR 12,912 lakhs. The capex includes expenditure towards plant & machinery, development of civil and other associated infrastructure. The project will be funded through a grant from Government of India sourced through World Bank loan and equity funding from MoMSME. The revenue is projected to grow from INR 250 lakhs in 2017-18 to INR 3,287 lakhs by year 2025-26. The overall project internal rate of return (IRR) is estimated to be 8.6%. The detailed assumptions for revenue/ cost projections and profitability have been provided in section 14.

All the initiatives mentioned above for the proposed 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.

# 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 1.8 Trillion ranking 10th amongst all countries[3]. The objective of the Government of India's, 12th Five-Year Plan (FY2013–17) 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. Micro Small and Medium Enterprises play an essential role in the overall industrial economy of the country and account for over 45% of India's manufacturing output[4].

Despite strong potential, India's manufacturing performance has not been encouraging. The share of manufacturing in India's GDP has stagnated at around 16 percent[5], 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 also present in India e.g. automotive sector.

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

- access to finance (especially for MSMEs)
- access to technology and skilled manpower
- access to markets (domestic & export)
- infrastructure deficiencies

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, casts, 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 –

[3] http://unstats.un.org/unsd/snaama/dnltransfer.asp?fID=2
[4] http://www.dnb.co.in/Nashik2013/PDF/MSMEsInIndia.pdf
[5]The Manufacturing plan - Strategies for accelerating growth of manufacturing in India in the 12th Five Year Plan and beyond, Planning Commission

including in India) dominated by MSMEs (more than 80% of firms in India, Europe, US and Japan). Like 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 2011). The constraints to the growth and competitiveness of the Indian tooling industry mirror the ones affecting manufacturing as a whole, as articulated above. The scarcity of skilled workers and problems related to their retention, as well as the lack of access to a high-quality design and prototyping facility has hurt growth.

In 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 increased 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 percent[6]. 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 have received skills training, either through formal or informal means[7]. 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 providing decent employment opportunities to the growing young population, on the other. According to the National Skill Development Policy published in March 2009, India has set a target of skilling 500 million people by 2022[8]. 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 schooling and skill levels leads to higher productivity and personal income. A 2011 study showed that students who attended three-year vocational training courses at ITIs earned 25 percent more than two-year course students, who

[6] Report on the Third-Annual employment & unemployment survey (2012 – 2013) of the Ministry of Labor, Government of India.
[7] 11th and 12th Five Year Plan
[8] http://labour.nic.in/upload/uploadfiles/files/Policies/NationalSkillDevelopmentPolicyMar09.pdf

earned 14 percent more than did one-year course students[9]. These results were also observed 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 India[10].

### 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 has 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:

- Increase manufacturing sector growth 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.

[9] Vocational Training in the Private Sector (Goyal 2011)
[10] The Knowledge Economy and Education and Training in South Asia (World Bank 2007)

### 1.1.3 Recommendations of XII plan Working group & Parliamentary Standing Committee

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, as well as opportunities for technical skill development to the youth at varying levels.

Considering the performance of existing TCs, the Department related Parliamentary Standing Committee on Industry, in its 235th report submitted to Rajya Sabha on 4 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 money 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.

During the budget speech of 2013-14, following announcement was made;

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 2,200 crore during the 12th Five Year Plan period to set up 15 additional Centres".

In pursuance of (i) the announcement made in the Budget (2013-14), (ii) the recommendations of the Department Related Parliamentary Standing Committee on Industry in its 235th Report submitted to Parliament (Rajya Sabha) on 4 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 INR2,200 crore 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 Centres Systems Program

The Technology Centres Systems Program, a national program, seeks to enhance the technological and skill base of MSMEs in selected manufacturing industries, via upgraded and new TCs (currently called TRs and TDCs). The TCs will have as their mission 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 will 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.).

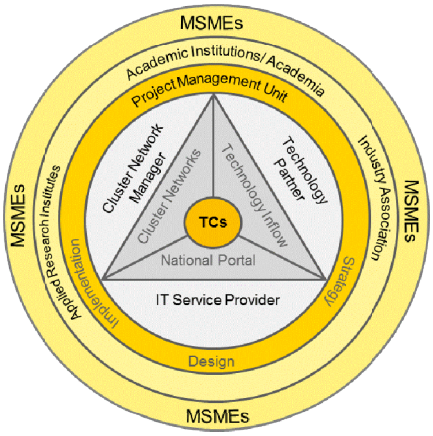
TCSP's Program Development Objective has been defined to enhance the competitiveness of MSMEs by improving their access to technology and business advisory services as well as skilled workers through systems of financially sustainable TCs. The program seeks to establish 15 new TCs and upgrade capabilities of select existing TCs and develop linkages between MSMEs, Indian and international research institutes and leading manufacturers. This would include upgradation in technology, land and building infrastructure and other associated infrastructure of the TC. The program will connect leading practices contributing to advance technology, knowledge, skilling and innovation which 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 offtake of these paid services of the TCs by MSMEs. Therefore, the key indicators that will be measured are;

- Number of enterprises paid for services rendered including placement services
- Number of long term trainees employed by industry, including MSMEs, within six months after being trained at TCs
- TCs' gross profit before depreciation (not including land)
- Access to Technology
  - Revenue of TCs from access to technology activities (production support and consultancy)
  - Capacity utilization of TCs machines
  - Number of technology strategies/roadmaps developed by TPs and endorsed by Industry Associations and IC
- Access to Skilled Workers
  - Number of trainees trained (direct program beneficiary)
    - external trainers trained
    - with newly developed contents
    - female
    - from low income states
    - from disadvantaged section of society (SC/ST)
  - Number of skills development contents (e.g. curricula, standards, certification schemes) developed and adopted by industry associations, and/or certifying agencies
- Access to Business Advisory
  - Number of needs assessment and related business plans developed by CNMs and endorsed by Industry Associations
  - Value of TCs' businesses generated with support of Cluster Network Managers

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 Technology Partner and Cluster Network Manager. Examples of such indicators include capacity utilization of machines, number of 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.

Figure 1: TCSP eco-system




This program will create an ecosystem to help MSMEs 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 the linkages with larger firms (e.g. as part of the supplier network of an OEM), which will provide 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 for better employment opportunities. The program will therefore benefit the Indian MSMEs, students and workers and help establish systems of TCs in the country wherein each centre will gain from the specialisation and experience of the others and improve the competiveness of MSMEs.

### 1.1.5 Key TCSP stakeholders

TCSP has multiple stakeholders who will need to work together to achieve the objective of enhancing 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:

- MSME Units - Beneficiaries

MSME units will be the prime beneficiaries of the program and the overall objective of the program centres around providing them with access to modern technology, access to business advisory services and access to skilled workforce.

- Skill seekers

Workers, job and skill seekers will also gain from this program with access to short term and long term training/skill development courses that will help job seekers to improve their career prospects and finding livelihood.

- 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. O/O DCMSME has the mandate to support MSMEs and TCSP will serve this towards this purpose.

- Technology Centres

The TCs will serve MSMEs with 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 to upgrade selected existing TCs and development of 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.).

- Collaborations with Industry associations, academia, applied research institutes and others

Strategic collaborations between TCs and various other organizations will be critical to foster research and development, business 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)

Role of PMU is to assist the O/o DC MSME in designing and implementing this program. This includes developing framework for identifying sites/sectors for the new TCs, developing detailed project report, support in procurement of services and 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 selected as the PMU for the TCSP by the O/o DC MSME via competitive bidding as per World Bank guidelines.

► Technology Partner (TP)

Role of TP is to 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)

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

The CNM would seek to increase competitiveness of supply chains of large firms by enhancing quality, reliability and productivity of MSME suppliers by offering services of the TC, thus also helping in meeting revenue targets of the TC. The CNM will enhance the competitiveness of the cluster business environment by establishing a network of service providers which will address the needs of the MSMEs not served by the TC e.g. access to a network of financial services. The CNM will also facilitate closer cooperation between the TC and MSMEs with key innovation stakeholders such as applied research institutes, autonomous institutions such as IISc, CSIR, academia, skill seekers, and students etc. to enhance product and process innovation. TC's capacity will be further enhanced through closer cooperation amongst skills development and labour market stakeholders to increase the number of workers/ trainees from TCs finding long term employment to improve their livelihood.

- National Portal Service Provider (NPSP)

Role of NPSP is to design, develop, set-up, operate and maintain 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 intends to 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

TCSP's objective is to enhance the competitiveness of MSMEs by improving their access to technology, business advisory services as well as skilled workers through systems of financially sustainable TCs. For monitoring the program outcomes, RFD has been defined; which contains 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 General Manager of TCs will be essential for steering the operationalization of TCSP in line with the envisioned mandate. The key success parameters of the General Manager include:

- Revenue earned by respective TC from,
  - Production
  - Training
  - Consultancy and others
  - Business given to private tool rooms
  - Production/training/consultancy with the help of CNM (territory/sectors to be identified Jointly by CNM and TCs in advance)
- Recovery ratio--Revenue/ recurring expenditure (cash) in percentage
- Profit before depreciation
- Profit after depreciation
- No. of trainees trained in Long term & Short term training programme
- No. of courses identified which are suitable for women employment & courses designed and started (CNM to assist the identification of courses and TP to design)
- No. of units assisted , out of which how many are MSMEs
- Present technical papers showing successes delivered and how it has aided industry
- Technical incubation centre to start and the long term trainees to be encouraged to register for starting enterprises

The table below depicts the snapshot of result indicators which form a part of the RFD.

Table 1: Result indicators of the RFD

| | | |
|---|---|---|
| Program development objective indicators | | Number of enterprises paid for services rendered including placement services |
| | | 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 | TCs revenue 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 |
| Component 3-Technical assistance to MoMSME | | Establishment of PMU for program implementation and capacity building of MoMSME |

The program aims to 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 Overview of existing MSME TCs

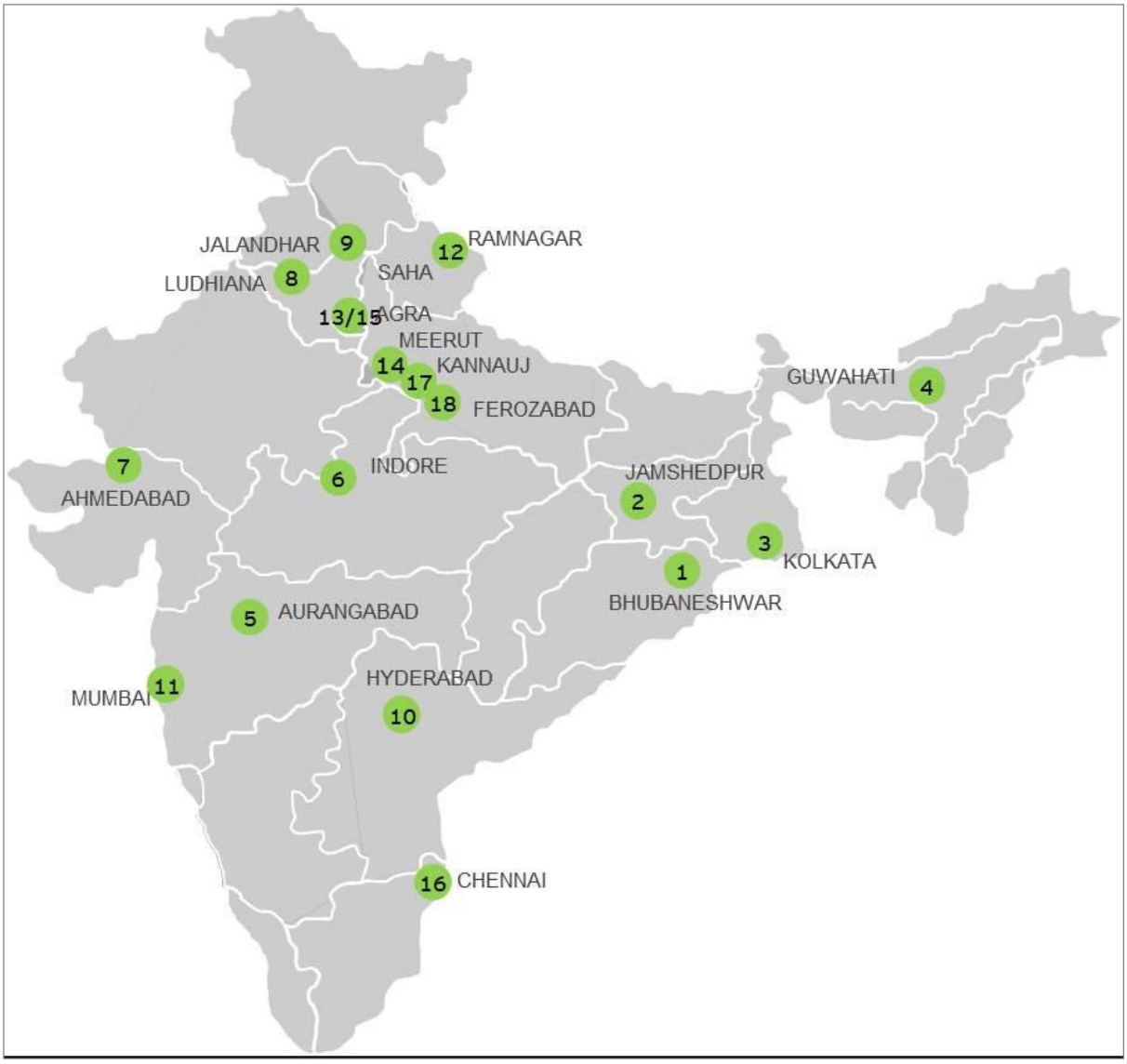
Out of the currently operational 18 Technology Centres (TCs) & Tool Rooms (TRs), 10 are for the tooling industry and 8 are for other industries such as ESDM (electronics system design and manufacturing), glass, footwear, and fragrance and flavour and sports. Half of these eighteen TCs are located in low income states (Uttar Pradesh, Madhya Pradesh, Odisha, Jharkhand and Assam). The TCs are self-sufficient institutions that provide design support, training, manufacturing, testing & calibration and consulting services to MSMEs and other enterprises. They have created a niche in the market in various fields such as hand tools, plastics, automotive, testing & calibration etc. The list of the existing TCs & TRs along with their specializations is given below:

Table 2: Existing TCs & TRs with focus sectors

| SN | Name | Focus Sector |
|---|---|---|
| 1 | Central Tool Room & Training Centre (CTTC), Bhubaneswar (Odisha) | General engineering (Precision components) |
| 2 | Indo Danish Tool Room (IDTR), Jamshedpur (Jharkhand) | General engineering (Auto components) |
| 3 | Central Tool Room & Training Centre (CTTC), Kolkata (West Bengal) | General engineering |
| 4 | Tool Room & Training Centre (TRTC), Guwahati (Assam) | General engineering (Training in tool making) |
| 5 | Indo German Tool Room (IGTR), Aurangabad (Maharashtra) | General engineering (Auto components) |
| 6 | Indo German Tool Room (IGTR), Indore (Madhya Pradesh) | General engineering (Auto & Pharma) |
| 7 | Indo German Tool Room (IGTR), Ahmedabad (Gujarat) | General engineering (Auto & Plastic tools) |
| 8 | Central Tool Room (CTR), Ludhiana (Punjab) | General engineering |
| 9 | Central Institute of Hand Tools (CIHT), Jalandhar (Punjab) | General engineering (Hand tools) |
| 10 | Central Institute of Tool Design (CITD), Hyderabad, (Andhra Pradesh) | General engineering & ESDM |
| 11 | Institute for Design of Electrical Measuring Instruments (IDEMI), Mumbai, (Maharashtra) | ESDM and tool making |
| 12 | Electronics Service & Training Centre (ESTC), Ramnagar (Uttarakhand) | ESDM |
| 13 | Process and Product Development Centre (PPDC), Agra (Uttar Pradesh) | Foundry and forging |

| SN | Name | Focus Sector |
|---|---|---|
| 14 | Process cum Product Development Centre (PPDC), Meerut (Uttar Pradesh) | Sports goods |
| 15 | Central Footwear Training Institute (CFTI), Agra (Uttar Pradesh) | Leather & footwear |
| 16 | Central Footwear Training Institute (CFTI), Chennai (Tamil Nadu) | Leather & footwear |
| 17 | Fragrance and Flavour Development Centre (FFDC), Kannauj (Uttar Pradesh) | Fragrance & flavours |
| 18 | Centre for Development of Glass Industries (CDGI), Firozabad (Uttar Pradesh) | Glassware |

Figure 2: Location of existing TRs & TCs



Several of these were set up through support from German and Danish Government under bilateral agreements as well as with the UNIDO. These TCs are largely self-sustaining entities that provide technical and vocational training programs to more than 1,00,000 trainees annually. Some of these include 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 primary 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 specialisations with a view to improve employability and livelihood opportunities.

The key services offered by the TCs include:

- Design & manufacturing
  - Product Development
  - Design & Manufacturing of tools, dies, moulds, precision tools
  - Process Development & Improvement

- Skill development
  - Conduct long & short term training programs in the areas of CAD, CAM, CNC, automation, RPT, mechatronics, glass design, shoe design, aromatherapy etc.
  - Offers customised programs for industries

  The education level of the participating students ranges from school drop outs to $10^{th}$/$12^{th}$/ITI/diploma/degree holders

- Consultancy
  - Process and Product Improvement
  - Automation solutions
  - Quality Systems support
  - Turnkey assignments
  - Course curriculum developments

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 and few TCs even after depreciation). Based on the recent reports and financial analysis, following are some of the key observations:

- 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. Majority of them have become profitable in the last three years.

- Skew 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.

- 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.

- 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 2011-12 to 2012-13. The highest increase was observed at IGTR Ahmedabad. Although this is a positive trend, the staffs 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.

There is a need to replicate the TCs at more places along with technological up gradation, improved training facilities and innovation in the business models etc. This will increase their capacities to train and strengthen the workforce supply. By improving the competitiveness of these facilities, the MSME TCs can be better utilized and expected to produce a bigger footprint in the Indian manufacturing sector.

## 1.3 Evaluation study of TCs and recommendations of the experts

A study of selected MoMSME TRs in India on *'Strategic Assessment and Recommendations'* was submitted under the '*Micro, Small and Medium Enterprises Umbrella Programme'*. The purpose of the study was to make comparison of the TRs with international TRs programmes. It is to be noted that these TRs have now been renamed as TCs. 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 train more people. 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.
- 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.
- 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.

Apart from above, several studies have been undertaken by O/o DC MSME in recent years to analyse the technology capabilities and governance framework established at the existing TCs. The key findings from these studies are summarized as follows:

- Technology
  - There is a possibility of improving the overall machine performance by suitable investments in large size milling machines and grinding machines to remove the bottleneck
  - Rationalization and standardization of all manufacturing processes
  - Reduction of in-machine set-up times using zero-point clamping systems and pallets
- Organization
  - Definition of requirements for improving 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 through the introduction of course offerings that address 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 Bhiwadi has been proposed with the underlying fact and review of the catchment area (Gurgaon-Manesar-Bhiwadi-Faridabad-Noida) which has some of the leading auto players and auto ancillary units. Further a number of transformational industrial projects like Delhi Mumbai Industrial Corridor are proposed and the TC can facilitate and support the MSME units coming up across this region. The TC at Bhiwadi will play an important role in enhancing the competitiveness of the MSME Units in the area. TC will focus on improving access to technology, providing skill up-gradation 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 Bhiwadi. 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 Bhiwadi. This DPR has been prepared in consultation with relevant stakeholders including O/o DC-MSME, Government of Rajasthan, RIICO, World Bank, OEMs, Tier I & II suppliers, BMA, industry association, Government Institutes and some ancillary units in the region. This DPR would facilitate the implementation plan of proposed TC at Bhiwadi. Also, a workshop with Bhiwadi Manufacturers Association was organised in which representatives from more than 50 key industries participated. Their suggestions and views were also taken into consideration during the preparation of this DPR.

## 2.2 Approach

To start with, a comprehensive secondary research was carried out to understand the tooling and technological requirements of the sector and in particular of the Bhiwadi catchment area. To validate the facts, the team performed a detailed primary research was carried out which included meetings with various key stakeholders including O/o DC-MSME, auto 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 key auto component manufacturers and suppliers in the Bhiwadi region (such as Manesar, Faridabad, Gurgaon, Delhi, Noida) 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 automobiles sector across segments across the various stages of manufacturing.

Way forward: Post completion of the DPR for the proposed TC at Bhiwadi 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 an development of cluster with the right mix of products and services

# Location Selection for New TCs

# 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, will get shortlisted. A TC at such location will further improve the competitiveness of this location.

b) Inclusive Growth approach: Approach is based on the assumption that that state which has higher Net State Domestic Product has better growth and hence the states with lower per capita state domestic product should be supported. A TC in such states would become 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 Product[11]
   - Identification of major manufacturing Industries in the State
   - Identification of the major clusters for the identified major industries in the state

One of the key drawback 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 may not make this TC a world class centre.

c) Alignment of Major Economic Projects: As a TC will create value for many years[12] and there are some mega projects in progress which will get completed in 10-15 years. This approach

[11] 2011-12 Current prices

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 above two approaches. The steps included are:

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

Above three approaches resulted in the first list of many 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 area[13] and Location Attractiveness 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:

LA Index Score= Catchment Score * Presence of TC Score

Catchment Score = $f$ x (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.

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.

[12] Existing Technology Centers are more than 25 year old.
[13]Catchment 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 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 need of ideas where the proof of concept is ready and unfortunately academia does not goes 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:

| | | | | Catchment Area Parameters | | | | Major Firms | | Tech Inst. | | Presence of state/pvt TR | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 100 | | 30 | | 20 | | 20 | | 10 | | 20 |
| State | Industry | Location | Net Score | Units | Unit Score | ITI/PT | ITI/PT 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 have 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 through 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 Bhiwadi 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, Bhiwadi was selected as the location for setting up of new General Engineering TC focussing on Auto sector. Bhiwadi region has been found suitable from multiple perspectives:

- Bhiwadi is part of Alwar District in Rajasthan, a low income state. A TC at Bhiwadi will create opportunity to growth spread
- Catchment area (Gurgaon-Manesar-Bhiwadi-Faridabad-Noida) has some of the leading auto players and ancillary units. Bhiwadi and its catchment area has several major auto OEMs and over 300 tier I auto suppliers. A TC at Bhiwadi will help improve the manufacturing competitiveness
  - Major OEMs include – Honda Siel, Hero Motocorp, Maruti Suzuki, Suzuki Motorcycle India Ltd., Ashok Leyland, Eicher, Yamaha
  - More than 100 tier I suppliers are present in the catchment area such as JBM, Motherson Automotive, Subros, Bosch, etc.
- Mega industrial projects in vicinity
  - Delhi Mumbai Industrial Corridor - Khushkhera – Bhiwadi – Neemrana (Rajasthan)
  - Dedicated Freight Corridor (DFC)
  - Road Corridor connecting Shahjahanpur-Neeemrana-Behror urban complex in Neemrana with Bhiwadi-Tapukara industrial complex
- Good connectivity and access from other locations
  - Identified as a priority town of the NCR region due to strategic location between Delhi, Gurgaon and Jaipur. 70 kms from Delhi, 200 kms from Jaipur and 90 kms from Alwar
  - Located at 55 Kms from IGI Airport, and 25 kms from nearest rail head, Rewari
  - Bhiwadi industrial area is located on Rewari-Dharuhera-Sohana road, 6 Kms from NH-8

# Location Brief

# 4. Location brief

## 4.1 Regional overview

Bhiwadi is located in eastern Rajasthan in Tijara tehsil of Alwar district. Bhiwadi is located at 28.21°N 76.87°E. It is bounded in the North by Gurgaon, Haryana, Bharatpur district on North-East and Mahendragarh, Haryana. Jaipur lies in the South-West and Dausa in the south. Alwar, Behror, Rajgarh and Kishangarhbas are four sub- divisions in the district. The district consists of twelve tehsils, seven sub-tehsils and six nagar palikas.

Bhiwadi has been identified as a regional centre or priority town of the National capital region due to its strategic location between Delhi, Gurgaon and Jaipur. The nearest airport is the Indira Gandhi Airport at New Delhi at a distance of about 55 Kms and the nearest rail head is Rewari, at a distance of 25 Kms. Bhiwadi industrial areas is located on Rewari-Dharuhera-Sohana road and is 6 Kms from NH-8. It is about 60 kms from Faridabad, 70 kms from Delhi, 95 kms form Noida, 200 kms from Jaipur and 90 kms from Alwar.

Bhiwadi falls in the Delhi Mumbai Industrial Corridor (DMIC) and Khushkhera – Bhiwadi – Neemrana (Rajasthan) has been identified as an investment region under DMIC. Further, a road corridor is also planned to connect the Shahjahanpur-Neeemrana-Behror urban complex in Neemrana with Bhiwadi-Tapukara industrial complex.

Figure 3: Location of Bhiwadi

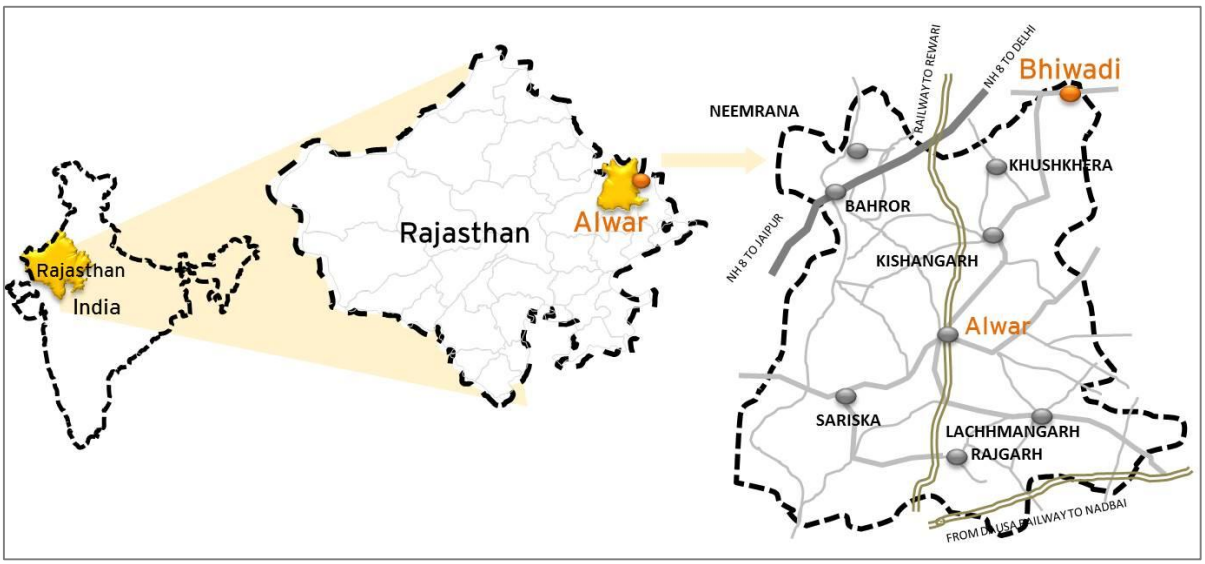


Table 3: Alwar district snapshot

| Section | Quantity/Value |
|---|---|
| Area | |
| Total geographical area | 8,380 Sq. km |
| Administration | |
| Tehsil | 12 |
| Villages | 1,946 |
| Land use pattern | |
| Total area | 7,83,281 Hectares |
| Total irrigated area | 4,51,546 Hectares |
| Population (census 2011) | |
| Total population | 36,71,999 |
| Men | 19,38,929 |
| Women | 17,33,070 |
| Literacy (except 0-6) | |
| Total literate | 71.68 % |
| Men | 85.08 % |
| Women | 56.78 % |
| Infant mortality rate | 59 per 1,000 live births less than one year |
| Energy | |
| Electrified villages | 1,873 |

Table 4: Status of power, water, wind and rainfall in the region[14]

| Aspect | Status | Significance for TC |
|---|---|---|
| Water availability | ▶ RIICO has an integrated water supply system supplying to all its industrial estates across the state<br>▶ RIICO in Bhiwadi sources water from ground only<br>▶ Ground water in Alwar has a potential yield of 20-30 m3/hr and occurs under unconfined conditions at shallow depth (18-28 mt below ground level)<br>▶ Water table in Alwar has fallen from 9m in 1984 to 27m in 2004 | ▶ Ensures availability of water on a daily basis TC will also have to dig a borewell. This would require permission from Central Ground Water Board<br>▶ The same would be permitted on the condition of provisioning of a rain water harvesting system of double the capacity of consumption of ground water |
| Electricity availability | ▶ Power is being distributed by Jaipur Vidyut Vitaran Nigam<br>▶ As per neighbouring industries the availability and quality of power in the area is satisfactory | ▶ Power back up to be designed keeping emergency and essential services/equipment's in mind |
| Wind flow | ▶ Typically the wind velocity is about 5 km per hour<br>▶ Humidity is 70%<br>▶ The height above the level of sea is around 268.70 meters in Bhiwadi region<br>▶ Wind direction: Winds are strongest (13.1 km/hr) in June and lightest (5.6 km/hr) in November. The predominant wind directions are NW, SW, SE and NE | ▶ Would be helpful to maximise natural ventilation during designing the layout of TC |
| Rainfall | ▶ The average annual rainfall measured in the region is about 600 mm | ▶ For estimation of capacity of rain water harvesting system in the TC campus |

[14] Source:
http://www.bmabhiwadi.com/aboutbhiwadi.html
http://ruidp.rajasthan.gov.in/IEE%20PDF/IEE%20Alwar%20Water%20Supply.pdf
http://www.bhiwadionline.in/city-guide/geography-of-bhiwadi

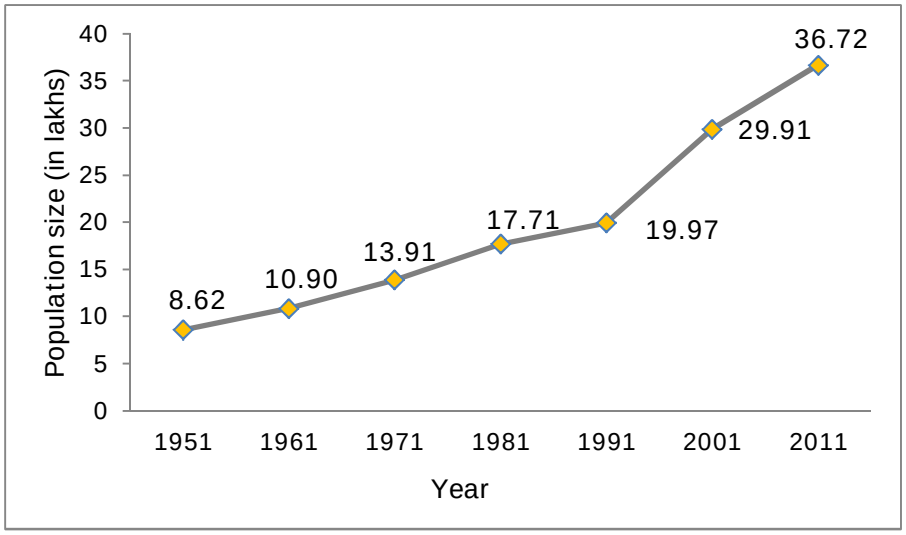
| Aspect | Status | Significance for TC |
|---|---|---|
| Temperature | ▶ The temperature in Bhiwadi varies from 7 degree celsius in winter to 40 degree celsius in summer season | ▶ For estimation of capacity of AC to be installed for adequate cooling, designing of building as well as estimate the potential for use of solar based[15] equipment |

[15] Rajasthan shines on the solar map of India with 300-330 clear sunny days. Within the state the districts such as Barmer, Bikaner, Jaisalmer, Jodhpur are the key regions with best solar radiation.

## 4.2 Demographic profile of the district

- Population growth: The total population of Alwar district is 36.72 lakhs (census 2011). The growth of population in Alwar district was 22.77% during the last decade (year 2001–11). Out of the total population of in 2011, around 53% (approximately 19.4 lakhs) are men and 47% (17.4 lakhs) are women. The density has increased from 357 people per square kilometres in year 2001 to 438 in year 2011. The graph depicts the growth of population over the decades of Alwar district.

Figure 4: Growth of population in Alwar district




*Source: Census of India*

- Rural-urban population composition: Alwar district has an urban population of around 18% (approximately 6.5 lakhs) and a rural population of around 82% (approximately 30 lakhs) as per census 2011. In urban area, males constitute around 53% (approximately 3.5 lakhs) of the population and women constitute for around 47% (approximately 3 lakhs) of the population. In rural area, males constitute around 53% (approximately 15.9 lakhs) of the population and women constitute 47% (approximately 14.3 lakhs) of the population.

- Sex Ratio: The sex ratio at the district level is 895 (year 2011).

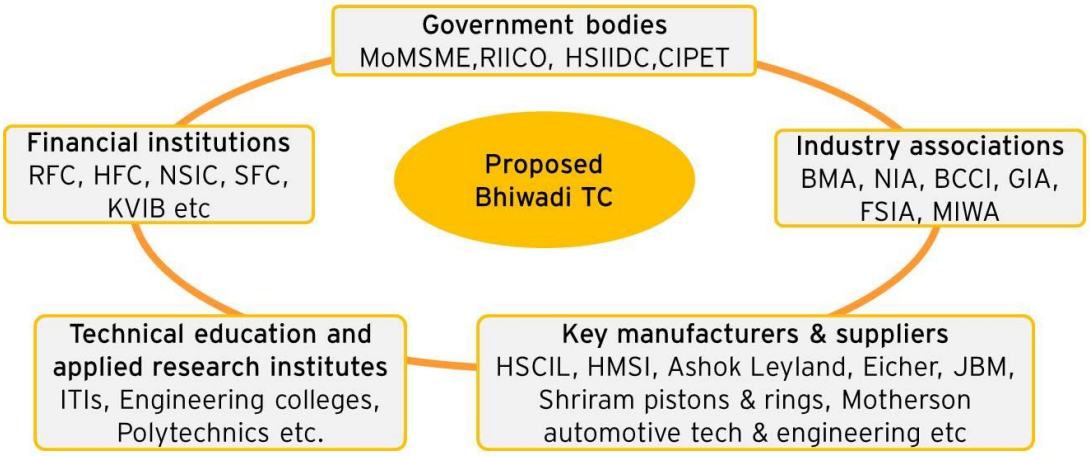
- Literacy Rate: The literacy rate of Alwar district is around 72%. Among male and female this rate is 85% and 57% respectively. At the district level, the number of literates has increased by 47% from year 2001 to 2011. The male and female literates increased by 36% and 68% respectively during this period.

## 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 Bhiwadi 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. Alwar and its catchment area include Rewari, Faridabad, Gurgaon (Haryana) and Gautam Budhnagar (Uttar Pradesh). The following figure depicts the stakeholders of the Bhiwadi TC;

Figure 5: Stakeholders of Bhiwadi TC




### 4.3.1 Government bodies

- 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.

► Haryana State Industrial & Infrastructure Development Corporation (HSIIDC)

The catchment area of Bhiwadi includes some districts of Haryana especially, Faridabad, Gurgaon and Rewari. 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.
- Development of support infrastructure like STP/ CETP, development of plantation/ green belts, commercial and institutional sites, common parking facilities, etc.

► 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 two centres in Murthal (Haryana) and Jaipur (Rajasthan) 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.

- CIPET's R & D wing named Advanced Research School for Technology & Product Simulation (ARSTPS), Chennai focuses on innovative product design for automobile, aerospace, medical and packaging industries, product and tool design conceptualization, E- manufacturing of prototypes, rapid prototyping for lead time reduction, reverse engineering for metal substitution with aesthetic and ergonomical approach.

The proposed TC at Bhiwadi can collaborate with CIPET with the objective to strengthen its expertise in tool manufacturing, research and development etc. CIPET has a product development cell which supports MSMEs in selecting right plastic material for their product. They also support in plastic processing mould design etc. Bhiwadi TC can work in collaboration with CIPET to supporting MSMEs in developing plastic products/ moulds for various auto OEMs and suppliers.

### 4.3.2 Industry associations

- Bhiwadi Manufacturers Association (BMA)

BMA was formed in 1982 with an objective to address the problems of industries in Bhiwadi. Key activities undertaken by BMA are;

- Facilitation in resolving issues of Industries in coordination with the RIICO, police, JVVNL and other stakeholders
- Management of Bhiwadi Jal Pradushan Niwaran Trust which looks after the Central Effluent Treatment Plant (CETP) treating 9 MLD of effluents daily
- Organization of conferences, seminars and presentations to awareness regarding the latest developments in relevant fields

- Neemrana Industries Association (NIA)

NIA was established in 1998. It works as an interface between industries, their business partners and Government/statutory bodies. It supported State Government and RIICO in conceptualizing Japanese Zone in Neemrana in 2006-07 (details about the zone has been given in section 5.2.2 ). Key activities undertaken by NIA are;

- Provision of support in overcoming business problems
- Organization of regular awareness programs on multiple aspects of business
- Unification among the industries and their business partners for their common interest and consolidated growth of Neemrana

- Auto Components Manufacturer Samiti, Alwar (ACMS)

It represents almost 250 SSI units and supports the cluster units to improve efficiency as well as works to encourage and strengthen its cluster units. It also supports cluster development initiatives, facilitates integration into the global automotive industry and support improvement in the range of products and services offered.

- Bhiwadi Chamber of Commerce & Industries (BCCI)

This association represents the industries & trade in Bhiwadi. Key activities are:

- Organisation of awareness programmes, seminars & workshops relating to various aspects of industries.
- Facilitation to solve problems of industries

- 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.

- 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.

- Manesar Industries Welfare Association (MIWA)

It was constituted in 2009 and has over 500 entrepreneurial members. It acts as a common platform for the MSMEs and key activities are:

- Facilitation to address & resolve issues of industrial units.
- Betterment of business scenario in Manesar and improvement of ecological environment.

- 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.

### 4.3.3 Leading manufacturers

- OEMs and Tier 1 players

The Alwar region houses some of the largest industries in the auto sector. Key OEMs and Tier 1 players in the region include; Maruti, HSCIL, HMSI, Ashok Leyland, Eicher, JBM, Shriram pistons & rings, Motherson Automotive Tech & Engineering etc. The proposed Bhiwadi 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

Alwar and other districts in its catchment area like Jaipur, Rewari, Faridabad, Gurgaon, Gautam Budh Nagar house approximately 30,000 MSME units in manufacturing across key focus sectors[16]. An overview of the spread of MSMEs in this region has been provided in the need assessment section.

- Key customers of MSMEs

Key customers of MSMEs are large manufacturing units in this area. A consolidated list of key large units has been given in the annexure 18.8.

### 4.3.4 Raw material suppliers

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

Table 5: 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 |

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

### 4.3.5 Financial institutions

Major financial institutions across the region are as follows;

Table 6: Prominent financial institutions in the region

| District name | Financial institutions |
|---|---|
| Alwar | Rajasthan Financial Corporation and Lead bank - PNB |
| Rewari | Lead Bank - Syndicate Bank and HFC Rewari |
| Faridabad | Commercial banks in Faridabad and State Financial Corporation |
| Gurgaon | Nationalised Banks, NSIC, HFC, KVIC & KVIB |
| Gautam Budh Nagar | Nationalised Banks |

### 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 1,129 technical institutions in the State. Approximately 11.4 lakhs students appear in 10th under Rajasthan Board. Rajasthan houses many prestigious academic institutions for higher education. Some of the key institutes are: BITS (Birla Institute of Technology & Science), Pilani, NIT Jaipur and Raffles University (Singapore) in Alwar. Also, several institutions are currently setting up campuses in the state like Indian Institute of Technology (IIT), Footwear Design & Development Institute (FDDI), National Institute of Fashion Technology (NIFT) and Indian Institute of Management (IIM) etc.

Table 7: Intake capacity at technical institutions in Rajasthan[17]

| Type of institutes | No. of institutions | Intake Capacity (2011-12) |
|---|---|---|
| ITI | 825 | 109,413 |
| Engineering | 127 | 54,500 |
| Polytechnic | 177 | 47,050 |
| Total | 1,129 | 2,10,963 |

Source: Government of Rajasthan

Alwar district and its catchment have a total of around 200 ITI, engineering colleges and polytechnics with an annual intake capacity of more than 37,000 students.

[17] Source: http://www.investrajasthan.com/education.cms

Table 8: Intake capacity at technical institutions in Alwar catchment

| District | Type of institutes | No. of institutions | Intake Capacity |
|---|---|---|---|
| Alwar | ITI & ITC | 91 | 10,118 |
| | Polytechnic | 11 | 3,060 |
| | Engineering | 8 | 3,900 |
| Gurgaon | ITI & ITC | 5 | 1,400 |
| | Polytechnics | 7 | 840 |
| | Engineering | 14 | 6,000 |
| Rewari | ITI & ITC | 15 | 2,224 |
| | Polytechnics | 4 | 480 |
| | Engineering | 2 | 780 |
| Faridabad | ITI & ITC | 8 | 1,672 |
| | Polytechnics | 9 | 1,020 |
| | Engineering | 14 | 5,730 |
| Gautam Budh Nagar | ITI & ITC | 4 | NA |
| | Polytechnics | 5 | NA |
| | Engineering | 26 | NA |
| Delhi[18] | ITI & ITC | 37 | NA |
| | Polytechnics | 18 | NA |
| | Engineering | 24 | 11,500 |
| Total | | 221 | 48,724 |

Source: Reports of Directorate of Technical Education, Rajasthan, Department of Industrial training, Haryana Department of Technical Education, Haryana and compiled from other websites.

- Vocational training: Government of Rajasthan established Rajasthan Skill and Livelihood Development Corporation (RSLDC) in 2004 to address the challenges of unemployment and to ensure gainful and sustainable employment. RSLDC formulates strategies to promote and facilitate large scale livelihoods. Till date its skill training initiative has covered 112,000 trainees with training contents for 202 courses in 34 sectors.

  - RSLDC introduced short term employment linked modular employable skills courses in production and manufacturing, automotive repair, electrical, electronics, fabrication, gem and jewellery, information and communication technology, plastic processing etc.
  - The duration of these training courses varies from 40 days (240 hours) to 90 days (540 hours) and the minimum qualification requirement to avail for these trainings is between 5th pass and 12th pass depending on the course.

Alwar district has around 17 SDCs offering vocational training courses mainly in the service sector. During 2013 these SDCs have trained 896 students.

[18] No of ITIs & Polytechnics are approximate figures compiled from different sources

# Opportunity and Need Assessment

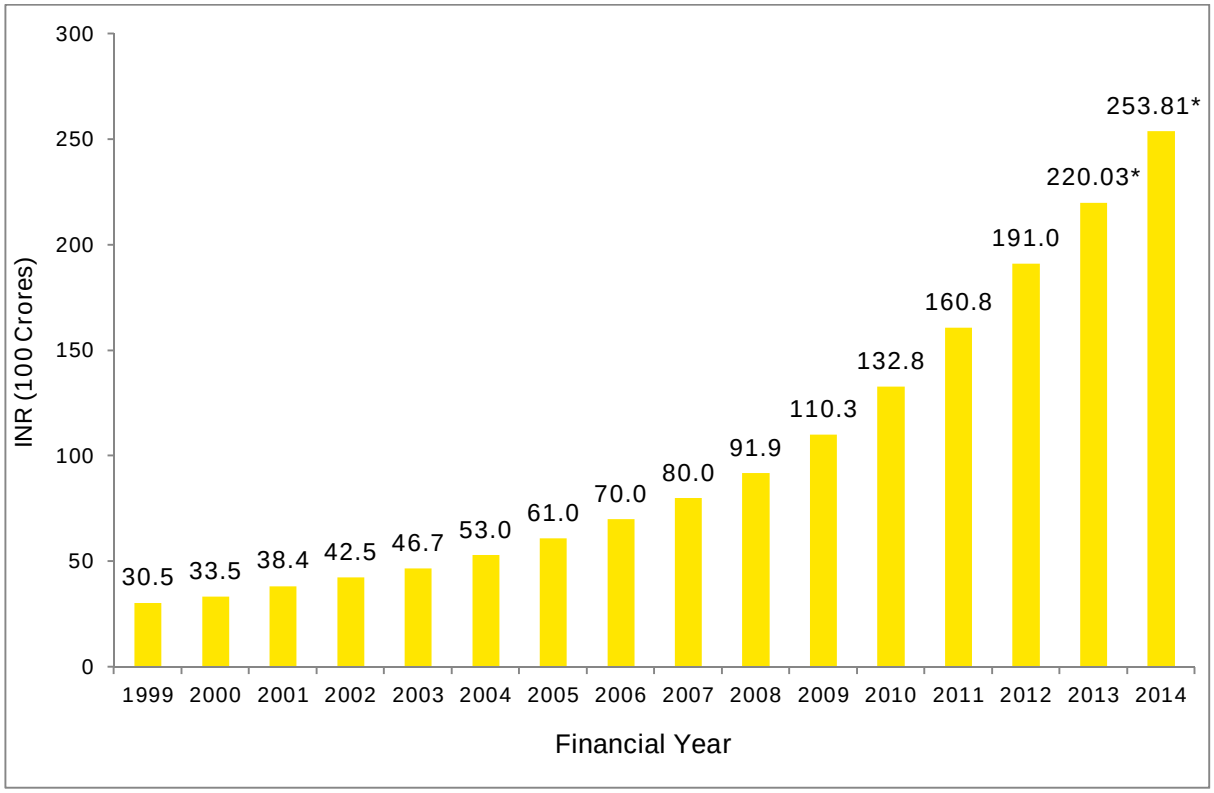
# 5. Opportunity and need assessment

## 5.1 India scenario

The tooling industry that consists of developing and manufacturing dies, moulds, jigs & fixtures as well as testing and prototyping serves as the interface between product design and product manufacturing. Growth of 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:

Figure 6: Size of the tooling market in India




Source: Indian tool room industry report, TAGMA (2011)

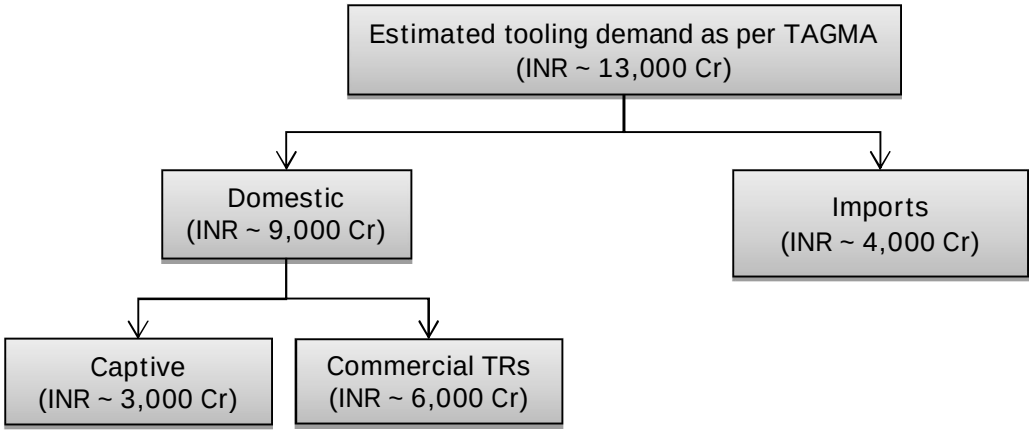
*Projections based on CAGR of 15.2%

Indian Tool Room industry size is estimated at ~INR 13,000 crore (2010-11)[19] which can be divided into two key segments - domestic (captive and commercial) and imports. Domestic Tool Rooms market is estimated at INR 9,284 crores 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

[19] Indian tool room industry report, TAGMA (2011)

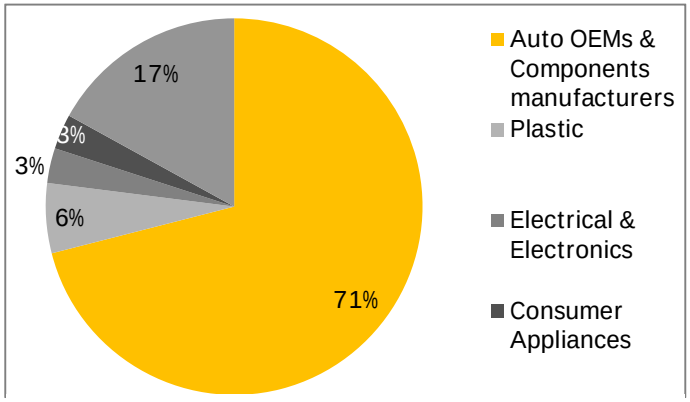
tune of INR 4,150 crores. In order to arrive at the addressable market for MSME TCs, a further analysis of the above three segments has been carried out.

Figure 7: Structure of tooling market[20]




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 manufacturers, plastic, packaging etc. Such Tool Rooms have state of the art equipment to meet the internal requirements. Auto OEMs and components manufacturers constitute around ~70% of this segment.

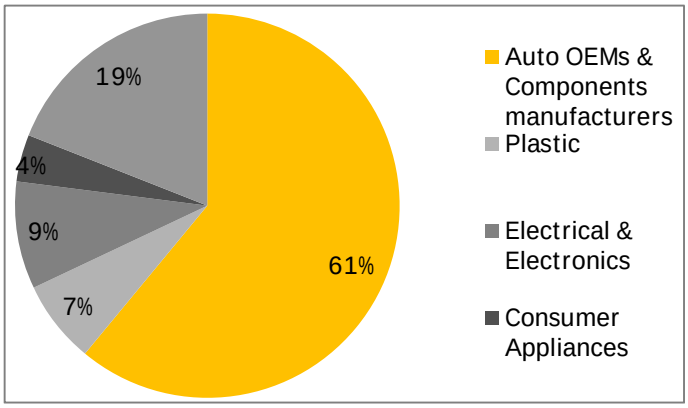
Figure 8: Composition of captive segment




Source: Indian tool room industry report, TAGMA (2011)

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

Figure 9: Composition of Commercial TRs segment




Source: Indian tool room industry report, TAGMA (2011)

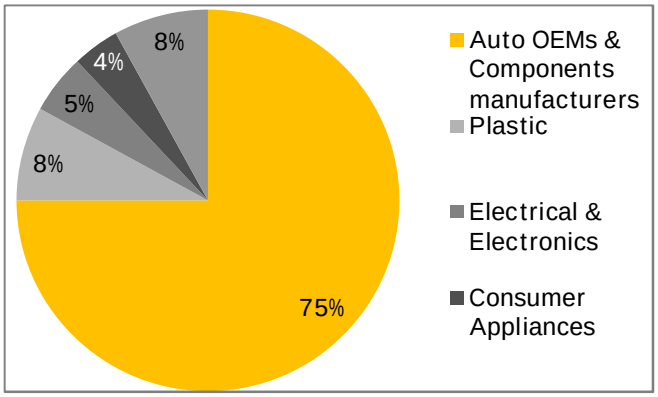
[20] Indian tool room industry report, TAGMA (2011)

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.

Commercial tool rooms (CTRs): CTRs 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 ~ INR 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;

Figure 10: Composition of imports segment




Source: Indian tool room industry report, TAGMA (2011)

- 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.

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 delivery times

### 5.1.1 Primary research

As a part of preparing the DPR, discussions with some auto component manufacturers and suppliers in the Bhiwadi region (including Manesar, Faridabad, Gurgaon, Delhi, Noida) was carried out. The objective of the primary research was to understand their business requirements, issues, challenges, and future requirements[21] 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' with respect to designing, training, manufacturing and consultancy.

Detailed telephonic discussions as per the questionnaire were conducted with owners/ senior management officials of around 40+ players[22] to understand their needs and potential areas of support. 60% of the companies had turnover of up to INR 60 crores and rest 40% had turnover of more than INR 100 crores.

Key inferences drawn from the primary research are as follows:

- The main items produced were die cast products, 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

[21] Key questions asked during telephonic discussions in Annexure 18.4
[22] Details provided in the Annexure 18.5

- 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
- Requirement for common facility for manufacturing of tools (sheet metal and plastic mould) in the catchment
- 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, Machino 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 with respect to tool designing, manufacturing and training
- There is scope for MSME's in making moulds, dies and sheet metal tools
- 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. The machine operators are generally ITI graduates in the respective field of manufacturing and further needs to be trained. Even some of the players (about 20%) expressed the need for training in management for their shop floor level manpower. In addition to the above training to motivate employees are also desired for maximization of output.

Further similar kinds of inferences were also observed during telephonic discussion with players[23] across Hyderabad, Bengaluru, Chennai, Aurangabad and Ahmedabad with respect to support requirements of these players for designing, training, manufacturing and consultancy carried on. There is a need to position the MoMSME TRs 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.

Summary of challenges faced by players based on primary research:

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 multiple machines
  - Main reason is lack of knowledge/ awareness of low cost automation technologies
- Lack of standardisation

[23] List of players contacted is attached in the annexure 18.8

- 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 6 week in China compared to 16 weeks required in India

- Lack of availability of skilled workers& high attrition/ job hopping, shortage of trained manpower at machine operator
- 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
  - 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

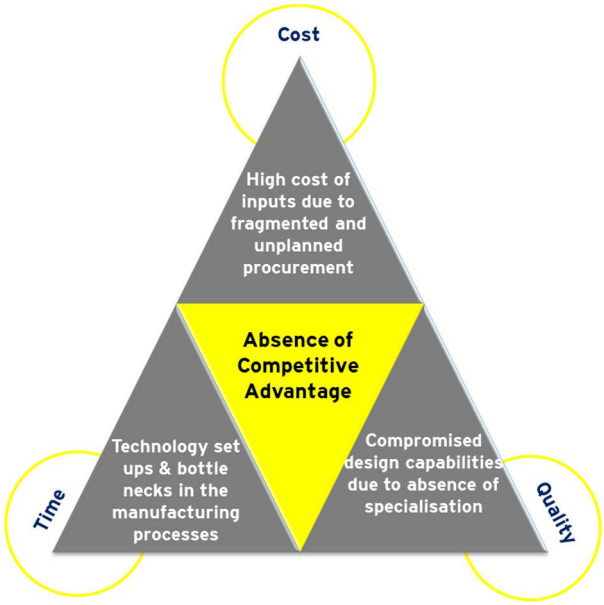
b. Other macroeconomic factors

- High interest rates of borrowing (~14%) which discourage investments by compromising viability
- Lower customs duty making imports more attractive and does not encourage domestic transfer of technology and local manufacturing and / or value addition
- Export efforts constrained by high cost of maintaining a presence in overseas markets

### 5.1.2 Challenges faced by MSME TRs

An analysis of the existing MSME TRs in India reveals that limited efficiency in production has caused loss of some of its 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.

Figure 11: Absence of competitive advantage




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

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 high. In Germany, a TR 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 TR 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. This results in 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. Absence of design facilities/ good designers in the MSME TRs is another important issue. Further, 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 study 1: 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

Case study 2: Specialised tool rooms in the world - 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 auto ancillary segment has seen large scale investments and Rajasthan has become a prominent base for auto manufacturing with the establishment of a growing auto cluster in Alwar district and Honda's facility at Bhiwadi.

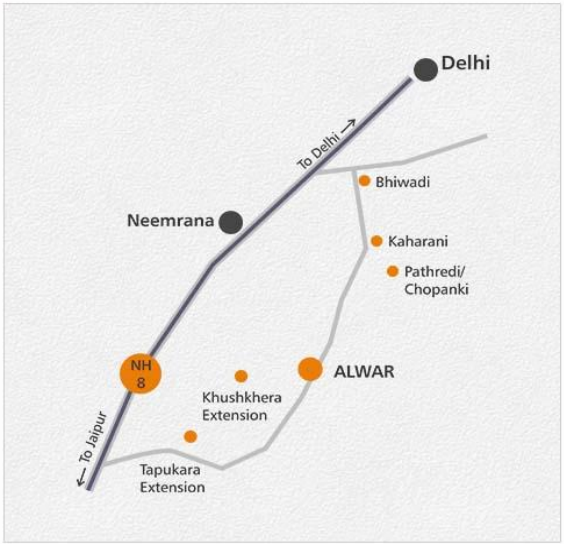
- Bhiwadi region is spread over approx. 5,300 acres and comprises of 3 industrial areas - Bhiwadi, Chopanki and Khushkera
- A special auto & engineering zone has also been developed in the Pathredi industrial area and another special zone is being planned

Bhiwadi is part of NCR and is around 70 km from Delhi and 200 km from Jaipur. It falls in the Delhi Mumbai Industrial Corridor. The Dedicated Freight Corridor (new high axle railway connectivity with multi modal linkages) between Delhi and Mumbai also passes through Bhiwadi, making it a strategic location for Industries. Khushkhera – Bhiwadi – Neemrana (Rajasthan) has been identified as an investment region under DMIC. Further, a Central Spine, a road corridor is planned to connect the Shahjahanpur-Neeemrana-Behror urban complex in Neemrana with Bhiwadi-Tapukara industrial complex. Along with its strategic location, Bhiwadi's competitive advantage lies in;

- Infrastructural development is underway in a big way for industry clusters by RIICO.
- Availability of labour and proximity to NCR helps in accessing industrial labour and managerial talent.
- Availability of basic amenities such as piped water supply, schools, transportation, hospitals, telecom networks, banks etc.

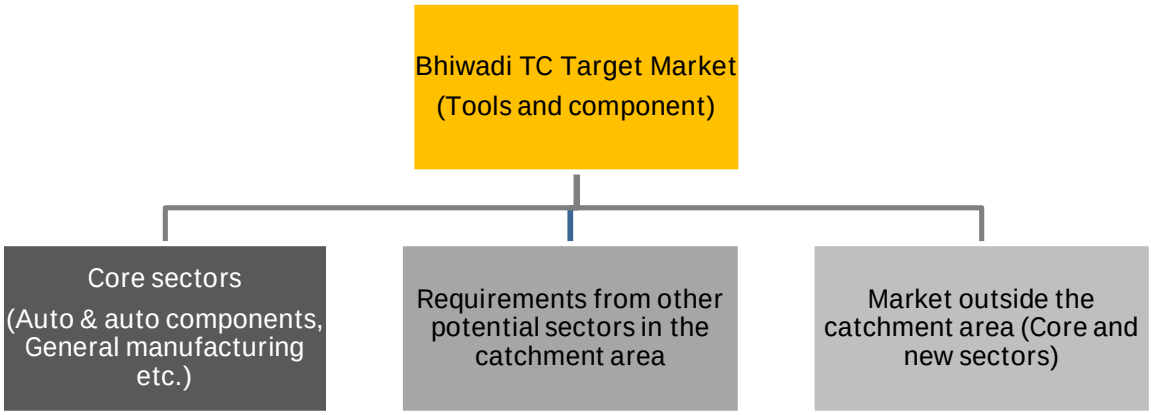
Figure 12: Proximity to automotive cluster


Figure 13: Auto clusters at a glance




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

Figure 14: Target market structure of Bhiwadi TC



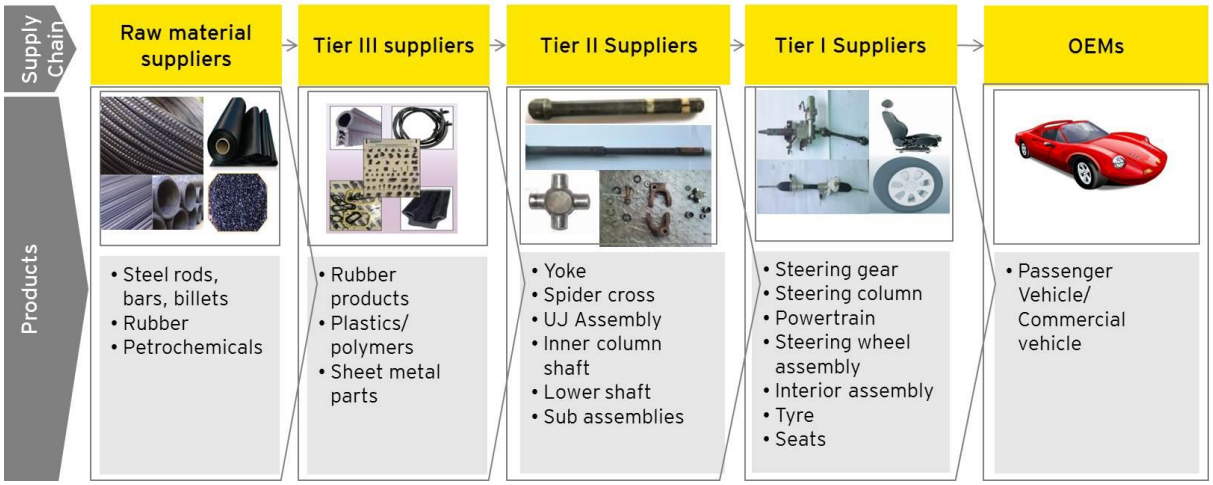

### 5.2.1 Market in core sectors in the catchment

60 per cent of India's passenger car production, 55 per cent of motor cycle production and 25 per cent of tractor production is concentrated in NCR, of which district Alwar is an integral part.

Rajasthan is coming up as an automotive hub with Bhiwadi, Neemrana and Pathredi in Alwar district hosting over 100 automotive and auto parts manufacturing companies (existing and proposed). Key players such as Honda Siel cars, Ashok Leyland, Eicher, Honda Motorcycle & Scooter India (HMSI),, Federal Mogul, Continental Engines, Global auto parts alliance India (GAPAI), Bestex, Shriram Pistons & Rings etc. have manufacturing bases in the state.

The auto industry in Rajasthan is present across the entire industry value chain.

Figure 15: Value chain in the auto industry (Illustrative)




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 Rajasthan in auto sector.

Table 9: Composition of major auto players in the catchment and region (NCR)

| Type | Key auto players |
|---|---|
| OEMs | ▶ Honda Siel cars India (HSCIL), Khushkhera, Alwar<br>▶ Honda motorcycle & scooter India (HMSI), Tapukara Industrial Area, Alwar<br>▶ Ashok Leyland, Matsya Industrial Area, Alwar<br>▶ Eicher, Itarana road, Alwar<br>▶ TAFE tractors, Alwar<br>▶ Hero motocorp, Neemrana, Gurgaon and Dharuhera<br>▶ Mahindra and Mahindra, Jaipur<br>▶ Eicher tractor limited, Faridabad<br>▶ Escorts limited, Faridabad<br>▶ Yamaha motor, Faridabad<br>▶ Eicher Motors, Gurgaon<br>▶ HMSI – Gurgaon<br>▶ Maruti Suzuki, Gurgaon<br>▶ Harley Davidson, Gurgaon<br>▶ Honda, Manesar<br>▶ Maruti Suzuki, Manesar<br>▶ Honda Siel cars India (HSCIL) Greater Noida<br>▶ India Yamaha motors, Surajpur |
| Engines & parts | ▶ HSCIL, Khushkhera, Alwar<br>▶ Federal moghulgoetze, Bhiwadi, Alwar<br>▶ Shriram pistons and rings, Bhiwadi, Alwar<br>▶ Bestex MM India, Industrial area Alwar<br>▶ Continental engines, Bhiwadi<br>▶ Gaurav Engineering, Faridabad |
| Transmission, steering parts and other components | ▶ Officine Canavesane Di Precisione (OCAP), Bhiwadi, Alwar<br>▶ Hitech gears, Bhiwadi, Alwar<br>▶ Amson automotive, Bhiwadi, Alwar<br>▶ Yamaha motor – Faridabad<br>▶ GKN Invel Transmission, Faridabad<br>▶ Hyderabad Industries, Faridabad<br>▶ Denso India, Greater Noida<br>▶ Hongo India, Greater Noida |
| Suspension, brakes & tyres | ▶ Nissan brake India, Neemrana, Alwar<br>▶ Horizon industrial products, Neemrana, Rajasthan<br>▶ Balkrishna industries, Bhiwadi, Alwar<br>▶ Chakradhari wheels, Bhiwadi, Alwar |

| Type | Key auto players |
|---|---|
| | ▶ Goodyear India – Faridabad<br>▶ Kobe suspension - Faridabad |
| Electricals/ Others | ▶ Motherson automotive tech & engineering, Khushkhera, Bhiwadi, Alwar<br>▶ Toyota gosei, Neemrana<br>▶ Hindustan Wires – Faridabad<br>▶ Delphi India – Gurgaon<br>▶ Nuchem – Faridabad<br>▶ Delphi Automotive Systems - NOIDA |

Key districts in the catchment area of Bhiwadi comprising of majority of the tooling demand in general engineering and auto sector are as follows;

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

| State | District | Automotive | Electrical | Foundry & forging | General Mfg | Grand total[24] |
|---|---|---|---|---|---|---|
| Rajasthan | Alwar | 200 | 1360 | 1270 | 1360 | 4190 |
| Haryana | Rewari | NA | NA | 310 | 113 | 423 |
| | Faridabad | NA | 430 | 2072 | 3675 | 6177 |
| | Gurgaon | 1478 | 28 | 1035 | 2000 | 4541 |
| Uttar Pradesh | Gautam Budh Nagar | 362 | 892 | 1221 | 776 | 3251 |
| Total | | 2040 | 3835 | 8832 | 8510 | 23,217 |

Source: DIP Data, Ministry of MSME

Districts expected to be served by the proposed Bhiwadi TC would be Alwar and its catchment area including Rewari, Faridabad, Gurgaon (Haryana) and Gautam Budh nagar (Uttar Pradesh). Key highlights of the catchment area have been presented in the table below;

[24] *Total number of MSMEs in major sectors of focus for TCSP like Automotive, Electrical, Foundry & forging & General Manufacturing

Table 11: Catchment area profile

| District & No. of MSMEs[25] | District Profile | Units in general engineering and auto & auto components | Key highlights |
|---|---|---|---|
| Alwar (22,201) | ▶ There are 3 industrial areas in the district namely, Bhiwadi, Chopanki and Khushkhera.<br>▶ Existing clusters of MSMEs in the district mainly manufacture processed food, auto components, edible oil, cement pipe & jalies, and leather tanning etc.<br>▶ Key products include; shaving blade, hand tools, surgical blade, empty hard gelatine capsules, leather shoes, subscriber carrier system, tyre-tube, picture tube, chemicals, slate tile, different chemicals like calcium cyanide, alkalis salt, moped. PVC cable sanitary ware, readymade garments etc. | ▶ Alwar district has over 4,000 MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors.<br>▶ Alwar Auto Components Manufacturer Samiti is an automobile component cluster in the district with a turnover of more than INR 250 crores and providing direct employment to around 5,000 people. | ▶ Alwar District is part of the NCR.<br>▶ As per the NCR plan, Alwar and Bhiwadi have been identified as regional centres and are to be developed for establisment of industries and other economic activities on priority basis.<br>▶ Investment region proposed as part of DMIC: Bhiwadi – Neemrana-Khuskhera lies in Alwar<br>▶ Tooling requirement arises majorly from the engineering units in the district. |
| Rewari | ▶ There are 3 industrial | ▶ Rewari district has over 400 | ▶ Rewari's location |

[25] Total number of MSMEs in the district, source: District Industries Centre, District Industrial profiles-MSME

| District & No. of MSMEs[25] | District Profile | Units in general engineering and auto & auto components | Key highlights |
|---|---|---|---|
| (1,330) | areas in the district namely, Dharuhera, Rewari and Bawal.<br>▶ Existing MSMEs in the manufacturing sector across the district cater to majorly metal based (steel fab.) and engineering units<br>▶ Key products include; motorcycles, zip fasteners, auto glass, etc. Other products include; televisions, non-woven carpets floor tiles, beer, cotton and synthetic Yarn, metal cans, jelly filled, telephone cables, copper and brass sheets and circles, disposable syringes and heavy earth movers and a host of other consumer and industrial products. | MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors.<br>▶ The prominent large units among these are Hero Motocorp, Honda motors, Sony India, Asahi India Safety glass Ltd., Beckon and Dickinson, Metso mineral, Aggarwal metal works, Gupta sheet Metal and Everest metal works situated in and around Rewari town. | and proximity to Delhi, its well-developed industrial infrastructural base makes it a sought after location for industries |
| Faridabad (11,896) | ▶ Existing MSMEs in the manufacturing sector across the district Faridabad spurted due the setting up of big industries. The top 3 industry segments | ▶ Faridabad district has over 6,000 MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors.<br>▶ Presence of auto majors like | ▶ Tooling requirement arises from the type of products manufactured like; spring leaves, clutch plates, steel tubes, bumpers, all kinds of |

| District & No. of MSMEs[25] | District Profile | Units in general engineering and auto & auto components | Key highlights |
|---|---|---|---|
| | catering to 60% [26]of the overall number of units present in Faridabad are the automobile parts (35%), sheet metal components (14%) & fabrication (11%).<br>▶ Key products include auto parts, tractors, shoes etc. | Escorts and Eicher, initiated the cluster development.<br>▶ 10 of the 15 industrial segments in Faridabad cater to the automobile market.<br>▶ Key OEMs served by the industrial units in Faridabad are Escorts, Mahindra, Eicher, Yamaha, Maruti, Honda Siel Cars, New Holland etc. | metal auto parts, cranes, fans, exhaust systems, heat exchanger etc. |
| Gurgaon (14,250) | ▶ 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.<br>▶ 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.<br>▶ Key products include; Cars, scooters, | ▶ Gurgaon district has over 4,500 MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors.<br>▶ Auto parts manufacturing and auto rubber parts are among the prominent manufacturing activities in the region.<br>▶ 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 | ▶ Gurgaon-Manesar-Bawal region has been identified as an Auto hub by the Government of India.<br>▶ A number of auto & auto component units have already set up base in this hub.<br>▶ Tooling requirement arises majorly form the large OEMs and tier 1 players in the district. |

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

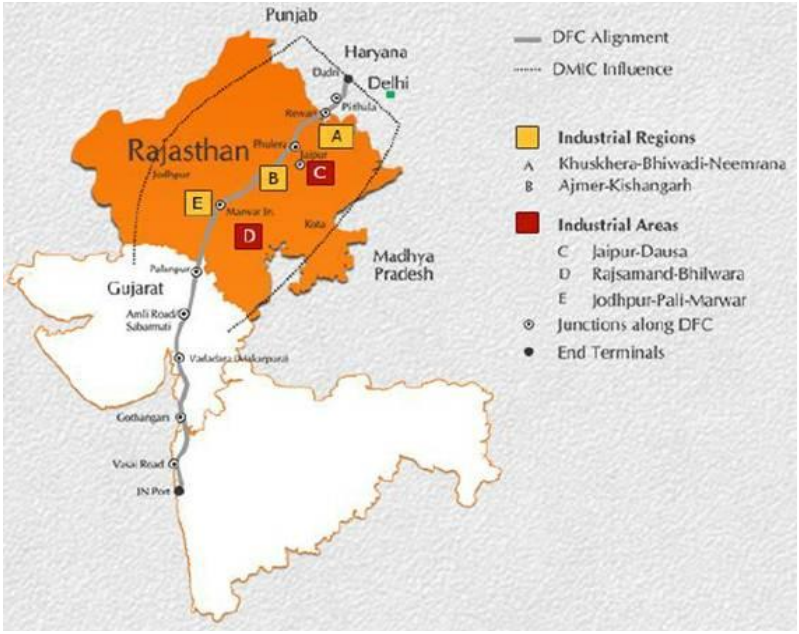
| District & No. of MSMEs[25] | District Profile | Units in general engineering and auto & auto components | Key highlights |
|---|---|---|---|
| | motorcycles, auto parts, readymade garments and plastic parts etc. | sector.<br>▶ The leading suppliers in this area include Asahi Glass, Krishna Maruti, Sona Koyo, Jai Bharat Maruti (JBM), Omaxe and Bharat Seats. | |
| Gautam Budh Nagar (14,048) | ▶ There are two key areas namely Noida & Greater Noida earmarked for industrial development in the district.<br>▶ Key manufacturing activities include electronics, textile products, engineering, computer software etc. mainly from Noida export processing zone (NEPZ). | ▶ The district has over 3,000 MSMEs in automotive, electrical, foundry and forging, general engineering sectors apart from other sectors.<br>▶ Key auto sector players in the region include Delphi, Denso India, Reinz Talbros, Hongo India etc. | ▶ The district of Gautam Buddh Nagar and its major industrial areas are of strategic importance and have immense growth potential due to its inclusion in the DMIC.<br>▶ Tooling requirement arises majorly from the automotive systems, electronics and component manufacturers in this district. |

Source: District Industries Centre, District Industrial profiles-MSME

### 5.2.2 Market in other potential sectors in catchment

The region has potential to tap the demand from other growth sectors in and across the neighbouring states within upcoming sectors in manufacturing and service particularly in the area of food processing, sheet metal components, plastic components, engineering components etc.

Figure 16: DMIC in Rajasthan




a) Industrial corridor in Rajasthan: With nearly 39% of DFC passing through Rajasthan, opportunities for industrial establishment along the route are eminent as the corridor will make Rajasthan easily accessible to western and northern markets in India and provide seamless port connectivity for international trade. About 60% of the state's area (in 22 Districts including major districts such as Jaipur, Alwar, Kota and Bhilwara) falls within the project influence area. With this, the state will become an attractive destination for setting up industrial and support infrastructure units. The two major upcoming areas identified in this catchment under DMIC are;

- 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;
  - Engineering cluster: Automobile, auto components, engineering, downstream iron and steel
  - Consumer products cluster: Food processing, ready-made garments, plastics – downstream and building materials
  - Technology cluster: Telecom equipment, consumer durables and IT/ITES
  - Future technology cluster: Nuclear equipment, pharmaceutical R&D. bio technology
  - Services cluster: Higher education and hospitality
- Khushkhera – Bhiwadi – Neemrana (KBN) Investment Region (Rajasthan) has been identified as the priority region for investment in the Rajasthan sub-region of DMIC.

Potential industry sectors in this investment region are biotechnology, IT/ITES and health sector along with automobile.

a) Japanese Zone in Neemrana: The state has developed an industrial estate in Neemrana dedicated to Japanese investors. Subsequent to the MoU between RIICO and Japan External Trade Organization (JETRO), RIICO has so far allotted 317 acres of land to 23 Japanese companies in this area, out of which around 10 companies have started commercial production and 5 companies have started construction work as on their units. Key multinational companies include Nissin, Mitsui, Nippon, Disking, Mitsubishi, Dykie colour etc. The region is equidistant from Delhi and Jaipur and will also be a part of the proposed DMIC, making it a strategic location for these companies. A total investment of approximately INR 2,540 crores is expected on the already allotted land which would translate into employment opportunities for approx. 4,900 persons. The key industries with expected investments in this zone are as follows;

Table 12: List of key companies with expected investment in the Neemrana Japanese zone

| Companies | Investment (in crores) |
|---|---|
| Nissan India private limited | 240 |
| Mitsui chemical private limited | 400 |
| Unicharm India hygenic private limited | 160 |
| ACI mitsui prime advanced composites private limited | 120 |
| Mikuni India private limited | 155 |
| NYK logistics India limited | 100 |
| Nippon steel | 300 |

### 5.2.3 Market outside catchment area

Going forward, in addition to the MSMEs in existing sectors (auto, general engineering etc.), Bhiwadi TC can also focus on MSMEs in other sectors e.g. food processing outside the catchment area. Typical opportunities for TC outside the catchment in existing and new sectors would be from existing and proposed industrial zones in this 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 Sonipat
- Gems and jewellery park at Udyog Vihar in Gurgaon and
- Two apparel parks, one in Gurgaon and another at Barhi in Sonipat

Figure 18: Agro food parks in Rajasthan

b) Industrial parks/ zones in Rajasthan: Industrial infrastructure developed by RIICO are as follows;

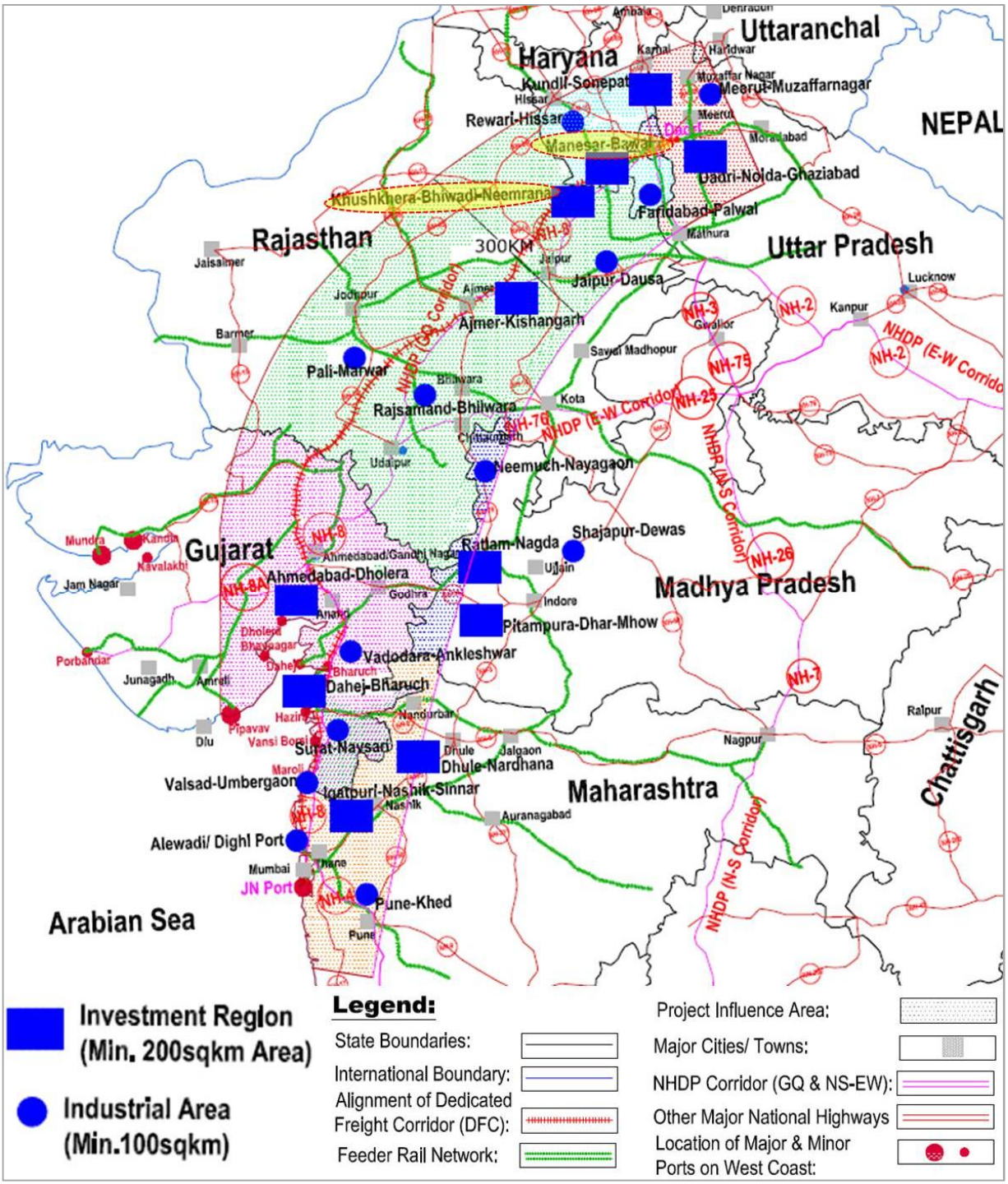
- Four agro food parks in Kota, Jodhpur, Sriganganagar and Alwar for development of agriculture based industries with an investment of INR 61.41 crores (US$ 13.6 million). The State is India's largest producer of oilseeds (rapeseed & mustard), seed spices (coriander, cumin and fenugreek) and coarse cereals. 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 (EPIPs) at Sitapura in Jaipur, Neemrana in Alwar and Boranada in Jodhpur. The EPIP in Jaipur is the largest export park in northern India. The EPIPs 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.

- Special Economic Zones in the state for gems and jewellery in Jaipur and handicrafts in Jodhpur.

Figure 19: Region of influence under DMIC



## 5.3 Opportunities associated with other mega projects planned in Bhiwadi

In Bhiwadi catchment area, following are some additional upcoming mega projects planned in the near future.

- Nippon Pipe India Private Limited: Part of the Japan-based Nippon group, is setting up a steel tube components project with an expected investment of INR 300 crores for the automobile industry in the Japanese zone at Majrakath, Neemrana.
- Japanese car major Honda is slated to double its production capacity to 2.4 lakh units annually with an investment of INR 2,500 crores as it drives in new models in the market.
- Two-wheeler maker Hero MotoCorp is working on building a new R & D centre at Kukas (20 km north of Jaipur) by investing INR 450 crores with plans to commence operations by first quarter of 2015. The R & D centres at Gurgaon and Daruhera plants in Haryana are likely to be shifted to the R& D centre in Kukas once it is operational.
- INR 1,000 crores state-of-the-art Mainline Electric Multiple Unit (MEMU) coach factory in Bhilwara by Indian railways and BHEL.
- ELCINA electronics manufacturing cluster, Salarpur Bhiwadi, Rajasthan: 100 Acres of land has already been allotted by the RIICO and in-principle approval has been granted by Department of Electronics & IT (DeitY), Govt. of India under electronic manufacturing cluster (EMC) Policy. SPV has already been formed and 19 Members have already joined. The SPV will have its own water distribution, sewage system and a dedicated power distribution system with power back up. The cluster will have facilities like; testing facility to be run by approved test laboratory, “common tool room”, convention and training Centre, other facilities as per decision of the cluster group.
- Integrated Industrial Township at Greater Noida (Uttar Pradesh): The Integrated Industrial Township has a total site area of 302.5 Hectares (747.5 acres) and a total project cost of Rs 35,000 crores. The township aims to promote R&D activities to give a boost to the manufacturing activity in the Dadri Noida Ghaziabad Investment Region (DNGIR). The Integrated Industrial Township is proposed with new age industry sectors such as Bio-technology, Hi-tech electronics industry, and Research and Development (R&D). The township will also provide support in key sectors like telecom, electronics, automobile, food, pharmaceutical, healthcare, and defence research sector.

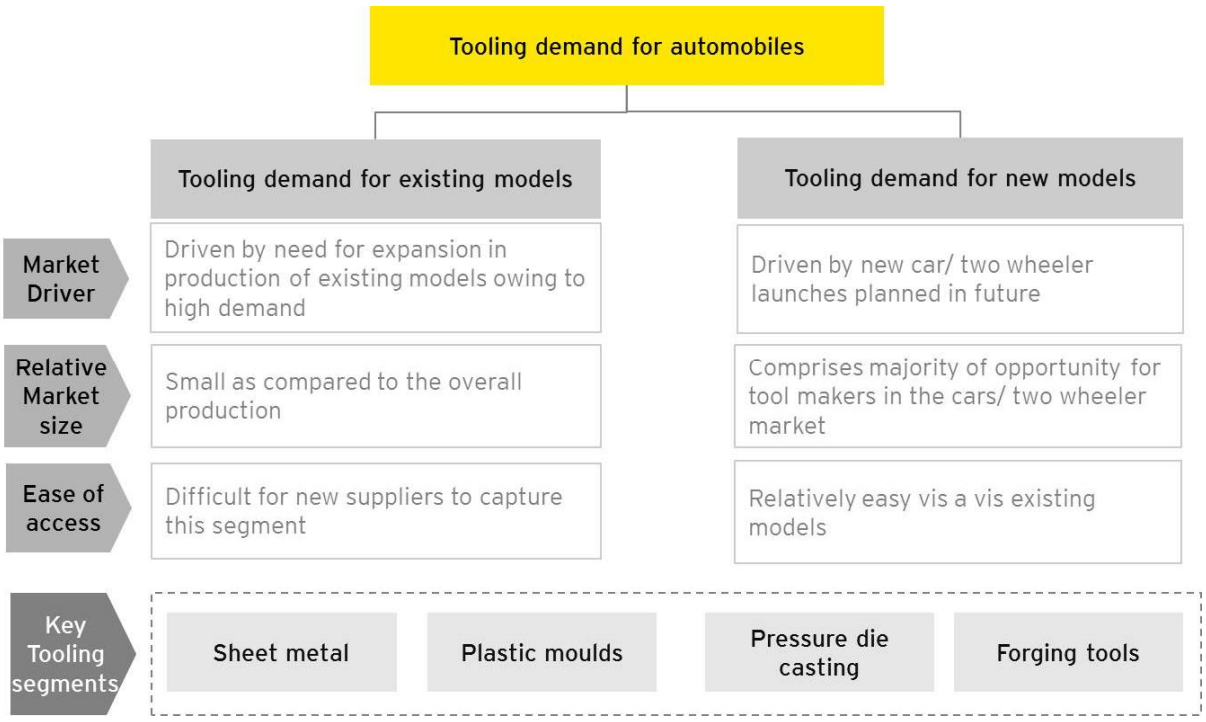
These mega projects will provide significant opportunities in key sectors like automobile, electronics, food processing etc. for the proposed TC in the long run.

## 5.4 Potential market for four and two wheelers

Tooling demand for automobiles can be categorised under two heads:

- Tooling demand for existing models – This requirement is driven by need for expansion in production of existing models owing to high demand. This segment is however very small as compared to the overall production. From the perspective of new, it is very difficult to capture this segment as existing tooling suppliers have a cost advantage over new tooling suppliers for entry into existing models
- Tooling demand for new models – This segment comprises majority of opportunity for tool makers in the car/ two wheeler markets. Demand for this segment is driven by the new car/ two wheeler launches planned in future.

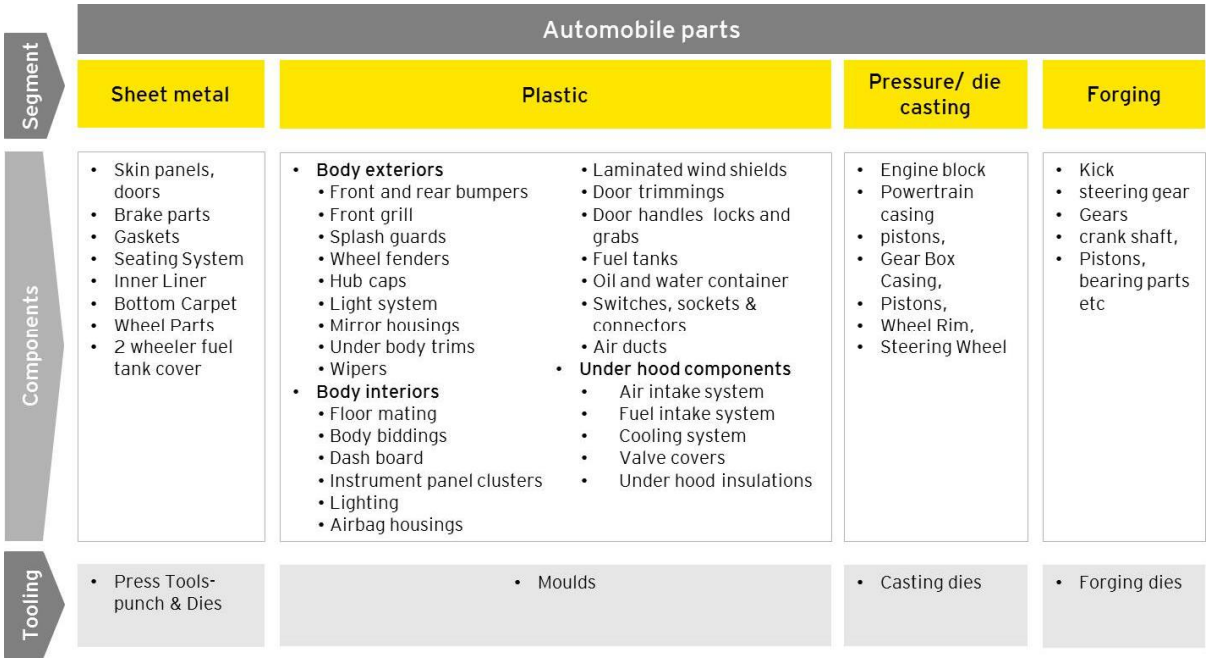
Figure 20: Tooling demand for automobiles




Tooling required for an automobile can be divided into 4 categories. The share of these tooling varies from 2 wheelers to 4 wheelers/ cars.

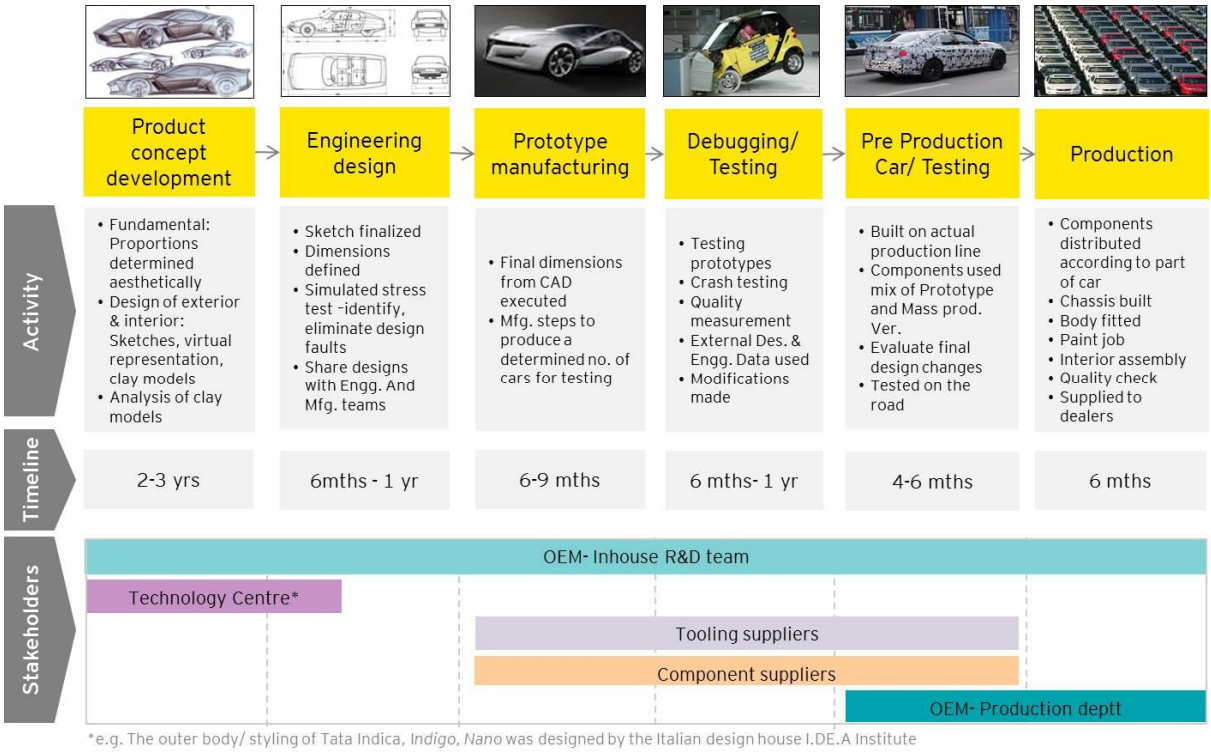
- Plastic moulds (bumper, mirrors covers, dashboard, inner panels etc.)
- Pressure-die casting (Engine block, powertrain casing, pistons etc.)
- Sheet metal (fuel tank cover, skin panels, doors etc.)
- Forging tools (kick, steering gear etc.)

Figure 21: Tooling demand for automobiles




Key stages in automotive product development: It takes about 4-6 yrs for a new concept to translate into production. Tooling and component suppliers are typically engaged 1-1.5 yrs before the start of final production. Key stages in automotive product development along with typical activities and timelines are given below:

Figure 22: Automotive product development – key steps




*e.g. The outer body/ styling of Tata Indica, *Indigo*, *Nano* was designed by the Italian design house I.DE.A Institute

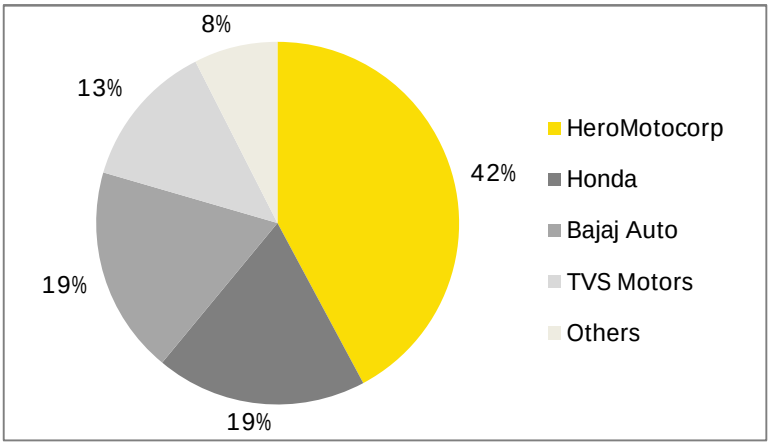
Tooling market for Two Wheelers

Currently about 14 million 2 wheelers are sold in the country every year. Top 4 players account for over 90% of the market. At present, top 4 players together have about 60 - 70 two wheeler models in the market.

Plastic moulds and pressure die casting together comprise about 73% of the tooling requirement from this segment and hence will be the focus areas for two wheeler tooling.

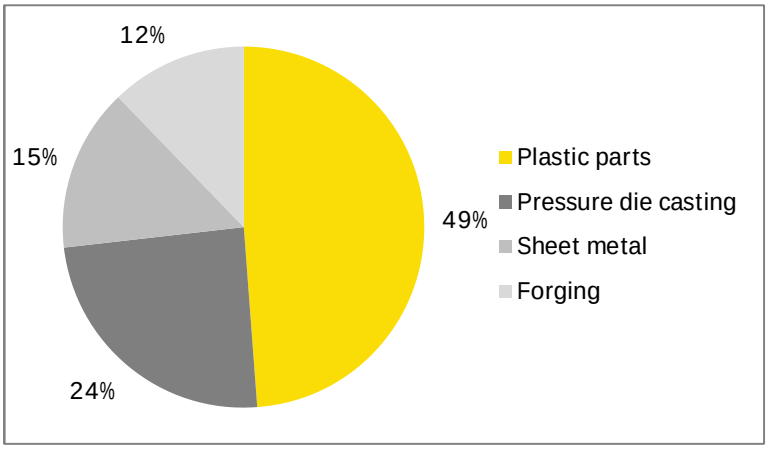
Over the period 2015-2020, around 60 to 90 new two wheeler launches are planned by the top 4 players. The total market size for tooling from year 2015–2020 for new launches is expected to be around INR 2,800 - 4,100 crores. Out of the total market, share of plastic moulds and pressure die casting is expected to be INR 1,400 - 2,000 crores and INR 700 - 1,000 crores respectively.

Figure 23: Two wheeler market share




Source: CMIE 2013

Figure 24: Typical breakup of tooling requirement- two wheelers




Source: Based on discussion with industry experts and commercial TRs

Table 13: New two wheeler launches by top 4 players over 2015-20

| OEM | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| HeroMotocorp | 10 | 2 | 8-15 models | | | |
| Honda | 8 | 2 | 1 | 6-10 models | | |
| Bajaj Auto | 7 | 1 | 8-10 models | | | |
| TVS Motors | 8 | 1 | NA | NA | NA | NA |

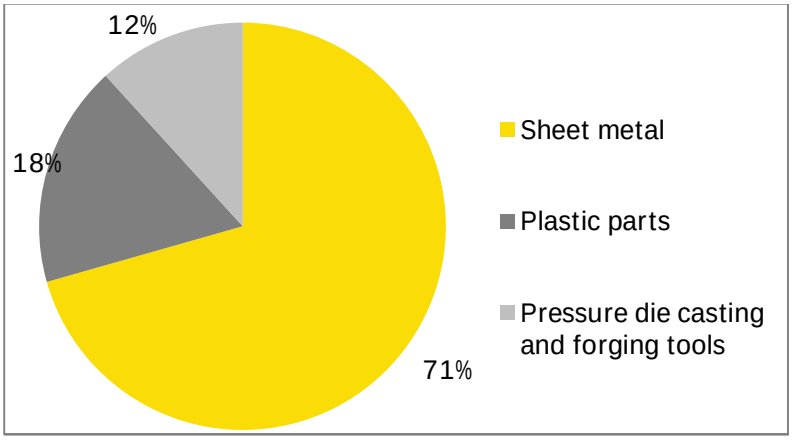
Source: News articles, company announcements, subject to change as per company plans

**Addressable tooling market for two wheelers during 2015-2020 is expected to be around INR 2,800 - 4,100 Cr.**

Tooling market for 4 wheelers/ passenger cars

Unlike two wheelers, sheet metal and plastic moulds together comprise the majority (about 88%[27]) of the tooling requirement and hence will be the focus areas for car tooling.

Figure 25: Typical breakup of tooling requirement - 4 wheelers/cars




Source: Based on discussion with industry experts and commercial TRs

Over the period 2015-2020[28], around 23 new launches are planned in small car and sedan categories. The estimated total market size for tooling for new launches from year 2015-2020 is expected to be over INR 19,500 crores. Out of the total market; share of sheet metal and plastic moulds is expected to be INR 13,800 crores and INR 3,400 crores respectively.

Table 14: New Launches (small cars and sedans) 2015-2020[29]

| Marque | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| Ford | 1 | 1 | 1 | 1 |
| Jeep | - | 1 | 1 | - |
| Audi | 1 | - | - | - |
| Dacia | - | 1 | - | - |
| Fiat | 1 | 2 | - | - |
| Fuso | 1 | - | - | - |
| Land Rover | - | - | - | 2 |
| Mercedes-Benz | 2 | - | - | - |
| Renault | - | 1 | - | - |
| Skoda | - | 2 | - | - |
| Volkswagen | - | 1 | - | - |
| Bajaj | 1 | - | 1 | - |
| Force | - | 1 | - | - |
| ICM | 1 | - | - | - |
| Leyland | 1 | - | - | - |

[27] Based on discussion with industry experts and commercial TRs
[28] 2014 launches may be currently in advanced stage of development
[29] Source: LMC Forecasts Q4 2013, Based on the current product plans of OEMs and subject to change

| Marque | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| Mahindra | 1 | 1 | - | 1 |
| Tata | 2 | - | - | - |
| Datsun | 3 | - | - | - |
| Ssangyong | 1 | 1 | - | - |
| Honda | 1 | 1 | 1 | - |
| Hyundai | 1 | 1 | - | - |
| Maruti | 1 | 1 | - | - |
| Nissan | 1 | - | - | - |
| Grand Total | 20 | 15 | 4 | 4 |

Source: LMC Forecasts Q4 2013, Based on the current product plans of OEMs and subject to change

**Addressable tooling market for 4 wheelers during 2015-2020 is expected to be around INR 19,500 Cr.***

There is a sizable opportunity in tooling in coming years which can be tapped by domestic commercial TRs with the support of the proposed Bhiwadi TC. Majority of this opportunity lies in sheet metal work (medium size) and plastic mould works (small size) and hence would be the focus of the proposed TC.

# Social and Environmental Safeguards

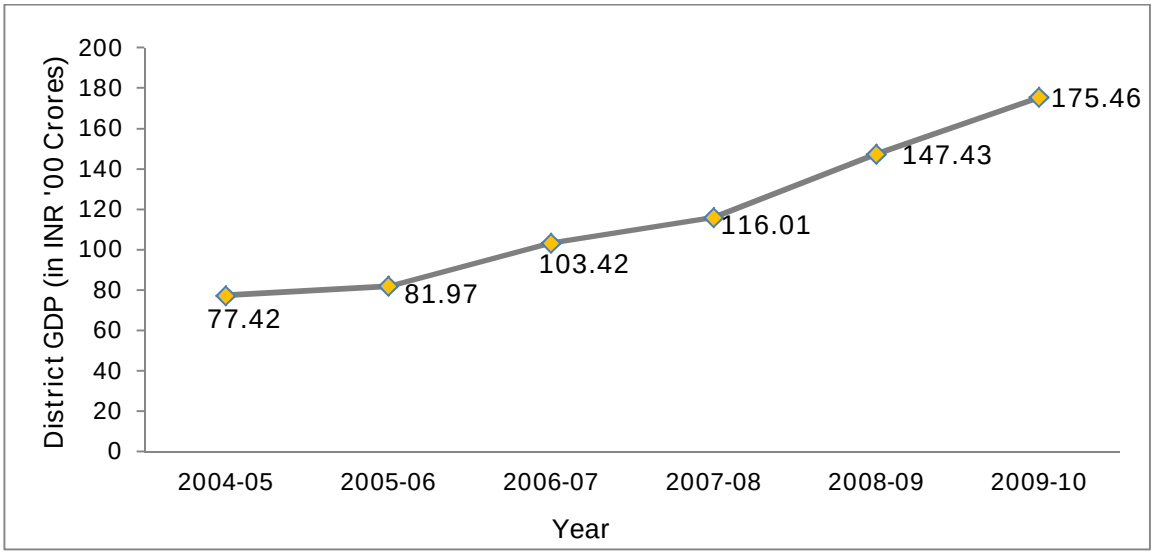
# 6. Social and environmental safeguards

## 6.1 Socio-economic profile of district

- Composition of workforce: The sectorial composition of the workforce in the district of Alwar has been 63.7% in primary sector, 14.7% in the secondary sector and 21.5% in the tertiary sector (including 12.7% of services) during year 2011.

- Sector composition: Alwar contributes 6.6% of the state domestic product of Rajasthan. The district domestic product of Alwar was approximately INR 17,546 crores at current prices in year 2009-10. Per capita income[30] of Alwar district was INR 29,300 (2009-10[31]) compared to that of INR 23,656[32] in Rajasthan (INR 33,843 in India) for the same period). The following graph depicts the growth of domestic product of Alwar district over the years.

Figure 26: Growth of district GDP of Alwar

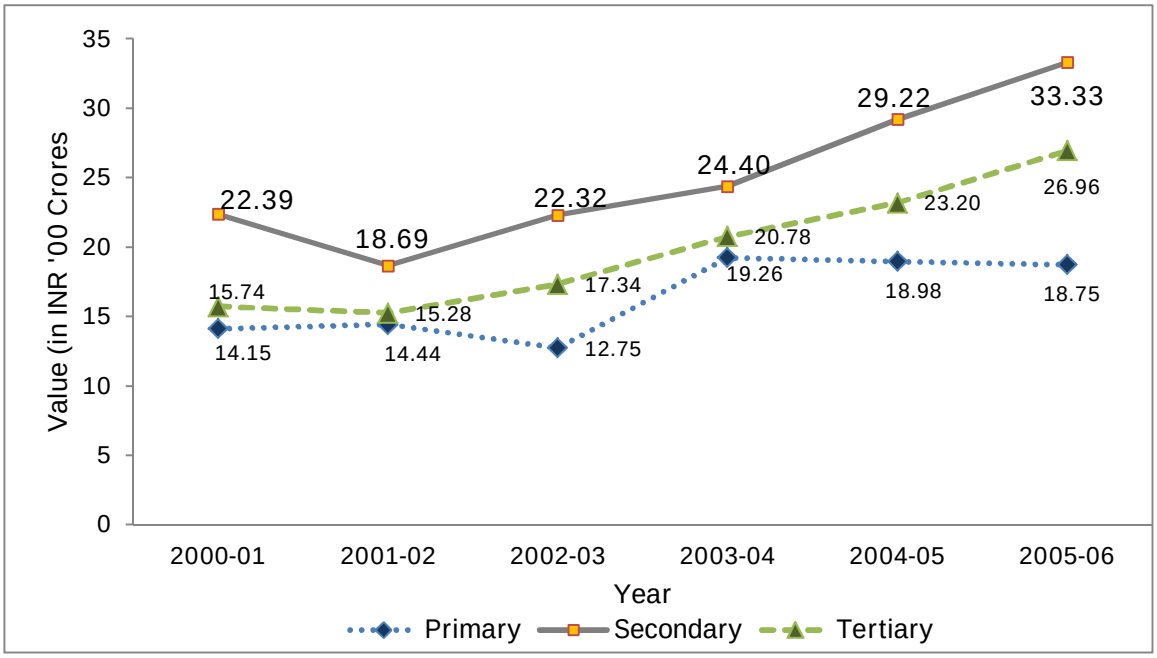



Source: Government of Rajasthan

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

[30] All Per Capita income mentioned are at Constant ( 2004 – 05) prices
[31] Source: Directorate of economics and statistics, Rajasthan
[32] Department of planning, Government of Punjab

Figure 27: Sector wise composition of district domestic product




Source: Planning commission

Primary Sector: This sector accounts for approximately 24% in the total district domestic product with major contribution from agriculture, forestry & logging, fishing, mining and quarrying.

- Total geographical area of the district is 7.8 lakh hectares which is about 2.5% of the State. During 2010–11 the net cultivated area was 5.07 lakh hectares from which about 83% of the area is irrigated.
- The major crops grown in here are wheat, millet and mustard etc.
- Alwar region is less arid and have benefited mainly from ground water in northeast region and some surface water in the southeast region. The average rainfall in last ten years in the district is 724 mm which is uneven and scattered resulting in flood and draught situations affecting the agricultural production as well as cropping pattern in Kharif & Rabi season.

Secondary Sector: This sector accounts for approximately 42% of the total district domestic product with major contribution from manufacturing activities.

- There are 22 industrial areas developed by RIICO at Alwar district. The districts have around 87 large scale industrial units and 22,201 MSME units[33] most of which are located in various industrial areas of Alwar district.
- The MSME units have a capital investment of approximately INR 1,314 crores providing employment to approximately 89,907 persons.

[33] D.I.C data (March, 2009)

- The type of industries registered includes leather, textile, handicrafts, mineral based, agro-food based, wood based, paper based, electrical based, demand based, resource based and ancillary industries included automobiles, engineering based industries, packaging and services, textiles and leather, cement, food processing industries.
- Industries in Alwar district export products such as shaving blades, hand tools, aluminium extruded product, surgical blade, synthetic blended fabrics, empty hard gelatin capsules, leather shoes, subscriber carrier system, tyre-tube, picture tube, Chemicals, sanitary items, crockery, suiting, slate tile, different chemicals like calcium cyanide, alkalis salt, moped. PVC cable, sanitary ware, readymade garments etc.

Tertiary Sector: Tertiary sector accounts for approximately 34% of the total district domestic product. The important areas in the service industry are; trade, hotels, restaurants and transportation along with emerging sectors like IT/ITES, retail.

- Education: Alwar's status in literacy was marked higher than the state average. Considering the density of population and the vast area, the school spread is average in comparison to the state average and across other districts. 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 Alwar district;

Table 15: Educational institutions in the district

| Education | Number |
|---|---|
| Pre-primary and primary schools | 2,036 |
| Upper primary | 2,397 |
| Secondary / senior secondary | 1,272 |
| ITI, Engineering colleges and polytechnics | 110 |

Source: Rajasthan skill gap report, National Skill Development Corporation

There are 23 registered vocational training institutes in Alwar district. More than 2,000 aspirants got enrolled in 2009-10 in the registered training institutes. Apart from these, a number of private organizations have initiated skill training in the region. As per Rajasthan Mission on Skill and Livelihoods (RSLDC), a total of 18 partners (includes NGOs, ITIs, private institutes) are implementing skilling initiatives with 42 approved programs.

- Health: Alwar is ranked 6$^{th}$ district in the HDI for Rajasthan in year 2009. The Human Development Index is 0.744 in year 2009 (Human development report-2009, Rajasthan). The following table gives an overview of health infrastructure in the district during 2010-11.

Table 16: Health infrastructure in Alwar district

| SN | Type | Numbers |
|---|---|---|
| 1. | Allopathic hospitals | 66 |
| 2. | Beds per allopathic hospitals | 40 (avg.) |
| 3. | Ayurvedic hospitals | 178 |
| 4. | Beds per ayurvedic hospitals | 15 (avg.) |
| 5. | Unani hospitals | 2 |
| 6. | Community health centres | 24 |
| 7. | Primary health Centres | 72 |
| 8. | Dispensaries | 5 |
| 9. | Sub health centres | 576 |
| 10. | Private hospitals | 75 |

Source: Brief industrial profile of Alwar district, Ministry of MSME.

- Tribal population: As per census 2011, 13.5% of the population of Rajasthan is scheduled tribe. District wise distribution of tribal population shows that concentration is found mainly in districts like Banswara, Dungarpur and Udaipur district. Nagaur and Bikaner has the lowest share of tribal population in the total population. In the district of Alwar tribal population is approximately 7.8% of the total population.

## 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 approach[34] 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.

[34] As per TCSP Environmental management framework - Draft (9 December 2013), MoMSME

In context of Bhiwadi TC;

- ► The identified site for the proposed TC at Bhiwadi;
  - Land has been allocated by GoR at the token amount of INR 1/- to O/o DC-MSME 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 consultants the same has been verified (Non-Incumbency certificate in respect of land is attached in Annexure 18.10).
- ► The allocated site for the proposed new TC at Bhiwadi is in RIICO developed industrial area. 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 RIICO industrial estate,

  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 even 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 RICCO officials. Based on the discussion, the checklist used to conduct environment screening at the selected site in the RIICO is given below:

Table 17: 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 area earmarked for industrial operations |
| 2 | Will the development include significant land disturbance or site clearance? | No | The land is clear from vegetation and there are no trees. Only wild grass, etc. will be required to be cleared. |
| 3 | Will the project involve acquisition of land from private players? | No | The land is a property of RIICO, a Government entity, and is an earmarked industrial zone. 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 protected are of biodiversity sensitive area in the 10 km radius of the allotted land. |
| 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? | No | The allocated land is open from two sides and is enclosed by other industrial operations on the rest of the two sides. As such construction activity 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 shall be supplied by the RIICO authorities (Municipal supply) as per the discussion with the RIICO officials and therefore, shall not put additional pressure on water source. |
| 10 | Will the project lead to increased air emissions in the region? | No | The TC is envisaged to insignificantly increase the air emissions in the region. Care may be exercised to minimize dust emissions from the construction activity. |
| 11 | Will the project lead to increase in noise levels in the area? | No | Increase in noise level in 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 lubricating oil and water soluble coolants in the manufacturing process. |
| 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 only use lubricating oil and water soluble coolants in the manufacturing process. |
| 14 | Is the project located in the area of seismic faults? In case yes, in which seismic does the location lie? | No | The TC location falls in the Seismic zone - IV and these may be designed to be capable of handling an earthquake in case there is one in the future. |
| 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? | No | There is no record of natural calamity in the region |

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 Bhiwadi 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 18: 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<br>- Municipal Solid Waste<br>- Hazardous waste<br>- Non-hazardous waste<br>- Other categories | Quarterly |
| 5 | Safety records<br>Near Misses<br>First Aid cases | Quarterly |
| 6 | Training<br>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 |

# Clearances Required and Respective Authorities

# 7. Clearances required and respective authorities

The proposed TC at Bhiwadi 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 by RIICO to O/o DC-MSME for development of TC, some of these regulations may not be applicable.

Table 19: Clearances required and respective authorities[35]

| SN | Required clearance/ approvals[36] | 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<br>• 60 days for above 10 hectares |
| 5. | Land Allotment | Revenue Department | • 30 days if allotment is to be made at the District Level<br>• 60 days in case Government's approval is required |
| 6. | Allotment of plots in Industrial Areas | RIICO | 30 days |
| 7. | Issue of NOC to the authority concerned | RIICO | 15 days |

[35] Sources;
http://bipraj.raj.nic.in/pdf/Single%20Window%20_Eng_%20Rules.pdf
http://environmentclearance.nic.in/Auth/openletter.aspx?EC=5331
http://pib.nic.in/newsite/erelease.aspx?relid=75314 http://pppinindia.com/business-rajasthan.php
http://rerc.rajasthan.gov.in
http://www.riico.co.in/DOLR%20FORM%20E.htm
[36] Indicative list of clearances/ approvals

| SN | Required clearance/ approvals[36] | Department /agency | Tentative time limit for approval (days) |
|---|---|---|---|
| | regarding conversion of land use | | |
| 8. | Environmental Clearance (Consent of Air and Water Pollution) | Ministry of Environment and Forests | • Site/environment clearance: 90 days,<br>• NOC to establish: 45 days,<br>• NOC to operate: 30 days, Renewal of consent: 30 days |
| 9. | Electricity Connection | Rajasthan Electricity Regulatory Commission | • Loads up to 60 HP: 66 days, Loads above 60 HP and up to 300 KW: 90 days,<br>• Loads above 300 HP and up to 3000 KW: 180 days,<br>• Load above 3000 KW and up to 33KV: 375 days |
| 10. | Water connection | RIICO | NA |
| 11. | Fire safety | RIICO/ Urban Improvement Trust, Bhiwadi | NA |
| 12. | Approval of place and for permission to construct building under the Factories Act) | RIICO/ Urban Improvement Trust, Bhiwadi | 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 |

| SN | Required clearance/ approvals[36] | Department /agency | Tentative time limit for approval (days) |
|---|---|---|---|
| 16. | Permission to establishments having more than 50 labours under Industrial Employment | Labour and Employment Department - Labour Department | 45 days |
| 17. | Lift | Urban Improvement Trust, Bhiwadi | NA |
| 18. | Borewell | Central Ground Water Authority | NA |
| 19. | Society registration | Indian societies registration act 1960 | NA |

# Manpower and Human Resource Development

# 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 TR Administration and Accounting is head 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 organisation 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 Bhiwadi TC, the main revenue streams are Production, Design and Consultancy and Training. 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 Bhiwadi 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 TRs 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.
- To achieve the envisaged objectives of TCSP, equal focus should be given on all the three pillars namely, production, training and business advisory. Consistent efforts will have to be made to optimize the revenue from all these areas. With this is 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 Bhiwadi 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 Bhiwadi 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 30 demonstrates the target organizational structure to be achieved in 5 years (by 2020-21) from inception. Though, we have provided the figures till 2025-26 since we are estimating the revenue and expenditures for next 10 years.

As highlighted above, the proposed Technology Centre at Bhiwadi 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 20: 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 | 7 |
| 5. | Production | 20 |
| 6. | Training | 22 |
| 7. | Marketing | 2 |
| | Total | 60[37] |

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.

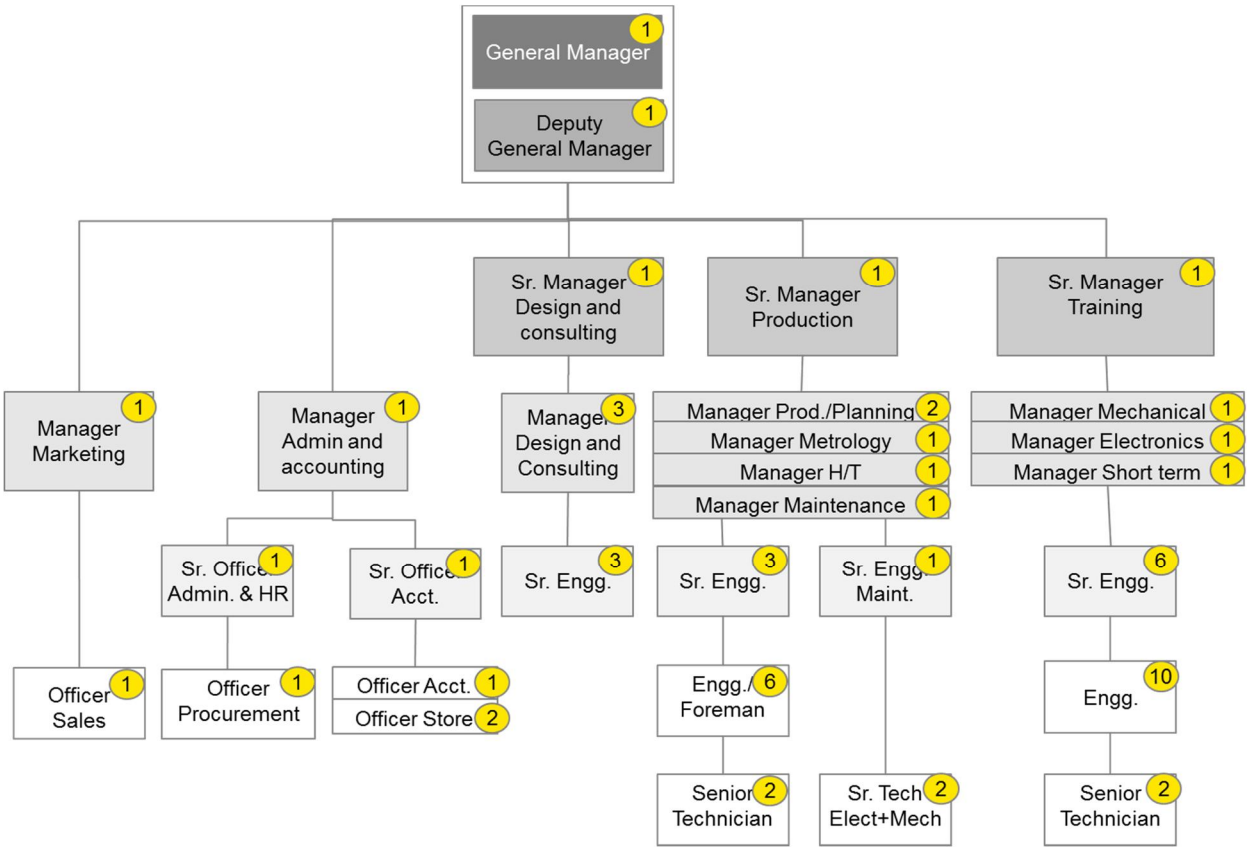
[37] The details and basis of number of employees is provided in the next section

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
- 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 28: Proposed organisation structure




## 8.2 Phase wise induction of human resources

As discussed in the above sections, the proposed TC will be have 60 employee as sanctioned strength and the target structure will be achieved within 5 years from 2015-16. Therefore due care have 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 2015-16: 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 2016-17: 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 2017-18: 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 2018-19: 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 21: Summary of phase wise induction of resources

| Year | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 | 23-24 | 24-25 | 25-26 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 2015-16 to 2025-26. In the year 2020-21, the TC is recommended to hire the complete sanctioned strength of 60 employees.

Table 22: Department wise induction of fulltime resources

| General Manager | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| General Manager | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Total | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Deputy General Manager** | | | | | | | |
| Year | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| Deputy GM | - | - | - | - | - | 1 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| **Administration and Accounting** | | | | | | | |
| Year | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| 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 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| 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 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| Senior Manager | - | 1 | 1 | 1 | 1 | 1 | 1 |
| Manager Prod/ Planning | - | - | 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 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| Senior Manager | - | 1 | 1 | 1 | 1 | 1 | 1 |
| Manager Mechanical | - | - | 1 | 1 | 1 | 1 | 1 |
| Manager Electronics | - | - | 1 | 1 | 1 | 1 | 1 |
| Manager Short 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 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 25-26 |
| 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 Bhiwadi 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 23: 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 | ► Tool Manufacturing/Design/ Auto-Product development/ Training.<br>► Experience in Project Implementation will be preferred | ► Over all responsible for the administration and financial health of the TC<br>► Key responsibility areas include (but not limited to); Marketing, Administration, HR, Accounts, Production, Design & consultancy etc.<br>► 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 | ► Tool Manufacturing/Design/ Auto-Product development/Training.<br>► 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 | 8 Years with 3 years in similar role | ► Experience in the area of Administration, HR and Accounting<br>► The Manager must also have basic knowledge of government laws, | Head of Accounts, Administration and HR:<br>► General housekeeping of TC<br>► Bookkeeping, accounting and finance including financial analysis |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| | Commerce/ Accounting / Finance | | regulations and state specific compliances<br>► Familiarity with ERP/accounting softwares | ► TC security<br>► Payroll<br>► Procurement management and store keeping |
| Sr. Officer - Admin. & HR | MBA or Equivalent | 5 Years | ► Experience in the area of HR and Administration<br>► Familiarity with Industrial laws and compliances | ► Housekeeping of TC<br>► Security systems operation<br>► Transport System and management<br>► Payroll |
| Sr. Officer - Accounting | Bachelor's degree in commerce/Accounting / Finance with M.Com. or MBA | 5 Years | ► Experience in accounting and Tax<br>► Should be familiar with latest accounting software | ► Bookkeeping and accounting<br>► Financial analysis |
| Officer - Accounting | M. Com. or MBA or Equivalent in Accounting | 3 Years | ► Experience in accounting and Tax.<br>► Should be familiar with latest accounting software | ► Bookkeeping and accounting<br>► Handling of Cash, Banking etc. |
| Officer Store | Diploma in Mechanical or Equivalent | 3 Years | ► Experience in Store keeping, including inventory management<br>► Experience in Computer systems / software for store keeping operation | ► Managing store<br>► Issue of consumable and non-consumable stores and keeping records |
| Officer Procurement | M. Com. or MBA or Equivalent | 3 Years | ► Experience in Procurement processes<br>► Knowledge of Govt. Procurement rules | ► Procurement<br>► Vendor Development |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| | | | and processes will be desirable | |
| Senior manager - Design & Consultancy | M.Tech in Mechanical engineering. | 10 Years with 5 years in similar role | ► Experience in product modelling, design, tool design<br>► Proficiency in one of the areas in Tool Design, either Sheet metal press tool or Plastic mould<br>► Practical Experience in use of CAD/CAM/CAE in product and tool design<br>► Experience of Tool trial<br>► Experience of assembly and inspection of Jigs and Fixtures<br>► Knowledge of Quality systems<br>► Experience in technical consultancy will be preferred | Responsible for designing tools, moulds and die casting w.r.t.<br>► New product development planning and its execution<br>► Quality systems<br>► Value engineering<br>► Tool try outs and proving<br>► Consultancy to MSMEs<br><br>In charge of Incubation centre<br>► Helping members of Incubation centre in getting orders and execution of the same |
| Manager- Design & Consultancy | B. Tech in Mechanical engineering. | 8 years with 3 years in a similar role | ► Experience in product modelling, design, tool design<br>► Proficiency in one of the areas in Tool Design, either Sheet metal press tool or Plastic mould<br>► Practical Experience in use of CAD/CAM/CAE in product and tool design<br>► Knowledge of Tool trial | ► Designing tools, moulds and die casting<br>► Product development<br>► Quality systems<br>► Value engineering<br>► Tool try outs and proving<br>► Consultancy to MSMEs: Deliver functional consulting on assigned areas to ensure MSMEs are able to successfully use the |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| | | | ▶ Experience of Jigs and Fixtures<br>▶ Knowledge of Quality systems<br>▶ Experience in technical consultancy will be preferred | solutions |
| Sr. Engineer-Design & Consultancy | B. Tech in Mechanical engineering | 5 Years | ▶ Experience with designing sheet metal tools, plastic moulds or die casting<br>▶ Knowledge of high end CAD software, analysis software and metrological instruments<br>▶ Experience of consultancy in the areas of product development, quality systems and value engineering | ▶ Designing tools, moulds and die casting<br>▶ Product development<br>▶ Quality systems<br>▶ Value engineering<br>▶ Tool try outs and proving<br>▶ Consultancy to MSME |
| Sr. Manager Production | M. Tech. in Mechanical Engineering | 10 Years with 5 years in similar role | ▶ Experience with tooling or manufacturing and at least 3 years of leadership experience<br>▶ The Sr. Manager should have been exposed to metal or plastic mould and/or die casting<br>▶ The Sr. Manager should also have hands on experience with CAD and CEM software, and programming of CNC machines | ▶ Overall responsible for Production, production planning and control, including quality assurance of Tools and components, Tool trials etc.<br>▶ Overall responsible for relevant software CAD/CAM/CNC<br>▶ Overall responsible for machine maintenance and upkeep<br>▶ Ensuring on-time deliveries<br>▶ Deliver budgeted quantities as per required |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| | | | ► Experience to debug tool, analyse problems, root causes & take corrective improvement actions when tool is not able to produce as per part specifications | quality standards<br>► Manpower deployment and controlling manpower costs as per target |
| Manager-Production | B. Tech in Mechanical Engineering | 8 Years with 3 years in a similar role | ► Experience with tooling or manufacturing<br>► Knowledge of metal or plastic mould and/or die casting<br>► Hands on experience with CAD and CAM software, and programming of CNC machines<br>► Experience to debug tool, analyse problems, root causes & take corrective improvement actions when tool is not able to produce as per part specifications | ► Production<br>► CAD/CAM/CNC programming and operation<br>► Responsible for timely delivery of tools and components<br>► Responsible for Tool Trial<br>► Responsible for Consultancy to MSMEs<br>► 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 | ► Experience in tooling or manufacturing<br>► Experience in metal or plastic mould and/or die casting.<br>► Experience in CAD and CAM software, and programming of CNC machines<br>► Knowledge of ERP software | ► Preparation of stage wise / machine wise scheduling in co-ordination with head of production team<br>► Production Planning and Control, and further despatching of jobs<br>► Estimate & manage to get raw materials and component requirements<br>► Responsible from issue of raw materials to |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| | | | | despatch of final product to customers including routing |
| Manager- Metrology | B. Tech in Mechanical Engineering | 8 Years with 3 years in a similar role | ► Practical knowledge and experience of handling CMM and measuring Instruments<br>► Knowledge of Quality assurance and systems | Head of QC and metrology section with in production |
| Manager- Heat treatment (HT) | B. Tech in Metallurgy/Mechanical 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 |
| Manager- Maintenance | B. Tech in Mechanical/ Electrical/ Electronic Engineering | 8 Years with 3 years in a similar role | ► Knowledge of Installation and commissioning of machines and equipment<br>► Practical experience in preventive and repair maintenance of machines and equipment<br>► Practical experience of maintaining utility equipment like sub-station, UPS, water treatment plant, DG set etc. | ► Head of Machinery maintenance including preventive maintenance, repair etc. of machines and equipment<br>► Responsible for Power supply, energy conservation water system in the campus |
| Senior Engineer- | B. Tech in Mechanical | 5 Years | ► Knowledge and experience in tool manufacturing, metal cutting through | ► CNC machine programming and supervision of machining and assembly of tools |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| Production | Engineering | | CNC programming and operation<br>► Experience of precision components<br>► Tool assembly<br>► Tool trial | ► Machinery maintenance<br>► Quality assurance<br>► Team work |
| Engineer-Production | Diploma in Tool & Die Making or Equivalent | 3 years | ► Knowledge and experience in tool manufacturing, metal cutting through CNC programming and operation<br>► Tool assembly<br>► Tool trial | ► CNC machine programming and operation<br>► Assembly and trial of Tools |
| Foreman | Promotion from Senior Technician | 3 years as Sr. Technician | ► Knowledge and experience in tool manufacturing, metal cutting through CNC programming and operation<br>► Tool assembly<br>► Tool trial | CNC machine programming and operation<br>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 | Experience in Maintenance of machines and equipment (electronics or mechanical)/<br>Experience in CNC machine programming and operation/<br>Experience in Tool assembly and trial | ► CNC machine programming and operation<br>► Assembly and trial of Tools<br>► 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 | ► Experience with tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems<br>► Experience with designing curriculum and preparing lecture plans and course material for long term and short term training | ► Overall responsible for planning and executing training activities<br>► Overall responsible for designing curriculum and preparing lecture plans and course material<br>► 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 | ► Experience with tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems<br>► Experience with designing of curriculum and preparing lecture plans and development of course material for long term and short term training | ► Planning and implementing of training activities in manufacturing and tooling, Mechatronics, IT etc. including market assessment to discover training demand<br>► Evaluation of training activities and identify improvements<br>► Curriculum design<br>► Lecture plans and course material |
| Senior Engineer-Training | B. Tech. Mechanical or Electronics/ Electrical | 5 Year | ► Experience with tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems<br>► Experience with designing curriculum and preparing lecture plans and development | ► Undertake training courses in manufacturing/ tooling and related courses |

| Profile/ Designation | Minimum Qualification | Minimum Experience | Other Skill set/ requirements | Key Responsibilities |
|---|---|---|---|---|
| | | | of course material for long term and short term training<br>► Knowledge of CAD/CAM/CNC | |
| Engineer-Training | Diploma in Tool & Die Making/Electronics | 3 Years | ► Experience in tooling / manufacturing and training in metal cutting / tool engineering / industrial automation systems | ► Undertake training courses<br>► Demonstrate practical skills to trainees<br>► Deliver theory lectures |
| Manager- Sales & Marketing | M. Tech. in Mechanical Engineering | 10 years with 5 years in similar role | ► Marketing of TC product range<br>► Supporting Sr. Managers of respective departments to acquire orders<br>► Follow up with prospective and existing customers | ► Plan and evaluate marketing activities towards all stakeholders<br>► Stakeholder analysis<br>► Sales according to targets |
| Sales Officer | MBA or Equivalent | 3 years | ► Experience of invoicing and sales accounting<br>► Payment collection from customers<br>► Should be familiar with Computerised accounting procedures | ► Execute marketing and sales activities<br>► 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 24: Comparison of Society Registration Act and Companies Act

| Features | Registered Society | No-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 |

| Features | Registered Society | No-for-profit Company u/s 25 |
|---|---|---|
| Membership transfer | Impossible | Free or control as per desire |
| Statutory Regulations | Limited | Exhaustive |
| Transparency | Transparent<br>(As society act is not so exhaustive requiring statutory compliance for each and every step of business operation) | Fully Transparent<br>(The Companies Law is quite exhaustive requires specific 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<br>Articles of Association with rules & regulations | Memorandum of Association<br>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 van 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 Bhiwadi 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 then 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 25: Governing Council of Bhiwadi TC

| Representation in the Governing Council | Suggestive recommendations |
|---|---|
| (i) Ex-officio members | |
| Representative from Government of India<br>► Development Commissioner, Ministry of MSME as Chairman,<br>► Industrial Advisor or Director of TR or Program Coordinator,<br>► Director DI-MSME of the respective States,<br>► Representative from Integrated Finance Wing of the Ministry of MSME.<br><br>Representative from State Government<br>► Official from concerned industry department,<br>► Official from concerned department of technical education/training. | ► Secretary, Industries<br>► Commissioner/Director, Technical Education & Training |
| (ii) Institutional members | |
| ► Representative of state level industrial promotion body<br>► Representative of association of small scale industries<br>► Representative of the local chambers of commerce and industries/ Industry Promotion Institution/NSIC. | ► RIICO<br>► Auto components manufacturer samiti, Alwar (ACMS)<br>► Bhiwadi Manufacturers Association (BMA)/Bhiwadi chamber of commerce & industries (BCCI) |
| (iii) Professional and other members | |

| Representation in the Governing Council | Suggestive recommendations |
|---|---|
| ▶ One expert representing the fields of finance & accounts/ law/management,<br>▶ One representative of small scale tool producers,<br>▶ One representative of OEM,<br>▶ One representative of major auto component manufacturer in the region<br>▶ Representative of Technical University of the state which governs engineering colleges | ▶ To be nominated by O/o DC-MSME<br>▶ To be decided by O/o DC-MSME<br>▶ Maruti Suzuki/Honda Siel/Hero Motorcorp<br>▶ Sriram Pistons<br>▶ Rajasthan Technical University, Kota |
| (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 *Member Secretary.* | |

▶ 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.

# Marketing Plan

# 9. Marketing plan of Bhiwadi TC

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

Figure 29: Suggestive framework for marketing of TC

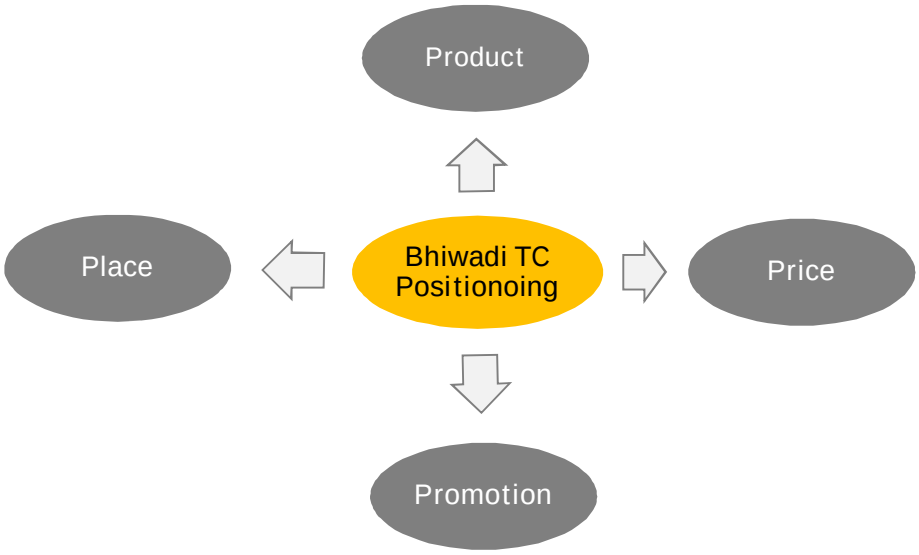

In line with the above suggestive framework, a detailed Go to Market plan of the proposed TC will be prepared subsequently by the Cluster Network Manager (CNM) along with the GM and marketing team of the TC. The role of CNM for marketing would be very crucial and will act as an additional arm of the 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/ tier 1 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 Bhiwadi TC has been highlighted below:

Figure 30: Positioning of marketing mix for proposed TC




| Product |
| --- |
| A General Engineering TC with focus on Auto sector is proposed to be developed at Bhiwadi based on the presence of large auto focused units and 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 specialisations 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.<br><br>The existing Auto focussed MSME TCs majorly focuses on the small size sheet metal work with negligible focus on the plastic mould work. They don't have the capacity to address the medium size tooling. As a differentiator and keeping the market needs in mind, we have proposed medium size sheet metal work and small size plastic mould work for the proposed TC at Bhiwadi. In contrary to the existing Auto focus MSME TCs, we have also proposed an incubation centre in the proposed TC for the budding entrepreneurs. The centre would encourage final year trainees to start their own ventures by providing necessary support like finance, high end machining, availing benefits of Government schemes etc. for a period of 3 years.<br><br>The summary is provided below:<br><br>The key offerings of the proposed TC will be auto sector focused like; manufacturing of tools, |

training for skill development with respect to various specialisations, consultancy services in Auto sector. Focus areas would include:

- Medium size sheet metal work and low size plastic mould work. (medium size press tool, mid- size plastic mould, pressure die casting etc.)
- Long and short term training programmes in CNC/ CAD/CAM, advance welding, industrial and process automation etc.
- Consultancy services in the field of product and tool design, manufacturing etc. for improved quality and productivity.
- Incubation support to the trainees/budding entrepreneurs for their start-up ventures

**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 will strengthen 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 Bhiwadi 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 Bhiwadi 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**

Bhiwadi is strategically located between Delhi and Jaipur within the National Capital Region. Further, it has also been identified as an investment region under DMIC and other mega industrial projects are coming up in this region. All these location advantages will be leveraged while preparing the detailed marketing plan to establish the proposed TC as one of the prominent TCs catering to the Auto Sector.

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 26: Suggestive marketing activities, ownership and timeline

| Phases | Activity | Ownership | Timeline |
|---|---|---|---|
| Preparation of promotional materials | • Designing brochure of TC (through outsourcing)<br>• Short video film of TC infrastructure and facilities available (through outsourcing- post completion of the infrastructure/construction)<br>• Development of TC website (through outsourcing) | Marketing team, GM and CNM | Construction and Post construction phase |
| Pre marketing activities | • Preparing list of industrial association bodies in the Bhiwadi catchment, district and state.<br>• Preparing list of industries in consultation with DIC.<br>• Shortlisting of perspective players' with respect to product range and process.<br>• Design a brief questionnaire.<br>• Preparing list of engineering colleges, ITIs, polytechnics, in the catchment area. | CNM and GM | Construction phase |
| Targeting the manufacturing units | • Send the brochure along with cover letter and short questionnaire to the shortlisted industries.<br>• Seek time from large industries and industry body associations to give presentation on the capability statement of Bhiwadi TC with respect to manufacturing of tools etc.<br>• Send representatives to get the filled questionnaire or fill the questionnaire circulated earlier.<br>• Analyse the questionnaires received with respect to production, consultancy, training requirements of industries.<br>• 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.<br>• Organise as well as participate in industry | GM, Manager Marketing, CNM and TP | During installation and commissioning of machines for manufacturing |

| Phases | Activity | Ownership | Timeline |
|---|---|---|---|
| | oriented outreach programmes/ seminars/ workshops/ boot camps etc. | | |
| Targeting OEMS | 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;<br>• 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.<br>• Presentation on the capability statement of Bhiwadi TC with respect to manufacturing of tools, training etc.<br>• Get their vendor details and understand their portfolio of product requirement at various levels<br>• Plan to Increase product portfolio to cater to the OEMs and their vendors | GM, Manager Marketing, CNM and TP | During installation and commissioning |
| Targeting technical and vocational training institutes and high schools | • Meet the principle/ HoD of the institutes and present on the capability statement of Bhiwadi TC with respect to training infrastructure, faculty, real time learning with on job learning etc.<br>• Seeking permission and presenting the same to final and pre final year students<br>• Getting permission to display the brochure of TC on the notice board of these institutes.<br>• Organise as well as participate in industry oriented outreach programmes/ seminars/ workshops/ boot camps etc. | Marketing team (GM) and CNM | During installation and commissioning of machines for training |

# Focus Area for Bhiwadi TC

# 10. Focus area for Bhiwadi TC

As mentioned in the previous section, NCR region caters to around 60 per cent of the India's passenger car production, 55 per cent of motor cycle production and 25 per cent of tractor production. The auto industry in the Bhiwadi catchment comprises players across the entire industry value chain.

Therefore, based on the data available, presence of large auto focused units, discussions with O/o DC-MSME and major firms in the region and domain experts, a General Engineering TC with focus on auto sector is proposed at Bhiwadi location in the Alwar district of Rajasthan. It is important to note that O/o DC-MSME has multiple TC focussed on the automotive sector across India. Therefore, Bhiwadi TC is planned in such a way that it complements the existing investment and overall improves the capability of automotive focussed MSMEs in India.

The table below presents the existing capacity of MoMSME TRs in the in different processes across small, medium and large size tooling requirement.

Table 27: Capability of existing MSME TCs

| Tool Size | Sheet Metal | Plastic | Casting | Forging |
|---|---|---|---|---|
| Small | ▪ Jamshedpur<br>▪ Aurangabad<br>▪ Ludhiana | ▪ Jamshedpur<br>▪ Ahmedabad<br>▪ Ludhiana<br>▪ Indore<br>▪ Kolkata | ▪ Jamshedpur<br>▪ Aurangabad<br>▪ Indore | ▪ Jalandhar<br>▪ Kolkata |
| Medium | - | - | - | - |
| Large | - | - | - | - |

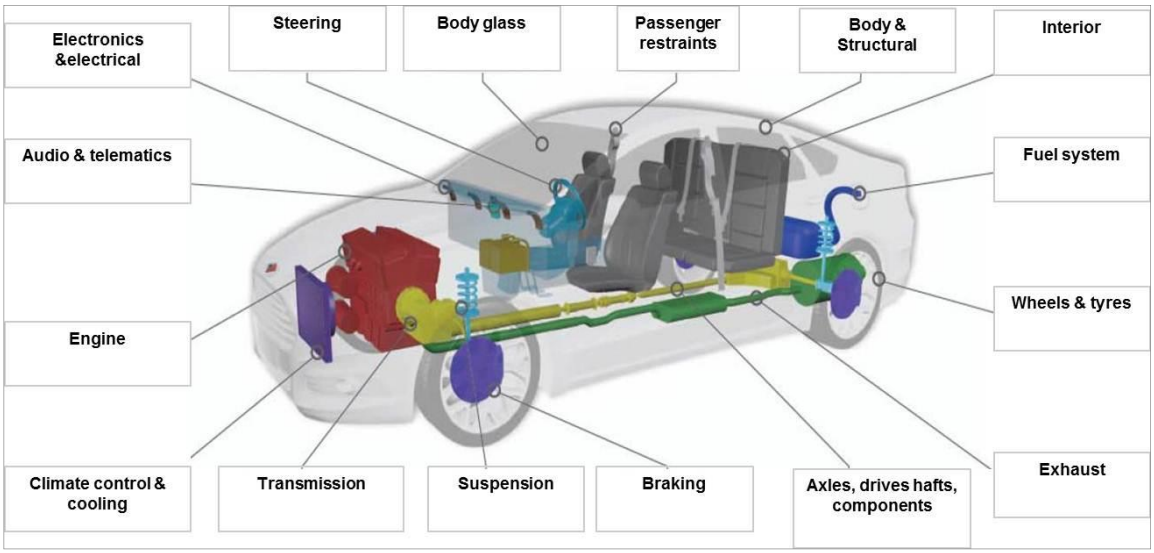
As explained in section 5.4, the requirement of sheet metal and plastic mould in the 2 and 4 wheelers together comprise majority (greater than 75%) of the tooling requirement. The sheet metal dies requirement for passenger cars is categorised as small, medium and large sized. As per the discussions with different OEMs, experts and O/o DC-MSME, present commercial tool rooms in India have sufficient capacity to develop small size sheet metal tools. Similar capacity is also available with all the existing MSME TCs who also cater to this segment. However, some critical and intricate tooling in this segment is still imported. There are few commercial and captive TRs catering to mid-size sheet metal tooling. As per industry estimates, around 60% in this segment are imported from countries like Korea, Taiwan and China.

From table 27 above, it is also evident that today MoMSME TCs lack capabilities in medium and large size tooling. Also, capacity is almost non-existent in large size sheet metal tooling in the private TRs. Considering the low volume of the large size tooling market and high level of

investment requirement, it may not be viable to venture into large size tooling as of now. Also, since the volume of new car launches is expected to be low in India, it is not economically viable to produce tooling for large components. However TC may review the market position after a period of 7-10 years. Medium size sheet metal constitutes the highest percentage (among all three sizes - small, medium and large size) of tooling value wise and as mentioned above currently more than half of it is imported. Hence, the proposed Bhiwadi TC should address this gap in the existing market.

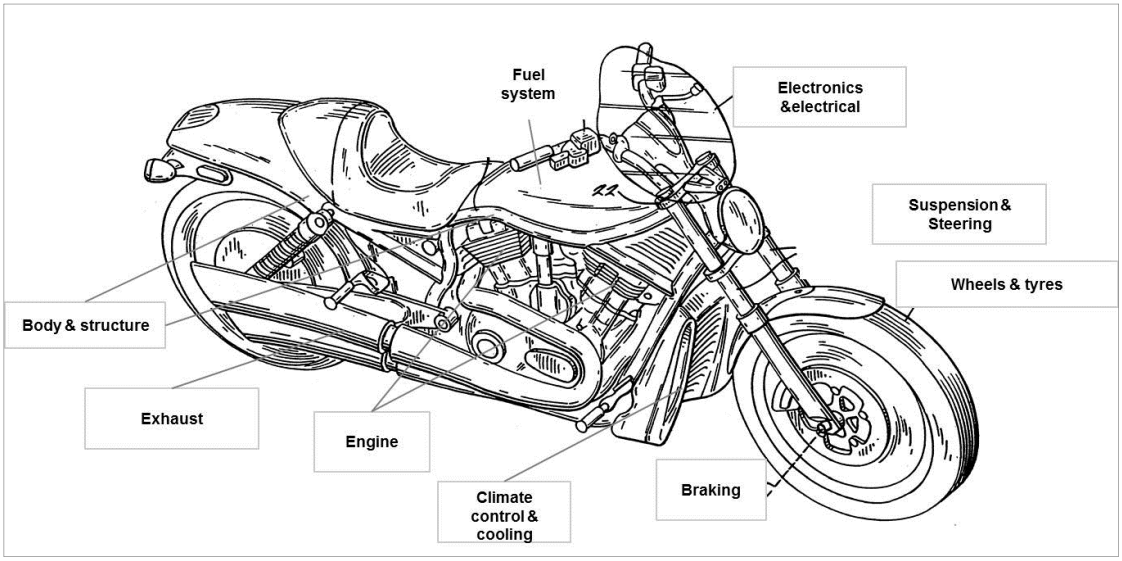
Therefore, it is proposed that the new green field TC in the auto sector should focus on mid-size sheet metal tooling. Based on discussion with the experts and industry players it is further proposed that TC should focus more on bigger size tooling in mid-size sheet metal. Similarly, plastic moulds which includes components like bumper, mirrors covers, dashboard, inner panels etc. is also another major area of tooling in 4 wheelers. There are about 30,000 components in a car in which sheet metal and plastic parts comprise the majority of components. Some of the key components have been highlighted in the following figure.

Figure 31: Key components in 4 wheelers




Further, as explained in section 5.4, plastic moulds (mainly small size) and pressure die casting together comprise about 3/4$^{th}$ of the tooling requirement and hence will be the focus areas for two wheeler tooling. There are about 5,000 parts in a motorbike. Plastic and pressure die casting comprise majority of parts. Some of the key components have been highlighted in the following figure.

Figure 32: Key components of 2 wheelers




The importance of sheet metal and plastic mould tooling requirements in auto sectors has also been validated further during various discussion carried out by our experts and team with OEMs, Tier 1 players, MSMEs, industry association in this region. Some of the key discussion points with these players have been highlighted in the annexure 18.9.

Since the Bhiwadi area has concentration of 2 and 4 wheeler units, development of an auto TC in Bhiwadi focussing on medium size sheet metal work and small size plastic mould work has been narrowed down[38]. Suggestive list of automotive parts which can be manufactured in the mentioned areas of focus has been given in table 28. The proposed TC should enhance its capacity in the areas mentioned and not only support the MSMEs in catchment area but MSMEs outside the catchment area as well.

[38] Specification for small, medium and large tool size is provided in Annexure 18.9

**Bhiwadi TC will focus on technology & training support**

- Auto component design, development and engineering solutions for manufacturing
- Expertise in Sheet metal tooling for Auto sector
  - Support in Tool and die making to commercial tool rooms/ MSMEs
  - Provide training/ Skilled manpower for tool and die making, metal cutting and other technical areas
- Testing, calibration, metrology & inspection support
- Reverse Engineering & Import substitution
- State of art training facility to cater to design & manufacturing requirements of tool rooms and other component manufacturers
  - CNC/CAD/ CAM etc.
  - Robotics & Industrial Automation
- Collaboration with Commercial tool rooms (CTRs) and MSMEs

## 10.1 Plant and machinery for the TC

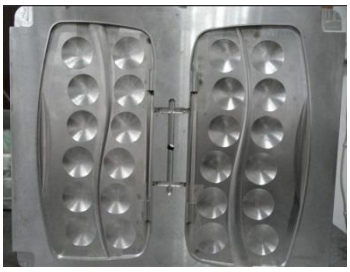
In automotive industry, original equipment manufacturers (OEMs) make the final product by assembling the components supplied by tier 1 suppliers. Tier 1 supplier's in-turn source their products from Tier 2 and Tier 3 supplier (some of these could be MSME suppliers). These MSMEs require machine tools in order to produce auto components where our TC can support them by providing tools.

These tooling involve large scale injection moulds, casting dies, forging dies and stamping dies. These can be classified in 4 broad categories:

- Press Tool - It is a special build for cutting and non-cutting operations on sheet metal to produce particular components like door panels, inner liner, clutch parts, brake parts etc. These tools are in the form of dies and punches which can be used in stamping, forming, blanking, piercing and other processes to produce these auto parts. In order to produce these press tools, machines like milling, lathe, drilling, die spotting press and wire EDM machines play a critical role.

Figure 33: Press tool

Figure 34: Mould



- Moulds - Auto components like front and rear bumper, engine cover, head light and rear light, and door trimmings are made of plastic. These components are produced using injection moulding process which requires moulds for each part. Production of these moulds requires milling, lathe, drilling, die spotting press, wire EDM, gun drilling, and surface grinding machines.

Figure 35: Die casting die

- Die Casting Dies - Die casting process offers an economical way of producing large quantities of complex, high tolerance parts in metal alloy. Engine block, power train casing, Gear box casing, pistons, wheel rim, and oil pump are the few examples. Milling, lathe, drilling, dies spotting press, wire EDM, gun Drilling, surface grinding machines, and cylindrical grinding machines are used to produce these dies.

Figure 36: Jig & Fixture

- Jigs, Fixtures and Gauge -Jigs and fixtures are devices that locate and hold the work piece. These devices also guide and control one or more cutting or punching tools. Gauges are generally used for measuring and checking of squareness,

perpendicularity, dimensions and testing finished surfaces. Milling, lathe, press, drilling and grinding machines are mainly used for production of these devices.

Based on the study and discussions carried out, some suggestive automotive parts which can be manufactured at Bhiwadi TC are given below:

Table 28: Requirement of machines for manufacturing of different automotive parts

| SN | Raw material | Automotive parts | Processes required for manufacturing the part | Tool required | Machines required for making tool |
|---|---|---|---|---|---|
| 1 | Sheet metal | Clutch Parts, Brake Parts, Gaskets, Seating System, Inner Liner, Bottom Carpet, Wheel Parts | Blanking, Piercing, Forming (Bending), Drawing, Stamping | Press Tools- punch and Dies | Milling, Lathe, Drilling, Die Spotting Press, Hydraulic Press, Mechanical Press wire EDM, |
| 2 | Plastic | Radiator Grill, Head Light, Engine Cover, Front and Rear bumper, Rear Lights, Central Console, Mirror Housing, Door Trimmings etc. | Injection Moulding | Moulds | Milling, Lathe, Drilling, Die/mould Spotting Press, Hydraulic Press, Mechanical Press EDM, wire EDM, Gun Drilling, Surface Grinding, Injection Moulding Machine |
| 3 | Metal Alloys | Engine block, Powertrain Casing, Gear Box Casing, Pistons, Wheel Rim, Steering Wheel, Oil Pump etc. | Pressure Die Casting | Dies | Milling, Lathe, Drilling, Die Spotting Press, wire EDM, Gun Drilling, Surface Grinding, Cylindrical Grinding, Pressure die casting machine |
| 4 | Plates and Bars | Welding Fixtures, Special Fixtures. Gauges, Relation Gauge, Templates | - | Jigs, Fixture, Gauge | Milling, Lathe, Drilling, wire EDM, Grinding |

### 10.1.1 Budgetary cost of plant and machinery

The machines for respective functions like production, incubation and training have been proposed based on the focus areas identified for Bhiwadi TC. The total budgetary cost (landing cost) of machines required for the same has been estimated to be around INR 7,944 lakhs, breakup off which is as follows:

Table 29: Budgetary cost of machines

| SN | Activity | Budgetary cost of machines (in Lakhs) |
|---|---|---|
| 1 | Production machinery and equipment | 4,908.22 |
| 2 | Incubation centre machines and equipment | 287.7 |
| 3 | Training machines and equipment | 2,747.85 |
| | Total | 7,943.77 |

The list of machines required for these activities along with respective budgetary costs have been given in the subsequent sections.

## 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 4,908 lakhs. The team has discussed with various vendors and taken quotes for machines to arrive on the estimated budgetary cost (the same has been attached as annexure 18.6). 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 30: Proposed list of machines for production/ manufacturing activities

| SN | Machine | Suggestive Specs | Similar machine in existing TC | No. | Budgeted Cost (INR Lakhs) | Total Cost (INR Lakhs) |
|---|---|---|---|---|---|---|
| 1. | CNC Milling-5axis | 3m*2m*1.5m | NA | 2 | 750 | 1500 |
| 2. | CNC Milling-3axis | 2.5m*1.5m*1.5m | NA | 1 | 300 | 300 |
| 3. | Die spotting press | 200 mt | NA | 1 | 150 | 150 |
| 4. | Hydraulic press | 1000 tonne | NA | 1 | 100 | 100 |
| 5. | Mechanical press | 100 tonne | NA | 1 | 40 | 40 |
| 6. | Wire EDM | 800*800*500 mm | Jamshedpur, Aurangabad | 1 | 300 | 300 |
| 7. | EDM | 1000*1000 mm | Jamshedpur, Aurangabad | 1 | 150 | 150 |
| 8. | Injection Moulding machine | 800 tonne | NA | 1 | 120 | 120 |
| 9. | CNC Lathe | 300*600 | All TCs | 1 | 80 | 80 |
| 10. | Gun drilling machine | 20*800mm | NA | 1 | 12 | 12 |
| 11. | Radial drill machine | 63mm | All TCs | 1 | 10 | 10 |
| 12. | Surface Grinding | 2.5m*1.5m | NA | 1 | 60 | 60 |
| 13. | Surface Grinding | 2m*1m | Ahmedabad, Aurangabad | 1 | 40 | 40 |
| 14. | Cyl Grinding | 200mm*750mm | All TCs | 1 | 40 | 40 |

| SN | Machine | Suggestive Specs | Similar machine in existing TC | No. | Budgeted Cost (INR Lakhs) | Total Cost (INR Lakhs) |
|---|---|---|---|---|---|---|
| 15. | Vacuum Heat treatment plant | 300mm*1000mm | Bhubaneswar & Jamshedpur | 1 | 200 | 200 |
| 16. | Assembly Benches & Fixtures | - | All TCs | 1 | 10 | 10 |
| 17. | Auxiliary Equipment (Drill m/c, pedestrial grinder, trollies etc.) | - | All TCs | 1 | 20 | 20 |
| 18. | EoT & Jib Crane | - | All TCs | 1 | 50 | 50 |
| 19. | Compressor (approx. 250 CFM) | - | All TCs | 2 | 10 | 20 |
| 20. | CMM (Coordinate Measuring Machine) | 3m*2m*1.5m | All TCs | 1 | 500 | 500 |
| 21. | Height Master/Gauge | - | All TCs | 1 | 10 | 10 |
| 22. | Surface Finish tester | - | All TCs | 1 | 20 | 20 |
| 23. | Other Metrology lab equip | - | All TCs | 1 | 70 | 70 |
| 24. | CAD Software like CATIA, UG etc | - | All TCs | 25 | 2 | 50 |
| 25. | Engg. Analysis software like ANSYS, mouldflow, autoform, PAMstamp etc. | - | All TCs | 1 | 100 | 100 |
| 26. | Additive Manufacturing/3D printing/RPT | - | Ludhiana & Ahmedabad | 1 | 700 | 700 |
| 27. | Drafting/Printing | - | All TCs | 1 | 5 | 5 |
| 28. | Workstations | - | All TCs | 25 | 0.7 | 17.5 |
| 29. | Misc., unforeseen | | | 1 | 233.725 | 233.725 |

| SN | Machine | Suggestive Specs | Similar machine in existing TC | No. | Budgeted Cost (INR Lakhs) | Total Cost (INR Lakhs) |
|---|---|---|---|---|---|---|
| | & Contingency | | | | | |
| | Total | | | | 4083.425 | 4908.225 |

*NA: Not Available

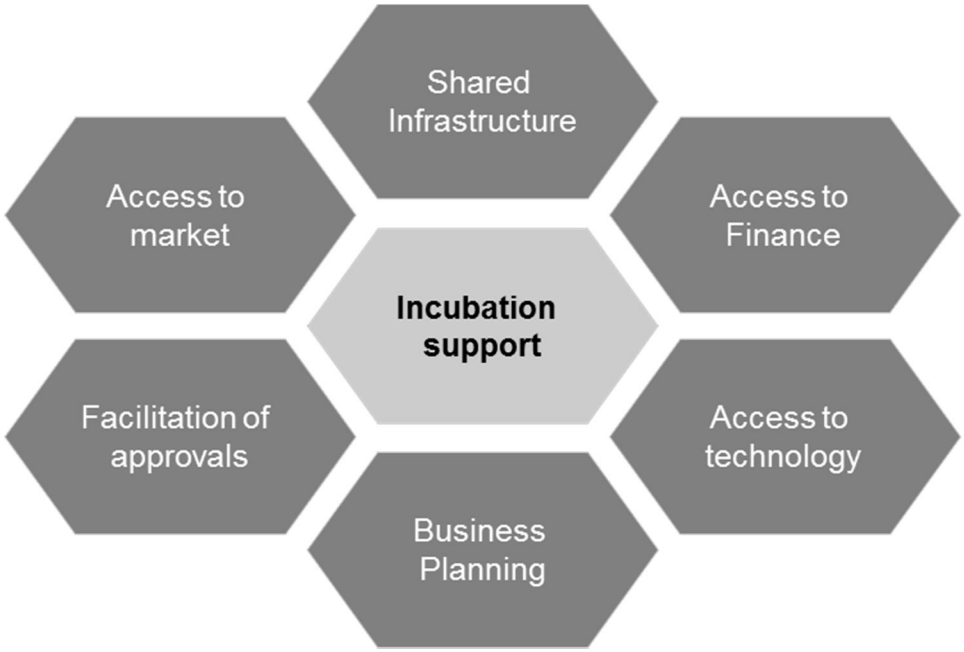
## 10.3 Incubation centre

Promoting emerging technological and knowledge-based innovative ventures that seek to nurture ideas from professionals is important for development MSMEs. Such entrepreneurial ideas need to be fostered and developed in a supportive environment before they become financially sustainable or attractive enough for venture capital. Hence need arises for incubation centres to promote budding individual innovators and to assist them to become technology based entrepreneurs. Typical areas of Incubation support include

- Idea conceptualisation & business planning - Technology commercialization,
- Access to infrastructure – networking, office space
- Access to finance - bank loans, loan funds, guarantee programs, investors
- Access to technology – access to machines, designing support
- Access to market – Introduction to strategic partners
- Facilitation of approvals - regulatory compliances, clearances

The incubation centre may also provide support to promote networking and forging of linkages with other constituents of the innovation chain for commercialization of their developments.

Figure 37: Key areas of incubation support




Typically the incubation support initiatives provide support to new businesses for an initial period of 2-4 years.

Business incubators differ from traditional research and technology parks in terms of scale and assistance. Research and technology parks are typically large-scale projects that house corporates, government companies or university labs to very small companies. Typically research and

technology parks do not provide business assistance services, which are the hallmark of business incubators. However, research and technology parks may house incubation programs.

Several initiatives in this direction of incubation have been taken by various departments of Central Government. Some of them include

- Incubators scheme for MSMEs- A component of National Manufacturing Competitiveness programme to improve competitiveness of MSMEs (MoMSME)

  The term 'innovation' covers a very wide domain. According to MoMSME, innovation signifies any activity and new/ ingenious procedure or product that is likely to be of use to society and marketable in the long run. The scheme seeks to provide small dose of assistance, to students/ ex-students of science and technology and entrepreneurs to try out their innovative ideas (new processes/ products) at the laboratory or workshop stage and beyond (to the extent possible) with an objective to carry the idea from concept stage to 'know-how' stage and then to 'do how' stage.

- Technology Business Incubator (TBI), Department of Science & technology, (MoST)

  TBI is a flagship programme of National Science and Technology Entrepreneurship Development Board (NSTEDB) and focuses on incubation of potential ideas and innovations through a well-defined venture/ enterprise creation process and by effectively utilizing the requisite expertise, facilities and other infrastructure available within the host institution and the adjoining region. The incubation period is expected to be 2-3 years. Key areas of assistance in the TBI scheme include:

  - Market survey/ marketing,
  - Business planning and training,
  - Organising management/ technical assistance,
  - Obtaining statutory approvals,
  - Information dissemination on product ideas/technologies,
  - Syndicating finances,
  - Arranging legal and IPR services,
  - Provision of work space, shared service facilities

The proposed MSME technology centre at Bhiwadi will also house incubation facilities to promote new entrepreneurs

### 10.3.1 Incubation centre at Bhiwadi TC

The proposed TC will provide incubation support to trainees for their start-up ventures. The centre would encourage final year trainees to start their own ventures by providing necessary support like high end machining, access to finance, availing benefits of Government schemes etc. for a period of 3 years. The TC can extend its facilities for nominal fee during this period to these start-up ventures and help them to specialise in their core activities. The incubation centre will not only provide support in its focus areas but also in other areas like non-auto focused sectors and non-precision works. The Incubation centre is proposed to perform in the following manner:

- The centre would encourage final year trainees in the long term programmes to start their own venture. Final semester trainees would be required to submit a business plan in an Idea competition to be undertaken by TC.
- Business plan of best 5%-10% students from each long-term course will be selected.
- Support would be provided to these students for their respective start-up venture from TC for a period of up to 3 years.
- These students can avail support with respect to product development, tool design, job work, automation solutions from the Incubation centre for setting up of their start-up ventures.
- The student would be allowed to use the facility on discounted rates (to be decided by the GC). During this support period TC can also extend its high end machining facilities like CNC 5-axis milling machine etc. for different job works of the start-up venture.
- The TC will also assign a mentor for necessary guidance during this support period.
- The TC would help the new venture to avail benefits under various Government schemes as applicable.
- The TC would also facilitate in mobilisation of finance/ seed money from venture capitalists or others in the market as well as in getting required statutory clearances.
- The TC with assistance from the TP, will develop a monitoring framework for the trainees who will opt for the incubation centre facilities.

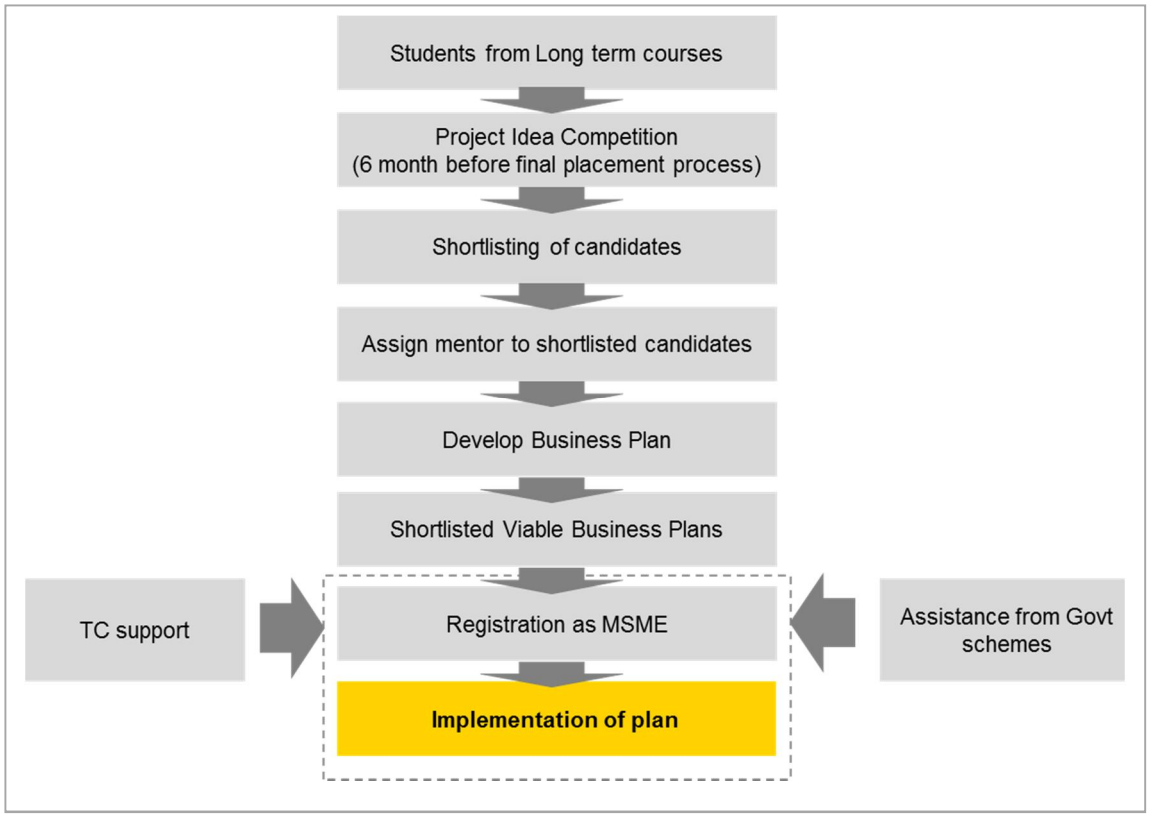
Incubation centre can take support from TC more than mentoring whereas order sharing can happen on need basis. Moreover, CNM will also support members of incubation centre on need basis in order to help them expanding the business as well as in collaborating with industry and academia.

While doing the study, it is also found that National Small Industries Corporation has taken initiatives to establish training-cum-incubation centre to promote and foster the growth of MSMEs in the country. Through franchisee arrangements with private partners it has set up such centres at various locations across the country under public private partnership mode. Around 80 such training-cum-incubation centres have already been set up in the country. Key services rendered by these centres are as follows:

- Opportunity to first generation entrepreneurs to acquire skill for enterprise building and provide incubation support
- Exposure in various areas of business operations such as business skills development, identification of appropriate technology, hands on experience on working projects, project / product selection, opportunity guidance including commercial aspects of business
- Display of low cost project technologies required for setting up new small business enterprises in working condition

During the implementation phase, it is proposed that discussions with institutes like National Small Industries Corporation shall be undertaken to further explore areas of collaboration and improvement for the proposed incubation centre.

Figure 38: Process for Selection of Projects for Incubation at the TC




Following is the list of machines identified for the incubation centre of the new TC at Bhiwadi. The budgetary cost (landing cost) of these machines is approximately estimated at INR 287.7 lakhs.

Table 31: Proposed list of machines for incubation centre

| SN | Machine | Nos. | Budgeted cost (INR lakhs) | Total (INR lakhs) |
|---|---|---|---|---|
| 1 | Mech. Press | 2 | 1 | 2 |
| 2 | Hyd. Press | 1 | 4 | 4 |

| SN | Machine | Nos. | Budgeted cost (INR lakhs) | Total (INR lakhs) |
|---|---|---|---|---|
| 3 | Heat Treatment Furnace | 1 | 10 | 10 |
| 4 | Hand Injection Moulding M/c | 2 | 2 | 4 |
| 5 | Injection Moulding M/c | 1 | 30 | 30 |
| 6 | CNC Milling 5 axis (minimum specifications) | 1 | 100 | 100 |
| 7 | CNC Turn Mill | 1 | 50 | 50 |
| 8 | CNC-EDM+WEDM | 2 | 25 | 50 |
| 9 | Surface Grinding | 1 | 4 | 4 |
| 10 | Cyl-grinding | 1 | 10 | 10 |
| 11 | Misc. Machines and Equip (like drill, benches etc.) | 1 | 10 | 10 |
| 12 | Contingency @5% | | | 13.7 |
| | Total | 14 | 246 | 287.7 |

It is recommended that no operators will be appointed in the incubation centre and incubators will operate machines with the support of trainees. In addition to the above dedicated machines, following facilities will also be available to the Incubation centre on need basis:

- Design and Consulting department facility (computers, hardware, software etc.)
- Reserve capacity within the training centre for fulfilment of orders

## 10.4 Training

The TC at Bhiwadi will provide professional training in various courses with focus on auto and general engineering. The TC will be able to produce highly skilled technical workforce, with greater career prospects in the automotive service and general engineering industry. The duration of courses will be both short and long term, ranging from 1 month to 36 months in various specialisations like; tool making and metal cutting, maintenance, CNC manufacturing, CAD/ CAM, advance Welding, Car/bike service training, Information Technology (part time courses), industrial and process automation etc. The course curriculum for the short term and long term courses of the TC would be reviewed and updated every 3 years based on industry needs and trends. The batch size, number of batches per annum and respective fees has been decided on the basis of capacity of existing TCs and NCVT norms. A soft skill lab having for training in English language and communication facilities will be established in the TC to cater to the various courses. 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 specialisations. The total capacity intake is expected to reach approximately 7,900 trainees over 5 years. The detail of courses in various specialisations is given below:

Table 32: Details of specialisation, courses, duration and capacity intake

| SN | Specialisation | Course name | Duration (months) | Batch size | No. of batches / year | Annual intake |
|---|---|---|---|---|---|---|
| 1 | Tool Making and Metal Cutting | Diploma in Tool & Die making | 48 | 120 | 1 | 120 |
| | | Machinist | 12 | 60 | 4 | 240 |
| | | Post Diploma in Tool Design | 12 | 30 | 2 | 60 |
| | | Post Diploma in Tool Manufacturing | 12 | 30 | 2 | 60 |
| | | Advance Diploma in CNC-Programming & Operation | 6 | 30 | 4 | 120 |
| | | Master of CAD/CAM/CNC | 4 | 30 | 3 | 90 |
| | | | | | | |
| 2 | Maintenance | Machine Maintenance-mechanical | 3 | 20 | 4 | 80 |
| | | Maintenance Technician | 3 | 20 | 4 | 80 |
| | | Machine Maintenance-mechanical (Part Time) | 6 | 20 | 2 | 40 |
| | | Maintenance Technician (Part Time) | 6 | 20 | 2 | 40 |

| SN | Specialisation | Course name | Duration (months) | Batch size | No. of batches / year | Annual intake |
|---|---|---|---|---|---|---|
| | | | | | | |
| 3 | CNC Manufacturing, CAD/ CAM | 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 ENGINEER (Full Time) | 2 | 30 | 12 | 360 |
| | | CAD/CAM/CNC ENGINEER (Part Time) | 4 | 30 | 6 | 180 |
| | | CAD Modelling with different softwares (Full Time) | 1 | 30 | 24 | 720 |
| | | 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 | 10 | 4 | 40 |
| | | TIG welding (Part Time) | 3 | 10 | 8 | 80 |
| | | MiG welding (Full Time) | 1.5 | 10 | 8 | 80 |
| | | MiG welding (Part Time) | 3 | 10 | 8 | 80 |
| | | Spot Welding (Full Time) | 1.5 | 10 | 2 | 20 |
| | | Spot Welding (Part Time) | 3 | 10 | 4 | 40 |
| | | Stainless Steel & Aluminium welding (Full Time) | 1.5 | 10 | 2 | 20 |
| | | Stainless Steel & Aluminium welding (Part Time) | 3 | 10 | 4 | 40 |
| | | Welding-NCVT | 12 | 20 | 1 | 20 |

| SN | Specialisation | Course name | Duration (months) | Batch size | No. of batches / year | Annual intake |
|---|---|---|---|---|---|---|
| | | | | | | |
| 5 | Car/bike service training | Car Servicing electro-mechanical | 3 | 30 | 4 | 120 |
| | | Basic Auto electronics | 3 | 30 | 4 | 120 |
| | | Servicing of Auto Air Conditioning | 3 | 30 | 4 | 120 |
| | | Bike Servicing electro-mechanical | 3 | 30 | 4 | 120 |
| | | Car Servicing electro-mechanical (Part Time) | 6 | 30 | 2 | 60 |
| | | Basic Auto electronics (Part Time) | 6 | 30 | 2 | 60 |
| | | Servicing of Auto Air Conditioning (Part Time) | 6 | 30 | 2 | 60 |
| | | Bike Servicing electro-mechanical (Part Time) | 6 | 30 | 2 | 60 |
| | | | | | | |
| 6 | Information Technology (Part Time Courses) | Basic computer and Hardware (Part Time - 4 hrs) | 2 | 20 | 20 | 400 |
| | | Advanced Hardware & Networking (Part Time - 4 hrs) | 4 | 20 | 10 | 200 |
| | | | | | | |
| 7 | Industrial and process Automation | Industrial Hydraulics | 1 | 20 | 12 | 240 |
| | | Industrial pneumatics | 1 | 20 | 12 | 240 |
| | | PLC Programming | 1 | 20 | 12 | 240 |
| | | Automation Technician | 4 | 20 | 3 | 60 |
| | | Industrial automation design | 4 | 20 | 3 | 60 |
| | | Diploma in Mechatronics | 36 | 60 | 1 | 60 |
| | | | | | | |
| | | Total | | | | 7,870 |

Table 33: Details of courses

| SN | Specialisation | Course name | Fee/ student (INR) | Capacity intake | Minimum Qualification | Classrooms | | Laboratories | | Workshops | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) |
| 1 | Tool Making and Metal Cutting | Diploma in Tool & Die making | 80,000 | 120 | 10th Pass and ITI for lateral | 1 | 75 | 3 | 162 | 1 | 756 |
| | | Machinist | 30,000 | 240 | 10th Appeared/ | 1 | 75 | 2 | 108 | | |
| | | Post Diploma in Tool Design | 50,000 | 60 | Dip/Degree | | | 1 | 54 | | |
| | | Post Diploma in Tool Manufacturing | 50,000 | 60 | Dip/Degree | | | 1 | 54 | | |
| | | Advance Diploma in CNC-Programming & Operation | 25,000 | 120 | Dip/Deg | | | 1 | 54 | | |
| | | Master of CAD/CAM/CNC | 20,000 | 90 | Degree | | | 1 | 54 | | |
| | | | | | | | | | | | |
| 2 | Maintenance | Machine Maintenance-mechanical | 15,000 | 80 | Diploma | | | 1 | 54 | | |
| | | Maintenance Technician | 10,000 | 80 | ITI-FIT/TUR/Mach | | | 1 | 54 | | |
| | | Machine Maintenance-mechanical (Part Time) | 18,000 | 40 | Diploma | | | | | | |

| SN | Specialisation | Course name | Fee/ student (INR) | Capacity intake | Minimum Qualification | Classrooms | | Laboratories | | Workshops | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) |
| | | Maintenance Technician (Part Time) | 12,000 | 40 | ITI-FIT/TUR/Mach | | | | | | |
| | | | | | | | | | | | |
| 3 | CNC Manufacturing, CAD/ CAM | 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 | | |
| | | 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) | 10,000 | 180 | Pursuing DIP/Degree/Working | | | | | | |
| | | CAD Modelling with different softwares | 6,000 | 720 | DIP/Deg | | | 2 | 108 | | |

| SN | Specialisation | Course name | Fee/ student (INR) | Capacity intake | Minimum Qualification | Classrooms | | Laboratories | | Workshops | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) |
| | | (Full Time) | | | | | | | | | |
| | | CAD Modelling with different softwares (Part Time) | 7,000 | 720 | DIP/Deg | | | | | | |
| | | Computer Integrated Manufacturing (CIM) | 7,000 | 720 | Deg | | | | | | |
| | | | | | | | | | | | |
| 4 | Advance Welding | Basic Arc and Gas welding (Full Time) | 12,000 | 80 | 10th | 1 | 75 | | | 1 | 756 |
| | | Basic Arc and Gas welding (Part Time) | 10,000 | 80 | Pursuing ITI/Industrial workers | | | | | | |
| | | TIG welding (Full Time) | 6,000 | 40 | ITI/Basic course | | | | | | |
| | | TIG welding (Part Time) | 6,000 | 80 | Pursuing ITI/Industrial workers | | | | | | |
| | | MiG welding (Full Time) | 6,000 | 80 | ITI/Basic course | | | | | | |
| | | MiG welding (Part Time) | 6,000 | 80 | Pursuing ITI/Industrial workers | | | | | | |
| | | Spot Welding (Full | 8,000 | 20 | ITI/Basic course | | | | | | |

| SN | Specialisation | Course name | Fee/ student (INR) | Capacity intake | Minimum Qualification | Classrooms | | Laboratories | | Workshops | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) |
| | | Time) | | | | | | | | | |
| | | Spot Welding (Part Time) | 8,000 | 40 | 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 | | | | | | |
| | | | | | | | | | | | |
| 5 | Car/ bike service training | Car Servicing electro-mechanical | 10,000 | 120 | ITI | 1 | 75 | 2 | 108 | | |
| | | Basic Auto electronics | 10,000 | 120 | ITI | | | | | | |
| | | Servicing of Auto Air Conditioning | 10,000 | 120 | ITI | | | | | | |
| | | Bike Servicing electro-mechanical | 10,000 | 120 | 10th | | | | | | |
| | | Car Servicing electro-mechanical (Part Time) | 12,000 | 60 | ITI | | | | | | |

| SN | Specialisation | Course name | Fee/ student (INR) | Capacity intake | Minimum Qualification | Classrooms | | Laboratories | | Workshops | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) |
| | | Basic Auto electronics (Part Time) | 12,000 | 60 | ITI | | | | | | |
| | | Servicing of Auto Air Conditioning (Part Time) | 12,000 | 60 | ITI | | | | | | |
| | | Bike Servicing electro-mechanical (Part Time) | 12,000 | 60 | 10th /ITI | | | | | | |
| | | | | | | | | | | | |
| 6 | Information Technology (Part Time Courses) | Basic computer and Hardware (Part Time - 4 hrs) | 8,000 | 400 | 10th/ITI/12th | 1 | 75 | 2 | 108 | | |
| | | Advanced Hardware & Networking (Part Time - 4 hrs) | 12,000 | 200 | 12th/DIP/Degree | | | | | | |
| | | | | | | | | | | | |
| 7 | Industrial and process Automation | Industrial Hydraulics | 6,000 | 240 | 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 | | |
| | | Automation Technician | 12,000 | 60 | ITI | | | 1 | 54 | | |
| | | Industrial automation design | 15,000 | 60 | Dip/Deg | | | | | | |

| SN | Specialisation | Course name | Fee/ student (INR) | Capacity intake | Minimum Qualification | Classrooms | | Laboratories | | Workshops | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) | Nos. | Area (Sq. mt.) |
| | | Diploma in Mechatronics | 1,20,000 | 60 | 10th | 1 | 75 | 2 | 108 | | |
| | | | | | | | | | | | |
| | | Total | | 7,870 | | 8 | 600 | 30 | 1,620 | 3 | 2,268 |

The TC will have adequate installed capacity of infrastructure like machines, software, computers etc. required to provide training to the proposed student capacity under various specialisations. The estimated cost of these machines is approximately INR 2,748 lakhs. The following table provides the details of the same;

Table 34: Proposed list of machines for training

| SN | Training Machines | Nos. | Budgeted Cost (INR lakhs) | Total (INR lakhs) |
|---|---|---|---|---|
| 1. | Con-Milling-V-H-U | 10 | 12 | 120 |
| 2. | Con-Lathe | 10 | 4 | 40 |
| 3. | Surface Grinding | 5 | 4 | 20 |
| 4. | Cyl-grinding | 3 | 10 | 30 |
| 5. | Pedestal Grinding | 3 | 1 | 3 |
| 6. | Drills | 5 | 1 | 5 |
| 7. | Tool & Cutter Grinder | 1 | 20 | 20 |
| 8. | Work benches | 30 | 0.4 | 12 |
| 9. | CNC-Milling | 15 | 30 | 450 |
| 10. | CNC -Lathe | 15 | 20 | 300 |
| 11. | CNC-Simulation Modules | 30 | 2.5 | 75 |
| 12. | CNC- Mill+Turn-Table Top | 2 | 15 | 30 |
| 13. | CIM Lab With Roba | 2 | 50 | 100 |
| 14. | Computers+ (for CAD/CAM) | 600 | 0.5 | 300 |
| 15. | Cad/Cam software Licence | 300 | 0.3 | 90 |
| 16. | CMM+ metrology lab equip | 1 | 50 | 50 |
| 17. | Welding workshop for 20 | 1 | 80 | 80 |
| 18. | Maintenance lab-Mech | 1 | 50 | 50 |
| 19. | Auto Electronics servicing lab | 1 | 150 | 150 |
| 20. | Tech aids (Audio Visual) | 30 | 1 | 30 |
| 21. | Tech aids (Smart Board) | 8 | 1 | 8 |
| 22. | Sub total | | | 1,963 |
| 23. | Basic automation Lab for 20 | 1 | 200 | 200 |
| 24. | Advance Automation lab for 20 | 1 | 250 | 250 |
| 25. | Furniture for labs | 30 | 0.1 | 90 |
| 26. | Classroom Furniture @ 60 seats | 8[39] | 0.05 | 24 |
| 27. | Sub total | | | 564 |
| 28. | Transformer @2000KVA | | | 20 |

[39] One of the Tech aids (Smart Board) will be used as communication/ language lab on need basis

| SN | Training Machines | Nos. | Budgeted Cost (INR lakhs) | Total (INR lakhs) |
|---|---|---|---|---|
| 29. | DG Set @ 500KVA | | | 40 |
| 30. | UPS (for training & production) | | | 25 |
| 31. | Sub total | | | 90 |
| 32. | Total | | | 2,617 |
| 33. | Misc, Unforeseen & Contingency | | | 130.85 |
| | Grand Total | | | 2747.85 |

## 10.5 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 standardisation 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 Bhiwadi TC would have a dedicated professional wing to assist MSMEs by providing consultancy services in the field of product and tool design, manufacturing and innovations for improved quality and productivity. 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, analysis software and 3D printing. 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 35: Areas of consulting and estimated revenue

| SN | Consulting Stream | Suggestive Revenue (in INR Lakhs) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year1 | Year 2 (17-18) | Year 3 (18-19) | Year 4 (19-20) | Year 5 (growth at 50%) | Year 6 (growth at 40%) | Year 7 (growth at 40%) | Year 8 (growth at 40%) | Year 9 (growth at 40%) | Year 10 (growth at 40%) |
| 1. | Design Support* (incl. Product Design) | 0 | 48.48* | 77.56 | 96.96 | 116.35 | 135.74 | 149.31 | 164.25 | 180.67 | 198.74 |
| 2. | Engineering Solutions | 0 | 6 | 7.8 | 10.14 | 15.21 | 21.29 | 29.81 | 41.73 | 58.43 | 81.80 |
| 3. | Quality System Support | 0 | 0 | 12 | 18 | 27 | 37.80 | 52.92 | 74.08 | 103.72 | 145.21 |
| 4. | Project Consultancy (curriculum develop, community colleges, trainers etc.) | 0 | 0 | 12 | 36 | 54 | 75.60 | 105.84 | 148.17 | 207.44 | 290.42 |
| 5. | Productivity Club | 0 | 0 | 3 | 4.5 | 6.75 | 9.45 | 13.23 | 18.52 | 25.93 | 36.30 |
| 6. | Other Consulting assignments | 0 | 10 | 15 | 22.5 | 33.75 | 47.25 | 66.15 | 92.61 | 129.65 | 181.51 |
| Total | | | 64.48 | 127.36 | 188.10 | 253.06 | 327.13 | 417.27 | 539.38 | 705.86 | 934.00 |

*The suggestive revenue from design support during 2017-18 has been estimated on the basis of usage of CAD Software like CATIA, UG etc. The TC is provisioned to have 25 numbers of such software packages which with an average estimated rate/hour of INR 400. So with installed capacity @ 80%, the revenue from this stream during one shift of operation is estimated to be around 25*8*80%*400 = INR 64,000. Assuming 25% capacity utilisation for 300 days during 2nd year (2017-18), the total estimated revenue from CAD Software like CATIA, UG packages is INR 48 lakhs. Similarly, revenue assumptions from other engineering analysis software like ANSYS, mouldflow, autoform, PAMstamp etc. has been estimated to be around INR 48,000. Hence, the total estimated revenue from design support is around INR 48.48 lakhs for year 2017-18.

Table 36: Proposed areas of consulting

| Consulting Stream | Focus Area (Recommended) |
|---|---|
| Design Support (incl. Product Design) | ▶ Tool design in the field of sheet metal, press tool and plastic moulds.<br>▶ Support MSMEs in designing products to be supplied to OEMs. This will require 3D modelling and may include reverse engineering etc. |
| Engineering Solutions | ▶ 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 | ▶ Supporting MSMEs in establishing quality systems, quality improvement and acquiring necessary certifications |
| Project Consultancy (curriculum develop, community colleges, trainers etc.) | ▶ Supporting training institutes in curriculum develop, community colleges, trainers etc.<br>▶ 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 agencies like Rajasthan Skill and Livelihood Development Corporation etc. |
| Productivity Club | ▶ To handhold MSMEs in improving productivity on a long term basis (1-3 years) on a membership basis |

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

Table 37: Estimated revenue from consulting

| Consulting Stream | Approximated Revenue Estimation |
|---|---|
| Design Support (incl. Product Design) | ▶ Revenue estimation from CAD Software like CATIA, UG etc. - 25 Nos. and hourly rate of Rs400. This is initially estimated to run in 1 shift (8 hrs.) at 25% capacity. The installed capacity assumed to be 80% running for 300 days a year. Therefore the calculation would be, 25%*[(25*400*8*300)*80%] = INR 48,00,000 per year<br>▶ Revenue from other Engg. Analysis software like ANSYS, mouldflow, autoform, PAMstamp etc. estimated to be INR 48,000 |
| Engineering Solutions | Rate of INR 250/hr with an estimation of minimum requirement 100 hours per product. We have estimated initially at least 2 products per |

| Consulting Stream | Approximated Revenue Estimation |
|---|---|
| | month. Therefore, 2*250*100 = INR 50,000/month (50,000*12=6,00,000/year) |
| Quality System Support | Estimated rate of INR 50,000 per unit. We have estimated serving atleast 2 units a month initially. Therefore, 2*50,000*12 = INR 12,00,000/year |
| Project Consultancy (curriculum develop, community colleges, trainers etc.) | 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 |
| Productivity Club | To start with, fee of INR 10,000 per from 30 units per year. Therefore, 30*10,000 = INR 3,00,000 |

## 10.6 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.

## 10.7 Industry collaborations and associations

The objective of this section to understand the potential areas of collaboration and association the new TC at Bhiwadi can form and further support MSMEs. The key stakeholders for Bhiwadi TC and respective areas for tie up have been mapped subsequently.

Figure 39: Potential areas of collaborations or association with key stakeholders

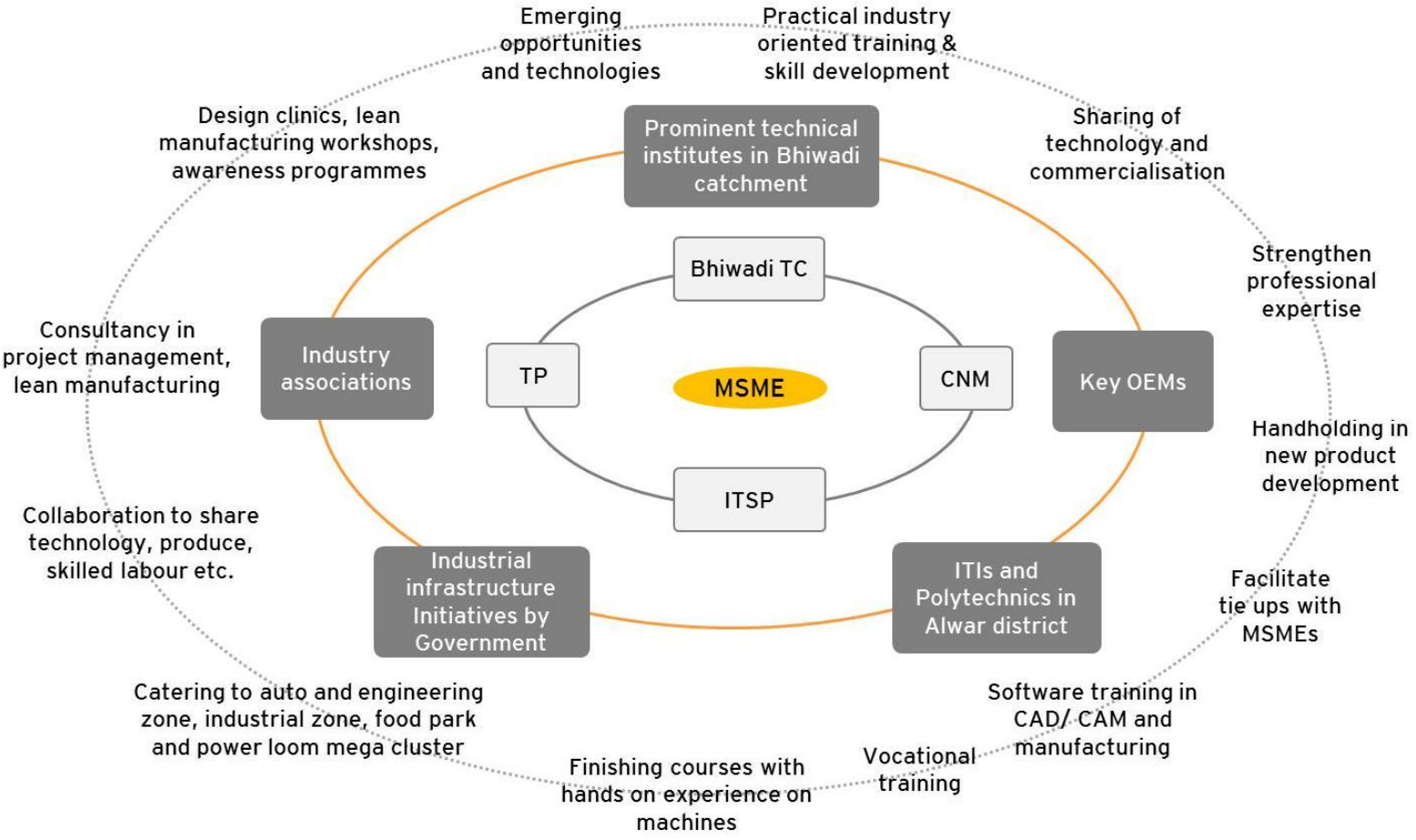


Table 38: Potential areas of collaborations and association with key stakeholders

| SN | Stakeholder type | Name | Potential areas of Collaborations and association for Bhiwadi TC[40] |
|---|---|---|---|
| 1 | Prominent technical institutes in Bhiwadi catchment | Delhi Institute of Tool Engineering (DITE), Wazirpur and Okhla | ► DITE is a centre of excellence for tool engineering. The Bhiwadi TC can collaborate with DITE with the objective to strengthen its professional expertise and skilled manpower in the field of tool engineering.<br>► Further, emerging opportunities and technologies can be jointly met with respect to the global revolution in tool engineering. |
| | | Indian Institute of Technology (IIT), Delhi | ► TC can tie up with these prominent institutes for student exchange programmes to provide better practical industry oriented training and skill development.<br>► TC can become partner for commercialisation of the research by these institutes in auto and tool engineering and help in technology sharing among MSMEs through CNM.<br>► To form technology collaboration with these institutes for technology innovation through TP. |
| | | Indian Institute of Technology (IIT), Jodhpur | |
| | | Netaji Subhas Institute of Technology (NSIT), Delhi | |
| | | National Institute of Technology (NIT), Jaipur | |
| | | BITS (Birla Institute of Technology and Science), Pilani | |
| | | BML Munjal University, Gurgaon, Haryana | |
| | | Delhi Technology University, Delhi | |
| 2 | Key OEM's | Honda Siel Cars India Ltd. | TC can,<br>► Provide handholding in new product development.<br>► Facilitate tie ups with MSMEs for production outsourcing etc.<br>► Support Tier I/ II suppliers to meet OEM requirements.<br>► Provide tailor made training programmes to the OEMs. |
| | | Motherson Sumi Systems Ltd. | |
| | | Honda Motorcycle & Scooter India | |
| | | Ashok Leyland | |
| | | Eicher Motors Ltd. | |

[40] The TC will take support from Technology Partner and Cluster Network Manager in mentioned areas wherever required

| SN | Stakeholder type | Name | Potential areas of Collaborations and association for Bhiwadi TC[40] |
|---|---|---|---|
| | | Hero Motor Corp | |
| | | Maruti Suzuki | |
| | | Tata Motors | |
| | | Mahindra Renault | |
| | | Hindustan Motors | |
| | | Bajaj Motors | |
| | | Harley Davidson | |
| 3 | ITI and Polytechnics in Alwar district | ITI, Bhiwadi | The Bhiwadi TC can tie up with the ITI /Polytechnics/ engineering colleges in Alwar district to provide training to the students for the development of various skill sets like;<br>► Software training to its students in CAD/ CAM and manufacturing.<br>► During summer vacation, the TC can conduct vocational training programmes for students.<br>► TC can further conduct finishing courses for students post completion of their diploma/ITIs. Finishing courses provide for sufficient hands on experience on machines, which helps students develop expertise in machining and increase the employability of the students.<br>► TC can help in development of similar finishing courses to train students in the premises of these institutes. |
| | | Bhiwadi College of Polytechnic | |
| | | Govt. Polytechnic College, Alwar | |
| | | Govt. Polytechnic College, Neemrana | |
| | | Sidhi Vinayak Polytechnic, Alwar | |
| | | Laxmi Devi Institute of Engineering & Technology, Alwar | |
| | | Bansur Polytechnic College, Alwar | |
| | | Dholaplash Polytechnic College, Alwar | |
| | | Dr. Radha Krishan Polytechnic Institute, Alwar | |
| | | Ch. Charan Singh Institute of Engg. & Tech, Alwar | |
| | | Maharana Pratap Institute of Polytechnic, Bhiwadi, Alwar | |
| | | MJF Polytechnic College, Alwar | |
| | | Institute of Engineering & Technology, Alwar | |

| SN | Stakeholder type | Name | Potential areas of Collaborations and association for Bhiwadi TC[40] |
|---|---|---|---|
| | | St. Margaret Engineering College, Neemrana, Alwar | |
| | | Alwar Institute of Engineering & Technology, Alwar | |
| | | Siddhi Vinayak College of Science & Higher Education, Alwar | |
| | | Siddhi Vinayak Engineering & Management College, Alwar | |
| | | Northern Institute of Engg. & Technical Campus, Alwar | |
| | | Laxmi Devi Institute of Engineering & Technology, Alwar | |
| | | Modern Institute of Technology & Research Centre, Alwar | |
| 4 | Industrial infrastructure Initiatives by Government | CIPET (Central Institute of Plastics Engineering & Technology) - 2 Tool Rooms at Murthal (Harayana) and Jaipur (Rajasthan) | ▶ The Bhiwadi TC can collaborate with CIPET with the objective to strengthen its expertise in tool manufacturing, research and development etc.<br>▶ Existing infrastructure of the auto and engineering zone, industrial zone, food park and power loom mega cluster, can be leveraged by new TCs by catering to the respective industries.<br>▶ TC can further collaborate with these zones/ clusters above to share technology, produce, skilled labor etc.<br>▶ TP can guide them in different high-end technologies for manufacturing and other process.<br>▶ These clusters will have easy access to market. CNM can collaborate with them in future for different initiatives. |
| | | A special auto and engineering zone has also been developed in the Pathredi Industrial Area and another special zone is being planned in Bhiwadi. | |
| | | Agro Food Parks - Matsya IA at Alwar | |
| | | Japanese zone in Neemrana. | |
| | | Ministry Of Textile - A Mega Cluster for power loom in Bhilwara in Rajasthan sanctioned during 2010-11. | |
| | | Export Promotion Industrial Parks have been set up at Sitapura in Jaipur, Neemrana in Alwar and Boranada in | |

| SN | Stakeholder type | Name | Potential areas of Collaborations and association for Bhiwadi TC[40] |
|---|---|---|---|
| | | Jodhpur.<br>ELCINA electronics manufacturing cluster | |
| 5 | Industry associations | Prominent industry associations include; BMA, NIA, ACMS, BCCI, GIA,FSIA, MIWA | ▶ TC can conduct various initiatives with industry associations and MSME members; design clinics, additive manufacturing and lean manufacturing workshops, awareness programmes such as quality management system/quality management tools etc.<br>▶ During these workshops, TC can educate about the details of different promotional policies and schemes of DC, MSME, Govt. of India (e.g. National Manufacturing Competitiveness Programme) for benefit and sustainable growth of MSMEs.<br>▶ TC can also provide consultancy services in the areas of project management, lean manufacturing etc. to these associations and MSME members. |

## 10.8 Technology collaboration

TC at Bhiwadi 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 (specially automotive and precision 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 auto OEMs or automotive and automotive 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 are – CMRI, SAMEER, NML, IISc 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 labor 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.

# Quality System

# 11. Quality system

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

Table 39: Indicative certifications of quality systems

| Name of certification | Area | Details |
|---|---|---|
| ISO 9001 | Quality Management System | ▶ This would help to monitor, control, and improve quality of the TC<br>▶ It is a series of standards that define, establish, and maintain a quality assurance system for manufacturing and service industries<br>▶ ISO 9001 deals with the requirements that organizations wishing to meet the standard must fulfil |
| ISO 14000 | Environmental Management System | ▶ Will help to address various aspects of environmental management of the TC<br>▶ It provides practical tools to identify and control environmental impact and constantly improve their environmental performance<br>▶ 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 | ▶ For quality professional practice, performance and enhance transparency<br>▶ 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 | ▶ Gives requirement for energy management systems<br>▶ Establishes framework for industrial plants; commercial, institutional and government facilities and entire organisations to manage energy usage |
| OHSAS 18001 | Occupational Health and Safety standard | ▶ Is an internationally-applied British Standard for occupational health and safety management systems<br>▶ 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 |
| TS 16949 | Automotive | ▶ Is an international Quality Management Standard specifically for |

| Name of certification | Area | Details |
|---|---|---|
| | Industry Quality Management Standard | the Automotive Industry to improve quality and assure the integrity of supplies to the industry<br>▶ Results in substantial improvements in all aspects of quality, delivery and overall efficiency throughout the supply chain<br>▶ It prescribes for technical specification aiming to the development of a quality management system that provides for continual improvement, emphasizing defect prevention and the reduction of variation and waste in the supply chain |

▶ 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 Bhiwadi TC 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 18.7 for reference) in view of the same. Also leading practises form international training institutes have also been considered. The TC will be built on area of around 10.08 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.
- 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 plantetc. 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 –mechanical and electrical, electrician, store keeper 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 reduces 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 40: Details of proposed infrastructure

| Details | Nos. | Total Area (Sq. mt.) |
|---|---|---|
| Production Block | | 4,500 |
| Stores including raw material | | 250 |
| Disposal yard | | 100 |
| Trial Room | | 250 |
| Heat Treatment | | 200 |
| Tool Assembly | | 700 |
| Machine Shop | | 2,000 |
| Metrology & Inspection | | 500 |
| Production Office (Cabins, Documentation & others) | | 250 |
| Design Office | | 200 |
| Toilet Block | | 50 |
| Training Block | | 5,344 |
| Sr. Manager/HoD Room | 1 | 54 |
| Training Office | | |
| Manager Room | 1 | 54 |
| Reception & Counselling | | 108 |
| Faculty Room | | 216 |
| Library with facility | 1 | 108 |
| Multi-purpose hall for examination/drawing/reading room | 1 | 216 |

| Details | Nos. | Total Area (Sq. mt.) |
|---|---|---|
| Classrooms | 8 | 600 |
| Labs | 30 | 1,620 |
| Workshops, including incubation centre | 3 | 2,268 |
| Toilet | | 100 |
| Admin Block | | 624 |
| GM Office & Sect | | 108 |
| DGM Office | | 54 |
| Purchase Officer cabin | | 54 |
| Accounts cabin | | |
| HR & Admin | | |
| Marketing | | 54 |
| Reception Area | | 108 |
| Placement Cell with VC | | 54 |
| Record Room | | 54 |
| IT Dept/Server Room | | 54 |
| Manager Admin Cabin | | 54 |
| Toilet Block | | 30 |
| Conference Rooms | | 638 |
| Conference Hall 1 (for 30 people) | 1 | 108 |
| Conference Hall 2 (for 150 people) | 1 | 400 |
| Toilet | | 30 |
| Lunch Area | | 100 |
| Others | | 2,285 |
| Staff Qtrs (60sqmt/ quarter) | 8 | 480 |
| Hostel dining area (incl. kitchen, toilet, store etc.) | 1 | 300 |
| Canteen (incl. toilets, kitchen, store, common facility etc.) | | 1,200 |
| Parking | | |
| Utilities Room - DG Set, Transformer, UPS | | 250 |
| Security Room (incl. toilet) | | 30 |
| Bank Counter | | 25 |
| Total | | 14,459 |

- 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 1,500 to 1,550 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 25% of the above mentioned capacity. Therefore, it is proposed to develop the hostel capacity for around 396 trainees and out of which 15% (around 60) will be reserved for female trainees. The hostel building has been planned to be G + 3 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. 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 41: Details of proposed infrastructure for hostel

| Hostel | Category | Floors | Trainees per Room | Number of trainees | Area per trainees (sq. mt.) | Total Area (sq. mt.) |
|---|---|---|---|---|---|---|
| Hostel No.1 | Boys | G+3 | 4 | 240 | 8 | 1,920 |
| Hostel No.2 | Boys | G+3 | 2 | 96 | 10 | 960 |
| Hostel No.3 | Girls | G+3 | 2 | 60 | 10 | 600 |
| Total | | | | 396 | | 3,480 |

Note: All viable options will be studied to decide on the design of the proposed block for hostel and staff quarters. The number of floors for these facility buildings and all other associated details can be further finalised with the appointment of CMC for development of the campus for TC.

As per the details of proposed infrastructure given in above two tables, the construction of the Bhiwadi TC will include development of 17,939 (14,459 + 3,480) square metre of built up area in total. Per square metre cost of construction has been estimated to be INR 22,000. Further, the tentative cost for development of 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 for entire campus has been estimated to be around INR 300 lakhs. Further discussion has already been carried out with officials of RIICO for development of boundary wall which is estimated to cost around INR 100 lakhs. The detail for development of campus infrastructures is as follows;

Table 42: Cost for development of campus infrastructures

| SN | Hostel | Cost (in INR lakh) |
|---|---|---|
| 1. | Cost of development of build-up area @ 22,000 per sq. mt. for 17,939 sq. mt. | 3,946.58 |
| 2. | 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 | 400 |
| 3. | Total | 4,346.58 |
| 4. | Contingency @ 5% | 217.33 |
| 5. | Grand total | 4,563.91 |

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

Table 43: 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 | 0.60 | 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 | 2 | 3 | 6 |
| 9 | Vehicle | 2 | 12.5 | 25 |
| 10 | Preliminary and Pre-operative expenses | 1 | 40 | 40 |
| 12 | Miscellaneous | | | 50 |
| 13 | Subtotal | | | 385 |
| 14 | Contingency @ 5% | | | 19.25 |
| | Total | | | 404.25 |

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 conductive 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.

Figure 40: TC layout plan[41]


[41] The given TC layout is tentative and the site plan will be further finalized in more detail after the appointment of Construction Management Consultant (CMC)

# Expenditure pattern

# 13. Expenditure pattern

## 13.1 Capital expenditure

Total capital expenditure to the tune of around INR 12,912 lakhs is envisaged for the setting up of new TC at Bhiwadi. Summary of the Capital Expenditure is provided as below:

Table 44: Capital expenditure

| Capex | Cost (INR Lakhs) |
|---|---|
| Production Machinery and equipment | 4,908 |
| Training machines and equipment | 2,748 |
| Other infrastructure | 404 |
| Incubation centre machines and equipment | 288 |
| Building and construction | 4,564 |
| Total Capex including contingency | 12,912 |

In addition to the above mentioned capital expenditure, pre-operative expenses to the tune of INR 258 lakhs will be incurred towards consultancy fees, obtaining clearances and approvals.

### 13.1.1 Plant and machinery

Total expenditure on machines to the tune of around INR 8,348 lakhs is envisaged for the setting up of new TC at Bhiwadi.

Table 45: Plant & Machinery

| Capex | INR Lakhs |
|---|---|
| Total Plant and Machinery | 7,950 |
| Contingency @ 5% of capex | 398 |
| Total Capex including contingency | 8,348 |

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 such as Maruti Suzuki, Hero Motocorp etc.,
- Site visits and discussions with local industry and industry associations such as RIICO, Bhiwadi Manufacturing association.
- Inputs from Office of DC MSME

Inputs as per the World Bank Environment and Safety requirements

### 13.1.2 Land & building cost

Bhiwadi has around 10 acres of land available for setting up of the facility of the TC.

Table 46: Land & building cost

| SN | Hostel | Cost (in INR lakh) |
|---|---|---|
| 1. | Cost of development of build-up area @ 22,000 per sq. mt. for 17,939 sq. mt. | 3,946 |
| 2. | 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 | 400 |
| 3. | Total | 4,346 |
| 4. | Contingency @ 5% | 217 |
| 5. | Grand total | 4,563 |

## 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

Table 47: 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 Bhiwadi. 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 48: 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 Prod. & 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 49: 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 |

| Top Management | Designation | Monthly salary (INR) | Nos. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 Manitenance | 82,777 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 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 |

| Top Management | Designation | Monthly salary (INR) | Nos. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 58 |
| Number of employees on temporary contract | | | | | | | | | | | | | | |
| | Training | 15,000 | - | 3 | 21 | 44 | 75 | 108 | 119 | 131 | 144 | 151 | 159 | 159 |
| | Contractual Employees (Production) | 10,000 | | | 4 | 10 | 10 | 10 | 12 | 12 | 12 | 12 | 12 | 12 |

# 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 2015-2016. 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. The infrastructure development will coincide with the arrival of machines to be able to start the operations as planned.

Table 50: Key assumptions

| | | |
|---|---|---|
| Start of Project | 1-Sep-15 | (2015-16) |
| Construction period (Months) | 15 | |
| Commencement of operation, date | 1-Dec-16 | |
| 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 51: Production assumptions

| | Machine | Estimated Machine Rate/Hour* | Shift | Hours |
|---|---|---|---|---|
| 1. | CNC Milling-5axis | 4,500 | 3 | 24 |
| 2. | CNC Milling-3axis | 2,500 | 3 | 24 |
| 3. | Die spotting press | 1,500 | 3 | 1.2 |
| 4. | Hydraulic press | 1,000 | 3 | 3 |
| 5. | Mechanical press | 3,00 | 3 | 24 |
| 6. | Wire EDM | 1,500 | 3 | 24 |
| 7. | EDM | 1,000 | 3 | 24 |
| 8. | Injection Moulding machine | 1,500 | 2 | 16 |
| 9. | CNC Lathe | 5,00 | 3 | 24 |
| 10. | Gun drilling machine | 2,50 | 2 | 16 |
| 11. | Radial drill machine | 150 | 3 | 1.2 |
| 12. | Surface Grinding | 300 | 1 | 8 |
| 13. | Cyl Grinding | 300 | 2 | 16 |
| 14. | Vacuum Heat treatment plant | Estimated rate per | NA | NA |

| | Machine | Estimated Machine Rate/Hour* | Shift | Hours |
|---|---|---|---|---|
| | | week is INR 60,000 | | |
| 15. | CMM | 2,000 | 2 | 16 |
| 16. | CAD Software like CATIA, UG etc | 10,000 | 1 | 8 |
| 17. | Engg. Analysis software like ANSYS, mould flow, autoform, PAMstamp etc. | 2,000 | 1 | 0.4 |
| 18. | Additive Manufacturing/3D printing/RPT | 3,000 | 1 | 8 |

| Machine utilisation | Year | |
|---|---|---|
| 2nd year of production | 2018-19 | 25% |
| 3rd year of production | 2019-20 | 40% |
| 4th year of production | 2020-21 | 50% |
| 5th year of production | 2021-22 | 60% |
| 6th year of production | 2022-23 | 70% |
| year on increase in machine utilisation 7th year onwards | 2023-24 | 10% |

| SN | Incubation Centre Machines | Nos | Machine Rate/Hr | Shifts | Total Hours |
|---|---|---|---|---|---|
| 1. | Mech Press | 2 | 150 | 2 | 16 |
| 2. | Hyd. Press | 1 | 150 | 2 | 16 |
| 3. | Hand Injection Moulding M/c | 2 | 100 | 2 | 16 |
| 4. | Injection Moulding M/c | 1 | 200 | 2 | 16 |
| 5. | CNC Milling 5 axis (minimum specifications) | 1 | 600 | 2 | 16 |
| 6. | CNC Turn Mill | 1 | 350 | 2 | 16 |
| 7. | CNC-EDM+WEDM | 2 | 250 | 2 | 16 |
| 8. | Surface Grinding | 1 | 150 | 2 | 16 |
| 9. | Cyl-grinding | 1 | 150 | 2 | 16 |

- Training revenue assumptions

Table 52: Training revenue assumptions

| SN | Specialisation | Course name | Duration (months) | Fee/ student (INR) | Batch size | No. of batches / year |
|---|---|---|---|---|---|---|
| 1 | Tool Making and Metal Cutting | Diploma in Tool & Die making | 48 | 80,000 | 120 | 1 |
| | | Machinist | 12 | 30,000 | 60 | 4 |
| | | Post Diploma in Tool Design | 12 | 50,000 | 30 | 2 |
| | | Post Diploma in Tool Manufacturing | 12 | 50,000 | 30 | 2 |
| | | Advance Diploma in CNC-Programming & Operation | 6 | 25,000 | 30 | 4 |
| | | Master of CAD/CAM/CNC | 4 | 20,000 | 30 | 3 |
| | | | | | | |
| 2 | Maintenance | Machine Maintenance-mechanical | 3 | 15,000 | 20 | 4 |
| | | Maintenance Technician | 3 | 10,000 | 20 | 4 |
| | | Machine Maintenance-mechanical (Part Time) | 6 | 18,000 | 20 | 2 |
| | | Maintenance Technician (Part Time) | 6 | 12,000 | 20 | 2 |
| | | | | | | |
| 3 | CNC Manufacturing, CAD/ CAM | CNC lathe programming and operation (Full Time) | 2 | 9,000 | 30 | 12 |
| | | CNC lathe programming and operation (Part Time) | 4 | 10,000 | 30 | 12 |
| | | CNC Milling Prog and Operation (Full Time) | 2 | 10,000 | 30 | 12 |
| | | CNC Milling Prog and Operation (Part Time) | 4 | 10,000 | 30 | 12 |
| | | CAD/CAM/CNC ENGINEER (Full Time) | 2 | 10,000 | 30 | 12 |
| | | CAD/CAM/CNC ENGINEER (Part Time) | 4 | 10,000 | 30 | 6 |
| | | CAD Modelling with different softwares (Full Time) | 1 | 6,000 | 30 | 24 |
| | | CAD Modelling with different | 2 | 7,000 | 30 | 24 |

| SN | Specialisation | Course name | Duration (months) | Fee/ student (INR) | Batch size | No. of batches / year |
|---|---|---|---|---|---|---|
| | | softwares (Part Time) | | | | |
| | | Computer Integrated Manufacturing (CIM) | 1 | 7,000 | 30 | 24 |
| | | | | | | |
| 4 | Advance Welding | Basic Arc and Gas welding (Full Time) | 3 | 12,000 | 20 | 4 |
| | | Basic Arc and Gas welding (Part Time) | 6 | 10,000 | 20 | 4 |
| | | TIG welding (Full Time) | 1.5 | 6,000 | 10 | 4 |
| | | TIG welding (Part Time) | 3 | 6,000 | 10 | 8 |
| | | MiG welding (Full Time) | 1.5 | 6,000 | 10 | 8 |
| | | MiG welding (Part Time) | 3 | 6,000 | 10 | 8 |
| | | Spot Welding (Full Time) | 1.5 | 8,000 | 10 | 2 |
| | | Spot Welding (Part Time) | 3 | 8,000 | 10 | 4 |
| | | Stainless Steel & Aluminium welding (Full Time) | 1.5 | 8,000 | 10 | 2 |
| | | Stainless Steel & Aluminium welding (Part Time) | 3 | 8,000 | 10 | 4 |
| | | Welding-NCVT | 12 | 24,000 | 20 | 1 |
| | | | | | | |
| 5 | Car/bike service training | Car Servicing electro-mechanical | 3 | 10,000 | 30 | 4 |
| | | Basic Auto electronics | 3 | 10,000 | 30 | 4 |
| | | Servicing of Auto Air Conditioning | 3 | 10,000 | 30 | 4 |
| | | Bike Servicing electro-mechanical | 3 | 10,000 | 30 | 4 |
| | | Car Servicing electro-mechanical (Part Time) | 6 | 12,000 | 30 | 2 |
| | | Basic Auto electronics (Part Time) | 6 | 12,000 | 30 | 2 |
| | | Servicing of Auto Air Conditioning (Part Time) | 6 | 12,000 | 30 | 2 |
| | | Bike Servicing electro-mechanical (Part Time) | 6 | 12,000 | 30 | 2 |

| SN | Specialisation | Course name | Duration (months) | Fee/ student (INR) | Batch size | No. of batches / year |
|---|---|---|---|---|---|---|
| | | | | | | |
| 6 | Information Technology (Part Time Courses) | Basic computer and Hardware (Part Time - 4 hrs) | 2 | 8,000 | 20 | 20 |
| | | Advanced Hardware & Networking (Part Time - 4 hrs) | 4 | 12,000 | 20 | 10 |
| | | | | | | |
| 7 | Industrial and process Automation | Industrial Hydraulics | 1 | 6,000 | 20 | 12 |
| | | Industrial pneumatics | 1 | 6,000 | 20 | 12 |
| | | PLC Programming | 1 | 6,000 | 20 | 12 |
| | | Automation Technician | 4 | 12,000 | 20 | 3 |
| | | Industrial automation design | 4 | 15,000 | 20 | 3 |
| | | Diploma in Mechatronics | 36 | 1,20,000 | 60 | 1 |
| | | | | | | |
| | | Total | | | | |

- Consultancy revenue assumptions

Revenue from consultancy is expected to start in 2nd year of operation i.e. 2018-19 when the TC is fully operational and all infrastructures are in place.

Table 53: Consultancy revenue assumptions

| SN | Consulting Areas | Year2 | Year3 | Year4 | Year5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 50% | 40% | 40% | 40% | 40% | 40% |
| 1. | Design Support | 48,48,000 | 77,56,800 | 96,96,000 | 1,16,35,200 | 1,35,74,400 | 1,49,31,840 | 1,64,25,024 | 1,80,67,526 | 1,98,74,279 |
| 2. | Product Design | | | | | | | | | |
| 3. | Engineering Solutions | 6,00,000 | 7,80,000 | 10,14,000 | 15,21,000 | 21,29,400 | 29,81,160 | 41,73,624 | 58,43,074 | 81,80,303 |
| 4. | Quality System Support | - | 12,00,000 | 18,00,000 | 27,00,000 | 37,80,000 | 52,92,000 | 74,08,800 | 1,03,72,320 | 1,45,21,248 |
| 5. | Project Consultancy (curriculum devlop, community colleges, trainers etc.) | - | 12,00,000 | 36,00,000 | 54,00,000 | 75,60,000 | 1,05,84,000 | 1,48,17,600 | 2,07,44,640 | 2,90,42,496 |
| 6. | Productivity Club | - | 3,00,000 | 4,50,000 | 6,75,000 | 9,45,000 | 13,23,000 | 18,52,200 | 25,93,080 | 36,30,312 |
| 7. | Other Consulting assignments | 10,00,000 | 15,00,000 | 22,50,000 | 33,75,000 | 47,25,000 | 66,15,000 | 92,61,000 | 1,29,65,400 | 1,81,51,560 |

### 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 2015-16, while phase 2 is expected to get completed by 2016-17. In the initial phase, construction of infrastructure for basic training courses is planned along with procurement of basic machines.

Table 54: Project cost and financing

| Project cost and phasing | | In lakhs |
|---|---|---|
| Particulars | 2015-16 | 2016-17 |
| Project Cost | 1,141 | 11,771 |
| Total | 12,912 | |

The Greenfield TC project will be funded by a grant from Government of India which would be sourced through World Bank loan and equity funding from MoMSME.

### 14.1.3 Other financial assumptions

| Terminal value assumptions: | |
|---|---|
| Discount rate | 9.25% |
| Growth rate in perpetuity | 4.0% |
| Cost of equity | 9.25% |

| | | |
|---|---|---|
| Repair & maintenance, (P&M) | 1.0% | of P & M |
| Repair & maintenance, (Building) | 1.7% | of Building |
| Insurance cost of new P&M (Post commissioning) | 0.5% | of Plant & machinery and Building |

| Working Capital Assumptions | | |
|---|---|---|
| Margin Money | % | 100% |
| 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 | SLM | Max Depn |
| Tangible Assets | | | | |
| | Plant and machinery | 13.91% | 10.34% | 95.00% |
| | Buildings | 10.00% | 3.34% | 95.00% |

## 14.2 Working capital and cash flow statement

Overall net working capital requirement for the TC is expected to grow from about INR 33 lakhs in 2017-18 to INR 745 lakhs by year 2025-26.

Figure 41: Net working capital requirement

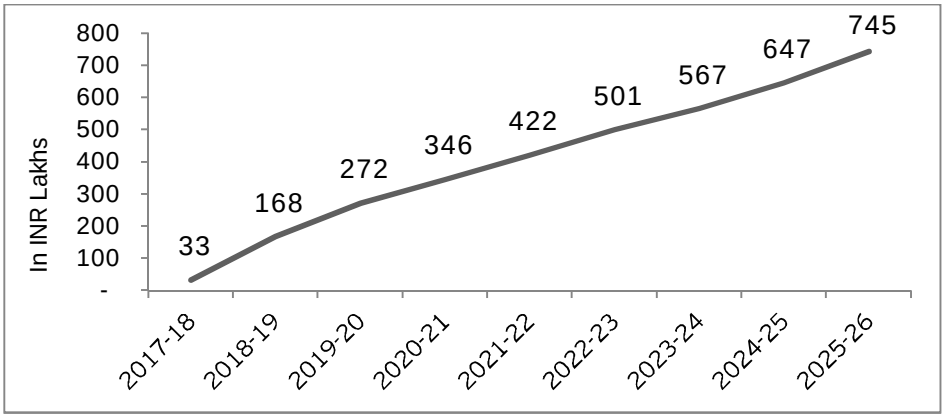



Figure 42: Cash flow closing balance

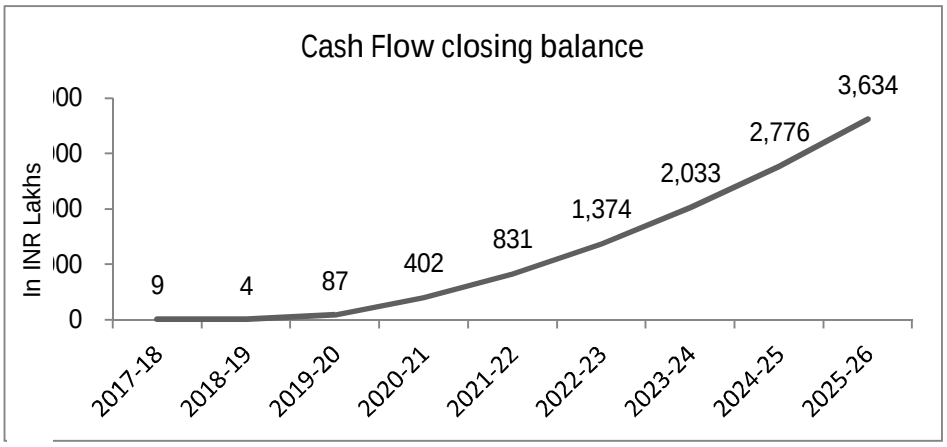


Table 55: Working capital schedule

| Working Capital Schedule | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Years | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 |
| | | | | | | | | | | | INR Lakhs |
| Raw Material Storages | | | | | | | | | | | |
| Finished goods | - | 4 | 19 | 30 | 38 | 45 | 53 | 58 | 64 | 70 | 77 |
| Training | 0.09 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 5 |
| Consumable tools | | | | | | | | | | | |
| Finished goods | - | 0 | 2 | 4 | 5 | 5 | 6 | 7 | 8 | 9 | 9 |
| Training | 0.09 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 5 |
| Consumable stores | | | | | | | | | | | |
| Finished goods | - | 0 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 8 |
| Training | 0.05 | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| Finished Product Storages | | | | | | | | | | | |
| Finished goods | - | 7 | 31 | 49 | 61 | 73 | 85 | 94 | 103 | 114 | 125 |
| Accounts Recievables | 0.08 | 20 | 114 | 189 | 246 | 303 | 363 | 416 | 482 | 564 | 667 |
| Gross Working Capital | 0.32 | 33 | 171 | 280 | 362 | 438 | 522 | 591 | 673 | 774 | 899 |
| Suppliers Credit | 0.08 | 0 | 2 | 9 | 14 | 18 | 21 | 25 | 27 | 29 | 32 |
| Net Working Capital Requirement | 0.24 | 33 | 169 | 271 | 348 | 420 | 501 | 566 | 646 | 745 | 867 |

Table 56: Cash flow statement

| Cash Flow | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Years | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 |
| | | | | | | | | | | | | INR Lakhs |
| Income post Depreciation | -27 | -257 | -1,931 | -1,459 | -1,004 | -654 | -411 | -180 | 20 | 205 | 412 | 686 |
| Add: Depreciation | | 114 | 1,552 | 1,359 | 1,191 | 1,043 | 915 | 803 | 704 | 619 | 543 | 478 |
| Inflow from Grant/ Capital fund | 1,141 | 11,771 | | | | | | | | | | |
| Grant to balance -ve cash flows, if any | 30 | 160 | 400 | 230 | | | | | | | | |
| Total Cash Inflow | 1,144 | 11,788 | 21 | 130 | 187 | 389 | 504 | 623 | 724 | 824 | 955 | 1,164 |
| Investment in Assets | 1,141 | 11,771 | | | | | | | | | | |
| Net Change in WC | | 0 | 33 | 135 | 103 | 75 | 75 | 79 | 66 | 80 | 98 | 121 |
| Total Cash Outflow | 1,141 | 11,771 | 33 | 135 | 103 | 75 | 75 | 79 | 66 | 80 | 98 | 121 |
| Opening Balance | | 3 | 20 | 9 | 4 | 87 | 402 | 831 | 1,374 | 2,033 | 2,776 | 3,634 |
| Surplus/Deficit | 3 | 17 | -12 | -5 | 83 | 315 | 429 | 543 | 658 | 744 | 857 | 1,043 |
| Closing Balance (Cumulative) | 3 | 20 | 9 | 4 | 87 | 402 | 831 | 1,374 | 2,033 | 2,776 | 3,634 | 4,676 |

## 14.3 Income & expenditure statement

The income to the proposed centre from training will start accruing from year 2016-17 with completion of phase 1 (basic training infrastructure and procurement of basic machines) and start of basic courses. Initially an income of INR 31 lakhs is expected in year 2016-17. Once the overall construction is complete, the TC revenue is expected to grow from INR 251 lakhs in 2017-18 to INR 3,287 lakhs by year 2025-26.

Table 57: Income and expenditure

| Income and Expenditure | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 |
| INR Lakhs | | | | | | | | | | | | |
| Income | | | | | | | | | | | | |
| Training Income | | 30 | 183 | 390 | 662 | 959 | 1,055 | 1,161 | 1,277 | 1,341 | 1,408 | 1,478 |
| Sale of Finished goods | | | 65 | 305 | 488 | 610 | 732 | 854 | 939 | 1,033 | 1,137 | 1,250 |
| Sale of Scrap | | 0 | 3 | 10 | 16 | 21 | 25 | 28 | 31 | 34 | 36 | 39 |
| Consultancy Income | | - | - | 64 | 127 | 188 | 253 | 327 | 417 | 539 | 706 | 934 |
| Total Income | | 31 | 251 | 769 | 1,293 | 1,779 | 2,065 | 2,370 | 2,665 | 2,947 | 3,287 | 3,702 |
| Expenditure | | | | | | | | | | | | |
| Variable Operating expenditure | | | | | | | | | | | | |
| Raw materials | | 0 | 15 | 67 | 107 | 135 | 162 | 188 | 207 | 227 | 249 | 273 |
| Finished goods | | | 13 | 63 | 100 | 125 | 151 | 176 | 194 | 213 | 234 | 258 |
| Training | | 0 | 2 | 4 | 7 | 10 | 11 | 12 | 13 | 14 | 15 | 15 |
| Consumable tools | | 0 | 4 | 12 | 19 | 25 | 29 | 34 | 37 | 40 | 43 | 47 |
| Finished goods | | | 2 | 8 | 12 | 15 | 18 | 22 | 24 | 26 | 28 | 31 |
| Training | | 0 | 2 | 4 | 7 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Consumable stores | | 0 | 2 | 8 | 14 | 18 | 21 | 24 | 26 | 28 | 31 | 34 |
| Finished goods | | | 1 | 6 | 10 | 12 | 15 | 17 | 19 | 20 | 23 | 25 |

| Income and Expenditure | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 |
| Training | | 0 | 1 | 2 | 4 | 6 | 6 | 7 | 7 | 8 | 8 | 9 |
| Utilities (Electricity & water) | | 1 | 13 | 39 | 64 | 87 | 99 | 113 | 124 | 133 | 143 | 154 |
| Finished goods | | | 4 | 20 | 32 | 40 | 47 | 56 | 61 | 67 | 74 | 81 |
| Training | | 1 | 9 | 19 | 32 | 47 | 52 | 57 | 63 | 66 | 69 | 73 |
| Variable Operating expenditure | | 2 | 34 | 126 | 204 | 265 | 311 | 358 | 394 | 428 | 466 | 507 |
| 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 | | | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 |
| P&M | | | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 |
| Buildings | | | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 |
| Training Expenses | | | 18 | 39 | 66 | 96 | 106 | 116 | 128 | 134 | 141 | 148 |
| Other Prdnn. & Admin. Exps | | | 19 | 60 | 100 | 138 | 160 | 184 | 206 | 228 | 255 | 287 |
| Marketing expenses | | 25 | 25 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Insurance of new machines | | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Fixed Operating Expenditure | 27 | 171 | 595 | 743 | 902 | 1,124 | 1,250 | 1,390 | 1,547 | 1,695 | 1,866 | 2,031 |
| Total Expenditure | 27 | 173 | 630 | 869 | 1,107 | 1,389 | 1,561 | 1,748 | 1,940 | 2,123 | 2,332 | 2,538 |
| Income (Gross Margin) | (27) | (142) | (379) | (100) | 186 | 390 | 504 | 622 | 724 | 824 | 955 | 1,164 |
| Depreciation | - | 114 | 1,552 | 1,359 | 1,191 | 1,043 | 915 | 803 | 704 | 619 | 543 | 478 |
| Income post Depreciation | -27 | -257 | -1,931 | -1,459 | -1,004 | -654 | -411 | -180 | 20 | 205 | 412 | 686 |

Note: Figures may not match due to rounding

## 14.4 Balance sheet

Table 58: Balance sheet

INR Lakhs

| Balance Sheet | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Years | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 |
| Liabilities | | | | | | | | | | | | |
| Capital fund | 1,114 | 12,629 | 10,697 | 9,239 | 8,234 | 7,581 | 7,170 | 6,989 | 7,009 | 7,215 | 7,626 | 8,313 |
| Capital for -ve cash flows | 30 | 190 | 590 | 820 | 820 | 820 | 820 | 820 | 820 | 820 | 820 | 820 |
| Total | 1,144 | 12,819 | 11,287 | 10,059 | 9,054 | 8,401 | 7,990 | 7,809 | 7,829 | 8,035 | 8,446 | 9,133 |
| Assets | | | | | | | | | | | | |
| Fixed Assets | | | | | | | | | | | | |
| Gross Block | 1,141 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 | 12,912 |
| Less: Accumulated Depreciation | - | 114 | 1,666 | 3,026 | 4,216 | 5,260 | 6,175 | 6,977 | 7,682 | 8,300 | 8,844 | 9,321 |
| Net Block | 1,141 | 12,798 | 11,245 | 9,886 | 8,696 | 7,652 | 6,737 | 5,934 | 5,230 | 4,611 | 4,068 | 3,590 |
| Current Assets | | | | | | | | | | | | |
| Cash | 3 | 20 | 9 | 4 | 87 | 402 | 831 | 1,374 | 2,033 | 2,776 | 3,634 | 4,676 |
| Other Current Assets | - | 0.2 | 33 | 168 | 272 | 346 | 422 | 501 | 567 | 647 | 745 | 866 |
| Total | 1,144 | 12,819 | 11,287 | 10,059 | 9,054 | 8,401 | 7,990 | 7,809 | 7,829 | 8,035 | 8,446 | 9,133 |

Note: Figures maynot match due to rounding

During the operational period of the Bhiwadi TC, the TC may utilise the accumulated depreciation towards upkeep, maintenance of existing machines or purchase of new machines to offset any impact of change in technology.

## 14.5 Profitability

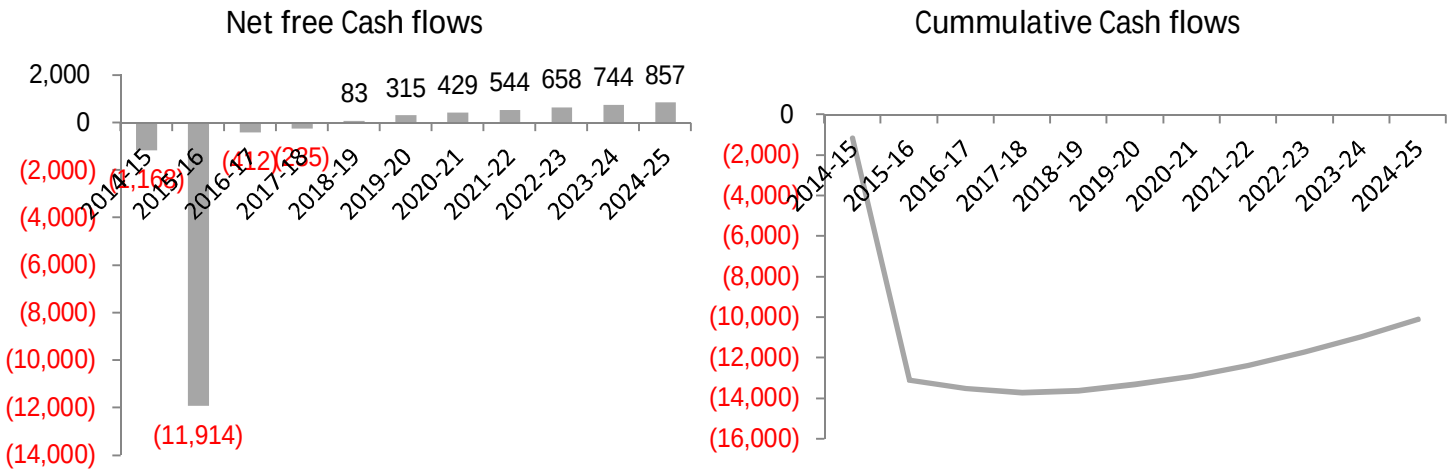
Overall project profitability has been estimated considering phased investment in plant & machinery and infrastructure. The full-fledged operations are expected to start from the year 2017-18. The project IRR for a period of 12 years till 2026-27 is 8.6%.

Table 59: Profitability with investment plant & machinery

| | |
|---|---|
| Project IRR | 8.6% |
| Payback period | >11 years |

The project is expected to generate positive net free cash flows starting year 2018-19. However equity of about INR 820 lakhs will have to be infused in first four years to balance the negative cash flows.

Figure 43: Net free Cash flows and Cumulative Cash flows



## 14.6 Sensitivity analysis

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

- Project cost
- Construction perio0064
- Revenue from Training
- Revenue from Finished Goods
- Revenue from Job work
- 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 0.7%.

5 percent increase/decrease in project cost decreases/ increases the project IRR by about 0.5%

5 percent increase/decrease in production revenue increases / decreases the project IRR by about 0.4%.

Consulting being the lowest contributor to revenue has the lowest impact on project sensitivity. 5 percent increase/decrease in production revenue increases / decreases the project IRR by about 0.4%.

Sensitivity of IRR to

Table 60: Sensitivity of IRR

| | | Construction period (Months) | | |
|---|---|---|---|---|
| | | 15 | 20 | 24 |
| Increase in Project cost | -5% | 9.2% | 9.2% | 9.2% |
| | 0% | 8.6% | 8.6% | 8.6% |
| | 5% | 8.1% | 8.1% | 8.1% |
| | 10% | 7.6% | 7.6% | 7.6% |

| | | |
|---|---|---|
| Increase in Training revenue | -7.5% | 7.6% |
| | -5% | 7.9% |
| | 0% | 8.6% |
| | 5% | 9.3% |
| | 10% | 10.0% |

| | | |
|---|---|---|
| Increase in Production revenue | -10% | 7.8% |
| | -5% | 8.2% |
| | 0% | 8.6% |
| | 5% | 9.1% |
| | 10% | 9.5% |

| | | |
|---|---|---|
| Increase in | -10% | 7.8% |

| | | |
|---|---|---|
| Consultancy revenue | -5% | 8.2% |
| | 0% | 8.6% |
| | 5% | 9.1% |
| | 10% | 9.5% |

# 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 $CO_2$-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 aluminium; 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. aluminium) 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 aluminium 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 refuelling 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 Bhiwadi 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 61: 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 | ▶ 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 | ▶ Water sprinkling at regular intervals during excavation and drilling activities would be practiced to avoid generation of dust.<br>▶ The excavated soil would not be stored in the direction of the wind and covers to be provided for loose construction material.<br>▶ Activities like digging and filling will be avoided in conditions of very high wind.<br>▶ Construction machinery will be properly maintained to minimize exhaust emissions of CO. SPM and Hydrocarbons. |
| | Soil erosion/ Loss of Top soil | ▶ Effort would be made to use the overburden within premises for landscaping.<br>▶ During levelling, gradation across the land (If any) would be reduced to the extent possible. |
| | Noise pollution | ▶ Regular maintenance of plant equipment will be carried out.<br>▶ Noise prone activities will be undertaken during day time and shall be avoided, to the extent possible, during night time.<br>▶ Personal protective equipment will be provided for workers performing drilling at site. |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| | Occupational health hazards | ▶ Provision of adequate personal protective equipment like safety helmets, face masks, safety shoes, safety goggles etc. for the safety of workers.<br>▶ The excavated area would be provided with a visible boundary (Usually created using a tape and sticks) to ensure safety at site.<br>▶ Training will be imparted to workers on occupational safety and technical aspects of job undertaken by them. |
| | Disposal of debris and other wastes | ▶ 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.<br>▶ The disposal site would be at least 1000 meters away from the areas including notified forest land, water bodies and productive lands. |
| 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) | Health Risks | ▶ Provision of separate mobile toilet facilities for men and women will be made.<br>▶ The domestic effluent will be properly disposed of in soak pits.<br>▶ Contractor will provide garbage bins to all workers' accommodation for dumping wastes regularly in a hygienic manner in the area.<br>▶ 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;<br>i) Twelve small sterilized dressings.<br>ii) Six medium size sterilized dressings.<br>iii) Six large size sterilized dressings.<br>iv) Six large size sterilized burn dressings.<br>v) Six (1/2 oz.) packets sterilized cotton wool. |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| | | vi) One (2 oz.) bottle containing a 2 per cent alcoholic solution of iodine.<br>vii) One (2 oz.) bottle containing sal-volatile having the dose and mode of administration indicated on the label.<br>viii) One roll of adhesive plaster.<br>ix) One snake-bite lancet.<br>x) One (1 oz) bottle of potassium permanganate crystals.<br>xi) One pair of scissors.<br>xii) One copy of the first-aid leaflet approved by the Chief Inspector of Factories. |
| | Chances of spread of sexually transmittable diseases like AIDS | ▶ Awareness programmes will be conducted regularly for workers on AIDS, and other health related issues.<br>▶ Health check-up facilities for employees and contract workers. |
| | Water pollution | ▶ Separate mobile toilet facilities will be made available for male and female workers. The domestic effluent will be properly disposed of in soak pits.<br>▶ 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 | ▶ Basic sanitary facilities will be provided for the workers staying at the labour camp and at the project site.<br>▶ Dustbins will be provided at the camp by the contractor. |
| Movement of vehicles (Vehicle | Air pollution | ▶ All the vehicles entering the site will be asked to have updated PUC (Pollution under control) |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| 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.) | | certificate.<br>▶ Vehicle speed will be restricted to 15km/hour at site.<br>▶ Trucks/dumpers will be covered by tarpaulin sheets during off site transportation of friable construction materials and spoil.<br>▶ Maintenance of vehicles will be carried out regularly.<br>▶ Sprinkling of water will be practiced at the site. |
| | Soil contamination | ▶ Proper maintenance of vehicle will be carried out to avoid any leakage of oil or grease. |
| | Water contamination | ▶ Proper maintenance of vehicle will be carried out to avoid any leakage of oil or grease. |
| | Safety risks | ▶ Vehicle speed will be restricted to 15km/hour at site.<br>▶ 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 | ▶ D.G will be optimally used with proper orientation and adequate stack height.<br>▶ Stack monitoring will be carried out on regular basis.<br>▶ Proper maintenance of the DG will be carried out on regular basis. |
| | Noise pollution | ▶ 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 | Soil contamination | ▶ A covered area will be defined for storage of HSD with concrete flooring |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| availability for D.G sets) | Safety risks | ▶ The diesel storage area will not be in proximity of the labour camps.<br>▶ 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 | ▶ Waste will be stored at designated place after segregation on the basis of category (hazardous and non-hazardous).<br>▶ Hazardous waste will be disposed of to the authorized vendors only.<br>▶ A waste management plan will be chalked out to properly dispose the debris generated from the site. |
| | Safety risks | ▶ Adequate PPE's will be identified and provided to the workers at site. |
| Installation and operation of concrete mix plants and batching plants (In case, these are installed on temporary basis at the project site) | Noise pollution | ▶ Noise shielding will be used where practicable and fixed noise sources will be acoustically treated for example with silencers, acoustic louvers and enclosures.<br>▶ 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 | ▶ Provision of clause in contractor's agreement will be made that bans child labour and forced labour at project site.<br>▶ Adequate procedures to avoid or prevent hiring/entry of child labour at the project site will be undertaken;<br>▶ Random check will be undertaken at the site. |
| | Health and safety risks for children of workers | ▶ Temporary crèche facility will be provided in case of migrant labourers children residing in the camps to ensure safety. |
| | Water | ▶ Emphasis will be given on optimization of water usage and supply of potable drinking water |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| | wastage | for labour camps. |
| | Pressure on forest produce | ▶ 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 62: Potential hazards during O & M phase

| Potential impact | Recommendation for mitigation |
|---|---|
| Deterioration of the structure over the period of time | ▶ Maintenance and repair work would be carried out on regular basis to slow down/mitigate the deterioration of the structure.<br>▶ A structural stability certificate would be taken from a chartered engineer every 5 years.<br>▶ 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 | ▶ 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 | ▶ Fire extinguishers will be checked for pressure on annual basis.<br>▶ Fire hydrant system would be checked once in six months to ensure it is operational.<br>▶ Electrical wiring in the premises would be regularly checked and repair should be undertaken wherever required. |

### 15.3.3 Manufacturing

Table 63: 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 | ▶ Ear plugs/muffs would be provided to the employees and students working in the hammering process.<br>▶ Level of noise would be monitored on regular basis so as to ensure that the noise level is within specified limits.<br>▶ Hammering would not be carried out during night time.<br>▶ 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 | ▶ Monitoring of the vibration will be conducted on regular basis. |
| Heat treatment | Air pollution | ▶ Ventilation would be provided in work shop to avoid concentration of the fumes. |
| | Burn injury | ▶ Employees would be provided with Apron while working in the workshop.<br>▶ Workplace safety training will be provided on regular basis.<br>▶ Eye wash and shower facility would be provided in the facility.<br>▶ Appropriate PPE including, gloves, safety shoes, goggles, etc. would be provided to employees and the students. |
| | Heat stress | ▶ Heat stress monitoring of the employees will be conducted once a year to ensure safe and appropriate working conditions. |
| Non-maintenance of clean | Injury due to | ▶ Cleaning schedule will be developed for the site. |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| premises | trips | ▶ Proper demarcation of the storage area for waste material will be done according to the different type of waste material. |
| 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 | ▶ Waste will be stored at designated place after segregation on the basis of category (hazardous and non-hazardous).<br>▶ Hazardous waste will be disposed of to the authorized vendors only.<br>▶ A waste management plan will be chalked out to properly dispose the debris generated from the site. |
| | Safety risks | ▶ 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 | ▶ D.G set will be optimally used with proper orientation and adequate stack height.<br>▶ Stack monitoring to be carried out on regular basis.<br>▶ Proper maintenance of the D.G set to be carried out on regular basis. |
| | Noise pollution | ▶ 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 | ▶ A covered area will be defined for storage of HSD with concrete flooring. |
| | Safety risks | ▶ Inflammable substance will not be allowed in the premises. |
| Specialised Tool manufacturing | | |
| Designing of components | Depletion of natural resource (paper) | ▶ Paper would be recycled for rough work. |
| Machining activities | Land | ▶ SOP would be formulated for handling and storage of waste oil and coolant. |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| | contamination due to waste oil and waste coolant | ► A designated area would be identified to store these wastes under the shed.<br>► 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 shearing activities | ► Ear muffs / Ear plugs will be provided to officials working on these activities. |
| | Land contamination due to metal scrap | ► The metal scrap would be collected appropriately and stored in a designated area before being disposed of/sold to a third party. |
| | Cut/injury due to metal scrap lying unmanaged | |

| Activity | Associated impact | Recommendation for mitigation |
|---|---|---|
| Use of D.G sets | Noise pollution | ▶ Acoustic enclosures would be provided to avoid noise pollution. |
| | Land contamination | ▶ Diesel would be poured in D.G set using funnel.<br>▶ Concrete flooring would be made near the D.G set. |
| | Air pollution | ▶ 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 | ▶ The storage area of the hazardous waste will be cemented in order to avoid land contamination.<br>▶ Proper demarcation of storage area for hazardous waste will be done to avoid chances of spill over during handling.<br>▶ 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 | ▶ 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 jokey 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

- The production area 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.

# Key risks and mitigation

# 16. Key risks and mitigation

The key risks associated with implementation of the project along with possible mitigation measures are e 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 64: Risk & 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 | ▶ Adequate time and cost buffer to be kept to deal with contingencies.<br>▶ 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<br>▶ Plan Sanction – Town Planning Authority/ Local Body<br>▶ Commencement Certificate – Town Planning Authority/ Local Body<br>▶ Fire NOC – Provisional and Occupancy – Local Fire Authority<br>▶ Plinth Checking Certificate – Town Planning Authority/ Local Body<br>▶ Building Completion Certificate – Town | ▶ Appointment of PMC firm.<br>▶ Timely application of approvals for relevant authorities by CMC<br>▶ Monitoring of status of Approvals. | | ✓ | |

| Key broad area | Risk | Mitigation | Impact on | | |
|---|---|---|---|---|---|
| | | | Cost | Time | Resources |
| | Planning Authority/ Local Body<br>▶ Consent to Establish and Operate – Pollution Control Board<br>▶ MAP Approval and Factory License – Directorate of Industrial Health and Safety<br>▶ Labour License – Labour Commissioner<br>▶ Fuel Storage – Chief Controller of Explosives<br>▶ Tools, Tackles, Pressure Vessels, Hoists – Competent Engineer<br>▶ Electrical Systems – Electrical Inspector | | | | |
| Environmental risk | Loss of top soil | ▶ 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<br>▶ Maximum effort should be made to utilize the top soil for landscaping within the site | ✓ | | ✓ |
| | Air pollution due to digging and levelling activities | ▶ Water sprinkling shall be practiced<br>▶ Construction machinery shall be properly | ✓ | | ✓ |

| Key broad area | Risk | Mitigation | Impact on | | |
|---|---|---|---|---|---|
| | | | Cost | Time | Resources |
| | | maintained to minimize exhaust emissions of CO, SPM and Hydrocarbons<br>▶ 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 | ▶ Toilet shall be earmarked for both men and women contractual workers<br>▶ Adequate drinking facilities shall be provided at the construction site;<br>▶ 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 | ▶ Waste shall be stored at designated place after segregation on the basis of category (hazardous and non-hazardous)<br>▶ Hazardous waste shall be disposed of to the authorized vendors only | ✓ | | ✓ |
| | Air pollution due to use of D.G set. | ▶ D.G set to be optimally used with proper orientation and adequate stack height<br>▶ Stack monitoring carried out on regular basis<br>▶ Proper maintenance of the DG Set should be carried out on regular basis | | | |

| Key broad area | Risk | Mitigation | Impact on | | |
|---|---|---|---|---|---|
| | | | Cost | Time | Resources |
| | | ▶ 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. | ▶ Appoint a PMC for a design and build contract for managing construction.<br>▶ Strict timeline will be made and agreed with PMC.<br>▶ 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<br>▶ initiated by MoMSME,<br>▶ Machinery supplier constraints<br>▶ Product discontinuation | ▶ Clear buy in on project plan and execution planning.<br>▶ 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. | ▶ Appointment of third party Government quality assurance agency. | | | |
| On-boarding of Key players | Delay in on boarding of key project stakeholders<br>• Technology Partner<br>• Construction Network Manager<br>• Construction Management Consultant | ▶ Clearly defined scope and incentives for stakeholders.<br>▶ Timely contracts with the project stakeholders. | | ✓ | ✓ |

| Key broad area | Risk | Mitigation | Impact on | | |
|---|---|---|---|---|---|
| | | | Cost | Time | Resources |
| | Quality Assurance | | | | |
| Procurement of machinery | Delay in procurement of machines and goods due to high Lead time and time taken for clearances | ▶ Machines and equipment chosen should be standard and popular models available in market. Early release of order confirmation and advance if any.<br>▶ Appointment of efficient and pre-approved Clearing & Handling Agency (CHA) to ensure timely clearances and transportation of machines. | | ✓ | |
| | 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 | ▶ Change in product mix<br>▶ Change in customer mix<br>▶ Change in technology<br>▶ Change in product pricing<br>▶ Competition from Govt./Public tool rooms<br>▶ Lack of cluster development in the target | ▶ Expansion of product base.<br>▶ Increase in customer base.<br>▶ Develop a backup plan for retiring of obsolete machines. | | | |

| Key broad area | Risk | Mitigation | Impact on | | |
|---|---|---|---|---|---|
| | | | Cost | Time | Resources |
| | region | | | | |
| Policy | Change in Government Policy/ Schemes for<br>► Training<br>► key sectors<br>E.g. Change in Government space programme, increase in imports may affect orders from major clients | ► Increase existing customer base.<br>► 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 | ► Labour availability<br>► Retention of key employees (Flight of key talented people can make it difficult to achieve centre's growth plans) | ► Planning for holidays and lean periods.<br>► Good incentive scheme and career development plans. | ✓ | | ✓ |
| Management risk | Lack of capable management to run the TC | ► Leadership training.<br>► 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. | ✓ | | |
| Performance of key stakeholders | Poor performance of Outsourced agencies like TP, CNM and PMC | ► Establishment of KPIs<br>► Periodic review of performance. Suitable | | | ✓ |

| Key broad area | Risk | Mitigation | Impact on | | |
|---|---|---|---|---|---|
| | | | Cost | Time | Resources |
| | | penalty clauses to be added in the ToRs. | | | |
| Weather | Delay in construction due to monsoon season | ▶ Planning for lean periods and periods of low construction activity. | ✓ | ✓ | |

# Conclusion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# 17. Conclusion

The TC at Bhiwadi is proposed to be a General Engineering TC with primary focus on auto sector. It will specialise in medium size sheet metal components and tools in 4 wheeler segment and small size plastic mould works in 2 wheeler segment not only in the catchment area but also outside the catchment. There is an opportunity for the TC to grow further catering to other upcoming sectors like agro processing and electronics in this region.

Going forward, revenue is proposed from consultancy / advisory streams. This includes support to 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 innovative ideas for the TC like;

- The new TC will take steps to form consortium with MSMEs including TRs 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 proposed TC will provide incubation support to trainees for their start-up ventures. The centre would encourage final year trainees in the long term programmes to start their own ventures by providing necessary support like finance, high end machining, availing benefits of Government schemes etc. for a period of 3 years. The TC can extend its facilities for nominal fee during this period to these start-up ventures and help them to specialise in their core activities.

- 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.

# Annexure

# 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.

Following is the resettlement policy framework, for social screening, which have been agreed in the initial stages and have been addressed during the site visit in Bhiwadi;

Name of Proposed Technology Centre: MSME TECHNOLOGY CENTRE by OFFICE OF DC MSME DEVELOPMENT INSTITUTE, BAISGODAM, JAIPUR

Address: PLOT NO SP3-871(A) and SP3-872 PATHREDI INDUSTRIAL AREA, PATHREDI DISTT. ALWAR (RAJASTHAN)

Name/Location: Existing Industrial Park/Special Economic Zone: INDUSTRIAL AREA PATHREDI DISTT. ALWAR, (RAJASTHAN)

Total Area of Land Previously Acquired Under Different Tenure Systems – Hectares

| Private/Patta Land | Village Common/Gram Sabha | Van Panchayat | Revenue Land | Forest Land | Others |
|---|---|---|---|---|---|
| PRIVATE | CHOPANKI | JODIYA | 10.08 ACRE | NIL | — |

Patterns of Previous Land Use – Private/Patta Land: List Number of Earlier Users

| Irrigated | Non-Irrigated | Homestead | Commercial | Others |
|---|---|---|---|---|
| IRRIGATED | NIL | NIL | NIL | NIL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Patterns of Previous Land Use – Government Land under Different Tenure Systems

| Land Tenure | NTFP | Fodder | Firewood | Residential Structures | Commercial Structures |
|---|---|---|---|---|---|
| Van Panchayat Land | — | — | — | — | — |
| Gram Sabha Land | — | — | — | — | — |
| Revenue Land | — | — | — | — | — |
| Forest Land | — | — | — | — | — |
| Total Number Of families | — | — | — | — | — |

Total Number of Families, if any, currently Dependent On

| Land Tenure | NTFP | Fodder | Firewood | Residential | Commercial | Total |
|---|---|---|---|---|---|---|
| Gram Sabha Land | — | — | — | — | — | — |
| Van Panchayat Land | — | — | — | — | — | — |
| Revenue Land | — | — | — | — | — | — |
| Forest Land | — | — | — | — | — | — |

Whether the land is currently available free of any encumbrances: Yes✓---- No-✗

This is to certify that all compensation, as required, have been paid and all claims/access rights have also been settled

Signing of Social Screening

Signature: _____ Date: 05-09-2014

Name: PRAVEEN KUMAR GUPTA Place: BHIWADI.

Designation: REGIONAL MANAGER

## 18.2 Checklist for environmental assessment

The output of the detailed site assessment shall provide a holistic view of the existing environment settings and the mitigation/preventive measures required to be adopted so as to minimize the EHS impact of the tool room.

Section I: General

| | |
|---|---|
| 1. Name of the Tool Room | |
| • Location | |
| • Block | |
| • District | |
| • State | |
| 2. Rural/Urban/Semi-urban | |
| 3. Date of site visit (dd/mm/yyyy) | |
| 4. Details about key person/s with whom interactions took place during site visit | |
| • Name | |
| • Designation | |
| • E-mail id | |
| • Telephone Number | |
| • Mobile No. | |

Section II – Physical Infrastructure Aspects (Land and Buildings Related)

| | |
|---|---|
| 1. Total Campus Area (in hac.) | |
| 2. Number of Buildings in the Campus | |
| 3. Total Built-up Area (in sq. mt.) | |
| 4. Ownership of land | Lease/Government/Any Other |
| 5. Name of the department/agency in whose name the land is registered. | Provide name as it reflects in revenue record. |
| 6. Land area as shown in revenue records | Mention area as it reflects in the revenue record. |
| 7. Is the total area properly demarcated/ protected by a boundary? | |
| 8. Environmental Setting | |
| • Topography of the site | |
| • Seismic Zone | |
| • Rainfall (average – in mm) | |
| • Temperature (max.) (in $^{o}$C) | |
| • Temperature (min.) (in $^{o}$C) | |

| | | | |
|---|---|---|---|
| 9. Land-use Zone within the Tool Room is located | Industrial/Special Economic Zone/ Commercial/Residential/Any Other | | |
| 10. Land-use surrounding the Campus | Industrial/Special Economic Zone/ Commercial/Residential/Any Other | | |
| 11. Is there any court case/legal dispute related to land on-going? | | | |
| 12. Is the existing Tool Center within 1 km from the following? | | | |
| • National Park | Yes | No | If yes, provide name and distance details. |
| • Wildlife/Bird Sanctuary | Yes | No | If yes, provide name and distance details. |
| • Protected/Reserved Forest | Yes | No | If yes, provide name and distance details. |
| • Wetland/Lake | Yes | No | If yes, provide name and distance details. |
| • Any other environmentally sensitive area? | Yes | No | If yes, provide name and distance details. |
| 13. Is the Tool Room located in a critically/notified polluted area? | Yes | No | If yes, name the area. |

14. Record observations on the following:

| | | |
|---|---|---|
| Ventilation in the building | Over-all | |
| | Hostel | |
| | Canteen/mess | |
| | Toilets | |
| | Rooms | |
| | Workshop | |
| | Any specific observation | |
| Any visible structural distress/defect in the building | | |
| Storm water drainage | | |
| Is there any water logging in the campus during the rainy season? If yes, how long does it last and what is the reason. | | |

| | |
|---|---|
| Parking | |
| Signage inside/outside the building | |
| Storage of materials | |
| Cleanliness and hygiene of the over-all campus | |
| Arrangements for the Physically Challenged | |
| Availability of open space/s in the campus | |
| Green area/ belt | |
| What kind of manure/chemical is used for maintaining green areas? | |

15. Sanitation Arrangements

| | |
|---|---|
| Number of toilets - gents | |
| Number of toilets - ladies | |
| Over-all cleanliness | |
| Cleaning and maintenance arrangements | |

16. Solid Waste Management

(Including wastes from canteen, office, canteen/mess, workshop and e-waste)

| | |
|---|---|
| Waste/s generated<br>(By Type and Quantum) | |

| | |
|---|---|
| Collection / Storage Practices | |
| Disposal Practices | |

17. Waste Water Management

(including wastes from toilets, canteen/mess, hostel, workshop)

| | |
|---|---|
| Waste/s generated (By Type and Quantum) | |
| Disposal Practices | |
| Is any water quality monitoring being done, particularly from wastes arising from production floor/workshops? If yes, | |

18. First Aid and Emergency Response Arrangements

| | |
|---|---|
| First-aid (availability and quality) | |
| Emergency Preparedness / Response Plan | |
| Fire safety arrangements (availability and quality) | |
| Electrical safety arrangements | |
| Injury/accident on the workshop/ production floor | |
| Type of natural disaster/s that the region is prone to | |
| When and what type of natural disaster has last | |

| | |
|---|---|
| struck the area? | |
| Mock Drills | |

19. Water Usage

| | |
|---|---|
| Source of water supply | Ground / Piped / Both / Rain water harvesting / Any Other |
| Is sub-project located in water scare area? | |
| If yes, then what is the ground water usage status? | |
| Is there any water body located in and around the campus? If yes, give distance. | |
| What is the existing water usage per month/annum in the Tool Center? | |
| Is any water treatment arrangement in place? If yes, give details. | |
| Is water quality monitoring being done? If yes, provide details. | |

20. Environmentally Augmentative Measures

| | |
|---|---|
| Is there any requirement for artificial lighting during day time? If yes, in which area/s. | |
| Have measures been taken for energy | |

| | |
|---|---|
| efficiency in the building. If yes, provide the details. | |
| Is there any rain water harvesting arrangement? | |
| Has any other water conservation measure been taken? If yes, provide details | |
| Has there been any use of environment friendly building materials? If yes, list the materials. | |
| Is there any current building or block that is compliant with Green Building norm/s? | |

Section III - Technological Aspects (Trade Technology/Machinery/Equipment Related)

| | |
|---|---|
| Type of Tool Room (Sector) | |
| Specific Activities that are Undertaken at the Center | |
| Over-view about Training Course/s Offered | |
| Duration of Training Course/s Offered | |
| Number of persons trained so far (by course) | |
| Type of Technology in use at the Center | |

| | |
|---|---|
| Remarks | Any Other Important Points (Affiliations/Certification/Production Facility and its use) |

As a part of the assessment, further areas were also assessed keeping in mind the nature of business:

| Resource/Raw Material use/Productivity | |
|---|---|
| What kind of raw materials are used? | |
| Provide production related details | |
| Is any specific technology being used that helps in resource conservation? If yes, provide details. | |
| **Water Usage** | |
| Quantum of water used | |
| Source of water | |
| Have measures been taken for water conservation/efficiency from a technological perspective? | |
| **Energy Consumption** | |
| Type of energy sources used | |
| Quantum of energy used | |
| Is there any renewable energy source in use? | |
| Are generators is use? | |
| If yes, of what type | |
| Have measures been taken for energy conservation/efficiency from a technological perspective? | |
| | |
| Is there any emission/discharge/pollutant generation? | |

| | |
|---|---|
| If yes, of what type? Mention quantum/level by category. | |
| Pollution Management (air, water, soil, noise) | |
| How is pollution being minimised/managed/mitigated? List specific measures that are being taken. | |
| Is there any emission/discharge of carcinogenic pollutants? | |
| Is there any GHG emission? | |
| What is the disposal mechanism/arrangement? | |
| Is pollution monitoring being done? | |
| If yes, what is the system and quality of | |
| What is the frequency of monitoring? | |
| Who manages this? | |
| Is there any budgetary provision for doing so? | |
| Is asbestos sheet used in the project site for | |
| How is pollution being mised/managed/ mitigated? List specific measures that are being taken. | |
| Occupational Health and Safety | |
| What are the specific occupational health and safety hazards associated with the technology in-use at the centre? | |
| What measures have been taken to avoid/minimise/mitigate these risks? | |
| Other Aspects (regulatory compliance, awareness, training etc.) | |

## 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 | 1626X813X762 | | 204815 | 1,22,88,900 | 1,47,46,680 |
| | HAMLEY | C60U | 1200X1300X900 | 864840 | | 7,00,52,040 | 8,40,62,448 |
| | DMG MORI | DMV 270 P | 2700X2700X1600 | 1684210 | | 13,64,21,010 | 16,37,05,212 |
| | RAMBAUDY | | 3000x2000x1500 | 12,00,000.00 | | 9,72,00,000 | 11,66,40,000 |
| | | | | | | | |
| 3 AXIS VMC | HAAS | VM3 | 1016X660X635 | | 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 | 2600X700X700 | 310440 | | 2,51,45,640 | 3,01,74,768 |
| | RAMBAUDY | | 2500x1500x1500 | 10,00,000.00 | | 8,10,00,000 | 9,72,00,000 |
| | HARTFORD | HSA323 | 3000X2200X780 | | 2,40,000 | 1,44,00,000 | 1,72,80,000 |
| | HARTFORD | HEP 2150 | 2250X1500X780 | | 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 |
| | JOBBERS | JOBBERS JR CNC | 1875X1740X1720 | | | 47,92,15,080 | 57,50,58,096 |
| | | | | | | | |
| Grinder | KENT | KGS920AHD | 2000X900 | | 124275 | 74,56,500 | 89,47,800 |
| | KENT | KGS925AHD | 2500X900 | | 137270 | 82,36,200 | |

| Machine | Make | Model | Specification | Price | | | Price (INR) |
|---|---|---|---|---|---|---|---|
| | | | | | | | 98,83,440 |
| 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 |

| SN | Name of the Unit | Region | State | Contact |
|---|---|---|---|---|
| 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 |
| 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 |

| SN | Name of the Unit | Region | State | Contact |
|---|---|---|---|---|
| 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 |
| 37. | SKH auto components | Faridabad | Haryana | 9650004227 |
| 38. | SRS die casting | Gurgaon | Haryana | Mr Vineet Ahuja, 9899290883<br>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<br>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) |

| SN | Name of the Unit | Region | State | Contact |
|---|---|---|---|---|
| One to One discussion meeting | | | | |
| 46. | Maruti suzuki | Gurgaon | Haryana | Mr M.K.Gupta, GM, 9811158136<br>Mr S.K.Sharma, Manager (MSTA), 01242341416<br>Mr Bhupendra Singh Rana, Dy. Manager (Training academy), 9811743255 |
| 47. | Nagata India private limited | Gurgaon | Haryana | Mr Mittul Soni, MD 9810312809,<br>Mr Rajiv Sharma, Manager (Design), 9810603608<br>Mr U.K. Singh , GM (Operations), 9818897900 |
| 48. | JBM auto limited | Faridabad | Haryana | Mr Rakesh Chandra Kushwaha, Dy GM, 9711209656 |
| 49. | Hero motocorp | Dharuhera | Haryana | Mr Sandeep Wadhwani , Senior manager (Engineering) - 9466080065,<br>Mr M.M.Singh, Dy GM (Human resources), ,<br>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 | Gurgaon | Haryana | Mr Sanjeev Sharma, AVP, |

| SN | Name of the Unit | Region | State | Contact |
|---|---|---|---|---|
| | technologies and engineering | | | 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) | ▶ 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.<br>▶ There is a huge demand for operators, die fitters/ makers for sheet metal operations.<br>▶ Need for manpower trained in CNC, CAD/CAM/CAE.<br>▶ 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) | ▶ Suggested that auto TC should be sheet metal and plastic focused as these account for majority of auto components.<br>▶ Trained manpower in tool design, machine operators are in short supply. |
| JBM auto tool room and training centre | Key industry trends and requirements–<br>▶ Overall there is a shortage of trained manpower at machine operator level in auto sector<br>▶ Requirement of skilled manpower in upcoming areas like mechatronics and automation<br>▶ 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<br>▶ Also emphasized that going forward,<br>• Technology centres should focus equally on both production and training. Training in high end simulation (die design) should be provided to engineering graduates<br>▶ Tool room should focus on Technologies that are futuristic and currently not available in India |
| Hero Motors Corp, (Plant Dharuhera) | ▶ Trainees from existing tool rooms lack practical knowledge especially in areas like mechanical maintenance, electrical maintenance, automated paint shops, assembly jobs, supply and quality assurance (SPC & SQC, PFMEA, Six sigma)<br>▶ Key capabilities sought in skilled workers and areas of |

| | |
|---|---|
| | development<br>• Training in Automated paint shops<br>• Injection and spot welding<br>• Assembly line training<br>• Mechanical & electrical maintenance |
| Mr. Kahli, Manager, Tool Room, Tata Motors Jamshedpur | Discussion on the tooling requirements in the commercial vehicle. Major outcome of the discussion were:<br>▶ The tooling requirement in sheet metal for a commercial truck is in the range of 50-60 crore.<br>▶ The usage of plastics is increasing in the newer models.<br>▶ There is a need of mid-size sheet metal TC to cater to a large market. |
| ▶ Mr. Santosh Raout, Tool Procurement Manager (Nano), TATA motors.<br>▶ Mr. Nitin Solanki and Mr. Prasana, Tool procurement managers, Renault Nissan, Chennai.<br>▶ Mr. Venkatesh M, Development manager (tooling), General Motors, Bengaluru. | Major outcomes of these discussion were mainly the following:<br>▶ The tooling requirement for 4 wheeler is estimated to be around 600-700 crore.<br>▶ There is a need for mid-size to large size sheet metal TC for 4 wheeler segment.<br>▶ Mostly, major plastic moulds required for the 4 wheeler are imported mainly because of cost effectiveness and quality as compared to Indian moulds.<br>▶ 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=Ax 4 | 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 |

| | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Where,<br>• Category X of courses: Mechanical, Production, Civil, Electrical, Chemical, Textile, Marine, Aeronautical and allied courses of each.<br>• Classrooms, Tutorial rooms and Laboratories required for 2nd, 3rd and 4th year may be added progressively to achieve total number as stated.<br>• Additional Library (Reading room) area of 50 sq m / per 60 student (UG+PG) intake beyond 420.<br>• UG laboratories if shared for PG courses shall be upgraded to meet requirements of PG curriculum<br>• Progressive requirement, 2nd year onwards shall be calculated as 3+3+2 labs/course<br>• Additional 5 Labs/Course when number of divisions are more than 2/course.<br>• 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 | A | Y | C=AxY | D=C/4 | 06/Course* | 1 | 2/Course | 1 | 1 | 1 | 1 | |

| | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| rooms | | | | | | | | (Max 4) | | | | |

Where;

- 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 | ▶ Passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of the Chemistry / Biotechnology / Biology<br>▶ 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 | ▶ Passed 10 std. / SSC examination Obtained at least 35% marks at the qualifying examination |

| | | | |
|---|---|---|---|
| 3 | Post diploma programs | 1.5 years/ 2 years | ▶ Passed Diploma examination<br>▶ 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<br>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 |
| 15. | Medical and Counselling Facilities | Essential |
| 16. | Public announcement system at strategic locations for general announcements/paging and announcements in emergency. | Desired |

| SN | Details of requirement | Provisioning |
|---|---|---|
| 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 x R) - 1 | (S/15 x R) x2 | (S/15 x R) x6 | S/15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Postgraduate | 1:12 | - | (S/12 x R) | (S/12 x R) | (S/12 x 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 Key large units in the region

List of Key large units in Bhiwadi

| SN | Name of the Unit | Address | Contact Person | Contact Number | E-mail Id |
|---|---|---|---|---|---|
| 1 | Honda Cars India Ltd. | SPL-1, Khushkhera, Industrial Area, Bhiwadi | Sunilkumar Yadav General Manager | 9772208703 | skyadav@hondacarindia.com |
| 2 | Honda Motorcycle and Scooter India Pvt. Ltd. | SPL-2(D), 2(E), 2(F) & 2(G), Tapukara, Industrial Area, Bhiwadi | Pradip Kumar Jain Sr. Manager | 9799574888 | pradip.jain@honda2wheelersindia.com |
| 3 | Shriram Piston & Rings Limited | 892-893, Pathradi, Industrial Area, Bhiwadi | R.B. Sharma General Manager | 9810244760 | rb.sharma@shrirampistons.com |
| 4 | Shree Cement Ltd. | 3-11, A-1, Khushkhera, Industrial Area, Bhiwadi | D.K. Yadav Asst. GM (P&A) | 9214339051 9887101111 | yadavdk@shreecementltd.com |
| 5 | Lafarge Boral Gypsum India Pvt. Ltd. | SP-73-74, Khushkhera, Industrial Area, Bhiwadi | Jahan Khan | 8696911800 | jahan.khan@in.boral.com |
| 6 | Kajaria Ceramics Ltd. | Tijara Road, Village Gailpur | Dr. Rajveer Choudhary Vice President | 9810112717 9810013718 | rajveer_1953@hotmail.com |
| 7 | Jaquar & Company Pvt Ltd. | SP-53, Phase-I, Industrial Area, Bhiwadi | Ved Bandhu Aggarwal | 9983323782 | bandhu@jaquar.com |
| 8 | Orient Craft Limited. | A-809-820, Pathradi, Industrial Area, Bhiwadi | S.K. Tiwari Manager (HR) | 8696937607 | personnel.chopanki@orientcraft.com |
| 9 | Sakata Inx (India) Ltd. | 1245, Industrial Area, Bhiwadi | S.K. Chhabra Head-Plant | 9810183096 | sunil.chhabra@sakataindia.com |
| 10 | Siegwerk India Pvt. Ltd. | Alwar Road, Industrial Area, Bhiwadi | Girish Agarwal General Manager (HR&Admin) | 9818817500 | girish.agarwal@siegwerk.com |

| SN | Name of the Unit | Address | Contact Person | Contact Number | E-mail Id |
|---|---|---|---|---|---|
| 11 | Orient Syntex | SP-147, Phase-I, Industrial Area, Bhiwadi | H.R. Sharma Executive Director | 9414012663 | orientsyntex@yahoo.in |
| 12 | Balkrishna Industries Ltd. | SP-923, Phase-III, Industrial Area, Bhiwadi | Pankaj Kudesia Sr. General Manager | 8058998303 | pankaj.kudesia@bkt-tires.com |
| 13 | KEI Industries Ltd. | SP-920, Phase-III, Industrial Area, Bhiwadi | Rajinder Singh Sr. Manager | 9983313818 | rajender.singh@kei-ind.com |
| 14 | Mehru Electricals & Mech. Engrs. | 1247, Phase-I, Industrial Area, Bhiwadi | Sandeep P. Sharma Executive Director | 9694098050 | sandeep@mehru.net |
| 15 | Insecticides (India) Ltd. | E-443, Chopanki, Industrial Area, Bhiwadi | Madhur Gupta Admin. Manager | 9667217564 | madhurgupta@iilindia.co.in |
| 16 | Tata Bluescope Steel Ltd. | 298-299, Chopanki, Industrial Area, Bhiwadi | Narendra Prabhu Head HR | 9799004004 | narendra.prabhu@tatabluescopesteel.com |
| 17 | Federal Mogul Automotive Products (I) Ltd | 812/B-1&2, Industrial Area, Bhiwadi | Dhirender Singh | 9694096501 | dhirender.singh@federalmogul.com |
| 18 | Ajanta Chemical Industries | 812-E-11, Phase-III, Industrial Area, Bhiwadi | Arun Tyagi Sr. Manager | 9414013077 9983300577 | arun@ajantasoya.com |

List of other large units in the region

| District | Unit |
|---|---|
| Alwar | 1. Ashok Leyland<br>2. Lord ChloroAlkalies<br>3. Parryware Roca Pvt. Ltd.,<br>4. United spirits Ltd.<br>5. Carlsberg India Pvt. Ltd.<br>6. Tafe Motors & Tractor Ltd. |

| District | Unit |
|---|---|
| | 7. M/s Climate System India Ltd. |
| Jaipur | 1. National Engg. Ind. Ltd.<br>2. K C Mercantile Ltd.<br>3. Poddar Pigment Ltd.<br>4. Wire & Fabric (SA) (P) Ltd.<br>5. KEC International Ltd.<br>6. ASIL Industries Ltd.<br>7. Hindusthan Coco-cola Beverage (P) Ltd.<br>8. Krishna Paper Mill & Industry Ltd.<br>9. Amrit Environmental Technology (P) Ltd.<br>10. Ericsson Tele Communication<br>11. Grasim Industries Ltd.<br>12. Mahindra & Mahindra Ltd.<br>13. Manglalspat (Jaipur) Ltd.<br>14. Neesa Leisure Ltd. |
| Rewari | Dharuhera Industrial area:<br>1. Hero Honda Motors Ltd.<br>2. O.C.C.L. Ltd.<br>3. G.K. Invel Transmission Ltd.<br>4. Pasupati Spining And Weaving Mills Ltd.<br>5. East India Syntex Ltd.<br>6. Inertia India Ltd.<br>7. Delton Cable Ltd.<br>8. Uni Products Ltd.<br>9. Rico Auto<br>10. Omax Auto Ltd<br><br>Bawal Industrial area:<br>1. M/s Y.K.K.India Ltd.<br>2. M/s Asahi India Safety Glass Ltd.<br>3. M/s Backton& Dickinson Ltd.<br>4. M/s Svedala India Ltd.<br>5. M/s Anant Raj Clay Products<br><br>Rewari Industrial area:<br>1. M/s Aggarwal Metal Works Ltd.<br>2. M/s Gupta Enterprises |

| District | Unit |
|---|---|
| | 3. M/s Haryana Petro Chemicals Ltd.<br>4. M/s Everest Metal Works |
| Faridabad | 1. Bata India Ltd.<br>2. Bhartia Cutler Hammer<br>3. Eicher Tractor Ltd.<br>4. Escorts JCB Ltd.<br>5. Escorts Ltd.<br>6. Escorts Yamaha Motors India Ltd.<br>7. GKN Invel Transmission Ltd.<br>8. Goodyear India Ltd.<br>9. Hindustan Wires Ltd.<br>10. Hyderabad Industries Ltd.<br>11. Hyderabad Industries Ltd.<br>12. Jindal Strips Ltd.<br>13. Lakhani India Ltd.<br>14. Nuchem Ltd.<br>15. Tecumseh India P. ltd.<br>16. Whirlpool India Ltd. |
| Gurgaon | 1. B & C textiles private limited<br>2. Cast master<br>3. Chelsea mills<br>4. Devyani international limited<br>5. Exciting fashions & embroidery limited<br>6. Frestex orient craft private limited<br>7. Jaibad metal co. india private limited<br>8. Jindal stainless steelway limited<br>9. JNS instruments<br>10. Kuma stainless tubes ltd<br>11. Locoanet hemant India private limited<br>12. Magic international private limited<br>13. Microtool sterlization services medical items private limited<br>14. Munjal showa limited<br>15. Suzuki metal India limited<br>16. V.K. International<br>17. Dantal hydraulic private limited<br>18. DDSI foods limited<br>19. Fidility network India limited |

| District | Unit |
|---|---|
| | 20. Hero motors limited<br>21. Hewetts associates<br>22. JBM textile private limited<br>23. M & M machine craft private limited<br>24. Maruti udyog limited<br>25. Pearl global limited (formerly known as Mina exports limited<br>26. Subrose India limited<br>27. Suzuki powertain India limited<br>28. Cosco India limited<br>29. Kautilya industries private limited<br>30. Mag filters & equipment private limited |
| Gautam Budh Nagar | 1. HCL Group Computers / Software<br>2. Panasonic Electronics<br>3. Amit Agro<br>4. Fedders Lloyd<br>5. Flex Industries<br>6. Indo Copp<br>7. BPL Sanyo<br>8. Samsung<br>9. Phoenix Lamps<br>10. SGS Thompson<br>11. Tata Unisys<br>12. TCS Software<br>13. Eveready Torch<br>14. National Fertiliser<br>15. HUDCO<br>16. BHEL<br>17. PDIL<br>18. IOC<br>19. NTPC |

## 18.9 Specification of tools

| Tooling activities | Tool size | Specification |
|---|---|---|
| Sheet metal | Small | 2.5 metre X 2 metre X 1.5 metre |
| | Medium | Up to 3 metre X 2.5 metre X 2 metre |
| | Large | Any dimension greater than that of medium size |
| Plastic mould | Small | Up to 500 grams |
| | Medium | Between 500 to 2,000 grams |
| | Large | Beyond 2,000 grams |

## 18.10 Non-Incumbency certificate in respect of land

MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म लघु एवं मध्यम उद्यम

एमएसएमई-विकास संस्थान
सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
भारत सरकार
बाईस गोदाम औद्योगिक सम्पदा,
जयपुर - 302 006 ( राजस्थान )

सत्यमेव जयते

**MSME- Development Institute**
Ministry of Micro, Small & Medium Enterprises
Government of India
Bais Godam Industrial Estate
Jaipur - 302 006 (Rajasthan)

MSME-DI/Tool Room-Bhiwadi/ 2012-13 / 731

Date: 16.06.2014

**The Development Commissioner (MSME),**
Ministry of MSME, Govt. of India,
Nirman Bhavan, 7th Floor,
Maulana Azad Road,
New Delhi – 110 108.

Kind Atten: **Shri R.K.Rai, Director (TR)**

Sub: **Non-Incumbency certificate in respect of Land allotted by State Government at Bhiwadi-Reg.**

Sir,

Kindly refer to your office letter no.21/Tool Room/Rajasthan/2012/TR Dt. 13.06.2014 on the above mentioned subject. In this regard, it is to submit that the officials of this office visited the site of proposed Technology Centre at Bhiwadi on 14.06.2014 and found that the land is free from all incumbencies.

This is for information & necessary action at your end please.

ADTC&P
2416

Yours faithfully,

(Vikas Gupta)
Dy. Director (Mech.)
For Director

819/DI/TR/2014
25/6/14

Phone: 0141-2212098, 2213099, 2215847 (EPABX), 0141-2210553 (Director), Fax: 0141-2210553
E-mail : dcdi-jaipur@dcmsme.gov.in, visit us : www. msmedijaipur.gov.in, DC(MSME) : www.dcmsme.gov.in

## 18.11 Profitability - Alternate scenario

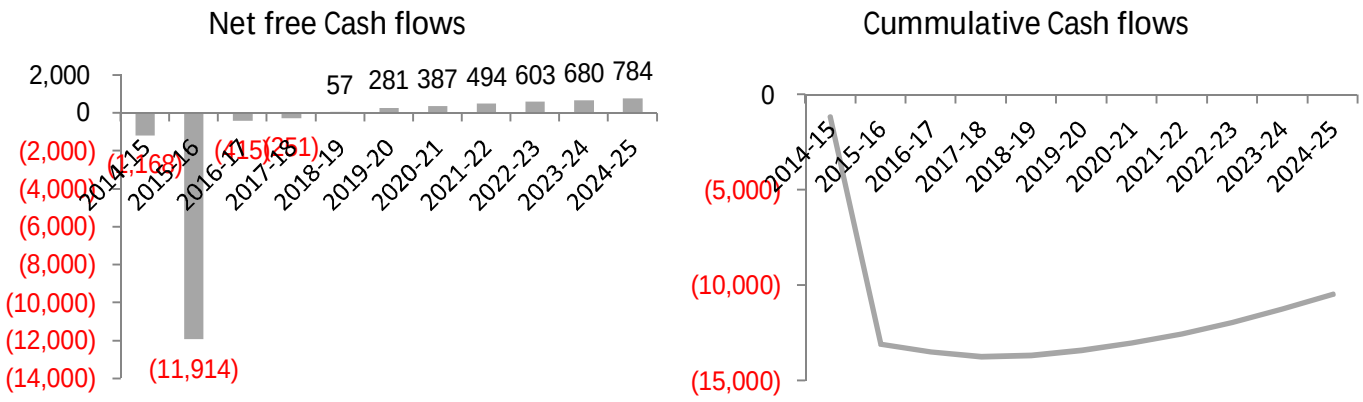
Overall project profitability in this scenario has been estimated considering phased investment in plant & machinery and infrastructure. A debt equity ratio of 60:40 has been considered in this scenario. The interest rate on debt is the World bank loan interest rate of 3.1%. Due to relatively lower cost of debt than equity, the project IRR in this scenario for a period of 12 years till 2026-27 is higher at 29.8%.

Table 65: Profitability with investment plant & machinery under alternate scenario

| | |
|---|---|
| Project IRR | 29.8% |
| Payback period | >11 years |
| Average DSCR (2018-2026) | 2.4 |

The project is expected to generate positive net free cash flows starting year 2018-19. However equity of about INR 1120 lakhs will have to be infused in first four years to balance the negative cash flows.

Figure 44: Net free Cash flows and Cumulative Cash flows alternate scenario



# References

Reports and websites referred;


- DIP Data, Ministry of MSME
- District industries centre, District Industrial profiles-MSME
- India tool room industry report 2011, Tool & Gauge Manufacturers Association
- Draft Environmental Management Framework, MoMSME
- Environmental Social Standards World Bank Group
- Environmental master plan Alwar
- News articles and company announcements
- LMC Forecasts Q4 2013 based on the current product plans of OEMs
- http://www.bmabhiwadi.com/aboutbhiwadi.html
- http://ruidp.rajasthan.gov.in/IEE%20PDF/IEE%20Alwar%20Water%20Supply.pdf
- http://www.bhiwadionline.in/city-guide/geography-of-bhiwadi
- http://dte.rajasthan.gov.in/INTAKE-ITC/ALWAR.htm
- http://dte.rajasthan.gov.in/map-rajasthan/Technical%20Institutes/district/Alwar.pdf
- http://dte.rajasthan.gov.in/map-rajasthan/Technical%20Institutes/district/Alwar.pdf
- http://www.techeduhry.nic.in/seat-distribute/Dist-wise-list-of-polytechnics.pdf
- http://itiharyana.gov.in/download/List%20of%20ITI.pdf
- http://techeduhry.nic.in/seat-distribute/engg.pdf
- http://bipraj.raj.nic.in/pdf/Single%20Window%20_Eng_%20Rules.pdf
- http://environmentclearance.nic.in/Auth/openletter.aspx?EC=5331
- http://pib.nic.in/newsite/erelease.aspx?relid=75314 http://pppinindia.com/business-rajasthan.php
- http://rerc.rajasthan.gov.in
- http://www.riico.co.in/DOLR%20FORM%20E.htm
- http://www.dmicdc.com/
- www.investrajasthan.com/
- Directorate of Technical Education, Rajasthan, Department of Industrial training, Haryana
- Department of Technical Education, Haryana
- Government of Rajasthan
- Planning commission
- Rajasthan skill gap report
- Brief industrial profile of Alwar district, Ministry of MSME.
- Directorate of economics and statistics, Rajasthan
- Department of planning, Government of Punjab

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