



Cluster Diagnostic Report, MSME Technology Center Bhiwadi

**Auto-component & General Engineering Cluster, Bhiwadi
Automotive & Engineering Cluster, Neemrana and Bawal
Automotive & General Engineering Cluster, Alwar**

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1. Executive Summary

The increased focus on manufacturing in India has boosted the Indian Machine Tool Industry & Tool Rooms and has helped in positioning it on the world tooling market. The market size for the Indian machine tooling industry was estimated to be around INR 14,691 Cr as of 2018¹ of which 47% was accounted for domestic consumption. In terms of the global market, India is placed 17th in terms of production and 12th in terms of consumption of tools and faces stiff competition from other countries like the USA, China, and Germany. In order to keep up with the domestic and global market in terms of optimized costs, reduced scrap and improved efficiency & productivity of the machines, the Indian market needs to focus on automation of processes in manufacturing and engineering.

Bhiwadi is strategically located close to Delhi within the National Capital Region. It has been identified as an investment destination IC under DMIC and is home to some of the large Auto OEMs and Tier 1 to Tier 4 players. Through the Technology Center at Bhiwadi, the focus is on catering to this investment destination with a specialized focus on the Auto Industry in the region.

To prepare this cluster diagnostic report, an extensive exercise was conducted to understand the challenges being faced by the cluster coupled with an extensive review of existing and proposed services offered by the Technology Center in Bhiwadi. This report is a result of a detailed assessment conducted with an objective to understand the requirements of the cluster. During the course of the study, an excessive focus was given to understand the three prioritized auto clusters of Bhiwadi, Neemrana (including Bawal) and Alwar. The idea of this exercise was to map the existing and proposed TC services with the cluster requirements and accordingly recommend solutions for the transformation of TC's business avenues. Some of the key observations from the study are as below:

- Limited availability of private/government tool rooms in the region forces the units to connect with tooling service providers in other cities like Gurgaon, Faridabad, Hyderabad, Pune, Mumbai, etc.
- There are limited recognized and authorized testing facilities in the region. The units require testing facilities to conduct tests for which they are dependent on non-NABL accredited testing labs in the region
- There is limited availability of state of the art institutions that provide training for tool and die making and manufacturing. Further, there are very few institutes focussing on training related to CNC, CMM operators.

Recommendations have been provided in domains like reducing the skill gap of the workers, resolving the technological backwardness and nullifying the information asymmetry. Some of the key recommendations are:

- New training courses on CNC Operations and Machining, Aluminium Welding and Introduction to Foundry have been identified that can be introduced by the technology center
- Technology center can take up NABL accreditation for its testing labs and can offer various testing services for the MSME units
- Conceptualization of Entrepreneur facilitation cell (EFC) in the Technology Center to support MSMEs in availing different government schemes
- Modification of planned machines in the production facility to cater to the needs of the local industry

¹ IMTMA Production, Export & Import Report, Details of Machine Tools 2017-18

2. Introduction

The Indian Engineering sector is closely associated with the manufacturing and infrastructure sector and has witnessed remarkable growth over the last few years driven by increased investments in infrastructure and industrial production. The sector is of strategic importance to India's economy with the automobile sector being one of the key focus sectors. It has seen massive innovations and technological advancements in the past few decades and the same are expected to continue in the future as well. Lately, the automobile industry has started embracing changes like electric vehicles, connected cars (IoT), artificial intelligence and smart assistants which is changing the automobile landscape in the country. The industry also needs to evolve at the same pace and keep up with the shift through technological advancements.

The increasing focus and growth in the Automobile sector in the country has created a positive impact on the Indian auto-components industry which has experienced strong growth over the last few years. The total auto-component industry of India was at USD 51.2 billion in FY 2018, a growth of 18.3 percent over the last year². It accounts for 2.3 percent of India's Gross Domestic Product (GDP) and employs more than 1.5 million³ people across the country.

The Indian auto-components industry can be broadly classified into the structured and unstructured sectors. The organized sector caters to the Original Equipment Manufacturers (OEMs) and consists of high-value precision instruments while the unorganized sector comprises low-valued products and caters mostly to the aftermarket category. OEMs contribute more than 70% of total auto components revenue³, with cars and utility vehicles having the highest share. The total value of India's automotive exports stood at US\$ 13.5 billion in 2017-18 as compared to US\$ 10.9 billion in the year 2016-17. This has been driven by strong growth in the domestic market and increasing globalization (including exports) of several Indian suppliers. The share of exports is expected to increase in FY 20 as India is moving towards adopting global standards and stable global conditions

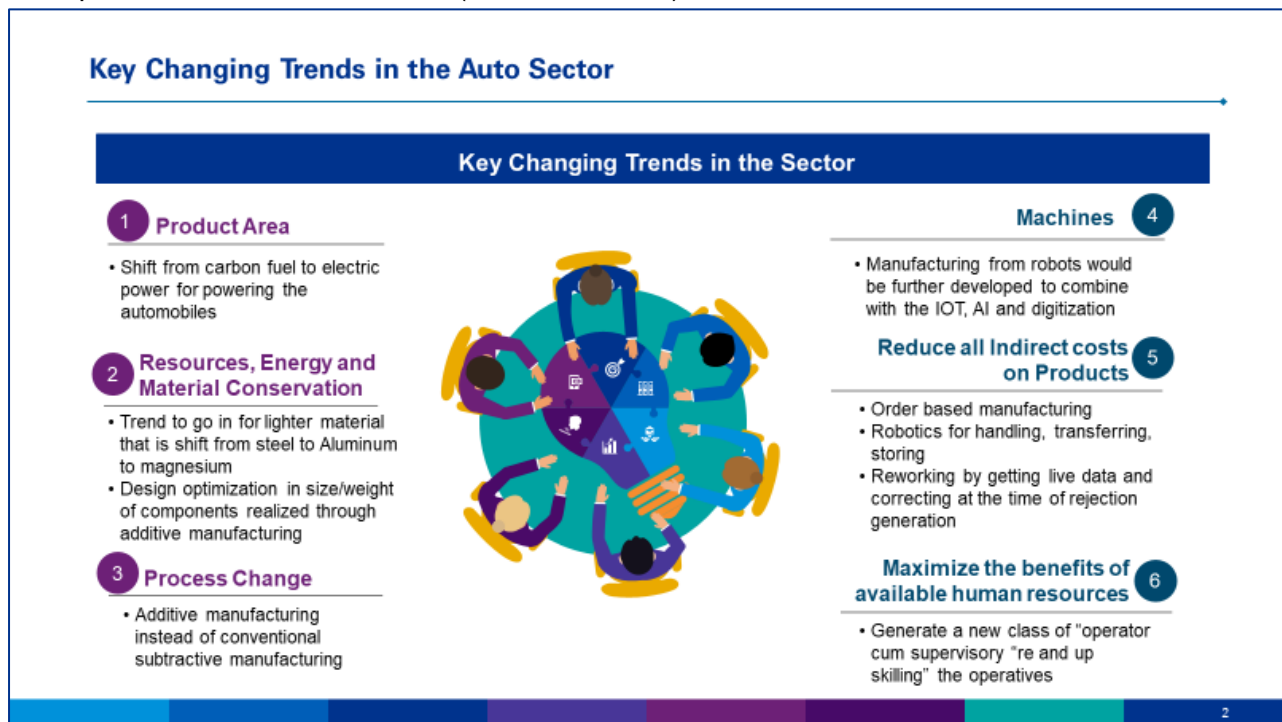
In order to cater potential growth of the auto industry in the country, the government of India has taken numerous initiatives to ensure access to technology, skill up-gradation, and advocacy support to the MSMEs for fulfilling the aspirations and requirements of the market. Some of the initiatives taken up by the Government are:

- Ministry of MSME has Initiated a world bank funded national programme, "Technology Center Systems Programme (TCSP)" at an estimated project cost of INR 2,200 crore aims to setup 15 new TCs and modernize/upgrade existing TCs. As a part of this program an Automotive, Auto-component, General Engineering sector-focused Technology Center is being set up in Bhiwadi and Auto sector-focused IGTR, Aurangabad is being upgraded.
- The FAME – India Scheme (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) formulated by the Department of Heavy Industry led to a continuous increase in registered OEMs and vehicle models. Also, the scheme enhanced the sales of electric vehicles and about 261,507 electric/hybrid vehicles were supported under the scheme up to December 6, 2018. In February 2019, the Government of India approved the FAME-II scheme with a fund requirement of Rs 10,000 crore (US\$ 1.39 billion) for FY20-22.
- Under National Automotive Testing and R&D Infrastructure Project (NAT Rip) various facilities including passive safety labs comprising of the crash core facility and crash instrumentations including dummies were established at ICAT-Manesar and ARAI-Pune

²CRISIL Research – Auto Components, March 2019

³Indian Brand Equity Foundation, March 2019 – Auto Components Industry in India

- To give a fresh thrust to e-mobility in public transport, the Department of Heavy Industry announced the launch of public & shared mobility based on the electric powertrain.
- Under NAT Rip, the Government of India is planning to set up R&D centers at a total cost of US\$ 388.5 million to enable the industry to be on par with global standards.
- The Ministry of Heavy Industries, Government of India has shortlisted 11 cities in the country for the introduction of electric vehicles (EVs) in their public transport systems under the FAME (Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles in India) scheme. The government will also set up an incubation center for start-ups working in electric vehicle space.
- In February 2019, the Government of India approved the FAME-II scheme with a fund requirement of Rs 10,000 crore (US\$ 1.39 billion) for FY20-22.



3. Auto-Component Industry in Rajasthan

Industrialization is considered one of the foremost method to stimulate the overall growth of the country. Rajasthan had no place on the industrial map of India but some strategies were undertaken to increase the investment in the public sector industry and to promote private sector Investment which gradually led to the development of auto industry in the state.

Over the years, Rajasthan has become home to several key industries which are engaged in production of goods like cotton clothes, cotton yarn, cement, sugar, lubrication and plastic, heavy machinery, metal allied products, Automobile parts, and machine tool parts, electrical and electronics-related product, urea, zinc-ingots, ball bearing, edible oil, salt, copper cathodes etc. The state of Rajasthan has a strong and vibrant auto - auto component industry. Some of the salient features about the Auto industry in Rajasthan are

- Alwar and Jaipur districts are close to major auto production hubs of the country such as Noida (Uttar Pradesh), Gurgaon and Dharuhera (Haryana) offering an excellent advantage for setting up of the auto and auto ancillary unit. This has attracted over a hundred units in Bhiwadi, Neemrana, and Pathredi in Alwar district, Rajasthan.
- Neemrana Japanese zone a 167acre industrial area in Neemrana has been developed especially for industrial units from Japan. Automotive unit of Nissin brakes, TPR auto parts,

Takata India, Nippon Steel, Toyota Gosei, Mikuni India and Toyota Kirloskar motor are present in this Zone.

- Honda two Wheeler, Honda four-wheeler, Ashok Leyland are some of the major Auto OEMs present in the state of Rajasthan

4. Approach and Methodology

To ensure a comprehensive diagnostic study was conducted, a multi-step approach was adopted that involved conducting a detailed and structured analysis of the Technology Center and the different clusters prioritized for the study. As a part of this approach, Technology Cluster Manager (TCM) team in Bhiwadi, Cluster Manager - Mr. Rituraj Sharma, Support Consultant - Mr. Dinesh Rana, and Tool Design Expert, Mr. Bal Gangadhar PRC conducted a desk review and in-person consultations with the representatives from the Technology Center, cluster-based industrial units, financial institutions, industry associations, and other stakeholders. The idea behind adopting this approach was to get a detailed understanding of the Technology Center, technology and training service portfolio, and map them with the requirements of the cluster.



Figure 1: Steps followed for cluster diagnostic report

Step 1: Desk Review of the Bhiwadi TC's DPR and the Automotive and General Engineering Industry in Bhiwadi

A detailed desk review of the DPR to understand the cluster needs and basic requirements of the General Engineering Industry in Bhiwadi was conducted. As a part of this exercise, secondary research was conducted to do preliminary mapping of TC offerings with the requirements of the industry in Rajasthan and Haryana particularly Bhiwadi and neighboring auto clusters. The exercise also tried to identify the current requirements and upcoming trends in the auto sector and general engineering manufacturing industry. The desk research also focused on identifying the key auto engineering clusters in the catchment area of the Technology Center. Three industry clusters that provided complete representation of the region in terms of products and services offered were shortlisted for carrying out the detailed study.

Step 2: Identification of Key Stakeholders

To validate the preliminary findings from the desk review, a sample of key stakeholders was identified from the prioritized clusters that ensured representation from industry associations, MSMEs, governmental bodies and Industry Associations. While preparing the list of key stakeholders, heterogeneity of thought process and complexity of the information being sought were two important parameters considered.

Step 3: Industry Consultations

To understand the business requirements, issues and challenges being faced by the industry in Bhiwadi and to develop an understanding of how TC can work on these issues, a stakeholder consultation with 40+ actors was conducted. Industry associations, manufacturers and suppliers were contacted to get a complete view of the expectations of the industry from the technology center. Apart from this, it was also ensured that the final list of stakeholders had a good mix of those that were contacted during DPR preparation, revision exercise and new stakeholders. This was done to understand how the market has changed over the years and what are the potential areas of changes.

Step 4: Analysis and Recommendations

Inputs and feedback received from all the stakeholders were analyzed carefully by a team of experts. Stakeholder inputs and recommendations were then framed into a set of recommendations which were discussed with the TC representatives.

5. Technology Center – MSME TC Bhiwadi Overview

Bhiwadi Technology Center is one of the new Technology Centers being set up by the Ministry of Micro, Small and Medium Enterprises, Government of India under TCSP (The Technology Center Systems Programme) and would support units in the catchment area of Bhiwadi, Alwar, Neemrana, Bawal, Tapukhera, Chaupanki, Daruhera, Gurgaon, Manesar, Faridabad, and Noida. Apart from this, other transformational industrial projects like Delhi Mumbai Industrial Corridor, Logistic hub are proposed in the region that would also be facilitated and supported by the TC.

The technology Center proposes to provide support from the point of concept creation to the development of prototypes and low volume production; also providing consulting and training support to the workforce and MSME units. The technology center will also play an important role in supporting the state government in developing a strong ecosystem for attracting large auto and electronics manufacturing units in the state. The Technology Center in Bhiwadi aims to provide improved access to technology, skill up-gradation, and advocacy support to the MSMEs for fulfilling the following aspirations and requirements of the market

Bhiwadi TC will focus on Technology & Training Support

- *Auto component design, development and engineering solutions for manufacturing*
- *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 Design Lab*
 - *Robotics & Industrial Automation Lab*
- *Collaboration with commercial tool rooms (CTRs) and MSMEs*

- A strong and sustainable component supply chain, simultaneously developing the local MSME network along with the existing tiers of parts suppliers
- The national objective to make India and especially the Bhiwadi area - a manufacturing hub for the globe through technical excellence by providing necessary infrastructure, facilities, and manpower
- The global need to save the energy – material, and power - along with environmental protection of the globe - for the future generations

5.1 Production Facilities

The new greenfield MSME TC Bhiwadi will provide services on bigger and mid-size tooling in sheet metal, plastic moulds which include components like bumper, mirrors cover, dashboard, inner panels etc. TC Bhiwadi will also provide technical services such as the design of Tools, Dies, Moulds and Materials Testing, Heat Treatment and Quality Control. The key focus areas of the Technology Center are as follows

- Progressive dies making - for tier 1 and 2 industries
- Prototyping and Reverse engineering facilities
- Training to the students in Tool & Die Technology, CAD/CAM solutions
- Training in Mechatronics & Robotics for Industrial automation solutions
- Mould base production facility for supply to the industry including SMEs.
- Engineering Solutions -Development of Jigs & Fixtures for Machining, Welding, etc.

#	Cluster Products produced by MSMEs	Tool required	Machines in TC Bhiwadi for supporting MSMEs
1	Clutch Parts, Brake Parts, Gaskets, Seating System, Inner Liner, Bottom Carpet, Wheel Parts	Press Tools- punch and Dies	Milling, Lathe, Drilling, Die Spotting Press, Hydraulic Press, Mechanical Press wire EDM,
2	Radiator Grill, Head Light, Engine Cover, Front and Rear bumper, Rear Lights, Central Console, Mirror Housing, Door Trimmings etc.	Moulds	Milling, Lathe, Drilling, Die/mould Spotting Press, Hydraulic Press, Mechanical Press, EDM, wire EDM, Gun Drilling, Surface Grinding, Injection Moulding Machine
3	Engine block, Powertrain Casing, Gear Box Casing, Pistons, Wheel Rim, Steering Wheel, Oil Pump etc.	Dies	Milling, Lathe, Drilling, Die Spotting Press, wire EDM, Gun Drilling, Surface Grinding, Cylindrical Grinding, Pressure die casting machine
4	Welding Fixtures, Special Fixtures. Gauges, Relation Gauge, Templates	Jigs, Fixture, Gauge	Milling, Lathe, Drilling, Wire EDM, Grinding

Table 1: Cluster product mapping with Machines in TCs

The technology center will play an important role in supporting the state government in developing a strong ecosystem for attracting large auto and general engineering manufacturing units in the state. A detailed list of machinery currently procured for TC is mentioned in the Annexure 2.

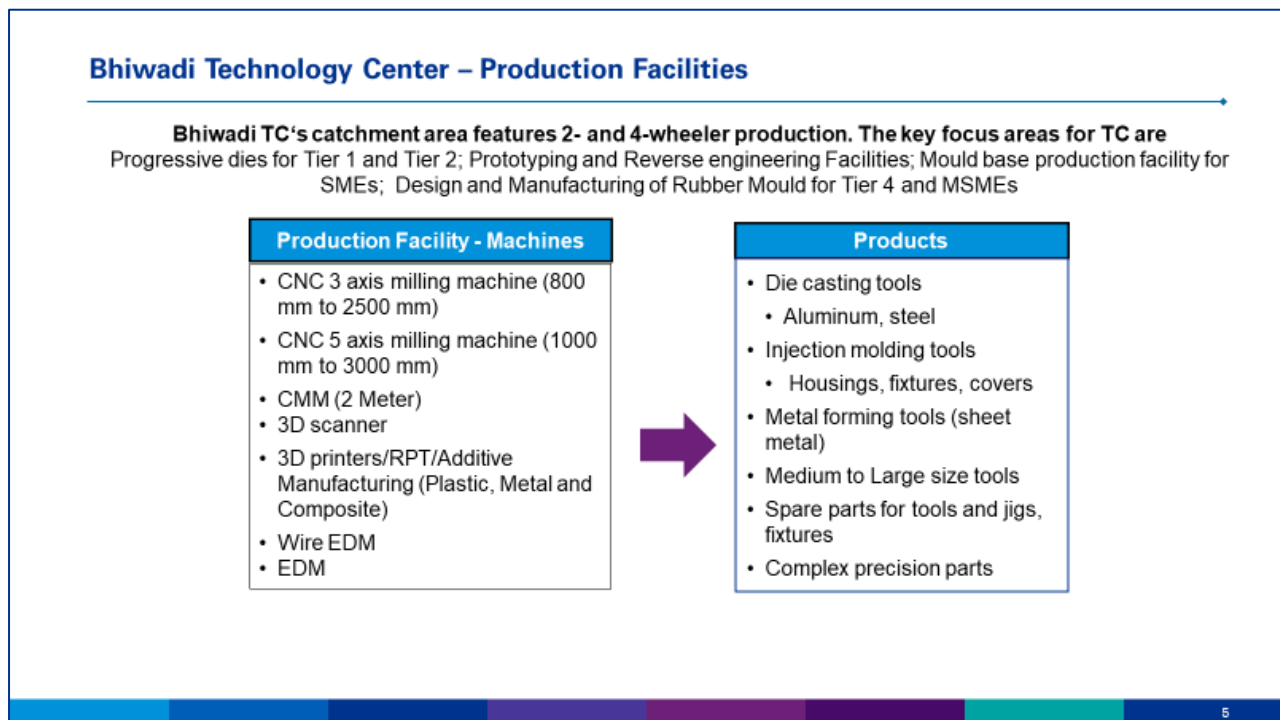


Figure 2: Technology Center Bhiwadi - Production Portfolio

5.2 Training Facilities

The Technology Center will provide professional training in various general engineering courses with a focus on fabrication techniques by offering advanced courses that will produce a highly-skilled technical workforce, with greater career prospects. The duration of courses will be both short and long term, ranging from 1 week to 48 months in various specializations like; Tool Room & CNC Manufacturing, CAD/ CAM, Advance Welding, Maintenance Training, Electronics and IT, Industrial and process Automation (Robotics), Training on Testing and calibration, etc. A key focus area of

the TC is to skill workers in quality testing of finished products. The batch sizes, the number of batches per annum and respective fees have been decided based on the capacity of existing TCs and NCVT norms.

Bhiwadi Technology Center is one of the fast movers in terms of initiating operations in the training portfolio in the country among the other new Technology Centers planned under the Technology Center Systems Programme. Bhiwadi TC is already equipped with various general-purpose training machines and has initiated training programs in the following courses.

- CAD/ CAM / CAE Design
- Tool Manufacturing
- Tool Design
- Computer Hardware/ Networking
- Civil / Architecture
- Low-Cost Automation
- Mechatronics
- CNC programming

A detailed list of current training programs & courses are mentioned in the Annexure 1

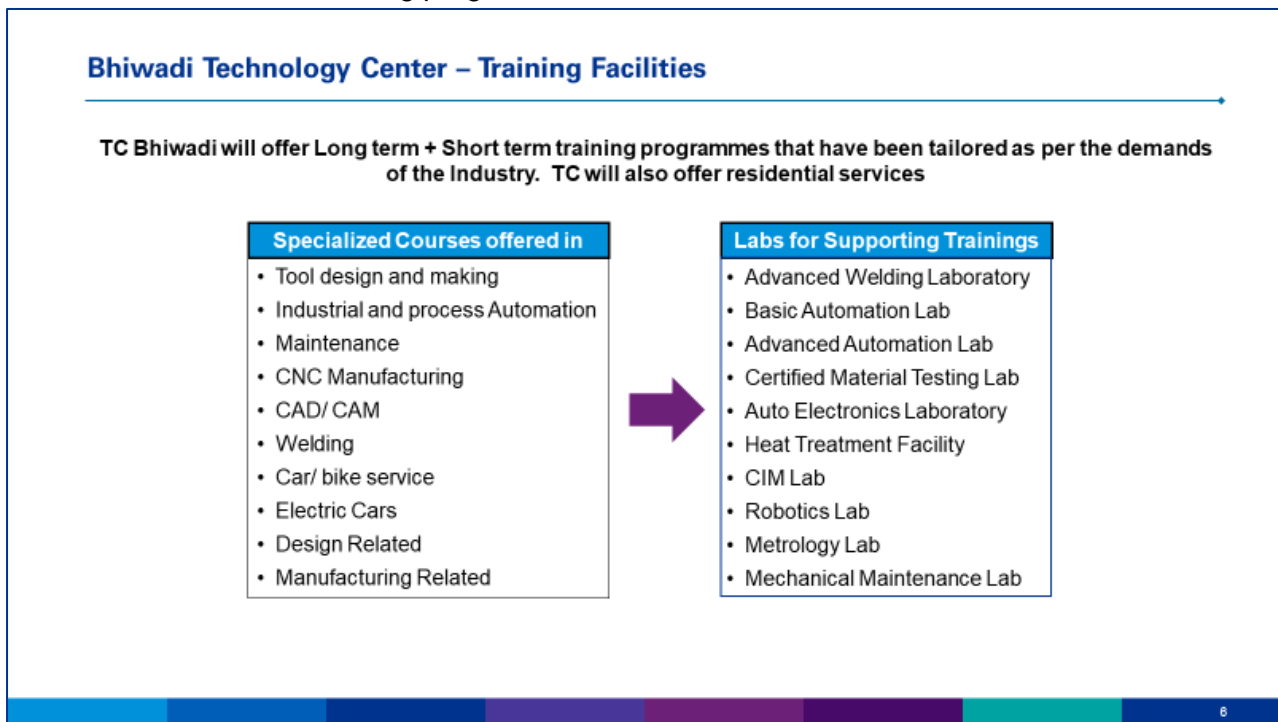


Figure 3: Technology Center Bhiwadi - Training Portfolio

5.3 Consultancy Portfolio and Incubation Center

Technology Center Bhiwadi also plans to set up a center that will provide incubation support to trainees for their start-up venture. Through this center, the technology center aims to nurture entrepreneurship by encouraging final year trainees to start their own ventures by providing necessary support in the following areas for three years

- High-end machining
- Access to finance
- Availing benefits of Government schemes

The incubation center will not only provide support to startups in the auto sector but also in other areas like non-auto focused sectors and non-precision works. As mentioned in the DPR of the technology center, the Incubation Center is proposed to perform in the following manner:

- The Center 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% of students from each long-term course will be selected. . Support would be provided to these students for their respective start-up ventures 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 Center for setting up 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 the 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 Center facilities.

Apart from providing the production, training and incubation support, the technology center will also support MSMEs in overcoming bottlenecks and inefficiencies in improving their competitiveness and presence in the market. The technology center will also provide handholding support to MSMEs in areas of product and process development, operations improvement, streamlining and standardization of processes through the adoption of international norms, new technologies, and capacity enhancement. Bhiwadi TC would have a dedicated professional wing to assist MSMEs by providing consultancy services in the field of Design Support (incl. Product Design), Engineering Solutions (Development of Jigs & Fixtures for Machining, Welding, etc., Quality System Support, Project Consultancy (Low-cost Automation Solution support, Productivity Improvement)

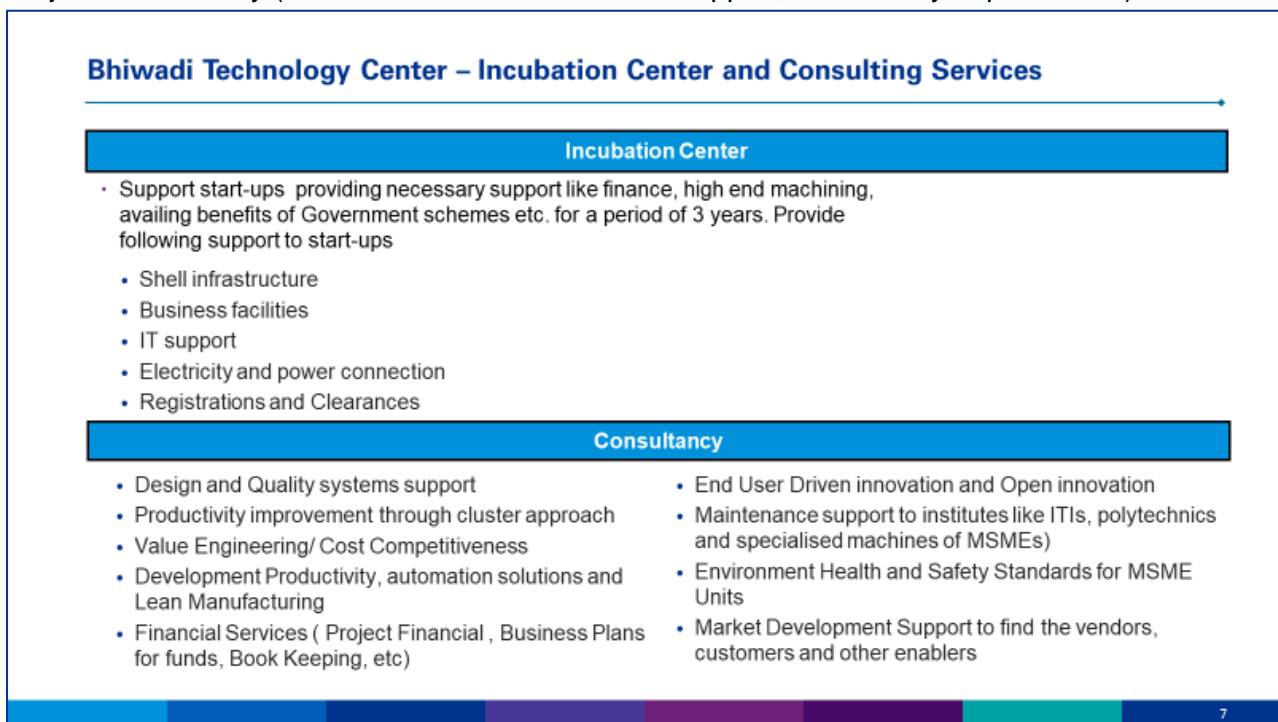


Figure 4: Technology Center Bhiwadi - Incubation and Consulting Portfolio

SWOT Analysis of TC

STRENGTHS	Opportunities
<ul style="list-style-type: none"> • Latest machinery for providing production and training support • Access to a strong network of 14 General Engineering Technology Centers under the parent Ministry • Availability of state-of-art laboratories for providing testing services • Government of India support for capital investment 	<ul style="list-style-type: none"> • Presence of a large number of OEMs like Hero, Honda, Maruti Suzuki, Ashok Leyland in the catchment area. • Non-availability of NABL accredited testing facilities in the region • Absence of Private Tool Rooms in Bhiwadi. Local units are dependent on tooling facilities in Gurgaon, Faridabad, Hyderabad, Mumbai, Pune for tooling related work
Weaknesses	Threats
<ul style="list-style-type: none"> • Access to TC is a challenge as it is situated away from the city. Further, as TC does not provide any transportation facilities, the commute would be a challenge for training seekers • High lead time in initiating production facilities of the technology center 	<ul style="list-style-type: none"> • Advance private tool rooms set up in Manesar, Faridabad & Gurgaon area having lower product cost, supporting to NCR. • Rigid government procedures for procurement causing higher delivery times. • There are many excellence & vocational Training centers of OEMs like MACE, Hero, Honda etc.

Table 2: SWOT Analysis of the Technology Center

6. Overview of Bhiwadi Catchment Area

The catchment area of Bhiwadi TC - Alwar, Rewari, Faridabad, Gurgaon and Gautam Budh Nagar – have more than 64,000 MSME units. The area has a presence of several global auto giants, OEMs, and tier 1 & 2 industries. A large number of automobile and automobile ancillary components are developed in the area due to the presence of major OEMs like Maruti-Suzuki, Hero Motors, Honda Motors, Escorts, Ashok Leyland, etc. These OEMs are catered by a number of MSMEs units that operate in areas pertaining to auto sheet metal parts, forgings, castings, machining of components, fans, exhaust systems, cranes, heat exchangers, electronics and component manufacturers etc.

The clusters were prioritized based on different areas that cater to the auto manufacturing units, to improve the linkages and reach of the TC. The total catchment area of the TC and Geographical proximity for Bhiwadi TC, possibilities for future linkages, cluster forming viability, number of units are considered while considering the forming of the clusters. The following three clusters are prioritized based on in-depth study and detailed discussion with Bhiwadi TC. Other factors considered during prioritization are major industries in and around with growth potential factors, industry associations, number of units and socio-economic conditions.



Figure 5: Location of Prioritized clusters

1. Bhiwadi Auto and General Engineering Cluster
2. Neemrana and Bawal Auto General Engineering Cluster

3. Alwar Auto and General Engineering Cluster

Bhiwadi Automotive Cluster

Bhiwadi is a city in the Alwar district of Rajasthan state and is an industrial hub in Rajasthan. Bhiwadi is about 75 Kms from Delhi. As of today Bhiwadi region has more than 15 Industrial Zones namely Bhiwadi Phase I-V and nearby industrial areas like Kahrani, Rampur Mundana, Tapukara, Khushkhera, IID Center Khushkhera, Pathredi, Chopanki and Sarekhurd including upcoming Industrial Areas Karoli and Salarpur. It is home to several major auto OEMs and their suppliers. Some of the major OEMs and Tier 1 players in this region are Honda Cars India Ltd., Honda Motorcycle Scooter India Pvt. Ltd., Shriram Piston & Rings Limited, Global Auto Parts Alliance India Pvt. Ltd., Yutaka Auto Parts, etc. Other major companies are KEI Industries Ltd., Jaguar & Company Pvt Ltd etc.

Neemrana Auto and General Engineering Cluster

Neemrana is an ancient historical town in Alwar district of Rajasthan and another major industrial hub in the Rajasthan. Neemrana is located about 120 Kms from Delhi on NH-8. The Export Promotion Industrial Park (EPIP) and the Japanese Industrial Zone in Majra Kath are the major industrial parks in the region. These parks have helped in attracting a number of global and Indian companies for setting up units in the region. Some of the major OEMs and their suppliers in the region are Hero Honda Ltd., Hema Engineering Ind. Ltd., Nissin Brake India (P) Ltd, TPR Auto Parts Manufacturing India (P) Ltd, Toyoda Gosei Minda India (P) Ltd., KOKOKU Intech India Pvt. Ltd., Takahata Precision India Pvt. Ltd., etc. Other major companies are Tokai Rubber Industrial Hose India Pvt. Ltd., Nippon Steel & Sumikin Pipe India Pvt. Ltd., HNV Casting Pvt. Ltd., Mitsui chemical private limited Etc.

Alwar Auto and General Engineering Cluster

Alwar is located 150 km south of Delhi and 150 km north of Jaipur, is a city in India's National Capital Region and the administrative headquarters of Alwar District in the state of Rajasthan. This cluster in contrast with the other two clusters has more diversified industries. Apart from several auto-based units, there are major agro-based, electronic, chemical, heavy engineering, fabrication, and other manufacturing industries are present. Some of the major companies are Ashok Leyland, TAFE tractors, Eicher, METSO, Surin Automotive Pvt Ltd., AMLOK Engineering, Mahalakshmi Engg. Etc

6.1 Key Cluster Stakeholders and Institutional Framework

Rajasthan government's enhanced focus on improving the industrial ecosystem in the state has helped in the development of a strong stakeholder and institutional framework in Bhiwadi. A constant interaction between these stakeholders has helped in the development of a strong industrial community as well as the market for the industrial units. Key stakeholders for Bhiwadi TC include: government bodies, industry associations, raw material suppliers, financial institutions, testing & certification facilities, machinery Suppliers, skilling and training institutes

Government Institutions: Government Institutions play a very important in the overall development of the industrial clusters and growth of the MSMEs in the state. These institutions play an important role in influencing policy decisions and are responsible for the execution and implementation of different central and state schemes and initiatives for last-mile delivery of different benefits. Some of the major government institutions in the state are:

- Commissioner Industries (CI) Rajasthan is an executive arm of the Government of Rajasthan and is engaged in the implementation of government policies for all-round development of industries in the state by seeking coordination amongst the state level promotional corporations

and other departments of the government relating to industries. The CI has been established to monitor, implement and develop various schemes including incentive schemes for promotion of industries in Rajasthan. It also assists the state government in the formulation of various industry-related policies and promotional schemes viz. Industrial policy, SEZ policy, IT Policy, Package Scheme of Incentives, etc.

- Bureau of Investment Promotion (BIP)- is the nodal agency of the Government of Rajasthan to facilitate investments in various sectors in the State. Since its inception in the year 1991, BIP has been providing investment facilitation services mainly for the large projects by acting as an interface between investors and the Government for speedy clearances and redressal of issues. It acts as the single point of contact for complete back-up support right from project conceptualization to final implementation as well as for post-investment services, for ensuring early fructification of the investment proposals.
- Rajasthan **State Industrial Development and Investment Corporation** is popularly known as **RIICO**, is a premier agency of the Government of Rajasthan that has played an important role in the industrial development in Rajasthan. RIICO is owned by the Government of Rajasthan and it is a premium organization of govt. of Rajasthan. RIICO is mainly engaged in (site selection and acquisition of land, developing infrastructure for industrial area) industrial cluster development, financial assistance to small, medium and large-scale projects, equity participation in large projects on merit, technical consultancy for project identification and technical tie-up, industrial escort services, facilitation of government clearances, merchant banking and financial tie-ups and extending incentives and concessions as per the policy of the State Government.
- Rajasthan Financial Corporation (RFC) is the term loan lending development financial institution in Rajasthan state. It provides finance to small and medium scale enterprises. It was set up by the Government of Rajasthan in 1955 under SFC Act. The corporation has 37 branches and 5 sub-offices in 33 districts of the State. The headquarter of RFC is at Jaipur.
- MSME- DI- The Micro, Small & Medium Enterprises Development Institute (MSME-DI), Ministry of MSME, Govt. of India was set up for the promotion and development of Micro and Small Enterprises. MSME Development Institute provides various types of extension services and assistance for setting up of units, promoting and developing products and services by the MSME Sectors. The institute has technical officers to provide guidance in all trades i.e. Metallurgy, Mechanical, Chemical, Leather, Electric Electronics, Food industry, Management, Economics Investigation, etc.
- National Small Industries Corporation (NSIC) is an ISO 9001-2015 certified Government of India Enterprise under the Ministry of Micro, Small and Medium Enterprises (MSME). NSIC has been working to promote, aid and foster the growth of micro, small and medium enterprises in the country. NSIC operates through a countrywide network of offices and Technical Centers in India.
- 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 the 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.

Industry Associations: Apart from government institutions, industry associations are other important stakeholders that play an essential role in the overall development of the industrial units. The associations represent the voice of different MSME units and are responsible for shaping the

ecosystem required for the growth and development of MSMEs. Some of the important associations in this region are:

- Rajasthan Chamber of Commerce & Industry, Jaipur
- Confederation of Indian Industries-CII - Jaipur
- Federation of Indian Chambers of Commerce & Industry(FICCI), Jaipur
- Bhiwadi Manufacturers Association (BMA), Bhiwadi
- Bhiwadi Chamber of Commerce & Industries (BCCI), Bhiwadi
- Neemrana Industries Association (NIA), Neemrana
- Matsya Udyog Sangh, Alwar
- Manesar Industries Association, Manesar
- Alwar Chamber of Commerce & Industry, Alwar
- Auto Components Manufacturer Samiti, Alwar (ACMS)
- Laghu Udyog Bharti, Bhiwadi
- Rewari Chamber of Commerce & Industries, Rewari
- IMT industrial Association, Manesar
- Faridabad Small Industries Association (FSIA), Faridabad

They also play an important role in keeping the members informed about policy and procedural changes. Their role is to strengthen the relationship between government and industry and to pursue different economic policies.

Financial Institutions: Most of the MSME units are financed through term loans and working capital loans from banks and equity contributions by entrepreneurs. Though PNB, Syndicate Bank and SBI are the leading banks in the catchment area of Bhiwadi TC, all major banks have set up their branches in the region. Rajasthan Financial Corporation (RFC) is one of the major financial institutions, which encourage MSMEs for setting the businesses by sanctioning the loan with lower interest rates. Some of the other institutes providing funding support in the region are:

- Haryana State Finance Corporation
- RIICO
- SIDBI
- IDBI

Major Buyers: OEMs and Tier 1 players - The 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.

Academic and Skilling Agencies: There are more than 50 engineering colleges, technical institutes, and diploma colleges along with incubation centers within the 100 km radius of Bhiwadi. These technical institutes play an important role in catering to the skilled manpower requirements of the clusters. Rajasthan is the first state in India to establish a mission for livelihoods, in September 2004, in order to address the challenges of unemployment and ensuring gainful and sustainable employment by formulating appropriate and innovative strategies for the poor and vulnerable people. In view of the importance regarding skill development for enhancing employability of the working population, Rajasthan Mission on Skill and Livelihoods, in 2009-10, formulated specific action plans to provide further impetus to the Skill Training. Some of the key academic & Skilling agencies are:

- Industrial Training Institute, Bhiwadi
- Malviya National Institute of Technology, Jaipur
- MSME Technology Center, Bhiwadi
- NTTF Skill Development Center, Bhiwadi
- International Center for Automotive Technology (ICAT), Manesar

Some of the other key institutes in the region are BITS (Birla Institute of Technology & Science) Pilani and Raffles University in Neemrana. Other institutes of importance in the region are Indian Institute of Technology (IIT) Delhi, Jaipur Footwear Design & Development Institute (FDDI), National Institute of Fashion Technology (NIFT) and Indian Institute of Management (IIM), etc.

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	-
	Polytechnics	5	-
	Engineering	26	-
Delhi	ITI & ITC	37	-
	Polytechnics	18	-
	Engineering	24	11,500
Total		221	48,724

Table 3: Type of Educational Institutes in the catchment area

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

Raw Material Suppliers: For the majority of the job work, the raw material is directly supplied by the clients, however for specialized material, the units import the material from other states like Gujarat, Maharashtra, etc. Some units also import the material from China as per their requirement of the specialized material. Some of the other units supplying raw material to the local industry include

- Mild steel - SAIL, TATA Steel, Jindal Steels
- Tool & die Steel - ASSAB Shripad 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

Testing & Certification Facilities: There are several public and private testing facilities available in NCR Delhi with NABL certified testing labs. But there is no NABL certified Lab available in Bhiwadi, Neemrana & Alwar General Engineering clusters area. Some of the labs in the region are:

- Acument Measurements & Consultancy Pvt. Ltd. (Calibration Division),
- AIMIL Calibration Laboratory
- Envirotech Calibration Laboratory (A Division of Envirotech Instruments Pvt. Ltd.)
- Bharat Electronics Ltd. (Calibration Laboratory)
- Pharmaffiliates Analytics and Synthetics Pvt. Ltd.
- Test Factory, AVL Technical Center Private Limited

- Test Lab (R & D), Krishna Maruti Limited (Seat Division)

6.2 Cluster Need Assessment

The focus during the field surveys was to identify the major challenges impacting the Auto and General Engineering clusters in Bhiwadi. As mentioned in the methodology, to translate this focus into reality, the team conducted one to one discussions and interactions with major stakeholders including MSMEs, OEMs, technical experts, HR, industry associations, and business development service providers. During and after the interactions with different stakeholders, efforts were put in to bringing up and noticing the issues being faced by the industrial units in the cluster. Some of the key challenges faced by the units are -

Cluster Challenge	Bhiwadi Auto and General Engineering Cluster	Neemrana Auto and General Engineering Cluster	Alwar Auto and General Engineering Cluster	Current TC Service Offerings – Cluster Applicability
Skilled Manpower and Up-skilling of Workforce	<ul style="list-style-type: none"> Most of the MSMEs do not have formal in-house training for skill up-gradation. MSMEs have varied requirements of training, which need to be customized as per requirements and affordable to them. Some of the areas where training is required by MSMEs are <ul style="list-style-type: none"> CNC machine Operations, Machine Maintenance Advance welding Inspection & Testing 	<ul style="list-style-type: none"> Few units have their own internal training programs for skill up-gradation, despite this availability of skilled manpower is an inherent issue in the cluster. MSMEs have varied requirements of training, which need to be customized as per requirements and affordable to them. Some of the training required by MSMEs are <ul style="list-style-type: none"> CNC machine Operations, Machine Maintenance Advance welding Inspection & Testing 	<ul style="list-style-type: none"> Few units are providing on the job training well and are imparting practical experience as per the in-house requirement. However, most of the MSMEs do not have formal in-house training on skill up-gradation. There are no training institutions for training on CNC machine Operations, maintenance, advance welding, Inspection & Testing 	<ul style="list-style-type: none"> Bhiwadi TC is proposed to have various short term and medium-term training courses to upgrade skill levels for the existing and fresh workforce Bhiwadi TC will offer customized tailor-made training programs as per the requirement/need of MSME units
Tooling Manufacturing and other services	<ul style="list-style-type: none"> Absence of private and government tool rooms in the region leading to increasing reliance on tool rooms in other states for production of dies and fixtures No prototyping facilities are available in the region 	<ul style="list-style-type: none"> Most of the tools used in the production are getting supplied from parent companies which are imported from other countries to meet the demands of the OEMs 	<ul style="list-style-type: none"> Most of the tools used in the production are getting supplied from parent companies which are imported from other countries to meet the demands of the OEMs 	<ul style="list-style-type: none"> TC will offer services related to advanced welding, Industrial process and automation, simulation through its different labs TC can also arrange and offer various knowledge-sharing workshops towards new machining

Cluster Challenge	Bhiwadi Auto and General Engineering Cluster	Neemrana Auto and General Engineering Cluster	Alwar Auto and General Engineering Cluster	Current TC Service Offerings – Cluster Applicability
	<ul style="list-style-type: none"> Most of the tools used in the production are procured locally at substantial cost. This is coupled with issues related to the quality and supply of tools 	<ul style="list-style-type: none"> No prototyping facilities are available in the region Absence of private and government tool rooms in the region leading to increasing reliance on tool rooms in other states for production of dies and fixtures 	<ul style="list-style-type: none"> No prototyping facilities are available in the region Absence of private and government tool rooms in the region leading to increasing reliance on tool rooms in other states for production of dies and fixtures 	<p>methods and how they can be adopted at the firm level</p> <ul style="list-style-type: none"> Though TC will be offering advanced tooling technologies, it has been observed that there is a need for the TC to upgrade some machines like CNC 5 axis milling, CNC 3 axis VMC for catering to the requirements of the cluster units
Testing and Certifying Facilities	<ul style="list-style-type: none"> NABL accredited testing facilities are not available in Bhiwadi. The units rely on testing facilities In Gurgaon, Faridabad and at other far away places for different Chemical and Mechanical testing Services 	<ul style="list-style-type: none"> NABL accredited testing facilities are not available in Bhiwadi. The units rely on testing facilities In Gurgaon, Faridabad and at other far away places for different Chemical and Mechanical testing Services 	<ul style="list-style-type: none"> NABL accredited testing facilities are not available in Bhiwadi. The units rely on testing facilities In Gurgaon, Faridabad and at other far away places for different Chemical and Mechanical testing Services 	<ul style="list-style-type: none"> TC plans to set up a NABL accredited chemical and metallurgical labs that would offer material testing facilities. Apart from offering this TC also plans to offer training services in Testing. Calibration, recalibration, and vibration testing services are not being planned by the TC
Productivity and Quality Improvement	<ul style="list-style-type: none"> Limited awareness among MSMEs about best practices for improving productivity and quality improvement. The use of smart tools, methods, machining tools, equipment and automation methods are limited to OEMs and Tier 1 Players. Limited adoption by MSMEs leads to higher production time and increased cost 	<ul style="list-style-type: none"> Limited awareness among MSMEs about best practices for improving productivity and quality improvement. The use Smart tools, methods, Machining Tools, Equipment and automation methods are limited to OEMs and Tier 1 Players. Limited adoption by MSMEs leads to higher production time and increased cost 	<ul style="list-style-type: none"> Limited awareness among MSMEs about best practices for improving productivity and quality improvement. The use Smart tools, methods, Machining Tools, Equipment and automation methods are limited to OEMs and Tier 1 Players. Limited adoption by MSMEs leads to higher production time and increased cost 	<ul style="list-style-type: none"> There are trainings in TC, on Use of Automation or Semi-Automation or Tooling Aids which will improve the productivity levels TC also plans to introduce training on 5S, Kaizen & other shop floor practices, and also provide consultancy services on methods for improving productivity and quality.

Cluster Challenge	Bhiwadi Auto and General Engineering Cluster	Neemrana Auto and General Engineering Cluster	Alwar Auto and General Engineering Cluster	Current TC Service Offerings – Cluster Applicability
Limited Adoption of New Technologies	<ul style="list-style-type: none"> MSMEs have limited reach to advanced and latest technologies such as low-cost automation, advanced cutting tools & machining, manufacturing methods, advanced welding, automation, etc. 	<ul style="list-style-type: none"> Some of the bigger units are aware of the latest technologies, MSMEs have limited reach to advanced and latest technologies such as low-cost automation, advanced cutting tools & machining, manufacturing methods, advanced welding, automation etc. 	<ul style="list-style-type: none"> Though it is observed that some of the medium industries have the tendency to go for new technologies, MSMEs have limited reach to advanced and latest technologies such as low-cost automation, advanced cutting tools & machining, manufacturing methods, advanced welding automation etc. 	<ul style="list-style-type: none"> TC can also arrange and offer various knowledge-sharing workshops towards new machining methods and how they can be adopted at the firm level Through its production facility, TC also plans to support MSMEs by providing them prototyping support to acquaint them with new technologies
Poor Occupational Health and Safety	<ul style="list-style-type: none"> MSMEs are aware of safety guidelines but lagging effective implementation of safety and health practices 	<ul style="list-style-type: none"> MSMEs are aware of safety guidelines but lagging effective implementation of safety and health practices 	<ul style="list-style-type: none"> MSMEs are aware of safety guidelines but lagging effective implementation of safety and health practices 	<ul style="list-style-type: none"> TC does not have any plans currently for a course on EHS, However, it will organize Workshops to increase awareness and proper implementation among the MSMEs.
Poor Access to Information	<ul style="list-style-type: none"> Low awareness of various central and State government schemes and incentives (concessions & facilities). There is a common perception among the units that the process of scheme approvals requires a lot of paper-work and is time-consuming. Limited information about financial institutions and their schemes 	<ul style="list-style-type: none"> Low awareness of various central and State government schemes and incentives (concessions & facilities). There is a common perception among the units that the process of scheme approvals requires a lot of paper-work and is time-consuming. Limited information about financial institutions and their schemes 	<ul style="list-style-type: none"> Low awareness of various central and State government schemes and incentives (concessions & facilities). There is a common perception among the units that the process of scheme approvals requires a lot of paper-work and is time-consuming. Limited information about financial institutions and their schemes 	<ul style="list-style-type: none"> Though this is not the direct focus area of the technology center, TC will support the local government institutions like MSME DI, DIC and other institutes in conducting awareness workshops on different government schemes and initiatives

Cluster Challenge	Bhiwadi Auto and General Engineering Cluster	Neemrana Auto and General Engineering Cluster	Alwar Auto and General Engineering Cluster	Current TC Service Offerings – Cluster Applicability
Limited Access to market	<ul style="list-style-type: none"> • Inadequate linkages in Marketing • Smaller units are not able to participate in the large orders-and coping with the trend of delivery of the final product from a single vendor. 	<ul style="list-style-type: none"> • Inadequate linkages in Marketing • Smaller units are not able to participate in the large orders-and coping with the trend of delivery of the final product from a single vendor. 	<ul style="list-style-type: none"> • Inadequate linkages in Marketing • Some of the units are focussing on marketing and diversification • Smaller units are not able to participate in the large orders-and coping with the trend of delivery of the final product from a single vendor. 	<ul style="list-style-type: none"> • Marketing access is a major issue faced by the units. Though this is not TCs’ direct focus area, it will support the cluster MSMEs in availing different government schemes for participating in trade fairs and buyer-supplier meets. Further, it will also contact different PSUs for conducting different Vendor Development Programs, that will support the MSMEs in becoming their vendors

Table 4: Cluster need assessment

7. Recommendations

After an inspiring experience in the field and stimulating discussions with different stakeholders like MSMEs, Industry Associations, Government officers and OEMs, TCM found that though Bhiwadi TC is catering to majority of the requirements of the cluster, there are certain gaps that need to be filled up to support in making the Technology Center as a center of excellence. After capturing, understanding and analyzing the needs of the clusters and Bhiwadi TC's planned infrastructure and services, the following are recommended.

7.1 Skill Development and Training Facility

The unskilled workforce has been one of the major cluster level challenges that were also witnessed on the ground. Based on the interactions with the stakeholders, it has been found that there is a massive need for capacity building workshops in machining, foundry, and forging. TCM recommends certain new training programmes that can help Bhiwadi TC inculcate standards, quality assessment, value addition and knowledge base amongst MSMEs existing in the cluster. These training were also mentioned in the DPR revision report and were also validated during the cluster diagnostic study.

Most of the MSMEs and major companies are interested in availing customized training for their employees to improve their skill levels. Considering their requirements, it is recommended to introduce the new training as given below. Though some of these training are available as medium-term courses, MSMEs are interested, in availing parts of the courses considering the availability of their workforce as well the affordable finances.

CNC Machining operations and Programming: There is a considerable requirement for training for CNC Operations. MSMEs are interested in getting their personnel trained who have some experience in machining operations hence, it is recommended to organize customized CNC machining training in the TC.

Aluminum Welding: A good number of fabricated parts of aluminum assemblies are being delivered by the units. The trend is to use more Aluminum alloy products which result in considerable weight reduction when compared with the other equivalent ferrous and steel products. In the process, it is required to weld the Aluminum parts together and this skill set is scarcely available with most of the MSMEs. Though Stainless steel and Aluminum welding are planned as part of advanced welding training in TC, based on the feedback, it is recommended the inclusion of Aluminum welding training as customized training in the upcoming TC at Bhiwadi.

Foundry technology - introduction and practice: In all the 3 prioritized clusters, there are a good number of casting manufacturing units that cater to the supply of castings to the larger Auto OEMs as well as to Railways and other heavy machinery industries. The operators lack requisite skills while working in the foundries. To cope up with this lack of skilled operators, it is proposed to introduce additional training on introduction to foundry technology. This training will have a maximum of theory classes and practical knowledge & experience would be imparted while working as trainee apprentices in MSMEs by tying up with some of the foundry units.

Fitters Training: As per the feedback, skilled manpower with the required fitter skills is not available for assembly units, sheet-metal work etc. It is recommended to introduce fitter's training in the Technology Center. The training will be imparted on the below-mentioned topics:

- Practice on tools used in fitting - Hacksaw, Chisels, Marking, Dividing, Vernier Calliper, Micrometre, Height Gauge, slip gauges etc.

- Sawing, Chipping, Filing on given MS block according to given size & drawing, Practice of Drilling, Chamfering & Tapping on MS block using Drill Machine & Hand Tap
- Plate joints making assembling practice and pipe joints practice.

The training programs are applicable in all the Three prioritized Clusters				
#	Specialization	Title of the Training Program	Duration in weeks	Pre-Requisite
1	CNC Machining	CNC Milling Operations – (Introduction of CNC machines, Programming, and Practical training) – Full Time	3	Min. 1 Year machining experience
2		CNC Milling Operations – (Introduction of CNC machines, Programming, and Practical training) – Part-Time	6	Min. 1 Year machining experience
3		CNC Turning Operations – (Introduction of CNC machines, Programming, and Practical training) – Full Time	3	Min. 1 Year machining experience
4		CNC Turning Operations – (Introduction of CNC machines, Programming, and Practical training) Part-Time	6	Min. 1 Year machining experience
5		CNC Programming	3	Min. 1 Year machining experience
6	Manufacturing	Aluminum Welding (Introduction to welding principles and of Aluminum; and practical welding) – Full Time	4	Min. 1 Year of relevant experience
7		Aluminum Welding (Introduction to welding principles and of Aluminum; and practical welding) – Part-Time	8	Min. 1 Year of relevant experience
8		Introduction to Foundry technology–and practice – Full Time	6	Min. 1 Year of relevant experience
9		Introduction to Foundry technology–and practice – Part-Time	12	Min. 1 Year of relevant experience
10		Fitters training – Full time	6	Min. 1 Year of relevant experience
11		Fitters training – Part-time	12	Min. 1 Year of relevant experience

Table 5: Proposed Training Programs for TC Bhiwadi

Apart from introducing these new courses in the Technology center, it is important for the technology center to prioritize the training courses, from the list of more than 30 training courses in the DPR, that should be introduced over the next one year till the time TC becomes completely operational. These courses have been prioritized based on the inputs received during the cluster surveys.

Courses Recommended on priority in TC

#	Specialization	Course name	Duration - Months	Pre-Requisite
1	CNC Manufacturing	CNC lathe programming and operation (Full Time)	2	ITI/Diploma/1 year relevant experience

#	Specialization	Course name	Duration - Months	Pre-Requisite
		CNC lathe programming and operation (Part-Time)	4	ITI/Diploma/1 year relevant experience
		CNC Milling Prog and Operation (Full Time)	2	ITI/Diploma/1 year relevant experience
		CNC Milling Prog and Operation (Part-Time)	4	ITI/Diploma/1 year relevant experience
		Certificate course in Machinist	24	10 th Pass
		Post Diploma in CNC-Prog & Operation	12	ITI/Diploma/Degree 2 year relevant experience
2	Advance Welding	Advanced Aluminum welding (Part-time and Full Time)	1 and 2	1 year relevant experience
		Basic Arc and Gas welding (Full Time)	3	10 th Pass /(ITI)/6 months experience
		Basic Arc and Gas welding (Part-Time)	6	10 th Pass /(ITI)/6 months experience
		TIG welding (Full Time)	1.5	ITI/Diploma/1 year relevant experience
		TIG welding (Part-Time)	3	ITI/Diploma/1 year relevant experience
		MiG welding (Full Time)	1.5	ITI/Diploma/1 year relevant experience
		MiG welding (Part-Time)	3	ITI/Diploma/1 year relevant experience
4	Manufacturing	Foundry technology - introduction and practice	1.5 and 3 Months	1 year relevant experience

Table 6: Training programs to be initiated on Priority

The focus of the technology center should be in imparting training in a way to become a renowned center for improving the overall skills of the workforce. Bhiwadi Technology Center while imparting training, also to focus on

- **Finishing School:** Bhiwadi TC should join hands with the existing educational institutions in the nearby areas and make the last year of their studies aligned to industry practices for making the pass-outs “industry ready”. Institutions have shown interest to get the students to undergo customized training during the change of the semester. The TC should fill in the role of “finishing school” – through enhanced coverage of the syllabus, as this will help the entire industry – from OEMs to MSMEs – in reducing substantial indirect cost and time.
- **Safety Needs and Good Manufacturing Practice (GMP) aspects:** Increased focus on making the workforce aware of the importance of adhering to safety standards and products are manufactured consistently and controlled according to quality standards

- **Maximise the benefits of available human resources:** Develop a new class of “operator” by “up skilling” the operatives. It will tend to attract and reward people by getting the right job to good skills.

7.2 Production facilities in TC

Technology Center, Bhiwadi focusses on the following requirements of the industry and will support the MSMEs, OEMs and Tier 1 - Tier 2 suppliers.

- All types of sheet metal die including the Progressive dies, Forming Dies, Stamping dies, Compound dies, etc

- Forging dies production
- Permanent moulds, patterns for Foundries and Alloy casting industries
- Die Casting Dies
- Plastic Moulds
- Jigs & Fixtures
- Assembly tooling aids
- Automation equipment support
- Testing and inspection templates, gauges, equipment, etc
- Production support to SMEs
- Reverse engineering facilities

- **Automation:** Majority of MSMEs in the region use conventional manufacturing processes. To bolster the competitiveness and efficiency of these MSMEs, Semi automation/automation needs to be introduced in the manufacturing processes. But, the MSMEs might not have the capacity to purchase latest technologies. Therefore, it is pertinent to introduce semi-automatic production equipment or appropriate tooling in their production.
- **Manufacturing support:** Units which have low capacity of machining, grinding etc. may need support in manufacturing of certain operations on the products to meet their schedules and complete the delivery. This also opens opportunities for the TC, for the manufacturing of their tooling.
- **Reduce all indirect costs on products:** Reduced rejection and reworking by 'doing every time right at first time' by introducing right tooling and appropriate automation.

7.2.1 Production Machines Quantity

As observed during the DPR revision process and validated during current visits, it was observed that MSMEs, Tier 3 and 4 units face difficulty in meeting their targeted schedules in getting dies and moulds due to the unavailability of proper tooling manufacturing facilities in the region. Due to the absence of tool manufacturing facilities, the majority of the demand is met through tool rooms in Ghaziabad, Pune, Mumbai and other parts of the country. In order to cater to this demand and reduce the lead time in meeting the requirements for moulds and dies production, there is a need to re-look at the quantity and the size of machines proposed in the DPR. The same has been mentioned in the DPR Revision report as well.

To ensure that the TC meets the market demand, quantities of the machines should be increased to achieve the desired output and reduce the lead time in production. This supply would give the trainees a good opportunity to get aligned to the regular production. The planned increase in the quantity machines should be staggered over a period of 2-3 years in order to reduce the financial impact of capital outlay and proceeding with the procurement based on the return on investment of the TC and demand at that time.

Machine	Original Qty	Modified Qty	Year 1	Year 2	Year 3
CNC 3 axis milling machine (2.5m*1.5m*1.5 m) Modified Size: CNC 3 axis milling machine – (2.0m*1.5m*1.5 m)	1	6	2	1	2
Wire EDM (800mm*800mm*500 mm)	1	3	1	1	1
EDM (1000mm*1000mm)	1	3	1	1	1
CNC 5 axis milling machine (3m*2m*1.5m)	2	2	1	1	
Gun Drilling Machine (20mm*800mm)	1	0	This machine is dropped, as it is observed that there is no immediate requirement of Gun drilling		

Table 7: Production Facility: New Machines Proposed

7.2.2 Prototype Production and Reverse Engineering

The demand for a reverse engineering facility has increased with India becoming a potential hub for component suppliers in the global market. This positioning in the market has increased the demand for the production of components based on a physical component without detailed drawing. As a result, Tier 3, 4 units and MSMEs are to manufacture reverse-engineered components in batches/mass production.

3D Scanner: On several occasions, a prototype component that is physically modified as per the aesthetic and functional point of view also needs to be reverse-engineered. TC can cater to these requirements by offering a 3D scanner along with a CMM of size 1.5M*1.5M*1.5M instead of the original CMM size 3m x 2m x 1.5m planned in the DPR originally. The same has been mentioned in the DPR revision report and was validated during the cluster diagnostic surveys.

3D Metal Printing: Parts manufacturing using 3D metal printing require no tooling and very little machining. It offers a way to produce metal prototypes with a reduced cost - helping to evaluate more designs in a shorter period of time - compressing the product development cycle and lead time. Metal 3D printing allows medical device manufacturers to quickly and inexpensively prototype products using stainless steel. This process can be used very effectively for -

- For low volumes/batch production - avoiding steep overhead and custom tools, at a low cost per part.
- Conformal tooling – With intricate undercuts which are not possible to machine with any other material removing methods for Tooling such as moulds and inserts
- Some of the applications are:
 - Aircraft and auto parts
 - Rocket / Missile / Propulsion.
 - Turbine Blades for Energy Production.
 - Nuclear Components.
 - Refractory Metal Components.

The recommended machines are as given below:

Sr. No.	Machine	Qty	Comments
1	3D printer for plastics / polymers additives	1	
2	3D printer for metal components	1	
3	3D Multilayered component maker	1	
4	CMM of size 1.5M*1.5M*1.5M with 3D Scanner	1	Size of CMM in the Original DPR is 3m x 2m x 1.5m

Table 8: Prototyping and Reverse Engineering: New Machines Proposed

7.2.3 Additional Service – Sheet Metal forming, Pressure Die Casting and Gravity Casting simulation

Sheet Metal Forming Simulation: For designing sheet metal forming dies, very good experience and understanding of forming process is required to optimize the number of stages (forming dies) and arriving at the accurate developed shape for blanking operation. Designing the optimized number of dies results in the saving of initial investment, reworking on the dies during the try-outs which eventually saves operations cycle time. It is also very important that the quality of the formed component is very good without any wrinkles and thinning defects. Their skills are highly scarce and are seldom available even among the experienced designers having the required knowledge, hence, it is recommended that TC can provide services in the simulation of the sheet metal forming through a knowledge-based Software. This will not only support MSMEs but can also be used in the internal designs of Sheet Metal dies and manufacturing.

There are several good sheet metals forming simulation software available in the market – Hyperworks, LS DYNA, AutoForm, PAM-STAMP, ABAQUS, DEFORM 3D etc. It is suggested to include the software procurement in Phase-II in the second year of TC operations.

Note: TC to check for the required licenses in the existing Simulation/analysis Software packages (ANSYS and others) to carry out the above requirement

7.2.4 Liquid material flow Simulation in the dies: It is very important to manufacture a defect-free component in the die casting dies. It is common that during the solidification of hot liquid material in the dies/moulds, there may be issues like – unfilled areas, blowholes, shrinkage cavity, hot tears, hot spot, cold shut, misrun, unsatisfactory surface etc. It is very important to consider all these aspects while designing the die casting dies as there is a huge shortage of experienced and knowledgeable designers in this area. To overcome this, it is recommended that TC can provide services in liquid material flow simulation in the dies using good knowledge based software. These knowledge based software will provide good analysis and clear forecast of the issues in the proposed design, which will help the designers to modify and get correct designs for defect free component. There can be multiple runs of simulations with different setups of preliminary design considerations till optimum results are achieved. There are several good software available in the market for Liquid material flow Simulation in the dies – MAGMASoft, Nova- Solid/Flow, ProCAST, AutoCast, Flow-3D Cast, etc. It is suggested to include the software procurement in Phase-II in the second year of TC operations.

Note: TC to check for the required licenses in the existing Simulation/analysis Software packages (ANSYS and others) to carry out the above requirement

7.2.5 Gravity Casting metal flow Simulation: There are a good number of foundry units in all the clusters who supply castings to Auto Industry, Railways etc. Some of the units have capability and facility to simulate the Metal Flow in Gravity Castings - so that features like runners etc. can be placed appropriately in the moulds – to maximize the quality and minimize the defects and rejection of the casting.

It is recommended that TC should provide simulation of metal flow in the mould service to the other MSMEs where the facility is not available. Bhiwadi TC can start this service and it is suggested to include the software procurement in Phase-II in the second year of TC operations.

Note: Most of the software mentioned in the Liquid material flow Simulation are also capable of Gravity casting metal flow simulation - suitable software needs to be finalized by the TC.

TC to check for the required licenses in the existing Simulation/analysis Software packages (ANSYS and others) to carry out the above requirement.

The Services are applicable in all the Three prioritized Clusters		
#	Service	Details
1	Sheet Metal Forming Simulation:	Simulation service of Sheet Metal forming in the SW. <ul style="list-style-type: none"> • Modeling of component for simulation • Adding the Preliminary set up of die with forming orientation and design features • Meshing • Pre and post-processing • Analyzing the results • Repeat the above required till getting satisfactory and approved results
2	Liquid material flow Simulation in the dies:	Simulation of Material Flow in die Castings in the SW. <ul style="list-style-type: none"> • Modeling of the component • Adding the Features Cast/Mould with its design features for simulation • Meshing • Pre and post-processing • Analyzing the results • Repeat the above required till getting satisfactory and approved results

3	Gravity Casting metal flow Simulation:	<p>Simulation Metal Flow in Gravity Casting in the SW.</p> <ul style="list-style-type: none"> • Modeling of component • Adding the Mould with its design features for simulation • Meshing • Pre and post-processing • Analyzing the results • Repeat the above required till getting satisfactory and approved results
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Table 9: Simulation services proposed in the TC

7.3 Testing and Certification Facilities in the TC

MSMEs find it difficult to get testing certificates for the products manufactured through foundries, forgings and other processes due to the unavailability of a NABL accredited facility in the region. This forces them to depend on private and unrecognized labs /facilities in the region. It is proposed that the material testing lab planned in Bhiwadi TC should be NABL accredited and should have facilities for mechanical and chemical tests. The three major divisions of testing - metrology, metal testing, and failure analysis should also be carried out in the laboratory. The laboratory is expected to cater to the following requirements of the industry

- Ensure regulatory compliance and recognition by all the industries
- Select a suitable process
- Help in quality job work.

Apart from the planned material testing lab, the TC should also focus on setting up two testing labs for meeting the testing needs of the cluster

- **Testing & calibration Services:** MSMEs are required to carry out specified Mechanical and chemical tests on their products before delivery and have to submit a recognised certificate stating the compliance of their products

Calibration and Recalibration Laboratory: Due to the absence of a proper Calibration and Recalibration facility in the region, the units in this area are facing difficulties, - have to send their instruments to far off places – for calibration and certification in order to meet the mandatory calibration requirements of different OEMs. Since the calibration exercise has to be carried out periodically, the time period is often set by OEMs as per ISO requirements, thus there is a need to set up a Calibration and Re-calibration laboratory in the region.

It is strongly recommended that this lab should be operated on a BOT (Build-Operate-Transfer) basis. Thus the TC need not make any investment - other than housing the Lab. The lab can also be used to train new entrants.

Vibration testing and Analysis laboratory: During the interactions, the industry players have suggested on providing vibration tests - which is also a common requirement with the other process and power plants – to make sure that the components do not leave any residual strain in the operating parts and any failures resulting from vibration do not become disastrous or effect production of the plant. This is applicable for all smaller units also where pumps and motors are running and where vibration results are unavoidable. There is no such established facility in and around the region for this purpose. Therefore it is proposed to set up a Vibration testing and analysis lab.

It is recommended that this lab should also be run on BOT basis for the initial 5 years to reduce the capital outlay during the initial stages of TC setup.

It is expected that TC will start all the services as soon as the required infrastructure is available to support the MSMEs. However, as per the feedback, Bhiwadi TC should take up Chemical and Mechanical testing services on a priority basis and expedite the availability of required equipment.

There are no accredited institutions for testing and certifying the mechanical and chemical properties of the components. It is a mandatory requirement of suppliers to submit testing reports of their products during the delivery and it is one of the main criteria for the acceptance of delivered products. Though the units are managing with the nearest available testing services, all the MSMEs have asserted the requirement of this testing services in Bhiwadi TC

7.4 Cluster Development Activities

A careful assessment of the training services and consultancy and other offerings of the TC - to bridge the gap with the cluster requirements and process improvements that can be taken up - TCM recommends the following activities based on the analysis.

7.4.1 Productivity Improvement

Considering present manufacturing processes in the clusters, there is a good scope to introduce production improvement methods with the use of semi-automation aids. TC can offer consultancy services to study the existing practices and to suggest appropriate methods for improving the productivity of the workforce. Further, wherever it is not viable to introduce a sort of automation in the processes, TC can support in the implementation of production aids for the production with Jigs and fixtures and other methods. TC can also support the units in the implementation of robotic technology in areas where regular operations and welding are required in the production.

Apart from the consultancy services and technical Skill up-gradation, it is also recommended to introduce regular courses and workshops in:

- Lean Manufacturing
- TQM
- TPM including all the pillars - Autonomous Maintenance; Planned Maintenance; Quality Maintenance; Focused Improvement; Early Equipment Management; Training and Education; Safety, Health, Environment; TPM in Administration
- ISO certifications and its benefits
- 5S

7.4.2 Quality Control

As the majority of the units are without ISO Quality certifications, TC can act as a prime institute to provide consultancy services to increase the awareness about ISO Quality systems and implement them in the MSME units. TC can undertake activities for increasing awareness about the benefits of implementation of the Quality Systems among the MSME units. This will help the units to qualify and fulfill prerequisites of the registration with the organizations, opening larger markets for them. As a part of this initiative, TC can offer services related to Total Quality Management (TQM), Six Sigma Green Belt, 5S, Productivity Management etc.

7.4.3 Limited Access to market

To resolve the issue of limited linkages for MSMEs, TC can take the local support of the local Govt. bodies like MSME DI, and Industrial Associations and other Marketing Promoters, TC for

- Registrations with OEM VDPs
- Capturing the Local Market effectively
- Formation of MSMEs consortiums to cater large orders

TC can provide support in registering with all the national and international OEMs and service providers like Maruti Suzuki, Honda Siel cars India, Honda motorcycle & scooter India, Ashok Leyland, TAFE tractors, Eicher, Escorts, Metso etc by conducting Vendor Development programs. This will also expose the MSME units to the end-user requirements that can motivate them to

upgrade their capabilities accordingly. Wherever possible, TC can act as the aggregator for the OEM and can facilitate orders to MSMEs while taking the overall execution responsibility. TC can also lend a lot of credibility to joint marketing efforts of the MSMEs while being a credible Govt of India facility and having state of the art infrastructure to support high precision jobs outsourced by OEMs.

It is further recommended that TC supports MSME DI and DIC to organize buyer-seller meets for a greater outreach for the MSMEs. These meets can significantly help in the creation of market linkages. These meets can be organized at the regional, state and national level. Organizing exposure visits to MSMEs in the general engineering sector will make the manufacturers aware of the prevailing trends and modern machinery. This exposure can help both TC Bhiwadi and manufacturers to benefit immensely from the existing setup.

7.4.4 Entrepreneurship Facilitation

Entrepreneurs' Facilitation Cell can be established at TC Bhiwadi to bridge the information gap and provide services like

- Basic documentation for UAM, GST
- Import /Export Registration
- Loan processing
- Digital learning
- E-marketing
- Providing information regarding government schemes through mailers and scheme booklets
- Information on how to set up new enterprise,
- Preparation of proposal for large OEMs.

Annexure 1: Planned Training Programs and Courses

No	Specialization	Course Name	Duration (Months)
1	Tool Room & CNC Manufacturing, CAD/ CAM	Advanced Diploma in Tool & Die making (ADTDM)	48
		Diploma in Mechatronics (DIM)	36
		Certificate course in CNC Turning & Milling	12
		Certificate Course in Tool & Die Making	12
		Certificate Course in Machine Maintenance & Automation	5
		Certification Course in Mechanical Product Design	6
		Certification Course in CAD	5
2	CNC Manufacturing, (CAD/ CAM)	CNC lathe programming and operation (Full Time)	2
		CNC lathe programming and operation (Part-Time)	4
		CNC Milling Prog and Operation (Full Time)	2
		CNC Milling Prog and Operation (Part-Time)	4
		CAD/CAM/CNC Programming (Full Time)	2
		CAD/CAM/CNC Programming (Part-Time)	4
		CAD Modelling with different software (Full Time)	1
		CAD Modelling with different software (Part-Time)	2
		Computer Integrated Manufacturing (CIM)	1
3	Industrial and Process Automation	Industrial Hydraulics	1
		Industrial pneumatics	1
		PLC Programming	1
		Automation Technician	4
		Process automation design	4

Annexure 2: Planned Production Machines as per the DPR

SN	Machine	Suggestive Specs
1.	CNC Milling-5axis	3m*2m*1.5m
2.	CNC Milling-3axis	2.5m*1.5m*1.5m
3.	Die spotting press	200 mt
4.	Hydraulic press	1000 tonne
5.	Mechanical press	100 tonne
6.	Wire EDM	800*800*500 mm
7.	EDM	1000*1000 mm
8.	Injection Moulding machine	800 tonne
9.	CNC Lathe	300*600
10.	Gun drilling machine	20*800mm
11.	Radial drill machine	63mm
12.	Surface Grinding	2.5m*1.5m
13.	Surface Grinding	2m*1m
14.	Cyl Grinding	200mm*750mm
15.	Vacuum Heat treatment plant	300mm*1000mm
16.	Assembly Benches & Fixtures	-
17.	Auxiliary Equipment (Drill m/c, pedestrial grinder, trollies etc.)	-
18.	EoT & Jib Crane	-
19.	Compressor (approx. 250 CFM)	-
20.	CMM (Coordinate Measuring Machine)	3m*2m*1.5m
21.	Height Master/Gauge	-

SN	Machine	Suggestive Specs
22.	Surface Finish tester	-
23.	Other Metrology lab equip	-
24.	CAD Software like CATIA, UG etc	-
25.	Engg. Analysis software like ANSYS, mouldflow, autoform, PAMstamp etc.	-
26.	Additive Manufacturing/3D printing/RPT	-
27.	Drafting/Printing	-
28.	Workstations	-
29.	Misc., unforeseen & Contingency	

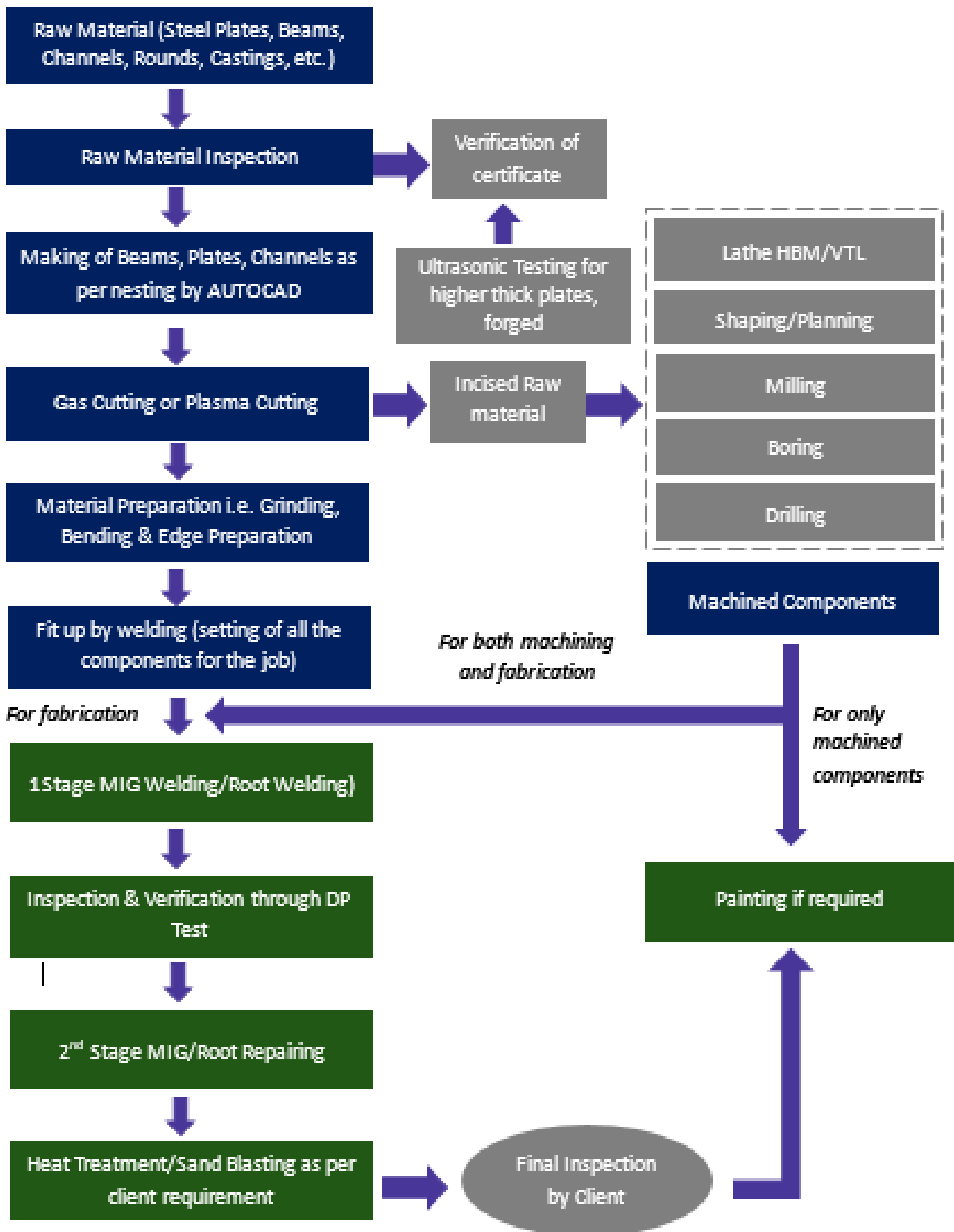
Annexure 3: List of Stakeholders Contacted

Sr. No	Stakeholder	No. of Stakeholders Contacted
1	SMEs/ MSMEs	24
2	Industrial Associations	4
3	OEM	2
	Total	30

Sr. No	Association/MSME/ Entity Name	Stakeholder Name	Designation	Cluster Location
1	JETKT India Ltd	Avanish Kumar Singh	GM	Dharuhera
		Lal Singh Dinker	AM- Tool	Dharuhera
2	Hema Engineering Ltd	VP Yadav	Head - Operations	Dharuhera
3	Minda Kyoraku Ltd	Lalit Kumar Jangir	Plant Head	Bawal
4	Wheels India Ltd	Mahavir Gupta	SM	Bawal
		Sachin Sharma	AM-R&D	
5	MJ Castings	Ombir Yadav	AM- Quality	Bawal
6	Hero Moto Crop	Mr. Sudhanshu	AGM	Dharuhera
7	TPR Auto parts Mfg. India P Ltd	Kamal Kumar	Manager- HR	Neemrana
		Akhilesh Yadav	DM-SCM	
8	CMT Group	Sushil Chauhan	MD	Bhiwadi
		Manoj Kumar Rajput	MD	
9	Kamal Wires	Mr. Praveen Lamba	MD	Bhiwadi
10	Jindal Forgings	Dena Nath Pandey	MD	Bhiwadi
11	Amba Tech Engineering	Vijay Patel	MD	Bhiwadi
12	SR Auto Industries	Naveen Yadav	MD	Khushkhera
13	SM Precision	Yudhvir Singh	MD	Bhiwadi
14	Mittal Forgings & component pvt ltd	Tarun Mittal	Director	Bhiwadi
15	Sunshine Auto Engineering	Amit Rana	MD	Bhiwadi
16	Para coat Products Ltd	Arvind Haldia	GM	Bhiwadi
		Sushil Agarwal	AGM	

Sr. No	Association/MSME/ Entity Name	Stakeholder Name	Designation	Cluster Location
17	SSB Engineers Pvt. Ltd	Deven Bhatia	Director	Alwar
18	Shashank Engineering Works	Shashank Yadav	Director	Alwar
19	GM Hitech	Bhasker Modi	Director	Alwar
		Vaibhav Modi	Director	
20	Emvee Auto Forge Ltd	Roshan Mehndiratta	Director	Bhiwadi
21	Nationals Gears	Vivek Gupta	MD	Alwar
22	Hariom Precision Alloys P Ltd.	TC Vishwakarma	MD	Alwar
23	Metso Industries	Naveen Kumar	Plant Head	Alwar
24	Munjal Auto	SS Sharma	HR- Head	Bawal
25	Honda Car India Ltd	RK Dubey	Section- Head	Tapukara
26	Ashoka Gears	DN Pandey	MD	Bhiwadi

Annexure 4: Manufacturing Process



Machining Processes

Machining is any process in which a cutting tool is used to remove small chips of material from the workpiece (the workpiece is often called the "work"). To perform the operation, relative motion is

required between the tool and the work. This relative motion is achieved in most machining operation by means of a primary motion, called "cutting speed" and a secondary motion called "feed". Machining is a part of the manufacturing of many metal products and including materials such as wood, plastic, ceramic, and composites. Much of the modern-day machining is carried out by computer numerical control (CNC), using the computer to control the movement and operation of the mills, lathes, and other cutting machines.

The three main machining processes are classified as turning, drilling and milling. Other operations like shaping, planning, boring, broaching and sawing, etc. may fall into miscellaneous categories. Also, grinding and similar abrasive operations are also included within the category of machining

In turning, a cutting tool with a single cutting edge is used to remove material from a rotating workpiece to generate a cylindrical shape. The primary motion is provided by rotating the workpiece, and the feed motion is achieved by moving the cutting tool slowly in a direction parallel to the axis of rotation of the workpiece.

Drilling is used to creating a round hole. It is accomplished by a rotating tool that typically has two or four helical cutting edges. The tool is fed in a direction parallel to its axis of rotation into the workpiece to form the round hole.

In boring, a tool with a single bent pointed tip is advanced into a roughly made hole in a spinning workpiece to slightly enlarge the hole and improve its accuracy. It is a fine finishing operation used in the final stages of product manufacture.

Reaming is one of the sizing operations that removes a small amount of metal from a hole already drilled.

In milling, a rotating tool with multiple cutting edges is moved slowly relative to the material to generate a plane or straight surface. The direction of the feed motion is perpendicular to the tool's axis of rotation. The speed motion is provided by the rotating milling cutter

Other conventional machining operations include shaping, planning, broaching and sawing.

Roughing cuts are used to remove a large amount of material from the starting work part as rapidly as possible. Finishing cuts are used to complete the part and achieve the final dimension, tolerances, and surface finish.

A cutting fluid is often applied to the machining operation to cool and lubricate the cutting tool.

Today other forms of metal cutting are becoming increasingly popular. An example of this is water jet cutting. Water jet cutting involves pressurized water in excess of 620 MPa (90 000 psi) and is able to cut metal and have a finished product.

More recent, advanced machining techniques include precision CNC machining, electrical discharge machining (EDM), electro-chemical erosion, laser cutting, and plasma cutting, or water jet cutting to shape metal workpieces

Machining requires attention to many details for a workpiece to meet the specifications set out in the engineering drawings or blueprints. Besides, the obvious problems related to correct dimensions, there is the problem of achieving the correct finish or surface smoothness on the workpiece. The inferior finish found on the machined surface of a workpiece may be caused by incorrect clamping, a dull tool, or inappropriate presentation of a tool. Frequently, this poor surface

finish, known as chatter, is evident by an undulating or irregular finish, and the appearance of waves on the machined surfaces of the workpiece

Forging:

Forging is a forming manufacturing process involving the shaping of metal using localized forces in hot condition. The localized forces are delivered with a power hammer or a die. Forged parts can range in weight from less than a kilogram to hundreds of metric tons.

Forged parts are widely used in processes and machines wherever a component requires high strength. Forging is classified according to the temperature at which it is performed: cold forging (a type of cold working), warm forging, or hot forging (a type of hot working). Different types of forging are: Drop forging, Open-die drop forging Closed-die forging or Impression-die forging

Forging dies are usually made of high-alloy or tool steel. Dies must be impact and wear-resistant, maintain strength at high temperatures, and have the ability to withstand cycles of rapid heating and cooling.

Foundry Casting

It is a manufacturing process in which a liquid material is usually poured into a hollow cavity of the desired shape made in a mould and then allowed to solidify. The solidified part is called a casting, which is taken out of the mould to complete the process. Casting materials are usually metals. Heavy equipment like machine tool beds, ships' propellers, etc. can be cast easily in the required size, rather than fabricating by joining several small pieces.

Fettling is the process of cutting, grinding, shaving or sanding away these unwanted bits like caused by seams and imperfections in the moulds is called "fettling". In modern times robotic processes have been developed to perform some of the more repetitive parts of the fettling process.

Casting process simulation uses numerical methods to calculate cast component quality considering mould filling, solidification, and cooling provides a quantitative prediction of casting mechanical properties, thermal stresses and distortion. Simulation accurately describes a cast component's quality up-front before production starts.

Annexure 5: Cluster Prioritization Matrix

CLUSTER PRIORITIZATION - BHIWADI													
#	Cluster	Characteristics (sectors/ subsectors, type of enterprises, relevant for TC services)	Number Of Enterprises	No of Associations, Name of Main /Active Association	Presence of Engineering, Technical, Skill Development institutions, BDS Providers	Other support Institutions	Previous cluster development intervention (Name of the agency and Year)	Common Facility Center / SPV if any	Relevance for Agro and Rural Technology	Existing Linkages with TC	Geographical Proximity	TC's qualitative Feedback	Remarks
1	Auto component & General Engineering cluster, Bhiwadi (Chopanki, Pathredi, Khushkhera, Tapukara)	Sheetmetal, Welding & fabrication, Die casting, Forging, Precise Machining, Casting	400-500 Industries with the presence of large enterprises such as Honda Cars India Ltd, Honda motorcycle & scooters Ltd, Shriram Piston, Continental Engines, Sandhar, TPS infrastructure Ltd., etc.	3 Associations: * Bhiwadi Manufacturers Association, * Laghu Udyog Bharti, * Bhiwadi Chamber of commerce & Industries	- Nettur Technical Training Foundation (NTTF) skill development center - IL & SF Skills Development Corporation Limited, Bhiwadi - UPVC Window & Door Manufacturers Association (UWDMMA) - Govt. ITI, Bhiwadi - Shri Ganesh Private ITI Tapukara	Rajasthan State Industrial Development and Investment Corporation(RIICO), National Small Industries Corporation (NSIC)	ELCINA Electronic Manufacturing Clusters as per guidelines laid by Department of Electronics & IT, Government of India	No		Yes	20-30 Km	- Approx. 80-90 Automotive Ind.(Large industries) - Approx. -70-80 Forging industries - Approx. 250-300 Gen engg. Workshops (MSMEs)- Including welding, fabrications - Precise Machining, die casting, etc. - 8-10 casting & steel manufacturing industries	
2	Automotive & General Engineering Component cluster IMT, Manesar, Gurgaon	Sheetmetal, Fabrication, Die casting, Forging, Precise Machining, Plastic Moulding	Approx. 800-900 industries in the cluster concentrated on the automotive sector with the presence of OEMs/Large enterprises such as Maruti Suzuki, Honda motorcycle & scooters Ltd, Harley Davidson, Motherson, JBM, etc...	4 Associations : - Manesar Industries welfare association - IMT industry association - Gurgaon Industry association - Indian Machine Tool Manufacturing Association	- International Center for automotive technology, - KIKI Center for technology, - Amass skill ventures Pvt. Ltd - 15 Engineering colleges & ITI's	Haryana State Industrial and Infrastructure Development Corporation (HSIIDC), Confederation of Indian Industry (CII), National Small Industries Corporation (NSIC)	- Auto Part Cluster, Gurgaon under National Institute for Entrepreneurship and Small Business Development in 2008-09, - Multiple Auto part manufacturer focused 9 clusters under LMCS implementation scheme of M/o MSME	CFC for Readymade Garment Cluster, Village-Mohammadpur		Yes	50-60 Km	Short & Mid Term Training Programs, Manufacturing of Die & Moulds	

3	Automotive & Engineering cluster, Dharuhera & Bawal	Sheetmetal, Fabrication, Die casting, Forging, Precise Machining	Approx. 40-50 industries focused on the automotive sector with the presence of OEMs/Large enterprises such as Hero MotoCorp, Harley Davidson, TII (TIGER)	Rewari Chamber of Commerce & Industry	- Automotive skill development Center, Dharuhera - 6 Engineering Institutions & ITI's	Haryana State Industrial and Infrastructure Development Corporation (HSIIDC)	No	No	Yes	30-40 Km		Short & Mid Term Training Programs, Manufacturing of Die & Moulds
4	Plastic Engineering Cluster, Bhiwadi, Kushkhera, Kahrani	Injection moulding, Polyester Resins Manufacturer, FRP products, Plastic Granules	100-150 MSMEs	Bhiwadi Manufacturers Association	- Nettur Technical Training Foundation (NTTF) skill development center - IL & SF Skills Development Corporation Limited, Bhiwadi - UPVC Window & Door Manufacturers Association (UWDMMA) - Govt. ITI, Bhiwadi - Shri Ganesh Private ITI Tapukara	Rajasthan State Industrial Development and Investment Corporation(RIICO), National Small Industries Corporation (NSIC)	ELCINA Electronic Manufacturing Clusters as per guidelines laid by Department of Electronics & IT, Government of India	No	No	20-30 Km		Not much Relevant for TC
5	Wire & Cable Manufacturing Cluster, Bhiwadi (Chopanki, Khushkhera, Pathredi, Kaharni)	Electric wire & cables, Fireproof cables, Optical Fibre Cables, Industrial Cable, Instrument Cable, Earthing Electrode, Chemical Earthing & Polycab	40-50 Industries with the presence of large manufacturers like KEI, CORD, Paramount, etc.	Bhiwadi Manufacturers Association	- Nettur Technical Training Foundation (NTTF) skill development center - IL & SF Skills Development Corporation Limited, Bhiwadi - UPVC Window & Door Manufacturers Association (UWDMMA) - Govt. ITI, Bhiwadi - Shri Ganesh Private ITI Tapukara	Rajasthan State Industrial Development and Investment Corporation(RIICO), National Small Industries Corporation (NSIC)	ELCINA Electronic Manufacturing Clusters as per guidelines laid by Department of Electronics & IT, Government of India	No	No	20-30 Km		Not much Relevant for TC
6	General Engineering cluster, Neemrana, Giloth	10-15 MSME in Rubber & Plastic products, Precise machining	40 Industrial units in the cluster (Mix-up of different-2 sectors: Automobile & engineering (Korean & Japanese zone), Packaging, Textile, Food processing, White goods, etc.), OEM presence - Hero MotoCorp Neemrana	Neemrana Industry Association	* 4 Engineering Institutions	Rajasthan State Industrial Development and Investment Corporation (RIICO)	No	No	No	60-70 Km.		10-15 industries from automotive sectors

7	Matsya Industrial Area, Alwar	A mixup of different-2 sectors: Chemical, Pharmaceutical, Automotive, Packaging, Food processing, etc.	Approx. 50-60 industries in the cluster, No specific cluster exist (Mixup of the various industrial segment), OEM presence - Ashok Leyland, TAFE Motors & Tractors Ltd. (TMTL)	Alwar Chamber of Commerce & Industry	- Rajasthan Basic Industrial Skill Development and Training Center - 6 Engineering colleges	- RIICO - Alwar - Development Commissioner (MSME)	NO	No	Agro Machinery Manufacturer (TMTL)	No	80-90 Km.	Approx. 8-10 Automotive MSME
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