# Cluster Diagnostic Report, IDTR Jamshedpur

## Automotive Cluster, Adityapur

## Fabrication & General Engineering Cluster, Bokaro

## General Engineering Cluster, Ranchi

**Technology Cluster Manager**

**Technology Center Systems Program (TCSP)**

**Office of DC MSME, Ministry of MSME**

**6th April, 2020**

# Disclaimer

This report has been prepared on the basis set out in our engagement contract reference 21/DCMSME/TCSP/CON/TCM/2016/TR with The Development Commissioner, MSME, Ministry of MSME dated 03rd December 2018 (the "Contract for Supplier Services")

Nothing in this report constitutes a valuation or legal advice.

We have not verified the reliability or accuracy of any information obtained in the course of our work, other than in the limited circumstances set out in the Services Contract.

This report is for the benefit of The Development Commissioner, MSME, Ministry of MSME and the other parties that we have agreed in writing to treat as parties to the Services Contract (together "the Beneficiaries").

This report has not been designed to be of benefit to anyone except The Development Commissioner, MSME, Ministry of MSME / Beneficiaries. In preparing this report we have not taken into account the interests, needs or circumstances of anyone apart from The Development Commissioner, MSME, Ministry of MSME / Beneficiaries, even though we may have been aware that others might read this report. We have prepared this report for the benefit of The Development Commissioner, MSME, Ministry of MSME / Beneficiaries alone.

This report is not suitable to be relied on by any party wishing to acquire rights against KPMG Advisory Services Pvt. Ltd. (other than The Development Commissioner, MSME, Ministry of MSME / the Beneficiaries) for any purpose or in any context. Any party other than The Development Commissioner, MSME, Ministry of MSME / the Beneficiaries that obtains access to this report or a copy and chooses to rely on this report (or any part of it) does so at its own risk. To the fullest extent permitted by law, KPMG Advisory Services Pvt. Ltd does not assume any responsibility and will not accept any liability in respect of this report to any party other than The Development Commissioner, MSME, Ministry of MSME / the Beneficiaries.

The photographs used in the report are for representation purpose only, KPMG does not endorse any product, vendor or technology provider.

In particular, and without limiting the general statement above, since we have prepared this report for the benefit of the Development Commissioner, MSME, Ministry of MSME / Beneficiaries alone, this report has not been prepared for the benefit of any other local authority / Trust / etc. nor for any other person or organization who might have an interest in the matters discussed in this report, including for example General Practitioners / those who work in the respective sector or those who provide goods or services to those who operate in the respective sector.

Please note that the Services Contract makes this report confidential between The Development Commissioner, MSME, Ministry of MSME/the Beneficiaries and us. It has been released to The Development Commissioner, MSME, Ministry of MSME/the Beneficiaries on the basis that it shall not be copied, referred to or disclosed, in whole or in part, without our prior written consent. Any disclosure of this report beyond what is permitted under the Services Contract will prejudice substantially this firm's commercial interests. A request for our consent to any such wider disclosure may result in our agreement to these disclosure restrictions being lifted in part. If The Development Commissioner, MSME, Ministry of MSME / the Beneficiaries receive[s] a request for disclosure of the product of our work or this report under relevant laws and regulations, having regard to these actionable disclosure restrictions The Development Commissioner, MSME, Ministry of MSME / the Beneficiaries should let us know and should not make a disclosure in response to any such request without first consulting KPMG Advisory Services Pvt. Ltd and taking into account any representations that KPMG Advisory Services Pvt. Ltd might make.

## Acknowledgment

We would like to express our sincere gratitude to MoMSME, o/o DCMSME and its officials for their involvement and valuable inputs during the preparation of this report on diagnostic study for Automotive & General Engineering Cluster, Adityapur, Fabrication & General Engineering Cluster, Bokaro, and General Engineering & Allied Industries Cluster, Ranchi. We would like to express special thanks to Shri. Ram Mohan Mishra, IAS, (Additional Secretary and DC-MSME) for his proactive support and guidance to the team during the entire process.

We would also like to express our gratitude to Shri. Piyush Srivastava (ADC), Shri. Virinder Sharma (Director), Shri. Sanjeev Chawla (Director), Shri. R K Rai (Director), Dr. Sunil Kumar Newar (Deputy Director, TCSP), Shri. B.M Saxena (Assistant Director, TCSP) and TCSP PMU Team for extending their support during the entire process.

We would also like to thank Shri Anand Dayal, General Manager, IDTR, Jamshedpur & Shri Ashutosh Kumar, Dy. General Manager, IDTR, Jamshedpur, and the team of TC officials for their guidance and valuable inputs during the diagnostic study.

We would like to convey our sincere thanks to Shri. P.K. Gupta, Director I/c MSME-DI Ranchi and his team for their support during the exercise. Also, we must extend our sincere thanks to all the stakeholders including industry associations, academic institutes, and Industry units who gave us their valuable time and provided their thoughtful feedback and insights.

## Revision History

| Version | Issue Date | Prepared by | Reviewed by |
|---|---|---|---|
| 1.0 | 21st January 2020 | Mr. Jitendra Bairagi | Mr. Anshul Katyal |
| 2.0 | 31st January 2020 | Mr. Anshul Katyal/ Mr. Jitendra Bairagi | Mr. Rituraj Sharma |
| 3.0 | 6th April 2020 | Mr Jitendra Bairagi | Mr Rituraj Sharma |

## Table of Contents

## List of Figures



## List of Tables

# 1. Executive Summary

Jharkhand has enormous potential for industrialization due to its mineral-rich geography, which covers 40% reserve of nations' minerals along with 29% of coal reserves of India. Such a large deposit of minerals & coal provides a solid launching pad for rapid industrialization. Jharkhand is home to large steel manufacturers, mining and coal processing industries. Some of these organizations are amongst the pool of the largest organizations in the world. Industries in the state have a geographical advantage of a vast market of eastern India, ports of Kolkata, Haldia, and Paradip helping in the transportation of minerals. The major drivers for engineering industries in the state are the availability of raw material, power, water and industrial labor.

As a part of the TCM project, a detailed analysis of IDTR, Jamshedpur and Jamshedpur area industries were undertaken to map and understand the availability of TC infrastructure for production and testing, manufacturing process and map them with cluster requirements. Apart from getting a detailed understanding of the technology center, an extensive exercise to understand the three prioritized clusters of Adityapur, Bokaro and Ranchi were also undertaken to map the existing services of the TC with the cluster requirements and accordingly suggest new opportunities of revenue generation for the TC.

Some of the key observations during the study are as below:

- There are 13 key customers covering around 80.1% of the revenue of IDTR, which shows concentrated operations of the production facility.
- TC's 18% of machines are at low accuracy levels and delivery compliance is at 89%.
- The training department lacks formal induction mechanism for newly joined trainers, which may be a reason for the quality of delivery.
- Training department runs various short-term courses and it is the main source of revenue for IDTR. We observed that there is scope of many operational improvements in training operations.
- Cluster survey shows there is less awareness about TC's consultancy services amongst the MSMEs, especially in Bokaro and Ranchi.
- Cluster MSMEs have expressed a need for authorized NABL testing facility especially in Bokaro and Ranchi clusters.
- During the cluster survey, it was observed MSMEs have limited awareness of various govt. schemes and policies.

Recommendations have been provided in the area of technology, process improvement, and training portfolio. Some of the key recommendations provided after the study are

- To make TC strong on the tool and die making perspective, two new machines, Press and Waterjet Cutting Machine have been suggested. It will strengthen the capability of TCs for tool and die making along with creating capacity for prototypes.
- Streamline existing processes at TCs for ensuring process improvements. Some of these measures suggested are related to MIS & Dashboard design aligning with SAP B-One of TC, review, and up-gradation of existing work instructions of TC and updating them for best practices for its IMS certification, quality & productivity improvement interventions, inventory management guidelines with updated stock policy etc.
- To make training operations more effective, various initiatives such as formal feedback mechanism, formal induction mechanism and framework for the training of trainers, integrated MIS for student information, etc. have been recommended.
- Some new training programs are also recommended as per requirements identified from cluster surveys.

- NABL accredited testing laboratory to support the MSMEs and setting up one more revenue stream for TC.
- Provide consultancy services in quality improvement, productivity improvement, management guidelines for MSMEs.
- Cluster centric interventions to utilize TC's expertise for the effective support of MSMEs.

## 2. Introduction

Micro, Small and Medium Enterprises (MSMEs) are growth boosters of the economy. They are considered as engines of economic growth in both developed and developing countries and have immense potential to contribute to the overall development of the country. Micro, Small and Medium Enterprise (MSME) clusters are present worldwide and the success of these clusters depend upon their mutual support and efforts to share supply chain and other resources. Governments across countries have identified the potential that can be leveraged from MSMEs and have accordingly launched a number of programs and schemes to increase their overall competitiveness.

The Engineering Industry is strategically crucial for all developing economies as it is closely associated with the manufacturing and infrastructure sector. The Industry in the clusters can be broadly categorized into two parts: Heavy Engineering and Light Engineering. There are however several sub-sectors within the Engineering Industry, namely, Iron & Steel; Metallurgy, Mechanical and Electrical Machinery, Transport Equipment (including automotive), Instruments and Appliances, Measuring Instruments, Arms and Ammunition, etc. With adequate support of the government entities, the Industries in Adityapur, Bokaro and Ranchi have the opportunity to thrive and reduce the stiff competition that they face from countries such as China and Korea.

## 3. Approach and Methodology

To ensure a comprehensive diagnostic study, a multi-tier approach was adopted that involved conducting a detailed and structured analysis of the Technology Center and the different clusters

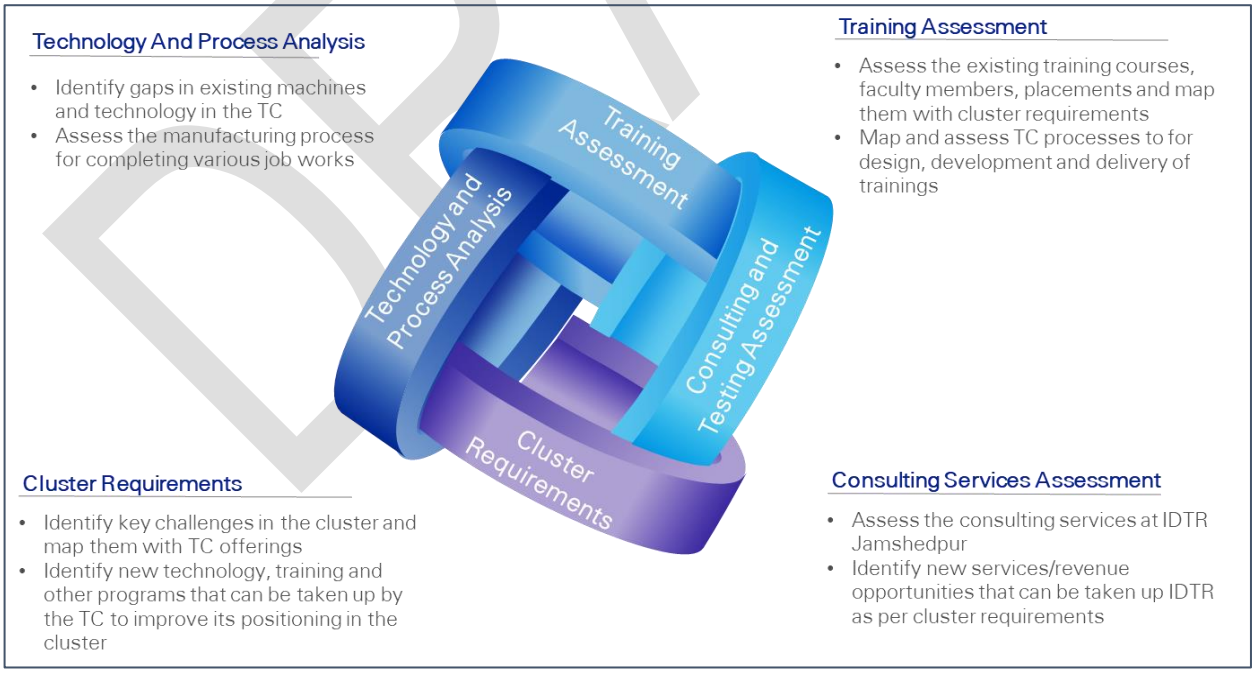



*Figure 1: Approach & Methodology*

prioritized for the study. As a part of this approach, Technology Cluster Manager (TCM) team in Jamshedpur, Cluster Manager, Mr. Rituraj Sharma, Support Consultant, Mr. Jitendra Bairagi, and Tool Design Expert, Mr. Supriya Kahali conducted 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.

**Tier 1 – Gap Analysis of the Technology Center**

**Step 1: Review of the Technology Center annual reports, training brochure, and market insight reports.**

A detailed review of the available literature was conducted by sector experts. As a part of desk research, secondary research was carried out to understand the market need and trends. Apart from the secondary research, the expert also conducted detailed discussions with the head of different departments and faculty members of IDTR to receive their key inputs.

**Step 2: Production Floor and Training Floor Visits**

The Team visited all the production and training departments of TC to understand the availability of physical infrastructure for the present services. These visits assisted the experts in identifying TC's standing in the technology and manufacturing process. Apart from technology and manufacturing processes, the focus was on conducting a qualitative and quantitative assessment of all the parameters critical to understand the requirements of the TC. Some of the key qualitative parameters included- curriculum development process, methods of training delivery, examination process, the status of equipment and infrastructure, placement and -post-placement tracking mechanism, skill set and qualifications of the trainers, etc.

**Tier 2 – Analysis of the clusters**

**Step 1: Desk Review of the Industry**

A detailed desk review of the Industry segment was conducted by the cluster team under the guidance of the cluster development expert. As a part of this exercise, secondary research was conducted to understand the industry ecosystem in Adityapur, Bokaro, and Ranchi to identify key trends in the market in terms of overall market growth rate and other parameters. The team also conducted one to one discussions with different stakeholders such as Micro, Small & Medium Enterprises-Development Institute (MSME-DI), Industry Associations to identify the cluster development activities that can be taken up by the technology center

**Step 2: Stakeholder Identification and Industry consultations**

For mapping cluster requirements, the team identified major cluster actors and conducted consultations with close to 55+ stakeholders. As a part of these consultations, the team interacted with all the major stakeholders having a good mix of MSMEs, TC, associations, academia and financial institutions. The main objective of the stakeholder consultation was to understand the business requirements, issues, and challenges of the complete cluster ecosystem and map them with the TCs. As a part of these consultations, inputs were sought in terms of marketing, financing, manufacturing and training requirements across the value chain. The focus of the industry consultation was on identifying the key challenges faced by the units in clusters and accordingly suggest key interventions through which the Technology Center (TC) can play an important role in the overall development of the clusters.

**Tier 3: Analysis and Recommendations**

Inputs and feedback received during the TC technology, training, and manufacturing gap analysis were mapped with the requirements received from the cluster stakeholders. These findings were analyzed and discussed with TC officials to identify specific interventions that can be driven by the technology center.

# 4. Technology Center - IDTR Overview

Indo Danish Tool Room is a Society, registered under Societies Registration Act 21 of 1860. The Extension Centers of IDTR Jamshedpur were set up in Varanasi in 2014 & in Patna in 2015. IDTR is certified with ISO 9001:2008, ISO 14001:2015 & ISO 29990:2010 & has state of the art facilities with a sophisticated plant, machinery, labs, classrooms, & other infrastructure.

The center manufactures intricate, high precision Tools, Dies, Jigs & Fixtures, Molds, etc. & provides technological support & skilled manpower to MSMEs and Industries. IDTR conducts AICTE approved Diploma Courses in Tool & Die Making, Production Engineering & Mechatronics; NCVT approved ITI courses of Fitter & Machinist; NSQF Courses approved by Ministry of MSME, Govt. of India & other short-term courses. The broad services provided are as follows:

- Impart Long Term & Short-Term Training to youngsters in the field of Tool & Die Making with the latest technologies (and other allied Engineering Trades) both for freshers and personnel already engaged in this field.
- Provide consultancy services primarily to Micro, Small & Medium Enterprises in the field of Tool Engineering aimed at improving their productivity & import substitution
- Provide common facility services in precision machining/heat treatment and other technical engineering expertise in tooling to the Micro, Small & Medium Enterprises in the country.
- Design and manufacture Molds, Tools, Dies, Jigs, and Fixtures, etc. of high precision quality.
- Develop complicated products through precision machining for the Research Institutes.
- Support and mentorship to MSMEs for developing innovative products.
- Handholding support to budding entrepreneurs to set up their own enterprises

IDTR has divided its service offerings into three verticals to provide the necessary support to MSMEs. As a part of these verticals, TC offers Production Support, long term and short-term training, customized corporate training programs and consultancy services to MSMEs. All these services are provided by TC through interlinkages among various functions for a common goal to serve MSMEs. Each function has its resources, process, guidelines with a collaborative approach.

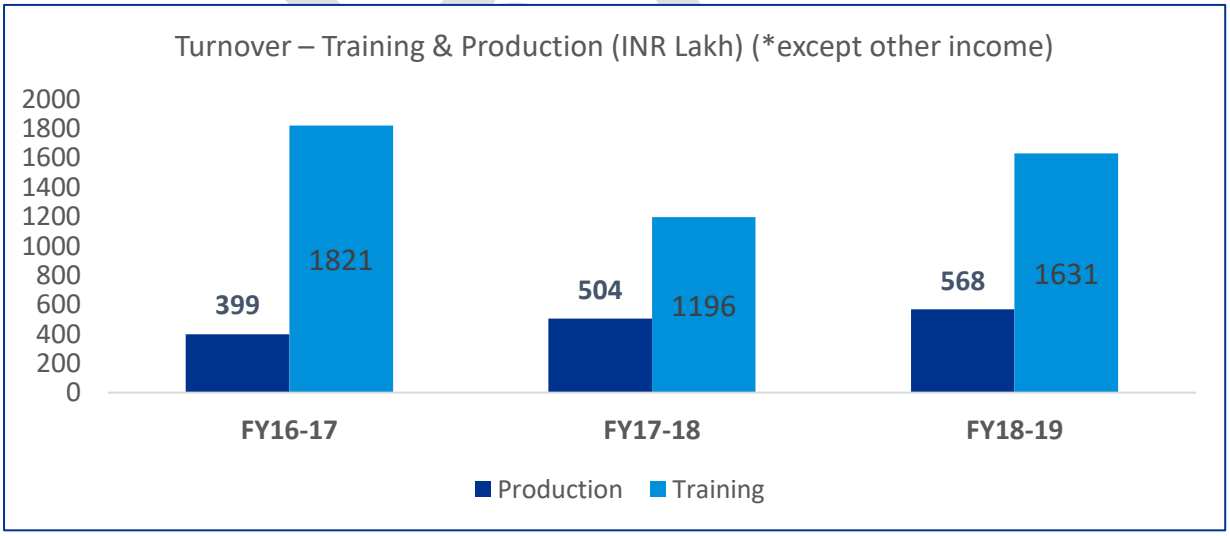



*Figure 2:Training and Production Revenues - IDTR Jamshedpur*

## 4.1 Production Portfolio

IDTR provides design & manufacturing support to MSMEs through its product portfolio. This portfolio is primarily focused on providing design & manufacturing of tool, die & fixtures, precision machining of the complex part, reverse engineering, job work support for MSMEs through its high-end machines set up and competent manpower.

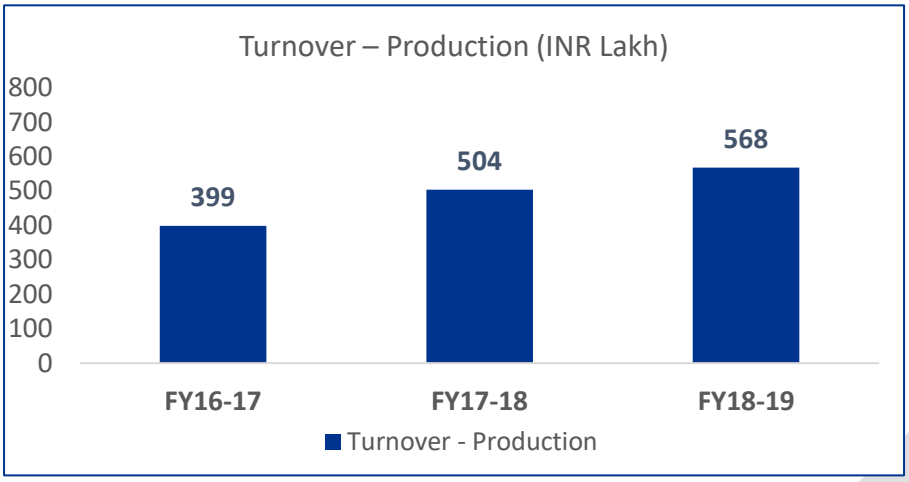



*Figure 3: Turnover overview of TC in Training and Production for last 03 years*

Figure 3 shows that the revenue generation from production services is showing an increasing trend, which is a direct commitment of TC leadership and Team towards making it a sustainable model on the revenue front.

On analysis of TC's services offered under this portfolio, it is observed that TC is doing miscellaneous machining work for MSMEs which contributes close to 72.9% of total share and only 20.5% share is coming from die making, which is TC's core competency.
During detailed analysis of miscellaneous machining components, it was observed that TC has also given technical support to MSMEs for precision machining, low-end machining support and job work support.

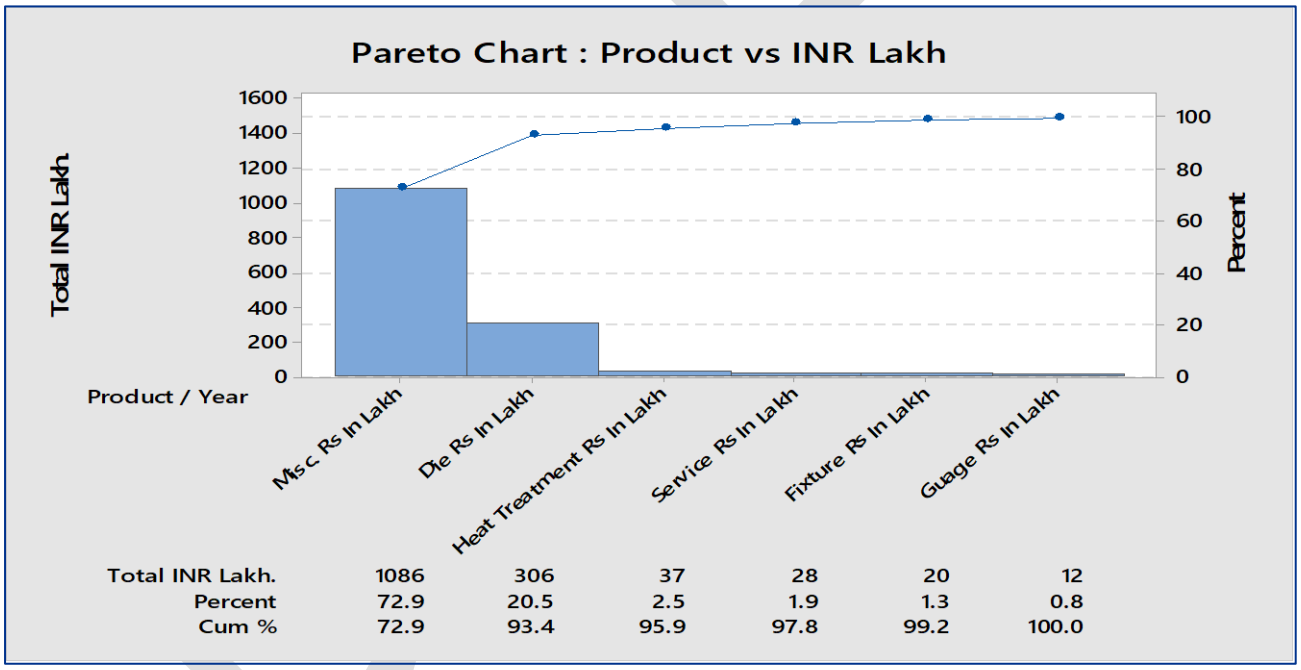



*Figure 4: Figure of Pareto Analysis for revenue vs various production services*

TCM team conducted an assessment of TC for its manufacturing processes & techniques and identified the following key focus areas for the production facility.

1. Figure 5 shows that 18% of machines are having low accuracy due to their aging effect and wear & tear. TC is in the process of procurement of some machines, which will help in increasing the fleet of updated and accurate machines for manufacturing
2. Workplace organization practices need improvement along with effective visual management on the shop floor
3. Preventive maintenance checklists to be reviewed and modified for effective PM activity with some tracking mechanism.
4. Oil leakage, water leakage, entangled wires & cables, ineffective storage of items was observed in some area.

5. Delivery % is at the level of 89.53%, but during MSMEs' visits, it was noted that units have issues with the delivery timelines of TC. So, the data capturing should be reviewed, and improvement initiatives can be taken to improve the delivery timelines.

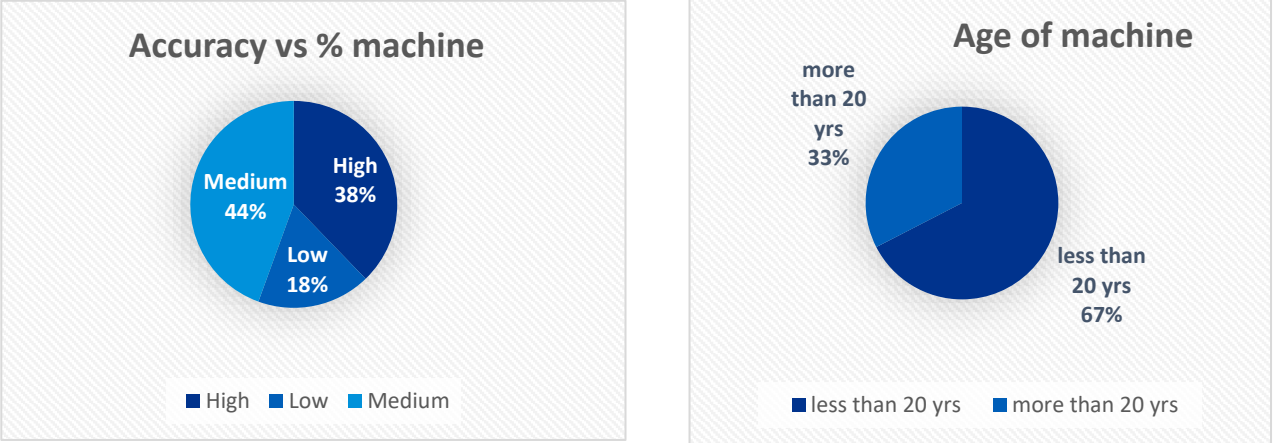



*Figure 5: Overview of Accuracy levels and Age of machines of TC*

6. Key observations for manufacturing functions are given below:

| Function | Observations |
|---|---|
| Marketing | • 13 Customers are contributing to 80.10% of the revenue for the IDTR, this customer base can be increased to have a higher bandwidth of customers for orders and revenue generation.<br>• Planning for marketing activities is not done in an effective manner. |
| Design | • Designing team has only 3 members (including design head). It is disproportionately small compared to manufacturing strength and market need.<br>• Designers are involved in various non-core activities like taking classes, process verification, cost estimation for quotation, etc |
| Procurement & Stores | • Stock policy needs review as it was last reviewed in 2011.<br>• Stores area needs improvement for effective traceability of items.<br>• Rigid purchase processes impact the timeline of delivery as bulk PO purchase option is not available. |
| Planning & Production | • Master schedule plan is there but can be improved to make planning more effective<br>• Provision for capturing machine utilization is there but data is not effectively captured from each machine.<br>• In the production area, stock list and levels are not defined, and indenting is done on a need basis. It is a challenge to anticipate tools/consumables for the duration as it is not a traditional production environment, however, some items can be defined.<br>• There are no charts available on the shop floor for the display of planned jobs.<br>• Ineffective capturing of maintenance data, machine availability, utilization, rework, rejections and status of each job. |

## 4.2 Training Portfolio

IDTR was set up primarily for providing skilled manpower to MSMEs in tool & die making, general engineering and CNC operations. It has a proven record of providing quality education & training to trainees with industry exposure to make them fit for the requirements of MSMEs. IDTR's training operations are divided into long term courses, short term courses, and customizable corporate courses. These courses are affiliated to national frameworks such as AICTE, NSQF, and NCVT. IDTR is also involved in MoMSME skill-based initiatives such as EAP, ESDP, SIYB, SCORE, etc. to support the entrepreneurship potential of India.

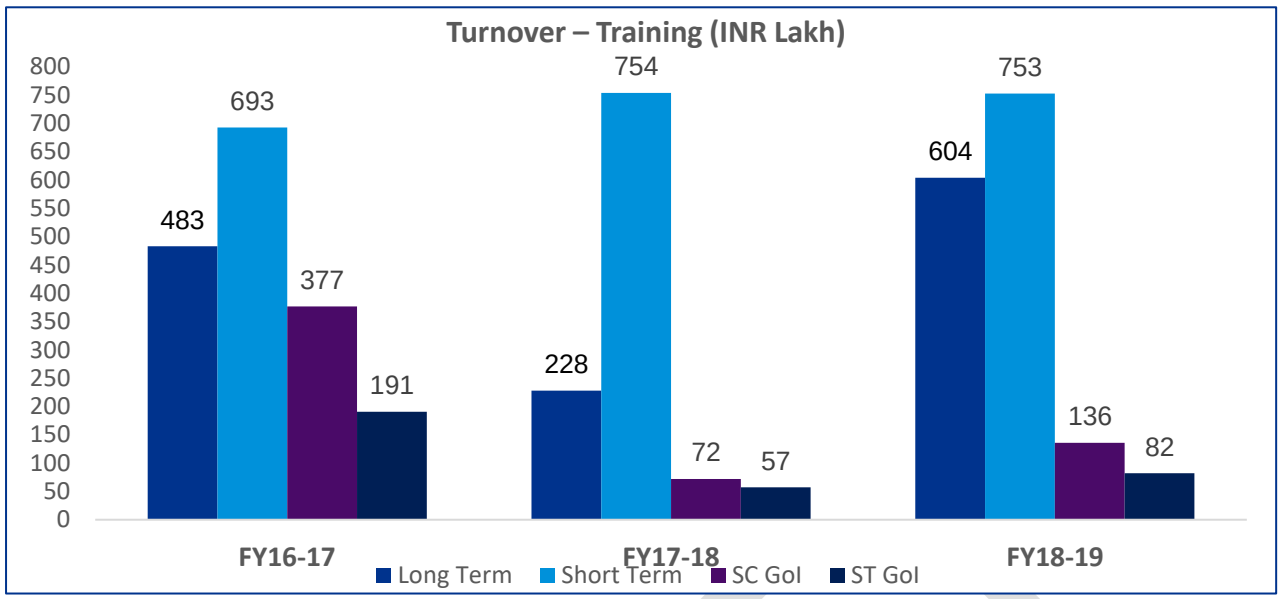



*Figure 6: Training portfolio revenue distributions from various category of courses*

TCM conducted a gap assessment of the training portfolio of TC by evaluation of training operations and existing modules. TCM team further visited MSMEs to record feedbacks on existing modules of TC and the requirement of new modules. Under the TC training operations, assessment trends for revenue and numbers of trainees from long term and short-term training, trends for admission, drop out and placements were also observed. Key observations during the assessment, in brief, are as follows:

1 **Training Portfolio Performance**:

- Training in the long term, short term along with SC/ST GoI funded courses, has shown an increase for the last 3 years.
- TC has started ITI in 4 trades i.e. 1) turner, 2) welding, 3) tool & die making and 4) computer hardware & networking maintenance during FY18-19. Capacity utilization for these newly started courses is not reaching full potential. Welding and Turner courses have seen less than 30% utilization during FY18-19.

2 **Assessment of existing training modules**:

- DTDM course is being measured for equivalency with Diploma in Mechanical engineering by the higher education department of GoJ, this process should expedited by TC so that it can benefit the students and will improve the credibility of existing DTDM course.
- Corporate courses do not have a separate marketing strategy and are not certified as per the demands of the corporates.
- Some courses have not witnessed admissions during the last 3 years and require effective marketing reach to utilize the existing capacity.

| Course Type | Course Name | Accreditation Body | Batch Size-Capacity | Duration of Course |
|---|---|---|---|---|
| ST Non-NSQF | CNC Programming Milling | IDTR | 30 | 96 Hrs. |
| ST Non-NSQF | CNC Machining Lathe | IDTR | 30 | 96 Hrs. |
| ST Non-NSQF | Revit Architecture | IDTR | 30 | 96 Hrs. |
| ST Non-NSQF | 3DMAX | IDTR | 30 | 96 Hrs. |
| ST Non-NSQF | SCADA | IDTR | 30 | 96 Hrs. |
| ST Non-NSQF | Hyper mesh | IDTR | 30 | 96 Hrs. |
| ST Non-NSQF | Embedded System | IDTR | 30 | 96 Hrs. |

*Table 1: List of inactive course of TC*

3 **Existing Feedback Mechanism**:

- Feedback from students is taken in a formal way but feedback process from industry and institutions is not formalized
- The review committee for received feedback is not effective

4 **Training of Trainers and Upgradation of Trainers**:

- An induction system for new trainers is not available, this impacts the delivery of concepts during classroom training
- ToT framework is not formalized for training internal resources. Such a framework can improve the latest knowledge and developments on various concepts being taught in existing modules or new concepts

5 **Assessment of Delivery**:

- The experience level of around 40% of trainers is less than 2 years, which can also impact the effectiveness of delivery.

6 **Optimization of Training infrastructure**:

- It is not monitored effectively due to the absence of a formal method. Usage of such utilization monitoring practice gives visibility to management for effective use of available infrastructure.

**7 Workplace Organization Practices:**

- RM stores in the training area do have effective traceability; workshops for practical training lack effective visual management.

**8 Assessment of Information flow of training function**

- Multiple MIS because existing ERP module (SAP B1) is not working effectively, such repetitive creation of information leads to wastage of manpower capacity.

## 4.3 Consultancy Portfolio

TC has a very strong knowledge base in providing consulting services for setting up any technical training institution, preparing DPR and handholding for implementation. TC has also been involved in providing consultancy in the area of inspection services, design of complex parts, etc.

During the cluster surveys, it was observed that MSMEs are not aware of this portfolio of TC. Also, the services provided under the consultancy portfolio by TC are very limited and have a very good potential in the MSMEs.

## 4.4 SWOT analysis of TC

| STRENGTHS | WEAKNESS |
|---|---|
| Dedicated and Knowledgeable technical workforce.<br>The quality of manufacturing is well established and trusted in the cluster. | Non-availability of accredited testing labs.<br>Lack of awareness of faculty on modern teaching aids and effective delivery methods.<br>Lack of marketing for consultancy services. |

| | |
|---|---|
| ▪ Geographical advantage; at the center of auto cluster touching Tata Kandra main road.<br>▪ Hard finishing facility, a pre-requisite for high precision parts production.<br>▪ Practical oriented training with 70% focus on workshop practice.<br>▪ Pioneer in providing very good skilled manpower in tool & die making.<br>▪ Coverage of various skill focussed training courses under national framework AICTE, NCVT & NSQF for the general engineering sector. | ▪ Lack of dedicated marketing for training portfolio.<br>▪ No dedicated product line for a steady revenue stream from production.<br>▪ Do not have last leg infrastructure to finish a die in spite of having a strong setup.<br>▪ Weak design strength and non-availability of try out facility holding TC to move up the value chain.<br>▪ Long lead time due to in-built process bottlenecks.<br>▪ Competent Manpower strength for high-end machines and effective training delivery is low<br>▪ Shop floor work and information flow are individually managed and require a systematic approach.<br>▪ Limitation of Infrastructure for increasing more training courses. |
| **OPPORTUNITIES** | **THREATS** |
| ▪ High demand for sheet metal dies.<br>▪ Major Proto job and batch job requirement for Defense projects under make in India<br>▪ In the Adityapur and Bokaro clusters, there is no formal tool room except IDTR<br>▪ There is a significant demand from industries for industry-ready skilled manpower.<br>▪ Govt. is also focussed on the upskilling of maximum manpower.<br>▪ Requirement of quality and productivity improvement support from MSMEs. | ▪ Advance tool rooms set up in Southern and Western part of India having lower product cost, supporting to Adityapur cluster.<br>▪ Rigid government procedures for procurement causing higher delivery times.<br>▪ NTTF, NITT and other technical institutions of Jamshedpur give competition to IDTR in technical training. Their running courses have more variety to cater wide audience of trainees. |

*Table 2: SWOT Analysis of the Technology Center*

## 5. Overview of Clusters

IDTR is working under the aegis of MoMSME to support the MSMEs for providing skilled manpower and technology support and consultancy. IDTR is situated near Jamshedpur city of Jharkhand and has the geographical location of TC has the advantage of the presence of Tata Motors, TRL Krosaki, other large firms and MSMEs of Adityapur Automotive Cluster. To increase TC's reach and improve its linkages with MSMEs, the following regions were identified near TC's location in addition to Adityapur area:

| **Major geographical areas of concentration of industries for IDTR** | |
|---|---|
| Automotive Cluster, Adityapur | Steel and General engineering cluster, Bokaro |
| Engineering & Allied Industries Cluster, Ranchi | Tribal Jewellery Cluster, Jamshedpur |
| Brass & Bronze Cluster, Hazaribagh, Bishnugarh | Tiles & Allied Product Industries Cluster, Bokaro |
| Black Smith Cluster, Bedki Lari, Ramgarh | Silver Jewellery, Sukrigah, Ramgarh |
| Steel Utensils Cluster & Agriculture Equipment Cluster, Deoghar | Sari Calendaring Cluster, Nirsa, Dhanbad |
| Refractory Cluster, Chirkunda, Dhanbad | |

*Table 3: Major Industrial Clusters in the Jharkhand*

Out of the above-mentioned clusters, following 03 clusters were selected on the basis of geographical proximity from IDTR-Jamshedpur, existing linkages, and possibilities for future linkages, qualitative feedback of TC, presence of active industry associations, number of units in the cluster, past cluster development programs, viability of the cluster, social & environmental considerations etc.

1. Automotive Cluster, Adityapur
2. Steel and General engineering cluster, Bokaro

3. Engineering & Allied Industries Cluster, Ranchi

The following sections will give insights on the detailed survey carried out in these 03 clusters, focusing on various support requirements of MSMEs, the opportunity for IDTR, Jamshedpur, and interventions required to create and improve the linkage between TC and MSMEs.

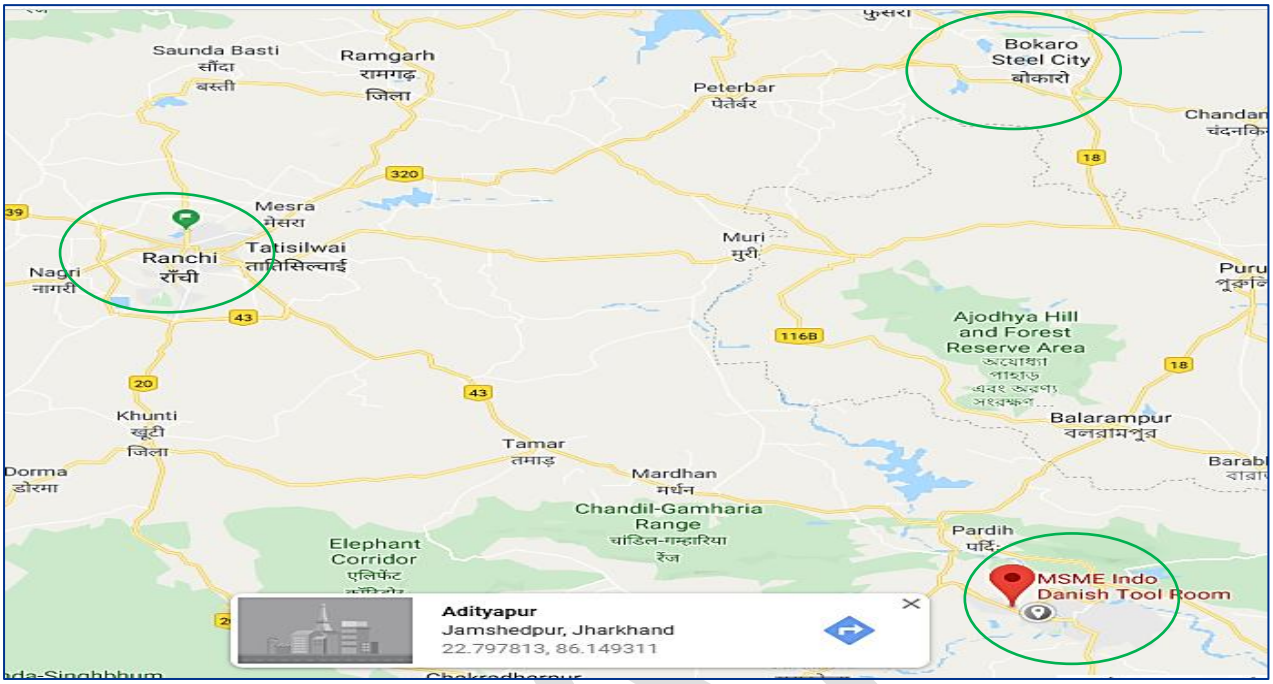



*Figure 7: Geographical overview of prioritized 03 clusters for IDTR*

## 6. Adityapur Automotive Cluster

Although the global market for auto components holds a broad range market segment for the products, a gradual market shift can be seen towards the Asian countries, such as China and India. In other words, Asian countries are increasingly becoming the preferred manufacturing destination for countries across the globe. This upcoming market in Asia can also be referred to as the *replacement market*.

The Indian auto component industry accounts for 2.3% of the country's GDP and employs about 1.5 million people, both directly and indirectly. The Indian auto component industry has the potential to emerge as one of the biggest auto component manufacturers in the world. The growing industrial production clubbed with the rapidly expanding Indian economy and the increasing purchasing power of the Indian middle-class households are some of the key factors that hold the potential to contribute to India's future success. It is in the same light that the country is expected to make it to the top five markets in cars and commercial vehicle consumers by the year 2020.
The overall excellent performance of the Indian auto component industry, primarily accrues to the availability of a trained workforce at competitive costs, making India a favored global manufacturing hub and putting India at a competitive advantage.

Jamshedpur cluster has more than 600 auto-ancillary as well as component factories that manufacture a wide range of products (such as suspension and precision gear). The auto industry is affiliated with a highly affluent mining and metal segment, given the chief raw material for the auto industry is steel that needs to be mined in the form of iron (steel is an alloy of carbon). Jharkhand produces 25% of the country's steel, hence, producing a wide variety of auto-grade steel. In other words, the auto segment, indirectly, creates a market for the mining industry. It is also worth to

mention that the auto industry also produces mechanical tools that are employed in the mining industry, hence, catering to the needs of the mining industry.

Adityapur Industrial Area Development Authority (AIADA) was established in 1972 for the purpose of promoting industrial growth in the region. Adityapur industrial area is developed by Adityapur Industrial Area Development Authority (AIADA) on an acquired land of 13723 hectares, out of which 1194 hectares are developed and remaining is under development. Industries in and around Jamshedpur are focused on following engineering processes with a primary focus on the Automotive sector:

| Major areas of concentration of manufacturers at Jamshedpur* | | |
|---|---|---|
| Metal-Based (Steel Fabrication) | General Engineering | Foundry & Casting |
| Stamping units | Rubber, plastic, and Petro | Agro-based |
| Chemical-based | Mineral-based | Electrical machinery |

*source DIC East Singhbhum and Seraikhela-Kharsawan

| Key Stakeholder | Brief Description |
|---|---|
| Raw Material Suppliers | MSMEs buys raw material from large firms' supplier or directly from OEMs like Tata Steel. Tata Steel Processing & Distribution Limited (TSPDL) is a major source of raw material in the region. Raw materials, such as steel and Fe-alloys, are principally sourced from TSPDL, SAIL and its affiliated suppliers. For non-ferrous alloys like aluminium, some local re-melting units and foundries manufacture the alloys with various compositions based on manufacturers' requirements.<br>The availability of raw material is smooth and cost-effective because of geographical advantage. |
| Buyers | Major buyers for MSMEs are Tata Motors being the key stakeholder along with Tata Steel, Tata Cummins, Tata Hitachi. Tata Motors plays a key role but MSMEs are outreaching to other OEMs for increasing buyer base such as Ashok Leyland and Govt. sectors Railways & Vehicle Factory Jabalpur. |
| Autonomous/ Govt. Agency | Govt. agencies active in the clusters are IDTR Jamshedpur, NSIC Jamshedpur, JSDM, MSME-DI, etc. IDTR plays a key role in providing skilled manpower to cluster with knowledge transfer on key technologies. JSDM is also a key contributor to increase the skilled manpower base in the region so that the availability becomes easy and employment can be sustainable. MSME-DI, Ranchi represents the MoMSME to inform stakeholders on various govt. policies for MSMEs, upskilling and creating an ecosystem of inclusive growth. |
| Industry Associations & SPV | Adityapur Small Industries Association (ASIA), DICCI, TICCI, Singhbhum Chamber of Commerce, Confederation of Indian Industry (CII) associations are active in the region to take care of MSME's local issues and coordinate MSME related activities. An SPV Adityapur Auto Cluster is also established in the cluster for supporting MSMEs by providing machining and testing facilities at an affordable cost and a faster speed. |
| Large Firms/ OEM | The major contributor to the development of the Adityapur cluster is Tata Steel & Tata Motors along with their subsidiaries such as Tata Cummins, Timken, Usha Martin, Tata BlueScope, etc. Other major players operating in this region are TRL Krosaki, RKFL, Caparo etc. |
| Financial Institutions | The financial needs of MSMEs are taken care of by key financial institutions like Bank of India, SIDBI, State Bank of India, HDFC, etc. These institutions provide financial support to MSMEs which is often aligned with Govt's policies and schemes for the financial assistance of MSMEs. |

| Key Stakeholder | Brief Description |
|---|---|
| Academic Institutions | Many academic institutions are contributing significantly to the upskilling of manpower in the region and making candidates industry-ready with industry-focused approaches for training. Some of the important institutes present in the region are XLRI- Jamshedpur, NIT- Jamshedpur, IDTR-Jamshedpur. Other major regional institutes in the region are ARKA Jain University, RVSCET, B.A. College Engineering & Technology, Tata Polytechnic, RVS College of Engineering & Technology, Swami Vivekanand Institute of Information Technology and Government Polytechnic Adityapur. |

*Table 4: Cluster Stakeholder - Jamshedpur*

## 6.1 Cluster Understanding

TCM interacted with Industry associations and MSMEs for sample study of the cluster. This survey helped in getting an understanding of cluster facts, operations of MSMEs, and requirements of different stakeholders such as suppliers, buyers, funding, employment, vendor base, etc. The following areas were stressed upon while getting a detailed understanding of the cluster

| Parameter | Survey Observations about MSMEs |
|---|---|
| Turnover Range | Maximum industries are vendors of Tata Motors and other Tata subsidiaries. Turnover range varies from less than 5 Cr to more than 50 Cr, which shows a mix of small and medium enterprises. |
| Employee Strength | Maximum enterprises have a manual process for manufacturing and employee strength range varies from 20 to 100 with most of the industries employing more than 50 employees (regular and contract basis) |
| Activities of MSMEs | MSMEs in the region are primarily involved in general engineering and stamping auto components. Some enterprises are involved in fabrication and foundry practices. |
| Funding Source | Funding of maximum MSMEs is from Banks, whereas some of MSMEs are self-financed |
| Future Plans & Capacity | Most MSMEs showed interest in diversifying their service offerings in other areas such as Defense, Railways and Govt. related manufacturing. They have at least 30% idle capacity available for more market requirements and linkages. |
| Rejection Rates | As most MSMEs are vendors of Tata Motors and have participated in Tata's vendor development program, rejection rates are very low except for casting-based manufacturers. |
| ISO/ Quality standards | Maximum MSMEs have ISO 9001 certifications and IATF certifications. |
| Employment | MSMEs employ manpower primarily from local reference and medium enterprises often leverage online job portals. |
| OEM/Large firm linkage | Most of the MSMEs have linkages with less than 05 firms with Tata Motors being the primary buyer |

*Table 5: Cluster Snapshot - Jamshedpur*

## 6.2 SWOT analysis of Adityapur cluster

| STRENGTH | WEAKNESS |
|---|---|
| • Availability of raw material<br>• Presence of Auto majors in the region.<br>• Availability of good industrial infrastructure.<br>• Presence of auto cluster set up by a collaboration of central govt., state govt. and MSME associations | • Limited skilled manpower<br>• Poor quality control measures<br>• Low level of labor productivity<br>• Weak linkages between MSMEs and support Institutions |

| | |
|---|---|
| | • Poor R&D and slow technology up-gradation by cluster firms |
| **OPPORTUNITIES** | **THREAT** |
| • The growing need of outsourcing by OEMs presents large opportunities for Tier 1 and Tier 2 players<br>• Growing demand from the domestic and international market<br>• Product diversification: Electric Vehicle and Automation | • Low-cost machining and products from countries like China, Taiwan, Thailand etc.<br>• Developments of new technologies like fuel cell, hydrogen-powered vehicles, which may affect the auto component industry.<br>• Auto majors in the cluster alternatively may go for global outsourcing |

*Table 6: SWOT Analysis - Jamshedpur*

## 6.3 Cluster Need Assessment – Key Issues and Challenges

The focus of the cluster diagnostic report is on identifying the key challenges faced by the different units in the clusters and how TC can play a role in serving the clusters. For this purpose, the team conducted one to one discussions and interactions with different stakeholders including MSMEs, associations, financial institutions, and business development service providers.

Based on the interactions with Industry units across clusters it was observed that challenges faced by different types of units are different and have been listed as per the following categories:

| Cluster Challenge | Description of the Cluster Challenge | Current TC Service Offerings – Cluster Applicability |
|---|---|---|
| **Lack of Quality Improvement Trainings** | • During the cluster visit, it was observed that MSMEs are less aware of best practices for workplace organization, quality improvement, productivity improvement, and shop floor management. By following these practices, MSMEs can keep their defect rates lower, lower manufacturing costs, higher productivity and higher morale of employees.<br>• MSMEs also need awareness about effective material management, such as ISO auditor training. | • TC has competent manpower on 5S, lean and Kaizen practices, but MSMEs are not getting consultancy on these concepts. |
| **Limited Adoption of New Technologies by Small & Micro Units** | • MSMEs have limited reach to some advanced and latest technologies such as low-cost automation, advanced welding automation, Plasma coating, 3D scanning, and reverse engineering.<br>• 20% MSMEs feels that loan processes are time taking and complex.<br>• Limited information about financial institutions and their schemes | • TC regularly conducts workshops on new technologies for MSMEs primarily on TC premises, however, outreach is not adequate to reach out to maximum MSMEs.<br>• TC has started its Entrepreneurship Development Cell, which gives information on all available schemes to any visitor. The marketing department should reach out to maximum MSMEs/associations to make them aware of its ED Cell's service and it will also aid to identify the opportunities for consultancy portfolio and corporate training. |

| | | |
|---|---|---|
| | | • The availability of finance is not the core activity of TC but TC links them with MSME-DI and also ED cell of TC can give access to all the information to interested persons/MSMEs. |
| **Up-skilling of Workforce & Skilled Manpower** | • Lack of in-house training on skill upgradation. MSMEs have varied requirements of training, which should be customized as per requirements and should be affordable to them.<br>• Lack of training on CNC Operations, tool room maintenance, advance welding, Testing (Destructive & Non-destructive both), foundry methods, core making, new advancement in tool & die making, Grinding methods, etc.<br>• Limited availability of managerial / trainers' training<br>• Need more skilled manpower in general engineering skills | • IDTR is running courses on CNC operations and maintenance.<br>• IDTR can provide certification to skilled manpower through RPL scheme<br>• At present, there are no courses in TC for training on Testing methods.<br>• IDTR is running a lot of courses aligned with national frameworks for general engineering skills.<br>• IDTR can make its corporate training portfolio with some standard training by identifying frequent needs and initiating a dedicated marketing approach to tap the opportunity. |
| **Limited capacity on design expertise** | • Sheet Metal Die Design: Sheet metal stamping enterprises has limited die design capability and one die and fixture design & simulation set up will be convenient and will assist local MSMEs to meet project timeline.<br>• Forge Die Design: forgings suppliers have smaller set up without design facility and source their forging die from Pune and other places at competitive rate. TC can look for some collaboration with established institute | • TC has strong design facility with more than 10 design workstations and providing design consultancy to MSMEs. TC needs to increase awareness and access to design services of its existing facility for MSMEs. |
| **Limited uptake on green energy initiatives** | • Green energy initiatives in industrial cluster are limited to solar panels and roof ventilator wind turbines.<br>• Some medium firms have installed solar panels and LED lights in factories.<br>• Energy audit is conducted by medium sized enterprises<br>• During repair and maintenance replacement is done with energy efficient systems like motors, controls etc. However, old running systems of the factory are untouched and no investment is done to improve energy efficiency.<br>• Nearly all the industries in Adityapur cluster switched over to LED lighting saving significant | • TC provides awareness to MSMEs during its awareness sessions through EAP, ESDP, IMC etc. |

| | | |
|---|---|---|
| | electrical energy. Failure of lighting bulbs in shop floor with high vibration like stamping line, hammer bay etc is a concern. | |
| **Supply Side Challenges – Raw Material Procurement** | • Lack of availability for special grades of steel.<br>• Payment terms are either advance or less than 10 days for most of the enterprises. | NA |
| **Limited uptake of TC's consultancy services** | • Lack of awareness about TC's high-end production services such as reverse engineering, hardened finishing (EDM) and high-end precision work.<br>• Limited unawareness about consultancy services offered by the TC | • Less marketing reach for reverse engineering hardened finishing and precision work of TC.<br>• Absence of proper consultancy portfolio and service offerings. |
| **Poor Occupational Health and Safety** | • MSMEs are aware of safety guidelines but lack effective training and awareness on safety and health issues | • TC does not have any course on EHS. |
| **Poor Access to Information** | • Low awareness about government schemes and incentives (concessions & facilities) | • Enterprise Development Cell has been started by IDTR but there is limited awareness regarding the ED Cell amongst MSMEs |
| **Limited Access to market** | • MSMEs have more than 30% capacity idle. This capacity is always available in spite of orders from Tata Motors and existing linkage with OEMs/Large firms.<br>• Some of MSMEs are supplying to Railways and Govt sector, but need more robust linkages to increase their capitalization rate<br>• As more than 60% of MSMEs are in stamping and general engineering job work, there is a highly competitive market for the same type of job work.<br>• Most MSMEs are secondary or tertiary suppliers in the supply chain of Tata Motors and thus MSMEs are primarily dependent on Tata subsidiaries or other OEMs. MSMEs need support for robust linkages in the government sector and reach other OEMs and large firms. | • TC is providing awareness through its awareness session during various conducted programs conducted under EAP,ESDP, IMC etc.<br>• It is not TC's core area but, MSME-DI, conducts Vendor Development Programs to increase OEM-MSME linkages |

*Table 7: Cluster Need Assessment - Jamshedpur*

## 7. Bokaro Fabrication & General Engineering Cluster

The Indian engineering sector accounts for 5% of India's GDP. Rising domestic demand; increasing investment and growth opportunities; favorable government policies; and global and domestic focus on establishing low-cost plants have propelled the engineering sector to greater heights.

As Jharkhand is very rich in mineral resources with Bokaro district being the most resource-rich district, it makes Bokaro as one of the most industrialized zones in India. The industrialization of Bokaro goes way back in time. The district experienced developments much prior to the country's independence when the region fell under the districts of Giridih and Dhanbad. Essentially, it was the discovery of colossal coal reserves in the region, during the early decades of the last century that attracted the British and they started coal mining in the region. Several minerals, such as coal, limestone, and quartz were found and thus, the process of setting-up industries began, considering the availability of resources in the state

With the increasing production of coal in the district, accompanied by a surge in the power requirement of the collieries and the people of the region, several Thermal and Hydel Power Plants were established with each successive year. There are about 358 units in the cluster, out of which around 180 are functional. These units employ around 3,000-4,000 workers. The total estimated turnover of the cluster is around INR 500 Crores.

Bokaro Steel Plant plays an important role in the overall economy of Bokaro, as it provides crucial raw material(s) to the cluster. Presently[1], Bokaro has a total of 1,600 industrial engineering and non- engineering units, out of which 1,496 are registered. Due to the presence of a large number of PSUs and private sector industries in the Bokaro district, there exists a tremendous scope of vendor development of steel industry; cement industry; general engineering industry; chemical industry; ceramic industry; machine tools industry; electrical and electronics machinery; and refractories.

Based on the product type, the units may be divided into three segments as mentioned below:

- Structural Fabricators
- Foundry and Casting Units
- Machining Units

| Key Stakeholder | Brief Description |
|---|---|
| Raw Material Suppliers | Bokaro MSMEs require plates, bars, etc. of structural steel, special grade steel, and non-Fe metals. These varied demands are fulfilled by SAIL Bokaro and other SAIL plants. Sometimes non-Fe metals are imported for higher quality requirements in foundry units. Bokaro Steel Plant, other SAIL plants, Electro steel Castings Ltd., etc. are the major raw material suppliers for MSMEs. |
| Buyers | Most units are suppliers to the Bokaro steel plant which fulfill the day to day fabrication and maintenance needs of the Bokaro Steel Plant. Some foundry units and special general engineering units are supplying to other SAIL plants, large firms and OEMs such as Ashok Leyland, Electro steel, MECON, JSW, Tata Steel and other Tata subsidiaries. |

[1] Brief Industrial Profile of Bokaro District, Report by MSME-DI Ranchi, Ministry of MSME, GoI

| Key Stakeholder | Brief Description |
|---|---|
| Autonomous/ Govt. Agency | Directorate of Industries, DIC Dhanbad plays an important role in spreading awareness on state govt. policies and schemes for MSMEs. MSME-DI Ranchi and Dhanbad work for the implementation of central govt. policies of the Ministry of MSME. NSIC, Jamshedpur supports MSMEs for the procurement of raw material and other land-related needs.<br>Bokaro Industrial Area Development Authority is the key agency for land and industrial shed related issues of MSMEs along with Power, Water, and accessibility to the industrial area. |
| Industry Associations | Many Industry associations are active in the region such as Bokaro Chamber of Commerce and Industries. They play a key role in acting as a bridge between the MSMEs. Government Agencies and the policymakers.<br>Jharkhand Industrial Association is working very actively in the region for the resolution of delayed payments of MSMEs from SAIL. Some other active associations in the region are Laghu Udyog Bharti, Jharkhand Small & Tiny Service Business & Enterprise Association, Jnanamore Industries Association, etc. |
| Large Firms/ OEM | Bokaro has the presence of SAIL – Bokaro Steel Plant, Dalmia Cement, Electro steel Casting Limited, Indian Explosive Limited (Guma) under the large firm & OEM segment. |
| Financial Institutions | There are ten important banks in the cluster including LDM -Bank of India, Punjab National Bank, AXIs, Bank of India, Bank of Baroda, etc. |
| Academic Institutions | Bokaro and nearby region have very reputable academic institutes such as ISM Dhanbad, CMERI Dhanbad, BIT Sindri. These institutes play a key role in skill up-gradation, R&D support and other academic activities. Bokaro also has one Govt, ITI institute along with few private ITI institutes. Bokaro district in total has around 30 ITI institutes out of which 10 are in and around Bokaro city and Bokaro industrial area.<br>Bokaro also some training centers, which provide multiple courses on computer software, software developments, various languages/platforms such as .net, Java, .php, etc. |

*Table 8: Cluster Stakeholders - Bokaro*

## 7.1 Cluster Understanding

TCM interacted with Industry associations and MSMEs for sample study of the cluster. This survey helped in getting an understanding of cluster facts, operations of MSMEs, and requirements of different stakeholders related to suppliers, buyers, funding, employment, vendor base, etc. The following areas were stressed upon while getting a detailed understanding of the cluster

| Parameter | Survey Observations about MSMEs |
|---|---|
| Turnover Range | Maximum units are vendors of Bokaro Steel Plant (SAIL), SAIL steel plants and other Tata subsidiaries. Turnover range varies from less than 5 Cr to less than 50 Cr, which shows a mix of micro and small enterprises. |
| Employee Strength | Maximum enterprises have manual processes for manufacturing and employee strength ranges from 20 to 50 with most of the units employing less than 50 employees (regular and contract basis) |
| Activities of MSMEs | MSMEs in the region are primarily involved in fabrication work and general engineering job work. Some enterprises are involved in steel processing, steel components, and foundry process. |
| Funding Source | Funding of almost all the MSMEs is from Banks, whereas some of MSMEs are self-financed |

| Parameter | Survey Observations about MSMEs |
|---|---|
| Future Plans & Capacity | MSMEs have shown interest in Railways and Govt. sectors for manufacturing. They have at least 30% idle capacity available and are looking for enhanced market linkages. |
| Rejection Rates | As many of them are vendors of SAIL and participate in SAIL's vendor development program, their rejection rates are very low except for casting-based manufacturers. |
| ISO/ Quality standards | A few MSMEs have ISO 9001 certifications and few MSMEs follow IS standards. |
| Employment | MSMEs employ manpower primarily from local reference and medium enterprises sometimes leverage online job portals. |
| OEM/Large firm linkage | Most of the MSMEs have SAIL as their primary buyer |

*Table 9: Cluster Snapshot - Bokaro*

## 7.2 SWOT analysis of Bokaro cluster

| STRENGTH | WEAKNESS |
|---|---|
| • Strong presence in the local market<br>• Presence of SAIL plant creates continuous fabrication job work for MSMEs<br>• Geographically situated at an ideal location (near-end users) with good connectivity<br>• Most setups are self-employed and have a lean management structure | • Obsolete technology, machinery, and equipment used for manufacturing<br>• Availability of raw material but inconsistent raw material prices<br>• Unskilled labour – only a very small number of workers have certificate/diploma from technical/ training institutions)<br>• Absence of the culture of research and development<br>• Limited synergies between government support institutions and the market.<br>• Lack of standardization and quality control<br>• Unorganized vendor base<br>• Limited access to information (availability of finance, technological know-how, and government regulations)<br>• Poor quality of power and high energy costs<br>• Lagging in technology, hence producing substandard goods that hamper consumer perception about local engineering products.<br>• High dependence on single buyers |
| **OPPORTUNITIES** | **THREAT** |
| • Increasing demand for fabrication and general engineering work<br>• Supportive policies of the government both at the state and central level<br>• Availability of Hi-tech infrastructure increasingly becoming available for the production of high-value products | • Competition from countries like China, which have a farther advanced engineering technology base<br>• Uncertainty in inputs costs |

*Table 10: Cluster SWOT Analysis - Bokaro*

## 7.3 Cluster Need Assessment – Key Issues and Challenges

Based on the interactions with Industry units across clusters it was observed that challenges faced by different types of units are different and have been categorized in the following categories:

| Cluster Challenge | Description of the Cluster Challenge | TC Service Offerings – Cluster Applicability |
|---|---|---|
| **Lack of NABL Testing Facility** | • Bokaro MSMEs face challenges in getting authorized testing services. They have to go to Kolkata for this purpose which consumes time and impacts the lead time for completing orders. | • Presently no testing services are provided by TC. TC can explore the possibility of setting up the lab based on the cluster demand. |
| **Lack of Quality Improvement Trainings & Poor Occupational Health and Safety** | • Congested workplaces show poor workplace organization practices impacting productivity. Less awareness about quality and productivity improvement practices<br>• MSMEs are less aware of safety instructions and EHS guidelines due to the absence of effective training. | • TC can start modules on 5S, Lean, quality and productivity improvement training |
| **Less Awareness on New Technologies** | • MSMEs face challenges in up-gradation to the latest technologies. Being the fabrication and general engineering hub, there is limited awareness of advanced and latest technologies in Welding as there are no technical institutions available for such consultancy.<br>• MSMEs want to explore the possibility of expansion or adding new technology but limited access to finance due to complex loan disbursement processes impacts their plans<br>• Limited information about different schemes offered by financial institutions | • TC regularly conducts workshops on new technologies for MSMEs, but these workshops are only conducted in Jamshedpur or TC's extension centers<br>• Availability of finance is not a core area of TC, but TC can connect MSMEs to MSME-DI for the support |
| **Up-skilling of Workforce & Skilled Manpower** | • Lack of in-house training on skill upgradation.<br>• Absence of training provider on CNC Operations, tool room maintenance, advance welding, understanding drawings.<br>• Limited availability of managerial / trainers' training<br>• Need more skilled manpower in general engineering skills | • IDTR is running courses on CNC operations and maintenance, which can be made accessible to Bokaro MSMEs.<br>• IDTR is running a lot of courses aligned with national frameworks for general engineering skills, which can be made accessible to Bokaro MSMEs. |
| **Supply Side Challenges – Raw Material Procurement** | • Lack of availability for special grades of steel.<br>• Payment terms are either advance or less than 10 days for most of the enterprises. | NA |
| **Less Awareness about TC consultancy services** | • Lack of awareness about all the TC services.<br>• Less marketing reach for reverse engineering hardened finishing and precision work of TC. | • Less marketing reach for reverse engineering hardened finishing and precision work of TC.<br>• Absence of proper consultancy portfolio and service offerings. |

| | | |
|---|---|---|
| **Poor Access to Information** | • Low awareness about government schemes and Incentives (concessions & facilities) | • ED Cell has been started by IDTR but there is limited awareness regarding the ED Cell amongst MSMEs<br>• Periodic awareness workshops can be done by IDTR |
| **Limited Access to market** | • Maximum MSMEs have customers within India with SAIL being the primary customer.<br>• MSMEs have more than 30% idle capacity This idle capacity shows a lack of job work available to MSME.<br>• Highly competitive market due to many players for the same type of job work.<br>• Some of MSMEs are supplying to Railways and Govt sector, need more robust linkages to maximize the involvement | • TC is providing awareness through its awareness session during various conducted programs conducted under EAP,ESDP, IMC etc.<br>• It is not TC's core area but, MSME-DI conducts Vendor Development Programs to support MSMEs in entering the supply chain of large OEMs |

*Table 11: Cluster Need Assessment - Bokaro*

## 8. Ranchi General Engineering & Allied Industries Cluster

Ranchi is the capital of the Indian state of Jharkhand, which was formed on 15 November 2000. Jharkhand holds approximately 40% of the mineral resources of India and contributes to nearly 18% of the nation's cumulative mineral production. Ranchi is known to be rich in several mineral resources such as coal, limestone, fireclay, china clay, granite, stone as well as sand. Significant industrial areas within the Ranchi District include Tupudana, Kokar, Getalsud, Namkum, and Tatisilwai. Some of the large industries in the district are Heavy Engineering Corporation, Marine Diesel Engine Project (Garden Reach Ship Builders Ltd), Central Coalfields Limited, Metallurgical Consultant Limited, Doranda, Steel Authority of India Limited, Central Mining & Planning Design Limited, Indal, etc.

For enhancing connectivity GoJ has initiated up-gradation of Ranchi airport to international status. Most of the existing commercial hubs and markets lack basic amenities like parking, electricity and water supply, sanitation, and aesthetics.

| Ranchi Engineering Cluster | |
|---|---|
| No. of Units | 4000 |
| Type of Cluster | 80% of the units are micro-units |
| Product Range | Copper fitting, fabrication, drawing structure, cycle frame, kitchen appliances like a burner, chain conveyor, utensils, centering plate, Almira, bed, packaging fabrication, and customized machining work, etc. |
| Market | Suppliers to large firms and OEMs-40% Local Market- 60% |

| Key Stakeholder | Brief Description |
|---|---|
| RM Suppliers | National Small Industries Corporation (NSIC) works for MSMEs in Ranchi to arrange raw materials. MSMEs buy raw material from TISCO's distribution unit, RINL, and trade market. Kolkata metal market is also a major source of raw material for MSMEs. |
| Buyers | Maximum MSMEs are supplying to local manufacturers and OEMs/large firms like SAIL plants, MACON, BEML, Usha Martin, DRDO Gwalior. A few MSMEs are also supplying to ordinance factories and Railways as well. |

| Key Stakeholder | Brief Description |
|---|---|
| Autonomous/ Govt. Agency | MSME-DI, Ranchi plays a key role in the awareness and implementation of ministry schemes and policies and conducts Vendor Development Programs throughout the year. Directorate of Industries, Govt. (DIC) looks after guidance on the business opportunities and implementation of state govt. schemes for MSMEs. NSIC takes care of raw material supply, support on new equipment and machinery. Ranchi Industrial Area Development Authority (JIADA) takes care of industrial land development and support on the infrastructure required in the Ranchi industrial area. |
| Industry Associations | One of the key associations is the Federation of Jharkhand Chamber of Commerce and Industries (FJCCI), this association takes care of various challenges and supports manufacturing industries, service sectors, and traders on issues in areas of legal, technical, administration, manpower, market access etc. Another key association is Jharkhand Small Industries Association that acts as a voice for small manufacturing industries in the city. Some other associations active in the area are Laghu Udyog Bharti, Kokar Industrial Association. |
| Large Firms/ OEM | Large firms/OEMs active in the region are MACON, Usha Martin, HEC Ltd., Coal India Ltd. and Tata subsidiaries of Jamshedpur are also accessible to MSMEs of Ranchi. |
| Financial Institutions | There are ten important banks in the cluster including Punjab National Bank, Axis Bank, Bank of India, Bank of Baroda, etc. SIDBI is also active in the region and provides financial support to MSMEs and new entrepreneurs. |
| Academic Institutions | Ranchi is an educational hub and is home to many key academic institutions such as IIM-Ranchi, BIT-Mesra, NIFFT, JUT, and many Engineering, Diploma, and ITI institutes. |

*Table 12: Cluster Stakeholders - Ranchi*

## 8.1 Cluster Understanding

TCM interacted with Industry associations and MSMEs for sample study of the cluster. This survey helped in getting an understanding of cluster facts, operations of MSMEs, and requirements of different stakeholders such as suppliers, buyers, funding, employment, vendor base, etc. The following areas were stressed upon while getting a detailed understanding of the cluster.

| Parameter | Survey Observations about MSMEs |
|---|---|
| Turnover Range | 90% of the MSMEs have a turnover less than 5 crores. |
| Employee Strength | More than 50% of the units have an employee strength ranging from 20-50 employees and around 30% have less than 20 employees |
| Activities of MSMEs | Maximum MSMEs are involved in fabrication work along with other general engineering-related job work such as wire drawing, precision manufacturing, Non-Fe metal works, castings and forgings, foundries, manufacturing of pumps, compressors, general-purpose machinery, electrical panels, mobile substations and transformers, Roller bearing, etc. |
| Funding Source | Maximum MSMEs rely on banks for funding related issues. SIDBI also supports in meeting finance requirements through schemes and products aligned for MSMEs. |
| Future Plans & Capacity | Almost all the MSMEs have an idle capacity of more than 25% and some of them want to expand the facility if the market is available. |
| Rejection Rates | As the buyer base for Ranchi MSMEs does not have stringent requirements, the products manufactured by MSMEs are not in large batches thereby reducing the rejection rates |
| ISO/ Quality standards | Almost all the MSMEs follow some standards for manufacturing and many of them have ISO certifications for quality management. |

| Parameter | Survey Observations about MSMEs |
|---|---|
| Skill Mapping & Inhouse training | All the MSMEs do inhouse training along with on the job training for employees. Considering the skills required and low manpower strength of MSMEs, maximum MSMEs do not have any formal method for skill mapping. |
| Employment | MSMEs are employing manpower through the local network only. A few of them reach out to Mini Tool Room, Ranchi, GoJ for skilled manpower |
| OEM/Large firm linkage | MSMEs are primarily doing order-based job work. Some of them are linked with large firms/OEMs. |

*Table 13: Cluster Snapshot - Ranchi*

## 8.2 SWOT analysis of Ranchi cluster

| STRENGTH | WEAKNESS |
|---|---|
| • Availability of industry-specific skills which are mainly required by MSMEs<br>• Being the state capital, Ranchi can leverage its air, rail and road connectivity which provides supports in improved logistics<br>• Units are located at the heart of raw material zone and have access to surplus power<br>• Diversified products and processes of MSMEs | • Obsolete technology machinery and equipment used for manufacturing<br>• The longer product development cycle<br>• Unprofessional working styles<br>• Inadequate training of the workforce<br>• Unorganized vendor base<br>• Limited access to information (availability of finance, technological knowhow) |
| **OPPORTUNITIES** | **THREAT** |
| • State government's focus on the development of a thriving ecosystem for industrial development<br>• Strong potential for direct exports to neighbouring countries due to nearby port facilities<br>• Potential for becoming key outsourcing destination for global companies | • Chinese products domination and proved establishment in the International Market<br>• Fluctuating raw material prices and low availability of special grades materials |

*Table 14: Cluster SWOT Analysis - Ranchi*

## 8.3 Cluster needs assessment – Key Issues and Challenges

Based on the interactions with Industry units across clusters it was observed that challenges faced by different types of units are different and have been divided into the following categories:

| Cluster Challenge | Description of the Cluster Challenge | TC Service Offerings – Cluster Applicability |
|---|---|---|
| **NABL Testing Facility** | • Ranchi MSMEs face challenges in getting authorized testing services. They have to go to Kolkata increasing the overall cost of production | • Presently no testing services are provided by TC. TC can explore the possibility of setting up the lab based on the cluster demand. |
| **Poor Access to Information** | • Low awareness about government schemes and Incentives (concessions & facilities)<br>• The process for availing benefits from CLSS scheme is complex as it requires a lot of documentation.<br>• Under the export policy of GoJ, documents demanded are more than required as per the scheme guidelines, which impact EODB for MSMEs. | • ED Cell has been started by IDTR but there is limited awareness regarding the ED Cell amongst MSMEs. It is difficult for the MSMEs in Ranchi to access the ED Cell in Jamshedpur. |

| | | |
|---|---|---|
| **Support requirement in entrepreneurship development and specific technical trainings in Academic Institutions.** | • Ranchi has many training centers for ITI diploma, 04-year Diploma courses, reputed engineering and management institutes with some special niche segment focussed institutes. But it was observed that all the trainees and some institutes have a requirement of systematic training on entrepreneurship development courses. This will build the capability and understanding of fresh graduates for becoming an entrepreneur.<br>• Jharkhand Technical University needs support in conducting specific technical training/modules for diploma and ITI trainees.<br>• BIT Mesra and NIFFT need support in conducting entrepreneurship development courses.<br>• Central Training Institute of HEC Ltd. also has the requirement of some specific technical training for its ITI trainees. | • TC has a large bucket of various courses in general engineering skills, CNC operations, various software required in manufacturing. |
| **Lack of Quality Improvement Trainings & Poor Occupational Health and Safety** | • The cluster units have congested workplace which shows poor workplace organization practices impacting productivity.<br>• Units have less awareness of quality and productivity improvement practices. | • Though TC focuses on following good manufacturing practices in its own facility, it does not offer training on Safety, 5S, Lean, quality and productivity improvement |
| **Less Awareness and limited uptake of New Technologies** | • MSMEs face challenges in up-gradation to the latest technologies. Being fabrication and general engineering hub there is less awareness of advanced and latest technologies in Welding.<br>• MSMEs need 2D laser cutting in the region. There are limited facilities in the region that provide these services.<br>• Low understanding of various manufacturing standards such as BIS, DIN, etc.<br>• Limited access to finance further reduces their capability to adopt new machines and technology | • TC regularly conducts workshops on new technologies for MSMEs. Currently, these workshops are conducted only in Jamshedpur and not in Ranchi. TC can also conduct these workshops for MSMEs in Ranchi.<br>• Availability of finance is not a core area of TC, but TC can connect MSMEs to MSME-DI for getting an understanding of initiatives taken by Ministry |
| **Up-skilling of Workforce & Skilled Manpower** | • Lack of in-house training on skill upgradation.<br>• Absence of training providers for CNC Operations, tool room maintenance, advance welding & tool design and drawings.<br>• Limited availability of managerial trainers and training | • IDTR is running courses on CNC operations and maintenance, which can be made accessible to Ranchi MSMEs.<br>• IDTR is running a lot of courses aligned with national frameworks for general engineering skills, which can be made accessible to Ranchi MSMEs. |

| | | |
|---|---|---|
| **Supply Side Challenges – Raw Material Procurement** | • Lack of availability for special grades of steel so MSMEs have to import the raw material. | • NA |
| **Limited Access to market** | • MSMEs have idle capacity. This idle capacity shows a lack of job work available to MSMEs which can be utilized if MSMEs can have access to more job works.<br>• Maximum MSMEs have customers within India only, the majority of them are in and around Ranchi. MSMEs face the challenge of delayed payments from PSU.<br>• Very few MSMEs have linkages with OEMs/Large firms. Few MSME units are supplying to Railways and Govt sector but need more robust linkages to maximize their orders. | • TC is providing awareness through its awareness session during various conducted programs conducted under EAP,ESDP, IMC etc.<br>• Creating access to market is not TC's core area however MSME-DI conducts Vendor Development Programs and other market outreach programs |

*Table 15: Cluster Need Assessment - Ranchi*

# 9. Recommendation

A careful assessment of the training portfolio, process & technology gaps at the TC and cluster requirements was done by TCM experts to identify technological and process improvement that can be taken up. Based on this analysis, it was identified that there is a considerable gap in technology offerings of the TC and the requirements of the cluster. TCM recommends adding some machines for improving the job work services portfolio of the TC along with adding some new training programs and process improvements.

## 9.1 Technology Specific Interventions to strengthen job works services

The selection of the right product and machines is important to enable TC to provide maximum support for local MSMEs. The investment should be in line with the local requirement. The following matrix provides information on the potential areas for the TC to invest by mappings TC's competencies with the Market requirements

| Core Competency of TC | | | |
|---|---|---|---|
| | *High* | **(C)**<br>• **Precision machined parts**<br>• **Pressure die casting – Al**<br>• **Advisory on measurement and calibration services.** | **(A)**<br>• **Hard finished die elements**<br>• **Refractory industry gating system** |
| | *Low* | **(D)**<br>• **Foundry patterns**<br>• **Low cost tools,**<br>• **Parts/components with lower technical inputs** | **(B)**<br>• **Complete Sheet metal dies**<br>• **Defense jobs**<br>• **Proto jobs and batch jobs** |
| | | ***Low*** | ***High*** |
| | | **Market Volume** | |

*Figure 8: Product selection matrix for IDTR*

(A) TC is competent and handling this section well.

(B) Investment and skill-building proposal is based on the requirement of this segment which is much higher in the value chain. It is a demand area.

(C) This section to be continued as it is to support local MSMEs
(D) Attention to be diverted from this segment

### 9.1.1 Recommended new machines

To fulfill the above transition, we recommend below machines for strengthening TC's job work capability:

| Machines | Price of Machine | Description of Technology | Applicability |
|---|---|---|---|
| Stamping Press (600 Tons) | Approx. 5.5 Cr | A stamping press is a mechanical press machine which deforms metal as per the given shape of the tools and tolerances. | As TC is a pioneer in tool and dies making, they need a higher tonnage (around 600 Tons) press machine for making complete die in the TC itself. It will remove the dependency of TC on the outside facility for tool trials, which will reduce the delivery time and increase the capacity of TC to make more dies. |
| Water Jet Machine (6000 bar, 5 Axis) | Approx. 2.5 Cr | Water Jet machine is an industrial metal cutter with the capacity to cut a wide variety of materials of varied thickness using a high-pressure jet of water. This water stream is mixed with abrasive particles for metal cutting and due to cold cutting, it can cut all types of metals without disturbing metallurgical properties. | It is a long-awaited technology for the Jamshedpur auto cluster. It is useful and has advantages over conventional machining from the aspect of cost and processing time. It has got a wide range of applications in the auto cluster which is dominated by more than 70 auto stamping units. |

*Table 16: New Machines Proposed as a part of TC Gap Assessment*

### 9.1.2 New facility for testing with NABL Accreditation

There is a need in the visited clusters for setting up a NABL accredited testing and certification facility. This would require the TC to focus on setting up the following testing and training facilities. Following are some general testing requirements and available tests for the clusters:

| S.N. | Material Engineering Lab Testing | Metrology Lab Testing & Equipment |
|---|---|---|
| 1 | Spectro | Profile Projector |
| 2 | Microscopes | Slip Guage Calibration |
| 3 | Surface Preparation Lab | Precision Guage for Length |
| 4 | MPI/ Eddy Current testing | Surface Roughness Measurement |
| 5 | Ultimate Tensile Machine | Surface Table with digital height guage, Measurement table and Work Table with all necessary equipment |
| 6 | Hardness Testing – Universal machine | |
| 7 | Ultrasonic testing | |

## 9.2 New Training Programs

TCM conducted an assessment of the training portfolio of IDTR and provided recommendations to make the operations with respect to delivery of training, data management, feedback mechanism etc. more effective. Feedbacks from the clusters were also taken to identify the requirement of new

courses as per the changing trends of industries. The following are the list of courses that were finalized with the TC and Cluster stakeholders during the training portfolio assessment and were verified during the cluster diagnostic study.

| S.N. | Training Module | Qualifications | Duration | Batch Size - Nos |
|---|---|---|---|---|
| 1 | **Advanced Tool Assembly & Try Out**. This course can provide training on drawing study, sheet metal Die assembly, inspection and try out. Inspection of parts manufactured by Die. | Work experience of minimum 3 years in tool making in the press shop. ITI in fitter is preferred. | 48 Hrs (04 Hrs*02 Weeks) | 25 |
| 2 | **Advanced Design & Manufacturing of Jigs & Fixtures.** | Work experience of 1-2 years in the machine shop, fabrication and sheet metal assembly. | 48 Hrs (04 Hrs*02 Weeks) | 25 |
| 3 | **Foundry methods and pattern design**: This course can provide training on Simulation, Draft, Shrinkage allowance, Gating system, Methods, and pattern design. | Work experience of minimum 3 years in foundry methods. ITI in fitter/machinist is preferred. | 192 Hrs (1 Month) | 25 |
| 4 | **Low-Cost Automation – LCA** | Work experience of minimum 2 years and exposure to process optimization. | 01 Month | 15 |
| **5** | **AR/IoT/Industry 4.0** This course can include Introduction to industry 4.0/IoT, Automation technologies in industry 4.0, device configuration and network, linkage between mechanical and virtual worlds, cyber physical system, leadership capability for industry 4.0, case studies from manufacturing industries. | Undergraduates, Fresh Graduates or Work experience of 0-2 years in manufacturing, exposure to computer software and computing devices, Academic qualification of undergraduate/graduate in science stream/ B. Tech/B.E. Diploma in | 03 Month | 20 |
| **6** | **Electric Vehicle area** This course can include topics for outcome-based learning for below outcomes:<br>1 Battery Charging Solutions<br>2 Swapping of Batteries<br>3 Spare Parts Manufacturing<br>4 Home Delivery of Batteries<br>5 New Innovations<br>6 Uberisation of E Rickshaw<br>7 Two-Wheeler Retrofit | Work experience of 1-2 years in automotive industry, Academic qualification of diploma in mechanical, graduate in science stream | 03 Month | 20 |
| **7** | **Lean Six Sigma** certification to individual professional | Work experience of 0-1 years in operations in the manufacturing or service sector. | 04 Days | 25 |

*Table 17: New Courses Proposed as a part of Training Portfolio Assessment*

## 9.3 Consulting Services related Interventions

TC should expand its consultancy portfolio with more services to MSMEs and large firms. TC can reach out to all the 03 clusters with its revamped consultancy structure and thus it can also create one more substantial revenue stream for itself. To initiate expansion through a focus on the following recommendations:

### 9.3.1 Quality Control and Improvement

As the majority of the units are without ISO Quality certifications, TC can act as the prime institute to provide consultancy services to increase the awareness about ISO Quality systems and implementing 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 fulfil 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.

### 9.3.2 Productivity Improvement

Considering current manufacturing processes in the general engineering, fabrication, and allied industries clusters, there is a lot of scope to introduce productivity improvement methods with the use of semi-automation aids. TC can further 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 full-automation in the processes, TC can support in the implementation of production aids for the production of Jigs and fixtures. TC can also support the units in the implementation of robotic technology in areas where regular welding is required.

### 9.3.3 Design Expertise Consultancy:

Cluster MSMEs have limited reach to design capability in sheet metal die design & simulation, forge die design and casting simulations. TC is providing design services in limited way to MSMEs which can be increase by making design consultancy separate service of TC to MSMEs. A framework can be prepared using which MSMEs can utilize the TC's strong design set up for their projects basis. TC can also support entrepreneurs for their prototype development through this new initiative in more effective way and students can also develop their design skills through innovative projects under guidance of TC's skilled designers.

### 9.3.4 Green Energy Consultancy:

MSMEs in the cluster have done initial work on energy efficient methods for manufacturing by using LED lights, replacement of old high-power consuming equipment by a few MSMEs. TC can initiate spreading awareness and aid through government policies for motivating MSMEs to go for green energy methods for manufacturing. TC can do awareness workshop and provide assistance in modifying existing manufacturing methods and environment to energy efficient methods.

### 9.3.5 Project Consultancy

TC should market its project management consultancy in a bigger way to reach out to the available market. TC has a strong knowledge base on this service so it can explore national and international linkages for project management consultancy which can include a market survey for the project, preparation of Detailed Project Report, Implementation of all the recommendations as Implementing Agency. TC can also work as Technical Agency in some projects because TC has highly skilled manpower in general engineering, precision manufacturing and tool & die making.

## 9.4 Cluster Interventions:

### 9.4.1 Access to Market

To resolve the main issue of limited linkages, TC can support government institutions like MSME DI and DIC in exposing the units to a wider market. TC can provide support in registering with all the national and international Auto and other OEMs 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 levels. 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 and manufacturers to benefit immensely from the existing setup.

### 9.4.2 Entrepreneurship Facilitation

Enterprise Development Cell is established at TC to bridge the information gap, awareness can be spread in the clusters about ED cell of TC with exploring services via cell such as:

- 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 a new enterprise,
- Preparation of proposal for large OEMs.

## 9.5 Manufacturing process Improvement Interventions for TC

TCM has conducted a complete gap assessment of TC's manufacturing processes, techniques, available machines and systems. Basis the assessment, TCM has recommended following process improvement interventions to increase productivity, quality, delivery speed and to decrease the cost and in-process rejections. The implementation of these interventions will increase the effectiveness and efficiency of TC's processes and system, which will give more smooth support to MSMEs.

| Sl No. | Recommendations | Indicative Outcomes |
|---|---|---|
| 1. | Process standardization & Governance<br>*This will feed to IMS of TC | Standard procedures and governance structure will improve the decision making |
| 2. | Inventory management guidelines | It will help in improving lower PR to PO time, reducing delivery time, reducing cost and optimizing storage |
| 3. | MIS and dashboard development<br>*This will feed to ERP- SAP B1 up-gradation of TC | It will improve the data gathering system at TC for better visibility, Improved report, and planning, quick review, analyzing the data and subsequently effective decision making. |
| 4. | Effective Planning System | It will improve the effectiveness of resource utilization and visibility of operations |

| | | |
|---|---|---|
| 5. | Quality & Productivity Improvement: 5S Implementation, Basic TPM, Quality Circle | It will improve the workplace for effective organization of material and reduce the searching time to create a clutter-free workplace.<br><br>It will improve the maintenance practices of TC hence bringing an improvement culture across the organization.<br><br>It will improve the capability of TC in identifying and doing process improvement with strong sustenance |
| 6. | Strengthening of Design Function – Design Manpower, Simulation Software, Design capability upgradation | This will improve the design capability and capacity of the design function to take up more design orders and lower design cycle time. |
| 7. | Smooth functioning of Purchase Function – Bulk PO, Annual Rate Contract | This will reduce the repetitive work for procurement of standard and regular parts |

*Table 18: Improvement in Manufacturing Processes - TC Gap Assessment*

## 10. Linkage matrix between recommended interventions and cluster

All the above given recommended interventions are applicable to every cluster on a different requirement level. This is illustrated in the following matrix as to how each recommendation is linked with which cluster at which level of requirement:

| Recommended Interventions | Adityapur Cluster | Bokaro Cluster | Ranchi Cluster |
|---|---|---|---|
| Technology Specific Interventions to strengthen job works services: Waterjet Machine | High | Medium | Low |
| Technology Specific Interventions to strengthen job works services: Press Machine | Medium | Low | Low |
| NABL accredited testing lab | Medium | High | High |
| New Training Programs | Medium | High | Low |
| Consulting on Quality Improvement | Low | Medium | Medium |
| Consulting on Productivity Improvement | Medium | High | Low |
| Design Expertise Consultancy | High | Medium | Medium |
| Green Energy Consultancy | Medium | Low | Medium |
| Project Consultancy Services | Low | Medium | Low |
| Cluster Intervention: Access to market | Medium | Medium | Medium |

| Recommended Interventions | Adityapur Cluster | Bokaro Cluster | Ranchi Cluster |
|---|---|---|---|
| Cluster Intervention: Entrepreneurship Facilitation | High | High | Medium |

# 11. Annexures

## 11.1 List of Stakeholder Contacted – Adityapur Cluster

| Sl No. | MSME/ Association | Name MSME/Association visited | Contact Person Name | Designation |
|---|---|---|---|---|
| 1. | Association | ASIA - Adityapur Small Industries Association | Mr. Indra Kumar Agarwal | Manager - Operations |
| 2. | Autonomous Body | Auto Cluster | Mr. M. Pansari | President |
| 3. | MSME | G S Enterprises | Mr. Satpal Singh | Partner |
| 4. | MSME | Pravat Fabricators Pvt.Ltd | Mr. D Roy | Plant Head |
| 5. | MSME | Dorabji Auto | Mr. Rajesh Kumar Lal | Partner |
| 6. | MSME | Pritam Auto | Mr. Amandeep Singh/Mr. Daljeet Singh | Owner |
| 7. | MSME | Proto D Engineering | Mr. Manish Kumar | Project Manager |
| 8. | MSME | Sharda Industries | Mr. Virendra Kharat | Plant Head |
| 9. | MSME | Cypress Auto Pvt Ltd | Mr. Pradip | Plant Head |
| 10. | MSME | Khurana Industries | Mr. Rahul Khurana | Owner |
| 11. | MSME | Automat Engineers | Mr. G P Singh | Director |
| 12. | MSME | Gloria Engineering Company | Mr. Ravindra Singh | Plant Head |
| 13. | MSME | Highco Engineers Pvt. Ltd | Mr. Premnath Mahato | Manager - Operations |
| 14. | MSME | Caparo Engineering India Ltd | Mr. Tapas Kumar Das | Manager |
| 15. | MSME | Acropoly Metal India Pvt Ltd. Unit I | Mr. Mukesh Kumar | DGM |
| 16. | MSME | Metaldyne Industries Limited | Mr. Suranjan Chatterjee | Plant Head |
| 17. | MSME | Multitech Auto Pvt Ltd | Mr. Sunil Sharma | Head- New Product Development |
| 18. | MSME | Shah Hitech Auto Alcast | Mr. M K Mohanty | Head of Production |
| 19. | MSME | Sati Auto Components Pvt Ltd | Mr. Mandeep Singh | MD |
| 20. | MSME | JMT Auto Ltd | Mr. Neelkantha Pati | AGM Planning |
| 21. | MSME | Zenith Forge Ltd. | Mr. Sarangdhar Singh | DGM Marketing |
| 22. | MSME | Sudisa Foundry | Mr. Ashok Mishra | Head Marketing |
| 23. | MSME | Auto Profiles Ltd | Mr. Bikas Mukherji | MD |
| 24. | MSME | Adya Enterprises | Mr. Rajkumar Sanghi | MD |
| 25. | MSME | Kross Ltd | Mr. Bhupendra Singh | QA Head |
| 26. | MSME | Industrial Forge & Engineering Co Ltd | Mr. Abhijit Kumar Chatterjee | Sr GM Operations |

## 11.2 List of Stakeholders Contacted – Bokaro Cluster

| Sl No. | MSME/ Association | Name MSME/Association visited | Contact Person Name | Designation |
|---|---|---|---|---|
| 27. | Association | Bokaro Chamber Of Commerce and Industries, Bokaro | Mr. Sidharth Parakh | Secretary |
| 28. | Association | Jharkhand Industries Association, Bokaro | Mr. Mahesh Kejriwal | President |
| 29. | Association | Jharkhand Small Tiny Service Business & Enterprises Association, Bokaro | Mr. Kundan Kumar Upadhyay | Secretary |
| 30. | Association | Industries & Commerce Association, Dhanbad | Mr. Chinmay | Gen. Secy |
| 31. | MSME | Kiran Ispat Udyog, Bokaro | Mr. Sidharth Parakh | Owner |
| 32. | MSME | Shri Bajrang Steel Udyog | Mr. Neeraj Singh | Partner |
| 33. | MSME | Ashoka Foundry | Mr. Shashank Agarwal | Owner |
| 34. | MSME | Lubryx Enterprises | Mr. Surendra Kumar Jain | Owner |
| 35. | MSME | Amit Industries | Mr. Amit Prasad | Owner |
| 36. | MSME | Quality Rubber Steels | Mr. Mahesh Kejriwal | Owner |
| 37. | MSME | Schemede & Mischenin | Mr. U K Pandey | Director |
| 38. | MSME | Ratan Industries | Mr. Rajiv Ratan | Owner |
| 39. | MSME | Nirmal Equipments | Mr. D K Poddar | Owner |
| 40. | MSME | Associated Plates & Vessels Pvt Ltd | Mr. Madhukar Sinha/Mr. Rohit | Owner |
| 41. | MSME | Ajay Chemical Industries | Mr. Ajay Kedia | Owner |

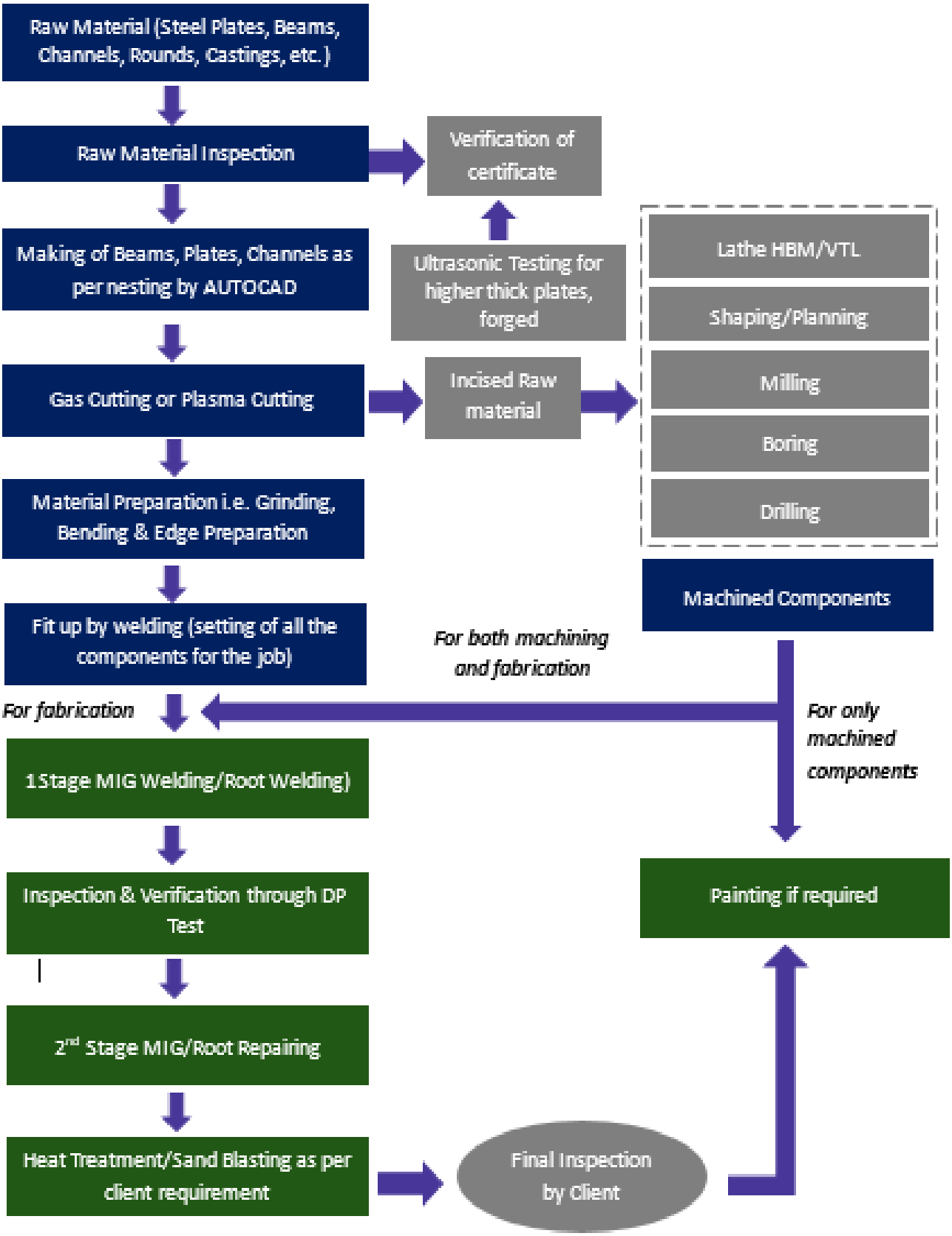
## 11.3 List of Stakeholders Contacted – Ranchi Cluster

| Sl No. | MSME/ Association | Name MSME/Association visited | Contact Person Name | Designation |
|---|---|---|---|---|
| 42. | Association | Federation of Jharkhand Chamber of Commerce & Industries | Mr. Kunal Ajmani (President) / Mr. Dhiraj Taneja (General Secretary) | President/ General Secy |
| 43. | Association | Jharkhand Small Industries Association | Mr. Philip Mathew (President) / Mr. R K Sharma (Hony. Secretary) | President/ General Secy |
| 44. | Govt. Agency | MSME-DI Ranchi | Mr. Gaurav Kumar | Asst. Director |
| 45. | Academia | Jharkhand University of Technology | Dr. Gopal Pathak (Vice-Chancellor) | Vice-Chancellor |
| 46. | Academia | Birla Institute of Technology (BIT), Mesra | Dr. Gautam Sarkhel (HoD)/ Dr. Anupam Roy (Asst. Professor) | HoD Chem. Dept. |
| 47. | Academia | National Institute of Foundry and Forge Technology | Mr. Anand Mohan Murmu (Asst. Professor – Manufacturing Engineering) | Asst. Professor |

| Sl No. | MSME/ Association | Name MSME/Association visited | Contact Person Name | Designation |
|---|---|---|---|---|
| 48. | Govt. Enterprise | Heavy Machine Tool Plant – HEC, Ranchi | Mr. D P Singh (Chief of Plant) | Chief of Plant |
| 49. | MSME | K M Udyog | Mr. Randhir Kr. Sharma (Owner) | Owner |
| 50. | MSME | National Industrial Corporation | Mr. Shashank Tulsyan (Owner) | Owner |
| 51. | MSME | Chotanagpur Graphite Pvt. Ltd. | Mr. K Poddar (Owner) | Owner |
| 52. | MSME | Bhawani Enterprises & Laghu Udyog Bharti | Mr. Vijay Chhapariya (Owner) | Owner |
| 53. | MSME | Shri Ram Wire Products Pvt. Ltd. | Mr. Anjay Pacheriwala (Owner) | Owner |
| 54. | MSME | Chhotanagpur Rope Works Pvt. Ltd. | Mr. Siddharth Jhawar (Director) | Director |
| 55. | MSME | ALCAST, SIRTDO Industrial Estate | Mr. S K Agrawal (Owner) | Owner |
| 56. | MSME | Micro Metal Craft, SIRTDO Industrial Estate | Mr. Alok Agrawal (Owner) | Owner |
| 57. | MSME | Precision Manufacturing, SIRTDO Industrial Estate | Mr. Anil Kr. Agrawal (Owner) | Owner |
| 58. | MSME | Meditron, SIRTDO Industrial Estate | Mr. N C Agrawal (Director) | Director |

## 11.4 Manufacturing Processes of clusters in brief

Different stages in the Fabrication and Machining 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. 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.

## 12. Annexure 3: Cluster Prioritization Matrix

| Cluster Prioritization Matrix- IDTR Jamshedpur | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | 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 | 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 | Automotive Cluster, Adityapur | Automotive | Approx. 900 MSMEs and 20 Large units | Main: Adityapur Small Industries Association (ASIA)<br>Others: Singhbhum Chamber of Commerce & Industry, Chamber Bhawan, Singhbhum Industries Association (SIA) | National Institute of Technology, Jamshedpur<br>RVS College Of Engineering and Technology, Jamshedpur<br>Al-Kabir Polytechnic, Jamshedpur | MSME-DI, Ranchi<br>NSIC, Jamshedpur | Members of Adityapur Small Industries Association (ASIA) formed a Special Purpose Vehicle (SPV) in the Name of Adityapur Auto Infrastructure Company Limited, later on, its name changed to "ADITYAPUR AUTO CLUSTER" (AAC)<br>Jan 2005 - Article of Association of Adityapur Auto Cluster (Creation of SPV i.e. Section 25 Company) | Common Tool Room and SPV (called as Adityapur Auto Cluster) | No | Linkage of Association | 6 Km | TC believes that the units in the cluster are not necessarily approaching it and wants to address the same | |
| 2 | Steel and General engineering cluster, Bokaro | Steel Fabrication | Approx. 60 MSMEs | Jharkhand Small Tiny Services and Business Enterprises Association<br>Jharkhand Industries Association Bokaro<br>Chamber of Commerce and Industries | Guru Gobind Singh Educational Society's Technical Campus, Bokaro<br>Bokaro Institute of Technology<br>J.P.S. Memorial Industrial Training Center, Bokaro<br>Pacific Group of Education, Bokaro<br>Government Polytechnic, Khutri<br>Government Women's Polytechnic Bokaro | MSME-DI, Ranchi<br>MSME-DI, Dhanbad | No | No | No | No Linkage | 133 Km | TC wants to establish linkages with units in Bokaro | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Engineering & Allied Industries Cluster, Ranchi | Steel Fabrication, Sheet Metal Cutting, etc. | Approx. 50 units | Jharkhand Small Industries Association | PanIIT Alumni Reach for India Foundation (PARFI), Ranchi<br>BIT Sindri, Ranchi<br>Birla Institute of Technology, Mesra | MSME-DI, Ranchi<br>NSIC and NSSHO, Ranchi | No | No | No | No Linkage | 130 Kms | TC wants to establish its presence with units having synergies in Ranchi | |
| 4 | Tribal Jewellery Cluster, Jamshedpur | Tribal Jewelry | 1000-1500 (micro units/ artisans) | Vishwakarma Karigar Sangh | National Institute of Technology, Jamshedpur<br>RVS College Of Engineering and Technology, Jamshedpur<br>Al-Kabir Polytechnic, Jamshedpur | MSME-DI, Ranchi<br>NSIC, Jamshedpur | No | No | No | No Linkage | 12 Km | TC would like to engage with them separately, at this moment there is no synergy of the cluster with the activities of TC | Not found suitable reason being lack of synergy with the activities and domain of TC |
| 5 | Brass & Bronze Cluster, Hazaribagh, Bishnugarh | Kitchen utensils-lota, thali, glass, kalchul, etc. (Not Relevant to TC)<br>Metal Craft - Bottle opener, Wall hanging, etc. (Not Relevant to TC) | Approx. 55 micro-units | Jharkhand Small Industries Association | College of Engineering, Vinobhabhave University, Hazaribagh<br>Govt Industrial Training Institute<br>Dr.Rajendra Prasad Industrial Training Center<br>Sapthagiri ITC<br>Srinivasa Institute of Technology ITC | MSME-DI, Ranchi<br>District industries center, Hazaribagh<br>Ranchi Industrial Area Development Authority(RIADA)<br>National Small Industries Corporation(NSIC), Ranchi | No | No | No | No Linkage | 196 Kms | | Not found suitable reason being lack of synergy with the activities and domain of TC |
| 6 | Tiles & Allied Product Industries Cluster, Bokaro | Not found suitable reason being lack of synergy with the activities and domain of TC | | | | | | | | | 133 Kms | | |
| 7 | Black Smith Cluster, Bedki Lari, Ramgarh | Not found suitable reason being lack of synergy with the activities and domain of TC | | | | | | | | | 149 Kms | | |
| 8 | Silver Jewelry, Sukrigah, Ramgarh | Not found suitable reason being lack of synergy with the activities and domain of TC | | | | | | | | | 149 Kms | | |
| 9 | Steel Utensils Cluster & Agriculture Equipment Cluster, Deoghar | Not found suitable reason being lack of synergy with the activities and domain of TC | | | | | | | | | 272 Kms | | |

| | | | | | |
|---|---|---|---|---|---|
| 10 | Sari Calendaring Cluster, Nirsa, Dhanbad | Not found suitable reason being lack of synergy with the activities and domain of TC | 140 Kms | | |
| 11 | Refractory Cluster, Chirkunda, Dhanbad | Not found suitable reason being lack of synergy with the activities and domain of TC | 140 Kms | | |

For further information, please connect with:


# Vivek Agarwal

Partner– Infrastructure, Government and Healthcare (IGH)
KPMG in India
**T:** +91 98117 05760
**E**: vivekagarwal1@kpmg.com

# Punita Bansal

Associate Director – Infrastructure, Government and Healthcare (IGH)
KPMG in India
T: +91 9910009401
E: punitabansal@kpmg.com