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Implementing business development Services in Rajkot Engineering Cluster

Diagnostic Study Report

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Executive Summary

Rajkot, in the state of Gujarat, is one of the largest engineering clusters in the country. The cluster produces a range of products such as castings, pump-sets, automobile components, diesel engine generating sets, bearings, machine tools and so on. SIDBI has entrusted TERI to undertake a project entitled "Implementing Business Development Services in Rajkot Engineering Cluster". The project focuses on development of local service providers/business development services for various activities (marketing, export, finance, technical, legal etc) for various engineering units.

In order to obtain an in-depth picture of the cluster and understand the environment in which the units operate a diagnostic study of the cluster was undertaken. At the outset of the diagnostic study, basic background information on the cluster was collected through interactions with industry associations, government officials, technical institutions and progressive entrepreneurs. It was felt that since the number of products manufactured in the cluster is too many for a detailed analysis it would be appropriate to concentrate on two major products only in the project The foundry and pump sets were selected for detailed analysis and intervention due to the large number of units in each of these two categories and potential to make a difference in these sectors in the time frame of the project.

Interviews of representative samples of foundry and pump set units were conducted in the cluster between April to July 2009, to get information about the business development services in the cluster and also to access the industry's perception of the need to develop these services within the cluster.

The interviews helped in developing a better understanding of the economic and social structure of the cluster and the strengths and gaps in services available for the units. Based on the information collected, a 'who does who pays' matrix was prepared. All these helped to identify the weakness among business service providers and to prepare an Action Plan so as to ensure methodological development of the business service providers.

Meanwhile, an awareness programme on Star Rating of Bureau of Energy Efficiency (BEE), Government of India was organized on 4th May 09. Representatives from BEE and SIDBI apart

from a large number of pump manufacturers and service providers from the cluster attended the programme. To initiate the process of stakeholder consultation on the diagnostic study and the proposed Action Plan, a Cluster Coordination Committee was formulated. The Committee has representatives from industry associations, government agencies, prominent entrepreneurs, academic institutions and SIDBI. A meeting of the Cluster Coordination Committee is proposed to be convened in August 09.

Implementing business development Services in Indian MSME clusters – Rajkot Engineering Cluster

1.0 Introduction

1.1 Project background

MSMEs play a vital role in Indian economy. Most of the MSME activities are geographically clustered. One of the well-known strategies for development of MSMEs located in clusters is to strengthen the access to BDS (Business Development Services) of these enterprises. Hence strategies aimed at development of the market for BDS, strengthening the access of MSMEs to BDS providers, and assisting BDS providers in the clusters to become self-sustainable are of vital importance in development of the MSME sector.

The objective of this project is to strengthen the access to BDS (Business Development Services) of MSMEs in Rajkot cluster by designing and implementing strategies to:

- Develop the market for BDS
- Strengthen the access to BDS providers
- Assist BDS providers in the clusters to become self-sustainable.
- Develop the clusters as 'role models' for other similar clusters in the country.

The project focuses on market based development of the cluster, through development of various BDS services such as technical experts, cluster development agents, financial institutions, local/ state/ national level government departments, suppliers/ manufacturers, other relevant organizations/ institutions with potential to become BDS.

1.2 Cluster Background

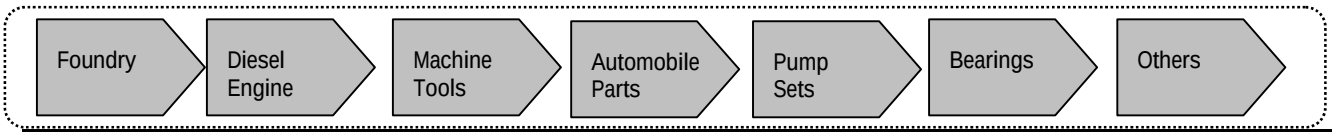
The engineering sector, popularly known as the mother of all industries, is an important industrial segment for economic growth. The sector contributes to nearly 38% of the total industrial production, 30% of the total employment and accounts for 28% of the total number of industrial units in the country (Ref. Annual Survey of Industries, Government of India, 2005-06). The sector has been growing at a brisk rate of 8.5% per annum for the past two decades. The engineering sector broadly covers a vast range of machinery, equipment and fabricated metal components used by industrial, agricultural, automobile and other transport sectors. A significant characteristic of the sector is the coexistence of a large number

of SMEs with relatively lesser number of large national and multinational conglomerates.

Gujarat has a large and vibrant engineering industry and accounts for nearly 9% of the total production from engineering sector in the country. Location of large industrial projects, good infrastructure, availability of natural resources, proactive government policies besides entrepreneurship excellence has contributed to development of the engineering sector in the state. Rajkot, in the state of Gujarat, is one of the largest engineering clusters in the country. The cluster manufactures a range of engineering items across the value chain.

Rajkot engineering cluster produces a range of products such as castings, pump-sets, automobile components, diesel engine generating sets, bearings, machine tools and so on. In addition a number of miscellaneous engineering items such as agricultural implements, hydraulic jacks, air compressors, fasteners and so on are also manufactured in the cluster.

Presence of Rajkot Engineering cluster in different engineering segments



Foundry	Diesel Engine	Machine Tools	Automobile Parts	Pump-sets	Bearings	Others
- Pump and motor bodies - Diesel engine components - Automobile components - Cylinder lines - Other casting products	- Lister Engine - Peter engine - Comet engine - Diesel Engine spares	- Conventional machine - Metal cutting e.g. lathe (ii) Metal forming e.g. power press, shearing press - CNC Machines - Machine tools spares	- Connecting rods - Pistons - Crankshafts - Camshafts - Liners - Sleeves - Air cooled block - Spares	- Submersible pump sets - Centrifugal pump sets - Mud pumps	- Ball bearing - Taper roller bearing - Cylindrical roller bearing - Needle roller bearing - Spherical roller bearing	- Forgings - Agricultural implements - Hydraulic jack - Air compressors - Fans - Dust collectors - Packaging & plastic items

There are various other clusters in India producing one or more of the engineering products made in Rajkot cluster. For example, important foundry clusters for manufacture of engineering castings in India are Belgaum and Kolhapur. Coimbatore and Ahmedabad are major pump set manufacturing clusters. Bangalore cluster is known for the manufacture of high quality machine tools in India. There is a good potential to learn

through cross exchange of information and knowledge between the different clusters in India.

One international engineering cluster which can be role model for engineering clusters in India such as Rajkot is TAMA (Technology Advanced Metropolitan Area) in Tokyo region, Japan. The cluster has about 16,562 SMEs, 16 R&D units of large enterprises and 34 Universities and Colleges with science, engineering & management departments. There is a high R&D orientation among SMEs. There has been a significant increase in cooperation between SMEs and university, new product introduction, R&D expenditure and profitability of firms after formation of the "TAMA cluster" in 1996.

1.3 Methodology

The Diagnostic Study was designed in two parts; quantitative survey of BDS providers and MSMEs (*through structured questionnaire*), and qualitative discussion with focused groups, opinion leaders, and a variety of stakeholders of the cluster.

A sampling criteria covering maximum diversity of MSMEs was adopted for the qualitative survey. A sample questionnaire survey of 77 MSMEs was done in the cluster. The samples are selected on a random basis. The detailed break-up of the number of MSMEs surveyed from each of the different product segments in the cluster is given in table 1.3.

Table 1.3 Number of MSMEs surveyed across different product segments in Rajkot cluster

Segment	Automobile parts	Bearings	Machine Tools	Diesel Engine	Foundry	Pump sets
No. surveyed	10	03	11	08	24	21

Analytical tools like 'who does who pays' matrix were used. The analysis was useful in developing a deeper understanding of the activities related to the cluster and identify the weakness among the present BDS providers. Subsequent, SWOT analysis helped the project to develop a Prioritised Action Plan aimed at methodological development of the BDS providers and improving their competitiveness.

Further involvement of the cluster stakeholders are planned in project steering process and a Cluster Coordination Committee has been formed. The Prioritised Action Plan was discussed informally with the Cluster Coordination Committee. It is planned to hold biannual meetings of the Cluster Coordination Committee starting August 2009.

2.0 Frame Work

2.1 The Cluster

Rajkot, is centrally located in Saurashtra region in the state of Gujarat (see figure 2.1[i]) in India. The geographical spread of the cluster includes Aji Vasahat, Bhaktinagar Industrial Area, Mavdi Plot, Samrat Industrial Area and Atika Industrial Area areas in Rajkot. In addition, a large number of engineering units are located in fast expanding industrial neighbourhoods such as Metoda GIDC and Sapar-Veraval. While Aji Vasahat is only about 3 km from the city centre, Sapar-Veraval and Matoda GIDC are at a distance of about 18 km and 20 km from the city centre, respectively.

Figure2.1(i) Location map of Rajkot

A detailed map of Rajkot District is given in figure 2.1(ii).

The main engineering product segments in the cluster, number of units, sales turnover, employment, exports and investment in plant and machinery of each of the segments are summarised in table 2.1.

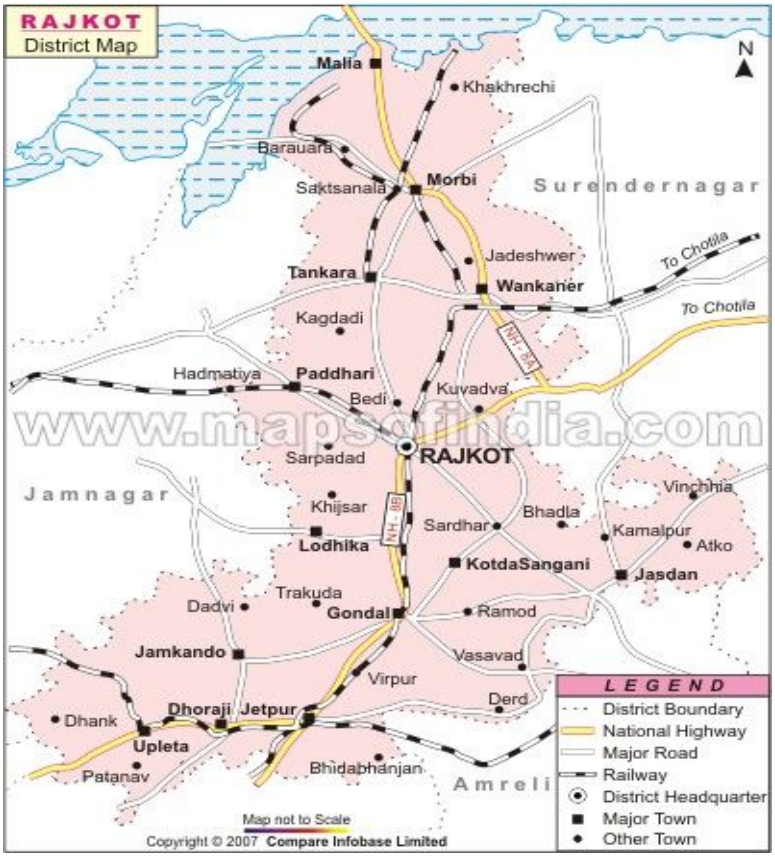


Figure 2.1(ii) Map of Rajkot

Table 2.1 Main product segments in Rajkot engineering cluster and key industry statistics (industry estimates)

Sr. No	Category	Number of units	Sales turnover (crores)	Employment (nos)	Export (crores)	Investment in P& M (crores)
1	Foundry	505	2,700	20,000	350	250
2	Diesel Engine Generating Sets	374	200	7,500	40	180
3	Machine Tools	326	600	10,000	60	130
4	Automobile parts	303	750	9,500	400	454
5	Pump-sets	161	300	4,700	55	70
6	Bearings	88	400	3,100	120	115
7	Others (including forging)	433	500	8,000	100	108
	Total	2,190	5,450	62,800	1,125	1,307

Selection of sectors for intervention

Interactions with MSMEs and cluster stakeholders revealed that there has been a few intervention by external agencies aimed at BDS development and promotion and common facilities at the cluster level in selected sectors viz. in machine tool sector by UNIDO, in bearings sector by MSME Development Institute and in diesel engines sector by EDI. In addition, some of the

other sectors like automotive components is too diversified in terms of the products they manufacture and markets they cater to. Discussions with BDS development experts during the course of diagonistic revealed that it is better to focus on a few sectors (ideally two) rather than targeting all the six or so industry segments present in the cluster. After focused discussions with stakeholders the following two sectors have been selected for BDS intervention in the Rajkot cluster (1) Foundry and (2) Pump set. These two sectors were found to be the most promising in their potential to improve/modernise and the scope for making the most impact with the limited project timeframe.

2.1.1 Tiny units

As can be seen from the analysis of core producing firms in the previous section, only a small number of SMEs are progressive in the cluster. A vast segment of units in each of the market segments in the cluster can be categorised as 'tiny' in size and lack the vision to modernize and grow their business. These units have traditional manufacturing systems and little awareness about the new technologies and product developments.. These units are producing sub-assemblies for more organized manufacturers of automobile parts, diesel engine, pump-sets and machine tools in the cluster. Usually, the manufacturers or middlemen purchase their goods directly from their doorsteps. Most of these small assembly shops employ less than 10 workers. The owners of these tiny units lack spare time to think about business growth since the owner himself and his family members are working in the same unit. Some of the common factors which can be attributed to their backwardness are lack of knowledge of latest technology and know-how, lack of access to finance/capital for expansion/modernization and lack of marketing skills. These tiny units are also not members of local industry associations since they even find the membership fee to be a hindrance. Most of these tiny units are too small to make use of any external BDS facilities.

2.2 The production process and flow chart

The product details and production flow chart for the two short listed sub sectors – foundry and pump sets – in Rajkot are provided in this section.

2.2.1 Product details

Foundries: Rajkot has about 500 foundry units from micro to large scale. The foundry units produce all kinds of engineering products such as electric motor bodies, pump bodies, diesel engine castings, machine tool castings, automobile components and agricultural parts. There are about 60 to 65 foundry units making high value investment castings in steel and alloy steels

for valve & pump castings, instrumentation castings, body implantation casting and so on. A typical flow sheet for the manufacturing process in a foundry unit is shown in figure 2.2.1.

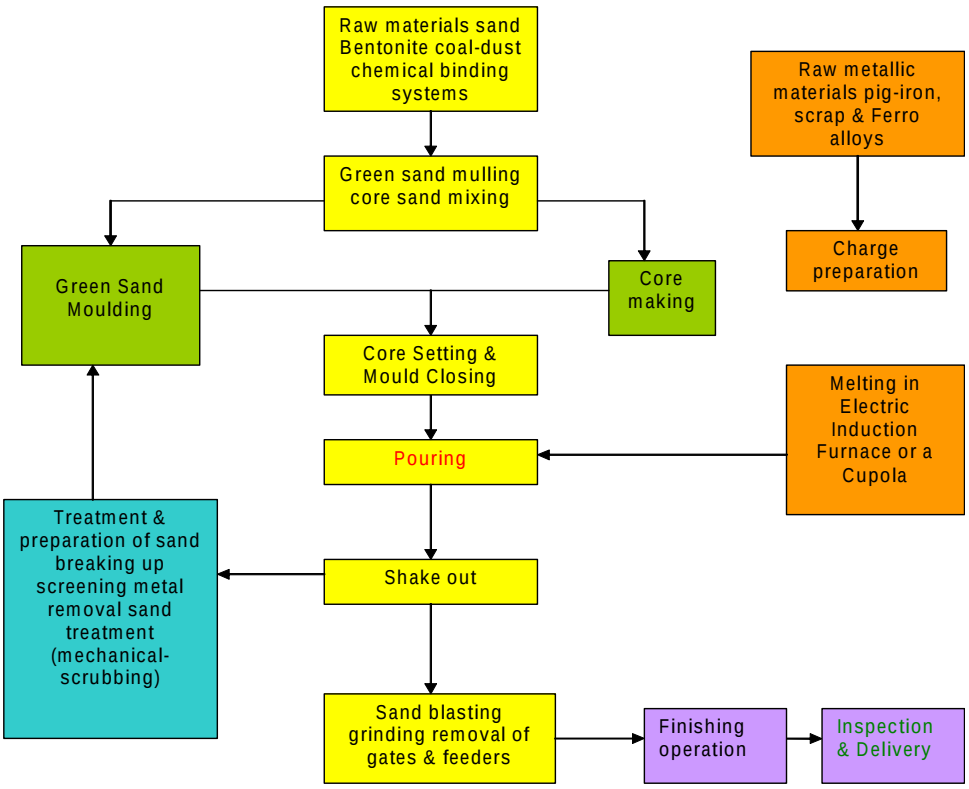


Figure 2.2.1 Manufacturing process of a typical foundry unit

2.2.2 Pump sets manufacturers:

Rajkot has about 160 pump manufacturers out of which only a quarter (40 numbers) have their own brand. The rest of the manufactures (about 120 numbers) are very small in size and cater to the local market requirements. The main products are submersible borehole pump sets (V3 i.e. Pump for 3”Borwell, V4 for 4”Borwell, V6 for 6”Borwell and V8 for 8”Borwell) mainly for agricultural sector, centrifugal pumps mainly for domestic and industrial sectors and mud-pumps for specialized applications. Flow sheet for manufacturing process in a typical pump manufacturing unit is given in figure 2.2.2.

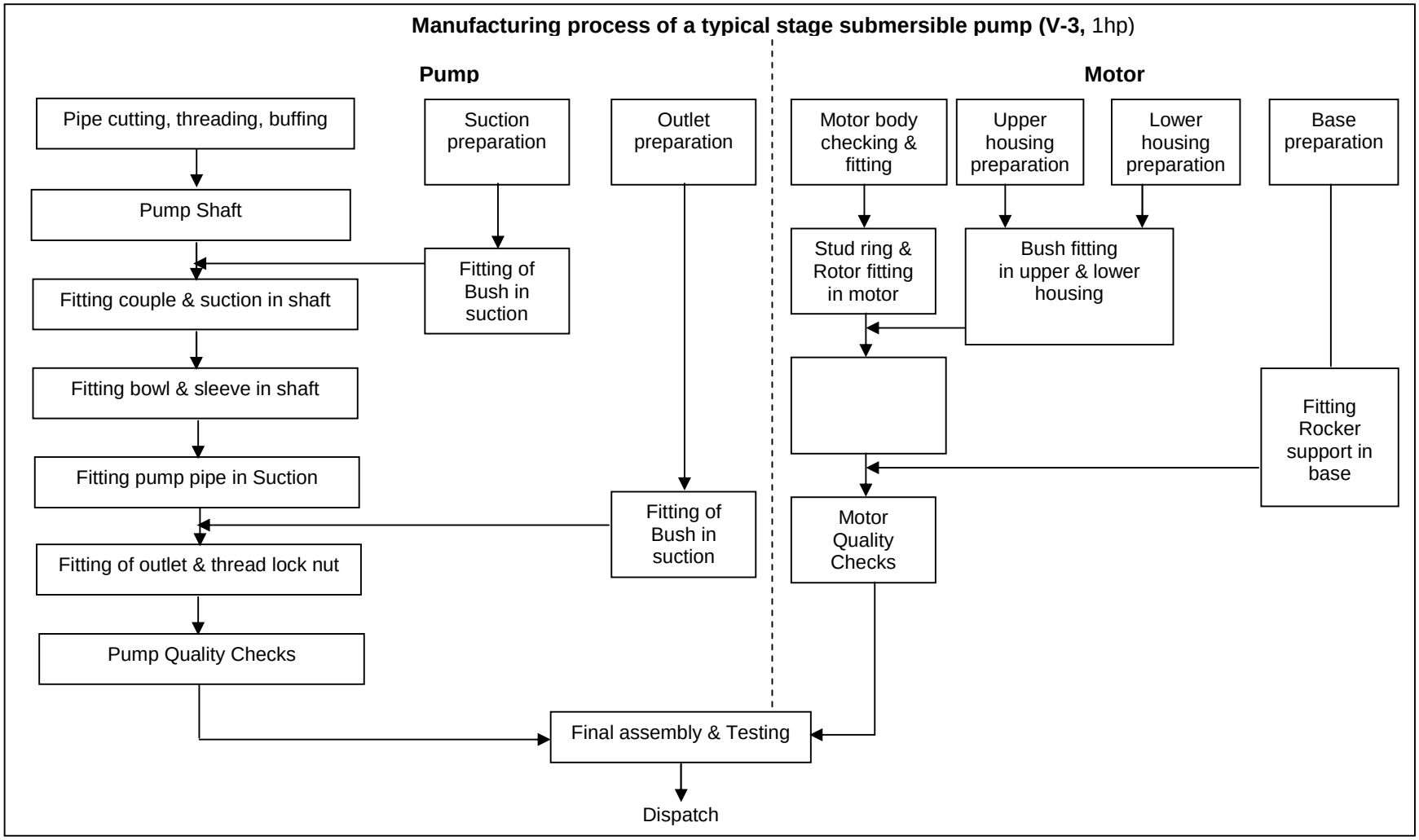


Figure 2.2.2 Manufacturing process of a typical submersible pump

2.3 History of the Cluster

Rajkot, located in the state of Gujarat, is an important engineering cluster in the country. Rajkot evolved as a centre of trade and commerce in Saurashtra because of its strategic location in the region. It evolved as a major engineering hub primarily after independence because of the growth of agricultural and industrial activity in Saurashtra. Presently, there are more than 2,200 engineering units in the cluster, majority (about 95%) of which are in the small-scale.

Traditionally, Rajkot was famous for the manufacture of diesel engines all over the world. It was exporting diesel engines to far off places such as Africa and Gulf countries. Diesel engine manufacturing was at its peak during the 1980s and early 1990s. However, the industry, which was primarily catering to the agricultural sector, was severely hit after the farmers were forced to switch to alternatives such as the submersible pumps due to falling water table in the region. Therefore, all the foundries that were earlier manufacturing diesel engine castings were forced to diversify to producing pump castings, automobile castings, electric motor bodies and gear box body castings. The bearing industry has developed locally due to the large demand for bearings in the diesel engine and pump set industry.

The cluster is known for its innovation, entrepreneurship and product specialisation. With changing market demand, the industry is known to innovate their manufacturing processes quickly at lower cost. The SME owners are known for entrepreneurship excellence and hard work. Product specialisation is common among the units. These have lead to improved productivity, decreased rejection percentage and increased yield percentage which all contributed towards increasing the competitiveness of the cluster. Many of the SME units are also exporting castings and forged sub-components, electric motor body castings, pump sets, oil engines, bearings, auto components, & machine tools items to giant multinational engineering and automobile firms.

2.3.1 Overview of past and ongoing interventions

There have been a few interventions by other agencies in the Rajkot Engineering cluster. A cluster development programme for Rajkot Engineering Cluster was initiated by EDI (Entrepreneurship Development Institute of India) in 2003. The intervention was supported by Development Commissioner, Small Scale Industries, Government of India and ICICI. Interventions included BDS development, especially in technology area, seminars on technology and market diversification, buyer-seller meets, developing a databank of BDS providers and implementation of quality and productivity recommendations among selected SMEs. Few cluster

development projects were undertaken in the segment of Bearing Industries by SISI, Rajkot & Diesel engine industries by EDI (Entrepreneurship development Institute of India) in 2003 & 2008 respectively.

UNIDO had also undertaken a technology up gradation program among machine tool units in Rajkot. This program has been running successfully in Rajkot but after the time period of UNIDO program was over, it became inactive, because they didn't develop sustainable BDS in the area. In hard intervention, they had set up lab as a common facility centre in NSIC campus only with the help of Indian Machine Tools Association, Bangalore.

TERI has been promoting energy efficiency in iron melting process among foundry units in Rajkot since 2002. The activities in Rajkot foundry industry has been part of a larger country-wide initiative undertaken by TERI, with support of SDC (Swiss Agency for Development and Cooperation), to promote energy-efficient technologies in several energy-intensive small-scale clusters including foundries, glass melting and baking units, brick kilns and a range of industries using firewood as fuel such as silk reeling units, silk yarn dyeing units, food processing units etc. Under the project, some of the specific activities among Rajkot foundries have included industry inventorisation, dissemination seminars, training and capacity building programmes and 'hands-on' technical assistance in design and implementation of energy-efficient DBC (Divided Blast Cupola) melting furnace among several progressive foundry units in the cluster. TERI has established a strategic partnership with IIF (Institute of Indian Foundrymen), Rajkot Chapter to disseminate the DBC among the interested foundry units in the cluster.

2.4 International, national and cluster scenario

An overview of the international, national and cluster scenario of foundry and pump industry is provided in this section.

2.4.1 Foundries

India is one of the largest producers of castings in the world and accounts for about 8% of the world's castings production. In the year, 2007-08 India's casting production was estimated to be nearly 7.8 Million metric tons. India is the second largest producer of grey iron castings behind China and third largest producer of steel castings in the world. Indian foundry industry produces various grades of value-added castings as per various international standards. The major casting producing countries and their share in production is depicted in table 2.4.1(i).

Table2.4.1(i) The major casting producing countries and their share in world casting production

Country	China	USA	Russia	India	Japan	Germany	Brazil	Italy	France	Korea	Others
% share of world casting production	34	12	8	8	7	6	3	3	3	2	14

The various types of castings produced can be categorized into the following types: ferrous, non-ferrous, aluminum alloy, graded cast iron, ductile iron and steel. Castings are mainly used in automobiles, railways, pumps, compressors and valves, diesel engines, cement industry, electrical industry, textile machinery, sanitary pipes and fittings, power generation, construction and many other specialized applications. Grey iron castings account for the major share of total castings market. Nearly 70% of all castings produced are of grey iron.

Indian scenario

In India, there are approximately 4,500 foundry units out of which 80% can be classified as small-sale units, 15% as medium-scale units and just 5% as large-sale units. Approximately, 20% of the foundry units have ISO international quality accreditation.

There are several foundry clusters in India. Some of the major clusters are Ahmedabad, Batala, Jalandhar, Ludhiana, Belgaum, Chennai, Kolhapur, Rajkot, Coimbatore, Howrah, Agra, Pune and Vijayawada. Most of the clusters are known to cater to a particular type of end-use industry. For example, while the foundries in Ahmedabad make castings for the local textile and pump manufacturing industry, Batala, Jalandhar and Ludhiana mainly produce castings for local machine tools, tractors and agriculture industry. Coimbatore foundries are known for pumps, motors and valve castings. Howrah is predominantly producing sanitary castings and manhole covers. Belgaum and Kolhapur belt mainly produce automobile castings. Foundry industry in Rajkot predominantly caters to the local diesel engine, pump and engineering industry.

Exports

The exports of castings have been showing a healthy growth rate of 25-30% per annum till 2006-07. However, the year 2007-08 saw a dip in the exports, and it grew by approximately 15% vis-à-vis the previous year. The slowdown in export was mainly due to the steep hike in raw material prices coupled with weakening of the US dollar during the period. In financial terms the export of castings was around Rs.4,500 crores or USD 1.125 billion (1 USD= Rs.40.06 as on 1st April'08) in 2007-08.

Raw materials and energy

Between April '07 and August '08, there was unprecedented and frequent hike in all key inputs to the foundry sector such as pig iron, scrap, coke and ferroalloys which made many foundries to shut down operations. Prices of pig iron went up by 76%, steel scrap by 60%, Coke by 165% and ferro alloys by 100% during this period. Almost all foundries were forced to cut down production and adopt cost cutting measures.

Since the beginning of 2009, the prices have started to stabilize. However, many foundries who had purchased raw materials at higher prices earlier are facing extreme hardships since they are forced to sell products at lower prices, corresponding to the current raw material prices.

Energy prices in India are typically the highest amongst the leading foundry producing countries. Although, the industry has been taking several measures to use energy efficiently, a lot more needs to be done.

Product Mix

Indian foundry industry predominantly produces grey iron, although production of steel, ductile iron and non ferrous castings is increasing. The break-up of total production of castings into different categories is given in table 2.4.1(ii).

Table 2.4.1(ii) Category wise break-up of castings production in India

Material	Cast Iron	Malleable Iron	Non Ferrous Castings	Ductile Iron	Steel Castings
% production	69	10	1	12	8

The Indian foundry Industry is trying to focus on higher valve added castings such as ductile iron to improve profitability and beat competition. The demand for light weight castings is growing, especially in the automobile sector due to increasing demand for fuel efficient cars.

Manpower

The Indian foundry industry is highly labour intensive. As per industry estimates, it provides direct employment to about half a million people. The Government has realized the importance of vocational education and skill-upgradation of existing workforce and has taken initiatives to upgrade nearly 1,390 Industrial Training Institutes (ITIs) in PPP (Public Private Partnership) mode.

Technology

In recent times, the Government has been encouraging technology transfer through joint ventures and foreign direct

investments. The Government has cooperated with UNIDO in technology up gradation of certain foundry clusters like Hyderabad. In addition, the Government has provided financial assistance to foundry clusters in Ahmedabad, Belgaum, Coimbatore and Howrah to strengthen industrial infrastructure and set-up common facilities in the cluster under industrial infrastructure up gradation scheme. There will be more clusters coming up for up gradation in the 11th five year plan. There are several other Government schemes such as CLCSS (Credit Linked Capital Subsidy Scheme) which encourage SMEs to invest in technological up gradation.

Environment

The foundry industry is considered to be a polluting industry. Hence the industry has been under severe pressure from the pollution control boards to install pollution control devices. Although, the awareness to control pollution has increased among the industry there is a need to develop and promote cost-effective pollution control systems for the industry. Closer partnerships between industry and academic institutions would help in addressing the environmental challenges facing the foundry industry.

Fresh investments/expansions and future outlook

The foundry industry will continue to be a sunrise industry in developing countries like India and China for many years to come because of the growth in automobile and infrastructure sectors. In recent times, the industry has been facing severe challenge due to rising cost of inputs and shrinking exports due to the global economic slowdown. The industry needs to focus on new manufacturing strategies and rationalize production processes, cut costs and introduce innovations. The future outlook for the industry is bright due to growing demand for castings within India as well as internationally.

2.4.2 Pump set industry

Pumps are used to transfer fluids such as freshwater, groundwater and so on from one place to the other or from lower levels to a higher level. Pumps are widely used in the agricultural, municipal, domestic and industrial sectors.

The United States, China, Germany, Japan and India are the major pump producing countries in the world.

Indian scenario

The agricultural sector in India is one of the largest consumers of pumps. Different types of pumps are used depending on the water table ranging from small centrifugal pumps in areas having shallow water levels to submersible pumps in areas having a deep water table.

According to Industry estimates, the Indian pump industry has more than 2,000 manufacturers of pumps with worker strength of over 120,000 producing about 3.5 million pumps per annum. The market for pump is estimated to be over Rs.2,500 crores and growing at an annual rate of 8%.

Pumps from India are exported to several countries located in Africa, Middle East and South Asia.

Technology

The two main categories of pumps manufactured commonly by the SME sector are - centrifugal pumps and submersible pumps. Some details of these two types of pumps are provided in this section.

Centrifugal pumps : The centrifugal pump is the most widely type of pumps in chemical industry, municipalities and households. They are available in a vast range of sizes and capacities. The primary advantages of this pump are simplicity, low first cost, uniform flow, low maintenance and so on. In its simplest form, the centrifugal pump consists of an impeller rotating within a casting. Both the impeller and casting are commonly made of cast iron.

The impeller is driven by an electric motor and the two are connected by a common shaft. The electric motors have cast iron bodies.

Submersible pump sets: Submersible pumps are installed in bore wells and very deep wells for irrigation schemes, domestic uses and industrial requirements.

The pump is of multistage centrifugal design. Three stage design is most basic type and the number of stages can go upto 12 or even 20 stages. Submersible pumps can have radial or mixed flow impellers which are usually made of bronze and are dynamically balanced. The diffusers are designed to give best possible efficiency and are built into the casings with replaceable guide bushes for easy maintenance. The pump shaft is made of stainless steel hardened and ground. A strainer is fitted at the inlet of pump to prevent entry of solid particles.

Submersible motors are fitted with wet type, water-filled, water-lubricated squirrel cage induction motors. The motor casing is of stainless steel. The starter winding is made of PVC/polyester film, wrapped around waterproof copper winding wires. The rotor laminations are fitted with electrolytic grade copper rods, and the ends are brazed with forged copper end rings, mounted on a stainless steel shaft, which is hardened and ground to

ensure long life. The shaft is supported by two sets of leaded bronze journal bearings lubricated by water. The axial thrust generated by the pump is absorbed by a thrust bearing fitted at the bottom of the motor. The motor is seated on radial seal rings.

BIS Certification

BIS has issued separate standard specifications for each type of pump. Similarly, testing facilities for agricultural, jet and submersible pumps are also specified by BIS to be followed by the industries. All pump set manufacturers must follow the Bureau of Indian Standards (BIS) for pumps. BIS is mandatory to ensure the industry produces standard quality pump-sets only.

Proper selection of raw materials is necessary for ensuring product quality. Hence, BIS defines material specifications for each component of the pump and motor. Regular calibration and testing of all gauges and instruments used in testing the final pump is essential. Hence the units need to maintain proper records of calibration of such testing equipment and meters. For BIS certification, it is mandatory to employ qualified technicians for conducting the inspection and testing. Most progressive industries have their own quality control system which is used during the manufacturing stages of each component. A small percentage of pump manufacturers have ISO 9000 certification.

Some of the common tests in manufacture of pumps include:

For motors:

- No load current, watts, speed
- Breakaway test to find starting torque
- Full load test of watts, amps, speed, power factor, efficiency slip and temperature
- For single phase motor, test for moisture proof and current leakage for user safety

For pumps:

- Test for overall efficiency
- Test for guarantee of performance at duty point
- Overload test in operational range

BEE Star Rating of agricultural pump-sets

India's Agricultural Sector consumes 30-40% of total electricity, up from 10% during 1970s. The high rate of growth in agricultural electricity consumption results from aggressive rural electrification coupled with a policy of below cost pricing to farmers. The agricultural tariff has not grown while the industrial and household tariffs have increased (from 1992) at an average rate of over 11%, that is much more than the average

inflation during the same period. It has been one of the factors contributing to inefficiencies and thereby high AT&C losses of the state utilities. The rural agricultural supply is characterized by the following:

(a) Low reliability due to high cost of service and low or no revenue;
(b) Use of inefficient pumps by farmers due to lack of incentives, given the low or no cost power supplied;
(c) The average extraction of water by such pumps is less than half that of China and is about 1.8% that of USA. This is despite the fact that the numbers of installed ground water extraction pumps / tubewells are (at 20 million) the highest in the world; and
(d) The unsustainable growth rate, low prices inevitably lead to a high subsidy burden on states, estimated at about Rs. 40,000 crores (Economic survey, 2006-07).

Opportunity

Agriculture Demand Side Management promises immense opportunity in reducing the overall power consumption, improving efficiencies of ground water extraction and reducing the subsidy burden on the states without sacrificing the service obligation to this sector. It also presents a promising prospect of targeting subsidy to the beneficiary farmers. In terms of electricity saved, given that most of the pilot projects as well as other studies project potential savings of 45 - 50% by mere replacement of inefficient pumps, the overall electricity savings (from 20 million pumps) is estimated at 62.1 billion units annually.

BEE has recently launched Star labelling program for energy efficient pump-sets. Installation of BEE energy efficient pump has the potential to reduce the energy consumption in the agricultural sector significantly.

Agricultural Demand Side Management Program has been launched in Maharashtra in February 2009. Under the Program, energy audits of agricultural pumps are being undertaken. It is proposed to extend the program to Gujarat in the near future.

Common Testing Facility and Research Centre

Coimbatore is the largest producer of quality pump sets in India. The success of pump industry at Coimbatore owes a lot to the setting-up of the common testing and research facility for pump-sets there- SITARAC (Small Industries Testing and Research Centre).

SITARC has facilities for all kinds of materials testing. It undertakes R&D on design and performance improvement of pumps. A SITARC Pump Institute funded by UNDP, UNIDO, Government of India and the Government of Tamil Nadu is in the process of setting up the most modern pump testing institute at a cost of approximately Rs 20 crores.

Similar testing and research centre for pump set units in Rajkot engineering cluster would go a long way in faster development of the pump industry in this cluster.

2.5 Vital statistics, BDS providers and WDWP Matrix

2.5.1 Vital statistics

The number of foundry and pump manufacturing units in Rajkot Engineering Cluster and the employment and turnover of the industry is summarized in Table 2.5.1.

Table 2.5.1 Vital statistics of foundry and pump industry at Rajkot

	Number of Units					
	Foundry industry				Pump industry	
Area	Micro	Small	Medium	Total	Small	Total
Rajkot City (Spread area in the radius of 6 kms)	20	230	9	259	101	101
GIDC Metoda (Spread area in the radius of 20 kms)	--	90	5	95	20	20
GIDC Shapar (Spread area in the radius of 20 kms)	6	138	7	151	40	40
Total	26	458	21	505	161	161
Employment	260	18,340	1,400	20,000	4,700	4,700
Turnover in Rs. Crores	20	2,380	300	2,700	300	300

(Note: Categorisation of firms into Micro, Small and medium has been done as per Goverment of MSME' s norm)

2.5.2 Principal stakeholders

There are about 500 foundry units in the cluster out of which 125 are members of IIF (Institute of Indian Foundrymen) and about 400 are member of REA (Rajkot Engineering Association). However, just about 30 to 40 foundry units actively participate in the technical programmes organized by IIF/REA from time to time. Rajkot has the largest number of foundry units (about 65 to 70 units) producing precision/ investment castings in a single cluster within India. The largest foundry unit in terms of tonnage of castings produced is Prashant Foundries. The foundry produces nearly 18,000 metric tones of castings per annum. Hi-mac Castings Pvt. Ltd. was the first foundry in Rajkot to install high pressure automatic moulding line. Other leading producers of castings in

the cluster are Shining, Mahadev, BR Technocast, Gautam Technocast and Radhe Enterprise.

2.5.3 Local support institutions

I. Industry Associations:

a) Rajkot Engineering Association (REA): Rajkot Engineering Association (REA) is the nodal industry association for engineering industry in Rajkot and has a membership of 1650 industrial units. The association was incorporated in 1963 with the objective of extending help to its members for the promotion and development of its manufacturing activities. The association also supplies raw materials like pig iron to its members on 'no-profit-no-loss' basis. The association is centrally located in Bhaktinagar Industrial Area of Rajkot and has its own building and conference facilities. It regularly arranges meetings, seminars and workshops for its members. It publishes a monthly 'Information Bulletin' in Gujarati to communicate with its members on a regular basis.

Apart from REA, there are separate industry associations for major products such as pumps and motors, diesel engines and machine tools as well as associations for some of the major industrial areas such as GIDC (Lodhika) and Shapar Veraval. Some of the association like Shapar Veraval Industrial Association (SVIA), Machine Tools manufacturers' Association (MTMA),Rajkot Chamber of Commerce and Industry, Rajkot Pumps & Motors Manufacturers Association (RPMMA),Diesel Engine Manufacturers Association (DEMA) and The Institute of Indian Foundry men (IIF), Rajkot Chapter regularly arranges meetings, seminars and workshops for its members. It publishes a monthly 'Information Bulletin' in Gujarati to communicate with its members on a regular basis.

b)

II. Training Institutions:

Rajkot has one of the oldest I.T.I (Industrial Training Institute) in the country, established way back in 1959. The institute offers one/two years training to about 1,000 students per year in a

number of trades such as turner, fitter, machinist, CNC operator, draftsman, welder etc. For the past three years, Indo German Tool Room (IGTR), Ahmedabad has opened a branch in the I.T.I. IGTR offers specialized training in CAD/CAM and CNC machine operator. Rajkot also has a Government Polytechnic and a number of Engineering Colleges However, presently the linkage of local industry with the technical training institutions and engineering colleges is weak.

Engineering colleges/ technical institutes

Saurashtra University, Rajkot

Saurashtra University is situated in Rajkot city of the Saurashtra region of Gujarat State, India. The campus of the University is spread over 410 acres of land. The jurisdiction of the University includes Amreli, Jamnagar, Porbandar, Rajkot and SurendraNagar districts. The University has 242 colleges affiliated to it imparting Undergraduate and Post graduate education

Atmiya Institute of Technology & Science

Atmiya Insistute of technology , is situated in Rajkot city. It has the pride to say that first Sun Solaris Lab in Gujarat with Sun Fire 280R Servers and 15 thin clients, extensive use of teaching-learning packages including, licensed version software's and computer aided leering packages.

V.V.P. Engineering College, Rajkot

V.V.P. Engineering College is an unaided institution affiliated to Saurashtra University and recognized by All India Council for Technical Education (AICTE), New Delhi and the Government of Gujarat. It has specially designed campus in 30 acres land with spacious building providing an adequate infra-structural facility which is set in a beautiful natural surroundings. It is Landscaped with enlivened architecture, creating an atmosphere conducive to learning.Campus is located 10 km west of Rajkot city on Kalawad Road, few other like G.K. Bharad Institute of Engineering, Rajkot, RK College of Engineering & Technology, Government Engineering College,
Lukhdhirji Engineering College,A.V. Parekh Technical Institute, in surroundings of Rajkot provide a good quality engineers.

III.Government Support Institutions:

a) National Small Industries Corporation Ltd (NSIC): A Technical Services Centre of NSIC (The National Small Industries Corporation Ltd.) has established in Rajkot in the 1960s. The Centre has a large campus of about 70 acres. The Centre used to offer courses for foundry, pattern shop, fabrication shop, electroplating and heat treatment shop, but these courses have been discontinued some time back and the facilities are not being used at present. Presently only courses related to welding and pump calibration and testing are being offered, albeit only once in a while. Other ongoing activities of the centre include material testing (both mechanical and chemical), testing and calibration of pump-sets for BIS certification, energy audit services, cleaner production audit and vendor registration services for SMEs. Vendor certification is mandatory for submitting quotation for DGS&D (Directorate General of Suppliers & Disposal) government rate contracts. A testing laboratory of CMTI (Central Manufacturing Technology Institute), Bangalore, has been established with assistance under the UNIDO machine tool intervention a few years back. The laboratory is housed within the NSIC campus.

b) MSME Development Institute (SISI), Ministry of MSME, Government of India
c) District Industries Centre, Government of Gujarat
d) Technical Services Centre, Rajkot
e) Prototype Development Centre, Rajkot
f) CMTI Regional centre NSIC

IV.Financial institutions

SIDBI, Rajkot Branch
Cooperative banks
Commercial banks

V. Private Unorganised BDS:

A questionnaire survey was conducted in the cluster to understand the present status of BDS providers in the cluster and needs of the local industry. Based on the questionnaire survey, the current BDS providers were classified into different categories according to the types (financial, marketing, technical etc) and whether they were in the private or public sector. The information on current BDS providers in the cluster is summarised in table 2.5.3(i).

Table 2.5.3(i) Types of BDS providers in Rajkot Engineering Cluster

		Foundry		Pumps	
Sr. No	Type of BDS	Public	Private	Public	Private
1	Finance and loan services	8 (common)	30(common)	8(common)	30(common)
2	Technical service providers	2	1	2	3
3	Quality certification and registration service providers	1+1(common)	5 (common)	1+1(common)	5 (common)
4	Environment and energy related service providers	1(common)	5(common)	1(common)	5(common)
5	Administrative and regulatory services	--	--	--	--
7	Marketing service providers	1(common)	9(common)	1(common)	9(common)
8	Testing laboratories	2	3	1	--
9	Research and Development	--	--	--	--
10	Training and skill development	3	--	2	--

A Who-Does-Who-Pays (WDWP) Matrix of the BDS providers was prepared, which is given in the table 2.5.3(ii).

Table 2.5.3(ii) Who Does Who Pay's Martix for Rajkot Engineering Cluster

BDS Function	*Who does*	*Who pays*	*Payment mechanism*
➢ Finance – loan assistance	CAs, retired staff of commercial banks, Project Report Developers	SMEs	Direct
➢ Energy audit	NSIC, Private consultants	SMEs	Direct
➢ Skill development	NSIC, ITI, Individual consultants/Experts, DIC, MSME Institute, SKPC (Saurashtra Kutch Productivity Council), IIF, ASM (American Society of Metals), Equipment suppliers	SMEs, workers/SMEs	Direct Subsidized in certain cases
➢Technology providers/suppliers			
(a) Process improvement	(a) Individual consultants, Experts	SMEs	Direct
(b) Testing & R& D lab	(b) NSIC/PDTC/CMTI, private laboratories (Scientific Laboratory, Ferrochem Laboratory, Your Lab)	SMEs	Direct

BDS Function	*Who does*	*Who pays*	*Payment mechanism*
(c)ERP Solutions	(c) Consultancy firms	SMEs	Direct
(d) Energy efficiency/technology up gradation services for foundries	(d) TERI, IIF-Rajkot, fabricators	SMEs (partially)	Subsidized by SDC
➢ Market development			
(a) web-site, buyer supply meets for market promotion & brochures etc	(a) Web designers , Advertising agencies, Industrial magazines (Industrial product finder, pump & valve magazine etc)	SMEs	Direct
(b) Export promotion	EEPC (Engineering Export Promotion Council), Private experts	SMEs	Direct
➢ Raw material supply	REA , Local Distributor, Direct Manufacturer	SMEs	Direct
➢ Improvement in quality	Technical experts , NSIC	SMEs	Direct
➢ Diversifying product	Technical experts	SMEs	Direct
➢ Product development	NSIC, Private units	SMEs	Direct
Pollution control/environmental management	NSIC, private consultants	SMEs	Direct
➢ Quality certification	Private consultants, govt. agency	SMEs	Direct

3.0 Analysis

3.1 Value chain analysis

The manufacturing processes of foundry and pump were analysed and cost details were collected during the survey. The value chain analysis of the foundry industry is given in table 3.1(i).

Table 3.1(i) Typical value analysis for Grey Iron casting producing foundry

Sr. No.	Processes	With good operating practices* Cost (Rs/kg)	With normal practices Cost (Rs/kg)
1	Moulds in green sand moulding	01.45	01.55
2	Cores in no-bake sand	03.55	03.55
3	Metallic raw material cost	21.50	21.50
4	Energy cost for melting	02.50#	03.00@
5	Fettling & finishing cost	01.10	01.15
6	Testing & inspection cost	00.60	00.75
7	Cost of rejections	01.80	02.70
8	Profit	05.00	03.3 0
9	Total cost to customer	37.50	37.50

* Estimates based on discussions with sectoral experts

@ in induction furnace

duplexing with cupola

The value analysis shows that it is possible to improve profitability reduce and cost of production in several manufacturing processes (number 1, 4, 5, 6 & 7 of table 3.1[i]) with technical assistance from BDS providers in technical areas.

The value chain analysis of typical pump set manufactured in Rajkot is given in table 3.1(ii).

Table 3.1(ii) Typical value analysis & comparison of a submersible pump set

	Pump	Motor	Total Cost (with good operating practices), Rs/unit	Total Cost (with normal practices Cost), Rs/unit
Raw material cost (Rs)	704	1641	2345	2650
Conversion Cost (Rs)	302	704	1005	1200
Fixed cost & Marketing cost (Rs)			500	300
Total	1005	2345	3850	4150
Mark up			750	450
		4600	4600	4600

From above analysis, it is clear that it is possible to reduce cost and improve the profitability of the units with assistance of BDS providers. Some of the areas were cost saving are possible are technology up-gradation, bulk purchase of raw materials and direct procurement from distributor instead of present practices of purchase of small quantities through local suppliers of raw materials.

3.2 BDS Analysis

The BDS providers in the cluster were categorized under the following broad heads:

(a) Finance - loan assistance
(b) Skill development
(c) Technology providers/suppliers
(d) Market development
(e) Raw material supply
(f) Energy audit
(g) Product development
(h) Pollution control/environmental management
(i) Quality certification

Further sub-classification of various BDS providers can be done under the following different categories as provided in table 3.2(i).

Table 3.2(i) Broad categories of BDS providers in the cluster

Technical sector	Non technical sector	
Specific field knowledge	Focused specialized	Non-focused generalized
Product development	Product Marketing	Taxation
Process control	Trade fair	Sector related benefits
Quality analysis	Procurement of raw materials	Procurement of utilities
Environment related services	Designing/developing website	Training in safety
Technology related R& D	Quality registration such as BIS, ISO	Patents related activity
Energy audits		

A questionnaire survey was conducted in the cluster between April to June 2009, to get information about the services in the cluster with respect to each of the above categories and also to access the industry's perception of the need to develop these services within the cluster. A summary of the results of the questionnaire survey showing the priority of these services to the local industry is presented in figure 3.2. The current status of BDS providers in each of the category is provided in table 3.2(ii).

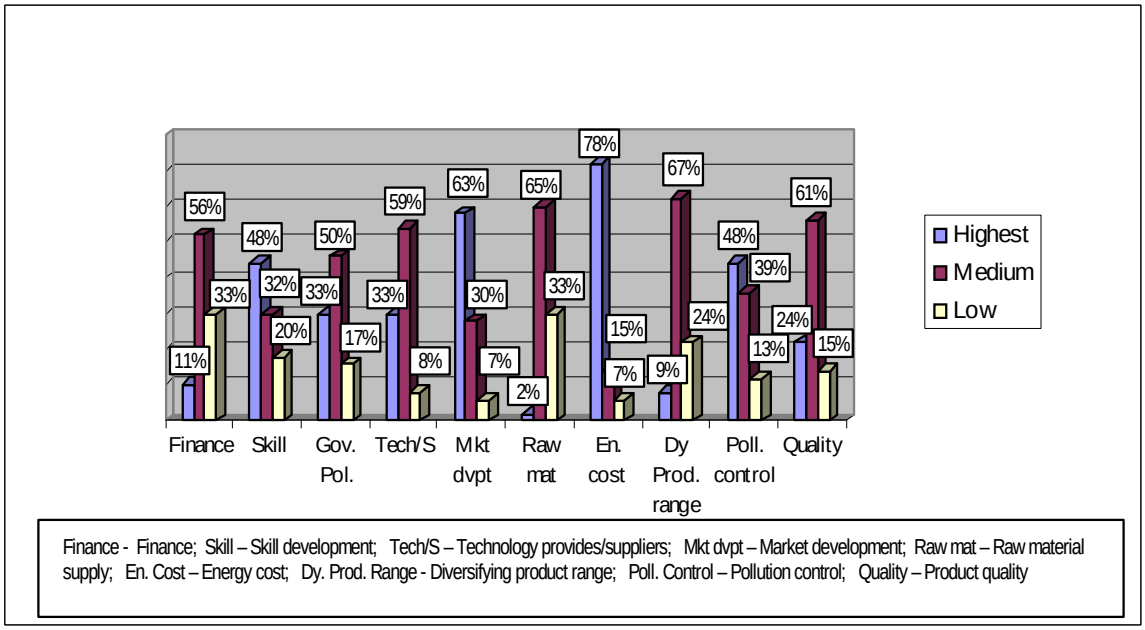


Figure 3.2 Priority areas of Rajkot engineering cluster identified through cluster survey

Table 3.2(ii) Analysis of BDS Providers in the cluster

		Information		
	Nature of BDS provider	No. of BDS providers	Value of business	Subsidy percentage
1	Finance	30	Rs 1.5 cr	nil
Payment Pattern		Upfront fees		
2	Skill development	1	Rs 1 lakh	90%
Payment Pattern		Subsidy		
3	Technology providers/suppliers	8	Rs 30 lakh	nil
Payment Pattern		Upfront fees/subsidy		
4	Market development	10	Rs 40 lakh	nil
Payment Pattern		Upfront fees		
5	Raw material supply	100		
Payment Pattern		Membership, upfront fees		
6	Energy audit	2	Rs 10 lakh	Part subsidy
Payment Pattern		Upfront fees		
7	Product development	nil	nil	nil
Payment Pattern				
8	Pollution control/environmental management	2	Rs 2.5 lakh	Nil
Payment Pattern		Upfront fees/Commission		
9	Quality certification	7	Rs 10 lakh	Nil
Payment Pattern		Upfront fees		

Interactions with various engineering units in the cluster revealed that there is an urgent need to strengthen the BDS in the following areas:

(a) Common Product Development, Testing and Calibration (PDTC) facility within the Cluster. Facilities for conducting a number of important tests such as metallurgical microstructure analysis, NDT (non-destructive testing) analysis such as magnetic particle testing, X-ray and Radiography) and so on are not available within the cluster. Hence, the engineering units have to send their samples to laboratories in Ahmedabad (such as Divine laboratory, CFER (Centre for Foundry Education and Research) or in Vadodara (TCR Laboratory). In addition, there is a need at the cluster level for a common facility for applications like casting simulation and methoding software, pump design software and other ERP solutions.

(b) Export documentation and facilitation services: A number of SMEs particularly in the automobile sector are exporting their products to OEM in Europe and after-sales market in Middle East. However, due to lack of knowledge and inability to complete the documentation formalities, they are unable to claim government benefits such as DEPB (Duty Entitlement Pass Book) Scheme etc. There is a dearth of BDS providers in this area in the cluster.

(c) Technical support: Majority of the SMEs are presently using conventional manufacturing processes such as manual lathe and turning machines. Knowledge about up gradation of manufacturing processes by use of advanced machining centres such as CNC (computer numerically controlled) machines and VMC (Vertical Milling Centre) is not existing among majority of the SMEs. Similarly, most of the machine tool manufacturers in the cluster manufacture conventional machine tools only and do not have knowledge of upgrading to advance machine tool manufacture.

(d) Vendor development: Most of the machine tool manufacturers are buying castings from foundries located in other clusters such as Kolhapur, Belgaum, Ahmedabad etc due to lack of availability of good quality castings for machine tools within Rajkot. Most of the foundries in Rajkot are primarily catering to diesel engine, pumps and motors and automobile segments. There is a need to develop good local vendors of castings for machine tool industry in Rajkot.

An exercise to analyse the demand side and supply side constraints with respect to local BDS providers in Rajkot cluster was undertaken. The summary of the analysis is presented in table 3.2(iii).

Table 3.2(iii) Demand and supply side analysis of BDS providers in Rajkot

Sr. No.	Area	BDS	
		Demand side constraints	Supply side constraints
01	Skill development of employees		Competent trainers not available
02	New technology provider		Providers do not have full know-how/ expertise
03	Market development	Lack of awareness about latest marketing techniques	Lack of marketing strategists
04	Energy audits	Lack of awareness, no mandatory requirement	Low competence of existing auditing

Sr. No.	Area	BDS	
		Demand side constraints	Supply side constraints
05	Quality certification	Lack of awareness, no mandatory requirements, considered as expensive	Few qualified BDS catering to this services, Poor implementation at shop floor

Further analysis of the interaction between MSMEs and BDS providers in the cluster was undertaken. The utilization of the various BDS services in the cluster as well non-availability of BDS providers in other areas is summarized in table 3.2(iv).

Table 3.2(iv) BDS - MSME cooperation matrix

S.No.	MSMEs area of working → BDS ↓	Marketing	Skill development	Energy	Technology	Govt. policies	Finance	Raw materials	Product quality/ testing	Environment/ pollution control
1	Public									
1.1	DIC	N.A	N.A	N.A	N.A	M	M	N.A	N,A	N.A
1.2	ITI	N.A	M	N.A	M	M	N.A	N.A	N.A.	N.A
1.3	NSIC/PDTC	L	M	N.A.	L	N.A.	L	N.A	M	N.A
1.4	IIF	L	M	L	H	M	N.A	L	M	L
1.5	SIDBI	N.A	N.A	N.A	N.A	M	H	N.A	L	N.A
1.6	PNB/SBI	N.A	N.A	N.A	N.A	L	H	N.A	N.A	N.A
2	Private organized									
2.1	REA	M	M	N.A	M	L	L	H	L	L
2.2	Other industrial associations	N.A	N.A	N.A	N.A	L	N.A	N.A	N.A	N.A
3	Private unorganized									
3.1	C.A' s	N.A	N.A	N.A	N.A	M	H	N.A	N.A	N.A
3.2	Consultants	H	H	M	M	L	M	L	M	L

Abbreviations:
L Services available but not utilize, M Services available but sometimes utilize H Services available and highly utilized N.A Services not available

3.3 Analysis of Business Operations

An analysis of business operations units was done for Rajkot cluster and pressure points in business operation was highlighted (Table 3.3).

Table 3.3 Analysis of Business Operations and Pressure Points

Area of Service	Current Status	Likely developments to be worked upon	Likely BDS	Supportive Role Player	Pressure points
Finance-Loan assistance	Exists in Most of units	Linkages between banks & SMEs	Banks, SIDBI, financial Institutions	DIC	Less capability of payment
Skill Development	Limited Utilization	Creation of onsite training groups with in the BDS for direct interaction with stakeholders	Private BDS providers Public Institutes Ministry of Labour welfare	BMOs Ministry of labour welfare by way of subsidizing and funding the activity	Creation of training groups and planning for the activity in different locations
New Technology Provider	Very limited almost non existent	A continual process of development on existing product	Association of technical BDS	REA, CMTI, NSIC	Not enough competency
Market Development	Existence	Encourage buyer-supplier meets	Domestic demands	REA, NSIC	Sump in a demand, Lack of knowledge, china competition
Raw material supply	Non existent	Easier availability of bank loan	Bulk procurement by REA	REA, SIDBI and other Bankers	Inability to procure due to lack of sufficient working capital, variation in raw material prices/quality
Energy Audits	Rarely Utilized	Making this a fundamental qualification for availing memberships of BMO Creation of awareness amongst stakeholders	NSIC Energy auditor	NSIC, Private Consultants	Less knowledge of BDS, Linkages between BDS, & SMEs
Product Development	Limited Utilization	Buyer Seller Meet Locally	Private Consultants	REA, IIF	Active Participation And knowledge distribution to Units
Pollution Control/Environmental management	Limited Utilization	Local meets with GPCB & CPC with MSME	Private Consultants	REA, IIF	Active Participation by Units and awareness programs

Quality Certification	Existence	Continuous interaction with MSME	Private consultants	REA	Active Participation And knowledge distribution to Units

As mentioned in the table, areas of services for SMEs are listed in column 1. Current status shows utilization of BDS is very less. Potential areas for development of BDS are skill development, technology provider, market development as well as raw material supply e.g. BDS for raw material (bulk supply). The identified BDS & BMOs in potential areas for SMEs are mentioned in the column 4 & 5 respectively. Pressure points (threats for respective services) are also mentioned in the last column.

4.0 Derivations

4.1 SWOT Analysis

Although the engineering units in Rajkot have a strong industry association, the association plays only a marginal role in the joint activities. A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was done to understand the abilities of the engineering units located in the cluster to respond to various challenges. The SWOT analysis table is given in table 4.1.

Table 4.1 SWOT analysis

	Current situation		Future	
	Strengths	Weaknesses	Opportunities	Threats
SMES Markets	Steady domestic demand for commodity items Proximity to ports	Slump in demand in export market Too many middle-men in the marketing chain Lack of knowledge of foreign markets and export documentation	Increase share of exports from the cluster (Opportunities and threats are external are beyond our control. This statement is a suggestive measure rather than opportunity)	High competition from China and other counties due to lower manufacturing costs

	Current situation		Future	
	Strengths	Weaknesses	Opportunities	Threats
Technology	Flexibility in manufacturing processes	Low degree of mechanization	Increased level of mechanization	Technological obsolescence
		High energy consumption/inefficient manufacturing practices	Increase energy efficiency, reduce rejections to reduce operating costs.	
		Lack of awareness of best practices	Dissemination of best practices	
		Relatively low R&D on product development	Develop specialized BDS for products/services required by local industry	
		Few technology service providers		
Inputs	Bulk procurement of raw material by association	Inability to acquire loans for modernization/working capital from banks	Easier availability of bank loans	Rise in interest rate of loans
	Cheaper scrap iron available from Alang ship-breaking yard	Variation in raw material prices	Availability of natural gas as a clean fuel	Rise in price of raw material and fuels
		Fluctuation in raw material quality	Availability of improved quality of raw materials	
		No third-party quality testing & certification agencies at cluster level	Reduce energy cost through energy audits/energy services Establish third-party testing & certification agency at cluster level	
Innovation	Quick to adopt incremental innovations in processes and products	Low investment in R&D	Establish Common facility for product development, calibration & testing	Reluctance to share information on innovation between units
		Simulation softwares and computerised design hardly being used at present	Structured processes for information sharing among SMEs in the cluster	
		Little or no sharing of information on product/process innovation	Cross-learnings from other progressive clusters	
			Conduct business reengineering studies of manufacturing processes	
			Weak institutional support framework for technology inputs/innovation	
			Strengthen peripheral institutions/develop new models for developing local innovative capacity	

	Current situation		Future	
	Strengths	Weaknesses	Opportunities	Threats
Skills	Skills acquired on-the-job	No mapping of skill-sets required/available in different sub-sectors/trades	Conduct training needs assessment	Rapid changes of technology/manufacturing practices of the products in the cluster
		Weak institutional mechanism to provide technical training to workers of SMEs	Develop institutional capacity to provide specialized training programmes	Non-availability of skilled manpower
		Inability to recruit/retain diploma engineers		
Business environment	Strong demand for quality products	Cumbersome government registration procedures	Better awareness of government schemes and regulations	Rapid changes in external environment e.g. regulations,
	Steady growth in domestic demand	Multiplicity of licensing requirements	Facilitate activities like NSIC registration	market recessions, etc
		Lack of knowledge of regulatory frameworks and government schemes	Facilitate BIS and BEE certifications	
		Fierce competition on cost among SMEs within the cluster and with other clusters	Increasing export volumes	
Capability criteria (Health, literacy, gender, social		Low literary level of workers	Better awareness of safe practices and use of safety equipments	Cost competition may result in neglect of social issues concerning the workers
		Poor common facilities such as drinking water/toilets at workplace		
		Poor or no facility for lodging of workers		

4.1.1 Vision, Strategy and Activity suggestions

Cluster Vision

The vision of the Rajkot engineering cluster can be summarized as follows:

1. To become the world's leading engineering cluster through continuous innovation and investment in R&D
2. To develop a world-class network of BDS providers within the cluster to cater to the varying needs of the local engineering industry in all strategic business functions such as marketing, technical and financial services.
3. To strengthen the capabilities of SMEs and increase their efficiency of production by agglomeration of producers and formation of production networks

4. To promote adoption of new technologies, new products and new businesses among engineering units in the cluster
5. To attract large industries to either set-up manufacturing facilities or procure components from Rajkot engineering cluster.

To achieve the abovementioned vision the following strategies are envisage to be undertaken in the Rajkot engineering cluster.

1. Develop new BDS as well as strengthen existing BDS especially in the areas such as export promotion and technical services.
2. Promote innovation and R&D facilities in the cluster through exposure visits, collaboration with technical institutions and universities and establishment of common R&D facilities
3. Enhance the skill base of the workers and supervisors of the SMEs in the cluster through training and knowledge sharing.
4. Strengthen networking and information exchange among local industry by developing information sharing platforms
5. Improve the awareness of local industry and BDS providers on new products, manufacturing processes, quality control and marketing strategies.
6. Attract world-class manufacturers to Rajkot by showcasing the strengths and competitiveness of the engineering cluster.

4.2 Suggested Action Plan

A detailed action plan was drawn-up to realize the cluster vision and implement the strategies outlined for the cluster in the previous sections. The action plan is based on a series of extensive consultation held with key cluster actors during the diagnostic study. The suggested action plan for the period August 2009 – March 2010 has been provided in table 4.2.

4.3 Cluster Map of Rajkot Engineering Cluster

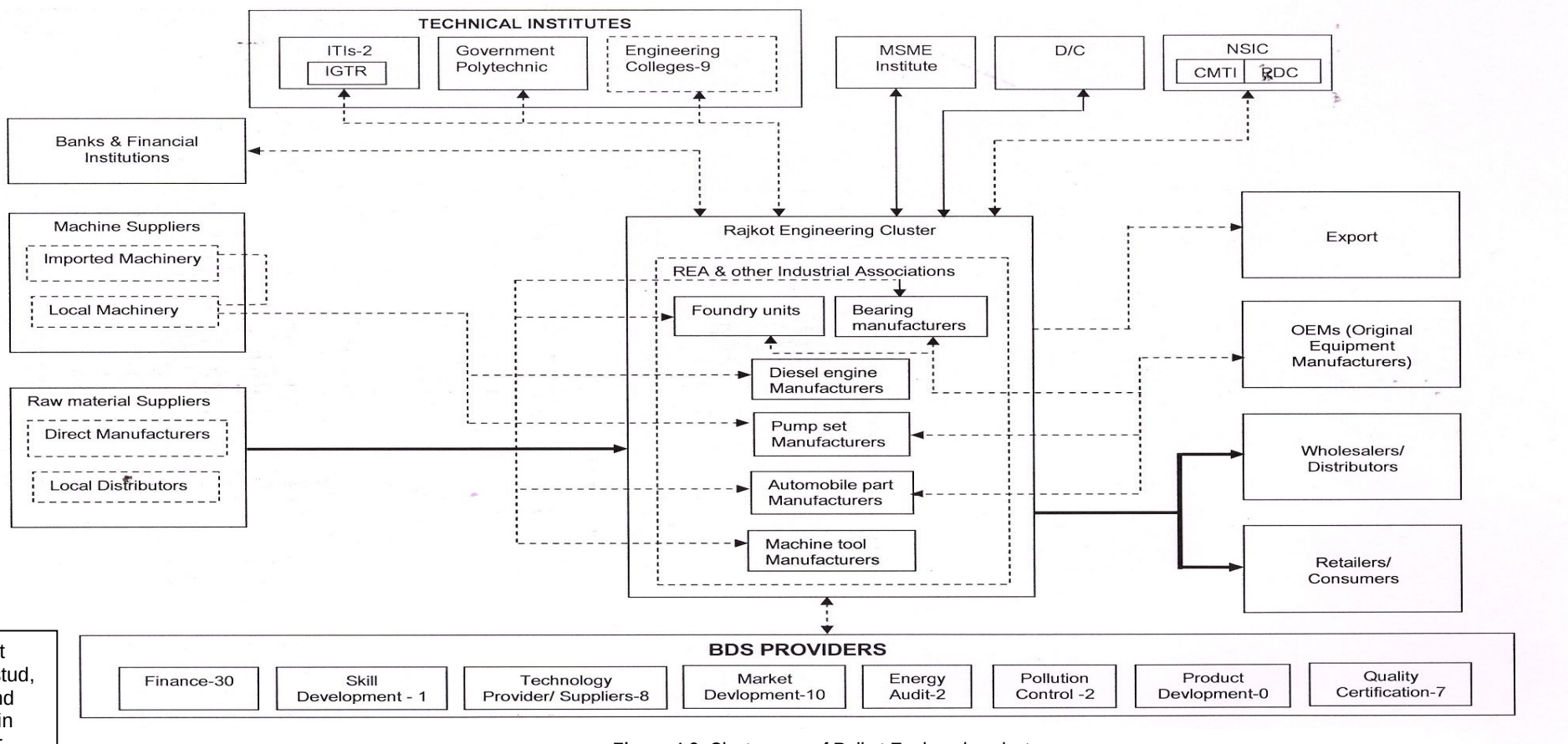
Support institutions: A cluster map showing the present interaction of industries within the Rajkot Engineering Cluster with major stakeholders is shown in figure 4.3.

(*Legend:* ..... Dotted Line -Less Linkage, Full Line – Good linkage, → Way of flow, <-> Flow at both sides , Full Box – Main Group/Activity & Doted Box – Sub activity/sub group).

Table 4.2 Short term action plan

Sr. No	Name of the activity	Time (M- month), M1 is April	Participants	Implementer	Outcome
1.	Awareness Programs		a) Entrepreneurs of all selected segments, BDS for all, government officials, as well as Institutes in Cluster.	a) TERI/SIDBI/ MSME	a) Increased awareness of TERI-SIDBI Rajkot Engg. Cluster project
	a) Introduction to on-going SIDBI program in the cluster/Government policies/Financing schemes of SIDBI	M5			
	b) BEE Star Rating Program and ISI specification	M2 & M7	b) Entrepreneurs of Pump & other selected segments, BDS for all	b) BIS, BEE TERI-SIDBI	b) Possibility of increased product standardization as well as improve in quality
	c) Marketing and export promotion	M9	f) Entrepreneurs of Foundry/Pump & other selected segments, BDS for all , industry association	c) Marketing/export consultants/experts	c) Increased market vision and thereby business of MSMEs
2	Training Programs	M8	a) Workers/ operators of machining units	b) ITI & IGTR c) Private consultants d) Machinery Supplier e) NSIC f) IIF g) TERI-SIDBI	a) Skill enhancement of workers and fabricators b) Possibility of more adoption CNC-VMC machines c) Good productivity with efficient energy use
	a) CAD/CAM & CNC machining				
	b) Energy efficient DBC fabrication	M11	b) Existing fabricators of cupola furnace		
3	Buyer-Supplier Meet for quality castings	M10	Entrepreneurs of Foundry/machine tool/Pump units	IIF, REATERI-SIDBI	Increased awareness regarding OEM requirements and possibility of increased business

Sr. No	Name of the activity	Time (M- month), M1 is April	Participants	Implementer	Outcome
4	PPP Facilitating establishment of SPV for Rajkot Foundry Cluster • Dialogue with relevant stakeholders	M9 onwards	Industry associations, government officials, TERI-SIDBI	Other Associations REA TERI-SIDBI	To address the common issues and possibilities to explore new markets
5	Meeting of Cluster Coordination Committee	M5-M11	CCC Members TERI-SIDBI	CCC TERI-SIDBI	Advisory inputs and reviewing the progress of cluster & get valuable suggestions time to time.
6	Development of cluster web-site	M5-M6-M7	Cluster stakeholders, Web Developer REA TERI-SIDBI	Web Developer TERI-SIDBI	Promote information exchange/networking in the clusters among BDS as well as MSMEs



Thrust
earing stud,
oil/ sand
guard in
motor

Figure 4.3 Cluster map of Rajkot Engineering cluster