Cluster Development Programme, India

DIAGNOSTIC STUDY

SME

THE ENGINEERING CLUSTER

TRICHY, TAMIL NADU

By The Cluster Development Cell
Trichirappalli Regional Engineering College
Science &Technology Entrepreneurs Park

PREPARED UNDER THE AEGIS OF THE UNIDO PROJECT: SUPPORT TO COUNTRY EFFORT TO PROMOTE SME CLUSTER DEVELOPMENT IN INDIA, 2002-2005

OCTOBER 2002

TABLE OF CONTENT

The views expressed in the Diagnostic Study are those of the author(s) and should not be attributed to UNIDO or to the institutions they may represent.

1. Industry Background

The Trichy Engineering Cluster was largely BHEL–centric during the first phase of its growth. This meant that the order book position of BHEL was the key determinant of the cluster’s performance. During that phase i.e. up to 1990, power industry was singularly responsible in driving BHEL’s and thereby the cluster’s performance. But thereafter, the cluster started undertaking fabrication work for a number of process industries like sugar, paper, cement, fertiliser, petrochemical etc.

Although the entire engineering industry depends on fabrication work yet the very nature of conversion work does not allow the former to treat the latter as a relevant industry for the cluster. Theoretically however, the fabrication cluster has a large user base, which accounts for more than a fourth of the total industrial production. But the engineering industry is spread across the country making a sizeable chunk of the market inaccessible to this cluster. Machinery and equipments, where there is a sizeable fabrication content, alone account for a tenth of industrial production. Despite the dwindling role of manufacturing in the economy and the continuous erosion of their competitiveness, the market for the cluster is still huge. More importantly, power sector in the country will remain a growth area at least for the next decade, given the huge demand-supply gap and low per capita consumption in the country. Within the power sector, micro power plants based on bio mass and wind energy offer much greater opportunities for the cluster at home and abroad.

2. Historical Sketch of the Cluster

2.1. The BHEL Story

The history of the Trichy Engineering Cluster known more as a ‘fabrication cluster’ is tied to the history of Bharat Heavy Electricals Limited’s (BHEL) Trichy operations. And even at present it continues to be BHEL centric in many respects. Therefore any attempt to trace the history of the cluster should necessarily start with BHEL.

Though BHEL was established in 1956, its Trichy unit came into being only in 1963. The Trichy unit was popularly known as the ‘Boiler Plant’ as it was set up to manufacture High Presume Boilers. The actual production started only during 1965-66 with the collaboration of Skodaexport- under an Indo-Czech economic co-operation programme to produce the First Generation Boilers (60 MW). The company switched gears during 1972 and started producing the Second Generation Boilers (500 MW) with the collaboration of Combustion

Engineers, USA, the then world leaders in power technology. Later on they merged with the Alstom Group.

The third burst of growth started during 1989, when the unit turned its attention towards the Third Generation Boilers based on IGCG, with its own R&D. Right now, the unit is also trying to popularize 50 MW small size Boilers (Heat Recovery Steam Generation & Fludized Bed Boilers) for captive purposes and its future plan includes introduction of “fuel cells” towards the end of this decade, widely considered as the energy of the future.

The Boiler Plant started with a capacity to produce 750 MW and got expanded to 1100 MW during 1974. In the year 1979, the company took a major step aimed at vertical integration by setting up a seamless Steal Tube Plant at Trichy itself. In an another expansion spree, the unit took its capacity first to 2500 MW in 1980 and ultimately to 4000 MW in 1983. During this period only, the unit developed a range of industrial boilers for process industries like sugar, cement, paper, petrochemicals, etc. The year 1983 also witnessed the establishment of Boiler Auxiliaries plant at Ranipet and subsequently the Piping Center in Chennai and the Industrial Valves Plant at Goindwal in Punjab. During 1995, the unit introduced 500 MW Boiler, for the first time in the country and to beat its own record, it came out with a 660 MW Boiler in the year 2000.

BHEL Tiruchirappali is the largest engineering and manufacturing complex in Tamilnadu, spread over 2908 acres of land at Trichy and 1256 acres at Ranipet. Of the BHEL’s current (2001-02) turnover of Rs7257 crores, Trichy units’s contribution works out to a handsome Rs1873 crores, which is more than a fourth of total turnover. Moreover, during the past ten years i.e. from 1991-92 to 2001-02, Trichy unit’s turnover more than doubled from Rs890 crore to Rs1873 crores. In the domestic power segment, it has an unassailable position. BHEL–built sets now account for 67000 MW or 65 percent of the country’s installed power generating capacity.

2.2. Rising of the Cluster

BHEL’s recent track record indicates its ascendancy in the global power sector. Today it has the distinction of being the only company in the world to manufacture almost the entire range of equipments needed for the ‘Boiler Island’ of the power plant under single roof. Boiler manufacturing has a high fabrication component and fabrication again is a labour-intensive as well as design oriented operation. This necessitated BHEL to have a bunch of fabricators and machinists who are techno-preneurs and who could do such work on contractual basis.

Sensing an opportunity to create entrepreneurial and employment opportunities, the State Industrial Development Corporation (SIDCO), the infrastructure providing agency of the Government of Tamilnadu developed an industrial estate in 1971 at Thuvakudi. This is just a couple of kilometers away from Tiruverambur, the place where BHEL's facilities are located. Developed in an area of 291 acres, the Estate today houses about 300 units. About two-thirds of them are fabricators and the remaining are mostly machinists.

In addition to this, a couple of other industrial estates are functioning in the same vicinity. The Tiruverambur Industrial Estate developed just one year after Thuvakudi by the same agency i.e. SIDCO, in an area of 16 acres houses 26 units–10 fabricators, 6 machinists and few others involved in binding, wiring, heat treatment and other activities. This Estate, though a stone throw away from BHEL consists of relatively smaller players. Nearly a third of them, are not in operation at present. One more industrial estate at Ariyamangalam developed long ago (1959) by the Directorate of Industries and Commerce, Government of Tamilnadu also has a handful of players. Three out of the 43 units in this estate do job work for BHEL. In the formative years of 1970s, all these units basically functioned as an extended arm of BHEL, doing job work exclusively for them.

The first sign of changes in the cluster have taken place during the 1980s. The creation of a separate unit at Ranipet injected a sense of insecurity among at least a few players of the cluster. The Ranipet unit depended on the cluster only for a couple of years and then subsequently, it started developing its own jobbers either at Ranipet or nearby in Chennai.

On the positive side, three executives from BHEL started their own ventures, independent of one another. This was the first natural development of significance, in this otherwise induced cluster. More importantly, all three focused on manufacturing as against job work, which was dominant in the cluster at that time. One among the three units is located in Mathur which is on the Trichy-Pudukottai highway. This unit's location prompted many fabricators to set up shops in the same area, as the former also subcontracted considerable amount of fabrication work. Added to this, is the subsidy given to entrepreneurs for units located in Mathur in Pudukottai district, which is a declared backward district. People who were not able to get land allotment at Thuvakudi SIDCO Estate also favoured this destination. Above all, the success of the pioneering unit motivated many more to come to this place. Today, Mathur boasts about 35 fabricators and a sizeable number of them have already achieved the critical mass in terms of business operations. Encouraged by this, SIDCO has developed one more estate in Mandaiyur, near Mathur in Pudukottai district. But as on date, only a few small/tiny fabricators are operating in this estate.

The real high-voltage changes in the cluster took place only during the 1990s. Some of these were negative by making cluster players feel insecure about their business and thus creating a dependency syndrome. Others were positive in nature and they helped in expanding their aspiration levels as well as in extending their growth horizons. The 1990s started with a sudden drop in BHEL's order position leading to a fall in the volume of job work. The intensity of the problem led to the closure of more than 50 units, although some of them resurfaced after some time. For the first time, many of the cluster players realized the folly of restricting their service only to BHEL. BHEL on its part had been asking them to explore newer avenues of growth for sustenance. But most of them were clueless as to how to go about doing that.

Luckily, however around 1993-94, a number of windmill companies discovered the fabrication strength of the cluster. A substantial number of windmill projects in the country were being implemented in Muppandal near Nagercoil and Pollachi near Coimbatore. Riding on the boom and supported by very liberal tax exemptions offered by the Government, most leading windmill companies were knocking the doors of Trichy fabricators. Proximity to both Nagercoil and Coimbatore also came in handy. It is said that it was only after this development that Trichy came to be recognized as a fabricator cluster. Unfortunately however, the opportunities disappeared as quickly as they came and many got stuck into financial problems. It however, induced many cluster players to look for other market for their services.

The higher level of motivation displayed by the second generation entrepreneurs and a fresh crop of first generation entrepreneurs have resulted in a clutch of new business initiatives. Many got attracted (or distracted?) by unrelated business opportunities as a number of them plunged into areas like agricultural farms, cell phone distributorship, edible oil extraction, hotels and restaurants, jewellery shops, knitwear, real estate etc. Happily, an equal or even larger number of initiatives exist in this cluster, which are capable of transforming the very profile of this place. An important fact here is that most of these initiatives are in sync with the cluster's core competence.

2.3. Cluster Composition

To sum up, there are more than 300 units operating in the cluster. There are five estates within the Trichy cluster; three located in and around BHEL and two in the adjacent Pudukottai district i.e. Thuvakudi and Mathur. These estates account for more than 95 per cent of the cluster activities. In terms of activity profile, fabrication is the dominant group. There are about 200 fabricators in the cluster. Out of this, 152 are BHEL vendors. Machinists numbering about 100 are the next important category of units. Though there are units doing both fabrication and machining yet they are few in numbers. 47 of the machine shops have found their way into the BHEL vendor list. The third category of units consists of small or tiny units numbering less than 50. These units are engaged in any one of the following activities: short blasting, sand-blasting, galvanising, bending, drilling etc. Some of them are also involved in the manufacture of consumables like electrodes, grinding wheels, paints etc. In addition to the above, there are three units who are into manufacture of power equipments like boilers, heat exchangers, pressure vessels etc. In terms of size, they are at least half the size of all other players put together.

3. Analysis of Business Operations

3.1 Fabrication: The Main Activity

The business of this cluster is defined in terms of fabrication although a number of units are involved in other related activities. This definition serves the purpose on hand much more accurately for a number of reasons: First of all, in terms of number of players in the cluster, fabricators are the single largest group accounting for more than two thirds of the total units. Therefore, this group of units will be the primary target for any intervention programme.

Secondly, there are already a handful of players who have moved away from mere fabrication to components and power equipments manufacturing. As far as the size of operation is concerned, they are the most important segment. But they are already on the right track and any cluster intervention programme will only aim at multiplying the number of such players and strengthening the initiatives of this small group of units. Moreover, fabrication forms the basic activity in this case as well.

Thirdly, though there is another group of cluster players coming under ‘machine shops’, the type of intervention to be made is not vastly different from the fabricators. In practical parlance, machinists are generally clubbed with fabricators. In view of all these factors, for the purpose of describing the business operations fabrication is being highlighted.

Fabrication as an independent business activity has its own characteristics and limitations. They are listed down here for proper understanding of the cluster operations:

Firstly, fabrication business as such does not have a product to offer. Even as a service, it is intermediate in nature i.e. fabricators carry out an intermediary service in the role of converters. Secondly, though all engineering industries need some or the other kind of fabrication input, the logistical factors stand in the way of developing a national, if not global business around this service. Raw materials need to be transported to the fabricator's site first and then taken back to the customer's facility after conversion. This involves huge transportation cost besides loss of man days.

Thirdly, the fabrication work is much more relationship-based than any other industrial service, demanding local outsourcing. Fourthly, the business operation is labour intensive on the one hand and has some built in design component on the other that require technical inputs. Finally, almost all the customers supply raw materials and drawings along with the order. Of late, few customers supply only the basic drawings, leaving the preparation of detailed drawings to the fabricators. All these factors not withstanding, the cluster has earned a reputation as a fabrication cluster and opportunities for market expansion do exist.

3.2 Process of Fabrication

The operations involved in fabrication are represented in the Exhibit 5.

Fabrication begins with material procurement. In most cases, the customer procures raw materials and sends them to the fabricator along with drawings. In few cases, the fabricator procures directly from the suppliers but from the customer's account. SAIL is the biggest supplier in the cluster with a well-equipped stockyard in Trichy itself. Upon receiving the materials, the fabricator subjects them to inspection and analysis. Only the top six players in the cluster have in-house testing laboratories. But they make their facilities available to other units as well. In addition to this, BHEL has its own lab, which can be accessed by any vendor. The Regional Engineering College (REC) Trichy located in the Thuvakudi Estate itself has also created such facilities for the benefit of cluster units.

Material preparation is the next activity and this is done at respective sites. This is followed by metal forming, welding and grinding, in that order. Once this core activity is completed, the material is sent for Non-Destructive Testing (NDT) for which there is at least a half-a-dozen service providers in the cluster. The list includes inspection agencies like Lloyds Register of Industrial Services, Engineers India Limited, Tata Projects Ltd, Indian Institute of Quality Assurance, etc. This is followed by another outbound activity viz. Sand Blasting/Finishing/Examination. There are about eight dedicated units in the cluster offering these services.

Then the Final Quality Control is carried out before the ready product is delivered to the customer. To carry out the above activities, the fabricators buys a number of consumables, mostly from BIDASS, a company promoted by BHELSSIA, the industry association. Skilled workers are available in the cluster itself and all cluster units depend on contractual labour at least for half of their requirements.

3.3 The Cluster Players

Based on the profile of the entrepreneurs as well as that of the enterprises, in terms of product and market mix etc., an attempt is made here to categorise them into distinct slots. There are basically four different kinds of cluster players and in order to facilitate an easy understanding and decide on the right intervention strategies, they are placed in a four-tier system.

3.3.1. <u>Tier 1</u>

On top is Tier 1, consisting of only three firms. From the point of view of setting the direction for the future growth of the cluster, they are the most influential. They are the pioneers of the industry, as they were the first people in the cluster to break out of the jobber-mode and entered into product manufacturing. By choosing to tread the less–traveled but more riskier route and subsequently by making success in their respective ventures, they have already shown the path. All of them have a turnover in excess of Rs.15 crores and their combined turnover is in the vicinity of Rs.50 crores. They manufacture smaller boilers, heat exchangers and pressure vessels.

None of these three units does any job work for BHEL, but they provide job work to few other cluster players. Even though they do not compete with BHEL nor among themselves, yet they operate at the national level with global aspirations. These three firms share some common characteristic i.e. they all were set up by ex-BHEL executives, who had left their secured positions to achieve something on their own. As a result they all have an ambitious growth plan for future.

3.3.1. <u>Tier 2</u>

The Tier-2 consists of about 20 units and their annual turnover range from Rs.1crore to Rs.10 crores. Few players who are yet to reach the one crore mark have also been included in this category in view of the key initiatives taken by them. These players can justifiably be termed as ‘Early Adopters’ as they were quick to change by taking steps to grow further than job-work and BHEL. Though all of them come under BHEL vendor category and continue to do job work for BHEL yet their dependence on the latter has reduced substantially.

All these twenty early adopters have expanded their market coverage by taking up fabrication work from other process industries located in Tamilnadu, Karnataka and Andhra Pradesh. Some have even created a niche for themselves in such industries. A couple of them are doing considerable work for a number of windmill companies on a continuous basis. One is even trying to position himself as an onsite fabricator and seems to have made inroads, at least at the regional level despite stiff competition from larger enterprises. Few others have built long-term relationship with one or more user industries like sugar, cement, paper, fertilizers, petrochemicals etc.

Among the machine shops, one player has already come out with a product (deep well hand pumps) and has even started executing small export orders. There also exists a collective move, by a group of established machinists to produce valve components and supply them to BHEL. Other successful cases include a unit supplying components to the Defense Sector and another providing reclamation of camshafts to the Indian Railways. The former has plans to undertake high precision work on a larger scale and a number of players talked about some business plan or the other during the interviews.

Many more such initiatives are likely to surface when a more elaborate survey is undertaken. An important common denominator of this Tier is the fact that most of these units are run by second generation entrepreneurs who display a healthy appetite for growth.

3.3.1. Tier 3

The Tier-3 is the most populated one with more than 100 players. They are clubbed together in the name of 'Complacent Majority' for the simple reason that they are yet to come out of the status quo syndrome. This does not however mean that they are not hungry for growth. It can only be taken that they do not know the ways and means of growing beyond the BHEL boundary or looking for some kind of an external stimuli.

Their individual turnover is likely around Rs. 25 lakhs per annum. Most of them are fabricators and enjoy the status of being in the BHEL vendor list. These units do job work only for BHEL or in some cases for Tier 1 units. Another common feature defining this group is their position in life cycle. A considerable number of them are first generation entrepreneurs in the 50 plus age group waiting for the second generation to take over. The players below this age group are relatively new to the field.

3.3.1. Tier 4

The fourth Tier languishes with about 50 players who are generously dubbed as 'Toddlers' as most of these players are not only small but relatively young. Therefore, it is too early to predict their future behaviour and performance. One common feature between the Tier 1 and this Tier is that both of them do not find a place in the BHEL vendor category. While the Tier 1 units grew big enough to deliberately ignore the steady flow of orders given by BHEL, the bottom tier players are too small to get an immediate entry. Their average turnover is likely to be in the region of Rs. 5-10 lakhs. It is said that all Tier 3 players started like this and then graduated to their present level.

The immediate concern of these units is also to get into BHEL vendor list. The fact that the number of BHEL vendors jumped from 67 in 1991-92 to 152 in 2001-02 seems to provide some hope for them. But a large unutilised capacity in the cluster may stall such a graduation process in the future. Right now, the cluster does about 50,000 tonnes of fabrication work whereas it is capable of doing at least three times of that volume without stretching its present facilities.

Moreover, in line with emerging manufacturing trends, BHEL is likely to go for more outsourcing (as against job work) of components and sub assemblies, thereby limiting the number of units it transacts with. On the positive side, Tire 1&2 units can be expected to provide more fabrication work in the coming years.

3.4. Value Chain Analysis

As indicated earlier, the bulk of the cluster activity i.e. fabrication is done only on a job work basis. The customer supplies raw materials and technical inputs (the drawings) and the fabricator does only a conversion job for which he gets compensated. The current size of this business is Rs. 90-100 crores. And out of this, BHEL contributes about Rs. 70 crores and the balance comes from other/outside customers. Strictly speaking, this is not a turnover figure but only value-addition. For this kind of work, the margin is said to range from 10 to 15 per cent.

In the case of components and equipments manufacturing, the margins are lower at 8-12 per cent. The size of this business segment is about Rs. 50 crores. But this is a turnover figure and not comparable with the earlier one. However, in absolute terms, components and equipment manufacturing is more profitable, sustainable and a scalable activity for the cluster.

4. Assessment of Orgnisational Linkages

One of the key factors differentiating a vibrant cluster from not so vibrant ones is the physical presence of a range of supporting organizations and the quality of linkages that exist between these organizations and the cluster players. The various types of organizations that typically promote the performance of a cluster are portrayed in Exhibit 6.

4.1 Government Agencies

Government agencies, both in regulatory and promotional roles play a pivotal role in any cluster development programme. As far as the Trichy cluster is concerned, the number and types of regulatory bodies that have greater relevance are restricted to the following few:

- Inspectorate of Factories, Government of Tamilnadu.
- Employee State Insurance (ESI) & Provident Fund (PF) Authorities.
- Sales Tax Department & Central Excise.

Job work, being the predominant type of cluster activity, labour is the major component of the expenditure. Naturally then, cluster players have to wrestle with the above agencies as they are concerned with key aspects of labour welfare. However, the perceived usefulness of ESI and PF even among workers is quite low and promoters often consider these measures as unnecessary and troublesome. But these are common problems applicable to the country as a whole. Though a number of Government Departments, both central and state, have various promotional measures for SSIs, there is no specific measure applicable to the cluster on an exclusive basis.

4.2 Certifying & Inspection Agencies

Apart from the above Government Agencies supervising the Cluster units, there are a number of certifying and inspection agencies from the private sector that are unique to the cluster. They are:

- Indian Boiler Regulatory Authority (IBRA)
- Lloyds Register of Industrial Services
- Engineers India Ltd.
- Tata Projects Ltd.
- Indian Institute of Quality Assurance
- Quality Evaluation & System Technology (QUEST)
- Det-Nortsp Veritas??

The IBRA is relevant only for Boiler Manufacturers that are referred to under the Tier 1. The Lloyds Register of Industrial Services is affiliated to the

American Society of Metallurgical Engineers and American Welding Society. Certification from this agency though not mandatory is highly valued in the industry as a mark of quality. Other agencies like Engineers India Ltd and Tata Projects Ltd. also offer third-party inspection and certifying services. Det-Nortep Veritas, in addition to ISO Certification offers other related services. All the above organizations have significant presence in the cluster with local offices and specialist staff etc. The quality of linkages with these organizations is quite strong.

4.3 Educational and Research Institutions

Educational and Research Institutions should ideally be the second pillar of the organization edifice on which any cluster operates. The mere presence of prestigious institutions does not on its own guarantee better results as much depends on the quality of linkages with the former. This is quite true in the case of Trichy cluster also.

The **Welding Research Institute** (WRI) functioning within the BHEL structure and campus was set up in 1975 with the financial support from UNDP. It offers a range of services with a view to facilitate free flow of information on the latest trends in the welding research into the industry. Basically, their services are in the areas of: Applied Research, Consultancy, Metallurgical Testing and Training, which is offered at three levels; that of engineers, supervisors and artisans.

But these services are not being fully used by the cluster units. Apart from few units making use of testing facilities, most of the units are yet to realize its usefulness in furthering their business objectives. A part of the reason lies in the fact that most of these units have not grown big enough to access these services. WRI's prestigious assignments today seem to come mostly from outside the cluster. There is an urgent need to strengthen this linkage for mutual benefit.

The other institution capable of shaping the future success of the cluster is the **Regional Engineering College** (REC) located right in the midst of Thuvakudi Industrial Estate. Despite having fine research infrastructure and domain expertise, particularly in departments like metallurgy, very few units in the cluster take advantage of their resources. Quite unfortunately, many tend to believe that academic research and expertise available at REC cannot contribute meaningfully to the cluster's growth. Some kind of formal relationship needs to be developed in order to remove such misconceptions.

The third institution- which incidentally happens to be a cluster development agency and can shape the industry-institution relationship in the desired direction is **REC TREC-STEP**. Functioning as an autonomous agency to promote entrepreneurship among technical graduates, TREC-STEP already helped promote more than 150 start-ups. Through its Incubator and Mentoring services, it has produced quite a few success stories in the cluster. This is reflected in the fact that for the second year in running, it has received the 'Best Step Award' from the Government of India.

One more institution capable of playing a decisive role particularly in bringing best management practices to the cluster is **Bharatidasan Institute of Management** (BIM) which is functioning in the BHEL complex itself. BIM has the distinction of pioneering a fruitful industry-institution interaction at least in this part of the country, thanks to BHEL. As an industry partner, BHEL is instrumental in making BIM a front-ranking management institution. BHEL has benefited from this venture as it helped their executives in keeping abreast with new management thinking. Now there is a need to extend this relationship to the cluster as a whole.

4.4 Infrastructure Organisations

Infrastructure providing organisations can be considered as the third pillar of the cluster's organisation system. This in turn consists of varied types of infrastructure, some in the public and others in the private sector. The SIDCO i.e. State Industrial Development Corporation of Tamilnadu has provided the physical infrastructure by way of initially developing industrial sheds. Today, it collects Rs. 1000 per acre per year as its maintenance charges. But the quality of services as can be seen by the pathetic road conditions in the estate are far from satisfactory. At present, there is a move by the industry association to take over the maintenance function from SIDCO.

Tamilnadu Electricity Board (TNEB) having a sub station in the Thuvakudi Estate takes care of power requirements of the cluster. The problems in this sphere are common to the whole country, like unreliable supply, high tariff etc. Recently, the State Electricity Board increased its power deposit rates steeply resulting in a cluster wide resentment. This problem was solved amicably by Trichy District Small Scale Industries Association's intervention/lobbying power.

As far as the communication infrastructure is concerned, there is no deficiency worth mentioning. STPL has set up an earth station at REC TREC-STEP campus.

Last but not the least is the financial infrastructure by way of banking facilities, development finance etc. The State Bank of India's small industry branch at

Thuvakudi estate is the banker to a majority of units in the cluster. The level of customer satisfaction seems to be quite high. However, there are at least dozen cases of NPA's in the estate, caused mainly by unplanned growth plans by some units in the 1990s. Tamilnadu Industrial Investment Corporation provides term-finance. While the linkages with commercial banks, particularly SBI are quite strong, the same is not true in the case of term finance institutions.

Business Development Service (BDS) providers in the cluster are conspicuous by their absence. The Tier 1 and few of the Tier 2 units make use of BDS providers who are located elsewhere in the country and who provide them services such as getting new orders and other related advisory services. With regards to technical service providers, though experts are available with WRI and REC, they are yet to be tapped for mutual benefits. Few progressive units have started using the training expertise available in the Management Department of REC and other places. The need of the hour is to develop a systematic mechanism to make such services available, accessible and affordable to all cluster units.

4.5 Industry Associations

At the center of all these organizations are the associations representing the cluster players. Here again, typical of any under performing cluster, the linkage is not much effective. There are three types of associations functioning in the cluster. The first one relates to the cluster specific associations. Leading this pack is **BHEL Small Scale Industries Association (BHELSSIA)** that was started in 1980. This is the most represented association with 130 members.

However, this association does not seem to be financially strong as each member contributes just Rs. 1000 as life membership. It has only one paid staff member and the activities of the association are propelled by the time, energy and contribution made by office bearers of the association. Though the cluster players are quite happy with BHELSSIA's role in liasoning and sorting out issues with BHEL, its overall effectiveness has not generated unanimous appreciation. Distrust among members is said to be quite rampant.

Recently, a group of well established machinists joined together to form a separate association for themselves in the name of **Trichy Machinists Association (TMA).** The rationale behind such a move is to have a greater say for machine shops in the overall development of the cluster. This has also coincided with the creation of another association called **Thuvakkudi Industrial Estate Manufacturer Association(TIEMA).** This association has succeeded in roping Tier 1 units to its fold but it still excludes units operating in Mathur and other places.

An association representing the cluster as a whole, cutting across activities and locations is till date non-existent here. In the centre of all these associations, however, we can see the **Trichy District Small Scale Industries Association (TIDITSSIA).** As the name suggests, it represents all the small scale units in Trichy district, and is affiliated to the state level associations called Tamilnadu Small and Tiny Industries Association (TANSTIA). There are about 300 members with two paid workers. This association is particularly effective in lobbying with Government machineries and in disseminating information on various Government rules, regulations and procedures. At least 40 cluster units are members of this association.

Confederation of Indian Industry (CII) too has a chapter at Trichy and BHEL is the prime mover of this chapter. The top ten cluster units are members of this association as well. Its key strength is in disseminating the latest information on different aspects of the industry and business environment by conducting topical seminars in the city.

From the pattern of patronizing different associations, the following inference can be made. All cluster units with reasonable size of operations are members of BHELSSIA. While the better performing ones have got into TIDITSIA, the best ones have got themselves enticed by the CII.

BIDASS is the success story of BHELSSIA's thoughtful initiative. The cluster players for long were not able to get good quality consumables at affordable prices in view of their poor bargaining power. To overcome this problem, BHELSSIA formed an organization called BIDASS as a limited company with a view to procure all consumables in bulk and retail the same to its member units. Today it has as many as 156 members. Its turnover has nearly doubled during the past five years reaching Rs. 60 million.

The number of items in the inventory works out to a whopping 356. Today BIDASS supplies consumables at 10-15 per cent cheaper than market prices. Its success is evident from the fact that BIDASS pricing is widely regarded in the cluster and elsewhere as a referral pricing. This model is being replicated by many other clusters all over the country. The success also led to two brand extensions in the cluster but both of them unfortunately ended in a failure.

In 1992, 40 BHELSSIA members joined together contributing Rs. 5000 each and formed BIDASS Engineering to take up large projects that can be executed by the members. But, the experiment turned out to be a failure in view of conflict of interests. Some seven years ago, another collective effort aimed at duplicating the success of BIDASS led to the formation of BIDASS Apparels. Under this 30 members came together contributing Rs. 5000 each to set up a knitwear unit at Tirupur. This also ended in failure due to a number of reasons. These two failures should not however underrate the high decibel impact made by the original experiment.

5. SWOT Analysis of the Cluster

The SWOT analysis for the cluster is done at the following three levels.
(a) Entrepreneur
(b) Enterprise
(c) Cluster

At the individual level of entrepreneurs, the exercise has shed sufficient insights as to the type of intervention required in shaping the right attitudes, imparting the required skills and transferring the relevant knowledge. The strengths and weaknesses identified at the enterprise level have also provided enough inputs for formulating effective intervention strategies. Lastly, the analysis at the level of the cluster as a whole has exposed the grey areas like lack of trust among cluster players, weak linkages between organizations etc and has also revealed the bright spots giving hope and optimism for the future.

Strengths	Opportunities
1. Fine track record, fabrication skills, industry expertise and good infrastructure.	1. Growing demand for power and increasing awareness of Eco-friendly sources (renewable) of power.
2. Highly knowledgeable and motivated technopreneurs	2. Growing global concern for eradicating energy problems in the third world and role of micro power plants.
3. Recognised fabrication center by windmill companies	3. Possibility of developed countries vacating industries like metal transformation and turning to countries like India for such services
4. Presence of a clutch of successful initiatives	4. Emerging opportunities in outsourcing to BHEL and other large enterprises.
5. New found optimism and increasing appetite for growth	5. Scope for applying IT and internet for accessing distant markets.

Weaknesses

1. Location of the cluster, high freight component and inability to develop a national market.
2. Jobber attitude of many promoters and reliance on sub-contracting
3. Spoon feeding by BHEL leading to lack of design skills and costing knowledge.
4. Mistrust among cluster players stalling cooperative behaviour.
5. Perceived as a low-technology and an unglamorous field.

Threats

1. Dispersed and fragmented nature of the market
2. Matured technology & easy absorption thus facilitating easy entry into the industry
3. Declining importance of the manufacturing sector in India
4. Erosion of competitiveness of Indian manufactured products and the threat of Chinese invasion.
5. Dispersed nature of raw materials suppliers and end-users working against the clustering of fabricators.

6. Strategies for the Future

Before attempting to outline the proposed strategies for the cluster's growth , it is necessary to look at the readiness of the cluster players to embark on such a growth path. The Cluster Development Programme envisaged by the UNIDO methodology aims at making a paradigm shift in thinking and doing. And fortunately in the case of Trichy cluster, there are enough indications to suggest that the time is ripe for making any such `paradigm shift'.

6.1 Readiness of the Cluster

Needless to say, people change only when there is a threat/insecurity or rewards /incentives. This can be applied to all situations including the issue on hand. Viewed from this angle, there are both positive and negative stimuli for change among cluster players. Some of these inducements come from within while others are triggered by external environment. For instance, internally the insecurity and the fear of depending only on BHEL, and an increasing appetite for greater achievement displayed by the young and second generation entrepreneurs, bode well for a cluster intervention strategy. In the same way, threats and opportunities in the external environment like fear of disinvestment, distant outsourcing etc and unexploited opportunities for growth have helped prepare the right `pitch' for an aggressive intervention.

Readiness to change is a necessary but not a sufficient condition to ensure success of any cluster intervention strategy. The industry in which the cluster is operating should also be amenable for changes. It can be argued that every cluster can be made growth-friendly by diagnosing its problems accurately and coming out with appropriate strategies. And the Trichy cluster also offers enough room for making such growth oriented interventions. To drive home this point, another simple analytical tool is employed and the resultant output is presented in Exhibit 8. Here the robustness of a cluster is determined by two factors i.e. its richness and reach (both present and potential).

A cluster is called an `under-performing' or `under-achieving' one, when it is not able to develop a sustainable competitive advantage. This could be due to many reasons but it is the basic structural weaknesses that prevent them from realizing their full potential. The structural weaknesses can be gauged by looking at how `rich' the cluster is. The term `richness' is used to symbolise the "vertical depth" of a cluster i.e. the presence of strong backward and forward linkages in the form of input and machinery suppliers on one end, and distributing agents and customers on the other. Any deficiency here will reflect itself in the cost competitiveness or quality image of the products manufactured in the cluster. However, richness should not be taken to mean cent percent integration within the cluster. In some cases distant outsourcing of raw materials would be the only option (as in the case of Trichy cluster) or the most preferred one. Going against the economics will only be detrimental to the competitiveness of the cluster.

As conversion i.e. fabrication cannot be developed as the sole activity of the Trichy cluster so getting into component manufacturing and ultimately into equipments seems to be the only solution for its long term sustenance. The successful players in the cluster, although few in number, have already demonstrated this.

The other term used to indicate the `robustness' of a cluster is `reach', which implies the geographical scope of the cluster. All the vibrant clusters in India and elsewhere operate at the global level. The Trichy cluster that was catering only to BHEL, has over a period of time expanded its radius of operations. But fabricators could at best operate at the regional level due to certain inherent problems. However, the component manufactures could go further. Few success stories already exists in the cluster. But it can aspire to become a global player only by specialising in few select product groups. At least one Tier I unit is working in that direction by doing some preliminary work in micro power plants

6.2 Proposed Strategies

Coming to the core issue, the strategy proposed for the cluster involves both product and market expansion. This is illustrated by making use of a product-market matrix, as shown in Exhibit 9. A right mix of product market portfolio can be expected to ensure an optimal richness vs. reach ratio, thereby making the cluster a truly robust one in a 5-7 year framework. As indicated earlier, some kind of initiatives have been taken already by few cluster players. What is needed now is the strengthening of such initiatives, identifying and initiating related ones and multiplying them cluster side.

The immediate opportunity for growth comes in two forms; Moving from fabrication to components supply and entering into the adjacent markets. With outsourcing becoming an urgent agenda for cost cutting and quality upgradation, the cluster should “pluck this low-hanging fruit” without losing any further time. Fortunately, one such initiative is getting shape. Apart from making this happen, more such initiatives should come from the cluster otherwise distant outsourcing may take away a slice of the existing conversion job.

The other opportunity refers to ‘adjacent markets’ for fabrication. Here again at least a dozen units in the cluster are involved in fabrication work for a number of process industries in the adjacent states. But the need is to prepare the cluster to take part in the emerging ‘onsite fabrication’ work, which is gaining ground in the country. Economics as well as taxation system (sales tax and excise duties) favour such a trend. The Cluster should ‘fabricate a network’ across the country to capitalize on this market.

The big opportunity for the cluster however lies in power equipments. The focus should be on micro power plants based on bio mass, which apart from being eco-friendly are also affordable. Simultaneously, efforts should be made to manufacture certain windmill components by tying up with global majors in the industry. According to one estimate, India has the potential to produce 60000 MW from wind energy. So far it has set up only 1600 MW thus leaving a huge gap. Windmills have high fabrication content and a few cluster units posses the relevant skills. In case of micro power or distributed power plants, the emerging scenario suggests a huge potential. The track record of the cluster in fabrication and boilers should be exploited to emerge as a global player in the field.

6.3 Stages of Growth

All these strategies involve a three-stage growth i.e. from fabrication to components and components to power equipments. Not only are they inter related but success in even one area i.e. components or power equipments will transform the profile of the cluster beyond recognition. This sequential growth path is portrayed in Exhibit 10. The one new area mentioned in the vision statement of the cluster relates to providing complete energy solutions. Right now, the cluster does not have any player in this growth area but scope exists to tap this potential by leveraging the strength of Regional Engineering College (REC) Trichy.

7. Concluding Comments

Based on the SWOT analysis and aspirations of a sample of cluster players, a 'vision' for the cluster is built. It however needs to be validated by them. This exercise is scheduled to be completed during the second week of October 2002. The proposed strategy outlined in the Chapter 6, can be expected to help achieve the vision in a stipulated time-frame of 5 years. From the strategy, an Action Plan is being drawn and the same will also be validated in the above mentioned meeting. The Action Plan will consist of basically two intervention measures viz. Corrective Interventions and Directional Interventions

While the directional interventions will help the cluster in setting new directions for the future, the correctional ones will address all deficiencies and weaknesses that exist in the cluster, so that they don't stand in way of the cluster's march towards its vision. The above measures will be categorized as per the UNIDO Methodology i.e. a) Trust Building b) Capacity Building c) Pilot Activities d) Regular Activities and e) Strategic Activities. This will help monitor progress and evaluate the results in an effective manner.