DIAGNOSTIC STUDY

SME

THE ELECTRICAL FANS CLUSTER

HYDERABAD, ANDHRA PRADESH

By NISIET

YEAR 2003

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1. INTRODIUCTION

1.1 GENESIS

Electric fans are broadly categorised as general purpose fans and industrial fans. While the latter are used in factories for driving out hot or polluted air, the former includes ceiling fans, table fans, railway fans and pedestal fans etc that are meant to provide human comfort. The present study deals with this segment of the fan industry in Hyderabad.

Though the first electric fan was manufactured in India in 1921, the industry was dominated by imports until the late forties. Import of fans was banned after independence. With this ban, the domestic manufacturing was started in the medium scale sector in 1947 around Kolkata with a unit called Jay Engineering Works. This was followed by orient in early fifties again in Kolkata. Crompton's unit came up in late fifties at Mumbai with a British collaboration. Other organised sector manufacturers also emerged like Khaitan and Rallies (in sixties), Polar (in seventies) etc. With the development of skills and migration of labour, the industry developed around metropolitan cities like Delhi, Mumbai and Chennai and then expanded in the small scale sector of Punjab, Haryana and around cities like Bangalore, Pune, Hyderabad, Varanasi etc.

Although the first fan manufactured in India was in 1921, yet the commercial manufacturing was started only in 1947

1.2 NATIONAL SCENARIO

The fan industry has grown tremendously in the post-independence period. The industry has grown nearly ten times between 1950 and 1970. The production from the organised sector had a five-fold growth from 15.5 lakhs in 1970-71 to 81.4 lakhs in 1998-99. The production from the unorganised sector for the period has grown from 4.5 lakhs to 24.1 lakhs. Thus, the total production has increased from around 20 lakhs in 1970-71 to around 108.5 lakhs in 1998-99.

The annual compounded growth comes to about 5.9% for both the organised and the small-scale sector, the relative share being fairly stable over the period. According to Usha International Limited, the marketing arm of the leading fan manufacturer, Jay Engineering Works, a total market size of Rs.1500 crores is being shared by the organised and the unorganised sectors. On this basis, the total production comes to 262.5 lakh pieces, with the organised sector accounting for 75 lakhs (at a market price of Rs.1000 per fan) and the unorganised sector accounting for 187.5

lakhs (at a market price of Rs.400 per fan). According to their industry sources, the current production is of the order of 200 lakhs, with the share of unorganised sector rising to 60%. On this basis, the production comes to 80 lakh fans from the organised sector and to 120 lakh fans from the unorganised sector.

Table – 1.1 : Production of Electric Fan in India

(in lakhs)

Year	Production by		Total
	Organised Sector*	Small Scale Sector**	
1970-71	15.5	4.5	20.0
1980-81	41.2	10.7	51.9
1990-91	54.6	-	-
1991-92	53.3	-	-
1994-95	70.2	16.2	86.4
1995-96	75.3	17.5	92.8
1996-97	74.6	24.2	98.8
1997-98	76.1	24.0	100.1
1998-99	81.4	24.1	108.5
1999-00	79.4	23.7	103.1

Source: * *1. "Export Prospects for Electrical Fans, 1974-84", Industrial Researcher, Vol.12, No.2 July 1986. (for 1970-71 & 1980-81).*

2. Statistical Abstract of India (for 1990-91 & 1991-92).

3. "Market & Market Shares", Centre for Monitoring Indian Economy, August 2001 (for 1994-95 to 1999-00).

** *Statistical Abstract of India, several issues.*

Table – 1.2 : Export of Electric Fans from India

Q: in 000's V: in Rs. (Crores)

Year	Table Fan (84145101)*		Ceiling Fan (84145102)		Pedestal Fan (84145103)		Others (841459)	
	Q	V	Q	V	Q	V	Q	V
1995-96	42.4	4.5	426.5	26.8	7.9	1.5	32.4	2.7
1996-97	101.3	10.2	411.6	27.6	9.1	1.7	542.5	41.8
1997-98	73.3	7.8	500.0	33.3	10.5	1.9	50.1	3.9
1998-99	49.4	3.5	638.0	40.4	6.8	1.0	770.0	51.4
1999-00	36.0	3.3	649.7	41.6	4.1	0.7	30.3	3.2

** ITC / HS Code, Q: Quantity, V: Value*

Source: Monthly Statistics of the Foreign Trade of India (Annual Nos. 1995-96, 1996-97, 1997-98, 1998-99, 1999-2000)

1.3 INTERNATIONAL MARKET

Besides meeting the domestic requirements, electric fans are also bring exported from India (table – 1.2). It can be seen that with an export of nearly 6.5 lakh ceiling fans in 1999-2000, the export earning was of the order of Rs.41.6 crores (or an average realisation of Rs.640 per fan). The major destinations for Indian ceiling fans are the Middle East (Bahrain i.e. Kuwait, Oman, Saudi Arabia, Yemen, United Arab Emirates etc.), African countries (Ghana, Egypt, Nigeria etc.), South and South East Asian countries (Sri Lanka, Bangladesh, Singapore etc.), and Italy, United Kingdom and United States of America. Tables 1.3 & 1.4 provide data on imports of table and ceiling fans into India in recent years.

Given the tropical conditions of India, the growing population and the reducing cost of fans (particularly those from the unorganised sector), the demand is expected to grow with a major part of the growth coming from the household sector. The sources of new demand would be household sector, office sector, new buildings and replacement requirements of old fans. The estimated demand for electric fans is shown in table 1.5. With the demand estimated between 11.5 million and 14.9 million over 2001-06, prima facie there appears to be substantial opportunity for new investments, since the production by the industry was only around 10.8 million in 1998-99, with the contribution of organised industry at 8.1 million.

Table – 1.3 : Import of Table Fans by India

From	1997-98		1998-99		1999-2000	
	Quantity (in Nos.)	Value (in Rs. Lakhs)	Quantity (in Nos.)	Value (in Rs. Lakhs)	Quantity (in Nos.)	Value (in Rs. Lakhs)
China Taipei	305	1.17	3184	3.25	9275	13.9
China PR	-	-	420	9.4	12078	49.7
Japan	1463	8.42	700	5.5	200	0.50
Malaysia	-	-	-		72	0.18
Germany	169	1.86	2102	6.7	-	-
Hong Kong	-	-	1344	2.66	-	-
Italy	-	-	43	0.13	-	-
Singapore	105	0.53	498	1.43	-	-
Total	11352	25.82	12040	29.29	22211	70.2

Source: Monthly Statistics of the Foreign Trade of India
(Annual Numbers 1997-98, 1998-99, 1999-2000)

Table – 1.4 : Import of Ceiling Fans by India

From	1997-98		1998-99		1999-2000	
	Quantity (in Nos.)	Value (in Rs. Lakhs)	Quantity (in Nos.)	Value (in Rs. Lakhs)	Quantity (in Nos.)	Value (in Rs. Lakhs)
China Taipei	200	0.62	100	1.11	463	3.5
China PR	-	-	-	-	2688	7.7
Korea RP	-	-	-	-	14	0.24
Nepal	-	-	-	-	14	0.08
Total	200	0.62	103	1.19	3191	11.7

Source: Monthly Statistics of the Foreign Trade of India (Annual Numbers 1997-98, 1998-99, 1999-2000)

Table – 1.5 : Estimated Demand for Electric Fans

(Million Numbers)

Sl. No.	Enduse Industry	Base Year consumption (1997-98)	Anticipated growth rate (%)	2001-02	2002-03	2003-04	2004-05	2005-06
A.	INDIGENOUS DEMAND							
	I. Household Sector							
	1. Estimated Population	971.9	2	1052.0	1673.0	1094.5	1118.4	1138.7
	2. Estimated Families	194.38	--	210.40	214.60	218.90	223.28	227.74
	3. Per capia consumption (No/00 families.	45.68	5	54.84	57.59	60.47	63.49	66.66
	4. Total Population of Electric fans.	88.81	--	115.38	123.59	132.35	141.76	151.81
	5. Estimated Demand per annum.	--	--	7.64	8.21	8.77	9.40	10.05
	II. Non Household Sector							
	1. Total Population	47.82	5	58.13	61.03	64.08	67.29	70.65
	2. Estimated Demand per annum.	--	--	2.94	2.90	3.05	3.21	3.36
	Total Indigenous Demand (I + II).			10.38	11.11	11.82	12.61	13.45
B.	EXPORT DEMAND	--	--	1.15	1.23	1.31	1.40	1.49
C.	TOTAL DEMAND (A+B)	--	--	11.53	12.34	13.13	14.01	14.94

Source: "Electric Fan", Corporate Observer, January-March 2000.

1.4. THE HYDERABAD CLUSTER

The seed for fan industry around Hyderabad was sown by the Jay Engineering Works (JEW) in late sixties with their Usha brand. By 90s, the Kolkata unit of JEW was closed due to labour problems and the Hyderabad unit became the main centre for JEW. Even though during the initial stages, JEW started manufacturing parts and components in-house, gradually the company started outsourcing components to reduce its cost. The other organised sector units, such as Khaitan came up in the 70s around Hyderabad.

Some of these units initially started as suppliers to JEW and with encouragement and support from the company many of their employees also started their own component/service units in order to cater to the needs of Usha. Some of the suppliers to JEW and other component manufacturers from Kolkata also started their units in Hyderabad. A situation of surplus power supply and better infrastructure in Andhra Pradesh as compared to Kolkata further contributed to this process. Finally, a stage came when practically all components were outsourced by Usha and the company itself was only engaging in the assembly line. During peak demand period, Usha even started procuring finished fans, made to their specifications and only branded them with its name.

JEW is responsible for development of fans industry in Hyderabad.

The golden period for JEW was in mid eighties, when its Hyderabad unit peaked with a production of around 75,000 fans per month. With the emergence of other brands from the organised sector, such as Khaitan, Polar etc., this peak came down in few years, leaving the component supplier of Usha with excess capacity. This led to their scouting for new customers. With this, the ceiling fan technology was out in the open in Hyderabad.

Over a period of time, this situation resulted in the emergence of manufacturing units in the un-organised sector as well, each of them manufacturing just one or two components or providing services like machining etc. With units specialising in different components such as CI castings, aluminium die castings, blades, stator, rotor etc., several assembly units also sprang up. This resulted in assembly work becoming almost akin to cottage industry. Many skilled assemblers supplemented their income by assembling 10 to 15 pieces per day on their own and selling them to leading electrical shops. Some of the assembling units graduated to manufacturing some components, assembling, testing and marketing under their brands. Thus, the fan industry in Hyderabad got developed.

2. **INDUSTRY STRUCTURE ANALYSIS**

Hyderabad is considered to be the largest ceiling fan manufacturing centre in the country contributing to 45 to 50% of country's production, of which 30% comes from the SSI units. It is difficult to mention exactly how many units are engaged in the process of making fans here as many of them are unregistered. Most of them open shops only during peak season and then vanish. This number varies from year to year. However, it is estimated that there are about 600 units engaged in manufacturing of fans and its components. They are concentrated in few industrial estates around Balangar, Kukatpally, Jeedimetla, Gandhinagar, Nacharam, Fathenagar, Ferozguda, Musapet, besides a few scattered units in other localities around the twin cities. Many unorganised units are located in a locality called Fathenagar pipe-line road. Most of the areas mentioned above constitute of organised industrial estates developed by the Government of Andhra Pradesh. Except for Nacharam, most of industrial estates are adjacent and lie within a radius of 4 to 5 Kms.

The industry operates in three distinct segments.

a) Large and medium organised units.
b) Organised small scale (SSI) units i.e. registered with DIC
c) Unorganised manufacturers / assemblers.

Of the 600 units engaged in manufacturing of fans and its components, 50% i.e. about 300 of them are manufacturing complete fans while the other 300 are in the business of manufacturing components. It is estimated that about 175 units manufacturing fans are registered with DICs. These can be further classified into big SSIs and medium SSIs.

Big SSI Units

There are about 30 units that can be termed as big SSI units and are well organised with investment ranging from Rs.15 to 25 lacs in plant & machinery. Production in these units is between 75000 fans/year to 1 lakh fans/year. Their turnover ranges from Rs.2 crore to Rs.4 crore per year. Employment in these units vary from 75 to 100 persons. These units manufacture some important components such as blades, sheet metal components and machining of top and bottom covers, die-casting of rotors & machining. They also have better testing facilities for finished products. The relationship between management and workers in these units is good and salaries are prompt and workers welfare is looked after in a proper way.

Medium type SSI Units

There are about 100 medium type SSI units, having investment of Rs.2 lacs to Rs.5 lacs. Production in these varies from 20,000 to 30,000 fans per year with turnover ranging from 60 lacs to 75 lacs. Employment varies

from 10 to 25 persons. The relationship between workers and management here is just ordinary. Hire and fire is frequent. In such type of units, machining top & cover, die casting of rotors etc. are carried out i.e. one or two components are manufactured. They have basic testing facilities.

Assembly Type of Units

The remaining units are assembly type of units. They procure all the components and assemble them. Their investment is only in stocks. Some of them have testing facilities. Few have permanent workers. Employment varies from 3 to 10 persons and the turnover ranges from Rs.5 lacs to Rs.15 lacs per annum.

The total turnover of SSI units is estimated at Rs.220 crore per annum and the estimated employment is around 10,000 persons directly and 50,000 persons indirectly.

Transformation Of SSI Units

Initially, the SSI units started to manufacture the fans by assembling. Some of the units graduated to making one to two components such as stator winding. Earlier it was a manual process, however now it is done by an automatic winding machine. 140 sets can be manufactured on a single machine. Top & bottom covers form important part of the fan. For better efficiency, the gap between rotor and stator should be as less as possible. This means that there has to be less tolerance limit in the covers, which can be achieved by good machining process. So some units started machining of covers by themselves to have control over tolerance limit.

Likewise wherever it was possible to manufacture components in-house, it was started. This increased control over quality and reduced cost. They also added few testing facilities for finished goods. Some even manufactured blades in-house. It is a very specialised line and it is to be seen whether it'll be a viable proposition. Because of the increased competition in ceiling fans, now the units are diversifying into table fans, exhaust fans & pedestal fans.

Sl. No.	Type of SSI unit	No. of units	Invest-ment in Plant & Machinery in lacs	Employ-ment	Turnover/annum in Rs.
1.	SSI Big units	30	15 to 25	75 to 100	2 to 4 crore
2.	SSI Medium type	100	2 to 4	10 to 25	60 to 75 lacs
3.	Assembly type units	170	0.5 to 1	5 to 10	5 lacs to 15 lacs

Table 2.1. Classification of SSI units in Fan industry cluster in Hyderabad

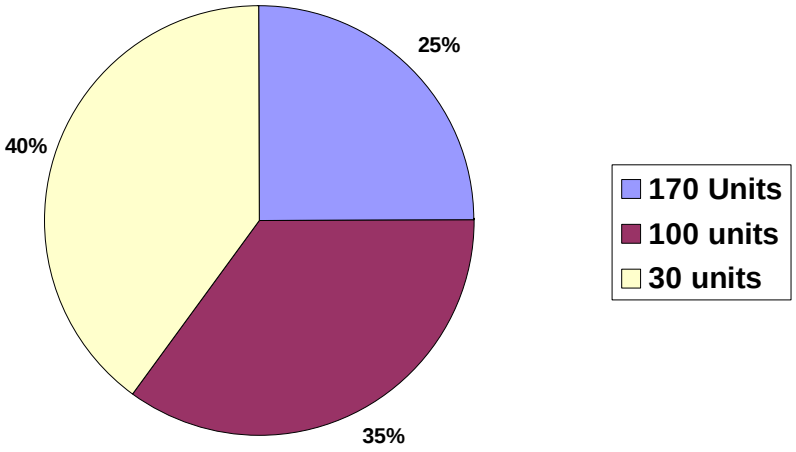

Fig. 2.1: Turnover distribution of SSI units in fan industry cluster, Hyderabad.

3. SUPPORT INSTITUTIONS / ASSOCIATION

There is no industry association in the Hyderabad fan cluster. However, there is the Indian Fan Manufacturers Association located in Delhi. The members of this association are the big industries such as Crompton Greaves, Usha, Bajaj, Khaitan, Orient etc. However, none of the SSI units of Hyderbad fan manufacturers is a member of this association. They are not even member of any other industry associations in Hyderabad, such as Federation of Andhra Pradesh Chambers of Commerce & Industry (FAPCI) or Federation of Andhra Pradesh Small Industry Association (FAPSIA) or local associations.

SISI HYDERABAD

The Small Industries Service Institute, Hyderabad is a field office of Small Industry Development Organisation, New Delhi under the Ministry of SSI, Government of India. This office had rapport with fan industry when it was in the infancy stage. Many units were supported technically and for registration with National Small Industries Corporation for participating in Government Purchase Programmes. A few years back, this institute had prepared a status report on this industry. But over the years, as the industry got developed, they did not seek any help from SISI but now the Institute has now selected the cluster for development and has initiated cluster development work.

NATIONAL SMALL INDUSTRY CORPORATION (NSIC)

NSIC, Hyderabad is serving these industries through SISI. If the SSI units are registered with NSIC, they get some good benefits under the Government Purchase Programme. They need not pay earnest deposit

money when they participate in Government tenders. The NSIC offers other services like hire-purchase schemes, term loans, credit guarantee schemes etc. However, these are not being utilised by the cluster units.

FINANCIAL INSTITUTIONS AND BANKS

Hyderabad, being a well developed city, all the nationalised and commercial banks and financial institutions are present here. The most prominent among them are SIDBI, APSFC, SBI, Andhra Bank, Bank of Baroda, SBH, Corporation Bank etc. However, the linkages of the cluster units with these financial institutions and banks is very weak. The reasons for this situation are trade practices of the industry and lack of proper record maintenance.

EDUCATIONAL, TRAINING and R&D INSTITUTES

There are good engineering colleges, Polytechnics and ITIs in this cluster. No interaction is there between the industry and the institutions. The skills required for assembling of fan or machining is of low level, hence no specialised training is required. Hence, they do not feel the need of a training Institute. The technology that is used is a copied one and in the units do not seek R.D. support either.

DISTRICT INDUSTRY CENTRES (DIC)

These are the field level offices of Commissioner of Industries, Government of Andhra Pradesh, engaged in regulatory and developmental work for industries in general. The interaction of cluster units with DIC is limited to getting registration and availing subsidy, when available.

FIELD TESTING STATION, HYDERABAD

Field Testing Station, Hyderabad is a common testing facility, under SIDO and administrative control of SISI, Hyderabad. It provides services in mechanical testing, chemical and physical testing of material. Recently, it had acquired facilities for testing fan, including air delivery chambers and facilities for testing raw material. These facilities are yet to be used in a wide spread manner by the cluster units.

4. ANALYSIS OF BUSINESS OPERATIONS

4.1 SITUATION MATRIX

Entry barrier	Rivalry
Low	High

Bargaining power of the supplier	Bargaining power of the customer
Low	High

The entry barrier in the cluster is low because anyone can enter the industry with a minimum investment of Rs.30,000 - 50,000 and the inputs are available in plenty. There is no proprietary skills/technology and there is hardly any product differentiation or brand identification in the unorganised sector especially.

Since fan is an electrical item, BIS certification can be made compulsory. This will improve the quality and make it more energy efficient. Brand building & BIS certification can serve as entry barriers.

The rivalry among firms is high in domestic market but is limited in the export markets. Rivalry among firms can be reduced by encouraging non-price competition. Consumers should be educated to buy the product by paying proper duties and to buy quality product by paying a little more extra price if required. Rivalry is moderated by the fact that the exit barrier is also very low.

The bargaining power of the suppliers in the cluster is low and there are a large number of suppliers available in the market. There is hardly any switching cost from one supplier to another and almost no input difference. The bargaining power of the suppliers can be further reduced by forming networks for common bulk purchase.

As far as the bargaining power of the customer is concerned, it was found to be on the higher side. Since there is hardly any product differentiation, the customers switch over from one supplier to another. The switchover cost is also very low. Customers are only price sensitive. This bargaining power of the customer can be reduced by forming consortium and brand building.

4.2 PRODUCT COMPOSITION

A fan consists of down rod that supports and takes the load of the fan and the plastic canopies. The top canopy covers the hanging portion from the roof and the bottom canopy covers the lower hanging portion of down rod. They also provide good appearance. Then there are bearings, top and bottom covers, shaft, rotor, stator and blades. The top & bottom covers are usually made of CI castings or Al castings. The rotor is made of Al die casting. The stator is made of stampings in which copper wire is wound. Stamping is a sheet metal component in which perforations are made to have coil winding inside.

The stampings are made of steel of various grades such as cold rolled non-grained orientation sheet, CRCA (cold rolled coil annealed) and silicon sheets. The cheap variety is CRCA sheets. Shaft is made of mild steel (MS). It supports stator and passes through a bearing in top cover. Blades are made of Al sheets. There are some other parts such as M.S. sheet metal components called shanks that connects blades to the body, locking pins which connect shaft to the down rod and hardware. The canopies are made of plastic, which are injection moulded products.

Products: The various sizes manufactured are 24", 36", 48", 52", 56". 90% of the production is of 48" and 56", 5% of 24" and remaining 5% various sizes. Export requirements only for 56".

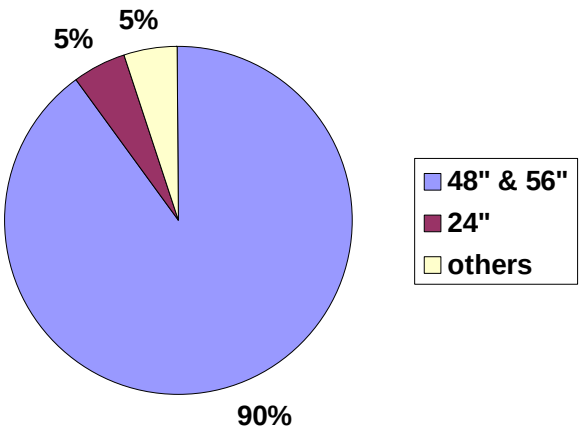

Fig. 3.2: Production of various sizes of fans in SSI units

4.3. RAW MATERIAL / COMPONENTS

The word raw material is a misnomer in the fan industry as it mainly refers to components. Only a few units buy Al. sheets and M.S. sheet as raw material for converting into blades, shanks and other sheet metal components. Various raw materials and components that are used are:

i) Super enamelled copper wire.
ii) Al. sheets.
iii) M.S. sheets.

iv) Top & bottom covers.
v) Stampings.
vi) Bearings.
vii) Al. die casted rotor.
viii) M.S. shaft.
ix) Blades.
x) Down rod.
xi) Canopies.
xii) Sheet metal components.
xiii) Hardware.

Super Enamelled Copper Wire

The Super enamelled copper wire used is of gauge 36 and 37. The Electrolytic grade copper wire rods are used for manufacturing super enamelled winding wire.

Al. Sheet & M.S. Sheet

Alternative material for manufacture of blades is to be explored.

Al. sheet is used for making blades. Reprocessed material and re-rolled sheets are used in this process. The thickness of re-rolled sheet is not uniform and also it is difficult to give it a proper shape which is essential for air delivery. Sheet made from virgin material has uniform thickness and can attain proper shape. The cost of these sheets is high. And thus an alternative material for manufacturing blades is to be explored. Can they be manufactured out of plastic (injection moulded components) or fibre glass?

Re-rolled Al. sheets are available in local market at affordable prices. M.S. sheets are used for making shanks and other sheet metal components. They are also available cheaply in local market.

Top & Bottom Covers

Top & bottom covers are cast iron components. The cast iron used is that of a low grade and hence, the covers cannot have good distribution of material. This is required for better balancing. Here an alternative material for the components is also to be investigated. Sheet metal, plastic & fibre glass can be thought of. There are many foundries in Hyderabad that are manufacturing top & bottom covers at competitive prices.

Stampings

Stampings are also called as laminations. These are made of steel of various grades. The good variety is the silicon steel. Lamination plays a major role in increasing the efficiency of a fan. The power consumption of fan is highly dependent on lamination CRCA (Cold Rolled Coiled Annealed) sheet is used at present for manufacturing of this component. This does not have good electrical properties. It is manufactured in Delhi and is sold here through agents.

The electrical properties of CRCA sheet can be improved by removing its carbon content through de-carbonising process. A common facility should be established for this purpose.

Bearings
Two or one bearing is used in each fan. These are imported from China and are sold here through agents. They are cheap, easily available and are of fairly good quality.

Al. Die Casted Rotor
Few units die-cast their rotor. This is mostly a bought-out or sub-contracted item. Al. used for die-casting is of inferior quality whereas the electrolytic grade (i.e. 99% pure) should be used. This also contributes to the efficiency of the fan. Many small units supply this component.

Shaft
Shaft is made of mild steel. It appears that not much improvement can be made in this product. It is properly machined to the required dimensions. Many units are manufacturing this product in Hyderabad at competitive prices.

Blades

Blades are made of Al. sheets. Good Al. material can give proper shape and angles. Two angles are the most important to judge the profile of a blade. One is a radial angle, which is helpful in sweeping the air and the other is axial angle that spreads the air. Radial angle is 6^0 and the axial angle is 9^0. Many units are manufacturing this component in Hyderabad at competitive prices.

Down Rod
Down rod is a simple component that supports the whole fan. It is usually a M.S. pipe of required length. In inferior quality fans, sheet is rolled into the pipe and welded at certain points. Down rod is also available at affordable prices.

Canopies
Canopies are made of plastic material. They cover the joining portions of a fan and give a good aesthetic view. Again it is available easily and many units are engaged in manufacturing of this component.

Sheet Metal Components And Hardware
Sheet metal components are simple products. They can be manufactured in-house but they are mostly sub-contracted. Hardware used are rivets, nuts/bolts which are available in abundant quantity in the local market.

4.4. MACHINERY & TECHNOLOGY

The machinery used in most of these units are: i) Lathes, ii) Drilling machine, iii) Winding machines, iv) Hand press, v) Grinding machines, vi) Drying ovens and vii) Electronic digital measuring equipments for testing.

Lathes, drilling machines, drying ovens, grinding machine, hand press and measuring equipments are available locally and their maintenance is easy. Skilled personnel for maintenance and operations are also easily available. The only machine which is unique to this industry is coil winding machine. They are made to order by the local technicians and are not required in large numbers. The capacity of each coil winding machine is 140 sets per day. On an average, 4 to 10 machines are used in a unit. There is hardly any maintenance problem with these machines. Sometimes there are problems with counters (to count the number of turns etc) and motor burn-outs that can be easily repaired. On the whole, the industry hardly faces any maintenance or spare parts scarcity.

The technology used in manufacturing is mostly screw-driver technology. M/s.Jay Engineering Works standardised the design of fans of various sizes and a majority of the units are following the same standard design aspects without knowing the real principle behind it. Hardly any unit goes in for R&D work. They wait for new designs to be introduced by big units and then do reverse engineering on those designs, in order to copy them.

There is a need for consultants to develop new products and induce new technology.

Some of the units who want to diversify into table fans, pedestal fans etc. are finding difficulty in developing some components. There is a need for consultants who can develop various components and introduce new technology. There is also a need for intervention on industrial design aspects i.e. improving aesthetic appearance.

4.5. PROCESS OF MANUFACTURING

As tdescribed earlier, the various components of a fan are i) Down rod, ii) Top & bottom covers, iii) Bearings, iv) Stampings, v) Copper wire, vi) Al. die casted rotor, vii) Shaft, viii) Canopy, ix) Blades, x) Sheet metal components, xi) Hardwares, and xii) Capacitor.

A special purpose machine needs to be developed for machining of top & bottom covers and can be used by units as common facility.

The most demanded items are: i) Down rod, ii) Top & bottom covers, iii) Bearings, iv) Stampings, v) Copper wire, vi) Shaft, vii) Canopy, viii) Blades, ix) Sheet metal components and x) Hardware. Some of the units manufacture top & bottom covers in their foundry and blades in sheet metal fabrication shop. Off late they have also started manufacturing of capacitors.

Cast iron top & bottom covers are bought from foundry units and are machined in-house. The various machining operations for top cover are, i)

outside diameter of cover (O.D), ii) Facing, iii) inside dia (I.D), iv) boring operation for fitting bearing, vi) centre drilling for passing shaft & drilling holes on four sides on periphery for clamping it with hardware to bottom cover. The operations for bottom cover are, I) Facing, ii) O.D, iii) I.D. All these operations can be carried out on a single lathe but the production will be very less and hence, they are carried out on different lathes. This saves setting time, but decreases the accuracy and thus the tolerance limit. To increase production level and accuracies a special purpose machine need to be developed which can do various operations in a single go.

A surface plate and better mechanism is to be developed for better balancing of covers.

After machining the covers, they are tested for balancing of mass. This is done to give more life to the bearing. Because of uneven mass, uneven forces develop while the fan is rotating and this leads to stressing of the bearing and ultimately its failure. Usually balancing of covers is done on a frame which supports the cover at the centre. It is slowly rotated and seen whether it rotates in full circle. If it falls back to right or left of centre, then mass is removed from that side by drilling inside of covers. Such type of balancing is not accurate as the surface on which the frame is kept is not on zero level. A surface plate (which provides zero level) and better mechanism has to be developed for better balancing. After balancing, the covers are painted and kept ready for assembly.

Simultaneously, the stampings are stacked in the required number and are riveted. They are then passed to winding section. Here they are mounted on automatic copper-wire winding machine and the required turnings are wound in the slots provided in stampings. This forms the stator. It is then tested for high voltage. In some of the units, grinding operation is carried out to get correct O.D. of the stator. Later threading and looping operation is carried out to make tappings, to which electrical connection is given. The whole assembled piece is then dipped in varnish and dried in oven to provide insulating effect. M.S. shaft is fitted in the stator with the help of hand press. The stator is now ready for assembly. Assembling of fan starts with fitting of die casted rotor in top cover.

The top cover is then fitted with bearing. Stator is fitted to the bottom cover. The top and bottom covers are matched and clamped with hardware. The assembly is hammered with nylon hammer to check whether the stator is touching the rotor and everything sits in proper place. Down rod is fitted to shaft and the assembly is tested for voltage consumption i.e. units of amps it is using and for r.p.m. Few of these are fitted with blades and tested for air delivery. After testing, the assembled body and the down rod are packed in a single carton and the blades in a separate packing. The process of assembly seems little bit clumsy with least quality control. Fitting of bearing in covers, rotor, stator shaft etc. can be improved.

4.6. TESTING FACILITIES / QUALITY CONTROL

Common testing facility is to be established for finished goods and raw materials.

The BIS specifications for fan are given in IS: 374-1979. It talks mainly about power consumption and air delivery. The units have very rudimentary testing facilities like wattage testing, voltage and amperage consumption. None of the SSI units have air delivery testing facilities. This facility is costly and carrying this test requires an exclusive air-delivery chamber and is also time consuming. Raw materials should also be tested. Copper wire should be tested for good enamelling, elongation while winding etc. Blades have to be checked for correct angles. Hence, there is a need for establishing common testing facility.

Employment of quality control inspectors.

The units do not have quality control inspector. A single unit cannot afford to have one. Quality control inspector can check quality when the process is going-on. This can reduce rejection of value added products. One or two inspectors can be employed by 10 to 15 units to do this operation.

4.7. MARKETING

The maximum fans sold are of sizes 48”, 52” and 56”. Hence a majority of the production tends to limit to these sizes only. Marketing of the products seems to be a major weakness of the SSI units. They do not have brand name nor do they advertise. The products are pushed into the market through own distributors or directly to the retail shops. The bigger units have distributors while the others reach the customer through retail shops. They have to depend on dealer or shops to sell their products i.e. they are at the mercy of dealers/shopkeepers. This weakness is exploited by the latter. The amount is not paid to the manufacturer until it is sold.

Further, they sell the products to those who offer them more profit margin. This has led to an unhealthy competition and a decrease in quality. Cheap fans consume more power though there appears no exterior difference. Many customers especially rural population are not aware of power consumption and they end up in paying more on electric bills than the amount they save by buying a cheap quality electric fan. This indicates that the buyer awareness on this aspect is very low.

Larger Manufacturers Have Brand Name

Week marketing set up. Exploited by dealer / shop keeper.

Why not create brand names and form market consortia ?

All major manufacturers of fans have popular brand names such as USHA, Crompton Greaves, Bajaj, Khaitan, Orient etc. They spend crores of rupees on advertisement. They sell through dealers, their own retail outlets, shopkeepers etc. Customers come to the shop and without bargaining pay the price. Of course, their quality and performance is far superior that the local ones. The SSI units in Hyderabad can manufacture good quality fans but cannot sell them at higher price. If consortia are formed, they can create a common brand name and can also afford to advertise. This will also provide opportunity to achieve economies of scale.

Big SSI Units

The big SSI units have dealers in other states. They sell in neighbouring states such as Karnataka, Kerala, Tamilnadu, Maharastra, Madhya Pradesh and to some extent in Utter Pradesh, Bihar and Orissa. Marketing in far off places sets off the competitive edge they have with Delhi and Kolkata units. Some use 'good quality' and some only fancy looks as their unique selling proposition(USP). They also have advantage of less sales tax. Selling to other states attracts 4% tax, whereas if sales take place within Andhra Pradesh the tax 12%. To be competitive in the local market, assemblers and manufacturers often resort to unhealthy practices i.e. selling the products without bills.

Most of the sales take place outside the State. Unhealthy practices by units in marketing the products in A.P. because of higher sale tax within Andhra Pradesh.

Some of the units are indirectly exporting the products to countries like Bahrain, Kuwait, Oman, Saudi Arabia, Yemen, United Arab Emirates (middle East), African countries (Ghana, Egypt, Nigeria, Uganda etc.), European countries like Italy, United Kingdom and also to U.S.A.

Export house arrangement required to export directly

The exports are to the tune of 30 crore per annum. There is a lot of scope to increase exports. Hyderabad fans are competing with Chinese fans in the foreign markets. Due to indirect exports their prices are uncompetitive to Chinese products. The Chinese products sell at $6 to $8 whereas Hyderabad fans sell at $12 to $14. The quality of Indian fan is better compared to Chinese. There are other markets such as Thailand, Singapore, Taiwan, Japan, Australia etc. that need to be explored. Exports from the cluster can be increased by establishing export houses and developing agents at Hyderabad, and by encouraging the cluster units to participate in the International Trade Fairs.

Marketing Set-up Medium, SSI Units & Assemblers

Assemblers and medium size SSI units sell their products in local market called troop bazaar. The business is all clandestine.

4.8 INFRASTRUCTURE FACILITIES

Almost all units are located in Government / private industrial estates. The industrial estates are well developed with good infrastructure facilities. Labour is also available at affordable price. Some of the units provide residential quarters for workers inside the factory itself.

4.9. INTERACTION BETWEEN SSIs & COMPONENT SUPPLIERS

In this cluster, there are five to six groups and the group members interact with each other occasionally but it is doubted whether there is any business related interaction.

No inter-actions between SSIs, suppliers and insti-tutions.

There is hardly any interaction between the SSIs and almost negligible information flow between them. There is always a customer-related insecurity weighing in the minds of the unit owners. This situation is also exploited by dealers. The dealers or shopkeepers takes the goods and do not pay back for a long time. When insisted, they drop the present supplier and do business with other units. A similar situation is there for the component suppliers also. Lower margins and higher taxes are the main reasons for such cut-throat competition. This is also the reason for unhealthy business practice.

Because of unhealthy business practices, the SSI units hardly approach institutions for their interventions and support. Even if institutions want to help, they face a lot of difficulties as there is hardly any information flow in the cluster. The units are not able to get financial help from banks and other financial institutions as there are no proper records of performance maintained by these units.

The skills required to assemble fans is of low order and hence there is no fear of loosing skilled workers. Further, the management hardly feel that there is any need for training their workers. Workers doing machining process possess machining skill. They acquire the skill in ITIs. In a nutshell, there are no inter-linkages between SSIs, institutions and there exists loose connections with suppliers.

4.10. SALES TAX HINDERING GROWTH

The sales tax on these products was increased to 12 per cent recently. As most of the fan industry deals in low value products i.e. ranging from Rs.350 to Rs.450, the increase in sales tax affects the growth of the industry and also leads to unfair practices. In this context, everyone feels that the sales tax should be decreased in order to make the products competitive to ensure the survival of the cluster.

There were vehement complains about the harassment by the sales tax department. The excise duty does not affect them as they get back some amount through MODVAT system. There are no complaints about excise duty and also there is no harassment from the excise department. If intervention on sales tax is done, the industry will grow many folds and this would contribute to healthy practices and an increased revenue to the State Government.

5. VALUE CHAIN ANALYSIS

The Fig.4 depicts the degree of value addition at each stage of processing. The prices indicated here are for good quality material except for regulator, canopies and other such items. The value chain analysis is for 48” size ceiling fan. As can be seen from the figure, the two main processes take place simultaneously in most of the industries.

	In Rupees
Silicon stampings required for manufacturing 48” size ceiling fan is about 1.1 kg. @ 45/kg.	49.50
Copper wire required for winding is about 335 gm @ 190/kg.	63.50
The labour cost of stacking & winding.	1.00
The cost of grinding stator, dipping in varnish & drying.	1.50
Labour cost of looping & fitting shaft.	1.00
Cost of shaft	8.50
Cost of C.I. top & bottom covers. Weight of each cover is 1.2 kgs. @ 22/ kgs.	52.80
Cost of machining of covers	6.00
Labour cost of balancing of covers.	1.00
Labour cost & raw material of painting of covers.	6.00
Cost of bearings.	30.00
Cost of rotor	8.50
Cost of regulator	18.00
Cost of canopies	8.00
Cost of capacitor	9.00
Cost of blades	50.00
Cost of packaging	20.00

Labour charges for assembling and testing	3.00
Production cost of 48” size ceiling fan.	374.30
Adding 10% profit margin.	37.00
Manufacturing sale price.	410.00
Excise duty @ 16% Sales Tax @ 12%, transportation 10%, profit margin for dealer which approximately may work out to.	150.00
A good fan may cost	**550.00**

6. SWOT ANALYSIS

STRENGTHS:

- Location of the cluster in a well developed city with all infrastructural facilities.
- Presence of a large number of component suppliers within the cluster.
- Good scope for capacity enhancement of the units with minimum additional investments.
- Adaptability of the units to technology improvements and market needs.

WEAKNESSES:

- Price sensitive customer base.
- Low quality of products.
- Unhealthy trade practices and competition.
- Technology copied from large scale units. No R&D efforts by SSI units.
- Lack of adequate testing facilities either within the SSI units or with any common facility centre.
- No linkages with financial institutions and banks. Current trade practices are a hindrance for availing institutional finance and credit facilities.
- Weak business and other linkages among the cluster units and absence of industry associations.
- Lack of institutional support and weak linkages of the industry with support institutions.
- Dependence on middle-men/agents for exports.

OPPORTUNITIES:

- Growing demand, both in domestic and export markets.
- Scope for enhancing exports to middle-east and African countries.
- Creation of brand names and brand reputation.
- Scope for improvement and specialisation of some processes.
- Scope for exporting decorative fans to Europe and U.S. markets.
- Good scope for product design for introduction of new features in the fans.
- Reduction of energy consumption levels of fan while in use.

THREATS:

- Emergence of China as a competitor with improved product quality.
- Competition from other clusters located in neighbouring countries, especially for exports.
- Growing prices of raw materials and components resulting in reduced margins.
- Low entry and exit barriers making it convenient for fly-by-night operators.

7. **VISION STATEMENT**

The fan industry cluster is operating in a market segment, where the price sensitivity of the customer is high and the awareness level on the quality aspects of the products is rather low. This has led the cluster units to manufacture low priced products and compromise on quality. This is also limiting the capacity of the units.

These are unhealthy competitions and business transactions in the cluster. The export opportunities that are available are not tapped much and the current exports are through middlemen.

There are weak business linkages among the units. There are no linkages with support institutions e.g. financial institutions and banks even though the cluster is located in a well developed city.

In order to address the above aspects and set the cluster on a growth graph, the cluster should have the following vision.

“To become a vibrant cluster that is manufacturing quality fans at reasonable prices, achieving export-led growth and popularising the cluster by serving the needs of both the domestic as well as the international customers.”

8. ACTION PLAN

8.1 STRATEGY & INTERVENTIONS

The strategy for development of Hyderabad Industry is grouped into 6 main areas.

1. Formation & strengthening of association.
2. Capacity building of units.
3. Developing business development service providers.
4. Marketing
5. Quality improvement of the product.
6. Addressing issues of Sales Tax.

1- Formation & Strengthening of Association

Fan industry had an association in the past, whose main activity was to deal with the various Government departments. It stopped functioning due to differences among units. There is a need for formation of association with broader activities. The main activities of association should be :

i) Educating consumers on quality products.
ii) Educating consumers on proper billing receipts.
iii) Educating units on Government rules regarding excise, sales tax, factories act, labour laws etc.
iv) Development activities such as participating in international trade fair, organising national, international trade fair, participating in big government tenders, providing technological inputs etc.

The above activities and other need-based activities such as organising energy conservation programmes, waste minimisation programme, productivity improvement, material management etc. will strengthen the association.

2- Capacity Building of the Units

The capacity building of units can be achieved by forming networks among cluster actors. This at present is very limited. Only when the entrepreneurs face pressing problems, do they interact in groups. This may be due to the fear that technology will be replicated or customers will be taken away. A marketing consortium can be formed so that they can have a common brand name and advertise it.

They can jointly market their product in the global market by forming export house. They can achieve the economies of scale and compete with the Chinese/Korean manufacturers in international market. The units in cluster can go for ISO and BIS certification. They can employ a common quality inspector to check the quality of products while it is being manufactured. They can explore the possibilities of tying with M/s Godrej or M/s Phillips for marketing of fans under brand name of Godrej or Philips.

3- Developing Business Services

A scope in improvement of process of manufacturing or technology exists but there are no technical training or R&D institutes in the cluster. The technology in the process of manufacturing is not changing as fast as it should. Moreover there are no consultants/experts, who can guide them in international marketing, export procedures, documentation etc. Therefore, business development services have to be developed in the cluster. Establishment of common testing facilities for testing finished goods/raw material, common machining facility & common facility for decreasing carbon content in C.R.C.A. also form a part of this.

4- Marketing & Export Marketing

As already discussed, a marketing consortia has to be formed with a common brand that will help in fetching a good price. A website for the cluster should be created that can further help to increase market. Also export house is to be established solely for exporting cluster products.

5- Quality Improvement and R&D Facilities

This may be one of the most important activities of the project. The various activities include: i) improvement in the process of manufacturing, ii) improvement in stamping / lamination material, iii) use of a good regulator, iv) use of a good quality copper wire, v) use of an electrolytic material for die-casting of rotor. Establishing of R&D centre for improving the technology and introducing new products.

Based on the above analysis, the following interventions are required for development of fan cluster.

8.2. OTHER INTERVENTIONS

1. Development of dies for developing table fans.
2. Alternative material for top and bottom covers and for blades needs to be investigated.
3. Establishment of export houses/formation of marketing consortia.
4. Advice on product design.
5. Improvement in packaging.
6. Establishment of common facility of special purpose machine for machining of covers.
7. Bringing improvement in the process of manufacturing and assembling process (Focusing on balancing of covers, manufacturing blades and assembling process).
8. Increase of institutional finance and other services.
9. Quality certification such as ISO and BIS.
10. Registration of units with NSIC to increase their participation in Government purchase.

11. Increase in institutional sales.
12. Employment of common quality inspector.
13. Improvement in stamping / lamination material (use of cheaper material, but with good electrical properties).
14. Establishment of common testing facility for finished product and raw-materials.
15. Explore the possibilities of tying-up with Godrej or Phillips who are in business of electrical appliances but do not have this product.
16. Rationalisation of sales tax.
17. Formation and strengthening of associations.
18. Improving the quality of regulator.

9. PRESENT CLUSTER MAP

SISI SIDBI NSIC CITD FTS