Management Case

describes a situation faced, a decision or action taken by an individual manager or by an organization at the strategic, functional or operational lewis.

Amtrex Hitachi Appliances Limited: Competing for the Future

Anand Sridharan and N Ravichandran

The case featured in this issue presents the history and managerial initiatives of a rapidly growing organization in the consumer durable industry. The industry is characterized by the presence of several competing (national/multinational) players, changing consumer need and preferences, and MNC's access to national market. The Organization needs to take stock of what it has achieved so far, what needs to be done, and how?

Anand Sridharan is a PGP (1999-2001) student of the Indian Institute of Management, Ahmedabad.

N Ravichandran is a member of the faculty in the Production and Quantitative Methods Area of the Indian Institute of Management, Ahmedabad. e-maiL- aTavi@iimahd.ernet.in

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Amtrex Hitachi Appliances Limited (AHAL) — the comparty which specialized in air-conditioners - kicked off the implementation of Oracle III ERF package on 6th December 2000. This was the latest in a series of measures that AHAL had initiated in the last few years to enhance its competitiveness in the fast changing Indian marketing environment The earlier efforts included an ERP implementation, Business Process Re-engineering, and rapid new product development initiatives. While each of these efforts had resulted in operational improvements, it was unclear to the management whether they fitted into a single overai competitive strategy of AHAL.

In recent years, AHAL's sales had increased rapidly (without any increase in employee head-count), while profits in absolute terms remained stagnant. Though AHAL had retained its market share in the rapidly growing market, new entrants like LG and Samsung had quickly emerged as market leaders.

The Company

Amtrex was promoted in 1982 by Mr Naishadh Parikh and Mr Sanjay Lalbhai of the Lalbhai group, and it commenced commercial operations in 1984. The company was listed publicly under the name of Amtrex Appliances Limited in 1990. The promoters had 33 per cent equity and the rest was held by the public. Exhibit 1 traces the significant events in Amtrex's history. The Lalbhai group was founded in 1908 by the three Lalbhai brothers - Kasturbhai, Narottambhai, and Chimanbhai. It had grown to become one of India's diversified business houses, with a presence in textiles, seady-to-wear garments, agrochemicals, finance, air-conditioners, and telecom. The group employed about 20,000 people and had a combined annual turnover of Rs 2000 crore in 1999-2000.

Amtrex had a manufacturing plant at Kadd$_v$' in Gujarat, with an annual installed capacity of 18,000 air-conditioners. Since its inception, AAL had a technical collaboration with Hitachi of Japan for

'Kadi is an industrial estate approximately 50 km from Ahmedabad, the commercial capital of Gujarat state.

designs and drawings of air-conditioners (See Exhibit 2 for company profile). In December 1998, AAL formalized a joint venture with Hitachi, and the new company was named Amtrex Hitachi Appliances Limited (AHAL).

In March 2001, AHAL had an employee strength of 450. Of these, 400 people were in the air-conditioning business and 50 in the commercial refrigeration business. The air-conditioning department, in turn, had 200 employees in the field (sales and distribution), 150 employees in the three factories at Kadi, Silvassa,[2] and Changodar, and 50 employees at their head office in Ahmedabad.

In 1999-2000, AHAL's revenue was Rs 181 crore against the other group companies of Lalbhai: Arvind Mills Limited's Rs 1216 crore and Atul Product Limited's Rs 568 crore.

Amtrex in the Ninteties

In February 1991, AHAL appointed Arvind Nair, a post-graduate ih management from the Indian Institute of Management Ahmedabad, as its Chief Executive Officer (CEO). Arvind Nair was viewed by the management as a creative person. He played a key role in shaping the culture and growth prospects of the company.

Amtrex had factories at three locations, Silvassa, K%di, and Changodar. Kadi assembled the kits for air-conditioner manufacture while Changodar made the kits for the Commercial Refrigeration (CR) business. The Silvassa factory performed the final assembly for both the air-conditioner and the CR businesses. The company had National Logistics Centres at Madras and Pondicherry[3] to coordinate imports of traded items, specifically from Hitachi.

In January 1994, Amtrex commissioned a manufacturing plant at Silvassa. In March 1995, the total installed capacity of Amtrex was 50,000 air-conditioners per year (on a two-shift basis). In March 1996, the installed capacity was increased to 100,000 air-conditioners per year (on a two-shift basis).

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Amtrex manufactured a complete range of products consisting of window, split, ceiling, ducted, and packaged air-conditioning units. These units were sold under both the Amtrex and the Hitachi brand names. In 1991, Amtrex introduced the Shizuka range of window air-conditioners. With this, Amtrex was the first company in India to introduce window air-conditioners with a left-hand throw (earlier American models were top-throw). Amtrex was also a pioneer in introducing wall-mounted split air-conditioners in India. Earlier, split air-conditioners were either ceiling or floor mounted.

In the CR business, Amtrex manufactured coolers for holding cool drinks, beer, juice, and other beverages. It had a tie-up with Oxford Refrigeration of Australia for making visicoolers and bottle coolers. While this business represented a small portion of the company's 1999-2000 revenues, it was considered to be a high-growth segment.

Performance

Until 1993, the company registered a (low) turnover from Rs 7 crore in 90-91 to Rs 11 crore in 91-92 and Rs 15 crore in 92-93. Since the commissioning of its Silvassa plant in 1995, the company's sales grew rapidly. The revenue growth of AHAL is shown in Exhibit 3 and the detailed financial statements are shown in Exhibits 4 and 5. The company saw an annual revenue growth of 19.3 per cent over the last three years (1997-1999), and reported a revenue of over Rs 181 crore in 1999-2000.

Since the air-conditioner market is seasonal, most of the sales happened during March to June. The production was also seasonal and usually followed sales. The installed capacity was fully utilized in peak months and consequently all air-conditioner companies had lower capacity utilization in lean months.

Hitachi Collaboration

Amtrex has had a tie-up with Hitachi since its inception. The extent and scope of the tie-up has increased over the years. Till 1995, Hitachi provided only designs and drawings. After Amtrex's persuasion to strengthen *the* collaboration, Hitachi agreed to Amtrex using Hitachi brand (from 1997) without any royalty from Amtrex. In the 1998 season, the Amtrex-Hitachi brand of air-conditioners was launched.

Hitachi's only foray into the Indian market was in air-conditioners. In 1998, Hitachi sent a feasibility study team to evaluate a possible joint venture with Amtrex and appointed Coopers-Lybrand to do due diligence. Following this, a joint venture agreement was signed in January 1999, with Amtrex and Hitachi as equal partners, each holding a 35.2 per cent share of the equity.[4] Amtrex was then renamed as Amtrex Hitachi Appliances Limited (AHAL).

Following the joint venture, the governing board

[1] Silvassa is an industrial estate complex located approximately 150 km away from Bombay towards Ahmedabad.

[3] A union territory location situated about 150 km south of Madras.

* In 1995, a poor response to a rights issue forced the Lalbhai group to increase their shareholding in Amtrex to 54 per cent When the joint venture was signed, Hitachi matched the 54 per cent equity, leaving each with 54/154 or 35.2 per cent of the equity.

was reconstituted with three Amtrex members and three Hitachi members (representing products, design, and quality). Amtrex was responsible for marketing, finance, and human resources. Sanjay Lalbhai was the Chairman, Naishadh Parikh was the Managing Director, and a Joint Managing Director (JM'D) was named from Hitachi. In addition to the three board members, Hitachi assigned specialists to assist in product engineering, design, and quality assurance. Training programmes with exchange of personnel were commenced. Amtrex's manufacturing facility in Gujarat was approved by Hitachi and this was Hitachi's seventh manufacturing facility worldwide. The JMD from Hitachi assumed a line function with responsibility over the supply chain.

Compared to other multinationals like LG and Samsung, Hitachi had been cautious in its business ventures in India. It had not pumped in capital the way some of these competitors had. It was unclear whether Hitachi would become a more active partner in future and help AHAL face stiff competition in India.

Organization

Till late 2000, AHAL was structured along functional lines, as shown in Exhibit 6. The different divisions of the company were the customer service chain, supply chain, shareholder service chain, innovation chain, and human resources chain. The head of each of these chains reported to the CEO.

The customer service chain handled marketing, sales, and distribution functions. The teams were spread across the head office, regional, and branch offices. At the head office, there were product specific teams coordinating the sales and marketing of different products. The sales teams in the branches handled the entire range of products for that geographic region.

The supply chain was in charge of production and supply logistics related to sourcing of components and vendor management. The chain managed the operations in three factories at Silvassa, Kadi, and Changodar. The shareholder service chain covered corporate functions including legal, IT, accounting, and management services. The shareholder service chain was located entirely at the head office. The innovation chain had responsibilities for development of new products and designs. The human resource chain dealt with recruitment, compensation, performance evaluation, and retention issues.

Human Resources

AHAL had four levels of hierarchy within its organization - officer, executive, manager, and head. The officer level included support staff such as secretaries and administrative staff. A fresh graduate in engineering, accounting or management joined AHAL at the executive level. Employees stayed at the executive level for one to five years (including one year as a trainee) before moving on to the manager level. At the manager level, employees were expected to handle process teams. After five to ten years with the company, employees were promoted to the department head level. There were gradations within the department head level like the manufacturing head reporting to the head of the overall supply chain.

All new recruits underwent an initial exposure training that comprised both functional skills and overall management concepts. In the last few years, the company had experienced a high turnover of employees. The company also undertook dealer development initiatives, where the dealers were trained on customer service, product quality, and new product features.

AHAL's human resources strategy was aimed at identifying and rewarding performance, as measured by tangible customer benefit.

Performance-linked pay formed about 10-12 per cent of the cost to the company. At senior levels, there was flexibility in the way the salary was structured to reflect the preferences of the employees. There were different pay levels within the same level of hierarchy based on their experience and contribution to the company. Essentially, each employee had two levels and pay-grade. The human resources department had introduced schemes like Reward for Customer Orientation (RECO), where individuals and teams were rated by their peers on an annual basis. AHAL had approved an employee stock option plan (ESOS) in 2000 that was to be implemented.

Marketing

AHAL's marketing department had six employees, equally divided between retail and commercial customers. Marketing was a centralized function and operated out of the head office. The marketing department was closely involved in identifying customer needs, new product identification and development, pricing, advertising, sales promotion, and brand management. The department periodically commissioned market research studies to keep track of changing customer preferences.

The marketing department provided support for both Amtrex and Hitachi brands. Amtrex was mainly aimed at government customers and entry-level retail consumers. Hitachi was positioned as a premium brand, aimed at the upper middle-class and the rich and wealthy. Hitachi's positioning was on the lines of 'for those who seek perfection.'

AHAL's marketing strategy had evolved over time. In the early 1990s, the company had competed only on the Amtrex brand name against other Indian manufacturers and assemblers. During this stage, the competition was limited. AHAL's product positioning was one of being a branded, reliable air-conditioning. As the company's relationship with Hitachi strengthened, AHAL moved towards the hybrid brand name of Amtrex-Hitachi, and supported it with a wide range of products and models. Since 1999, the Amtrex and Hitachi jrange. of jjroducts have been separated with Hitachi being positioned as a premium brand with superior quality.

Distribution

AHAL's distribution network system consisted of five regional offices and 13 branch offices. The structure was hierarchical with the branch offices relaying requests for order shipment, forecasts, and delivery acknowledgements through the regional offices. Every marketing department employee handled the sales of multiple brands - both Amtrex and Hitachi. The (same) dealers focused on sales to both retail and commercial market segments.

Nearly 85 per cent of products were shipped directly from the Silvassa assembly plant to the customer's residencfe Such shipments were exempt from sales tax. The remaining 15 per cent were shipped through a combination of retailers, dealers, and distributors to the end-consumer. The after-sales service function was separated from sales. A different set of employees managed after-sales service.

The regional office handled the price and credit decisions, accounts receivables, payments, and monitoring of shipments. The accounting function was done at the regional offices. The customer administration department at the regional office was responsible for orier verification (on price, credit, delivery, discounts, etc.) and comntunicating checked orders to the factory for assembly and delivery.

The branch office was headed by a branch manager and had separate territorial managers responsible for sales and service. The branch office had no authority over cash handling or credit and product pricing decisions. There was no signatory authority at the branch office. The primary responsibility of branches was generating orders and managing after-sales service. The branch offices in small markets like Bhopal and Udaipur were one-man operations.

Order Processing Cycle

The order processing cycle consisted of the following steps (Exhibit 7).

- The salesman, who was attached to a specific branch office, collected order from a dealer or a retailer. The order was entered in an Order Receipt Form. The salesman also collected documents related to local tax and octroi, road permits, payment terms, quality and feature (product) specifications, and delivery and installation parameters. (All orders were associated with a specific dealer, including direct orders from consumers.)
- The branch office relayed the order by courier to the respective regional office.
- Order was checked for two kinds of validity:
  * Price validity: Deviations from standard price (list) had to be approved by the regional manager or the product head at the head office.
  « Credit validity: Depending on the credit limit of the dealer, the order had to be approved either by the Credit Controller or the Head of Treasury and Taxation.
- Order was entered into the ERP system by the Order-To-Receipt (OTR) incharge executive.
- The orders were accumulated and sent to the factory by e-mail on a daily basis. At the end of the month or other times when the number of orders was high, the transfer was done several times a day. A hard copy was also sent by courier to the factory. In most cases, the factory did not process the order until the hard copy was received.
- The factory prepared the invoice directly in the customer's name in order to take advantage of sales tax benefits of being located in Silvassa. The desired units were then manufactured. The invoices were e-mailed back to regional office on a daily basis. A hard copy of the invoice was sent by courier to the regional office.
- The factory shipped the order out to the consumer using a pre-approved transporter. AHAL had an assigned transporter for each region. The transporter collected the payment on behalf of AHAL as well.
- The payment was sent back to the regional office. The regional office then updated the accounts receivable and credit status in its ERP system.

Market Characteristics

The Indian air-conditioning market, as it evolved during 1995-2000, was characterized by:

- *High growth:* Lower penetration levels, tropical climate, a rapidly growing middle-class with high disposable income resulting from industrial growth have made air-conditioners a high-growth segment in India. In 1999-2000, the Indian air-conditioning market was estimated to be Rs 1150 crore,[5] with a SaU of 550,000 units. The market was expected to' grow at 20-25 per cent annually for the next five years.
- *High-end among white goods .Among* consumers, air-conditioners had the lowest priority within white goods due to seasonally of its use and high operating (power) 'expenses. Consumers often purchased cars before deciding to go in for an air-conditioner. A typical sequence being two-wheelers, refrigerator, kitchen appliances, motor car, and air-conditioners.
- *Demand profile:* The institutional demand during 1995*2000 was higher than the household demand (4:1} and the latter had a much higher growth rate. In 19&9-2000, the household air-conditioner demand grew 'at over 50 per cent.
- *Hutation:* The Government of India viewed (until 1992} air-conditioners as a luxury (consumer) prod uct and levied prohibitively high excise taxes on them. This had resulted in a thriving unorganized sector that assembled air-conditioners without pay ing taxes and could sell them at lower prices. The tax rate had climbed down from over 100 per cent in 1992 to 32 per cent in 1999, enabling the organized sector to be more price-competitive in recent years.
- *Ligtotta:* .Air-conditioner assemblers were able to save 16 5 per cent sales tax by locating their factories in selected geographic areas (like Silvassa) and j (fee- products directly to the consumer from •factories. This resulted in complicated logistics, with blants being located in remote areas characterized by poor infrastructure logistics and most ciders being shipped individually to the customer location (residence).

With rationalization of tax rates and economic liberalization, several multinational players like Carrier, Hitachi, LG, and Samsung had entered the Indian air-conditioner market. These players usually brought in superior technology supported by internationally well-known brands to the Indian market. Other industry players included the Indian branded air-conditioner manufacturers and several unorganized players (with regional focus).

Initiatives to Enhance Competitiveness

During 1991-1998, Arvind Nair took the company through a range of management initiatives in order to face stiff competition in the Indian air-conditioner market. These included changes to instil, operational effectiveness like Just-in-Time (JIT) and Total Quality Management (TQM) (100% OK goal), and company-wide cross-functional efforts including Business Process Re-engineering (BPR) and Enterprise Resource Planning (ERP) implementation.

Total Quality Management

AAL initiated a TQM programme in 1996 following recommendations by Eicher Consultancy Services.[6] Prior to the TQM programme, die company bad a Zero-Defect-Machine (ZDM) initia tive. It used to test machines at the customer-end for quality. Based on certain sequence of checks, an air-conditioner was certified to be ZDM (if it passed all checks). From a mere 18 per cent ZDM in 1992-93, the company improved to over 90 per cent ZDM by 1995. However, the company felt that the ZDM was more reactive than proactive and did not fundamentally improve the quality of the manufacturing process. It viewed TQM as the way to reach 100 per cent ZDM, while ensuring that defects that were identified were completely eliminated at the manufacturing stage itself. In addition, the year 1995 had a hot summer, and the company experienced significant sales growth.

The facets of the TQM programme as implemented in AAL are:

- *Just-in-Time (JIT) Production System.* The company began implementing JIT in 1996. The implementation commenced with education and training for its employees and vendors. The system's benefits and scope were limited by infrastructure bottlenecks like delivery times variations for components that used road transportation as a mode of delivery. Within these limits, the company made an effort to have vendors deliver JIT with minimum safety stock at the assembly plant. It conducted weekly meetings with vendors (every Tuesday) to decide day-wise delivery details (model, component, and quantity). It had brought several vendors within a 5 km radius of its Kadi factory. In addition, vendors located as

1 crore » 10 million and 1 US$ = Rs 45.

[6] A well-known Indian consulting firm working as a part of Eicher group.

far away as Faridabad and Mumbai also delivered on JIT basis with reduced safety stock at the plants.

- *Kanban System:* The company initiated a system of using Kanban cards to ensure smooth flow of material from one operation to another in the assembly plants, while keeping inventory levels (both WIP ijnd RM) under control.
- *Direct-on-Line (DOL) Vendors:* The company up graded several of its vendors towards self-certifica tion using its DOL initiative. Under DOL, a vendor directly delivered to the shop floor without quality inspection at the material receipt stores. These DOL vendors worked closely with the company and allowed it to monitor and certify their (vendor) manufacturing processes, facilities, and equipment. DOL Certification was awarded depending on past performance and potential of, the vendors.
- *Vendor Rationalization:* Along with its JIT delivery and D^OL, the company reduced the number of vendors it had for each of its components and developed stronger relationships with retained ven dors. Jn 2000, the company was down to two to three Vendors for each of its critical components like compressors, motors, steel, and aluminum.
- *Ktuzet (Continuous Improvement):* IB order to involve a wider representation of employees in its TQM programme, the company encouraged its employees to come up with (Kaizen) suggestions that were subsequently implemented. During 1996-97, over 1!!00 Kaizens were suggested and implemented. Most of these were small ideas of improvement that were treated as Kaizen so as to encourage employee participation. Subsequently, the number of Kaizens had reduced to 100 per year, blit each of these was an improvement that had greater scope.

As '*. result of the TQM programme, both productivity and quality levels increased. The rejection rate of components declined from 20-25 per cent levels to near zero levels. Compressor failure rate in the field reduced from 3.5 per cent to 0.1 per cent. Compressor inventory levels were fewer than three days production requirements, down from 10-15 days (the compressor formed 45% of the ai.r-conditioner cost). Productivity was measured in terms of Man-Days per Unit (MDU). In the peak season, the company required 0.2-0.25 MDU, down from 2 MDU bejfore TQM.

More than these quantifiable benefits, there were several other learnings to the company that had accrued from TQM implementation:

- *Data-based management.* Employees had developed a mindset towards substantiating any conclusion with data.
- *Root-causing:* Employees regularly used Pareto analysis and fish-bone diagrams in analysing prob lems and identifying solutions. The focus usually changed to identifying the root-cause and imple menting a long-term solution rather than a quick-fix.
- *Employee empowerment:* With Kaizen, employees were more involved in ensuring product quality. A few employees started their own manufacturing facilities that supplied components to the company. The company encouraged such initiatives.
- *Radical thinking:* The company was able to set and work towards ambitious goals like doubling volume with the same employee strength, and moving to plastic bodies (material substitute) for air-condition ers. Earlier, the company was much more hesitant in setting stretched goals.

The TQM programme had a long way to go in terms of scope and content. The company did not compare itself to Hitachi world-wide in terms of quality, since the gap was significantly large. Low local skill levels and poor transport infrastructure had limited the effectiveness of the programmes. The operations themselves had not been de-skilled ad-equately and, therefore, still depended heavily on a few skilled workers.

Team of Accelerated Innovation (TAI)

After the rapid sales growth during the hot summer months of 1995, the company performed a competitor analysis to determine how it should sustain its growth in volume. Based on a study of its competitors (Voltas, Carrier, and BlueStar), the company determined that none of them had a strong New Product Development (NPD) capability. It then decided to focus on its own NPD efforts with the aim of getting a sustainable competitive advantage by a rapid product development process.

Inspired by 3M, the company had set itself ambitious goals of achieving 30 per cent sales in any year from new models introduced that year. The company also aimed to bring out a breakthrough product once in every two years. In 1996, the company started its Team of Accelerated Innovation (TAI) initiative. TAI consisted of three phases - idea to concept finalization, prototype to test launch, and launch to customer satisfaction. TAI aimed to reduce the time taken for each of these phases through concurrent engineering. Cross-functional teams were

created and engineers were encouraged to work with marketing team members to understand customer *needs* better and faster. In parallel, the company also attempted to develop skills in electronics and model development.

The company realized substantial benefits from this exercise, with new products accounting for 24.3 per cent of sales in 1999, up from 8.8 per cent in 1996. There were clear improvements in the number of models introduced and the cycle time needed for product development and launch. The number of new models introduced had increased from 12 during. 1996-97 to 15 during 1998-99. The cycle time from idea to commercial launch for window air-conditioners bad reduced from nine months in 1996-97 to six and a half months in 1998-99. The company also developed a new type of detachable easy-to-clean air-conditioner grill that was a first in India.

The NPD efforts in the company were limited by the lack of R&D on window air-conditioners by Hitachi. Hitachi and other global air-conditioner manufacturers focused more on split air-conditioners in recent years. AHAL was also yet to fully understand the cooling cycle and was dependent on Hitachi for know-how on refrigeration. The translation of customer requirements to design specifications was usually done in an *ad-hoc* manner. The company planned, to use techniques such as Quality Function Deployment (QFD) to facilitate customer preference solicitation process. The main constraint was non-availability of trained industrial designer (s).

ERP Implementation (1995-1998)

Trigger

In 1994, the company made a decision to go in for an ERP solution. In its evaluation of an off-the-shelf ERP solution vis-a-vis a customized application software, the ERP had the advantages of providing international work practices, reduced software development time, a tried and tested solution, and seamless integration among functional applications. The company commissioned its second manufacturing plant at Silvassain 1994 and needed to coordinate the operations of their two plants better with the head office. Further, the reduction in excise duty made the air-conditioner market move attractive for other players (mainly assemblers) and the company needed to stay competitive.

Based on a consultant's recommendations, the company opted for Ramco's[7] Marshal ERP system. The considerations for the selection of Ramco Marshal were the cost and the 'Indianization' of the product. The initial pilot phase of the implementation process lasted from April 1995 to March 1996 and the main phase lasted from April 1996 to March 1998. The implementation was done at the head office, regional offices, and factories at Kadi, Silvassa, and Changodar (Table 1).

The functions covered by the ERP solution included general ledger, accounts receivable and payable management, inventory management, payroll, sales order, and purchase order management. The company closed its 1996-97 and 1997-98 financial years through Marshal.

In terms of the implementation process, steering committees were formed at each location, and user champions and IT coordinators were nominated for each function. The ERP implementation itself was done in parallel with a BPR exercise from April 1995 to March 1996.

Limitations

The company experienced varying success in its ERP implementation. While sales order management and accounts receivable management implementation at Silvassa and the regional offices was .successful, it was less successful at Kadi. The company felt that the success level of an application was greater when the change and implementation were user-driven rather than management-driven. The requisite operational skills with the workforce facilitated die implementation.

Further, the Ramco Marshal ERP implementation was a multi-server implementation. The data at one location were unavailable to other locations on real-time. Data had to be synchronized manually through exchange of e-mails across the locations. This resulted in separate databases in head office, factory,

Table 1: ERP Implementation (Modules and Locations)

Modules	*Head Office*	*Kadi*	*Silvassa*	*Changodar*	*Regional Offices*
General Ledger	√	√	√	√	√
Accounts Receivable	√	√	√	√	√
Sales Order		√	√		
Purchase Order		√	√		
Accounts Payable	√	√	√	√	
Inventory		√	√		
Payroll	√	√			

[7] A leading Indian ERP software company.

and regional office(s) with no systematic communication between them. There was batch processing and manual intervention in ensuring that data were shared across locations.

Benefits

In conjunction with the BPR effort, the ERP implementation reduced the order processing time from seven days to two days and reduced finished goods inventory by 20 per cent. The company was able to achieve a three-fold growth in sales, while maintaining the same number of (marketing) support staff. Another indirect benefit of the earlier ERP implementation was improvement in the computing infrastructure of the company. The company had a PC manpower ratio of 1:2.5 and an e-mail ID:manpower ratio of 1:2. The ERP implementation led to greater uniformity and consistency in work practices.

The company realized the need for detailed documentation *of" procedures* at the outset itself. The ERP software itself was not very robust. It felt that active involvement by the ERP consultant was important to the success of the programme, though this was an expensive option. The company also felt that customization of the ERP solution by departments was counter-productive, which reduced the compatibility across departments.

ERP Upgrade

On 6th December 2000, AHAL kicked off the implementation of its new ERP system - Oracle Applications III, with Price Waterhouse Coopers as its implementation consultant. The driver for the upgrade was the inadequacy of the earlier system to meet the business needs of AHAL. The multiple server system prevented real-time sharing of data and hindered faster response to customers. The Ramco system also did not allow Internet as a medium of data transfer. Further, the Ramco system did not connect the branch offices. With increasing decentralization, the branches were expected to play a more important and critical role. The regional offices were expected to be done away with.

The scope of the new ERP implementation included both the appliances and the commercial refrigeration businesses. The ERP upgrade was to be implemented across the head office, three factories, 14 branch offices, and nine clearing and forwarding agents. The implementation of the new ERP system was expected to cost Rs four crore and was to be done in two phases spanning 15 months. The first phase was to be completed in six months with the system expected to go live in May 2001.

At the end of the first phase, the modules to be implemented included financial, purchasing, order management, finance and sales analyser, and Istore (allowing users to evaluate, select, and order AHAL products and services online). The second phase was expected to commence in May 2001 and last for another six months. The modules to be implemented included manufacturing, demand management, and supplier, sales, and service portals.

Based on their experience from the previous implementation, AHAL expected to have regular management reviews while ensuring that the implementation was user-driven. Reports, operating procedures, and user definitions were to be standardized and no customization was to be allowed across locations.

The main expectations from the ERP upgrade were scalability for potential expansion into other durable products, reduced transaction costs, and increased speed and reliability of customer sales and service. The ERP implementation was also expected to seamlessly allow the use of the Internet as an ordering and tracking channel. The ERP system was scaleable to allow suppliers and customers to be included in the network. Eventually, the company planned to have 24 hour service support through call centres and the Internet.

Business Process Re-engineering (1995-1996)

Trigger

The triggers for the BPR exercise were low margins despite a high growth in turnover, low productivity of people and cash, complex business practices, and AHAL's parallel investment in the ERP implementation. The BPR was done along with the ERP to simplify business processes, increase productivity, and improve gross margins.

Content

- Shift from a function to process-based organization structure.
- Decentralization of customer service operations.

  Accounting function shifted to the respective functions, creating cost and profit centres.
- Materials function attached to the supply chain and shifted to the factory.
- The order processing responsibility was Shifted to factory from head office.

Benefits

The main benefit of the implementation was the

simplification of business processes. The decentralization of order processing removed the need for additional communication between the factory and the head office. Similarly, vendor management was also completely controlled by the factory. This allowed the head office to focus on marketing and brand building efforts. These outcomes were the result of a consistent effort at decentralizing operations away from the head office to promote faster response and greater accountability. Combined with the ERP implementation, BPR ensured th^t authority and responsibility were decentralized but information was available centrally with an integrated database.

Limitations

The BPR effort did too little for AHAL in terms of expectation and potential. Most of the decentralization was on the manufacturing side. On the distribution side, die branch offices were still not empowered and all approval for credit and discounts (still) happened at the regional qffice. The order flow from the dealers went through multiple links including the branch office, regional office, head office, and finally the factory. Since the goods were directly shipped from the factory to the customer, the orders could also have gone directly to the factory.

The i BPR also did not address the presence of multiple brands (Amtrex and Hitachi) and multiple customer segments (commercial, retail, and government) and made no efforts to develop focused efforts towards each of these. The company lacked a clear cqstomer focus, with each dealer and the company office spreading their efforts across several product lines and segments.

The {company underwent a much more thorough arid wide-ranging reorganization exercise, starting in late-2000.

Indian Air-Conditioner(s) Market in 2000

The Indian air-conditioner market in 2000 is completely and fundamentally different from what it was during 1990-2QQO. Earlier, the market was characterized by a few players and at least three segments (assemblers, Indian brands, and MNCs). The consumer had more choice ta terms of model variety, features, performance, and pride. Presently, brand-based positioning has bettJMbe the norm of the industry. Air-conditioners with ittq»<wdl quality and enhanced features introduced by MNC players have increased the bargaining power of Aie consumer. The dealers' role in selling has become more critical and significant. Manufacturers need to compete on shelf space with the dealers. The industry has moved from order-based assembly .and delivery to produce, stock, and sell. The duty structure has become more reasonable. The increased purchasing power of consumers has made this market more attractive. Competition is intensive. Economics of scale and plant location in tax concession zones are no more important in competitive selling.

Entry of Consumer Durable Manufacturers

Until 1998, companies that focused (both in manufacturing and marketing) only on air-conditioners dominated the air-conditioner market in India. Though Godrej and Videocon made air-conditioners in addition to other white goods, they were not dominant players in the air-conditioner market. This situation changed in 1998 with the entry of Samsung, LG, and National into the Indian consumer durable market While National had tie-ups with different companies for different products, LG and Samsung entered as a single company across all products. LG had its plant in Nokia and National in Chennai (Madras). Samsung imported knocked-down units from Korea.

LG and Samsung also changed the delivery mode with showrooms across the country. Customers could buy the air-conditioner off-the-shelf. While this in itself provided extra convenience, the clincher was that these companies sold their air-conditioners at the same price[8] as the other players who delivered directly from the factory to the customer, in spite of the 16.5 per cent sales tax. This delivery model led to very high growth. The MNCs complemented the sales pitch by wider product range, better product reliability, and service. Since its entry in 1998, LG had grown rapidly to almost match Carrier's market share as India's number one air-conditioner manufacturer (with a 17-18% market share). Amtrex was in the third position behind Carrier and LG in 2000 (Table 2).

With increased competition, the product features and technological superiority of air-conditioners had also improved since 1998. Manufacturers introduced models promising bacteria-free air, power-saving

Table 2: Volumes (Units **in** 000)

Year	*LG*	*Samsung*
1997-98	15	*7*
1998-99	35	15
1999-00	80	35

* It is not clear as to what is the motivation for such a low price strategy. The general impression is that these players were willing to take a cut in their contribution to gain market share and acceptance.

rotary compressors, microprocessor-controlled sleep and temperature settings, and remote controls for the settings.

Industry Dynamics

The Indian air-conditioner market was getting more brand-conscious as a consequence of the presence of MNC brands. Further, some of these MNC brands sold a range of white goods with air-conditioners as one of their products. The entry of MNC brands also caused price-cuts across brands, making air-conditioners more affordable. With all these, the market share shifted towards MNC brands between 1999 and 2000, at the expense of both Indian and assembled players. In fact, between the first quarter of 1999-2000 and 2000-2001, MNC brands were the only ones that grew in both market share and revenue. The Indian brands were seen to compete with the assembled air-conditioners. The assembled players had consistently lost their market share with the reducing price differential with branded air-conditioners and the increasing brand-consciousness of the customers.

Managing Director's Perspective[9]

Mr Naishadh Parikh, Managing Director of AHAL, understood the Indian air-conditioner market and customers very well. He had been involved since 1985 with air-Conditioners and Amtrex.

Mr Parikh was very bullish on the Indian air-conditioner market, expecting it to double in size every 3-4 years. He expected the competition to be intense, with a shakeout happening among the existing players. While there was unlikely to be a single dominant player, Mr Parikh felt that the market could accommodate up to four players with high market shares.

On AHAL's relationship with Hitachi, Mr Parikh said "We really learnt what quality meant only after 1999 through Hitachi. With the use of the Hitachi brand, higher quality standards have become entrenched within our factories." While he agreed that Hitachi Had been cautious in its entry into India, he felt that Hitachi's depth in products and patience for market development would make it a strong competitor in the long-run.

Regarding AHAL, he said "We are a young and learning organization, with a high potential for growth. Our internal initiatives have kept our team together, with a sense of excitement." But, he was quick to also point out AHAL's mistakes in the past.

[9] *Case* writers' impressions based on an interview with Mr Parikh, CEO, AHAL.

"We were in some sense caught sleeping by our competitors. May be, we underestimated them. May be, we took the market for granted." According to him, AHAL had recovered from these setbacks with a coherent strategy behind the Hitachi brand and investments in brand building.

With AHAL's experience in the Indian market and Hitachi's participation, he was confident of growing faster than the market. Mr Parikh said, "One of our key strengths is that we do our strategic thinking in-house, and not in Japan. We now believe in ourselves and make decisions pro-actively, without waiting to find out what the competitor is doing."

Mr Parikh expected AHAL to be a Rs 1000 crore company by 2003. His short-term aim was to enhance profitability. In the long term, Mr Parikh's vision was to become the best performing Hitachi subsidiary in the world,

AHAL's Reorganization in 2000

AHAL lost its market share since 1999, when the MNC brands and white goods manufacturers made an entry into the air-conditioner market. In the second half of 2000, AHAL initiated its largest re-organization till date, changing its organizational structure from functional lines to customer-segment lines. This was complemented by an IT implementation that upgraded its ERP systems from Ramco Marshall to Oracle III and enabled faster communication between its dealers and the head office.

Constraints of the Past

In the face of competition from white goods manufacturers, AHAL found its original organizational structure inadequate on several counts:

- The structure was not conducive for a potential diversification into other white goods. The sales force was not structured and would have had to handle multiple brands, products, and customer segments.
- The hierarchy of having intermediate regional offices slowed down the flow of information from the customers to the company.
- The presence of multiple brands - Amtrex and Hitachi - at the same retail outlets hindered the possibility of distinct product positioning and mar keting strategies.
- The existing IT system did not allow online infor mation on inventory levels, order status, and dis patches. This system was not scaleable to make use of the online channel and E-commerce opportunities.

Drivers for the Reorganization

Although the ERP, BPR, and manufacturing initiatives led to operational efficiency improvements, AHAL's

competition in 2000 also became formidable. The presence of Korean white goods manufacturers changed the very nature of die Indian air-conditioner market. LG and Samsung offered convenient delivery of air-conditioners, lower prices, and a range of durables under one brand. In order to meet the emerging competition, AHAL went in for a reorganization aimed at die following objectives:

- Improved cost efficiency to match the price posi tioning of Korean companies.
- Enabling off-the-shelf availability of air-conditioners. This meant losing the tax exemption on air-conditioners that were earlier delivered directly from the factory to die customer.
- Support for potential diversification into otiier white goods - economies of scope could be had through having a range of products delivered through the same distribution channel and being promoted under a common brand name.

Content*

The main thrust of the reorganization was to realign the organization from a functional focus to a customer focus. The Hitachi and Amtrex product lines were separated in order to enable separate marketing efforts. The Hitachi product line was expected to be expanded to other consumer appliances. Within the Hitachi product tine, the organization was divided along customer segments into retail, commercial, and E-commerce. The Amtrex product line was treated as a separate segment, leading to four main consumer-focused segments as shown in Exhibit 6.

Hitachi and Amtrex product lines' front-end operations were split and treated as separate profit centres. Specific teams of dealers, showrooms, and franchisees were to be dedicated to each customer segment Each of these teams was to have a self-sufficient service team. The service function was Combined with the sales function. Earlier, service was a separate department. Now, the sales people catering to a particular segment were responsible for service as well. The Amtrex product line was expected to compete against the assembled air-conditioner manufacturers, while the Hitachi brand was to compete against the multinationals both in air-conditioners and other consumer durables.

To facilitate faster transfer of goods and information, the branch offices directly reported to the head office. Further, AHAL customers were allowed to purchase air-conditioners off-the-shelf. This required inventory to be held at different links of the supply chain, different from the earlier situation where most shipments were directly from the factory. A new logistics department was created to coordinate the shipments and manage inventory along the supply chain. A detailed description of the logistics department and distribution system is given in Exhibit 8.

Managerial Issues in 2001

Mr Nair had left AHAL in February 2000 and Mr Naishad Parikh took over as the CEO of AHAL in September 2000. AHAL's past efforts had aimed to alter the company's culture more than its performance. The BPR, ERP, TQM, TAL'and reorganization had made AHAL employees more prepared for and receptive to change. There was a strong financial orientation and accountability at the employee level. Employees were able to think radically and generate a variety of options in any (problem/opportunity) situation. They were open to new ideas at tactical, control, and strategic levels. With this culture, it was believed, AHAL had the necessary ingredients for improved efficiency and enhanced competitiveness.

The central issue was in leveraging the learning from these efforts in going forward (Exhibit 9). AHAL had to counter the threat posed by the rapid growth of LG and Samsung in India. With a wide range of products, these companies commanded much more bargaining power with their dealers and showrooms. Further, LG and Samsung had committed substantial capital into their Indian operations in an effort to aggressively enter the Indian market supporting large advertising budgets (see appendix for details).

AHAL had to decide (in 2001) whether to focus its efforts on improving its market share in the air-conditioner market or diversify into a full range of white goods. The air-conditioner market in India was growing rapidly, and a diversification effort would have diverted resources away from air-conditioners. At the same time, having a range of white goods would have allowed economies of scope and more leverage in the distribution channel.

AHAL also had to decide whether it was feasible to continue to operate in its present form. If the company was unable to compete even in the air-conditioner market, selling out was an option. This would mean a take over by Hitachi itself or by another player.

Another option was to redefine AHAL's place in the air-conditioner value chain. Recently, one of AHAL's traditional competitors - Voltas - had decided to become a component manufacturer, supplying to

the new players in the air-conditioner market. Voltas found it too difficult to compete in the branded air-conditioner market and changed its strategy to become an OEM supplier. AHAL could go the Voltas way and become a component manufacturer. Alternatively, AHAL could concentrate on the marketing and distribution functions with Hitachi supporting design and production.

It was unclear how much AHAL could achieve on its own. It wanted to strengthen its relationship With Hitachi. It would like Hitachi to play a more active role in the Indian operations. Hitachi's technology, brand name, and financial muscle would be an advantage both in air-conditioners and other white goods. If Hitachi was unwilling to be more aggressive in its Indian strategy, AHAL might have to look elsewhere for strength and support. There were a large number of air-conditioner manufacturers in the unorganized sector with excess capacity. AHAL might be able to forge relationships with some of them and create a network of focused regional companies.

AHAL realized that the rules of the game in the air-conditioner industry had changed and that it was trying to compete on these rules that had been set by others. It was possible for AHAL to do something drastic that changed the rules again in favour of AHAL. The company's knowledge and experience in the Indian market could allow it to have an edge on the multinationals.

As the AHAL top management met for a discussion on the ERP implementation, it was expected that they would talk about much more than just the latest ERP effort. It was time to take a view on AHAL's future business strategy and take steps to implement such a strategy.

Exhibit 1: Timeline of Amtrex's Operations

December 1984	Incorporated as Acquest Air-conditioning Systems Pvt. Ltd.
June 1985	Manufacturing plant commissioned at Kadi : Capacity 18,000 units/year
February 1990	Technical collaboration agreement with Hitachi for 5 years
September 1990	Name changed to Amtrex Appliances Limited
January 1994	Manufacturing plant commissioned at Silvassa
March 1995	Capacity increased up to 50,000 air-conditioners per year (on a double-shift,basis)
March 1996	Installed capacity increased up to 100,000 air-conditioners per year (on a double-shift basis)
December 1996	Technology agreement with Orford Pty. Ltd. Australia for commercial refrigeration products and commissioned factory in Changodar
April 1998	Agreement for technical collaboration with Hitachi Ltd. Japan, for various window and split models
January 1999	Name of the company changed to Amtrex Hitachi Appliances Ltd.
Jftwary 1999	51,65,490 Equity Shares allotted to Hitachi Group on preferential basis
March 1999	Appointed Hitachi Directors on the Board of Amtrex (including Joint Managing Director)

Source: Company records.

Exhibit 2: Hitachi Company Profile

Hitachi Limited was founded in 1910 by Mr Nameihi Odaira. Headquartered in Tokyo, Japan, Hitachi was one of the world's leading global electronics companies with fiscal 1999 (ended March 31, 2000) consolidated sales of 8,001 billion yen ($75.5 billion*) and a workforce of 330,000 people.

The company manufactured and marketed a wide range of products including computers, semiconductors, consumer products, and power and industrial equipment.

Hitachi was ranked 21st among Fortune 500 companies worldwide in 2000. It had 913 subsidiaries, including 276 overseas corporations and it operated in four business areas: Information Systems and Electronics, Power and Industrial Systems, Consumer Products, and Services.

Hitachi has been ranked number 2 in the world for room air-conditioners and has been Japan's leading electrical and electronics company. It sold 1.6 million units of air-conditioners annually worldwide. Its room air-conditioner was under the consumer products division.

Hitachi's industrial air-conditioners was under its power and industrial equipment division. In air-conditioning equipment, it reorganized its parent company operations to form a wholly owned subsidiary in April 1999 and merged it with the sales subsidiary in July 1999 to form an integrated manufacturing and sales company.

The consumer products group underwent a restructuring that began in fiscal 1997. In 2000, the restructuring reached its final stage with the transfer of manufacturing and design operations to affiliated companies. This resulted in improved efficiency and greater competitiveness,

Hitachi has concentrated on ways to cut operating and distribution costs. To do so, it tried to achieve greater speed by using supply chain management to more closely link its sales activities with its production system. The goal was to hold as little inventory as possible. The first target was room air-conditioners, a product category in which there was a large seasonal variation in demand. The company dramatically shortened the time between order receipt and delivery from over two month to six days. Moving forward, the company expected to shorten lead times for other consumer products in a similar manner.

In China, Hitachi's presence has been in the form of a joint venture - Shanghai Hitachi Electrical Appliance Co.Ltd. Shanghai Hitachi manufactured over three million compressors in 2000 and expected to increase its annual production capacity to six million air-conditioner compressors in the near future. Shanghai Hitachi was China's largest air-conditioner compressor manufacturer in 2000.

Hitachi's Worldwide Annual Income Statement

(Unit: US$ MUMon)

	99-00	*98-99*	*97-98*	*96-97*	*95-96*
Sales	77,956.0	65,928.7	63,763.9	68,734.7	75,770.8
Cost of Sales	52,199.0	45,498.5	43,027.7	46,026.9	49,173.9
<!S*o» Operating Profit	25,757.0	20,430.2	20,736.2	22,707.8	26,596.9
Selling, General, and Administrative Expense	18,785.0	16,190.9	14,983.2	15,927.7	18,302.8
Other Taxes	0.0	0.0	0.0	0.0	0.0
EBITDA	6,972.0	4,239.3	5,753.0	6,780.1	8,294.1
Depreciation and Amortization	5,273.0	4,520.8	4,169.6	4,383.5	5,192.1
EBFT	1,699.0	-281.5	1,583.4	2,396.6	3,102.0
Other Income, Net	-420.0	-1,076.1	169.3	216.3	740.8
Total Income Available for Interest Expense	1,279.0	-1,357.6	1,752.7	2,612.9	3,842.8
Interest Expense	507.0	487.8	451.8	489.3	591.1
Minority Interest	144.0	58.1	193.6	294.3	383.3
ire-tax Income	628.0	-1,903.7	1,107.3	1,829.2	2,868.4
Income Taxes	463.0	896.3	1,081.0	1,116.9	1,546.1
total Net Income	165.0	-2,800.0	26.3	712.3	1,322.3
Dividends Paid per Share	0.29	0.00	0.00	0.43	0.54
EPS from Total Operations	0.49		0.10	2.06	3.74

Source: Public information on Hitachi.

Exhibit 3: Revenue Growth of AHAL

(Rs Million)

Year	*90-91*	*91-92*	*92-93*	*93-94*	*94-95*	*95-96*	*96-97*	*97-98*	***98-99***	***99-00***
Revenues	79	138	158	289	526	836	1062	1139	1370	1809

Source: Company records.

Exhibit 4: Profit and Loss Account of AHAL

(Rs Million)

Period Ended	*1996-97*	*1997-98*	7555-55	*1999-00*
Gross Sales	1,034.6	1,131.7	1,361.6	1,809.2
Excise Duty	(237.2)	(236.2)	(286.5)	(338.4)
Net Sales	797.3	895.5	1,075.0	, 1,470.7
Other Income	34.4	7.3	8.5	6.1
Total Income	831.7	902.8	1,083.6	1,476.9
Raw Materials	422.9	485.7	645.9	770.9
Stock Adjustment (lnc)/Dec	(26.4)	6.9	(52.6)	(28.6)
Purchase of Finished Goods	79.3	36.9	64.9	113.5
Cost of Material	475.8	529.5	658.2	855.9
Employee Cost	29.9	54.4	77.2	95.4
Power and Fuel	3.1	6.7	10.5	13.0
Advertising/ Promotion/ Public	22.7	16.5	82.0	113.8
Freight and Forwarding	19.6	26.9	36.3	41.5
Other Expenses	195.7	186.0	228.1	256.6
Cost of Sales	746.9	819.9	1,092.2	1,376.2
PBIDT	84.8	83.0	(8.7)	100.6
Interest and Finance Charges	38.4	34.3	41.4	34.2
PBIW	46.4	48.7	(50.1)	66.5
Depreciation	9.3	17.4	23.1	29.6
PBT	37.1	31.2	(73.1)	36.9
Provision for Taxation	-	-	-	1.9
Extraordinary Items/ Prior Year	1.0	(0.8)	(1.9)	3.0
Adjwted PAT	38.0	30.4	(75.0)	37.9
Dividend Payout	18.8	15.7	-	17.9
Other Expenses	24.5	20.8	21.2	17.4
Cost of Sales	93.7	91.6	101.6	93.6

Source: Company records.

Exhibit 5: Balance Sheet of AHAL

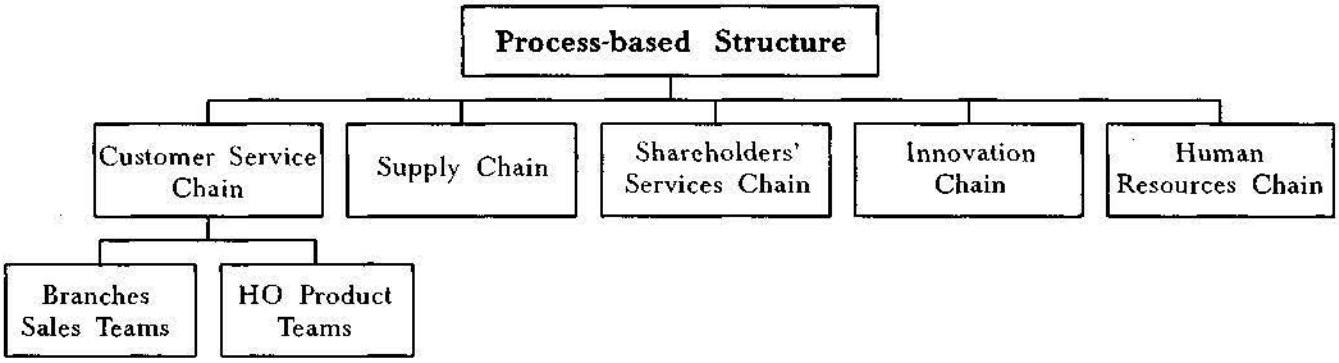
(Rs Million)"

	31/3/97	*31/3/98*	*31/3/99*	*31/3/00*
Sources of funds				
Equity Capital	95.0	95.0	146.7	146.7
Capital Reserve	0.4	0.5	0.7	0.7
Share Premium Account	105.1	105.1	213.6	213.6
Profit and Loss/General Reserve	69.1	83.8	9.1	29.2
Other Reserves	0.3	0.3	•	-
Reserves and Surplus	174.9	189.8	223.4	243.4
Net Worth	269.9	284.8	370.1	390.1
Secured Loans	106.2	155.1	163.5	178.9
Unsecured Loans	115.8	63.9	44.2	96.2
Total Debt	222.0	218.9	207.7	275.1
Capital Employed	491.9	503.7	577.8	665.2
Application of Funds				
Gross Block	193.0	218.3	321.1	380.8
Accumulated Depreciation	(30.0)	(47.2)	(69.6)	(97.4)
Capital Work in Progress	3.3	40.2	0.9	32.4
Total Fixed Assets	166.3	211.4	252.4	315.8
Investments	78.2	74.3	47.1	47.3
Inventories	147.0	152.8	244.6	309.1
Sundry Debtors	236.9	244.9	277.5	369.4
Cash and Bank Balance	45.6	36.6	64.4	60.7
Total Loans and Advances	94.8	88.1	128.4	125.8
Sundry Creditors/Acceptances	(181.1)	(196.6)	(268.6)	(355.6)
Other Liabilities	(78.4)	(91.9)	(172.4)	(199.6)
Provisions	(24.3)	(21.8)	(7.5)	(26.0)
Net Current Assets	240.5	212.1	266.5	283.8
Miscellaneous Expenses	6.9	5.9	11.8	18.4
Capital Deployed	491.9	503.7	577.8	665.2

Source: Company records.

Exhibit 6: Organization Structure of AHAL

During (1996-1999)



Chain	*Responsibility*
Customer service	Marketing, sales, and distribution
Supply	Production, material supply, and logistics
Shareholder Service	Legal, IT, accounting, and management services
Innovation	New product development
Human Resources	Recruitment, compensation, evaluation, and retention

Post-2000

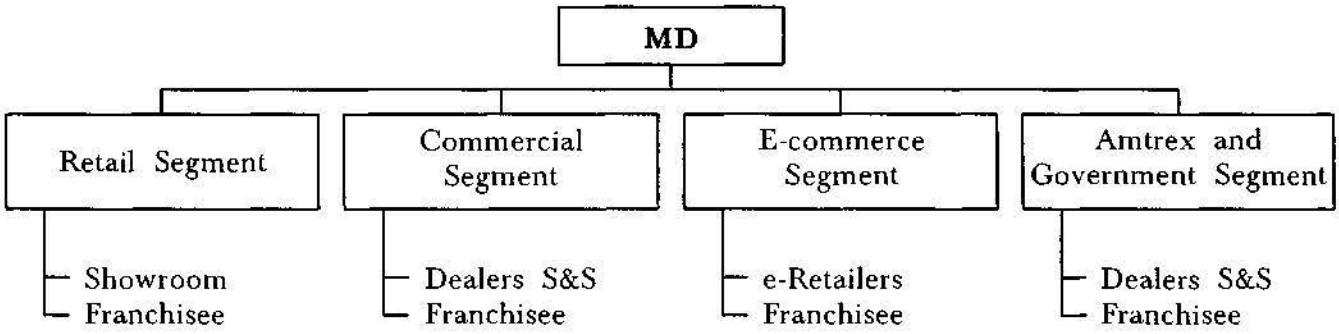


Exhibit 7: Goods, Information, and Payment Flow at AHAL

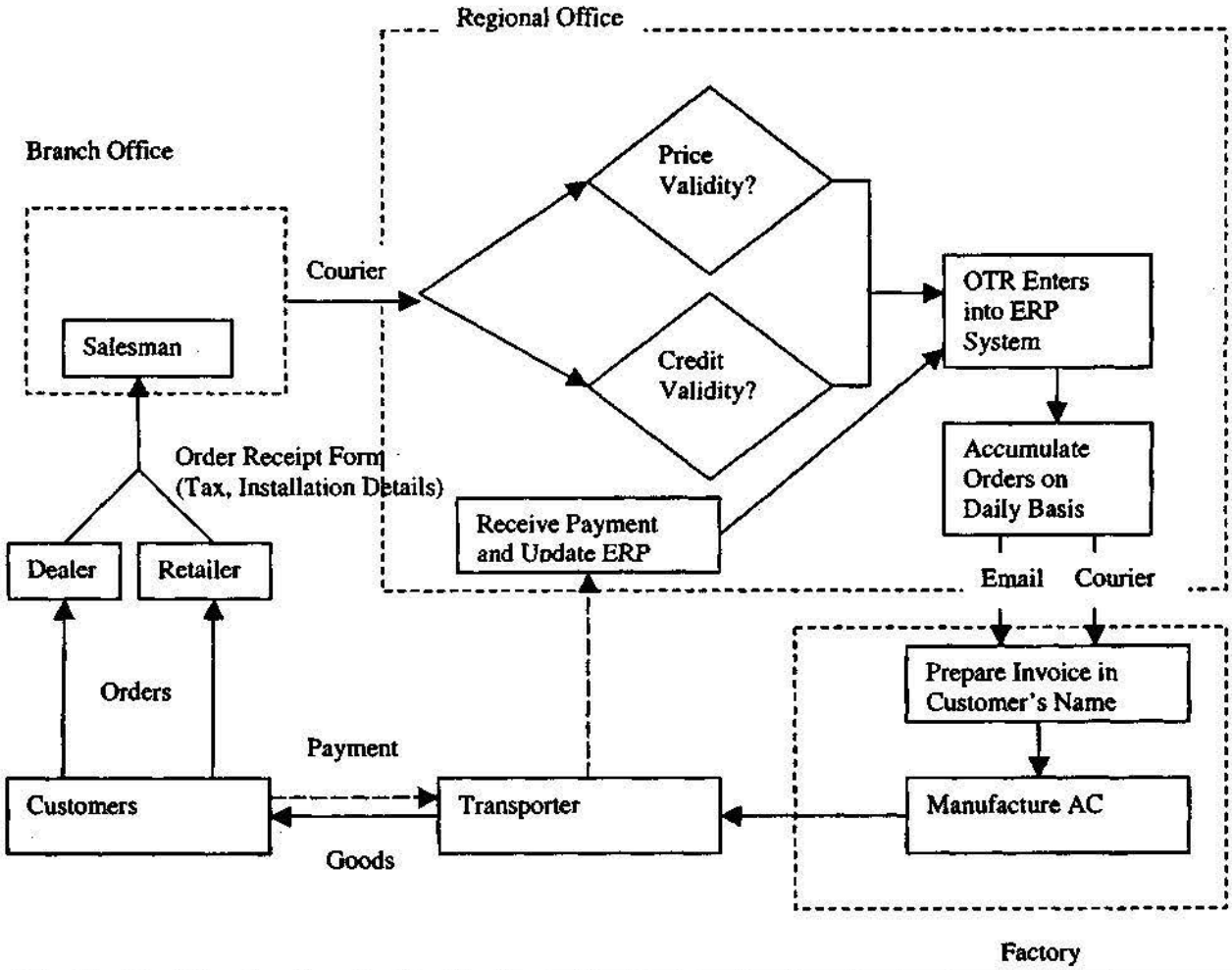


Exhibit 8: Operational Changes due to AHAL 2000 Reorganization

Logistics Operations in AHAL in 2000

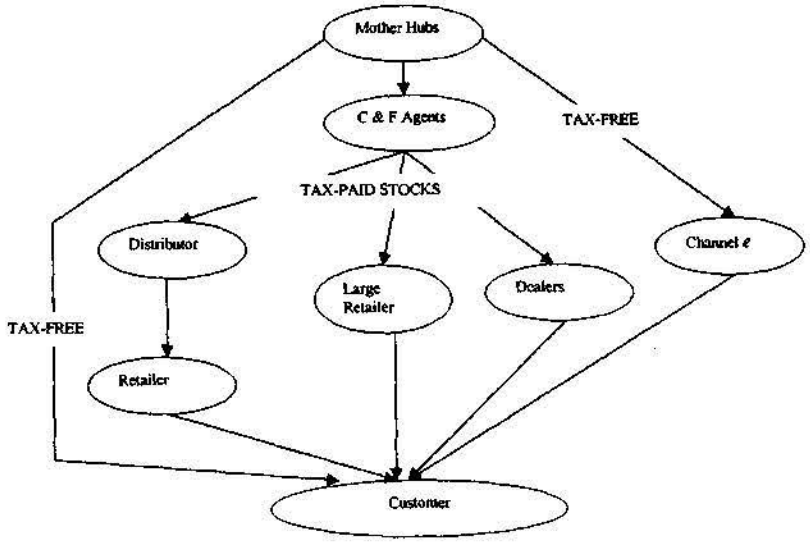


Exhibit 8 contd.

Distribution

In terms of distribution, the regional offices were removed as an additional level of hierarchy in the flow of information from the dealers to the head office. The 13 branch offices were to directly report and communicate to the head office. Each branch office was to have teams catering to the retail, commercial, e-commerce, and Amtrex segments. However, these teams were independent and reported to the appropriate profit centre at the head office in Ahmedabad.

Delivery

Ear the retail segment, air-conditioners were available off-the-shelf for purchase, delivery, and installation from dealerships and showrooms. These were tax-paid stocks. For the commercial segment, air-conditioners were to be delivered directly from the factory, though ordering could be done through the branch office. The flow of goods was as shown below.

Xflgfclfcf

Logistics was created as a new consolidated function at the head office for all AHAL products. The department was a cost centre. The department was expected to act as an interface between production planning and control, marketing, and the dealers. Logistics was to set up C&F agents and coordinate all storage and transportation activities. Once the products were assembled at the factories, logistics handled the movement of the products till they reached the retailers or the end-consumer, in case of direct delivery.

Logistics handled all outbound shipments, in the case of manufactured items. For traded items such as products that were only being imported and directly sold, logistics handled both the inbound and outbound shipments. In the initial stage, the sourcing of raw materials and components for manufacturing (i.e. inbound shipments) was still left to the production planning function. Logistics was in-charge of insurance for all shipments. Earlier, the legal department handled insurance cover for shipments as well.

Inventory

Inventory management was now more complicated. Earlier, most of the finished good inventory was being held at the factory, since die delivery was predominantly direct from the factory. Now, die logistics department had to decide the inventory to be held at different points of the delivery chain, including dealers, distributors, retailers, and C&F agents, in addition to the factory. Logistics interfaced with the finance department for inventory holding and freight handling cost management.

Production

The logistics department also provided input to the factory for production planning. The production planning was done by the factory, but required coordination with logistics since the latter had information on the inventory being held in the pipeline at any point. Inputs related to packaging were also provided by logistics to production.

IT Systems

The new ERP package with the single-server configuration allowed logistics to interface with multiple departments, with each department having access to a common pool of data.

The logistics department had 19 employees, five in the head office, five in the five regions, and nine across the Kadi, Silvassa and Changodar factories.

Exhibit 9: Summary of Competitiveness Enhancing Measures

	ERP (1998)	*BPR (1997)*	*TQM (1996)*	*TAI (1995)*
Trigger	Need for better coordination across locations and standardization of procedures	BPR needed to derive maximum benefits from ERP Low productivity and complex processes	Recognizing quality as a basis of competition	Opportunity in competitors' weak product (model) development capability
Implementation Methodology	Consultant for technology know-how	Top management driven	Series of shopfloor initiatives like JIT, Kaizen, Kanban cards, DOL, vendor rationalization	Cross-functional teams and concurrent engineering
	User driven, with user champions, IT coordinators	Focus on decentralization of responsibility		Designers understanding customer requirements
Achievements	• Productivity increase, with MDU (Man Days per Unit) down from 2 to 0.2-0.25 • Higher quality levels (Compressor failure rates reduced from 3.5% to 0.1%) • More frequent introduction of new products (12 models in 96-97 to 15 in 98-99) • Lower product design cycle time, from 9 months in 96-97 to 6.5 months in 98-99. • Inventory levels reduced by 20% • Reduced order processing lead time (7 to 2 days) • Sales increase from Rs 28 crore to Rs 181 crore while maintaining same employee levels			
Shortfalls	Separate servers prevented sharing data on real time	Minimal change on distribution side	Infrastructure bottlenecks restricted the scope of JIT Poor skill levels of workforce	Lack of understanding of cooling cycle
Learnings	Importance of user-driven change	Need to simplify distribution	Documentation and active use of real data	Factory people understand customer requirements
	Ensure standardization of business processes	Decentralization of financial responsibility also required	Better analysis and root-causing of problems	

Appendix: Indian Air-Conditioner Market

India had all the conditions for a thriving air-conditioner business. High temperatures and humidity levels made an air-conditioner a very attractive proposition to those who can afford t Historically, high taxes and high running costs stymied the growth of air-conditioners. During 1990s, due to growing industrialization and an expanding middle class with large disposable incomes, this trend had reversed. Poor environmental conditions due to increasing pollution levels pushed up retail demand. Growth in industrial sectors like software and telecommunications is expected to increase the institutional demand.

Concept and Details on the Working of an Air-conditioner[10]

An air conditioner uses a condensable working fluid - a chemical that easily converts from a gas to a liquid and vice versa - *to* transfer heat from the air inside of a home to die outside air. This process involves three major components and at least one fan. The three major comp onents are a compressor, a condenser, and an evaporator. The compressor and condenser are usually located on the outside air portion of die air conditioner while the evaporator is located on the inside air portion. The working fluid passes through the insides of these diree components in order, over and over again.

The working fluid arrives at the compressor as a cool, low-pressure gas. The compressor squeezes this working fluid, packing its molecules more tightly together so that their density and pressure increase. The squeezing process also does work on the working fluid, increasing its energy and therefore its temperature. The working fluid leaves the compressor as a hot, high-pressure gas and flows into the condenser.

Compressors come in various types. The most widely used is the simple reciprocating type with a cylinder and piston arrangement. For capacities more than 120 tonne of refrigeration (TR), centrifugal compressors are used. The more recent additions have been die rotary and screw compressors that are more efficient.

The condenser has metal fins all around it that assist die working fluid in transferring heat to die surrounding outdoor air. As diis transfer takes place, die closely spaced molecules of die working fluid begin to stick to one another, releasing additional diermal energy into the surrounding air and causing the working fluid to transform into a liquid. By die time the working fluid leaves die condenser, its temperatare has almost dropped back down to die outdoor temperature but it is now a liquid rather than a gas.

This high-pressure liquid then flows into the evaporator through a narrow orifice. This orifice allows the liquid's pressure to drop so that it begins to evaporate into a gas. As it evaporates, it extracts heat from die air around the evaporator because that heat is needed to separate the molecules of die working fluid. Like die condenser, the evaporator has metal fins to assist it in exchanging diermal energy widi die surrounding air. By die time die working fluid leaves die evaporator, it is a cool, low-pressure gas. It then returns to die compressor to begin its trip all over again. Overall, die working fluid releases heat into die outside air and absorbs heat from die inside air.

The basic unit of measurement used in die industry is known as "tonne of refrigeration" (TR) which is equivalent to the heat extracted in 24 hours for converting 1000 kg of liquid to ice at zero degrees centigrade.

Categories

The Indian air-conditioning industry was classified into diree segments" - unitary products, packaged air-conditioners and ducted splits, and central plants. Unitary products had capacities below three TR (tonnes of refrigeration). Packaged air-conditioners and ducted splits catered to cooling capacities of under 15 TR. Central plants typically had capacities in excess of 100 TR.

The unitary products segment was die largest among die three. This segment was further divided into two categories — window and split air-conditioners (these splits were sometimes called mini-splits to distinguish diem from die ducted

Within each of these categories, air-conditioners were classified by capacity, typically ranging from sub-one tonne to greater than two tonne units. In die case of split air-conditioners, die unit was 'split,' with die condenser forming an outdoor unit and die coil remaining in die indoor unit Internationally, split air-conditioners were die norm, while die two segments had comparable market shares in die Indian' market. The split air-conditioners cost more than die window units. Split air-conditioners were more popular among institutional customers in die Indian market.

Central air-conditioning plants were large air-conditioning systems that were installed in buildings. This category was unlike die window or split segments, with large turnkey projects to install centralized air-conditioning. The companies catering to this segment required strong project management skills. There were no small players in die ductable market, due to die size and technology complexity.

Players

The market was segmented along three types of players - multinational (MNC), Indian, and assembled manufacturers. MNC players included diose selling models under international brand names, including Hitachi (with Amtrex), Carrier, LG, Samsung, Electrolux, and Fedders Lloyd. The air-conditioners with Indian brand names included Amtrex, Shriram, Godrej, \foltas, Blue Star, and Videocon. Typically, the MNC brands sold at higher prices due to premium brand image. The assembled players were small regional outfits that rely on word-of-moudi publicity and low cost and acceptable quality to attract customers. They usually competed on price.

[10] Source: Sector report on the Indian Air-conditioning industry, www.indiainfoline.com

[11] Source: "Air-conditioning: Will the Competition be Met Coolly?" *Hindu Business Line,* May 23rd, 1999.

Sales of ACs

Company	*1997-98*
Carrier	**80,000**
Voltes	**47,500**
Amtrex	**32,500**
Videocon	**31,000**
Godrej-GE	**10,300**
Others	**49,700**
Organized	**251,000**
Imports	**NA**
Small-Scale	**135,000**
Total	**386,000**

Source: The Refrigerators and Air-Conditioners Manufacturers Association.

The early leader in the market was Voltas, with a market share of 45 per cent in 1993. Its market share has dropped consistently since 1994, following the entry of more market-savvy players like Carrier and Amtrex. By 1996-97, Carrier had overtaken Voltas as the largest air-conditioner manufacturer in India, with Amtrex in the third position. Both Amtrex and Carrier benefited from the shift in the air-conditioner market from the unorganized to organized sector, as well as the erosion in Voltas' market share to record high top-line growth. Other players who entered the air-conditioner market since 1998 included LG and Samsung, with air-conditioners as one offering in their line of consumer goods. Market Size and Growth

Year	*92-93*	*9$-94*	*94-95*	*95-96*	*96-97*	*97-98*	*99-00*
No. of Units in 000)	130	145	185	245	330	386	550

This growth of over 20 per cent per annum was achieved through an increase in market penetration. The total air-conditioner market in India was estimated at Rs 1 ISO[12] crore in 1999, of which window air-conditioners account for 48 pier cent share. The shares of the different segments are shown below. The window and split air-conditioner market was expected to grow at 20-25 per cent per annum.

Category	Share (%)
Central Plants Windows	**25.82**
Mini-splits PAC and	**48.00**
Ducted Splits	**15.98**
[illegible]	**10.20**

China had an annual residential air-conditioner demand of 12 million unite in 2000, with an annual growth of 20 per cent In Chinese towns and cities, 20 per cent of the households had an air-conditioner. China's largest player -- Orte Electronic Appliances, a domestic player — had an installed capacity of 2.5 million units per year and an annual revenue of US$ 960 million in 2000. China also had multinational players like Hitachi, Sharp, and National, in additional to domestic players. Chinese domestic manufacturers like Gree competed effectively with the multinationals and also exported air-conditioners to the USA and Europe.

Market Segment

Corporate demand accounted for 80 per cent of the total air-conditioner demand in India. Recently, this trend has started reversing. In 1999-2000, the home air-conditioner market saw a growth of 50-60 per cent. Even among the institutional demand, the government accounted for as high as 70 per cent of the demand in the past. The share of the government was also reducing, with privatization of government companies and growth of the private sector. Within the household sector, 20 per cent of the demand came from customer buying a 2nd unit for his house. The demand was generally restricted to major cities and towns. Eight cities, which included the four metropolitan cities, accounted for nearly 65 per cent of the total household demand.

The air-conditioner manufacturers needed to increase their focus on the retail distribution channel as well as on the reach into upcountry markets which were becoming last-growing segments. The key drivers for the growth were low penetration (air-conditioners had a lower penetration than automobiles), rising household incomes, and the fall in the unit price of air-conditioners. The limited availability and poor quality of power supply, especially in the rural areas, was the main limitation to increased air-conditioner penetration.

The demand for air-conditioners had been fairly price sensitive in India. In the last few years, financing schemes for air-conditioners became available, similar to other consumer durables.

Capacity

The installed capacity for room air-conditioners of the major players in the organized sector in 97-98 was around 0.6 million units. The total sales amounted to just 0.251 million units in the same year, implying a capacity utilization of less than 50 per cent

Environmental Concerns

Till the early 1990s, the air-conditioning industry used Ozone Depleting Substances (ODS), mainly chlorofluorocarbons (CFCs) as refrigerants. However, ODS had to be phased out by 2010 in India, due to their adverse effect on the environment. This phasing out was accelerated by an RBI regulation that prevents financing any factory that uses ODS. Companies gradually changed to hydro-fluorocarbons. For most companies, this change required access to imported technology from collaboration partners.

Taxation

Till 1993, the air-conditioner market growth was hindered by a specific duty (a lumpsum tax on each model, independent of the price) on air-conditioners. The duty arose from the government view that air-conditioners were a luxury good and could be taxed heavily. The product fell in the highest tax bracket, with the tax working out to about 110-120 per cent of the ex-factory price. The high tax rate gave rise to a thriving 'assembled' air-conditioner market. In this market, local assemblers, using screw driver technology, manufactured and sold air-conditioners without paying any excise duty. The price differential between branded and assembled air-condi-

[11] Source: IndiainfoHne

tioners was high.

Year	Price (Rs.)'	Price (Rs.)[2]
1992-93	34000	23000
1994-95	30000	23000
1995-96	27000	23000
1999-00	21000	18000

1 - Indian brand. 2 - Assembled unit.

MNC brands were more expensive. A rough estimate would be 30 per cent more than die comparable Indian brands.

In 1994-95, die specific duty was converted to an *advalorem* tax of 60 per cent. The tax reduction was passed on to the customer and the branded air-conditioner prices came down almost by Rs 4000. In 1995-96, the excise duty was further reduced to 40 per cent and then to 30 per cent in 1998. In 1999, there was a minor revision with the rate being 32 per cent. Throughout this period, air-conditioners continued to fall in the highest duty slab of the government, as far as consumer durables were concerned.

Consistent with die fall in duty, die share[13] of the assembled segment fell from 70 per cent (by volume) in 1993 to 35 per cent in 2000. The reasons for die decline in die assembled segment were several fold.

- Reduction in die price differential, as a consequence of excise duty reduction. Widi price differentials being low, the basis of competition shifted from price to technology, styling, and additional features provided.
- Widi liberalization, die Indian consumers were exposed to a larger variety of white goods and became more brand-conscious.

Delivery

Due to tax concessions, most air-conditioner manufacturers had set up their assembly units in Silvassa (located in Dadra and Nagar Haveli). A few others were located in Aurangabad, with similar tax concessions. In order to save on sales tax (up to 16.5%), dite air-conditioners were direcdy shipped to die end-customer from Silvassa. The customer was, therefore, unable to buy an air-conditioner off-die shelf. Customers had to place an order at a showroom (containing only display pieces) and dien wait up to ten days for delivery. The air-conditioner was delivered direcdy from Silvassa, with an invoice generated by die Silvassa factory. This exempted die company (and thereby die customer) from paying sales tax and hence reduced die final price to consumer.

Air-conditioners and Other Consumer Durables

Though air-conditioners were consumer durables, die buyer behaviour and usage characteristics were very different from other white goods. The reasons for this were:

- Air-conditioner use was seasonal, with die product being used primarily in the summer months.
- The running cost of an air-conditioner was very high, mainly due to its high power consumption.

Air-conditioners were also more difficult to maintain as they had more moving parts and accumulated dirt due to their role in air-filtering.

Due to these factors, air-conditioners had least priority in die mind of die customer. Customers typically bought TV, music system, refrigerator, washing machine, and a motorized . vehicle, before going in for an air-conditioner purchase.

On the manufacturer side, air-conditioners had separate distribution channels from other white goods and die industry's lobbying widi die government was not coordinated widi diat of other products.

Competitor Profiles"

Carrier Aircon Limited

Carrier Aircon Ltd. was die market leader in die Indian air-conditioner market, though its dominance had been threatened by LG Electronics in 2000. Carrier Inc. USA had a 51 per cent stake in its Indian subsidiary. Carrier Inc. was die world leader in air-conditioners.

The company became die market leader in 1993-94 through an aggressive marketing campaign that sold die need for air-conditioning in a (warm and humid) country like India. The company stressed die fact that diey were die world leaders in air-conditioning and that they had invented air-conditioning. The company had retained die number one position since then.

In 1999-2000, Carrier Aircon's profits declined by 66 per cent due to labor unrest coupled widi pressure on margins due to increased competition from LG and Samsung. Since then, Carrier responded to competition widi a wider product range and lower prices. The company planned to introduce 41 variants of window air-conditioners in 2000-2001, up from 11 new models a year earlier. The price range was expected to be from Rs 18,500 to Rs 32,000. In 1999-2000, Carrier's low end air-conditioner was priced at Rs 25,000. The company targeted die SEC B1 and SEC B2 segments widi its low priced models. This was a drastic change from die company that used to sell air-conditioners at premium price points.

The company also planned to increase its distribution strength from 414 exclusive dealer stores to 1200 sales outlets in 2000-2001. These included Comfort Points (company-owned stores and dealer-operated stores) and multi-brand outlets.

Carrier Aircon had 90 per cent indigenization levels in production, rendering it less susceptible to exchange rate variations. The company was also vertically integrated, widi its own compressor manufacturing unit in India. Other Indian companies like Voltas also sourced compressors from Carrier.

Voltas

Voltas Limited, a part of die Tata Group, had interests in air-conditioning, refrigeration, and engineering. The company had divested its businesses in chemical plants and other white goods to focus more on its core businesses. Voltas was one of die oldest players in die Indian air-conditioner market

[a] The market shares are approximate, as the assembled segment *is* fragmented and difficult to track. Hie market shares are calculated using compressor sales. Even this is complicated by the presence of imported compressors.

[14] Source: Company Research Reports, www.indiainfoline.com

The company was promoted by Tata Sons Pvt Ltd. and Volkart Brothers in 1954 to operate the engineering and import division of Volkart Voltas marketed imported products and acted as the indenting agent till the year 1961. By 1963, the company had its own factory at Chinchpokli (Mumbai) to manufacture air-conditioners and refrigeration equipment. In 1985, in collaboration with Danfoss of Denmark, Yoltas set up a compressor unit and a refrigerator plant at Warora near Nagpur. The company's cooling appliances were manufactured at the Thane and the Dadra plants. The Sanatnagar Plant was a sophisticated manufacturing facility for manufacture of commercial refrigerators.

In 1999-2000, the company registered sales of Rs 824 crore frQm all their businesses put together. Of this, air-conditioner sales accounted for Rs 114.5 crore (36,700 units).

Voltas had a distribution network of over 500 dealers. They had an installed capacity of 75,000 air-conditioners per year, on a single shift basis. Voltas adapted the air-conditioner technology from Toshiba to Indian weather and power conditions. They launched as many as 44 new models in 1998. Thev decided to invest over Rs 700 million in research and development to improve product features and develop models for different customer segments.

LG Eltetnmict

Internationally, LG was the world's third largest air-conditioner manufacturer in 1999. LG Electronics entered the Indian air-conditioner market in 1998 and saw a rapid growth in sales since then. LG, along with Samsung, was die first player in the Indian air-conditioner market to offer an entire range of white goods. The company sold televisions, micro-wave ovens, and washing machines in India, The company revolutionized the home air-conditioner market by offering customers off-the-shelf products, with no waiting time for delivery. In spite of the tax paid under this delivery scheme, the company was able to match prices offered by traditional players like Voltas, Carrier, and Amtrex.

LG Electronics' strategy included developing non-traditional channels of selling even while it continued to strengthen its retail sales network. The company banded together small teams of people to be attached to its branch offices to carry out brand promotions in smaller cities and towns. LG also changed rules in another area by providing incentives to the dealers to make intelligent demand projections.

LG planned to expand its retail network to 4,000 dealers (across its entire white goods range) by March 2001. The company was setting up a specific portal, which was expected to have at least 20 per cent of its dealers online carrying out all transactions over the internet. In 2000, die company had an online messaging system wltii 75 dealers.

hi the six months ended June 2000, the company's sales jumped by 86 per cent to Rs 9,350 million. The company earned a net profit of Rs 400 million (up by 350%) for the full year ending December 1999. The company achieved Ac same profit figure of Rs 400 million in just six months ended June 2000.

Cost Structure of Leading Indian Players

	AHAL	*Carrier*	*Samsung*	*LG*
Period	Mar-00	Mar-99	Dec-99	Dec-9t
Net Product Sales	92.65	88.06	100	100
AC&R Service	7.35	11.94	0	0
Total Salei	100	100	100	*im*
Freight Outward	2.64	2.80	2.09	2.99
Standard Material Cost	60.15	58.29	60.33	59.97
Service Cost	5.71	4.60	0	0
Royalty	0.44	0	1.47	0
Warranty	2.56	0.87	1.75	1.09
Standard Sales Commission	3.27	3.66	8.23	9.43
Power and Fuel	0.80	1	0.24	0.30
Total Grow Margin	24.43	28.79	25.90	26.21
Strategic Overheads	15.64	12.05	12.91	13.98
Manpower	8.15	8.24	2.09	2.79
Rent	0.74	0.98	0.74	1.73
Depreciation	2.81	1.40	0.74	1.73
Advertisement and Sales Promotion	3.94	1.43	9.34	8.93
Octroi, Rates, and Taxes	0.30	0.56	1.92	0.04
Operating Overheads	5.29	6.36	3.49	3.85
Financing Overheads	2.16	0.95	2.27	2.50
Operating Profit Before Tax	1.03	8.88	5.29	5.84
Profit Before lax (PBT)	1.54	10.40	4.67	6.54
Income Tax	0.17	1.63	. 0.54	1.97
Front After lax (FAT)	**1.37**	**8.77**	**4.12**	**4.58**

Source: AHAL estimates (the **figures are** in percentages).