

CASE STUDIES

In the previous chapter we researched cases of GCMMF and KMF belonging to cooperative sector but with differing ownership pattern. This chapter presents case studies of **BHARAT ELECTRONICS LTD (BEL)** and **INFOSYS TECHNOLOGIES LTD. (ITL)** both belonging to technology sector but differing in the nature of ownership and control for the reason that BEL is a PSU owned by the government while INFOSYS is a publicly held private sector company.

4.1 BHARAT ELECTRONICS LTD (BEL)

On the occasion of Bharat Electronics Limited being conferred the Navaratna status Mr V. V. R. Sastry, Chairman and Managing Director of BEL, said, "We are delighted. It is recognition of the company's inherent strengths in research and development, manufacturing, quality and thrust on self-reliance. It is also recognition of the company's ability to face global competition and become an international player."¹

By becoming a Navaratna PSU, BEL would have greater financial and operational autonomy to respond to changing market scenarios and leverage the autonomy for business growth and diversification.

To a question on BEL's future vision he added "we are aiming at achieving a turnover of US\$1 billion (Rs 4100 crore) this year. We want to touch US\$ 2 billion (Rs 8200 crore) by 2010-11."² BEL hoped to generate 10 percent of revenues through exports and planned to expand into professional electronics segment.

4.1.1 Introduction

Bharat Electronics Ltd. (BEL) was established by the Government of India under the Ministry of Defence in 1954 with the establishment of the Bangalore Unit. BEL is a public sector company with the government owning 75.86 % of the shares, the Indian public holding 2.36 % of the shares, and the remaining held by institutional investors. The goal of the company is to be a leader in the field of defence electronics. At present it is among India's premier electronics manufacturing organisations. BEL has totally nine operating units located at Bangalore (Karnataka), Chennai (Tamilnadu), Hyderabad (Andhra Pradesh), Machilipatnam (Andhra Pradesh), Pune (Maharashtra), Ghaziabad (Uttar Pradesh), Panchkula (Haryana), Talaja/Navi Mumbai (Maharashtra) and Kotdwara (Uttaranchal). The main mission of BEL around 1990 was to serve the national needs in defence by means of quality, technology and innovation.³

4.1.2 Corporate Mission and Objectives of BEL

The corporate mission and the objectives of BEL are as follows:

1. Mission

To be the market leader in Defence Electronics and in other chosen fields and products.

2. Objectives

- 2.1 To become a customer-driven company supplying quality products at competitive prices at the expected time and providing excellent customer support.
- 2.2 To achieve growth in the operations commensurate with the growth of professional electronics industry in the country.
- 2.3 To generate internal resources for financing the investments required for modernisation, expansion and growth for ensuring a fair return to the investor.
- 2.4 To strive for self reliance by indigenisation of critical materials and components in order to meet the nation's strategic needs.
- 2.5 To retain the technological leadership of the company in defence and other chosen fields of professional electronics through in-house Research and Development as well as through collaboration/cooperation with Defence/National Research Laboratories, international companies, universities and other academic institutions.
- 2.6 To progressively increase overseas sales of its products and services.

- 2.7 To create an organisational culture which encourages members of the organisation to realise their full potential through continuous learning on the job and through other HRD initiatives.

With over four decades of experience in manufacturing BEL has contributed in a pioneering manner to the development of electronics sector in India. At present, BEL has emerged as a multi-product, multi-unit, multi-technology firm. BEL has also tied up with GE to set up a joint venture for manufacturing X-ray tubes and another with Multitone, UK for manufacturing paging systems. It has established a subsidiary company BEL Optronic Devices for the manufacture of image intensifier tubes that are used in night vision devices used by the Indian Army. It may be noted that BEL is one of the few companies in the world to have capabilities to manufacture image intensifier tubes.

The key milestones attained by BEL in the process of its achievements in its chosen field are given in Table 4.1.1.

Table 4.1.1: Key milestones of BEL

1954	Incorporation of BEL
1956	Equipment production started at Bangalore (present LPE division)
1961	Manufacturing receiving valves
1962	Manufacturing germanium semiconductors
1966	Manufacturing radars
1967	Manufacturing transmitting tubes
1968	Manufacture of HF & broadcasting equipment, silicon semiconductors
1970	Manufacture of X ray tubes & magnetrons
1971	Manufacture of ICs & Hybrid microcircuits
1972	Manufacture of B&W tubes
1974	Start of Ghaziabad unit
1979	Start of Pune Unit
1982	Start of Space Electronics Division
1983	Integration of ASCO Machilipatnam with BEL
1985	Start of Chennai & Panchkula units, Manufacture of Broadcast & TV, Digital Communication Equipment Divisions, manufacture of vacuum interrupters
1987	Start of Naval Equipment Division
1988	Start of Central Research Laboratory, Bangalore
1989	Manufacture of Telecom – switching & transmission system and mass manufacturing facility
1990	Start of EMI/EMC Test facilities & computer software
1991	Manufacture of SATCOM
1992	Start of CRL, Ghaziabad
1993	ISO – 9002 Accreditation
1994	ISO – 9001 Accreditation
1996	Joint venture with Multitone and GEMS
1998	Kotdwara unit gets ISO 9001
1998	Hyderabad unit gets ISO 9002
1999	Bharat Electronics Quality Institute (BEQI) set up
2000	BEL, Bangalore unit implements rain water harvesting on an industrial basis
2001	BEL bags national R&D award in electronics industry sector
2002	Foundation for BEL's modern Corporate Office building in Bangalore
2002	BEL acquires category-I Mini Ratna status among public sector organisations
2003	Golden Jubilee year
2004	Shifts to new & modern Corporate Office, BEL Bangalore gets CII-Exim award
2007	BEL awarded Navaratna status

Source: www.bel-india.com.⁴

4.1.3 Industry Environment of BEL

Indian defence capital expenditure has increased from Rs 65000 crore in 2002-03 to Rs 89000 crore in 2006-07. As per the Confederation of Indian Industry, India is expected to spend Rs 184500 crore for the purchase of arms and equipment for the armed forces in the next five years of which Rs 123000 crore is to be spent on imports.⁵ India is one of the largest importers of weapons. The role of private sector in the manufacture and marketing of defence products is limited at present and is restricted to supply of raw material and components to defence public sector undertakings. The Indian private sector is, however, set to play a bigger role. Indian companies such as Tata Power, Mahindra and Mahindra, Larsen and Toubro, Astra Microwave, HCL Comnet and WIPRO have planned to increase their roles in the defence products market. The government is also planning to introduce the concept of Raksha Utpadan Ratna (RUR) that would expand the role of Indian private companies in the manufacture of defence equipment. The selected companies under RUR scheme would be preferentially treated on par with public sector undertakings in the defence sector. In addition the government is also planning to increase the foreign investment in defence joint ventures to 50 % from the present 26%. International companies are likely to explore tie-up with large Indian companies as a result.⁶

BEL is dependent on the defence market for almost 70% - 75% of its sales. Any reduction in orders from this sector can affect the company's fortunes. As of 1.4.2007, BEL had a healthy order book position of Rs. 9130 crore (Rs 9586 crore

as of 1.4.2008, Annual Report 2007-08). However, doing business with the defence had its own peculiarities as outlined below:

- Firstly, there was a rigid evaluation cycle followed by the defence services. Defence services raise specification as per their requirements. Each wing of the armed forces would modify the specifications and seek a version that met their requirements. The feasibility of manufacturing would be compared with technologies directly available abroad before placing a final order.
- Secondly, there was a series of process that had to be undergone before manufacturing could be taken up. These include BEL developing its own manufacturing specifications and developing working prototypes and arriving at the costs.
- Thirdly, for any equipment sold to defence an after-sales support of 15 to 20 years was required. This stemmed from the fact that most defence equipment was customised for specific requirements and availability of spares was a major issue.
- Fourthly, the waiting period was long before the requirement could be converted into a meaningful product.⁷ Technologies had a life-cycle consisting of concept stage, prototype design and development, manufacturing, trials, quality testing and retrofitting where relevant.
- Fifthly, products were custom made, often unique.
- Sixthly, scale of orders was low: hence the cost per unit was high, in the absence of volumes. In addition, the level of investment was very high compared to the volumes in components manufactured.

- Seventhly, government policies also affected the industry (for instance, the components also had to be manufactured in house in the absence of a national policy on component industry for the defence sector that limited the role of the Indian private sector).
- Finally, international policies followed specifically by USA would also directly impact BEL, as USA continued to be the market leader for many equipment and components. Thus, BEL often had to work with technologies for which no prototype was available. The defence sector was also opened to the private sector a few years back. While many private sector firms intend to enter this industry, there has been a very limited impact so far. The reasons are not far to seek. Long lead cycle time required for defence product approval, absence of market knowledge and inadequate understanding of the demand, act as entry barriers. Moreover, technological obsolescence is also an added limitation.
- In addition to the above, with liberalisation process in motion after 1991-92 there is a gradual opening of the electronics and allied sectors such as telecommunication, information technology etc. There has also been increasing convergence of these sectors.

4.1.4 Products Manufactured by BEL

BEL's gross turnover during the year 2006-07 was around Rs. 3952.69 crore (Rs.4102.54 crore in 2007-08), of which around 24% was to the civilian (non-defence) sector (17% in 2007-08).⁸ The growth in turnover was around 11.8%

over the previous year in 2006-07 (growth in turnover was 4 % in 2007-08). In 2005-06 BEL's turnover was Rs 3536.28 crore with an order position worth Rs 6633 crore. BEL had an estimated market share of 95 percent in the defence electronics market in India. The product mix of BEL has been given below, under broad groupings. Many of these may also have non-defence applications in communications and medical electronics.

- **Defence: military communication**

- VLF/HF Receiver (HS495).
- VLF/HF Receiver (HS496) 20 WHF Transreceiver (LHP 259).
- 1 KW HF Transmitter (MHN 185).
- Secure VHF Tactical Radio (STARS V).
- Combat Net Radio-AFV (LVM 280).
- Secure VHF Hand Held Radio 9LVP 285).
- Secure UHF Handheld Radio (LUP 291).
- V/UHF Transreceiver (MUN 223).
- Manpack V/UHF Transreceiver (LUP 327).
- V/UHF Transreceiver (LUP 322).
- UHF Radio Relay (LUT 789).
- Semi Ruggedised RAX (SRAX).
- Time Division Modular Exchange (TIDEX).
- Automatic Electronic Switch (AES Mk-II).
- Unit Level Switch Board Mk-II (E 926).
- Burst Error Control System (BEST Mk-II).
- Spurt Message Alphanumeric Radio.

- **Defence: naval systems**
 - Navigational Radar (PIN 524).
 - Medium Range Air and Surface Warning Radar (PFN 513).
 - Long Range Air Warning Radar (PLN 517).
 - Medium Range Surveillance Radar (PIN 521).
 - Naval Fire Control Radar.
 - Hull Mounted Variable Depth Sonar (HUS 002).
 - Hull Mounted Sonar Advanced (HUS 003).
 - Towed Torpedo.
 - Decoy.
- **Semiconductor devices**
- **Vacuum interrupters**
- **Defence: opto-electronics**
 - Night Vision Goggles (BENG 9402).
 - Night Vision Binoculars (BENB 9404).
 - Weapon Sight PNS Mk I.
 - Night Weapon Sight (BENWS 9701).
 - Night Scope (BENS 9304).
 - Laser Range Finder Ophthalmic Zoom.
 - Microscope (BEOM 9909).
 - Surgical Microscope ENT (BEOSM 9905).
- **Non-defence: telecommunications**
 - Rural Automatic Exchange.
 - Digital Switching Systems.
 - Digital Loop Carrier on Optical Fibre (SDH).
 - Primary PCM Multiplexer.

- 2/8 digital Multiplexer.
- 8/34 Mbps Digital Multiplexer.
- 2/34 Mbps Digital Multiplexer.
- Digital Cross Connect Equipment (DCC 512).
- Point to Multipoint Radio.
- **Non-defence: niche products (company technology)**
 - Alarm system for unmanned level crossing.
 - Vessel Identification System.
 - GPS based Vehicle Tracking System.
 - Electronic Voting Machine (EVM).
 - Integrated Fish Finder and Navigation.
 - Guidance System Simputer.
- **Non-defence: solar photovoltaic systems**
 - Solar cells and Modules
 - Lanterns.
 - Home lighting.
 - Street lighting.
 - Pumping System.
 - Traffic Signal System.
- **Systems**
 - Police Communication Network.
 - GPS Based Vehicle Tracking and Monitoring System.
 - Satcom Network for AP Government.
 - Nepal TV Broadcast Network.
 - Telemedicine system.
 - Coastal Surveillance system.

The focus areas for each of the operating centres of BEL are given in the Table 4.1.2.

Table 4.1.2: Focus area centrewise

Centre	Focus Area
Bangalore	Military Communication Naval Systems Radars Telecom & Broadcasting Systems Electronic components Export manufacturing
Chennai	Tank Electronics Optical Fire Control Systems
Machilipatnam	Optical products Medical Electronics
Hyderabad	Electronic warfare equipment
Pune	X-ray tubes, Batteries, Electro-optics
Taloja	Shelters for electronic equipment Warning System Electronic equipment assembly
Ghaziabad	Radars, Antennae, SATCOM (defence) Microwave components
Kotdwara	Telecommunication
Panchkula	Tactical communication equipment

Source: BEL

Product-wise customer groupings are given in Table 4.1.3.

Table 4.1.3: Domestic market

Product	Customer grouping
Defence communication	Defence services, Para-military forces
Radars & sonars	Defence services, Civil Aviation, Department of Meteorology, Department of Space
Telecommunication	Department of Telecommunication, Para-military forces, Power sector, Oil industry, Railways
Broadcasting equipment's studio systems	AIR, Doordarshan, National Radio and TV broadcasters
Electronic Voting Machines	Election Commission of India
Solar Products and Systems	Individuals, private and government organisations
Turnkey systems, E-governance networks	Police, State governments, PSUs
Components	AIR, Doordarshan, National Radio and TV broadcasters, instrumentation industry, switching industry, entertainment industry, telephone industry

Source: BEL

Exports were meagre and stood at US\$ 1.16 crore in 2006-07 (US\$ 1.54 crore in 2007-08). In 2005-06, its exports stood at US\$ 1.37 crore. In recent times, BEL took initiatives to diversify by manufacturing products for civilian sector taking advantage of the interface between defence and non-defence

technologies. Development of high potential GSM antenna and Wi-max antenna for the emerging telecommunication market are good examples. In addition, projects are currently ongoing for product development for use in satellite communication, CDMA-based telecommunication and radio communication networks. Interestingly, the focus on civilian technologies to an extent stemmed from an endeavour to increase manufacturing capacity utilisation and use of manpower resources. A few of these products with focus on market development are given in Table 4.1.4.

Table 4.1.4: Market development–civilian sector

1.	Satellite Transponder Payloads
2.	Department of Telecommunication – New Exchanges (C-Dot based)
3.	Turn-key System Solutions/Networking Solutions (APNET, POLNET)
4.	Security related products, ACCESS products, Smart Cards
5.	Solar Photovoltaic Systems
6.	Laser Based Systems: Laser Target Designators, Eye Safe LRF & Industrial Lasers
7.	Simputers and Set Top Boxes

Source: BEL

Certain recent new products are as below:

- Successful development, production and supply of upgraded Flycatcher Radar.

- Manufacture of Battlefield Surveillance Radars (Medium Range) through Transfer of Technology. Indigenously developed Short Range version taken up for production.
- Development and manufacture of high power VHF secure Radio.
- Production and supply of Hand Held Thermal Imager in large numbers.
- Production and supply of 989339 Electronic Voting Machines. Supported State elections through training and technical back up.
- Electronic Voting Machine customised and successfully demonstrated in Singapore and Mauritius.
- Established pilot batch production of SIMPUTER. Supplied first 200 units for the 'Bhumi' project of Karnataka Government.
- Secured development-cum-supply order for major software intensive Defence projects.
- Upgraded fire control system for the Indian Navy.
- High accuracy direction finder for the Indian Air Force.
- Hand held radio systems with digital secrecy for the Indian Army.
- Acquired qualification and commenced supply of space grade electronic sub-systems for ISRO.
- Call data record system for MTNL's convergent billing.
- Upgraded Electronic Voting Machines.
- Receive-only-terminals for EDUSAT programme aimed at rural schools.
- Solar Lighting Systems for remote rural areas.

There has been an increasing thrust to development of new products by BEL in recent years. The turnover from indigenous technology is around 81 % in 2006-07 (83 % in 2007-08)

In 1993, the following marketing problems were encountered by BEL as follows:⁹

4.1.5 Problems Faced in Marketing

Defence Sector

- Armed forces could have multiple sources of supply. This, in turn, led to price competition between suppliers through unfair cutting of prices and delays in finalisation and placement of orders.
- Clearance required for each order leading to delays in response to queries and sample could not be demonstrated easily.
- Ministry of Defence ought to clear exports to some countries as per Government of India policy. As a result, BEL could not develop international markets for defence products. (in recent years BEL has marketed its products to Srilanka, Surinam, Russia, USA and Maldives)
- Inadequate access to different generations and phases led to gaps, calling for technology development, leading to slow introduction of technology.

Civil (Non-defence) Sector

- Accumulation of inventory in the event of deferment in confirmation of orders and finalisation of delivery schedules.

- As orders were in small lots and most products were customised product development costs were high.
- Tardy and slow response of R&D in meeting specific customer demands.
- Marketing failures in certain low technology, consumer electronics items such as calculators that can be mass manufactured.

4.1.6 Problems Faced in Marketing as of 2004

As of 2004, BEL continued to depend on the defence sector. The firm's civilian business share had fallen from 28% to 21% in 2003-04. The problems faced by BEL in the marketing area around 2004 were as follows:

Defence Sector

- Stringent defence requirements and specifications leading to a long development cycle and acceptance cycle.
- International affairs affected sourcing of components by BEL.
- Central Government approval required for exports even to friendly countries.
- Potential entry of private sector in defence electronics business.

Civil (non-defence) Sector

- High standard professional components but small lot sizes leading to high development costs.
- Inability to capture software exports growth though SOFEX (software exports) cell was formed as early as 1991-92. Lower margins and after

sales requirements hampered growth in civilian markets, deployment of manpower was also high.

In some ways, R&D virtually became the marketing team by virtue of close collaboration with the customer. Exports continued to have a lower share of the sales despite formation of the International Marketing Division at Bangalore as early as 1991-92. The main objective of this division was exclusively to promote export of equipments and components. Difficulties in providing after-sales service in the civilian sector was a constraint.

4.1.7 Marketing Setup of BEL

The higher marketing set up of BEL since 1993 was as follows (Figure 4.1):

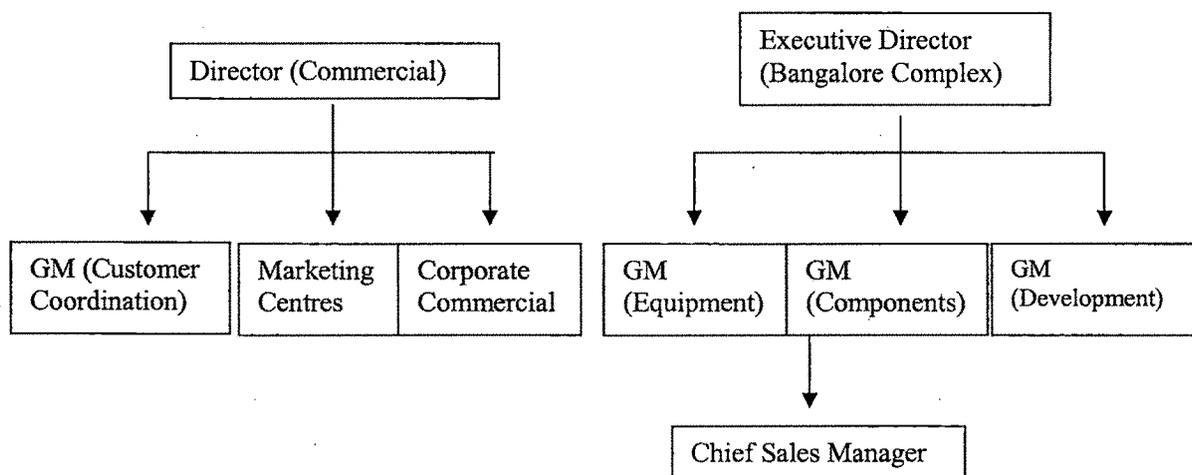


Figure 4.1: Marketing setup of BEL, (Source: BEL).

Chief Sales Manager coordinated with all units for sales of equipment, and coordination with inspection authorities, inputs to pricing and customer training. General Manager (Development) was involved in examining

customer requirements, the Commercial Director coordinated pricing, servicing, liaison between customers and units, management of receivables and seeking of future orders. This structural arrangement emerged from the fact that the Chief Sales Manager had to deal with the inspection units of the armed forces who had a say in approval of the product and their recommended modifications had to be incorporated. The General Manager (Development) looked at customer requirements.

As could be inferred, the emergence of such a complicated marketing structure was more as a response to operational situations with some focus on functional coordination. Discussions revealed that in the late 1980s the products were also made as and when any order was placed. In addition, certain units such as the Machilipatnam unit and Taloja unit that were taken over from other companies after those firms turned sick also led to complexities in the organisation structure.

In the light of the problems faced in the marketing area some of the strategies identified by BEL as responses to the problems faced were:

- Focusing on completely developed products i.e., products not having any technical shortcomings thereby reducing delivery time and costs.
- Targeting exports to S.E. Asia and West Asian markets, which did not have a well developed defence electronics base.
- Getting into organisational arrangements with accredited export houses.
- Alliances /tie ups with buy back arrangements.

4.1.8 Process of Placement of Orders

Before examining the strategic responses it would be appropriate to understand the process of placement of orders by the defence sector. As indicated earlier, the demand for a given product stemmed from the customer, and in BEL's case, mostly the armed forces. Typically, the defence wings did scanning and GSQR (General Staff Quality Requirement) was generated. GSQR was a broad specification requirement. The Navy and the Air Force had their respective equivalents of GSQR to suit their requirements. BEL engineers examined the same. Subsequently another specification was generated called Joint Service Specification also known as Penta 5. BEL also had its in-house Penta 5 (which involved 8-10 months of cycle time). The product would be finally offered to the customers, mostly the armed forces, for multiple trials in peak summer, monsoon and winter (this would take two years at the minimum). As a result, the product introduction cycle time could range from 36 months to 5 years (it is stated that the US defence forces had a corresponding cycle time of a maximum of 3 years in view of a well-developed component base). Volume was definitely a constraint as orders initially were in small lots. Components were mostly defined by the US specifications (MIL standard products). In view of its major involvement in NATO, even European countries had to follow the US specifications. Moreover, the US was also a major consumer of military grade components. As a result, BEL always had to manufacture its products to MIL standards. However, the demand for such high standards in the civilian sector was very low in India. As procuring components from USA was limited by international

affairs, and the government's foreign policy, BEL had developed relationships with French firms such as Thales for joint development of products, for semiconductors with Philips of Netherlands, with Swiss firms for electromechanical technology.

4.1.9 Strategic Responses of BEL

- Quality as a strategic response.
- Roll on Plan and Quality.
- Formation of Strategic Business Units (SBU).
- Diversification into systems.
- Cost cutting initiatives.
- Setting of BEL net.
- R&D strategy.

These have been discussed in the following sections.

- **Quality as a strategic response**

A major response of BEL was in the area of quality and it continues to be a major thrust for the company. The origin, rationale and initiatives taken with response to quality enhancement are highlighted in the oncoming sections.

The responsibility of quality assessment of products manufactured by BEL lay in the initial years with the armed forces that had their inspection agencies. In the late 1980s it was observed that there was considerable backlog in

sales i.e. accounted as sales, but physically not moved for various technical shortcomings. Thus focus of the first quarter of the subsequent financial year was in clearing the physical backlog of the previous year. A strategic decision was taken by the top management that the sales effort would involve uniform despatch throughout the year and not restricted to the last quarter of the financial year. Thus a 'market' driven system monitoring sales effort was required. Therefore quality enhancement and monitoring was a 'driver for completion' of product with customer-driven quality parameters. Thus TORQUE (Total Organisational Quality Enhancement) was a major initiative in response to the market demand and change¹⁰ (i.e. quality assessment was not just the responsibility of the armed forces but also ought to be joint responsibility of BEL).

A second market change that took place was BEL getting export orders, (specifically for Radars in the 1980s for West Asia) for subcontracted manufacturing with stringent customer-driven quality standards. Such orders provided BEL engineers insights and learning of market-driven quality with strict delivery schedules.

Prior to TORQUE, during 1970s, a period of expansion for BEL, a strong standards department was created in BEL. This department developed standards for material, component, process and workmen's standards. In 1975 an internal quality manual was also designed. While these were focused on manufacturing per se, the parameters for the TORQUE initiative which was

introduced initially in manufacturing and later was oriented towards market changes. The market aspect was obvious, for instance, a customer satisfaction survey / TORQUE report was introduced in 1997.

In 1992, ISO 9000 took its full fledged form with transformer and component division of the Bangalore complex, getting ISO certification, followed by Kotdwara. By 1997-98 all divisions had adopted ISO 9000. With a minimum of one day training for 13000 staff, 100 lead assessors of ISO 9000, 50 lead assessors for ISO 14000, quality was seen as a company wide strategic endeavour to acquire a market orientation.

In 1999, Bharat Electronics Quality Institute (BEQI) was set up in Bangalore to be a catalyst in the transformation of BEL as a customer focused, globally competitive company supplying world-class products and services, for which the guiding principles identified by BEL were: continuous skill improvement, adaptability and responsiveness to market environment, continuous cost reduction and process improvement.¹¹ Training was provided to officers of BEL (and other client firms such as ABB, MICO, Escorts, Reva, Wipro, Deccan Herald etc.) on aspects of management covering customer relationship management, innovation, benchmarking, supply chain management, six-sigma, quality management, reliability, with the above thrust on market orientation. Setting up of BEQI was a response to changes in market such as bug free products, shorter delivery time etc.

Six-sigma initiative:

In the 1990s, GE entered into a collaboration with BEL for manufacture of X-ray tubes with GE performing the role of marketing agents. These tubes were technology intensive and were recommended by the World Bank for health projects. By virtue of its association with GE, the top management was trained in six sigma practices by GE trainers for 12 days. GE, which marketed 70% of the products manufactured in GE-BEL, made adoption of six-sigma practices a condition for any manufacturing and marketing arrangements. There were around 300 green belts in six-sigma in BEL (more than 1000 officers have been trained). Around 150, six-sigma projects have been completed.

Six-sigma implementation in BEL resulted in some degree of integration of various quality initiatives taken up by the company. BEL had been exposed to world class manufacturing practices by virtue of an earlier association with Hewlett Packard, realised that, emerging competition was in the field of defence electronics and that quality was going to be a source of major competitive advantage in the international markets. It also planned a turnover of Rs. 8200 crore by 2010-11 of which a significant percentage would be from exports and the civilian market. Thus BEL's quality initiative, specifically TORQUE, is a major strategic response to changes taking place in the market environment (TORQUE Brochure 2004).¹²

The milestones under TORQUE are in Table 4.1.5.

Table 4.1.5: Milestones under TORQUE

Introduction of TORQUE Parameters for Manufacturing Areas	1990
Training of Internal Auditors/Lead Auditors	1992 onwards
ISO 9000 Certifications	1993 – 1999
Sustenance of the above certification	1993 onwards
Formation of the Review Committee on TORQUE Implementation	1996
IQSA	1996
Institutionalising the TORQUE Coordinators' Conference	1997
Generation of Quality Awareness material	1997
Customer Satisfaction Survey/ TORQUE Report	1997
Introduction of TORQUE Parameters for Service Areas	1998
Company-wide usage of ISO Logo	1999
Six-sigma Training and Project Implementation	1998 onwards
Formation of the Bharat Electronics Quality Institute (BEQI)	1999
TORQUE Conference	2000

Source: BEL

TORQUE parameters have been given a weightage of 10 in the Performance Appraisal System from 2003-04 onwards. From 2003-04 BEL had committed to the Government, through the MOU process, adherence to specific quality initiatives, thus making TORQUE a high level strategic endeavour of the company. This would eliminate tardiness in adoption of quality initiatives in certain units. To become a customer driven global company, exports were a

must and towards this end quality was a major strategy for gaining competitive advantage according to the management. These point out to the fact, that quality initiative is a major response in BEL to gear up with competition.

- **Roll on Plan and Quality**

Quality enhancement is a major strategy of BEL and is also evidenced by other initiatives. BEL followed a Roll on Plan method (1st year plan + 4 years future path based on customer inputs) which was an intense three day interaction of CMD, Directors and GMs of the business units. A mid year review was also undertaken in October. Traditionally, this forum was used for fixing production and sales targets. Subsequently, based on an office order quality targets were also decided in this forum. A set of TORQUE parameters covering the following aspects was introduced (Table 4.1.6).

Table 4.1.6: Major TORQUE parameters

1.	Procurement and inspection cycle time
2.	Quality Cost (including inventory pile up due to customer rejections)
3.	Customer complaints
4.	Delivery delays
5.	Sundry debtors
6.	Measurement of customer satisfaction

Source:BEL

- **Formation of SBU (Strategic Business Units)**

As indicated earlier, in the initial years, the approach of BEL was to manufacture as and when orders were placed. However, in the late 1980s, Capt. Prabala who was the CMD of BEL set up a Strategic Planning Unit called GRASP, which was not a permanent entity, with members from different areas, to prepare strategic documents in the light of changing market conditions with focus on internal changes required in the organisation to cope with a more liberalised economy.

This group met the top management in major customer groups such as defence, and civilian sector set-ups of AIR, Doordarshan, Railways, Police, Department of Electronics, Telecom to understand their planning and their future needs. The exercise was a major scanning of the market environment. The GRASP team aimed at a turnover of Rs. 1000 crore by 1994 by manufacturing products based on customer needs. This exercise of market research that lasted for a year resulted in three major Business Units viz. communication, radars and components. However, the strategy of converting them into full-fledged profit centres could not be implemented as a result of resistance from unions. Based on the experience gained in running these business units, in 2001 the Bangalore complex of BEL that contributed to around 40% of the turnover was converted into six Strategic Business Units viz., Radars, Naval systems, Mobile communication, Components, Telecom and Broadcasting and Export group. Initially these groupings were for internal purposes with the

long-term objective of becoming full-fledged profit centres with autonomy for outsourcing, vendor development. Thus formation of the SBUs in Bangalore complex was another important strategic response of BEL to changing market conditions.

- **Diversification into systems**

The company made an important diversification into Systems area. Based on the experience of software development, BEL perceived its limitation that the company was not geared for services sector. Its strength was in technology. At the same time, given the thrust of increasing the civilian business share in its turnover, an interesting initiative was to set up the AP Net on BOOT principle. This involved technical, software configuration and operating the same for three years. It should be noted the project is technology intensive and many state governments and national agencies are likely to set up similar networks. In 2005-06, it also bagged the contract from Mahanagar Telephone Nigam Ltd for convergent billing for Mumbai and Delhi, EDUSAT programme technology implementation, VSAT network for Nigerian government.

Thus diversification into systems was another key strategic response based on its strengths to market trends. An additional factor was the inability of BEL to penetrate civilian sector markets such as medical electronics that demanded a long distribution chain, continuous after-sales service and collaborations.

Other Strategic Responses

- **Cost cutting initiatives**

BEL introduced measures to reduce manufacturing costs. It has set up cost reduction task forces in each SBU.

- **Setting of BEL net**

In addition to BEL net, it implemented Enterprise Resource Planning (SAP) in Bangalore unit on a pilot basis.

- **R&D strategy**

In 2007 had plans to spend around 10% of its turnover for research (around Rs 450 crore including Rs 120 crore for collaborative research with DRDO) but spent around 5.1% of its turnover in 2007-08. It plans to focus on an anticipated research strategy rather than a reactive strategy.

The dimensions in the context of BEL (Table 4.1.7), role of factors for firm's growth (Table 4.1.8) and dimensions of the industry in which BEL operates (Table 4.1.9), as perceived by BEL executives have been highlighted.

Table 4.1.7: Dimensions of BEL

Sources of competitive advantage	Cheap cost, R&D, product development and engineering, large size of the firm
Responses to liberalisation	Technology upgradation, quality, product innovation, organisational restructuring, cost reduction, diversification, forming alliances
Importance of marketing function	Very important for civilian sector
Approach to marketing	Focused marketing for existing customers to build relationship and technical collaboration
Reasons for growth	Highly skilled professionals, role of government policy (critical), CEO's vision

Source: BEL

Table 4.1.8: Role of factors for firm's growth

Finance at cheaper rates	Moderately important
Turnover	Very important
Large product mix	Important
Market conditions	Very important
High end technology	Very important
Favorable government policies	Very important

Source: BEL

Table 4.1.9: Dimensions of the industry in which BEL operates

Product life cycle	Long
Pricing policies of products	Expensive
Distribution channels employed	Two level
Gestation period (lab to market)	Long
Dependence on foreign markets	Low
Importance of continuous product development	Highly critical
Importance of branding	Somewhat important
Industry level initiatives	Not adequate
Strategic alliances	Important
Scale of finance required	High
Size of operations	Large
Requirement of professional human resources	Very important
Scale of investment in R&D	Very high

Source: BEL

To further the growth of the firm it plans to focus on areas of core competence with thrust on exports. In the light of changes in the global scenario and the business environment BEL formulated its Vision, Mission and Objectives afresh in 2005-06 as follows:

Vision

- To be a world-class enterprise in professional electronics.

Mission

- To be a customer focused, globally competitive company in defence electronics and other chosen areas of professional electronics through quality, technology and innovation.

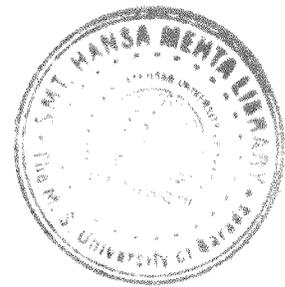
Objectives

- To be a customer focused company providing state-of-art products and solutions at competitive prices meeting the demands of quality, delivery and service.
- To generate internal resources for profitable growth.
- To attain technological leadership in defence electronics through R& D, partnership, with defence/research laboratories and academic institutions.
- To give thrust to exports.
- To create a facilitating environment for people to realise full potential through continuous learning and team work.
- To give value for money to customers and create wealth for shareholders.
- To constantly benchmark company's performance with the best internationally.
- To raise marketing abilities to global standards.
- To strive for self reliance through indigenisation.

In 2006-07 the company identified its strengths, weaknesses, opportunities and threats as follows:¹³

Strengths

- Strong R&D base, in-house as well as by close association with DRDO Labs.



- Very good infrastructure and manufacturing facilities.
- Well established systems and procedures.
- Financial strength.
- Skilled, dedicated and motivated work force.
- Capability to provide lifetime product support.

Weaknesses

- Low risk taking ability.
- Not proactive enough.
- Lack of aggressive marketing.
- Dependence on defence market.
- Slower response time.

Opportunities

- Upgrade programmes.
- System solutions business.
- Export through offset mechanism.
- Strategic alliances.

Threats

- Rapid changes in technology.
- Private participation in defence sector.
- Sourcing of Technology – non-availability and exorbitant cost.
- Large number of international players.
- Attrition of trained and skilled manpower.

As the Chairman and Managing Director in an interview stated “we want to expand into where we are not concentrating till nowcivilian segment, especially security systems, homeland security systems, civilian communication projects, wide area network, state-wide area network and E-governance projects.”¹⁴ It was also planning to undertake contract manufacturing for other companies. BEL was also planning acquisitions of good technology companies in areas relating to BEL’s business using the operational autonomy under its Navaratna status conferred on it by the government.^{15 16} BEL recorded a provisional turnover of Rs 4618 crore in 2008-09. It also signed an MOU with Bharat Heavy Electricals Ltd to explore the setting up of a joint venture in the area of solar photovoltaics.¹⁷

The responses of BEL have been highlighted in Table 4.1.10.

Table 4.1.10: Responses of Bharat Electronics Limited

	Internal	External
Controllable	<p><u>Responses initiated:</u></p> <ul style="list-style-type: none"> ▪ Quality improvement of its products ▪ Customer defined quality standards to avoid over designing ▪ Adherence to delivery schedules ▪ Technology upgradation and product innovation ▪ Quality as a mechanism to introduce organisational changes ▪ Setting up of BEL Quality Institute ▪ Introduction of Roll-on-Plan ▪ Formation of SBUs ▪ Cost cutting in production ▪ Investment in IT ▪ Investment in R&D ▪ Recently started benchmarking of processes with respect to international firms 	<p><u>Responses initiated:</u></p> <ul style="list-style-type: none"> ▪ Diversification into systems integration business though in a limited manner ▪ MoUs with companies such as Boeing, Northrop Grumman, Lockheed Martin etc to utilise the offset clause ▪ Planning acquisitions abroad ▪ Contract manufacturing ▪ Formation of SBUs and Strategic Planning Division <p><u>Limited responses:</u></p> <ul style="list-style-type: none"> ▪ In penetrating in the civilian electronics sector ▪ In capitalising on software industry growth ▪ In the formation of subsidiaries/alliances to enter emerging areas like medical electronics, telecommunication
Non-Controllable	<p><u>Limited responses:</u></p> <ul style="list-style-type: none"> ▪ In building a market-oriented work culture ▪ In moving towards a profit centre concept ▪ In removing the inability to shift to outsourcing and pooling of common services across units ▪ In moving towards retaining only critical aspects of manufacturing and outsourcing the rest ▪ In reducing trade unionism ▪ High attrition rates among engineering cadre and inability in retaining top class manpower 	<p><u>Limited responses:</u></p> <ul style="list-style-type: none"> ▪ In advocacy efforts with respect to Govt of India policies in the context of alliances, diversification and funding ▪ In influencing international market trends influenced by geopolitics ▪ In responding to standards influenced US industry ▪ Inability to respond to professional Human Resources market ▪ In responding to the potential entry of Indian private sector through Raksha Utpadan Ratna scheme

Source: Based on Sharma (2007), discussions at BEL and Annual Reports

As the framework of Sharma (2007) focuses on the past, an effort has been made to examine the future market scenarios and potential responses in the last chapter on summary of findings and recommendations.

END NOTES AND REFERENCES

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4.2 INFOSYS TECHNOLOGIES LIMITED

On the occasion of Infosys completing 25 years in 2006, N. R. Narayanamurthy, its founder stated “A great corporation must live on. Hence, we are all babies. Even these initial baby-years have taught us several lessons. These lessons are valuable not for just our future journey but for other corporations in the country and, perhaps the world.....Finally I would urge Infosys to choose a worthy dream, to go after it confidently, and to play a role that would make us proud in the years to come.”¹

4.2.1 Introduction

Infosys Limited was born out of the vision of one individual N. R. Narayanamurthy (see Box 2), who inspired his colleagues working with the software firm Patni Computers Limited in Pune to join him in the entrepreneurial venture. A major reason as to why N. R. Narayanamurthy decided to start Infosys was to take advantage of the differential tariffs paid for professional software services in India and those in USA. Infosys was started with a capital of Rs.10000 in 1981. By 2007 the market capitalisation of Infosys was around Rs.115307 crore. Earlier in 1993 the company went public.

Box 2: A brief background of N. R. Narayanamurthy

Nagavara Ramarao Narayanamurthy was born in a humble Madhva Brahmin family in Mysore in 1946. He completed his Bachelor's degree in Engineering from the National Institute of Engineering, Mysore and Master's degree in Technology from IIT Kanpur. He was employed as a Systems Programmer at IIM Ahmedabad and later worked with Patni Computers Limited at Pune prior to setting up Infosys. He was Chief Executive of Infosys for twenty years, stepped down voluntarily, by becoming its Chief Mentor in 2002, in favour of his younger co-founder Nandan Nilekani. Highly honoured in India and abroad, N. R. Narayanamurthy was awarded the Padmashree by the Government of India in 2000, voted World Entrepreneur of the year by Ernst and Young in 2003, awarded Max Schmidheiny Liberty 2001 prize (Switzerland), in recognition of his promotion of individual responsibility and liberty, and figured in lists of admired CEOs arrived at by many independent ratings. He is an institution builder and has served on the Boards of academic institutions such as IIMA and is on the Board of Wharton School, Cornell University etc. Known for his simple, middle class Indian lifestyle, Narayanamurthy is considered a phenomenon in Indian business and highly admired by peers across business. He is respected for his high sense of social responsibility

4.2.2 Evolution of Infosys

Evolution of Infosys has at its core a business model driven by professional entrepreneurs. The other co-founders were Nandan Nilekani, Nadathur. S. Raghavan, Kris Gopalakrishnan and Shibulal. In contrast to most other enterprises in India, the promoters were not born in business families. They also did not have investment capabilities derived from profits from

modern agriculture as in the case of entrepreneurs from land-owning families or got support from family-run enterprises since none of them belonged to traditional trading communities noted for business acumen in India. They had their origins in middle class families with only professional education as their strength. All the promoters had given up potential careers in the corporate sectors in pursuit of their venture.

The growth of Infosys is in many ways symbolises the liberalisation initiatives of India and its search for a status in global business commensurate with its potential. From a modest turnover of around Rs.11.63 lakh in 1991, the turnover of Infosys grew to around Rs.13149 crore in 2006-07. The number of employees grew from a modest 162 in 1991 to 72241 in 2006-07 (91187 in 2007-08). Infosys also improved its position steadily in the export front since its inception. In the initial years, Infosys got financial support from Karnataka State Financial Corporation (KSFC), Karnataka State Industrial Investment Development Corporation (KSIIDC) which had some visionary executives who lent finance for import of computers. Subsequently Infosys was supported by financial institutions such as State Bank of Mysore. By 1999 Infosys was the first Indian firm to list on the US stock exchange. On December 9, 2006, Infosys became the first ever Indian firm to be included in the prestigious NASDAQ-100 index which is well known and “is one of the world’s most recognised benchmarks that owes the distinction to its companies that are leaders in a diverse range of industries” according to the

Deccan Herald.² Its officials perceived that this recognition, in the silver jubilee year of Infosys's inception, was for the firm as well as for India.

The vision of Infosys in the words of its founding Chairman was and is "to be a globally respected software corporation providing the best-of-breed business solutions employing the best-in-class professionals." (Narayanamurthy as quoted in Chary, 2005).³

As indicated earlier Infosys's pattern of enterprise building was influenced by some early learning and had an influence on its strategies. These learnings in a nutshell were:

- Market success is a first step to building a successful enterprise.
- In addition, as Narayanamurthy indicated in various newspaper interviews that globalisation ought to be welcomed and adopted (as the market for customised software development was in the developed western countries and a similar market did not exist in India in the initial years).
- A long-term view of business is vital for success.
- Resources have to be sourced at the most economical place, conversion of the same where the product/service is cost-effective and marketing ought to be at places where it is most profitable without being hampered or limited by national boundaries.

- Minimisation of risk by not over-focusing on any single client, technology or as far as practically possible geography.⁴ Human resources are critical for success in business. Since Infosys is in the services sector its business is people oriented. This influenced Infosys's human resources strategy in later years. The company attached a high value to its human resources as assets and formulated strategies to reduce employee attrition.
- Values are not to be compromised in transactions both in India and abroad even under adverse circumstances.

In a wise move as early as the late 1980s, Infosys dropped its hardware business as it meant dealing with the government as the only customer specifically in the telecommunication business. Infosys also had a joint venture with the reputed management consulting firm for about 10 years in USA. This joint venture firm helped Infosys penetrate the US market and build its reputation as a software service provider. This joint venture was later terminated with Infosys acquiring independent marketing capabilities as it developed familiarity with methods of working with the US companies, business practices in USA and gained insights into customer requirements. It set up its own marketing office in USA.

Another sagacious move in its early years was to focus on software development as the crux of its business and has never had any dalliance outside this core area. Interestingly, it has been observed in many cases of

enterprises established by first generation entrepreneurs that grew to become successful ones, have focused on their core business for many years before diversification.⁵ From six employees in 1981 when it started, the number of employees of Infosys grew to around 162 in 1991, the year when the Indian nation embarked on its liberalisation to around 72241 employees in 2006-07 (91187 in 2007-08 and 104850 in 2008-09). Its turnover had increased from Rs.1.2 crore in 1981-82 to Rs.250.94 crore in the year ending 1998 and by 2007 further to Rs.13149 crore (Rs 16692 crore in 2007-08 and Rs 21693 crore in 2008-09). Infosys was having offices in around 9 locations in USA alone in addition to offices in Canada, UK, Germany and Japan. In India it had many development centres with multiple centres in some Indian cities.

4.2.3 Key Milestones of Infosys

The key milestones achieved by Infosys are given in Table 4.2.1 and are as follows:

Table 4.2.1: Key milestones achieved by Infosys

Year of Incorporation	1981
Became a public limited company in India	1992
ISO 9001/TickIT Certification	1993
Attained SEI-CMM Level 4	1997
Listed on NASDAQ	1999
Crossed US\$100 million in annual revenues	1999
Attained SEI-CMM Level 5	1999
Crossed US\$400 million in revenues	2001
Crossed US\$ half a billion in revenues	2002
Crossed US\$ billion in revenues	2004
Joined the NASDAQ Global Select Market	2006

Source: www.infosys.com

4.2.4 History of Infosys

The history of Infosys year wise in a nutshell is given below:

1981

- Establishment in India.

1987

- Global Initiatives - First international office in US.

1993

- Corporate performance - Successfully completed IPO in India.
- Quality initiatives - ISO 9001/TickIT certification.

1995

- Corporate performance - Best Annual Report Award from ICAI (every year from 1995).
- Globalisation initiatives - Set up development centres across cities in India.

1996

- Corporate performance - Infosys Foundation to focus on contributing back to the society.
- Globalisation initiatives - Set up first office in Europe in Milton Keynes, UK.
- Strategic initiatives - E-business practice (Infosys Internet Consulting Practice).

1997

- Globalisation initiatives - Set up office in Toronto, Canada.
- Quality initiatives - Assessed at CMM Level 4.
- Strategic initiatives - E-business practice (Infosys Internet Consulting Practice).

1998

- Corporate performance - First in "Award for Corporate Excellence" The Economic Times.
- Strategic initiatives - Enterprise solutions practice (packaged applications).

1999

- Corporate performance - US\$100 Million in annual revenue.
- India's most admired company by The Economic Times Survey.
- Globalisation initiatives - Listed on NASDAQ - (first India-registered company to list).
- Offices in Germany, Sweden, Belgium, and Australia.
- Two development centres in US.

- Quality initiatives - Assessed at CMM Level 5.
- Strategic initiatives - Infosys Business Consulting Services.
- Reorganisation for competence building Domain Competency Group (DCG), Software Engineering and Technology Labs (SETLABS), Communications vertical practice (CAPS).

2000

- Corporate performance - First company to be awarded the "National Award for Excellence in Corporate Governance" conferred by the Government of India.
- US\$200 Million in annual revenue.
- Globalisation initiatives - Opened an office in France.
- Opened new office in Hong Kong.
- Global development centre in Canada and UK; Three development centres in US.
- Strategic initiatives - Combined the dedicated E-business practice with rest of the organisation.

2001

- Corporate performance - Rated Best Employer of India in a joint rating by Business Today and Hewitt Associates.
- Touched US\$400 Million in annual revenue.
- Globalisation initiatives - Opened new offices in UAE and Argentina.
- New development centre in Japan.

2002

- Corporate performance - Ranked No. 1 in the "Best Employers in India 2002" survey conducted by Hewitt Associates for the second consecutive year.
- First rank in the Business World's survey of "India's Most Respected Company".
- Touched half a billion dollars in annual revenue.
- Globalisation initiatives - Opened new offices in Netherlands, Singapore and Switzerland.

2004

- Corporate performance - Crossed a billion dollars in annual revenue.

2007

- Appointment of Nandan Nilekani as Co-chairman.

Source: www.infosys.com.⁶

4.2.5 Industry Environment of Infosys:

Information Technology (IT) industry has been around in India for many years. In the light of increasing control on the IT industry in the late 1970 by restricting the extent of ownership by foreign firms, many MNCs decided to exit the country. The gap that was created by these companies was filled by Indian firms such as Patni Computer Systems, Datamatics, Tata Burroughs etc. These Indian firms operated in areas such as basic data-processing, software development and maintenance. Taking advantage of low-cost skilled engineers with good communications skills in English, companies such as Tata Consultancy Services (TCS), Tata Unisys Limited (Tata Burroughs) recruited many Indian professionals to develop software at customer sites in the USA. Capitalising on the favourable difference between cost of Indian software developers and their US counterparts, many Indian enterprises entered the business of providing Indian “Contract” programming services for on-site development of software, popularly known as “body shopping” business. TCS in some ways pioneered the on-site contract services model.

Taking advantage of favourable Indian government policies many new firms entered the software industry. Bulk of the demand for IT services was in the developed countries, with USA leading the pack. Japan, Germany and UK were also important markets. By mid 1990s India was becoming a leading provider of software services. Policy makers viewed the software sector as an approach to industrial development based on scientific manpower. According to a study, from 1995 to 2000, the software industry grew at a compounded

annual growth rate of 42% as per NASSCOM.⁷ This study also predicted revenues of US\$ 87 billion by 2008 from IT industry as a whole, of which software services exports was estimated to be around US\$ 50 billion.

There have been major contributing factors for the kind of growth seen in the software sector. India has the second largest scientific and technical manpower with knowledge of English, cheaper availability of technical and managerial manpower, recognition of software sector as a growth sector by government in the centre and the state irrespective of political affiliation (and hence support for infrastructural development and simplification of procedures for starting software enterprises). In addition, a large pool of NRIs with understanding of the US business and their working processes also helped in the growth of the Indian software sector.⁸

The IT industry is also influenced by the demand and supply of IT professionals. An important aspect of the industry is the quality of graduates joining the workforce. The quality not only includes technical competence, but also managerial capabilities such as project management, behavioural skills etc. As continued availability of IT graduates with such competence has been an area of concern for IT industry, initiatives have been taken by IT companies and industry associations to reduce this shortcoming.

There are atleast 1800 projects ongoing at Infosys. This makes project management an extremely critical function.⁹ Continuous innovation is another

aspect of the industry. Often new development can render programmes and specialists irrelevant. This calls for sustained upgradation of competencies. Hence Infosys set up its Global Education Centre to train its employees.

High quality infrastructure is another important aspect of this industry. Development of campuses with continuous expansion in seating space requirement is important. Infrastructure bottlenecks impair the growth of the IT industry. Often this calls for high level of interface with the state government and software enterprises come into conflict with the requirement of other industries. Development of world class infrastructure is also a deterrent to loss of qualified professionals to competing firms and reduces attrition rates. Cheaper availability of qualified labour has also resulted in the emergence of ITES/BPO industry with many IT enterprises diversifying into this area.

A comparative study of a few IT and Biotechnology firms indicated some interesting features of the IT sector in India.¹⁰

- Having clear client focus, cheap cost of labour, large pool of scientific manpower and ability to work with high end technologies were sources of competitive advantage.
- Establishing strategic alliances, increasing R&D spending, clear definition of the target market were important approaches to coping with the challenges of globalisation. Entering new markets and product innovation were also considered important.

- Institutional branding i.e. marketing of the IT firm was relevant in the IT industry.
- Though favourable government policies played a very important role in the growth of IT firms, favourable market conditions were more important.
- Dependence on foreign markets for growth was high in the IT industry. Access to international sources of finance has also been a factor that aided this industry.

While Indian IT firms did enjoy cost advantage there were concerns as to the sustainability of this aspect, particularly in value-added IT activities.¹¹

Another aspect was setting up of IT firms by large IT users, some of them multinationals.

4.2.6 Products and Services Offered by Infosys

- Providing IT professionals to a client to work at the client site. This is often a prelude to gain entry and establish stronger relationship.

In addition, following are a few of the services offered by Infosys:¹²

- Off-shore maintenance (OSM): This involves providing support to the client for software developed by Infosys as well as other firms.
- Application development: Customised development of applications that are expected to meet specific business needs of client.
- E-business.

- System integration: involves integration of various applications to the IT infrastructure of the client.
- IT consulting: involves bringing about integration and streamlining of a firm's business and IT strategies. This is a high value-added service and may follow Business Process Re-engineering initiative, IT infrastructure assessment leading to IT implementation.
- Enterprise solutions: include ERP, CRM, data warehousing solutions, data mining.
- Communication solution: focuses on IT needs of providers of telecom services and equipment.
- Engineering services: includes the entire lifecycle of software development in the context of engineering enterprises using CAD/CAM/CAE.
- Enterprise banking solutions: This service focuses on providing solutions to the banking sector. It has developed a few products such as FINACLE, an integrated core banking solution that is popular with many Indian banks (due to the value for money it offers in relation to those of competitors). In addition to private sector banks, Punjab National Bank, a major public sector bank adopted FINACLE as early as 2002. The other banks that adopted FINACLE were SBI, Indian Bank, ICICI, HDFC and the Bank of Baroda. In addition, Infosys also developed BANCS 2000, bank branch automation software, targeted at developing country banks. There were also other products such as Pay Away (billing and payment solution) and BancsConnect (linking Finacle and other applications). BANCS 2000 is

also available in an adaptation for the logistics and supply chain business.¹³

The various industry segments that Infosys catered to are as below:

(www.infosys.com)

- Aerospace and defence
- Automotive
- Banking and Capital markets
- Communication services
- Consumer packaged goods
- Discrete manufacturing
- Energy
- Healthcare
- High technology
- Hospital and leisure
- Insurance
- Life sciences
- Media and entertainment
- Resources
- Retail
- Transportation services
- Utilities

Infosys BPO services were also a major activity prior to it being spun off as a separate company called Progeon (now Infosys BPO Ltd).

4.2.7 Marketing Aspects of Infosys

Infosys defined itself as a services enterprise even though it had products such as Finacle, BANCS, etc. and also a successful product in the packaging sector. The focus is clearly on services as Narayanamurthy indicated on many occasions that bulk of its turnover was from services.

Given its software services, Infosys built strong capabilities in this area by design over time. In the absence of a powerful brand name such as Microsoft, the management of Infosys understood that product was distinct from services and that the resources required for product development were different. Many software developed would tend to have considerable common and standardised elements. There are, however, continuous changes in technology, business models of firms and changes in customer behaviour. In view of these changes enterprises would prefer to gain competitive advantage leveraging the above and hence Infosys perceived that there was role for customised software (development). The experiences of other enterprises such as I-flex also tend to confirm this aspect. This approach of Infosys involved a high level of customer orientation and problem solving approach. Typically, its marketing was targeted at the Chief Information Officers (CIO) of top firms. Potential projects were identified by undertaking a small project to get a foothold, develop a deeper understanding of customer needs and requirements and this was often a precursor to seek a bigger development project. Domain experts at Infosys also visited potential customers. Initially, Infosys experts discussed potential project feasibility. This was followed by further discussions to

finalise deliverables, scope of the work to be undertaken and price considerations. The entire cycle with aspects such as project initiation, team deployment, execution and completion followed after finalisation of contract terms.

Given the nature of software development, both a cascading approach (where stages of development and goals could be clearly defined) and a spiral approach (where the initially unclear goals changed with more clarity at every stage thus expanding the scope of work) were possible. These called for a high level of service marketing competencies in terms of people, processes, physical infrastructure in addition to dimensions of conventional marketing mix. Hence Infosys invested heavily in people, emphasised strong process discipline and created excellent physical infrastructure. Infosys, also realising that it was a service development firm, developed a relationship model with stress on long term relationship with clients.¹⁴ This involved forging strong relationships with client firms by successful completion of existing projects and helping clients to identify potential areas for IT interventions to enhance the client's business.

Over a period of time Infosys endeavoured to broad-base its customers by entering new segments, increasing the extent of usage and developing newer services to meet existing client requirements. There was a continuous effort to develop Infosys as a corporate brand. Infosys developed its marketing strategy taking a long term horizon of business that Narayanamurthy

expressed as not being disproportionately dependent on any one client, technology or particular geographical region so as to reduce vulnerability.

In its efforts to build a corporate brand, Infosys went beyond mere cultivation of an image and endeavoured to create what Kapferer (2005) in his book on brand management called as brand identity. This brand identity involved representing customer value, following practices that are honest, integrity, good corporate governance, social values, creating wealth by the enterprise and distribution of wealth among its employees. In recent times Infosys also made efforts to generate value addition by undertaking complex projects.

Infosys's marketing efforts also included undertaking domain research, analysing potential prospects, involvement in focused events. Other marketing aspects were lead generation, strategising, organisation, prioritisation of activities with identified leads and management of alliance partners. Corporate marketing also involved participation in seminars on various aspects of IT services such as quality issues, software engineering and software training and education.

4.2.8 Advertising and Promotion Aspects of Infosys

Advertising and promotion aspects of Infosys followed a multi-pronged approach as outlined below:

- Infosys recognised that potential employees were its audience and in all its employment advertisements highlighted select employees (hailing from

different regions) with their photographs, their responsibilities, their growth trajectory and their observation on the working environment in Infosys.

- It also had programmes such as “Campus Connect” to link with students of leading business schools and academic institutions which were feeders of human resources to the company.
- Infosys frequently had client meets organised by it to create a word-of-mouth positive opinion about Infosys. This helped forge relationship and elicit customer option of its services.
- Infosys’s top management was also conscious of its role in the IT industry and was often in the forefront of many IT industry initiatives, NASSCOM’s activities, CII and government sponsored programmes such as Bangalore IT.Com. Top political leaders of Indian states, heads of government (such as the President of Russia), and key leaders such as members of royal family of Thailand visited the Infosys campus, interacted with its employees and planted saplings in its campus.
- Infosys also had a well conceived public relations strategy. In recent times, in addition to Mr. Narayanamurthy, other members of the top management team such as Mr. Nandan Nilekani and Mr. Gopalakrishnan were highlighted in the press. It carefully handled its relations with the state government in Karnataka on controversial issues such as land requirements for the firm and employment to locals.
- Infosys projected itself as a socially conscious enterprise by supporting the activities of Infosys Foundation and being part of IT industry’s social

initiatives. In a recent initiative of CII, Narayanamurthy called for greater involvement of the industry in social causes.

- Infosys's top management was part of the IT task forces of government setups such as Government of Karnataka's IT department and those of the central government.
- Infosys also supported student research fellowships in leading institutes of management and technology.
- The annual report of Infosys and its website were carefully designed as part of a larger communications and public relations strategy. Its annual report carried write-up by top management thinkers such as C.K. Prahalad and Infosys's client representatives.

4.2.9 Organisation Structure of Infosys

To achieve its business objectives Infosys designed an organisation structure as indicated in Figure 4.2 (The structure evolved as a response to a changing marketing environment). The evolution the structure would be analysed in greater detail later. A few specific observations however would be in order:

- Infosys followed a combination of functional and matrix organisational arrangement.
- Exercise of tight control on operations with many critical groups reporting to the COO.
- Process standards and quality being important in this business and the entire function reported to an independent Director.

- Banking Business Unit, known for its products, was an independent responsibility centre.

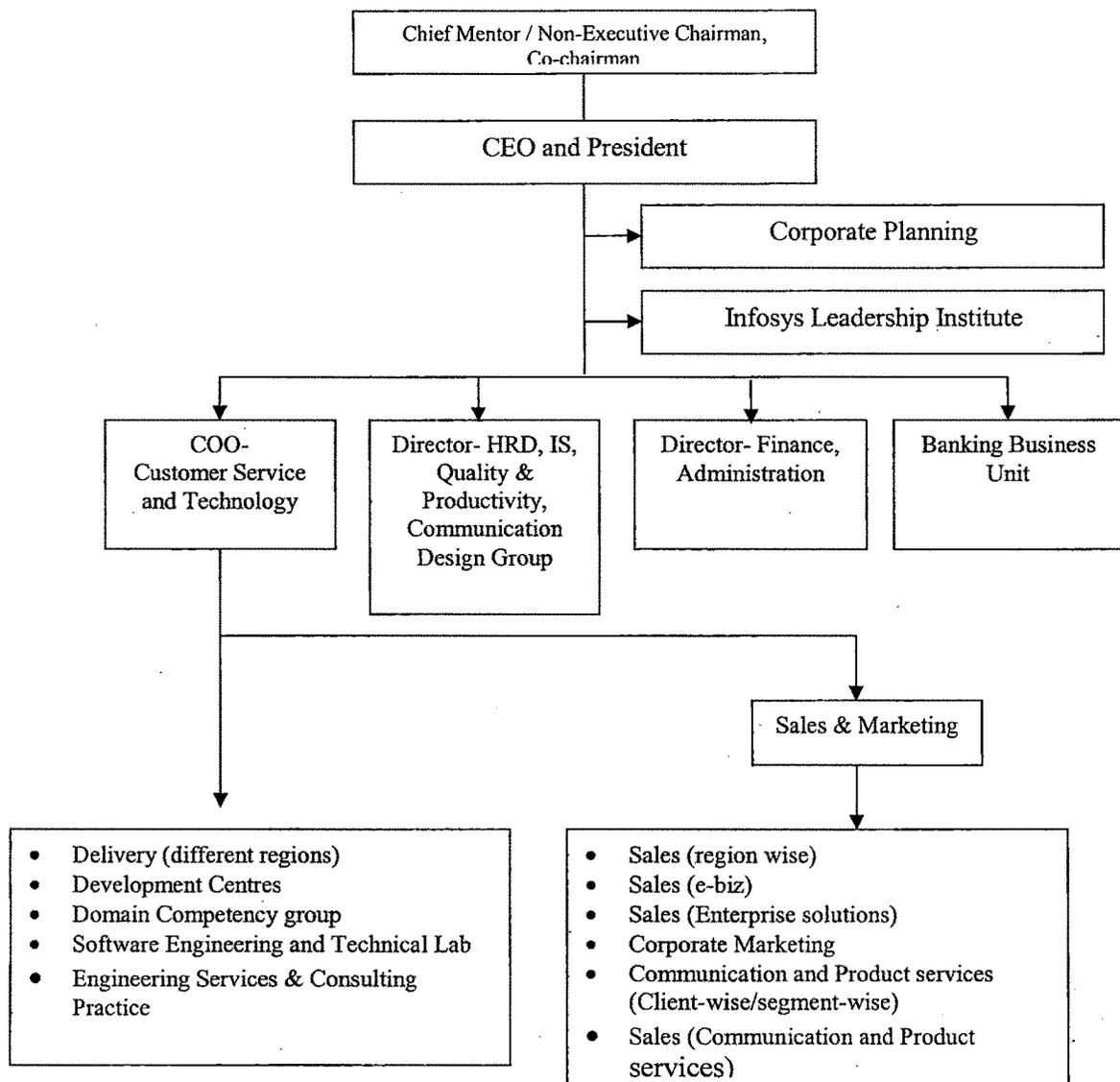


Figure 4.2: Organisation structure of Infosys
(Source: Adapted from Infosys Annual Report 2006-07, p.149).

4.2.10 Achievements of Infosys

- Infosys reached a turnover of Rs.13149 crore by 2006-07 (Rs 16692 crore in 2007-08 and Rs 21693 crore in 2008-09). Its market capitalisation was Rs.115307 crore (Rs 82362 crore in 2007-08) with a brand value of Rs 31617 crore (Rs 31863 crore in 2007-08). The company's human resource was valued at Rs.57452 crore in 2006-07 (Rs 98821 crore in 2007-08).
- Infosys was the first Indian IT firm with 160000 square feet of facility for software development in India.
- It was the first Indian company to recognise human resources as assets and publish the valuation of the same in its statement of accounts.
- Infosys also published all mandatory and non-mandatory disclosures. It also distributed quarterly reports after audit to its investors.
- Infosys was one of the first Indian companies to value its brand.
- It made available its audited balance sheet on the internet, the first one to do so and ensured availability of the balance sheet within 15 days of the year-end to its investors.
- Infosys was among the first Indian companies to adhere to GAAP norms (Generally Accepted Accounting Principles).
- Infosys was the first Indian company to be listed in NASDAQ.
- As an enterprise, Infosys was the first to offer Employee Stock Option Plans to its employees.
- Infosys was also included in the NASDAQ-100 in recognition of its achievements in the IT business.

- Taking advantage of the scope for IT services in international markets and recognising the constraints in the Indian market, Infosys embarked on the path of globalisation by design. In the process it showed a path to many other IT firms. It also created a successful business model of global delivery and offshore development. Thus it gained not only competitive advantage but also developed a successful strategy. This strategy was also being aped by many competitors.

4.2.11 Strategic Responses of Infosys

The strategic responses of Infosys could be summarised as below:

- Conscious and continuous development of infrastructural facilities.
- Designing of Employee Stock Option Plan.
- Developing a broad banded human resources management.
- Listing in NASDAQ.
- Acquisitions and strategic investments.
- Redesigning the organisational structure.
- Formulating a Global Delivery Model.
- Conceiving Profitability, Predictability, Sustainability, De-risking model.
- Investment in quality processes.
- Initiatives to move up the value chain and brand building.
- Networking with industry.
- Social responsibility.

These have been discussed in detail in the following sections:

- **Conscious and continuous development of infrastructural facilities**

After liberalisation in 1992, when IBM entered the IT business by establishing itself in Bangalore it was perceived that Infosys would lose its advantage due to employee attrition and would close its operations. Infosys's top management had the choices of pressurising the government to disallow multinationals from entering IT business or to accept IBM and other MNC's entry passively or recognise the causes that led to employee attrition. Infosys decided to take steps to eschew employee turnover. A factor that was recognised was the need for better working facilities and infrastructure. Thus in response to a change in the market environment, Infosys set about building a world class infrastructure. As early as 1995, Infosys built 125000 square feet with 1043 nodes and 54 hubs in Bangalore which was, at that time, the largest single software development location in India.¹⁵ In 1997-98 it developed the Infosys towers with a seating capacity of 550 software professionals in the heart of Bangalore and 360000 square feet for a software centre in Electronics City in Bangalore. It proposed to add 890000 square feet for 6000 professionals in India. It further developed 23000 square feet in Chennai and planned a new campus in Chennai in 1999.¹⁶ In 1999-2000 it developed Infosys Park I with 246400 square feet in Bangalore with an additional 77000 square feet exclusively for a customer care centre. It planned to develop space for 2400 employees each in Chennai and Bhubaneswar. By 2000-01, the company further developed software development facilities in Mangalore around 198000 square feet for 950 professionals, Bhubaneswar

Ind block with 75000 square feet (+28000 in common facility) for 600 professionals, and Phase I of Chennai facility with 236000 square feet for 1300 professionals.

With the construction of a Management Development Centre at Bangalore, an addition of 60000 square feet for 600 software professionals, the space availability with World Class infrastructure stood at 882500 square feet, for 4500 professionals in Bangalore alone. The Infosys city facility was also inaugurated. In addition, it added 10100 square feet in Mysore Phase-I facility and 1908200 square feet for the *Infosys Leadership Institute (ILI)*. In Hyderabad it added 273000 square feet for 1200 professionals. It also added an exclusive space of 115000 square feet for its Education and Research Unit. By 2002, Infosys had 1116000 square feet in Bangalore alone with a capacity of 5050 professionals. It has also space in its Pune campus.¹⁷

In 2003, Infosys had a total space of 34.31 lakh square feet. By 2005, the company established its *Global Education Centre* in 314 acres in Mysore, the world's largest training facility. In Hyderabad, Infosys set up the Enterprise Solutions Training Centre in 300000 square feet with a view to strengthening its capabilities in enterprise solutions in addition to 616000 square feet with a capacity for 3965 software professionals.

The expansion of seating capacity in different geographical locations was motivated by shortage of space in larger cities such as Bangalore and Chennai.

In addition state governments across the country, inspired by the success of Karnataka government in developing the IT sector, invited leading IT companies like Infosys by offering land. The development of infrastructure was in line with its strategy of having a world class infrastructure that could respond to international market demand (as part of its Global Delivery Model). Infrastructure was also a “key principle in developing an industry defining Business Model of technical service companies.”¹⁸ Recently, Infosys spent Rs.170.58 crore in technical infrastructure. Spatial infrastructure available stood at 9.126 lakh square feet.¹⁹

- **Designing an Employee Stock Option Plan (ESOP)**

Employee Stock Option Plan (ESOP) was an institutional innovation introduced in Infosys after liberalisation. It was anticipated that after liberalisation in 1991, with the influx of MNCs in India (such as IBM, HP in the IT sector) and with the possibility of many leading companies diversifying into IT, there would be a flight of human resources from Infosys. To counter this Infosys responded with the ESOP. In its essence, it involved allotting, at issue price, the Infosys shares to a trust (to circumvent certain Indian regulations at that time that did not encourage allotment of shares below market price to employees). The trust in turn allotted warrants with a lock-in period of 5 years. Around 750000 warrants were issued in 1994-95.²⁰ In 1998, Infosys offered 294300 ADS linked stock options to 72 employees. Under 1999 Plan, more than 3000 employees were covered under the stock option plan with the issue of 616850 warrants.

The employee attrition in Infosys was less than 10%, almost half that of the industry standard. ESOP was attractive in retaining and motivating talent thereby helping Infosys cope with the turbulence brought about by entry of MNCs in IT business arena. ESOP was motivated by business concerns and market changes.

An aspect to be noted is that ESOP was a strategic response on the part of Infosys to counter competition. Without ESOP (and thereby retaining talent) Infosys's strategy of Global Delivery Model could not have been sustained.

- **Designing and implementing a broad-banded human resources management**

In the light of the growth of the company, professionals were recruited laterally. The distinctions between product IT and IT service companies were not seen as critical by potential employees. Facilitated by the growth in IT services business, professional work culture in the company, the number of employees grew to around 20000 people across the globe. In parallel, Infosys designed its Global Delivery Model (GDM) (discussed in detail elsewhere) for implementation of software development projects. As a result there was a growing need for developing solutions and problem solving capabilities within Infosys. Involvement with clients was getting deeper with higher value projects being offered by client companies to Infosys. This called for an ability to customise the services to clients on the part of Infosys and also differentiate its proposition from those of competitors. In addition, the charm of ESOPs, as

a USP to attract talent was inadequate and providing financial incentives alone was insufficient in retaining talent. Other competitors copied Infosys's ESOP strategy. Infosys acquired the formal features of large organisations with 15 grades, while the market environment called for consulting service capabilities (such as utility to visualise client requirements, speedier response, clarify problems and provide solutions to clients) and still needed to maintain low levels of employee attrition. In this market scenario, a tenure based HR structure was archaic and superfluous. The top management of Infosys therefore, formulated and implemented a largely role-based Human Resources structure, evaluating 250 job functions ranging from software delivery to facilities support. This resulted in designing and implementing a role based job structure in seven bands from the earlier 15 grade tenure based job structure. The seven bands included operational roles, tactical roles and strategic roles with the top management at the helm.²¹

The transition to the above broad banded HR structure not only helped Infosys cope with customer demands and implement its Global Delivery Model much more effectively than competitors who were adopting this model. Given the fact that the IT services business did not have a guiding model Infosys's initiative in formulating HR broad banding was a major strategic response and an original one in nature.

- **Listing in NASDAQ**

Infosys was operating in a global market. This required crafting strategies that were aligned with a company with global ambitions. The top management of Infosys realised that to sustain growth and survive in a profitable manner in a global market characterised by intense competition, it was necessary to attain global talent. The company formulated a listing of American Depository Shares (ADS) in NASDAQ with the following objectives.²²

- Employee Stock Options (ESOP) in convertible currency to attract quality human resources, internationally.
- Enabling a mechanism for software business acquisitions.

In addition, it was aimed to put Infosys in the consideration set of Chief Executive Officers and Chief Information Officers of US based companies by having Infosys listed in US stock exchanges. In March 1999, Infosys issued ADS linked stock options, the first Indian company to do so, and generated US\$ 70.38 million (through 2.07 million ADS). It went in for another ADR (American Depository Receipt) offering in 2003-04 and generated US\$ 294 million. Thus NASDAQ listing in USA by Infosys, the first Indian company to do so, was a strategic response on its part.

- **Acquisitions and strategic investments**

Infosys carefully planned acquisitions in its efforts to increase market penetration in specific geographic markets. In addition, in 1999-2000, the Government of India permitted software companies to acquire businesses up

to ten times of their export revenues the previous year.

Two acquisitions/strategic investments by Infosys merit attention:

- It acquired in 2003-04, Expert Information Services, in Australia which had specialised in designing, building and integration of business solutions in Australia. The acquisition was undertaken for US\$ 24.3 million with a view to penetrating the Australian market and increase value for money for Australian companies.
- Infosys participated in JASDIC Park Company set up with the involvement of Kenichi Ohmae, the well known strategic management thinker, a consortium of Japanese companies and five other Indian companies, to provide high quality software engineering from India to the Japanese market.

The rationale for its acquisitions could be seen in Infosys's strategies outlined in its Annual Report 1999-2000, where it highlighted the need to explore innovative means of growth and alternative/non-organic means of growth. A study also highlighted its approach to growth.²³ These responses include acquisitions that further competitive advantage; selective strategic investments and support of entrepreneurs by incubating ventures.

- **Redesigning the organisational structure**

Infosys's organisational structure evolved in relation to its business needs of the day. Initially when the company had limited number of employees (around 200 people), an informal and simple structure was adequate to coordinate and business demands. In its initial years, Infosys had just four

levels. As the complexity of business grew, it acquired the features of a large organisation and introduced new structures over the years as a response to changes and demands of the market environment.

As early as 1995, with the arrival of major MNCs in the IT services business, Infosys restructured its Delivery Systems Group into technical units and industry units.

- Resource Planning groups were reorganised to focus on systems and procedures to provide warning in advance and formulate speedy response.
- Offshore Development Centres (OSDC) were established in various places in India including tier-II cities such as Mangalore, Pune, etc.
- Worldwide sales HQ was set up in Fremont, USA and branches were set up in Cincinnati, San Francisco, New York, Dallas, etc. To increase its market penetration in geographical markets other than USA, Infosys set up several sales/marketing offices in UK, France, Argentina, Japan, Canada, Germany, and Hong Kong.
- By 2000-01, Infosys had 24 marketing offices abroad. In addition, it had 33 software development centres globally.
- Software development centres could be a global development centre, proximity development centre or an offshore development centre.
- Infosys set up, in 2004, around 17 independent business units and enterprise capability units to further growth. In line with this strategy the company had dedicated client units such Nortel-Infosys

Development Centre, Johnson Controls offshore facility etc. Another strategic business unit (SBU) was set up for engineering services.

- It also established the technical advancement unit (TAU) to scan and assimilate new technologies so that customers were not exposed to turbulence from new technologies.²⁴ The concept of SBUs such as this, was to encourage autonomy of operations in dealing with emerging market needs.
- To improve customer relationship management practices throughout Infosys, 70 Account managers were developed and around 140 executives were identified exclusively in sales and marketing for customer relationship.
- Right from the beginning, Infosys had an exclusive Banking Business Unit (BBU) to market its BANCS (2000/Finacle) and allied products. This was in consonance with the liberalisation in the Indian banking sector, the entry of new generation private sector banks, expansion of old generation private sector banks and modernisation of large public sector banks in India. This response, in dealing with emerging market needs, resulted in 60% market share for Infosys in the banking sector with 4 out of 6 old generation banks, 5 out of 8 new generation private sector banks and 1 out of 2 public sector banks opting for Infosys services. In recent years this unit also developed markets for its banking products in the East and West African banks.
- In alignment with its strategy of entering higher-end services and offering better value to customers, Infosys also set up a Domain

Consulting Group (DCG) which worked on understanding customer needs in industry segments such retail, health care and financial services. DCG also published papers in international journals.

- To capitalise on India emerging as a hub for engineering, a major market development in recent years, Infosys established two Global Engineering Centres one in partnership with ALSTOM, a leader in power generation and rail transportation and another with Spirit Aerosystems, a leader in aeronautics.
- Post 9/11, in view of increasing security concerns, Infosys established a Disaster Recovery and Business Continuity Centre in Mauritius.
- Over the years Infosys also developed dedicated internal education structures as its employees hailed from 53 nations and had diverse backgrounds.
- It also set up Infosys Business Consulting Group to foray into business consulting needs and high-end opportunities as part of the Global Delivery Model. The structural responses of Infosys could be inferred from the following aspects highlighted below:

As Nilekani stated “Organisation will have to be aligned on different value propositions. Business units will have to be formed on separate product or service offerings.”²⁵

In the view of Shibulal, a co-founder “A matrix structure that harnesses the right resources from across the organisation for client engagement is critical.”²⁶

- The company also went in for a leaner organisational structure by forming Independent Business Units based on various verticals, geographical focus and key client engagements to handle complex projects.
- In addition, Infosys also redesigned the roles of its Chief Mentor, CEO and COO. The focuses of their roles were as below:

Chief Mentor and Chairman- Transforming into a next generation world class organisation, enhancement of Infosys leadership position.

Co-chairman- Corporate level strategic planning

CEO – Strategy implementation, brand equity and new initiatives.

COO – Customer service operations, technology and investments.

Thus structural changes and redesign of the organisational structure was a strategic response in alignment with market change that called for taking up complex projects. Recently, Mr Nandan Nilekani was made the Co-chairman so that Infosys could benefit from continuity in top leadership. Mr Gopalakrishnan was also made the CEO.

- **Formulation of the Global Delivery Model (GDM)**

The designing of the Global Delivery Model (GDM) was a well-thought strategic response on the part of Infosys in relation to a changing market environment. In the early 1990s VISA regulations were tightened by the US government and as a result, on-site software services offered by Indian IT service companies faced constraints. In addition, MNCs were planning their

entry in IT services business. Sending engineers for on-site work was not viable. In the light of this, Infosys developed offshore infrastructure with world class facilities (with talented Indian software professionals) offering the value proposition of “quality software delivered by productive people at an affordable cost”.²⁷ Emergence of other software developing nations in the market environment was also another factor.

Project development cycle duration shortened to 3-6 months from the earlier 12-18 months. There were changes in the marketing environment as well. The MIS departments of companies were shrinking in size and software maintenance and development of customised software were outsourced to external software companies. Infosys recognised that this called for the nimble-footed organisation in responding quickly leading to collaborative software development spread across geographically distributed development centres across time zones.

Ability to take advantage of the time difference between USA and India and availability of network technology, support such as tax holidays from state governments and the central government in India for such Off-shore Development Centres were facilitating factors. In addition to tax holidays, software developed for international clients were deemed exports and permission was granted to import technology easily. The state governments provided land at low rates to IT firms. They also developed IT software parks with infrastructure such as communication, roads and transport facilities.

A variety of concessions such as exemption from sales tax, concessions in power connections, freedom to formulate working hours and exemptions to formation of employee unions, permission to develop software development facilities in residential areas by exempting IT firms from municipal bye-laws modification etc., were given to IT firms. Another advantage of the GDM was the low cost of operations in India. This was a key marketing point to reassure US companies to agree to work done at OSDC. The GDM was coupled with strong project management methods to ensure timely delivery. The global delivery model included Proximity Development Centres (PDC) closer to the customers for user-need definition, modification of specifications and testing of final solution. The entire development work was undertaken by parallel teams in OSDC or Global Development Centres across time zones leading to 24x7 operational capability and resulting in reduction of delivery time.

*“Global Delivery Model is more than just a method of getting work done offshore. A genuine business innovation that delivers a superior value proposition at higher quality and lower cost. By leveraging global capacity, global resources and global strengths it creates new degrees of freedom that put post incumbent models at a disadvantage. We have brought the battle to our territory. This after all is the purpose of strategy”.*²⁸ The GDM though adopted by some MNCs in India, had the limitations in maintaining large pool of knowledge manpower from other countries in India. The activities under the Global Delivery Model²⁹ of Infosys have been given in Table 4.2.2. The GDM also provided an innovation that could be extended to other higher end business consulting services offered by Infosys.

Table 4.2.2: Activities in Global Delivery Model

Client location	Offshore development centre
<p>Project</p> <ul style="list-style-type: none"> ▪ Analysis and design of detailed approach ▪ High level scheme ▪ Focus on user interface design ▪ Project co-ordination ▪ Onsite checking and testing in relation to design ▪ Completion, implementation 	<p>Project</p> <ul style="list-style-type: none"> ▪ Project Management ▪ Detailed and itemised design ▪ Coding ▪ Testing ▪ Documentation, development of support material
<p>Proximity development centre</p> <p>Initial conceptualisation</p> <p>Post-Implementation support</p> <ul style="list-style-type: none"> ▪ Rapid reaction support 	<p>Post-implementation support</p> <ul style="list-style-type: none"> ▪ Remediating errors and faults ▪ Warranty support ▪ Maintenance and upkeep ▪ Other emerging customer needs

Source: Adapted from Srinivasan, R. (2002), Case: Infosys Technologies Ltd., pp.131-139, and Infosys Annual Report: 2001-02, pp.4-5.

Infosys while emphasising decentralisation of operations introduced appropriate internal controls in place as follows:

- Any unbudgeted expense to be approved by COO.
- Any policy change to be examined by a committee consisting of CEO, COO and the top management based on a five year profitability impact assessment.
- Periodically, progress to be reviewed by the CEO and COO. In addition, company wide project management tools were put in place. These efforts led to more decentralisation of operations which in turn called for deployment of more sophisticated controls.

- **Formulating Predictability, Sustainability, Profitability, De-risking (PSPD) model**

Over the years, Infosys shifted from a purely “body shopping” on-site projects (i.e sending Indian engineers to work on projects at client locations abroad) charged on the basis of time and material estimates to higher value projects. On the foundation provided by the Global Delivery Model it started undertaking fixed price, fixed time frame projects. The fixed time projects provided higher value to the company. This strategy was also in consonance with the relationship approach by which Infosys endeavoured to have a long term relationship with a customer and cater to all its IT requirements. Infosys around the mid 1990s perceived that international IT firms were its major competitors and not the many other Indian firms providing low end software services. Infosys also wanted to reposition itself as “company of choice” offering end-to-end software solutions for future growth of the company. By 2000, Infosys developed its growth strategy outlined as follows:

- Widening the scope of its service offerings to reduce risks of over exposure in the same market segment. New service offerings included taking advantage of new technologies, going beyond conventional software maintenance and development services, developing packaged applications, E-commerce and internet based applications.
- Increasing repeat business with existing clients.
- Increasing revenue per professional.
- Diversification of IT project base across geographies.

In addition, Infosys also sought to understand specific industry domains through its Domain Consultancy Group thereby providing value addition to clients. The PSPD model involved not being excessively dependent on any specific client, technology or geography, an aspect Narayanamurthy emphasised on various occasions. It also meant that Infosys had to insulate itself from the fluctuations of the marketplace by reducing dependence on any specific segment to 25 to 30 % of sales. In the light of market disturbance in the technology sector such as dotcom failures, inadequate investment in new initiatives by companies, the company had to follow a de-risking model by restricting revenue from any one client to 10 percent of total revenue. It also practiced a de-risked business mix. For instance, it reduced its Y2K business from 24% in 1999 to less than 1% in 2000 consciously. The PSPD has been outlined in a nutshell in Figure 4.3.^{30 31}

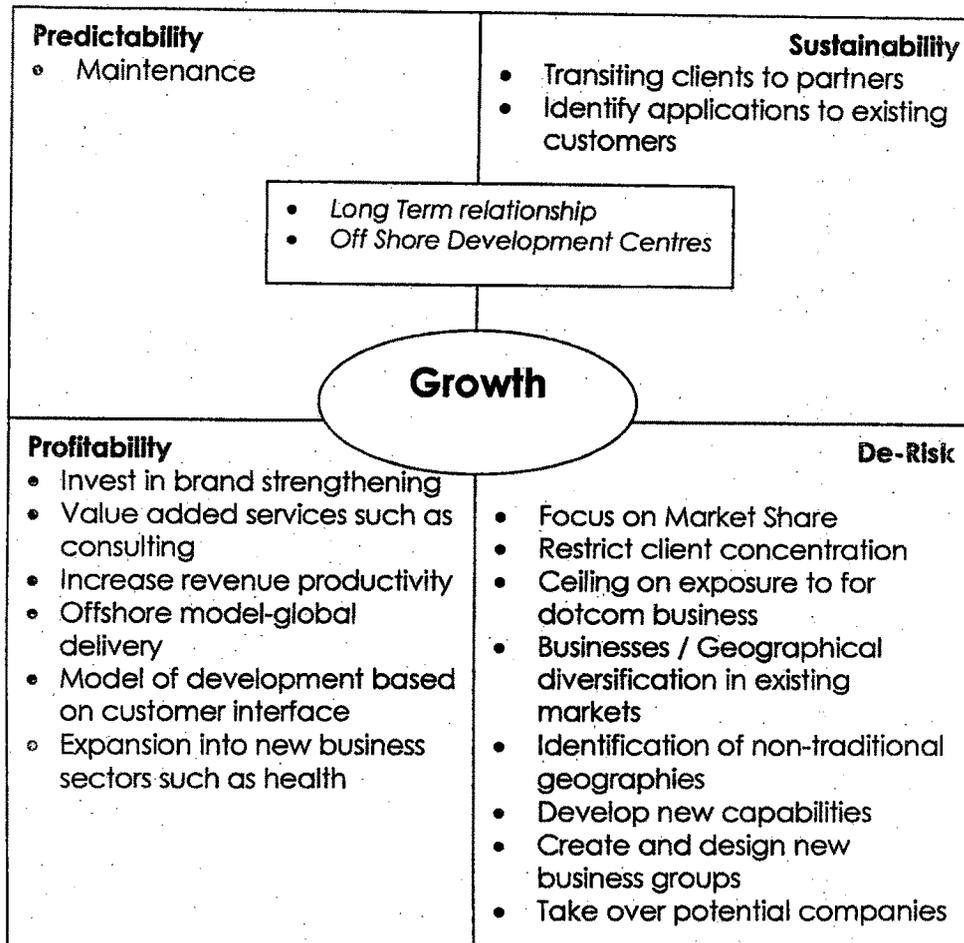


Figure 4.3: PSPD Model, Source: Adapted from Srinivasan, R. (2002), Case: Infosys Technologies Limited, pp.131-139; Infosys Annual Report 2001-02, pp.4-5; Krishnakumar, Dhanya (2008), Business World, Vol. 28, No: 17, Sept 15, 2008, pp.28-33.

The PSPD model implied Infosys focusing its marketing efforts on Fortune 500 companies due to the risks involved in start-up enterprises. For instance, in 2000-01, it generated US\$ 117.5 million of which 75% was from established companies while 25% was from dotcom companies and venture fund supported firms. Infosys also expanded its client-base from 115 in 1999 to 438 in 2005, thus spreading its risk. It also made marketing efforts to reduce dependence on US markets to other important regions such as Europe, Japan, China and South-America. In its service offerings the company diversified into new areas over the years from being a purely software development and maintenance company as indicated in Table 4.2.3.

Table 4.2.3: Revenues servicewise (%)

Service	2007	2006	2005	2004	2003
Development	21.0	20.2	23.2	25.7	32.1
Maintenance	29.3	30.2	29.9	30.1	28.2
Package implementation	17.5	16.2	15.2	14.5	11.0
Testing	6.9	5.9	5.8	5.3	3.4
Re-engineering	2.1	4.7	6.2	6.0	5.5
Consulting	3.6	3.5	3.6	3.7	4.3
BPM	4.7	4.0	2.7	1.6	0.5
Engineering services	1.6	1.8	2.0	2.2	2.6
Other	9.4	9.7	8.4	8.1	7.8
Products	3.9	3.8	3	2.8	4.6

Source: Infosys Annual Report: 2006-07, p.135.

The geographical coverage also changed over the years. In terms of industry segments, it could be seen that no segment contributed more than 25% of revenues (except banking and financial services). Thus the PSPD model was a strategic response of Infosys to gain competitive advantage.

- **Initiatives in quality processes**

Infosys quite early in the 1990s acquired CMM level 4 and TickIT/ISO 9001 certifications. It brought quality management units under the Chief Operating Officer. As early as 1995-96 Infosys perceived that “it must be in the international band of quality before it can use cost as a competitive advantage.”³² In 1998-99 it introduced quality systems documentation to include processes for the development and maintenance of engineering applications. Quality was also part of Infosys’s enunciation of important principles for the company’s growth.

In 2000-01, Infosys acquired level 5 of CMM for delivery processes, Malcolm Baldrige certifications for overall assessment of company and integration of all business activities and for cross-functional project management and six-sigma for crucial function process mapping. It implemented visa-sixes to improve internal customer satisfaction in the visa process. Infosys management services also acquired BS 15000 certification.³³ In 2004-05, the company identified 15 key process families and 143 specific processes.

All quality initiatives were earlier brought under one integrated approach called the Infosys Excellence Initiative (IEI). The quality management initiative (including various approaches) was a strategic response for the following reasons:

- Emphasising the vital requirements for building successful hi-tech service industries, Shibulal, co-founder of Infosys, stated that in large organisations “formal processes that encourage teamwork among disparate groups through collaborative selling and execution is essential.”³⁴
- The Global Delivery Model that was developed as a strategic response to changes in market environment (such as entry of MNCs in India in the IT services business, constraints for on-site projects, need for deeper relationship with customers) required quality processes to be aligned with the Global Delivery Model.

- **In the direction of a powerful corporate brand**

In a competitive market, developing a powerful brand is a strategy to cope with market vagaries and to combat “me-too” competitors. With Infosys endeavouring to position itself as a software services firm that added value to the customers branding was essential. It also aspired to be in the consideration set of CIOs of Fortune 500 firms and for which developing the Infosys brand would be a response. It also had to compete with leading international IT services firms.

In the light of anticipated market developments, developing a corporate brand was perhaps a major response. In its Annual Report of 2001-02, Infosys highlighted the importance of being a globally respected brand (for a technology service firm to formulate an industry defining model). A few

aspects of this respected brand would be operational excellence, image building and high value per rupee spent.³⁵

In the initial years i.e. in the mid 1990s, Infosys brand strategy focused on conventional branding approach. It extended its Finacle Core Banking product with brand extensions such as Finacle CRM, financial treasury, financial e-Channels, e-Corporate etc. Increasingly developing a corporate brand was and continues to be a major response in view of emergent market needs.

A few aspects of this corporate branding include:

- Communication with the analyst community.
- Designing exclusive programmes for various stakeholders such as academic institutions: Academic Entente programme, the global academic interface programme to generate brand capital, students using Campus Connect programme covering Indian colleges, Faculty enablement programme with teachers in engineering colleges.
- Group discussions with CIOs of major firms. It held the CEO event in Japan in addition to participating in the global outsourcing summit.
- It also organised the Wharton-Infosys business transformation awards.
- Infosys also brought top academicians, consultants in the area of finance and marketing as directors in the board.
- The company's initiatives in events organised by NASSCOM, Bangalore IT.Com, and CII ought to be viewed in this context.

- Its attempt to establish as a socially responsible company also resulted in its setting up of the Infosys Foundation to support development projects across the country.
- Infosys also networked with other competitors in line with its thinking of competitors joining together for mutual benefits to create new expanded markets (similar to GCMMF's cooperation among cooperatives). It also had a global alliance programme with Microsoft, SAP and Oracle.
- Infosys's top management also interacts with global thought leaders to strengthen its leadership position.

All the above initiatives point out to a carefully crafted strategic response by Infosys to emerge as a global brand in the minds of its customers, partners, shareholders and employees. Infosys was recognised as a 'Brand with Conscience' by Medinge group, an international think tank of brand experts. Infosys was one of the seven global companies to get this recognition in 2004.³⁶

The responses of Infosys have been highlighted in Table 4.2.4.

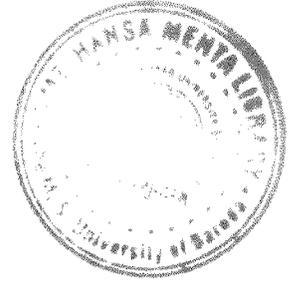


Table 4.2.4: Responses of Infosys Technologies Limited

	Internal	External
Controllable	<p><u>Responses initiated:</u></p> <ul style="list-style-type: none"> ▪ Cost cutting ▪ Global delivery model (focusing on good project management) ▪ Quality management practices ▪ Recruitment of talented pool of resources ▪ Development of leadership at upper-middle levels by setting up Infosys Leadership Institute ▪ Moving towards a band based HR structure ▪ ESOPs ▪ Internationalisation of workforce <p><u>Limited responses :</u></p> <ul style="list-style-type: none"> ▪ More refinement in recruitment processes required ▪ Weak social and acculturation of massive new workforce added. 	<p><u>Responses initiated:</u></p> <ul style="list-style-type: none"> ▪ Corporate restructuring (IPOs, listing in foreign stock exchanges) ▪ Diversification into allied businesses ▪ Building brand awareness and brand management ▪ Focused marketing for existing customers ▪ Focus only on growing segments. ▪ ESOPs ▪ Developing Global Development Model and PSPD model to reduce market risks in business. Setting up Infosys Consulting to tap the high-end IT consulting and business opportunities as part of Global Delivery model ▪ Appointing Nandan Nilekani as Co-chairman for strategic marketing of Infosys <p><u>Limited responses:</u></p> <ul style="list-style-type: none"> ▪ No major joint ventures with other top IT firms for product development purposes. ▪ Limited initiatives in the domestic market.
Non-Controllable	<p><u>Limited responses:</u></p> <ul style="list-style-type: none"> ▪ Weaknesses in getting into high-end technologies and limited responses in this regard. ▪ Limited response to loss of top managers who set up their own ventures. ▪ Weak responses to new (software) product development. 	<p><u>Responses initiated:</u></p> <ul style="list-style-type: none"> ▪ Getting large chunks of land sanctioned in different states of India and developing infrastructure ▪ Taking over foreign firms (to overcome geopolitical trends/protectionist tendencies in nations). ▪ Forming strategic alliances ▪ Lobbying with state government for infrastructure ▪ Opening more development centres in smaller cities in Karnataka and other states (partially cost cutting, partially to overcome criticism of bringing more outsiders to Bangalore) ▪ Limited responses and focus on non-English speaking countries ▪ Establishing links with top leaders of various governments

Source: Based on Sharma (2007) and Annual Reports of Infosys

(As the framework of Sharma (2007) focuses on the past, an effort has been made to examine the future market scenarios and potential responses in the last chapter on summary of findings and recommendations).

Increasingly Infosys's moves indicate a carefully thought out strategy for creating what Kapferer defined as "Brand Identity" in all its dimensions to cope with the market environment.³⁷ While the turnover of Infosys has increased it also faced pricing pressures from clients and found the market environment challenging.³⁸

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