CHAPTER 5 – CASE ANALYSES

In this chapter, to inquire into the nature of business transformation effected by IT, I use the qualitative case study method, taking multiple units of analysis. I consider specifically transactional ability, significance of business cycles, and the impact of business transformation on the workers. I examine, further, the trends with respect to outsourcing, cost-performance structures, business continuity, security, architecture, and enterprise management. I do this by a retrospective analysis covering an extended period of time, rather than a snapshot, of the IT initiatives taken at a point in time so that this investigation can obtain a more holistic view of the transformation. The cases and their analysis and observations that I develop here are based on documented information made available to me from the public domain. These sources give particulars of the companies and the specific product/technologies they have used. Refer Diagram 5.1 below to see units of analysis used for analyzing cases. The companies also provide, in 2 to 4 pages typically, necessary information about the implementation and functioning of the product/technology as they have tried and used it. The write-ups are completely company-dependent and fairly uniform in terms of structure and content. In some cases, the companies mention and discuss challenges in the implementing of the product/technology; in others they have elaborated usage issues also. This data is very significant and valuable, and is used it in this work to a number of advantages.

Diagram 5.1 - Units of analysis used for analyzing cases

One, if the focus of products/technologies is limited to the generally accepted top two ERP systems world-wide (SAP and ORACLE) having a combined market share of 67 % *(SAP Consulting, 2006),* then the number of organizations that are affected by these products is substantially large. Besides, the system called Maximo (now IBM), which is relatively more specific to the Oil, Gas, and Energy vertical, is also considered because of its relevance to the vertical.

Two, each of the organizations in the sample employs common software, minimizing divergence in terms of pure application differences.

Three, each of these studies took place within a common time frame – within the last twenty years – thus normalizing the effects of time.

Four, the company profiles are based on information uniquely available to the parent technology company (in this case SAP, ORACLE and IBM). There are many important quotes from various key personnel in the organizations that would not generally be available.

Five, as a result, the information provided in the profiles is very specific – and indeed, authentic, other things being equal – for instance, "post implementation, it takes only three days to close the year end accounts as compared to several weeks earlier."

Six, this approach permits me to take into account actual comments, if any, made by the CIO or equivalent business executive at a time when benefits were being analyzed – even if only implicitly. Many of these comments provide insights into the efficiencies brought about by the IT implementations.

Seven, the information was placed in the public domain and not aggregated, exaggerated, or disguised. Thus, the quality of data gathered is fairly good; or else the companies for which the results were attributed would be in a position to indicate any inaccuracies in the data – especially since specific individuals from the organizations were quoted to vouch for it. Any misquotations would result in a request for amendment for being a misrepresentation of facts.

Eight, although the data functions as marketing data, it represents real-world benefits. Organizations that are interested in the benefits displayed can contact the entities listed in the

studies for more information. If the benefits are not real, this would become a self-limiting exercise.

Finally, nine, the data that I have used provides me with good grounds to access insights into a much larger group of companies and thus it enables me to make much broad-based inferences and warranted generalizations than could be made with a single case-study. In particular, by using a relatively large number of firms, it is possible to do statistical analysis of the data.

Statements made by the organization's CIO or equivalent business executive are a vital source of data collection. Pattern mapping is used for cross-case analysis. Besides, relevant evidence from different informants and diverse literature sources has been collated to have optimum validity for both data and the results based on it.

Nine cases were selected for their special feature as illustrative of the systematic deployment of IT initiatives across the organization. These have been subdivided into three sets of case examples each set coming under one or the other of the three IT consulting companies – TCS, Accenture, and CapGemini. The case examples are all of multinational enterprises. Five of them are British, one is Indian, one Brazilian, one each from Italy and Romania. The criteria used to select the cases were:

1. The company should have used IT as a major enabler for business transformation, going beyond traditional automation and EDP (extended data processing).

2. The company should have a formal organization structure supporting global operations. If, during the course of its existence, it was part of a merger or an acquisition, this fact has been taken into account.

3. The company should have implemented IT from a strategic perspective and not a tactical perspective and should have done this over at least a period of eight years.

4. The company's implementation of IT should be across the entire enterprise and not isolated to a specific branch, location or office.

For analysis of the cases, different approaches were used to interpret the transformation described by the organization. I noticed that if a transformation is mapped on a 1:1 relation with a particular pattern per case, the pattern did not succeed in explaining the complex nature of transformation. Hence, in order to incorporate the different agents or drivers of change such as IT tools and techniques (including the IT organization structure), the organizational structure and its relation to the outward facing entities like customers and suppliers, its employees (both permanent and contractual) and its integral processes – the sum total of which constituted its systems and functions – which enabled it to work one enterprise, I have broken the entire transformation process as into corresponding to three time periods – initial, middle and current on the basis of distinct patterns of transformation. This makes a maximum of 108 possible combinations – nine cases over three time periods with four possible modes of transformation. The focus in each case was on how IT was used to bring about a given transformation, or how a given transformation necessitated the use of IT to make it an effective reality. Four parameters were used for the examination. The first (i) of these - structure - includes the organization structure in terms of its organizational hierarchy as well as its interaction with external entities like the government, customers, and suppliers. The second (ii) IT – encompasses the IT functions within the organization including the function's organizational structure, the technologies used as well as the functions of the IT staff within the organization. The third (iii) – employees includes the personnel within the company and their roles. Finally, (iv) the fourth – process encompasses the company's ways of performing the specific functions. This includes the sequence of actions required to perform a function along with the pre-requisites of each action.

5.1 Tata Consultancy Services

5.1.1 BACKGROUND

In June 2003, Tata Consultancy Services (TCS) – the leading information technology (IT) company in India, reported revenues of Rs. 49.975 bn (US$ 1.04 bn) for the financial year ending March 31, 2003 (Refer Exhibits 5.1-5.3 for the financials of TCS). This made TCS the first IT Company in India to cross the $1 bn revenue mark. Within a span of three and a half decades, TCS emerged as one of the largest software companies in Asia, employing 28,000 IT professionals from 30 nationalities working in 32 countries. TCS has also been the largest software exporter from India for the past 30 years.

TCS is part of one of Asia's largest conglomerates and most respected groups, the Tata Group, which has interests in areas such as energy, telecommunications, financial services, manufacturing, chemicals, engineering and materials. TCS is the first company to be rated at Level 5 maturity for both the CMMI and PCMM framework. It is also the first Indian company to be certified AS 9100: Rev B for design of airframe structures.

Tata Consultancy Services Limited (TCS Limited Company) commenced its operations in 1968, and it is one of the world's largest providers of information technology, consulting, services and business-process outsourcing. As of 2007, it is Asia's largest and India's Number One IT services firm with the largest number of employees amongst all the Indian IT companies with strength of over 100,000 *(Economic Times, 29-Sep-2007)* IT consultants in 47 countries. The company generated consolidated revenues of US $4.3 billion for fiscal year ended 31 March 2007 and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

5.1.2 ORIGIN

Tata Consultancy Services was established in 1968. It paved the way for software companies in India. It started off as a division of the Tata Group, Tata Computer Centre, whose main

business was to provide computer services to other group companies. However, the potential of computerization and computer services was realized early on, and an electrical engineer from the Tata Electric Companies, Fakir Chand Kohli, was brought in as the first General Manager. TCS played a major role in developing the IT industry in India. The company was a pioneer, starting its business way back in 1968. During the first couple of decades, TCS faced many problems in doing business, owing to unfavorable government regulations and the licensing system, which made it difficult to even import computers.

During its early days, TCS, with a staff of 10 consultants and 200 operators, undertook IT consulting assignments with other Tata Group companies. For instance, TCS managed the punch card operations of Tata Iron and Steel Company (TISCO). When the entire initial money invested by TSL was exhausted, TCS started looking for outside clients to sustain its operations. In 1969, TCS bagged the first banking software project – the Inter Bank Reconciliation System (IBRS) from the Central Bank of India (CBI), one of its earliest clients. The successful implementation of the IBSS at CBI enabled TCS to get similar orders from 14 other banks. In the next couple of years, TCS also executed orders for municipal authorities and telephone companies in India.

TCS's first software export project was undertaken in 1974 when it converted the Hospital Information System from Burroughs Medium Systems COBOL to Burroughs Small Systems COBOL. This project was carried out entirely in TCS Mumbai on the ICL 1903 Computer. A team of more than 12 people delivered this project to their first US based customer, and thus the Indian Software Export Industry was born. By mid 1970s it had spread its reach to Britain, Switzerland and the Netherlands. In 1979, TCS was the first Indian software firm to open overseas office in New York.

In 1980, TCS and a sister Tata firm accounted for 63% of the Indian software industry exports, $4 million shared by 21 firms. New players like Datamatics, Patni Computer Systems started to evolve in 1980's. In 1984, TCS set up an office in the Santacruz Export Processing Zone (SEEPZ) – Mumbai.

In the 1970s, TCS felt the need to equip itself with improved technological capabilities. The company believed that this could be achieved by serving foreign clients, as they demanded

high quality standards. By executing their orders, TCS felt that it could upgrade its technology. TCS' first international order was from Burroughs Incorporated.

After the positive response from Burroughs, TCS started seriously concentrating on the US market. The company obtained its first big foreign order from the Institutional Group & Information Company (IGIC), a data centre for ten banks, which catered to 2 mn customers in the US. TCS was assigned the task of maintaining and upgrading IGIC's computer systems. This was TCS' first full-fledged on site project, where its engineers worked in the premises of IGIC.

In 1979, TCS inaugurated its first international office in the US (New York) under the leadership of S. Ramadorai. This enabled the company to boost its marketing efforts in the US. In the same year, TCS got another major order for developing the accounts receivables system of American Express, one of the largest financial companies in the US. The successful implementation of this order significantly enhanced the goodwill TCS had among its US clients. The fact that US companies were also looking for ways to reduce costs by outsourcing IT projects to low cost service providers also helped TCS. In the 1980s, TCS bagged several prestigious IT projects from foreign companies like SEGA.

In 1981, in a bid to improve its R&D skills, TCS founded the Tata Research, Design and Development Centre (TRDDC). The centre played a key role in developing world class products and providing technical assistance for its consultants and other employees. In the late 1980s, with increasing orders from across the world, TCS felt that it was both convenient and economical for the company to execute orders from India rather than from the customers' sites located overseas. For this, TCS imported an IBM mainframe machine, IBM 3090, in 1988 to its Chennai office to execute mainframe related projects. With Chennai as a base, TCS marketing teams looked abroad for clients, whose projects could be executed in India at lower costs. With this, TCS pioneered the offshore development of IT projects in India. In 1991, TCS opened its first Offshore Development Centre.

The Tata Research Development and Design Centre was established in 1981 as a division of Tata Consultancy Services Limited, India's largest IT consulting organization. TRDDC is today one of India's premier R&D centres in software engineering and process engineering.

Research and development work at TRDDC is focused in different groups, each specializing in a key area of work. Projects of an interdisciplinary nature are also carried out. With expertise in process engineering, software engineering tools and technologies, advanced techniques, and in systems engineering methodologies, TRDDC provides solutions within TCS and for major clients. There is also an ongoing effort to integrate the products into the Eclipse Integration Framework.

The process engineering group of TRDDC focuses on modeling and optimization of industrial unit operations for steel and automotive sector. Successful implementation of this approach has produced significant benefits – i.e. efficiency enhancement, productivity improvement, energy reduction and quality improvement – for several industrial operations. In addition, TRDDC is also involved in the areas of language processing, formal methods, and research on Artificial Intelligence and Decision Support.

On account of the ongoing diversification effort, the other centers situated in India have also begun R&D facilities; the centre in Hyderabad, called Advanced Technology Centre (ATC), carries out work on e-Security related issues and bioinformatics.

5.1.3 FACTORS INFLUENCING GROWTH

Another favorable development for TCS was the liberalization of the Indian economy in 1991. Several provisions, especially those relating to the import and export of IT goods, were relaxed. TCS could now import computers whenever it wanted, without the problem of stringent and time-taking licensing procedures. This also enabled the company to handle larger size orders and increase revenues.

In the mid 1990s, TCS' revenue growth was propelled by the Internet revolution. In 1997, TCS made its Management Consultancy Division (MCD) which operated independently until then, a part of its software consultancy division. MCD's functional consultants, with expertise in areas such as Human Resource Development (HRD), Management Information Systems (MIS) and Materials Management, offered strategic and operational solutions, working in close collaboration with software consultants. The company visualizes its future as system

consultants and not as management consultants or computer consultants or a company with vast resources. The aim is to leverage the knowledge base in a specific business and expertise in technology. Globally, businesses are realizing that no problem has a worthwhile solution without factoring in information technology. From the TCS standpoint this has to be done to sustain growth and move up the value chain. In 1998, TCS generated revenues of Rs. 10.83 bn, representing 11.1% revenue share of the Indian IT industry. Between 1994 and 2000, TCS' revenues grew by a significant 42% per annum.

The company grew by consistently upgrading its skill sets, technology and its infrastructure, and in the process, developed several new innovative software products. A unique aspect of the firm's style of functioning was that despite being an IT company, it was run along the lines of a manufacturing concern, with a factory approach. The company managed its new recruits similar to how a manufacturing concern managed the inflow of raw material. TCS looked after its work force like a manufacturing company dealt with its inventories. The company allocated its work force to its branches spread across the world, similar to a retailing company managing its stores. TCS introduced the concept of Offshore Development Centers, where TCS engineers based in India worked on projects for clients abroad and saved costs for both TCS and its clients. By consistently undertaking and performing good quality jobs for clients at a fraction of the cost they would otherwise have incurred, TCS put India on the global map and became a premier IT outsourcing destination for companies in the West, particularly the US.

The early 1990s saw a tremendous surge in TCS's business, which led to a massive recruitment drive by the company. In early and mid-1990s, TCS re-invented itself to become a software products company. In the late 1990s, to accelerate its revenue growth, TCS decided to employ a three-pronged strategy – developing new products with high revenue earning potential, tapping domestic and other fast growing markets and focusing on inorganic growth through mergers and acquisitions. In late 1998, the company decided to concentrate on new revenue opportunities including Y2K and Euro conversion. E-business was a major area of focus in the late 1990s.

TCS started a project aimed at removing illiteracy in India with a pilot project in Andhra Pradesh. In 2001, TCS commissioned the latest 64-bit zSeries eServer from IBM, thereby

becoming the first organization in the ASEAN and South Asia region to adopt the latest technology in mainframe computing. In 2004, TCS became a public listed company. In fiscal 2006 the Company's profit before taxes and exceptional items aggregated Rs. 3,074.35 crore as compared to Rs. 2,308.65 crore in the previous fiscal 2005 - a growth of 33.17%. In 2006, Tata Infotech Limited and three wholly-owned subsidiaries of the company, namely Airline Financial Support Services (India) Ltd (AFSL), Aviation Software Development Consultancy India Ltd (ASDC) and TCS Business Transformation Solutions Ltd (TCS BTS) have amalgamated with the company.

5.1.4 AREAS OF OPERATION

The company operates in the following business areas (Refer Table 5.1):

Table 5.1 – TCS: Areas of Operation

Services	Client Industries	Products
Application Development and Maintenance	Banking	Quartz - Payments Processing Solution
Business Intelligence & Performance Management	Energy and Utility	FinDNA - Anti Money Laundering Solution
Business Process Outsourcing	Financial Services	FNS BANCS - Core Banking Solution
Engineering and Industrial Services	Life Sciences and Health Care, Embedded systems	EClearSettle - Clearing & Settlement Solution
Enterprise Solutions (CRM, ERP, SCM)	Insurance	Tax Mantra - Integrated Tax And License Solution
IT Consulting services	Securities trading system	eIBS - Integrated Brokerage Solution
IT Infrastructure Services	Manufacturing	IIMS - Integrated Insurance Management System
Testing and Quality Assurance	Telecommunications	NCS - Custody Services
	Retail and Consumer goods	OPAL - Integrated Payment and Loyalty Card Solution
	Transportation	
	Government	

Over time, TCS pioneered several best practices in the Indian IT industry. The company followed a unique factory approach in managing its functions including product development, creating new infrastructure and human resource management. (Refer to Exhibit 5.13 to see vertical wise contribution to revenues of TCS: 2001-07)

5.1.5 STRATEGY

For TCS, most of the product research and development was undertaken by its research wing – Tata Research Development and Design Centre (TRDDC) in Pune. The centre viewed the development of software products as a capital-intensive activity. TCS had realized from the very beginning that with technology changing at a rapid pace, it was not feasible every time for it to write new code from the beginning while developing new applications. Further, the increasing work force requirements resulted in increased costs. TCS felt the need for a set of standardized tools, which would help develop software products quickly. The company aimed at reducing development costs over a period. TCS' product development model resembled the traditional factory set up, where new products were developed using standard tools and processes, thus reducing costs over time.

The whole idea of software engineering is to change programming from an individual-centric, with its inherent stamp of individuality and hence non-standardization, to an industrial one, where others can easily understand and debug the programs written by somebody else. Creating components, which can be used repeatedly in different projects, thereby reducing time and manpower required for a project, is another feature in the software engineering.

In developing standardized tools, TCS put to full use the experience gained by its talented group of software engineers and consultants. For instance, in the late 1970s, when TCS engineers were engaged in the routine task of code conversion, they felt the need to automate the process. To solve this issue, a Computer Aided Software Engineering Pac tool called 'data dictionary' was developed, which did the job of code conversion. This tool was used in the various projects, which TCS executed in the 1980

TCS developed many more standardized tools. They included MasterCraft (1999) and Bio Suite (2004). MasterCraft was used to translate the specifications for a program into a code and served as a framework for new software development. TCS not only marketed MasterCraft as a full-fledged product, but also used it in developing other products. MasterCraft was marketed as "an integrated set of software tools for the development of medium- to large-scale multi-tier applications, which helps to organize and manage software development systematically." MasterCraft was also used by TCS to develop a product called Quartz, which was a banking product for the European market. Similarly, Biosuite was developed for the pharmaceutical industry, which helped companies and laboratories efficiently extract useful information from huge amounts of genetic data. TCS also marketed Biosuite globally.

TCS ensured that it created required infrastructure to build IT products on a large scale, so that product costs could be reduced further through economies of scale. It built state-of-the-art infrastructure facilities, keeping in mind existing as well as future scaling requirements. The company had built software development centers, also known as competence centers, in various cities in India. Each centre focused on a specific technology or IT hardware platform. TCS allotted its clients to these centers depending upon their technology and infrastructure requirements. The competence centers resembled those of a manufacturing concern in size and staffing capabilities. By creating such facilities, TCS successfully adopted the concept of a software factory in the IT industry.

In October 1997, TCS inaugurated a 70,000 sq. feet software development facility in Chennai. This was named the Y2K factory as it was established with the aim of providing IT solutions to the Year 2000 problem12 (popularly referred to as the Y2K bug). It could accommodate 1000 software professionals. TCS installed two large IBM machines costing Rs. 350 mn at the facility. It had the most advanced computing facilities and high-speed telecommunication links and was capable of generating 2 mn lines of code per day. The Y2K factory was recognized as the largest software development facility in the world then. The facility helped TCS execute nearly 80 Y2K projects for clients in Europe, US, Canada, UK, Australia, New Zealand, Singapore and Malaysia. Earlier, TCS had already developed a set of automation tools, which located and changed the date field in the programs from two digits to four digits. It was after this that TCS inaugurated the facility in which its 'assembly line' of employees worked on Y2K

projects. The Y2K factory became a key money spinner for TCS – it enabled the company to convert the Y2K bug into an income earner as TCS could develop code at much lower cost than several other local and foreign companies working on similar projects.

Apart from the Y2K center, TCS also opened other competence centres such as the Java Excellence Centre dedicated to the development of Java13 products and applications. This centre was authorized by the US-based company – Key Labs to offer 100% Java certification.

5.1.6 HUMAN CAPITAL

TCS followed the factory approach while managing its work force and framing its HR policies on recruitment, training and placement in different locations. The company viewed its employees as assets, which had to be efficiently utilized. TCS senior management constantly kept track of the vast intellectual assets, their skill sets, the status of projects on which they were working and the number of people available for being placed in other projects. TCS determined its manpower requirements on the basis of inputs from senior consultants, who provided information on changes in technology and the potential demand for new IT skills in the immediate future. This enabled the HR department to plan and schedule recruitment and training programs.

TCS took care of every aspect of personnel management, from recruiting to training and career development. The company viewed recruitment as an ongoing process. To fill entry level positions, the company picked up candidates from college campuses across the country. TCS deployed over 50 senior executives, who maintained contacts with leading educational institutions in India. The company combined its aim of recruiting software engineers with a broader objective of improving educational standards in India. It sponsored IT conferences and seminars in these institutes. The company also engaged in reforming the course curriculum and teaching methods.

TCS was well recognized in the industry for its emphasis on employee training. The company invested a large amount of money on this activity. In late 1997, the company inaugurated a training centre in Thiruvananthapuram, Kerala, to impart IT skills in the latest technology to

its new recruits. The centre had the capacity to train 600 employees at a time. The atmosphere resembled a college campus, providing a congenial environment for its fresh- out- of- college- recruits to learn. In 1998, TCS spent 6% of its total annual sales on training. The training contributed significantly to the quality of the company's products and its brand image.

Apart from training, TCS also believed in grooming its employees into consultants and managers. In their first couple of years at the company, employees were put to work on different technological platforms and applications. This was important for TCS as technologies and customer needs and preferences changed rapidly. The company did not aim to develop its employees as specialists, who would become useless once their area of specialization became obsolete. After two years, according to individual performances, the employees were promoted as system consultants. The TCS management provided them ample opportunities to go up the corporate ladder. This approach was different from several IT companies, who stressed specialization of their workforces.

Realizing that its workforce dispersed across the world needed assistance and support to adjust itself to the different working environments and cultures, a voluntary association of wives of TCS employees, called "Maitree" was established in 2002. This was aimed at imparting a much- needed personal touch to the TCS families. The network of "Maitree" members spread across the world provided assistance to TCS families in relocating to new places, finding houses, finding good schools for their children and healthcare facilities. "Maitree" also conducted other activities such as social meetings, theatre, adventure sports, trekking and so on for the families of TCS employees.

The success of TCS's HR policies could be reflected from the fact that its annual employee attrition rate was 7.5% in 2000, a low rate, particularly in the Indian context. Business Today, India's leading business publication ranked TCS 10th in its list of 25 best employers in the country. The company was recognized for its ability to attract and retain work force, providing good opportunities for learning and development, and for offering its employees challenging assignments, including the opportunity to work for Fortune 500 companies.

5.1.7 KEY FOCUS AREAS

In the late 1990s, to accelerate its revenue growth, TCS decided to employ a three-pronged strategy. This involved developing new products with high revenue earning potential, tapping domestic & other fast growing markets and focusing on inorganic growth through mergers & acquisitions. TCS identified high potential areas in terms of technology and industries on which it would concentrate. For instance, in late 1998, the company decided to concentrate on new revenue opportunities including Y2K and Euro conversion. A major area of focus in the late 1990s was e-business. All TCS products and platforms were web-enabled. It also decided to specialize in e-business consulting. The company offered e-business solutions and consulting in various functional processes including customer relationship management (CRM), supply chain management (SCM), enterprise resource planning (ERP), business intelligence, management information systems (MIS), customer support services, integrated knowledge management (Groupware) and more. Customers were offered a package of solutions, which addressed their requirements. Functional consultants teamed up with software developers to offer customized solutions to clients. With this, TCS projected itself as an end-to-end IT solutions provider.(Refer to Exhibit 5.14 for business areas of TCS)

While developing and offering IT solutions, TCS partnered with companies like IBM, Microsoft and Siebel. This enabled TCS to offer better service to its customers. The company's quality e-business offerings helped it acquire a number of high profile clients over the years including GE, KLM, AT&T, Prudential, British Telecom, Merrill Lynch, Xerox, P&G and more.

Among the various industries served by TCS, the company acquired major competence in the financial services industry, which it had been catering to since inception. TCS developed products, which addressed the different requirements of the industry, in areas such as custody, brokerage, stock exchange, clearance, settlement and depository products. Its products such as Network Custody System (a global custody product), Quartz (a wholesale banking product) and ITBS (an integrated total banking solution) had already gained recognition and finding more customers for these products was a part of TCS' growth strategy. By the late 1990s, TCS had nearly 250 global customers for its financial services products.

TCS focused on both domestic and foreign IT software markets. The company identified government, insurance, telecom and manufacturing sectors as key growth areas in India. TCS was already a major player in the banking sector, catering to several leading public sector banks. In 2002, TCS signed a deal with State Bank of India, India's largest commercial bank, which handled 20% of loans and deposits of the banking industry. As per the deal, TCS was responsible for customizing and implementing its Centralized Core Banking Solution in about 9000 branches of SBI. Considering the transaction volumes, number of locations and customers, it was one of the largest IT projects in the global banking industry.

In the international market, TCS served customers in BFSI (banking, financial services and insurance), telecom and manufacturing sectors. In each sector, TCS had focused marketing groups, which looked after every aspect of marketing and promotion activities relating to that sector. TCS made efforts to establish long-term relationships with its foreign clients. The company bagged several multi-million dollar deals from foreign clients, including the $100 mn deal with GE Medical in 2002, to supply IT products and services. TCS signed a contract with UK's United Utilities Water to provide complete IT solutions in a deal worth $30 mn. The company signed similar deals with the Swedish communication major – Ericsson - and the US-based Bank of America.

By 2002, TCS was operating in the US, Europe, Asian and other major markets in the world (Refer Exhibit 5.4 for international sales and marketing network of TCS). One of the company's most talked about international ventures was the setting up of a subsidiary – Tata Information Technology in China (Shanghai) in June 2002 to execute IT projects in the region. The US continued to be a major market for TCS and occupied a significant revenue share (Refer to Exhibit 5.5 for geographical segments of TCS).

By aggressively pursuing its global strategy, TCS emerged as one of the world's leading and fastest growing IT companies by the beginning of the new millennium. Its revenues doubled in a span of two years during the period 1998-2000 (Refer to 5.6 for revenues and export income of TCS during 1998-2000). It also emerged as the fourth largest IT consultancy company in the US and Asia's largest software consultant.

By the early 2000s, TCS was offering strategic consulting and system integration services to over 800 clients across the world in seven business segments – BFSI, telecom, manufacturing and process industry, retail, transportation, healthcare and utilities. In the fiscal year 2002-03, over 40% of TCS' global revenues were derived from the BFSI segment.

5.1.8 INTO THE NEW MILLENNIUM

In early 2000s, TCS primarily focused on acquisitions to grow its business (Refer to Exhibit 5.7 for the major acquisitions by TCS during the period October 2001 to August 2007). TCS believes that inorganic growth, such as mergers and acquisitions, would see the company becoming a global leader sooner than later. To consolidate its leadership position in the domestic IT industry, TCS acquired 51% equity stake in a public sector company – CMC Limited in October 2001 for Rs. 1.52 bn. CMC was a leading infrastructure management, networking and maintenance company in India. With this, TCS added the business of government and quality consulting into its service offerings. To help the company through the mergers and acquisitions process, TCS created a special M&A cell in December 2001.

TCS entered also into mutually beneficial partnerships with several IT companies for new product and market development. In August 2001, TCS teamed up with several leading companies including Ubiquity, British Telecom, Nortel Networks, National Institute of Standards and Technology (NIST) and Sun Microsystems to work on Voice over Internet protocol (VoIP) technology.

On the international front, TCS set up development centres in several countries across the world to expand its reach beyond the US and emerge as a truly global firm. It set up centres in the UK, Hungary, Australia, China and Japan. This helped the company to further localize its product/service offerings and strengthen its presence in new markets.

With respect to the new business segments within India and abroad, TCS concentrated on the booming bio-informatics industry. The company entered into a tie-up with the Centre for Scientific and Industrial Research (CSIR) in India in June 2002 in a $1.5 mn project to develop an end-to-end bio-informatics product for Indian academic institutions. Another area where

the company concentrated was embedded systems. In January 2003, TCS opened a new embedded systems division, which initially concentrated on developing embedded products such as multimedia search engine and server and other wireless solutions. The company decided to invest an estimated $6 mn over the next couple of years on this project.

TCS' efforts in recent years in aggressively pursuing its growth strategy helped it script one of India's greatest success stories and earned the company worldwide recognition. TCS successfully passed through the global technology meltdown in the late 1990s. Its success could be judged from its improving financials and from the fact that it continued its recruitment drive in the beginning of the new millennium when several other IT companies stopped new recruitment. For the fiscal 2003-04, TCS' revenues amounted to Rs. 59.395 bn, an 18.85% growth over the previous fiscal year.

With exports of $ 1.2 bn in the fiscal 2003-04, TCS was ahead compared to its competitors – Infosys ($ 1 bn) and Wipro ($ 854 mn). Though most of India's leading software companies, including Infosys, Wipro and Satyam had a large clientele; TCS led the pack (Refer Exhibit 5.8 for the number of clients of top Indian IT companies).

In June 2004, TCS formally announced its decision to launch its initial public offering (IPO). The company aimed to raise between Rs. 42.97 bn and Rs. 49.90 bn through an issue of 55.45 mn equity shares in a price band of Rs. 775 and Rs. 900 per equity share of face value of Rs. 1. The IPO was a part of the attempt by TCS to fulfill its vision of becoming one among the top ten IT companies in the world by 2010. TCS' officials felt that following the IPO, the company could more aggressively pursue its mergers and acquisitions strategy and reward employees through stock options.

Ever since its inception, TCS gave the utmost importance to maintaining quality of its products and services. In the early 1980s, TCS framed its internal quality standards to ensure that its product quality was checked and certified before they reached the clients. Starting from 1993, several of TCS delivery centers were certified as ISO 9001. In 2002, TCS as a whole was certified as ISO 9001:2000. By 2003, TCS had 16 CMM Level 5 certified delivery centers, with its Chennai facility receiving PCMM V2 Level 4 assessment. TCS' global delivery center in Montevideo, Uruguay received CMM Level 5 assessment in 2003. TCS had more than 2300

Certified Quality Analysts in its work force. Apart from its external certifications, TCS also had continuously developed its own quality assessment standards. A more recent development in this direction was to develop TCS' own quality model called iQMS, which combined several noted quality standards in the IT industry like CMM, PCMM, Six Sigma, ISO 9001 and the Tata Business Excellence Model. In 2004, TCS had started using iQMS in its operations with a plan to make it as an industry standard in future. Due to its ability to serve domestic as well as international clients with comprehensive IT solutions, TCS was able to gain a significant edge over its competitors.

Notwithstanding TCS' rapid growth (Refer Exhibit 5.9) in the past, analysts expressed doubts about whether this momentum could be maintained in the future. The company was witnessing declining revenue growth since the late 1990s. Its growth rate of revenues had decreased from a high of 56% in the fiscal 1998-99 to 19.97% in 2002-03 and further down to 18.85% in 2003-04. Analysts commented that TCS had witnessed high revenue growth in the late 1990s partly because of the depreciating Indian currency as compared to the US dollar.

5.1.9 ENVIRONMENTAL THREATS

TCS was viewed by analysts as a company which was aggressive in pricing, but very slow in decision making. It was also considered to be conservative, especially in disclosing its future plans to the media and general public. TCS was described by media as 'India's best kept secret.' However, analysts felt that after the IPO, the company had to bring in more transparency in its operations.

TCS had several issues to address. A serious challenge which the company faced was the business process outsourcing (BPO) backlash in the US. Several states in the US had been bringing legislations to ban outsourcing, primarily to protect the interests of local citizens. Since TCS was banking on BPO as one of its key growth areas, the opposition against BPO could prove costly for the company. In January 2004, the state of Indiana had cancelled a $ 15.4 mn IT services contract with TCS. Nevertheless, the company framed a strategy to deal with this issue. They have a short term, medium term and long term response to the backlash. In the short term, they take extra care of compliance with all regulatory issues. In the medium

term, they are ready with global delivery centres to finish projects in case restrictions are put on visas and movement of people. In the long term, they are looking at the potential of WTO negotiations for globalization of services.

TCS faced fierce competition from domestic as well as foreign companies. An area where TCS lagged behind domestic IT majors like Infosys and Wipro was the revenue contribution from offshore assignments. For a company which pioneered the global offshore delivery model in India, the offshore revenue contribution for TCS was considerably low at 36% of its total revenues as compared to 49% of Infosys and 42% for Wipro for the fiscal 2003-04. Lower offshore revenues resulted in lower operating profit margins, and this had a negative impact on TCS' bottom-line vis-à-vis its competitors.

Another issue for TCS was its heavy reliance on fixed price IT projects. For the fiscal 2003-04, the fixed price projects contributed to 56.3% of the company's total revenues, as against 36% for Infosys and 27% for Wipro. Though this reflected positively on TCS' project management capabilities and systems maturity, there were higher risks associated. In case of any delay on part of TCS in executing these projects, the extra cost incurred had to be borne by the company. This could seriously affect its profitability.

Foreign IT majors like IBM and Accenture had built a substantial base in India and had a much larger presence across the world compared to TCS. IBM had been fast expanding its business in India, posing a threat to TCS' domestic market share.

5.1.10 MILESTONES

In 2005, TCS received an application maintenance project from ABN AMRO worth US$250 million, which is the second largest deal signed by an Indian IT Company *(Computer Business Review, 23-jan-2006)*. TCS has successfully implemented E-governance projects in the various states like Andhra Pradesh. TCS has also won several multi-million dollar deals in the domestic market. One example is the $250 Mn deal with Tata Teleservices.

The company has recently done some strategic acquisitions like FNS, Tata Infotech & Comicrom which will boost its offerings to the market. The integration with Tata Infotech was completed on February 1, 2006. TCS was featured extensively in the British writer Mark Kobayashi-Hillary's book Outsourcing to India: The Offshore Advantage. TCS topped the list of top 10 best performing IT Services providers worldwide for 2006 as rated by the IT business publication Global Services. *(MSN, 01-Febuary-2007)*

TCS currently has 19 labs spanning across 4 countries. Many of the labs, including the TRDDC, are located in India. The most recent lab however is the TCS Innovations Lab, located in Peterborough, U.K. This new lab works as a central hub to the other 18 TCS Innovation Labs, making use of the ideas and innovations created in these labs and bringing them to one collaborative location.

TCS Innovation Labs-Web 2.0 focuses exclusively on trends in the consumer internet space and explores the implications of these trends on enterprises. The lab works on a range of areas from social software and enterprise mash-ups to co-creation platforms and rich internet applications.

5.1.11 GLOBAL DELIVERY MODEL

TCS has trademarked what it calls a global delivery model. This model is contrasted with an offshore outsourcing model in the sense that the two models differ in terms of maturity of the model. "Offshore outsourcing" models typically involve taking pieces of work and sending them to an offshore group. "Global delivery" models are much more holistic in approach, evaluating the best location — onsite, offsite, or offshore — to do the work and provide the optimum mix of professionals. The flexibility of global IT delivery makes it more viable in today's marketplace, and smart organizations are realizing the full value equation of global delivery, including quality and productivity improvement, cost reduction, scalability and speed to market advantages. Defined projects work best in the offshore model. For example, Y2K work, which was the start of the offshore boom, was very well suited for offshore outsourcing. However, more complex, ongoing projects, such as software application development, application testing and software application maintenance are better suited for a mature global

delivery model. BPO efforts lend themselves very well to the global IT delivery model as well. Projects where the requirements or desired business outcomes are not clear or cannot be clearly articulated, they present tough challenges when attempted in a global delivery model.

Basically, a GDM is the ability to capture knowledge and specifications, smoothly transition them to offsite developers, and re-integrate the results at the client on-site location. The model requires several individual components to work well. These include knowledge capture/playback confirmation, hourly/nightly handoffs often on a 24x 7 basis, quality control and continuous improvement efforts, staff mobilization/demobilization as efforts scale up and down, onsite and offsite staff logistics, staff recruitment, training and retention, expense and time billing for teams across borders, demanding standards for security/business continuity/telecommunications connectivity at the offsite locations. TCS has honed this capability over a decade over hundreds, if not thousands of client engagements. It is part of its fabric. And this model often acts as a differentiator and competitive advantage for the company. (Refer Exhibit 5.10)

Geographical spread – national

Currently (2006), TCS has branches in the following Indian cities: Bhavnagar, Mumbai, Chennai, Kolkata, Delhi, Hyderabad, Bangalore, Thiruvananthapuram,Lucknow, Ahmedabad, Pune,Nagpur, Jamshedpur, Gandhinagar, Coimbatore, Kochi, Gurgaon, NOIDA, Bhubaneswar, Nabadwip and Goa.

Geographical spread – global (Refer Exhibit 5.11).

Africa: South Africa

Asia (outside India): Australia, China, Hong Kong, Indonesia, Japan, Malaysia, Saudi Arabia, Singapore, South Korea, Taiwan, UAE

Europe: Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

North America: Canada, Mexico, USA

South America: Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay.

5.1.12 BUSINESS IMPACT OF IT: INDIAN CONSULTING COMPANIES

The NASSCOM - McKinsey Report 2005 estimates that the Indian IT industry has only addressed 10% of a potential market size so far. The report also predicts that innovation by industry players in India can accelerate the industry growth. It also predicts that growth is expected to be driven by traditional industries (e.g. retail, banking) and cross-industry functions. The Americas are expected to remain the largest market for services accounting for a little less than 60% of global spends through 2005-09 with emerging opportunities in Latin America and Eastern Europe.

These reports validate the Company's growth strategy. It continues to grow in multiple geographies such as Eastern Europe, Latin America and China, with a special focus on the North American and European markets. TCS expects that its global network of marketing offices and alliances will enable the Company to exploit the opportunities presented in the marketplace.

In India, the success of software industry can be attributed to the excellent teamwork between the Government and the Industry. The Government of India has announced IT as a thrust area. Accordingly, it has provided a liberal policy framework for the sector, including fiscal benefits, availability of high speed data communications and infrastructure and has ensured almost red-tape-free system. The fiscal benefits include Special Economic Zones, Software Technology Park schemes, zero import duty on software, and 100% exemption on profits from software exports (after a powerful lobbying by NASSCOM, in 1991). The major sectors which are witnessing a special thrust for adoption of IT are: Government administration, Insurance, Banks, Energy, Financial Institutions, Defense, Public Tax System, Ports, Customs, Telecom, Education and Small Office/Home Office / Individuals. Large sectors with slow IT penetration rate, such as textile industry and healthcare, are being encouraged by the government and the private sector to adopt IT. Indian government is working towards the goal of "IT for all" by 2008.

IT software and services industry is treated as a Priority Sector by banks. Major banks have created specialized IT financing cells in important branches, where IT Software and Services units are sufficiently large in number.

From governments to the private sector, increased spending in technology and government support has been a crucial part of TCS remaining competitive and efficient. It launched India's first mission-mode e-governance project, MCA-21, for the Ministry of Company Affairs, as well as used its skills to create an automated solution for the National Rural Employment Guarantee scheme that reduces waste and corruption.

Compulsory insistence of ISO-9000/SEI level-5 Standards or equivalent, certified by one or more competent certification agencies in India, by Government, has been a major driving force behind the company's increased focus on quality.

In India, the Intellectual Property Rights (IPR) of computer software is covered under the Copyright Law, hence, protected under the provisions of Indian Copyright Act 1957. Major changes to Indian Copyright Law were introduced in 1994, making it one of the toughest in the world. This has helped protect the assets of IT companies.

TCS is a part of National Skills Registry (NSR) - a centralized database of all employees of the IT services and BPO companies in India. The objective of NSR is to improve recruitment practices in IT and BPO industry, which will in turn help in maintaining India's global competitive advantage.

India exports software to over 102 countries around the globe. Leading product companies such as Microsoft, Oracle Corporation, Cisco, SAP and Adobe and service companies like Accenture and Capgemini have set up development centers in India. India has more than 1000 domestic IT service providers and the software exports account for a substantial amount of India's total exports.(Refer Exhibit 5.12 for NASSCOM report on Indian IT industry potential)

The IT outsourcing environment is changing, favoring the offshore players. The customers are splitting the deals into smaller parts, giving them to multiple-vendors. This is benefiting Indian

companies like TCS as it is a strong candidate for the off-shoring part of any deal. According to outsourcing consultant, TPI, out of the deals tracked in 2004, 40% of IT services had an offshore component. TPI has seen a 10-fold jump in value outsourced to Indian off-shore vendors over the last two years.

TCS has proved its ability to compete with global giants like IBM and Accenture by being a joint contractor in the ABN Amro deal, one of the biggest outsourcing deals in Europe worth €1.8bn ($2.2bn). *(Financial Times, 02-September-05)*. Through this deal TCS has caught the attention of top infotech companies of the world.

The growth of the Indian software industry can be attributed to some of the factors unique to Indian system in comparison to MNCs of the developed countries. These factors include availability of cheap labor, favorable dollar to rupee exchange rate, large scale availability of skilled, qualified and well trained manpower backed by organized software industry.

5.1.13 BUSINESS STANDING OF TCS

TCS is trying hard to move up the value chain by expanding service offerings, deepening domain expertise, adding new vertical segments, and broadening its client base. TCS finds it challenging to differentiate with other Indians IT companies as well who are largely alike in service offerings, pricing, workforce quality, skill set, execution delivery, and client servicing. As the size and complexity of the projects increase, TCS will be required to take more risks. For the larger deals it will have to compete with the top global players.

The Company's global Network Delivery Model has given them unparalleled execution capabilities across the world and has greatly enhanced their ability to consult and execute multi-location, complex engagements. This model has resulted in setting up near-shore centers in North America, Europe and Asia-Pacific, regional development centers in Hungary, Uruguay and Brazil and a global development centre in China, in addition to India. As part of the Global Network Delivery Model, these delivery centers across the world work round-the-clock collaborating with each other effectively to deliver real business results to customers.

Customers have the flexibility to choose from onsite, near-shore, and offshore options that best suit their business needs.

TCS has examined growth via mergers and acquisitions that are a strategic fit, complement its capabilities and extend its portfolio of offerings. The company is also participating in international programs and partnering with leading research institutions to pioneer next generation services.

In 2006, it has acquired Comicrom S.A., Chile, Financial Network Services (Holdings) Pty Ltd, Australia (FNS) and Swedish Indian IT Resources AB (SITAR) through its subsidiaries. The Company has set up two subsidiaries, viz. TCS FNS Pty Limited in Australia and Diligenta Limited in the UK. It has also set up other subsidiaries such as Portugal Unipessoal Limitada in Portugal, Tata Consultancy Services Luxembourg S.A. in Luxembourg and Tata Consultancy Service Chile Limited in Chile. The Company has 49 subsidiaries as on March 31, 2006. In March 2006, the Company, through its subsidiary Diligenta Limited ('Diligenta') acquired, on a going concern basis certain businesses of Pearl Group Services Limited ('Pearl'). The acquisition included specified insurance contracts and claim administration business and assets including goodwill and know-how. The Company has entered into a Joint Venture Agreement with the Intelenet Global Services Ltd. For the blockbuster GM deal, TCS is tying up with EDS to bid for parts of the business.

In February, 2007, TCS kicked off a Joint Venture in China with Microsoft and three Chinese entities, which is being seen by analysts as an emergence of a major force in the global IT services market.

5.1.14 TRENDS AND IMPACT

5.1.14.1 Trends
As can be seen from the above data, some definite trends emerge:

a. The main chunk of business comes from overseas with the Indian market constituting only about 10% of total revenue.

b. The Energy and Utilities vertical business, though is a focus area, but is a relatively small focus area (less than 5%). Consequently, the technologies that lead to business transformation will be implemented at slower rates or incrementally by a variety of companies for the firms in this sector.

According to a March 2005 IDC report, (Refer Exhibit 5.15) the global services market is poised to grow at a compounded annual growth rate of 7% over the next 5 years to $ 803.9 billion in 2009 from $ 573.1 billion in 2004. In the calendar year 2005, the industry is expected to grow by 6.3% to $ 609.1 billion. Gartner expects worldwide IT spending to increase by 5.6% with the IT Services market growing by 4.69% in 2005 *(Gartner Dataquest Market Databook, March 2005 Update)*.

The following chart outlines the total estimated services spending worldwide by service segments from 2004 to 2009, along with the corresponding compounded annual growth rates.

The United States is the region spending the largest amount for services globally and is expected to grow at a CAGR of 7.1% to $ 355 billion at the end of 2009. Latin America, Eastern Europe, Middle East, Africa and Asia/Pacific are regarded as major growth points. The US and Western Europe will continue to constitute 76% of the spending in 2009 (down 1% from 77% as in 2004).

5.1.14.2 Impact

As per NASSCOM published "Strategic Review 2005 – The Industry in India", off-shoring will continue to increase over time with offshore penetration expected to increase from 6.3% in 2004 to 8.8% by 2007 of the global IT services and BPO market. In CY 2004, $ 39.6 billion was estimated to be off-shored to countries like India, Canada, China, Mexico, etc. with off-shoring to India estimated at $17.2 billion. In CY 2008 overall offshore sourcing is expected to be $ 94 billion in CY 2008. Off-shoring to India is expected to grow to $ 48 billion by CY 2008. According to the NASSCOM Market Intelligence Service report, May 2005, on Engineering Services, the worldwide market for outsourced engineering services was $ 12 billion in 2003 and is forecast to grow at a CAGR of 12.2%. Close to 65% of revenues in ITES-BPO space being off-shored to India is done to captive units set up by companies in India. Over time, readiness to outsource to third party vendors, even in ITES-BPO is expected

to increase. Revenues to Indian IT services and ITES-BPO companies have increased at a faster rate than the global growth seen in these segments and is expected to continue doing so. The 'India' advantage is expected to continue in the global markets. Domestic IT services and software and ITES-BPO market has increased from $ 1.9 billion in FY 2000 to $ 4.3 billion in FY 2005 (E), a CAGR of 17.7% over the period and is expected to show strong growth going forward. (Refer Exhibit 5.12). These reports from reputed research firms corroborate the working strategy of TCS. TCS has grown in multiple geographies, with special emphasis on the North American and European markets. They have been early movers and one of the first to establish operations in Eastern Europe, Latin America and China. However, the major portion of revenues are largely denominated in foreign currency, predominantly US$, GBP and Euro. Given the nature of the business, a large proportion of costs are denominated in Indian rupees. This has the effect and potential to inflate to profit/loss due to currency fluctuations.

5.1.15 EXHIBITS

Exhibit 5.1- TCS – Consolidated Statements of Income (2001-04)

Fiscal Year ending March 31	2001	2002	2003	2004
				(in Rs. mn)
Income				
Consultancy Services	30,058	40,325	48,257	57,468
License of Software Packages	559	810	890	951
Other Income	781	520	828	976
Total Income	**31,398**	**41,655**	**49,975**	**59,395**
Expenditure				
Employee Cost	6,508	7,598	10,127	12,273
Operations and other Expenses	15,000	18,765	25,338	28,969
Total Expenditure	**21,508**	**26,363**	**35,465**	**41,242**
Profit before Interest, Depreciation, Extraordinary/Exceptional Items, and Foreign and Indian Taxes	9,889	15,292	14,510	18,153
Interest	78	45	152	93
Depreciation	679	783	929	1097
Profit before Extraordinary/ Exceptional Items and Foreign and	9,132	14,464	13,430	16,963
(Prior Period)/Excess Provision	329	267	(158)	--
Extraordinary Items	--		102	(1,164)
Profit before Foreign and Indian Taxes	**9,461**	**14,731**	**13,374**	**18,127**
Provision for Foreign Taxes				

Current Taxes	1,330	2,202	1,963	1,581
Deferred Taxes		75	(344)	101
	1,330	**2,277**	**1,619**	**1,682**
Profit Before Indian Tax (before restatement)	**8,131**	**12,454**	**11,755**	**16,445**
Total restatement	589	(838)	595	27
Profit before Indian Tax (after restatement)	**8,721**	**11,616**	**12,350**	**16, 473**
Provision for Indian Taxes				
Current Taxes	96	220	571	486
Deferred Taxes	--	(54)	15	14
Profit after Indian Tax (after restatement)	**8,625**	**11,450**	**11,764**	**15,973**

Source: TCS Red Herring Prospectus, July 2004.

Exhibit 5.2- TCS – Statement of Assets and Liabilities (2001-04)

Fiscal Year ending March 31	**2001**	**2002**	**2003**	**2004**
				(in Rs. mn)
A. Fixed Assets:				
Gross Block	6,619	7,911	8,315	10,034
Less: Depreciation	(4,018)	(4,626)	(4,979)	(5,113)
Net Block	2,600	3,286	3,337	4,921
Capital Work-in-Progress/Capital Advance	406	104	306	231
	3,006	**3,390**	**3,642**	**5,152**
B. Investments	**173**	**3,562**	**4,140**	**3,131**
C. Current Assets, Loans and Advances				
Unbilled Revenue	26	(1,144)	(49)	2,581
Sundry Debtors	6,941	8,795	11,344	9,644
Cash and Bank Balances	252	1,667	538	633
Loans and Advances	4,535	3,933	5,568	10,233
	11,754	**13,251**	**17,401**	**23,080**
D. Liabilities and Provisions				
Secured Loans	220	3,237	5,686	4,108
Unsecured Loans	297	470	1,147	2,719
Current Liabilities and Provisions	5,214	4,109	5,404	6,484
Deferred Tax Liability	479	135	236	--
	5,731	**8,295**	**12,371**	**13,546**
E. Networth	**9,202**	**11,909**	**12,812**	**17,816**
F. Represented by Tata Sons Limited	**9,202**	**11,909**	**12,812**	**17,816**

Source: TCS Red Herring Prospectus, July 2004.

Exhibit 5.3   Balance Sheets of TCS since it went public

Fiscal Year ending March 31	2005	2006	2007
A. Fixed Assets:			
Gross Block	10,411	11,698	12,504
Less: Depreciation	(1,329)	(2,574)	(3,434)
Net Block	9,082	9,124	9,070
Capital Work-in-Progress/Capital Advance	1,203	2,800	7,930
	10,285	**11,924**	**17,000**
B. Investments	**14,044**	**19,635**	**32,520**
C. Current Assets, Loans and Advances			
Unbilled Revenue	760	354	5,239
Sundry Debtors	14,635	23,266	27,998
Cash and Bank Balances	1,207	1712	5,571
Loans and Advances	6,008	11,079	13,569
	22,610	**36,411**	**52,377**
D. Liabilities and Provisions			
Secured Loans	4,588	10,148	11,134
Unsecured Loans	1,447	5,476	2,504
Current Liabilities and Provisions	7,143	11,719	16,899
Deferred Tax Liability	643	389	717
	13,178	**27,986**	**30,926**
E. Networth	**33,761**	**39,984**	**70,971**
F. Represented by Tata Sons Limited	**n.a.**	**n.a.**	**n.a.**

Source: TCS Annual Reports

Exhibit 5.4- International Sales and Marketing Network of TCS

COUNTRY/CONTINENT	NO. OF OFFICES	YEAR OF ESTABLISHMENT
United States and Canada	50	Since 1976
UK and Ireland	8	Since 1975
Continental Europe	20	Since 1985
India	50	Since 1968
Central and S America	8	Since 2002
Middle East and Africa	4	Since 1981
Asia-Pacific	9	Since 1992

Source: TCS SEBI Document, 2004.

Exhibit 5.5 Geographical Segments of TCS

Geographical Segments	% of revenues (2001-02)	% of revenues (2002-03)	March-December 2003
Americas	61.1%	59.3%	63.6%
Europe	20.7%	20.0%	19.4%
India	11.9%	14.8%	12.5%
Others	6.3%	5.9%	4.5%

Source: TCS SEBI Document, 2004

Exhibit 5.6- Revenues and Export Income of TCS (1998-2000) (In Rs. bn)

YEAR	REVENUES	EXPORT
1997-98	10.83	9.55
1998-99	16.90	15.18
1999-00	21.15	18.20

Source: Dynamic Progress, Fortune India, January 31, 2001.

Exhibit 5.7- Key Acquisitions 2001-2007

COMPANY/ACQUIRED FROM	MONTH AND YEAR	DESCRIPTION	STAKE
CMC Limited from Government of India	October 2001	Government owned IT company	51%
WTI from International Finance Corporation, USA	December 2003	BPO	20.67% (made 100% by 20Mar 31 2006)
Airline Financial Support Services from Swiss Airlines	January 2004	Airline back office unit, BPO	75%
Aviation Software Development Consultancy India Ltd (ASDC) from Singapore Airlines	March 2004	Consultancy and solutions in Aviation industry	51%
Phoenix Global Solutions (India) Private Limited	July 2004	Insurance-domain consulting and solutions company, BPO	100%
Comicrom S.A. Chile	November 2005	Back office BPO in BFSI	100%
FNS, Australia	October 2005	Banking solution	100%
Swedish Indian IT Resources, Sweden	May 2005	Telecom	51%
TKS-Teknosoft, Switzerland	April 2006	Banking solution	100%

TCS Management PTY Ld., Australia	November 2006	Consulting	100%

Exhibit 5.8- Number of Clients of top IT companies (MAR 31 2004)

	TCS	**Infosys**	**Wpro**	**Satyam**
All Clients	491	357	332	301
$1mn - $5mn	147	130	126	77
$5mn-$10mn	50	48	43	26
$10mn-$20mn	26	22	Nil	13
> $20mn	16	10	Nil	Nil

Source: Equity Research reports, TCS – Right Priced? Businessworld, Aug 02, 2004

Exhibit 5.9- TCS Growth over the years
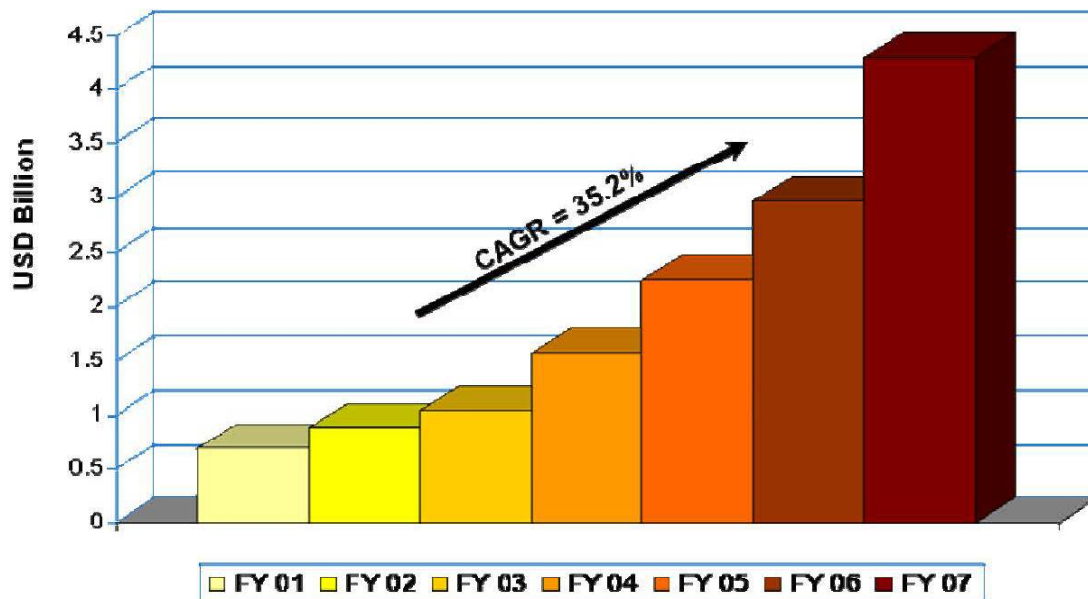
Exhibit 5.10 – Global Delivery Model of TCS
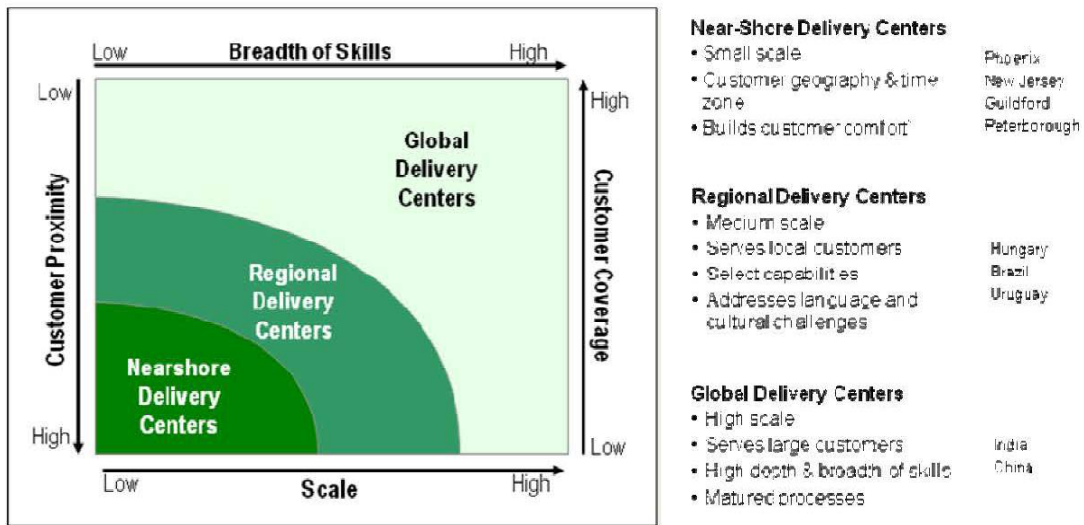
Exhibit 5.11 – Global Delivery Centres of TCS
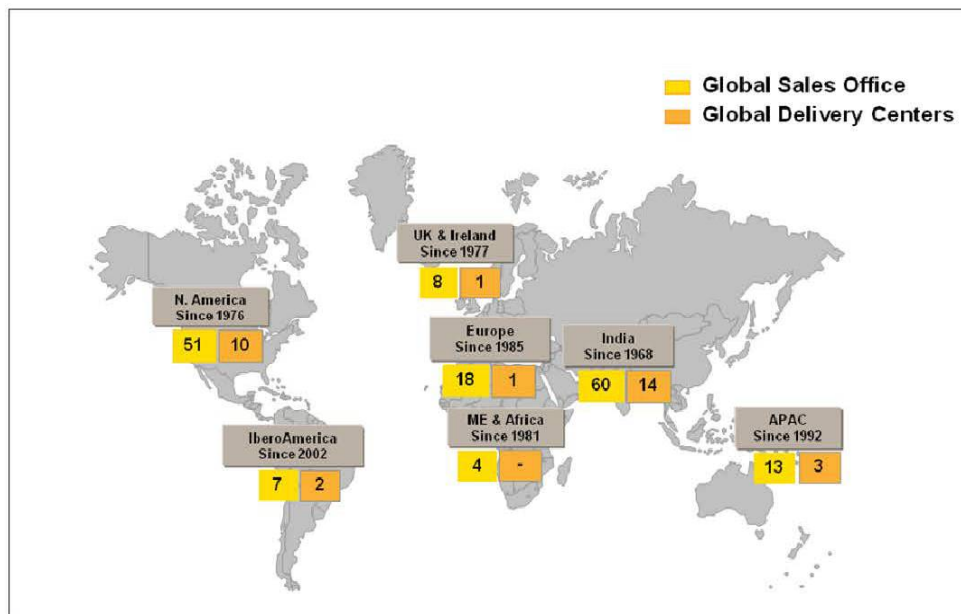
Exhibit 5.12– NASSCOM Projections for Indian IT industry
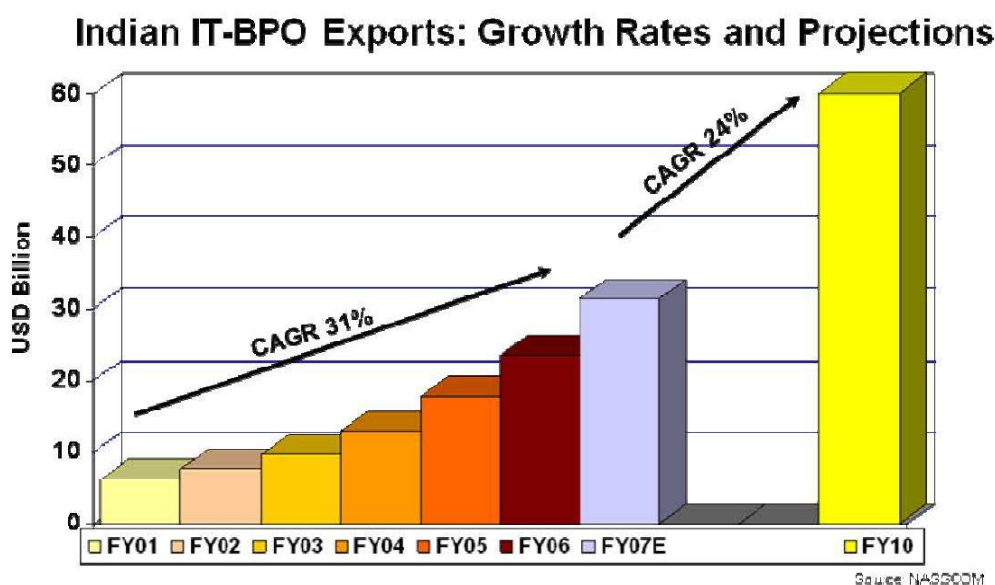
Exhibit 5.13– Vertical Wise Contribution to Revenue of TCS: 2001-07

Business Segments	%of revenue from internatio nal business 2001-2002	%of revenue from internatio nal business 2002-2003	%of revenue from internatio nal business 2003-2004	%of revenue from internatio nal business 2004-2005	%of revenue from internatio nal business 2005-2006	%of revenue from internatio nal business 2006-2007	%of revenue from internatio nal business Q2-2007
BFSI	44.6	42.7	40.7	34.8	38.77	43.89	43.3
Manufacturing	18.8	20.5	20.5	17.0	15.97	12.72	12.7
Telecommunic ation	15.7	14.4	15.7	14.6	14.78	16.09	17.8
Life Sciences and Healthcare	0.7	2.3	3.4	4.0	4.3	4.6	5.6
Retail and Distribution	7.0	6.9	6.7	5.8	5.0	5.9	7.6
Transportation	4.8	5.0	4.2	4.2	3.6	3.7	4.4
Energy and Utilities	1.1	1.9	2.5	3.0	2.5	3.0	2.5
Others	7.3	6.3	6.3	7.9	9.2	9.9	6.1

Source: Think Build and Operate – The TCS E-Business Strategy, www.bcs.org and www.tcs.com

Exhibit 5.14– Business Areas of TCS

E-Commerce and Internet Services: TCS offers end-to-end e-commerce and Internet services, including strategy, implementation and total outsourcing. These include security

consulting and audits, intranet and extranet applications, website and content development, content management solutions, Web hosting and ASP services.
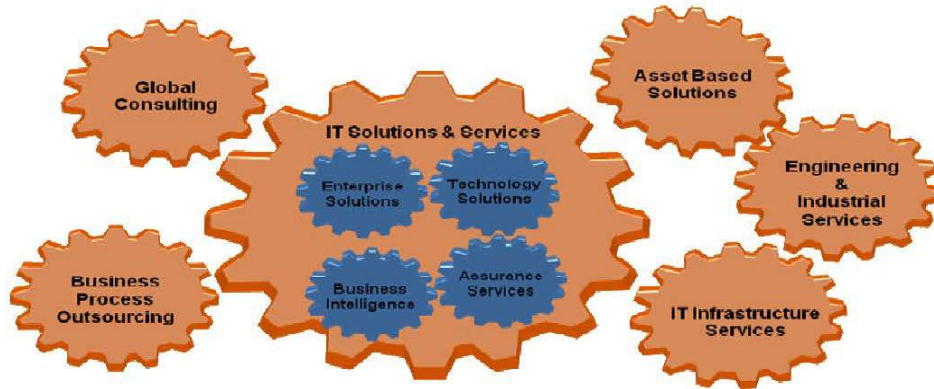
Enterprise Resources Planning (ERP): ERP solutions integrate key business and management processes, providing a high-level look to an organization's business. ERP integrates fragmented business operations, replacing multiplicity of legacy systems. TCS provides ERP solutions at all stages of the lifecycle such as enterprise visioning, best practices evaluation, gap analysis, package selection, prototype development, organization design and data conversion and migration. TCS has alliances with leading ERP vendors like SAP and Oracle with sub-practices dedicated to each of these products, which helps sharpen focus.

Customer Relationship Management (CRM): CRM solutions enable companies to select, acquire and retain long-term relationships with customers. These span the re-engineering of customer-centric processes along with the design, development, implementation and maintenance of packaged solutions. They also cover the automation of these processes and solutions. Backed by strong domain expertise, TCS has been offering CRM solutions focusing on Marketing Automation, Sales Force Automation, Contact Centres and e-CRM.

Supply Chain Management (SCM): TCS offers end-to-end solutions for supply chain planning, procurement, execution and collaboration by way of packaged software customisation or custom-built solutions. TCS specializes in implementing leading SCM products i2, SAP APO, Manugistics, Ariba and Oracle, using well-defined and proven methodology.

Business Intelligence (BI): Business intelligence and decision support systems help keep complex information up-to-date in a dynamic business environment. TCS offers Business Intelligence solutions to a variety of industries, ranging from financial services to fast-moving consumer goods; and from large-scale enterprise-wide data warehousing projects to multiple integrated data marts. Services part of this area are business intelligence, strategy planning, gap analysis, data warehousing, data modelling, data extraction and migration.

Enterprise Applications Integration Services (EAI): Within the e-business world becoming increasingly complex, it is imperative that state-of-the-art business processes are cohesively enabled by a seamless underlying IT infrastructure. Further, the Internet phenomenon is forcing companies to transform and exploit their IT systems, re-design their processes to be more responsive and flexible to ensure better co-ordination among customers, suppliers, trading partners and other business entities. This transformation demands application and process integration both inside and outside the enterprise. EAI tools and technologies address the unique challenges that this poses. TCS offers end-to-end services by way of custom-building solutions or through packaged software customisation and implementation. Among EAI tools, TCS has a special focus on industry leaders MQSI, Tibco, Seebeyond e-gate and Webmethods. TCS also assists customers in integrating their ERP software with other applications such as CRM and SCM and in Web-enabling legacy systems.

Exhibit 5.15– IDC Report: Growth of Global Services Market
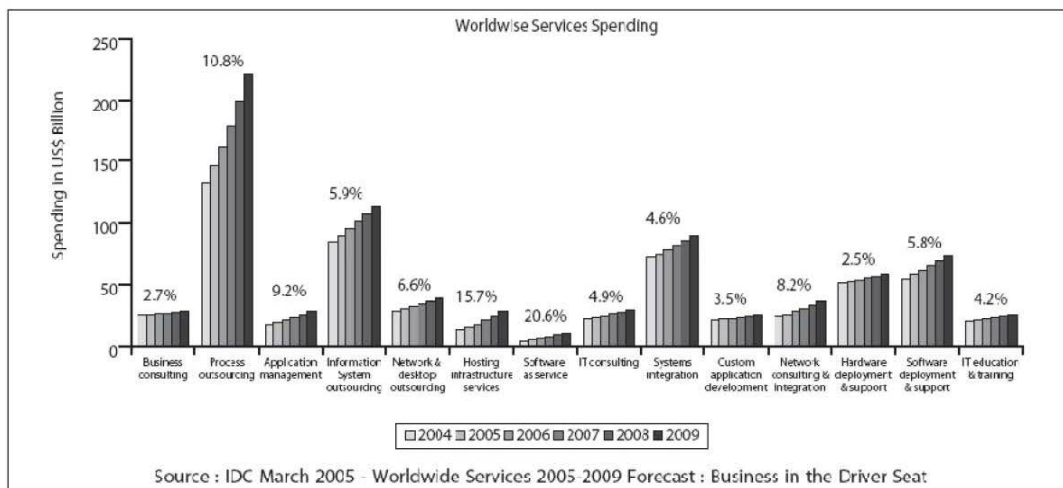
5.2 Case Analysis 1: Balfour Beatty (TCS Case-1)

The UK utilities and infrastructure industry is set to capitalize on the 2012 London Olympics in a big way. It is already one of the UK's most important economic sectors, with 250,000 firms employing more than two million people and representing, according to the DTI, eight per cent of gross domestic product (GDP). The Labour government's commitment to national infrastructure renewal in the form of the Private Finance Initiative – of which there was nearly £40 billion in projects up until the start of last year, a lot going to new schools and hospitals – means that the pressure to deliver quality solutions is high. But the industry as a whole has been slow to embrace IT. Conservative estimates are 5 to 10 years behind mainstream commerce, partly because of the demographics of the industry and partly because of the mobile nature of the work it does. This is reflected in the type of average salaries in IT in this area, which last year were equivalent to posts in the education area, and well behind the remuneration of IT professionals in financial services and computer services – £50,000 versus £30,000. But construction firms, particularly the larger ones, are beginning to take information technology more seriously and are realizing significant benefits as a result.

In the past this industry has had a poor reputation generally. One industry estimate in 2006 put 73 per cent of projects running over budget and 50 per cent of errors coming down to poor information. Partly due to the fragmented nature of the industry, where teams of contractors pull together for short periods, it's been historically difficult to tie together disparate business functions. But consolidation in the field – particularly at the higher end – as well as increased IT mobility and a realization that computers, seen as just for offices, can have a real contribution to make onsite, is changing the situation.

As the industry edges nearer to the 2012 Olympics prize and the large infrastructure projects in London continue, a growing number of executives, including IT professionals, are entering companies in the construction sector from other industries. These people tend to be more familiar with tier one ERP providers such as SAP and Oracle and thus are less likely to patronize the niche players that have tended to dominate the sector, such as Coins and others. Another significant factor here is Oracle's acquisition of PeopleSoft and JD Edwards, which has given it further 'critical mass' in the sector, and doubled the number of Oracle construction clients in the UK Construction 100 list. While ERP is gaining more acceptance as

a central coordinating platform in the field, other business processes are also changing, with greater use of off-site fabrication in a bid to reduce onsite problems, cost and time. This is seen by observers as leading to greater interest in supply chain management systems, collaboration tools, especially to support the design process, more deployment of 3D and co-ordination techniques in CAD and, interestingly, more adoption of mobile applications for the collection of data onsite. One such example is McNicholas, which has given mobile devices with a customized work-time management application to 800 of its staff.

5.2.1 COMPANY BACKGROUND

Balfour Beatty Utility Solutions was established in 2007 following the merger of Balfour Beatty Utilities and Balfour Beatty Power Networks, forming the largest utility solutions provider in the UK. Balfour Beatty Power Networks grew from two long established companies in the UK, an electrical contracting company formed in 1899 by James Kilpatrick and an engineering company Balfour Beatty, formed in 1909. Following decades of growth the companies were first linked in 1949 as James Kilpatrick and Son Ltd share capital was bought out by Power Securities whose main subsidiary was Balfour Beatty. Acquired by British Insulated Callender Cables, James Kilpatrick and Son Ltd and Balfour Beatty became Balfour Kilpatrick in 1971. In the year 2000, Balfour Beatty Power Networks emerged as an independent company once more and doubled its turnover in this period; establishing a significant power business in the UK and abroad.

During the last decade Balfour Beatty Utilities was born out of two companies, John Kennedy and Kenton Utilities & Development Limited. In 2001 and 2002 Balfour Beatty acquired John Kennedy and Kenton Utilities respectively. With effect from 1st January 2003 Balfour Beatty Utilities was formed as a new operating company, to integrate the gas and water utility services. The company provided a complete asset management solution to most of the major utility companies in gas, clean water and wastewater sectors. They also help clients maintain, repair and refurbish their utilities network across the UK. Balfour Beatty is a world-class engineering, construction, services and investment business, well positioned in the infrastructure markets which offer significant long-term growth. George Balfour, a Scot mechanical engineer, and

Andrew Beatty an English chartered accountant who founded Balfour Beatty in 1909 described their company as "general and electrical engineers, contractors, operating managers for tramways, railways and lighting properties and for the promoting of new enterprises."

Balfour, a leading solutions provider to water, wastewater, gas and civil engineering companies, is set to cut operating costs by £1.5 million each year after commissioning Tata Consultancy Services (TCS) to build an integrated, business and work management system. Balfour Beatty Utilities Limited (BBUL) is a leading solutions provider in distribution asset management to the UK utilities sector. Working in the water, wastewater and gas industries, BBUL has long term partnerships with many of the UK's major utility companies, including Yorkshire Water, National Grid and United Utilities. The company delivers solutions for all types of new lay, maintenance and rehabilitation projects, including water network repair and maintenance, replacement and reinforcement of gas mains, and sewer construction and renewal. Balfour Beatty Utilities is an Operating Company of Balfour Beatty plc, the fifteenth largest construction company in the world, and the second largest construction company in the UK. Balfour Beatty serves the international markets for rail, road, water, gas and power infrastructure, buildings and complex structures. It topped financial forecasts with a 25 per cent rise in annual profits on the back of record order books for its full 2005 financial year. This was followed by a 19% rise in 2006. (Refer Exhibit 5.16 for the revenue growth since 2001). The company is made up of around 18 different businesses, operating in a number of markets, including civil engineering and energy, road and rail services and construction. Balfour Beatty's long-term strategy is to work on sustainable projects, like infrastructure developments in road and rail links, which need long term support.

5.2.2 EXISTING IT LANDSCAPE

Balfour Beatty is a company that employs 2,300 people and has won long-term contracts with many blue-chip customers. The focus of the company was on consolidating back office and customer-facing processes on an ERP platform – thus building a technology foundation on which they could subsequently evolve and build as their needs grew.

Balfour Beatty Utilities was using several disparate technology platforms and applications to run its business and manage each of the 25 customer contracts it operates at any one time. Lack of integration had resulted in disjointed processes, often with manual dependencies, and high operating overheads. The company wanted to introduce standard processes for all contracts, cut overheads through automation, enhance quality through best-practice ways of working and raise productivity and performance by leveraging the skills of its workforce.

The company felt the need to integrate its processes and departments on a common platform. They felt that this would enable them to streamline operations. They commenced a search for a consulting company that could help them in achieving this – in terms of selecting the common platform as well as deploying it for them. The following basic criteria were laid down for this. (Refer Table 5.2 for a list of the criteria for selection.).

Table 5.2 – Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior utility domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

Tata Consultancy Services (TCS) was selected to recommend, design and implement a solution that could deliver best of breed financial and project management applications combined with work management and scheduling tools in an integrated application. The solution recommended by TCS was the ORACLE E-business suite. They implemented the finance, project, HR, payroll and purchasing functions in the Oracle e-Business on an Oracle 9i database running on Sun Solaris servers. TCS managed the project from solution engineering and process mapping through to building, configuration, interfacing the new solutions with retained legacy systems, testing, deployment, key user training, go-live and post-implementation support.

5.2.3 RESULTS – BUSINESS TRANSFORMATION

5.2.3.1 Outsourcing

The IT services market, according to a NASSCOM survey in 2006 was $4.5 billion – a growth of 29% over the previous year. IT and business process outsourcing is becoming more viable for the CIO day by day. This is also reflected in the Indian context by major deals like Bharti Airtel with IBM and Wipro with Yes Bank as well as the bludgeoning growth of the BPO/KPO industry in India. The Western world outsources to India primarily for cost advantages – arising out of the client and the consulting company working in different geographies and economies. However, for companies in India, this does not hold true since both service provider and client operate in the same economy and have access to the same cost structures. Therefore, one is compelled to look at the other driving forces behind this outsourcing. Companies want to concentrate on their core competencies and therefore want to outsource traditionally cost centre operations like IT to third party service providers. Another important factor that Balfour Beatty found was that with the rapidly changing pace of technology, it was becoming difficult for them to keep track of emerging trends and their implications to their business core competencies. Additionally, finding and retaining the right talent for these changing skill sets was another challenge. To meet these challenges, the company outsourced their infrastructure management and operations, network management and data centre operation as well as application development and maintenance. The company, however, did not outsource all its IT to the external provider. Refer Exhibit 5.17 for a list of things the company did not outsource.

The company looked at IT as a differentiator, and this is what led to the outsourcing. While outsourcing, however, the company did not get into micro-managing the contract. For example, the company established a service level agreement (SLA) with the service provider. As long as the provider operated within the parameters of the SLA, there was no need to specify what number of people having what skillsets were to be deputed onsite at any point of time.

Two aspects determine the success of outsourced initiatives – commercials and deliverables. The commercials allow a clear cost-benefit evaluation based on quantifiable figures. In Beatty's

case, return on investment (RoI) was the business value associated with the deliverables. Business value, in their case was equated with the rate of change and adoption to new technology, total cost of ownership, overall service level improvement in terms of percentage, improvement on SLA exception rates, and employee satisfaction surveys. They also added the satisfaction level of the service provider as a measurement parameter. The core competencies of the company is shown in diagram 5.2 depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced.

Diagram 5.2 – Core competencies and outsourcing
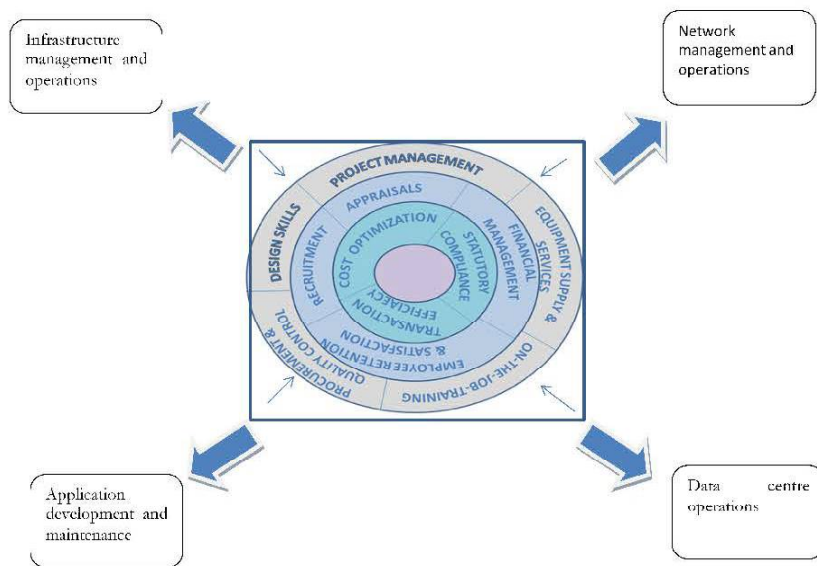
5.2.3.2 Effect of business cycles

Increasing shareholder value was one of the prime reasons Balfour Beatty went in for process integration. They wanted leaner, innovative, adaptable and flexible processes that could increase satisfaction levels of users as well as their clients. This requirement came about in 2004 – which was a year in which the economy grew by 3.1% *(Office for National Statistics)*. During this period the output in the production sector contracted 0.5%, the second quarterly fall in row and a state of affairs that some economists classify as a recession or down-cycle in

business. At a time like this, with margins being squeezed, companies looked towards getting more output from an existing set of resources.

Business cycles have an impact not only on developments in IT but also in the adoption of IT. In the down-cycle of business, companies must achieve enhanced profitability, in large part, through best in class performance and disciplined cost control as market demand for their products is strong, but not without fluctuation. Commodity price levels are cyclical in nature and are influenced in part by business cycles of the economy. In the face of fluctuating demand and cyclical pricing, operating an efficient and streamlined business, as well as squeezing costs, is critical. Therefore, in the matrix given above, in the down-cycle, businesses will turn to IT to streamline operational efficiencies primarily with the intention of reducing cost and thus improving profitability – or at the very least maintaining their existing levels. Refer Exhibit 5.18 for the Western Europe IT spend and growth pattern.

In the up-turn or stable phases of the cycle, however, industry consolidation will take place and create larger, more complex companies. This was also seen in the acquisitions and mergers Balfour Beatty went through from 2004-2006. Refer Exhibit 5.19 for a list of these acquisitions. One of the key agendas for the resultant organization is generating synergy from the merger and acquisition activity. Aging infrastructure needed to be upgraded or replaced. Compliance costs for environmental remedial and enhanced safety standards were trimming already thin margins. Achieving internal efficiencies ahead of the competition was a key challenge. Investing in medium and longer term process improvements and cost control measures while product demand is strong and prices are high made good business sense. And to do this all and at the same time integrate the legacy of different existing systems from the companies involved in the merger was a big challenge.

Certain industries are hit hardest during a downturn in the economy. These include construction and allied industries like cement. There are certain favored industries that are not impacted to a great extent during such down-cycles. This is to say, their growth rate slows down to low figures, yet they seldom show negative growth. An indicative list of these industries is shown in Diagram 5.3. Diagram 5.4 shows the impact of business cycles on Balfour Beatty.

Diagram 5.3 – Impacted industries in relation to business cycles
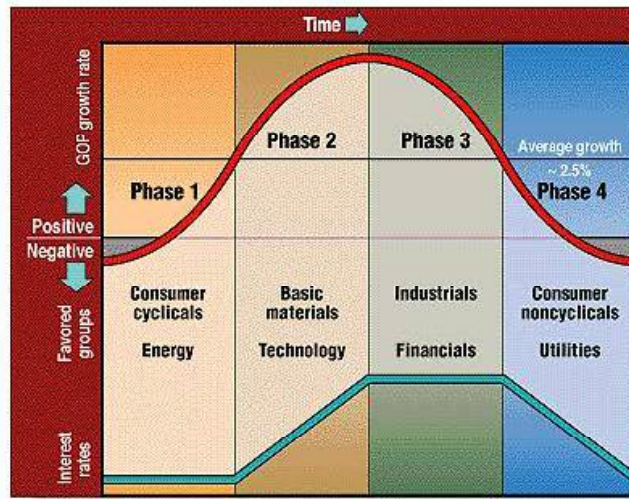
Diagram 5.4 – Impact of business cycles on Balfour Beatty
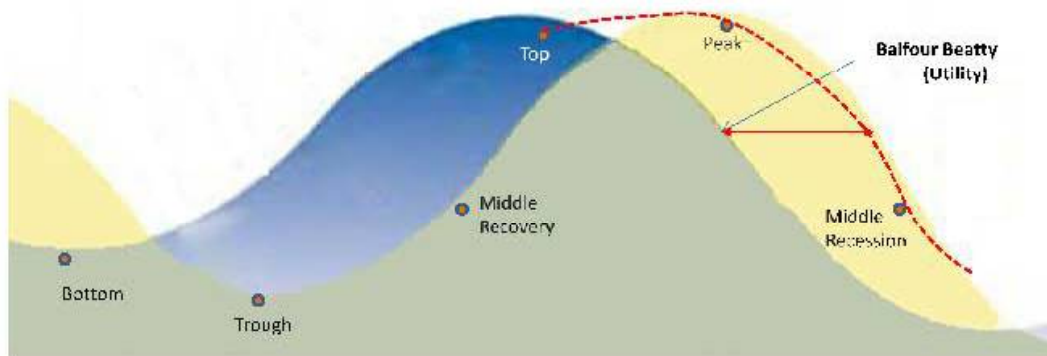
5.2.3.3 Transactional Ability

The implementation was part of Balfour Beatty's business excellence initiative with one of the main focus areas being customer service as the reason for the implementation. It is seen that for companies dealing in mass production of goods, the biggest achievement or benefit is high levels of stock availability, typically over 99%. Refer Exhibit 5.20 to see the areas in which Balfour Beaty introduced operational efficiencies which increased competitiveness. Any

production company in a competitive situation should be able to estimate the possible extra sales they could capture if they always had their products on the shelf. For firms in the assemble to order, make to order or engineer to order lines of business, the benefits typically come in the form of reduced lead time – a 50% reduction in 12 months is common – and on-time delivery close to 100%. The most basic improvement that accrued was a stable, managed master schedule out to the cumulative lead time. The manufacturing department had stable, reliable schedules so that managers could spend their time managing and improving their processes instead of chasing material and shuffling priorities – thus leading to a saving in both direct and indirect costs. Diagram 5.5 below shows stages of transactional efficiency.

Diagram 5.5 - Stages of transactional efficiency
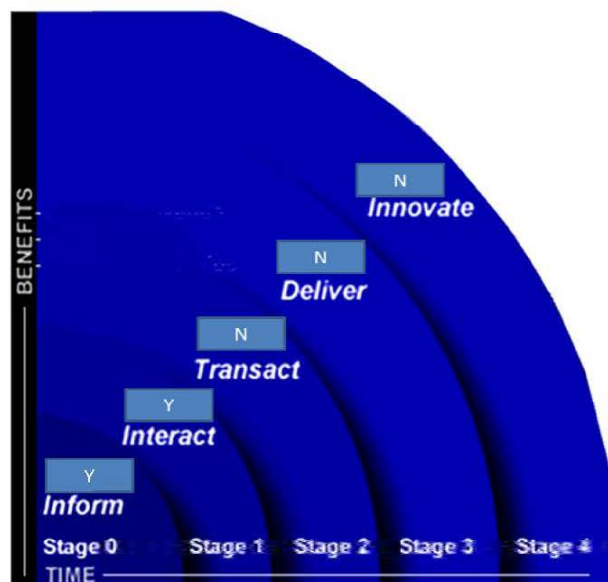
Direct material is frequently a large proportion in the cost of the project. There are many potential savings in this area that arise from improvements in master scheduling. Balfour was able to give its suppliers stable schedules enabling them to achieve the same manufacturing cost savings. The greater visibility brought about by the implementation enabled suppliers to invest in better equipment and to take on value engineering work with the company as a partner. Indeed, there was a transformation in the relationship with the vendor graduating to a partner in the whole process. These single, reliable sources of material, rather than multiple but unchecked sources, opened up the possibility of point of use delivery which saves inventory

carrying costs as well as administration time. The procurement department typically achieved a 20% reduction in the material costs with as little as three months forward visibility of requirements.

Balfour found that the inventory itself was the last main category of quantifiable savings. Merely replacing an intuition based planning system with a faster, computerized system often results in inventory rising for the simple reason that technology enables one to react to pending purchase orders often at the cost of executing complementary or supplementary actions – including re-scheduling of works orders and consequently related purchases. These overdue items lead to a cascading effect as all the other material that depended on the overdue items also needed to be re-scheduled. A big transformation that occurred was the elimination of such inter-dependencies in these schedules. This reduced raw material and work in progress. The entire master production schedule was managed and driven by a sales and operations plan, agreed by the senior team. It was possible to move towards slowly reduce slow moving items through overall better management of the project.

5.2.3.4 Impact on workers

Based on the adopted technology, the organizational structure in Balfour Beatty underwent changes in order to achieve synergy with the adopted IT strategy. This led to re-structuring and the formation of smaller teams within the company. These teams were 'virtual' in nature in the sense that employees from different geographies could be part of the same team. This resulted in teams that were more flexible and could actively respond to changes. This was especially the need of the hour given the global nature of Balfour's acquisitions. Organizational inter-dependencies came to the forefront and a sense of fitting into the overall scheme of things was imbibed into each employee.

Diagram 5.6 - Impact on workers due to technology.

At the same time changes took place in the worker's psychological resistance levels and adaptation to the change brought about by process re-engineering prior to the deployment. Last but not least the implementation created and enabled knowledge workers in Balfour to solve strategic as well as operational problems, thus reducing the traditional reliance on line managers. In fact, this also promoted a flatter organization structure since these workers began performing many of the functions their managers used to perform prior to the implementation. Refer Diagram 5.6 above for impact on workers due to technology.

This change typically manifested at the beginning of the implementation cycle. This led to a restructuring of the organizational and the formation of a leaner, flatter structure and the enhancement of the quality of interdepartmental coordination. Post implementation, as workers get comfortable with using the system, they will suggest process improvements to further evolve the process. As the firm begins to respond to these bottom-up suggestions, it will recognize the need to implement (or adapt) technology in order to achieve these (often significant) improvement in the process.

This is also reflected in the fact that in the same period, Balfour rolled out two other major projects, in parallel — a VoIP network and a custom job management solution that was developed by TCS for the whole group in addition to the ERP. The VoIP project was driven

by the demands of the business. For example, historically each business unit had its own network, but when the organization started offering clients solutions from across a cross-section of business units, they needed to make communications easier. A Voice over IP solution was selected as one of the best ways to increase communication levels, and cut operational costs. To support the increased load and to integrate all the business units, a new network had to be put in place. British Telecom (BT) was awarded the Networked IT Services contract for UK operations of Balfour Beatty. The contract value is £25 million, and the duration of the contract is five years. The scope of activities is to provide networked IT services for the UK operations of Balfour Beatty. Under the agreement, BT will consolidate Balfour Beatty's diverse network infrastructure into a single, group-wide multi-protocol label switching (MPLS) data network, enabling them to focus on their core business activities.

In one of the best examples of end-to-end process integration, the next phase of the project (also being done by TCS) is deploying the above work management solution across the contract and mobile-enabling the current job management and scheduling system, allowing work to be delivered to engineers in real time, as well as immediate feedback to be given on the work completed. This will allow for remote task allocation to field-based engineers and enable teams working on customer sites to provide real-time reports on the status of each project.

5.2.3.5 Security

Like the most firms worldwide, Balfour had a number of driving factors for investing in security systems. Refer Diagram 5.7 for a list of these driving factors. At the same time, they were conscious about the top threats that were likely to affect them in the current context. Refer Exhibit 5.21 for a list of top security risks and vulnerabilities. They realized that it was neither possible nor desirable to outsource everything related to IT security. Some things just don't outsource well they're either too close to the business, or they're too expensive for an outsourcing company to deliver efficiently, or they simply don't scale well. Balfour decided to outsource expert assistance: vulnerability scanning, monitoring, consulting, and forensics, for example; yet they retained security management within their own purview. This is especially important since outsourced contractors have to be treated as employees to all intents and purposes. The factors that played a role in determining the outsourcing were primarily

financial. Balfour was able to get the security expertise it needed at a far more cost effective rate by hiring someone else to provide it. If one simply examines the area of monitoring, for example, since attacks can happen at any time of the day, any day of the year, it is necessary to have staff present 24x7, 365 days a year. While it was possible for Balfour to build these capabilities, it was not cost-effective, since even with the maximum level of automated security and surveillance systems, a minimum of five full-time employees was required. Additionally, supervisors and backup personnel with specialized skills were also required. Not only was it expensive in terms of human capital, but finding people with the right mix of integrity and skills was not easy; nor was retaining them.

Diagram 5.7 – Security adoption driving forces

These debilitating factors work in reverse for the outsourcing service provider. The provider works to economies of scale. They can more easily hire and train personnel, simply because they need more employees. Vigilant monitoring means keeping up to date on new vulnerabilities, new hacker tools, new security products, and new software release versions. These service providers can spread such costs across all customers. A specialist security provider also has a much broader perspective than a single company as it can learn from attacks against one customer, and use that knowledge to protect all its customers. It also encounters such attacks much more frequently thus enabling it with the relevant experience to reduce risk for its customers for repeat methods of attack. In addition, on the threat landscape, security vendors have been coming out with a number of countermeasures that are evolving

almost as fast as the threats themselves. Refer Exhibit 5.22 for trends in these countermeasures which show security revenues by countermeasure category.

5.2.4 TRENDS

5.2.4.1 Cost-performance structures

Moore's Law describes an important trend in the history of computer hardware: that the number of transistors that can be inexpensively placed on an integrated circuit is increasing exponentially, doubling approximately every two years (*Moore, 1965*). The trend has continued for more than half a century and is not expected to stop for a decade at least and perhaps much longer Refer Diagram 5.8 for an illustration of this). Almost every measure of the capabilities of digital electronic devices is linked to Moore's Law: processing speed, memory capacity, even the resolution of digital cameras.

Diagram 5.8 – Moore's law
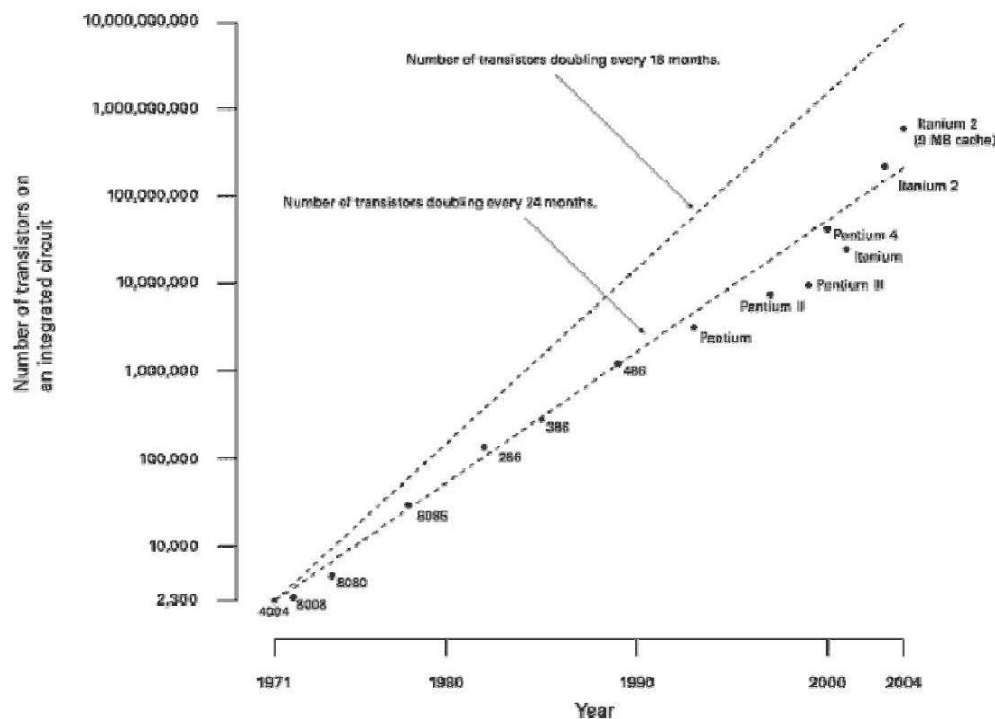
Moor's law has been proved annually. There have been increases in the absolute processor speeds from 2001 till date. The important fact, however is that the cost of this equipment has halved every two years. Estimates say that within a decade, it will be possible to procure a computing device for less than the amount of its sales tax today. Balfour experienced similar trends. In this era of activity based costing (ABC), it wanted to evaluate the actual costs of distributed computing. Balfour had adopted the client-server architecture for its deployment. This had the following cost components – Hardware, software, support and hidden costs.

a. Hardware costs vary, depending on the type of network operating system, the desktop operating system and the user's applications as these determine the computing power required and hence the cost of equipment. These costs were divided into two major categories – clients, servers and network infrastructure. While the former included the acquisition cost of the equipment, and capital cost components such as memory upgrades, hard disk drives, backup equipment, adapter cards and cabling, network infrastructure included additional costs for items like port controllers, bridges/routers, WAN equipment, and data communication links. In addition to the capital acquisition costs, several intangible hardware costs were also considered such as asset life, support availability, ease of use and resale value.

b. Balfour found that client-server software costs were more difficult to quantify due to the distributed computing environment. These generally include the license costs, connectivity cost (specifically required for the application to run), implementation cost, training cost plus the implicit opportunity cost of allocating human resources to the implementation. Balfour opted for the Solaris platform, partly for this reason.

c. Balfour found that while hardware and software account were the major components initially during the implementation, in the overall scheme of things, they accounted for a fraction of the overall costs – with support costs making up the majority of the total cost of owning the system. Potentially, up to 75% of network ownership costs consist of personnel support costs and not technology costs. Thus, identifying and reducing support costs is more important than reducing hardware and software costs.

d. The last component, hidden costs can account for as much as 25% of the cost of ownership. These costs typically include support staff, opportunity cost for floor space, power and cooling costs, transportation, travel, and user difficulty with tools, turnover, and time off for training. Balfour found it difficult to quantify these costs due to their shared services nature.

In the existing system landscape of Balfour, with disparate applications, there were also integration costs – which were required to make all the disparate applications work together. One of the major motivations for Balfour to reduce costs was to eliminate this cost by implementing an integrated suite of applications. Refer Diagram 5.9 for an illustration of this. The implementation had another effect – that of building a strong technology platform that could scale as requirements grew, and most importantly – that was standards based. This had the added effect of reducing the integration platform cost as well – a benefit that Balfour estimates will bring greater returns as the number of applications to be integrated increases in future.

Diagram 5.9 – Cost component reduction
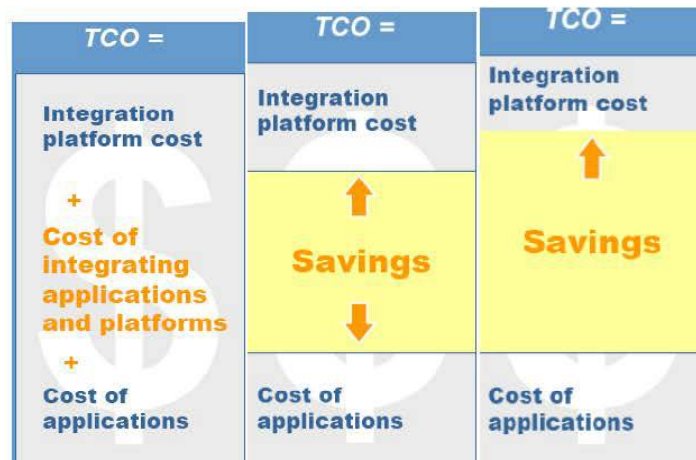
5.2.4.2 Architecture, Enterprise Management, and business continuity

Architecture: The architecture of deployed applications was predominantly client server. However, the mobility solution being rolled out used a 'n' tier architecture. Balfour deployed offline mobile applications to enable their workers streamline field operations, automate data capture processes, and optimize distributed assets. The technology enabled users to connect

into the network to bring a set of business data down to their mobile device, access this data locally, and connect back into the network at regular intervals to synchronize data and applications. The back-end included a lightweight database with full Java support for all standard laptops and popular handheld computers including Pocket PCs, Palm and Symbian devices; a synchronization engine that ensured applications and data were current. Additionally, it provided for centralized deployment and administration with Oracle9i Application Server.

It included an easy-to-use packaging wizard that packaged the mobile application components into a unique self-executable file that could be easily deployed to mobile devices. Most importantly, it supported the pre-dominant development standards like Microsoft technologies as well as Sun Microsystems standards letting developers use the tools and knowledge they were most comfortable with. Refer Table 5.3 for a list of technologies deployed.)

Table 5.3 – Technologies deployed in Balfour

Technology	Product
Operating system	Solaris 9
Database	ORACLE 9i Rel 2
Enterprise Application Suite	ORACLE E-business apps
Modules	Oracle Financials Oracle Procurement Oracle Inventory Oracle Projects Oracle Project Contracts Oracle HRMS Oracle Payroll Oracle Enterprise Asset Management Oracle Customer Support

Enterprise Management: The platform also eased its management by offering comprehensive features to centrally deploy, manage, and synchronize mobile applications to devices. The platform was scalable up to thousands of mobile devices – more with clustering technologies. The deployed mobile server ensured that at no time was there a need for the implementation team to physically handle mobile devices as it offered highly scalable, bi-directional synchronization of data between the Oracle9i Database Server and the mobile device over any wired or wireless network. The choice of operating environment was no accident. Refer Exhibit 5.23 for a technology maturation path of operating environments available at the time.

As can be seen, Solaris was getting into the commoditization mode from its earlier perception of being an esoteric operating environment that was perceived to have a high total cost of ownership. Additionally, at that time, Sun Microsystems had embraced the open source movement and had made Solaris an open source software (OSS) product. This had not only reduced the license costs of the operating environment in terms of client licenses, but also had opened up the support avenues for the system to the community at large – which further went to reducing management costs.

Business continuity: In the context of environmental uncertainty and emerging electronic threats, Balfour realized the importance of a business continuity plan (BCP) to enable critical services or products to be continually delivered to clients. Instead of focusing on resuming business after critical operations have ceased, or recovering after a disaster, a business continuity plan endeavors to ensure that critical operations continue to be available even in adverse conditions. Balfour outsourced the designing of the BCP to Turner and Townsend, management consultants in the UK. They, in consultation with the in-house team, developed a plan that included plans, measures and arrangements to ensure the continuous delivery of critical services and products, which permitted the organization to recover its facility, data and assets as well as the identified necessary resources to support business continuity, including personnel, information, equipment, financial allocations, legal counsel, infrastructure protection and accommodation. Diagram 5.10 depicts Business Continuity Planning.

Diagram 5.10 - Business Continuity Planning

In conjunction, a business impact analysis (BIA) was conducted to identify the organization's mandate and critical services or products; rank the order of priority of services or products for continuous delivery or rapid recovery; and identify internal and external impacts of disruptions in order of maximum risk.

5.2.4.3 Enterprise Integration

Enterprise Integration is the integration of processes across organizational and functional boundaries to provide competitive advantage. For ten consecutive years Balfour Beatty improved its profits and earnings by more than 10% – a record which few modern day companies can boast. This was achieved through extensive application of IT in the correct manner. End-to-end process integration happened effectively. Orgnanization wide there was an integration of people, processes and information. The impacts on the company work environment and performance were manifold. Diagram 5.11 shows the major effects of Enterprise Integration.

Diagram 5.11 – Major effects of Enterprise Integration

5.2.5 EXHIBITS

Exhibit 5.16 – Turnover of Balfour since 2001
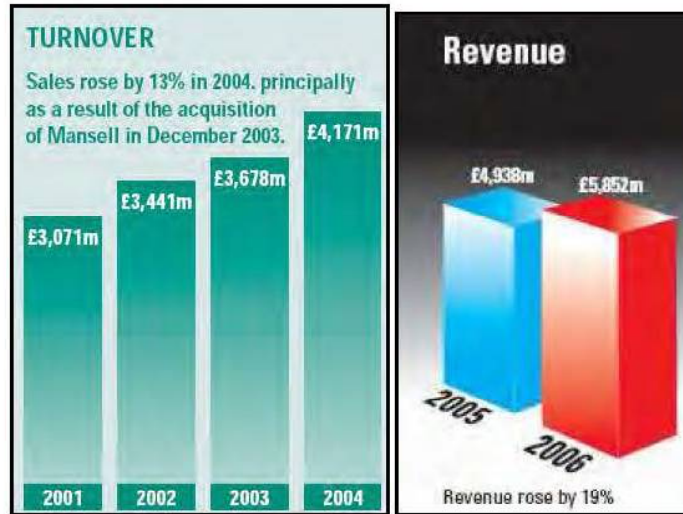
Exhibit 5.17 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

Exhibit 5.18 – Western Europe IT spend and growth pattern
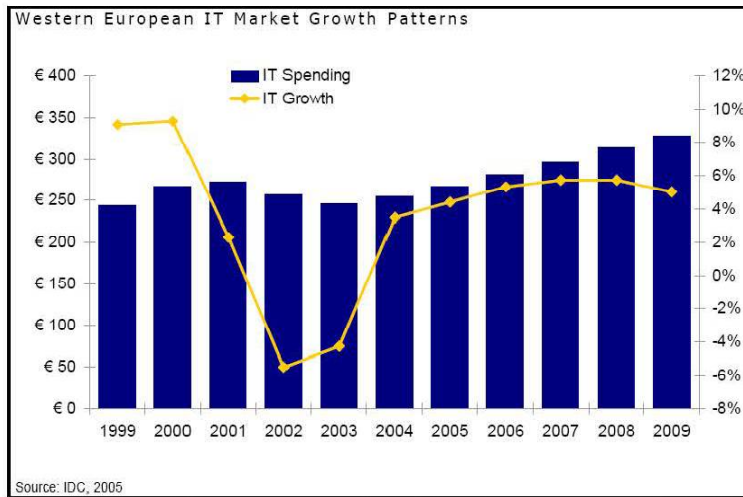
Exhibit 5.19 – Major acquisitions by Balfour Beatty between 2004-2006

Mansel plc	100% in FY 2004
JCM Group	100% in FY 2005
Pennine Group	100% in FY 2005
Charter from Clarillion	100% in FY 2006
Edgar Allen	100% in FY 2006

Exhibit 5.20 - Areas in which Balfour Beatty implemented operational efficiencies

Exhibit 5.21 - Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware
Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information
Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information
Spam: Unsolicited or unwanted email messages
Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable
Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders
Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site
Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations
Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers
Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data
Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized
Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

Exhibit 5.22 - Security revenues by countermeasure category
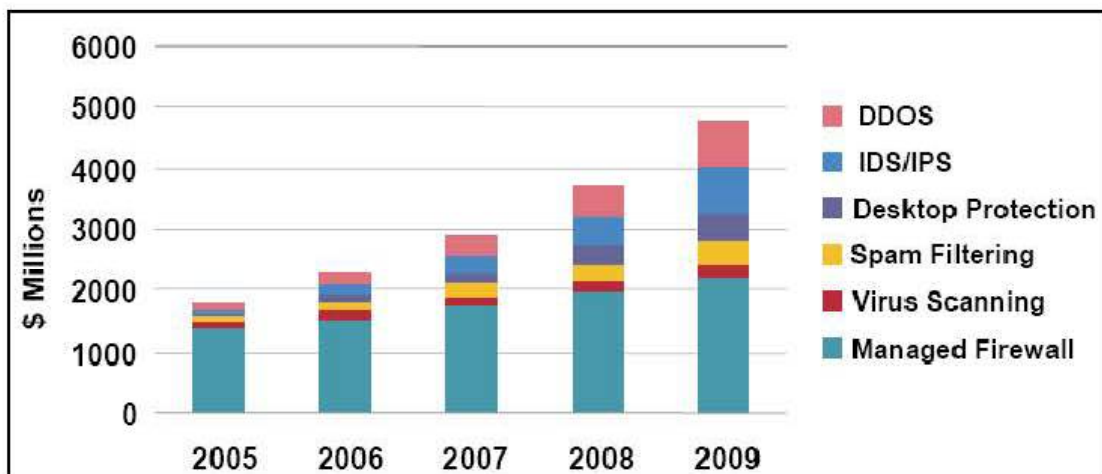
Exhibit 5.23 – Technology maturation path
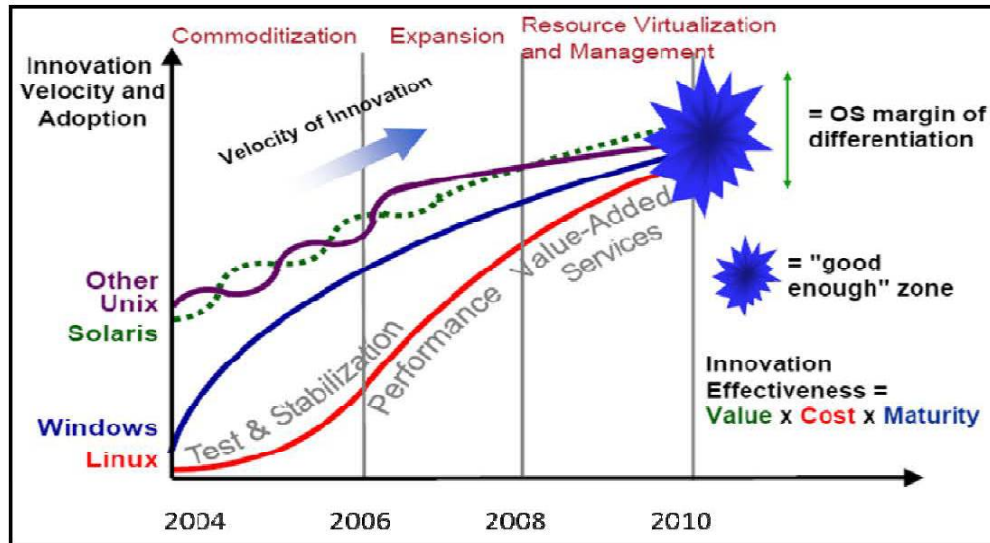
5.3 Case Analysis 2: British Airways (TCS Case-2)

5.3.1 COMPANY BACKGROUND

British Airways plc (BA, LSE: BAY, NYSE: BAB) is the largest airline and flag carrier of the United Kingdom and one of the largest in Europe. Refer Exhibit 5.24 for BA's financial performance. Its main hubs are London Heathrow and London Gatwick. In March 2008, BA will move most of its Heathrow operation to the new Terminal 5 that is currently being completed in Heathrow.

At the end of the 1990s, most carriers thought IT was a commodity available to one and all with no differentiation. Slowly they realized that their business had become too complex and too expensive to operate and ensure consistent profitability. It is at this time that an attempt was made to simplify business and process models and use technology to automate processes. Complexity was then in-built into the process slowly depending on customer requirements – always using technology as the enabler – for example flexible ticketing, flying into accessible

airports, and having back-up aircraft in case of a problem. Leveraging such technology enabled BA to be quite often just as price competitive as the low-frills carriers and to meet the demands of customers—and still get reasonable levels of returns. Refer diagram 5.12 for BA's values and goals.

Diagram 5.12 – BA's values and goals (Source: Company documents)
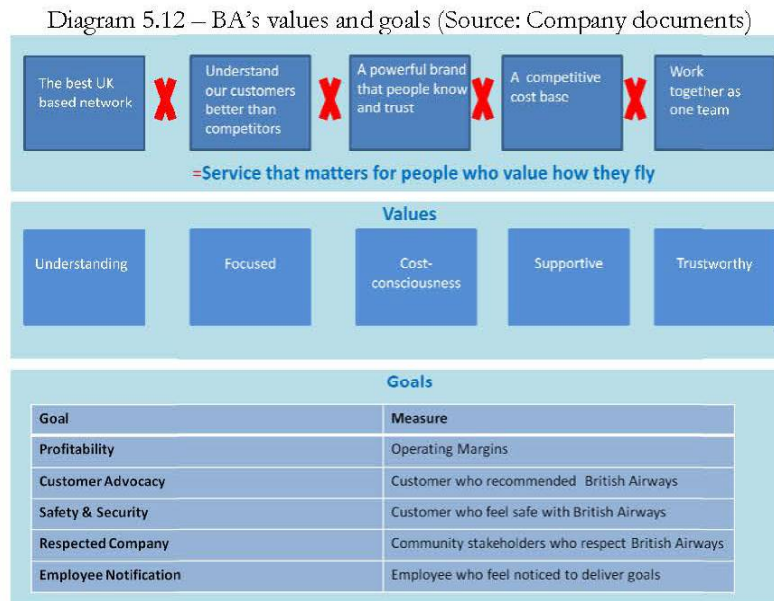
At the end of the year 2001, post the 9/11 debacle, British Airways (BA), like most other airlines, was facing a host of challenges – in terms of world economic problems, SARS (Severe Acute Respiratory Syndrome) and the war in Iraq, besides the security embargoes imposed because of the terrorist attack. These factors, combined with the stiff competition from North Atlantic carriers and the 'no-frills' airlines which had embraced the web as a low-cost way of doing business, meant BA was forced into a battle for its own survival. The focus therefore was on cost reduction.

5.3.2 EXISTING IT LANDSCAPE

In BA, the total expenditure on IT as a percentage of revenue was about two percent (2%) – of which the major part was spent on running IT operations and only a small part on fresh investment. The existing landscape included green screen reservation applications – with a lot

of disparity in versions. There were up to 39 versions of one application deployed within the BA environment.

Internally, the organization comprised a myriad of legacy systems – in terms of internal systems and even networks. In 2002, the organization under a new IT leadership, embarked on a series of changes to improve things. The restructuring reduced overall IT spend by £93m – 34 per cent – between 2002 and 2004. Yet this reduction was made not for lessening the dependence on IT but actually deepening the usage of IT within the organization.

BA decided to implement a customer relationship management (CRM) system. Poor data-quality and the lack of an enterprise application integration (EAI) strategy that ensures consistent data across applications were other drawbacks. There was also a need for integrated reporting and business intelligence (BI) for flexible analysis and delivery of insights to management. Further, the benefits of dash-boarding and score-carding, as powerful tools to support enterprise performance management (EPM) and optimize CRM strategy and execution were also priorities. TCS was selected as the implementation partner for this initiative. Refer Table 5.4 for a list of selection criteria.

Table 5.4 – Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior aviation domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

5.3.3 RESULTS – BUSINESS TRANSFORMATION

5.3.3.1 Outsourcing

After a strike by the employees of one of its outsourcing vendors in 2005 affected BA's operations, the company had a re-look at outsourcing as a concept. They realized that

outsourcing made them vulnerable to any labor problems the service provider may have with its employees. Refer Exhibit 5.25 for a list of elements which were not outsourced by BA.

BA currently has two framework agreements for software development work with consulting companies NIIT and TCS. BA uses these outsourced offshore resources primarily to free up the airline's internal IT department to focus on core strategy and design work by sending the lower-level application development and programming work overseas as and when the need arises. This model helps the company manage peaks and troughs in terms of IT workload and works very well for the organization. An example when this model was used tactically is in the development of the 'shopping basket' feature on ba.com, which allows passengers to book hotel rooms and car hire when they book a flight. This module was designed out of London by BA's IT staff, the development project was managed in Newcastle by the IT staff; yet the actual development was done by TCS out of its Chennai offices. This strategy was an important one for BA in terms of overall integration on a common platform – which would not be possible had the design of the module been outsourced as well. Refer to Diagram 5.13 for a depiction of this. The core competencies of the company is shown in the diagram depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced.

Diagram 5.13 – Core competencies and outsourcing
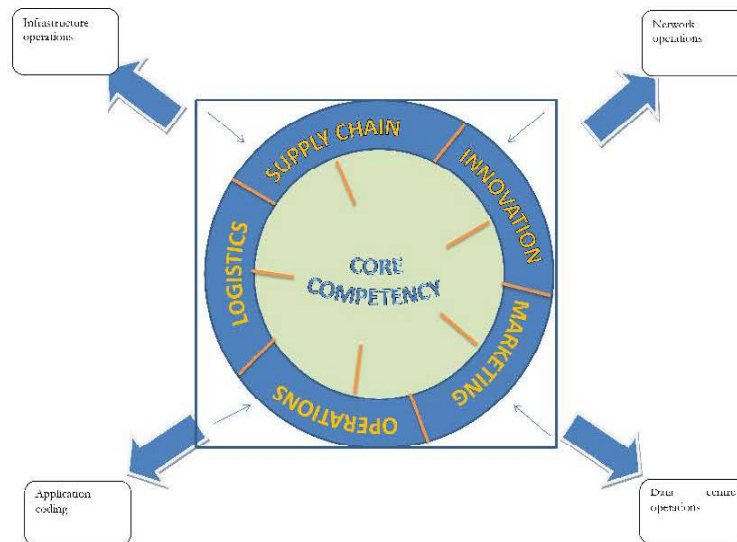
5.3.3.2 Effect of business cycles

The aggregate business cycle for the economy masks the individual business cycle for different industries. For example, the building industry business cycle can take up to 50 years to go from trough to trough, whereas fast-moving consumer goods, such as liquor and biscuits, have much shorter cycles of about 10 years from trough to trough. The fluctuations in the expansion and contraction of sales are far greater for the building industry than for fast-moving consumer goods. The aviation industry is heavily influenced by business cycles. Aviation as a product is offered to customers as a service. Therefore, it suffers from the same problem that plagues the industry – that it is not possible to stock the offering to the customer. In order to manage these cycles, airlines, like other industries, need to:

- keep close to customers; offer excellent goods and services that customers want to come back to buy time and time again

- control costs

- invest in new technologies for the future

Among the most important factors that influence a customer's decision to take a specific airline are flight schedule and price. Aggregated, this constitutes the demand for the service – and comprises the cycle. However, these factors work as contras depending on the category of customer – for business customers, the schedule is more important than the price where as for individual customers the price is often the over-riding concern. The airline's primary concern is therefore to maximize the business class passengers. For this, it is important to develop a flight bouquet that has a high number of destinations as well as frequent flights to these destinations. However, on the costs side, the biggest component of the overall costs of a flight are direct operating costs. Yet, the marginal cost of each passenger on a flight is low. Therefore, airlines seek to maximize the passenger load factor (PLF) or maximize the number of passengers on the flight, and seek to operate the flight only when the number is maximized. Refer Exhibit 5.26 for relation between operating profit and passenger load factor.

The cycles in the aviation industry can be described as follows: The economy is on an upswing. More people want to fly and have the paying capacity to do so. Seeing this, the airline decides to expand capacity and places orders with an airplane manufacturer. This does not happen immediately though – there is a definite time lag or delayed recognition of this need. There is typically a lead time of 18-24 months before the airline can get delivery of the new aircraft and expand its capacity. Meanwhile, retirement of existing aircraft reduces the capacity of the airline. Over capacity indicates low PLF. And thus the cycle is setup – oscillating around the desired PLF (currently 76.1 for BA). After excess capacity has reached its maximum value, further capital deepening stops and slows to rates lower than those required for growth – till the excess capital (aircrafts) are depleted and retired. This is illustrated in Diagram 5.14 below.

Diagram 5.14 – Relation of economic cycle to BA's business cycle
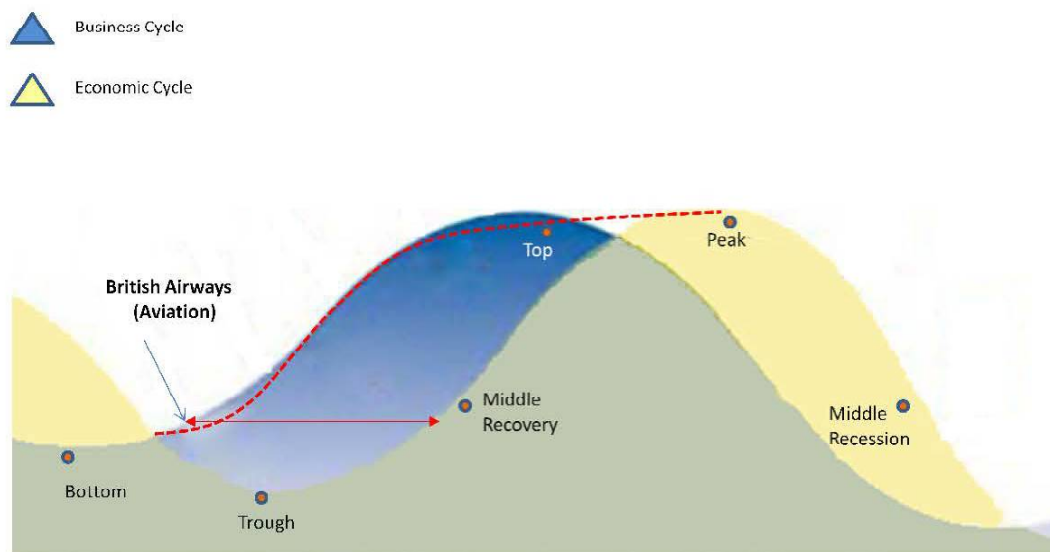
To further elaborate this, one can distinguish and categorize industries into cyclical and non-cyclical. Cyclical are companies whose success is tied to economic cycles or interest rates. These stocks generally perform well during economic expansions and perform poorly during recessions. Aviation comes into this category. This is in contrast with non-cyclical, i.e. companies whose success is not tied to economic cycles or interest rates. Examples include agriculture, tobacco, beverage and utility industry stocks, which are tied to products that are desired in any economic cycle. These are also called counter-cyclical.

Normal business cycles in the aviation industry have several implications. The first of these is on pricing. Differential pricing by airlines can only affect the amplitude and period of the cycles in the short term. However the long run cycles remain. The second is on growth – in this industry, growing at a slower rate than the competition means losing market share to the competition – since share is decided by capacity management. One method used by BA has been counter-cyclical ordering – that have resulted in lower prices and shorter lead times for aircraft that ultimately lead to quicker reaction time. Another way to work around these cycles is through strategic alliances – of the kind we have witnessed in India – with the merger of several major airlines – Jet/Sahara & Kingfisher/Deccan being the two most recent examples. A third implication is caused due to the liberalization and de-regulation of the industry giving airlines the freedom to shift capacity from regions with low demand to those with higher demand. A fourth method is to use leasing as a mechanism to keep spare capacity – for instance by retaining 10-15% of old aircraft in the fleet to be used only if demand is exceeding available capacity. These same aircrafts can be retired at low cost during a business down-cycle thus reducing capacity.

Business cycles will not only have an impact on developments in IT but also in the adoption of IT. In the down-cycle of business, companies must achieve enhanced profitability, in large part, through being the best in class performance and disciplined cost control as market demand for their products is strong, but not without fluctuation. Commodity price levels are cyclical in nature and influenced in part by business cycles of the economy. In the face of fluctuating demand and cyclical pricing, operating an efficient and streamlined business, as well as squeezing costs, is critical. Therefore, in the down-cycle, businesses will turn to IT to streamline operational efficiencies primarily with the intention of reducing cost and thus improving profitability – or at the very least maintaining their existing levels. Refer Exhibit 5.26 for the Western Europe IT spend and growth pattern.

5.3.3.3 Transactional Ability

The fundamental premise for all the new IT initiatives was to simplify and automate BA's business processes to fundamentally change the way the airline interacted with its customers and employees. This was coupled with a driving factor to reduce costs – primarily by leveraging technology to divert 60-70% of transactions to alternative delivery modes. This

would have the dual effect of not only reducing transaction costs, but also inducing tech-savvy customers to use the airline's services more often. Refer diagram 5.15 below for stages of transactional efficiency
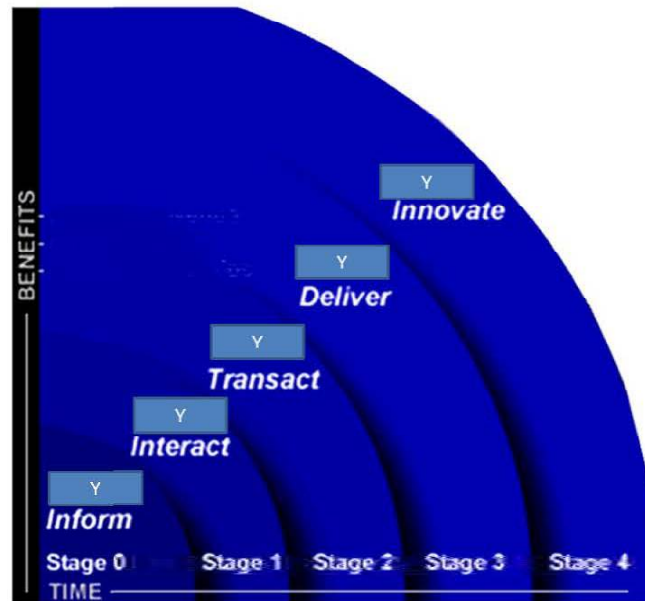
'Customer-enabled BA' program': One of the first (and most successful) initiatives was the 'customer-enabled BA' program, through the revamp of ba.com – once upon a time a URL owned by US regional telecommunications giant Bell Atlantic. The biggest motivation for this was the entry of low cost carriers who were eating into BA's market share drastically. BA had to reinvent, innovate the way they sold things and that's what they did by developing something they termed as 'calendar-led selling', i.e. putting the best fares up on the web. This included implementation of e-ticketing and self-service check-ins. The result was an increase in online bookings. The changes enabled customers to be in-charge of their own travel arrangements completely. Additionally, they were given insights into BA's operations as well in a more transparent manner. For example, when a customer booked a flight on the Web, they were shown flight availability 14 days, plus or minus the date they had selected, with color code denoting the cheapest and most expensive flights within that time frame. This meant putting live inventory levels into the public domain. Refer Exhibit 5.27 for the areas addressed by IT in BA.

Another example of simplification and re-engineering of processes was the 3,000 rules BA had governing fares: customers would be presented with three pages of incomprehensible text explaining the rules, and asked to agree to them. Under the new structure, the 3,000 rules were reduced to three basic fare conditions: 'fully flexible,' 'semi-flexible,' or 'you can't change it.' The result is improved customer understanding of the options, and the additional ability for customers using the Web site to upgrade to a flexible ticket. These processes were designed with the end user in mind.

At the back end, to enable this transformation, there has to be a very streamlined inventory and revenue management system. Further, the site enabled customers to do on the Web everything that used to be done at airport check-in desks, traditionally where employees used to type information into legacy green screen (old, mainframe based) applications that were outside the customer's control. Now, a customer can change their meal, seat, upgrade, register for advance passport info, and do executive club (frequent flyer) transactions online. This transformation has led to a shift in in the utilization pattern of online booking systems to a factor of 9 out of 10 bookings or 90% bookings being done online. The RoI figures are in excess of £100m per annum within the first 2 years of implementation. BA is now looking at deploying BA.com 2.0 (based on Web 2.0 technologies) in forthcoming business plans by using existing technologies like Google Earth. This will combine visualization, using Google maps with BA's fares to deliver better user experience.

Self-services for employees: Another initiative was the extensive implementation of self-services for employees. After a downsizing of about 13,000 employees, BA wanted to reduce operational costs. The objective of this implementation was to enable employees to perform most of their day to day administration themselves using a portal. The project, over a two year span (2003-2005) saved the company over £50m. The project budget was £8m, and had a core team of 20 people who were supplemented by business-area representatives from each of BA's 15 departments – such as crew and engineering. Each department was set 4 transformational targets. The aim of this initiative was to reduce the need for manual administration to 20% keeping 80% of employee administration as self service. The implementation also removed the need for paper processes as well as provided information 24x7 worldwide. Training was imparted online.

SSO: SSO (single sign-on) was implemented enterprise-wide using IBM's Tivoli secureway policy director that allowed employees to have a single username and password combination to access all their applications. The whole initiative was developed in house and built around the existing intranet at a cost of just £50,000. A variety of technologies were implemented to make this happen – including Adobe Workflow, RightNow, Ariba procurement software, Oracle's human resources applications, and Lotus SameTime and QuickTime for instant messaging and collaborative working. A list of technologies used in BA is given in Table 5.5. Initially 1,50,000 licenses were procured from IBM with the pilot project going live for 20,000 users in 2001.

VoIP: The Company also revamped its existing data and voice networks to a state-of-the-art VoIP (voice over IP) based unified network. Cisco systems, with its partner Prime Business Solutions, did this implementation for them. The network spanned over 14,000 office and airport employees. The network consists of over 8,500 end point IP phones with call management software and conferencing software with the necessary back-end switching capacity to handle the load in a fault-tolerant manner. The project was further integrated with the ESS portal by including capabilities to deliver digitized audio messages to the IP phones directly from the portal in an implementation of Unified Messaging. The RoI on the network is 50% with a payback period of 2 years. The unified system allowed BA to remove the cost of inter-office telephone calls and streamlined the management and provisioning of telephony services throughout the organization.

SAP implementation: The Company also implemented the SAP Engineering Wide System (EWS) across the company in one of Europe's largest SAP implementations and the world's biggest aircraft maintenance implementation.

The primary objective was to replace over 170 disparate legacy systems – some almost 30 years old under a common platform. Data was extracted from nearly 200 internal databases using ETL (extract, transform and load) methodologies for transformation and load into the company's new SAP system. British Airways chose to implement SAP because it wanted to integrate many of the various business processes within the British Airways Engineering division. The new system currently controls aircraft maintenance in 26 hangars and at 142

airports worldwide. The EWS also controls engineering staffing, spares supply and airworthiness data for the entire BA fleet. Quantifiable benefits of implementation include improved accuracy in tracking maintenance requirements and quicker processes for ordering spare parts.

Move to Terminal 5: BA's turnaround has put it in good shape for its next major challenge, the move to Terminal 5 at Heathrow in 2008. Terminal 5 (T5) is one of the largest construction and integration projects ever attempted in the UK. The terminal will be used exclusively by BA. Operations from its existing terminals will be moved to the new terminal. More than 20 years in the making, T5 is the joint brainchild of British Airways and the British Airports Authority. The construction project began in September 2002 and is due to cost £4.3bn, resulting in a new terminal capable of expanding Heathrow's capacity by 30 million passengers a year. With 180 different IT supplier contracts involved, T5 is not about how each individual system was created and the benefits it brings, but how the entire project was designed to bring together the various aspects of daily operations into a cohesive whole that is able to respond to the requirements of a busy airport.

T5 has represented a unique opportunity for an airline and an airport authority to define business processes during the design and construction of a new terminal, rather than having to create processes and IT systems that match the existing physical airport. T5 will include more than 9,000 connected devices, 2,103 PCs, and 5,000 mobiles and PDAs, with enough cabling to stretch to Istanbul and back, connecting 163 systems with 546 interfaces. It contains a fully integrated and IP-delivered building-managed environment with everything from the check-in terminals and the baggage handling system to the escalators and plant-watering systems controlled by that system.

The design of the airport, combined with the change in how passengers interact with their chosen airline, is the major transformation that is being brought about by BA. This is also a major differentiating factor for the airline. Whereas the most time consuming aspects of boarding a flight usually occur once passengers have arrived at the airport, BA is using manufacturing techniques in an attempt to reduce that lag. An example of this is the organizational aim to have 80% self-service check-in (of which 50% would be from home

using ba.com and the balance 50% using self-service kiosks present on the terminal.) BA has setup 96 self-service kiosks, (more than double the number currently deployed by BA across the rest of Heathrow), and the same number of fast bag drops, eliminating a bottleneck found in existing terminals where a lack of physical space means many more kiosks than bag drop points. Though traditional check-in mechanisms remain, for the most part these have been withdrawn to the edges of the building, so that passengers that want to move swiftly through the process will not have to be held up by those that prefer - or are required - to go through the traditional process. The kiosks are being viewed as an interim measure and will probably reduce over a period of time as web check-ins increase.

This process of encouraging the new while maintaining support for the old has been a significant challenge in the construction of the systems for T5; for, while the new terminal is a new start, it does not exist in isolation. This is especially important since whatever technology implementations are done in this terminal have to integrate with the existing systems of Heathrow. This is required since if a passenger is transferring to a flight in another Heathrow terminal, sooner or later their bags will have to be boarded onto a truck to be driven to their next aircraft. BA is looking at building an underground track transit system to link T5 with Heathrow to cater to this situation.

One of the biggest challenges in this was the selection of appropriate technology. BA has not experimented with any radical technology on the Greenfield site. They have used proven technologies and processes at existing terminals, while building on best practices from elsewhere. For example, active RFID tags have been installed in the taxis that will serve T5, which are at an external location. These can be automatically called to the terminal when they are required thanks to wireless communication services and embedded sensors in the road that detect traffic flow. Such a system is already in use across Heathrow's other terminals. Even the baggage handling system, is the next generation of a system developed by VanDerLande Industries for Amsterdam's Schiphol airport.

While integration has been an important part of the implementation, the technologies chosen have been carefully selected so that they are as future proof as possible. As an example, the check-in kiosks have been equipped with the capability for cameras to be used to photograph

passengers as they check-in, although this facility need not be utilized until security requirements make it mandatory to do so, if ever. Similarly, allowance has been made for the use of fingerprint and facial recognition technology at the security checkpoints in case they are required at a later date.

Customer Retention: Companies in this sector have to battle often huge customer churn. Retaining customer loyalty has always been a key concern for airlines. A system that could imbibe real-time information facilitating effective reporting and communication as well as integration with other customer data sources (such as ba.com) was needed, since this had an impact on customer service across all service delivery channels.

TCS consultants did an analysis of Buy (packaged solution options), Build (enhancement of existing solution) and Hybrid (a combination of build and buy) solution options. Further, they identified the desired Customer Loyalty Program (CLP). While evaluation of the loyalty system options ensured that it was aligned with parameters like vision, time to market, technical fit, TCO, vendor viability, TCS made certain that the solution took care of interactivity, integration, flexibility, and complexity of business needs. The solution enabled BA to launch personalized marketing programs across multiple channels, including mobile, create real time loyalty program to influence customer behavior across the customer life cycle and make customer relationship management an integral part of the entire travel experience. It also enabled BA to gain insights about its customers. For example, it discovered that its top 1000 customers (by revenue) accounted for 60 percent more revenue than its top 1000 customers by mileage. This was discovered to be due to some frequent fliers receiving corporate discounts or other perks that, in fact, made them less profitable than a passenger who flew less frequently at full first-class fares. Additionally, the system enabled BA to segment its customers into 12 segments. Refer Exhibit 5.28 for a list of these segments. BA also hopes to achieve through the CRM-enabled monitoring of corporate (business) customers to establish service level agreements with the sponsoring corporate house. They are also looking at giving corporate extranet access to their internal systems. Additionally the system will enable BA to target SMEs, who currently are not being targeted due to the cost requirements of hiring account managers and the costs associated with them. The system will also enable BA to interact directly with travel agents as shown in another example of B2B commerce. Finally, the

systems enabled BA to track infrequent flyers based on their company yet relate the total volume of business coming from that company and thus prioritize the infrequent traveler as well.

Refer Exhibit 5.29 for depiction of areas in which British Airways implemented operational efficiencies.

5.3.3.4 Impact on workers

BA followed a principle of 3PI – Proposition, process, people and IT. In this model, the fundamental premise is that IT should be 25% of the picture, and that the customer proposition, the process aspect, and the people change aspect should have equal weight. Besides this methodology, BA has also been using Lean, a methodology for improving the speed and reducing the cost of processes. In this methodology, the focus on all initiatives undertaken is on adding value to the end customer. Each process is examined and a value-stream analysis done. The objective of this value stream analysis is the examination of the entire collection of activities necessary to produce and deliver a product or service. Value stream analysis separates those activities that contribute to value creation from activities that create waste, and identifies opportunities for improvement. According to this methodology, any initiative should be done correctly in the first go to avoid any chances of wastage in terms of resources – including effort. To further boost this initiative, the same toolset was designed for customers as well as employees rather than developing different tools that were department or country specific. The biggest example of this is ba.com, which was used by both customers as well as BA employees.
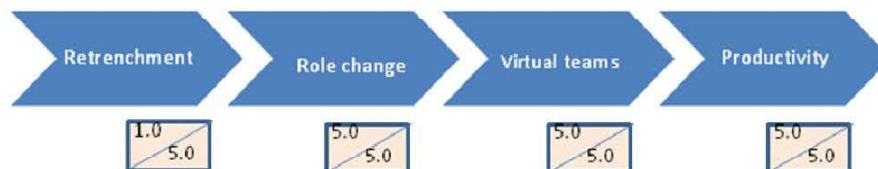
Most initiatives done by BA had an impact on employees. Refer diagram 5.16 above to see the impact on workers due to technology. The self-service portal for example, had the dual impact of empowerment (no longer had employees to depend on external resources to handle operations, they could do tasks themselves supported by the system.) Usage also improved as

every part of the system had a simple user interface. Further, the employees felt themselves as part of the process since there was a lot of user acceptance testing done before the actual deployment. This made employees to use it extensively – thus making it a success. The initiative was pushed further through a top-down governance structure for the project, starting at director level, and, in conjunction with cost optimization, making the initiative a corporate priority as part of BA's business plan. The ESS portal included features like e-pay, where employees could get their pay-slips online, and online cabin crew rosters, where flight staff could put in bids for specific routes they wanted to work on. The initiative was communicated through a big internal communication campaign – that stressed that all other alternatives to doing those processes would be removed. This left a single way of accomplishing a task. At the same time, employees couldn't purchase anything in the U.K. or the U.S. unless they used the online workflow based procurement system. This had the added impact of controlling expenditure.

This model was replicated for a host of other functions as well – that led to a lot of cohesion and integration between departments and the employees who worked in those departments. Benefits are quantifiable – with 25% of training being provided online, 80% of personal administration being carried out through the portal, and 85% of orders being placed online. Usage was measured using a number of parameters that are standard to web site statistics – such as the number of distinct usernames. By using this data, it was possible to quantify and obtain information that out of 3500 flight crew, only 47 had not connected to the system. These 47 were then targeted for further training and hand holding.

The results in terms of numbers speak for themselves - self service transactions increased by 300%, with an average of 10,000 unique users per day and five million page views per month on the intranet. 60% of ESS users accessed the system from home rather than from work. BA is now moving this project from a centrally driven one to one that is ingrained as part of routine business processes and is sustainable.

BA's ESS project has brought together a wide-range of technology initiatives that on their own would have presented a challenge - such as e-learning, online purchasing and single password sign-on for users - and provided a system that staff have embraced with enthusiasm, as well as

delivering significant cost savings. Refer Diagram 5.17 for the initiatives implemented and their effect

Diagram 5.17 – Implemented initiatives and their impact
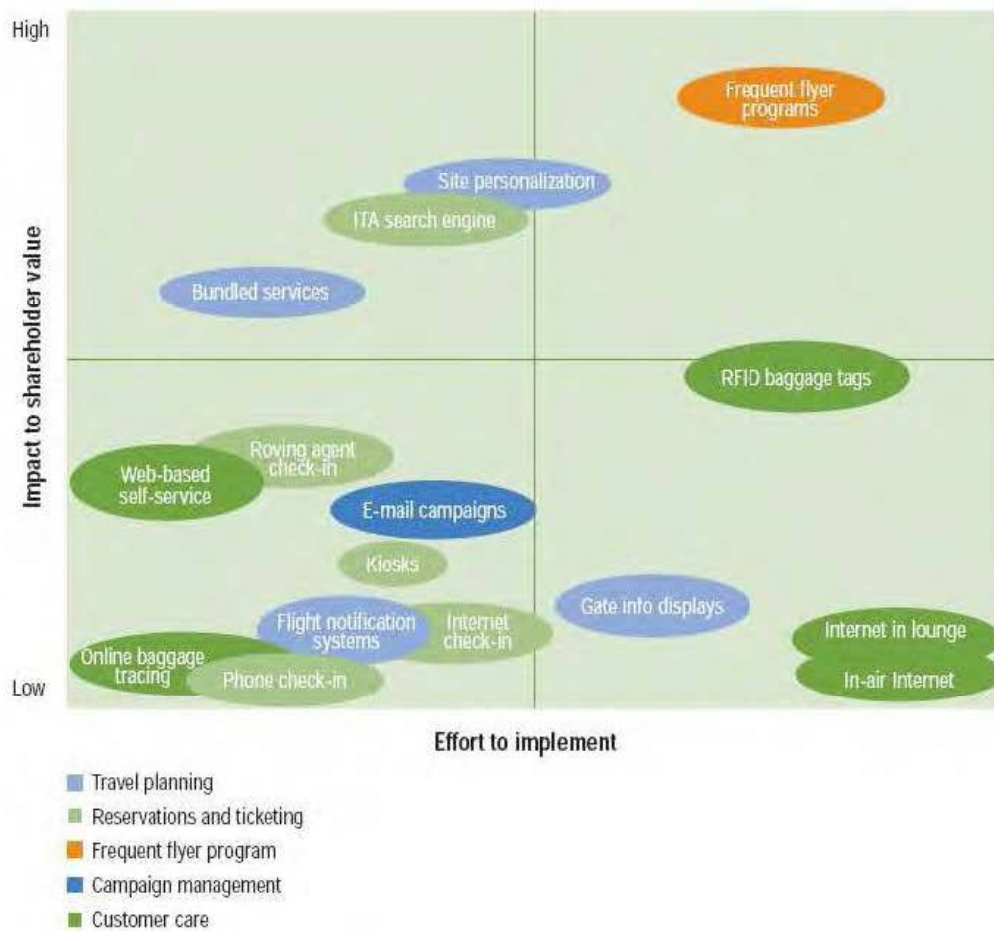
Overall BA implemented changes in each of the areas shown in Exhibit 5.29 bringing in Operational efficiencies. These had substantial returns on investment and resulted in significant cost savings.

5.3.3.5 Security

Diagram 5.18 – Security adoption driving forces
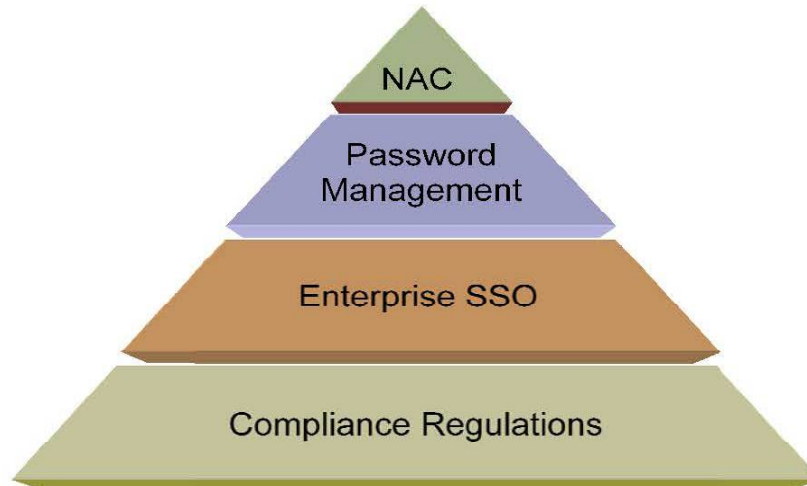
The key drivers for information security are shown in Diagram 5.18 above. Security was (and is) a prime concern for BA – especially since they are required to be SOX (Sarbanes-Oxley) compliant and rely so heavily on IT in their business operations. The SSO deployed was one of the first steps in implementing this. Tivoli SecureWay Policy Director provided access control management that centralized network and application security policies providing granular access control for Web applications and resources without requiring modifications to the existing web applications. This helped BA reduce implementation time and management complexity, thereby lowering the total cost of ownership of the solution. Refer Exhibit 5.30 for a list of top security risks and vulnerabilities.

These debilitating factors work in reverse for the outsourcing service provider. The provider works to economies of scale. They can more easily hire and train personnel, simply because they need more employees. Vigilant monitoring means keeping up to date on new vulnerabilities, new hacker tools, new security products, and new software release versions. These service providers can spread such costs across all customers. A specialist security provider also has a much broader perspective than a single company as it can learn from attacks against one customer, and use that knowledge to protect all its customers. It also encounters such attacks much more frequently thus enabling it with the relevant experience to

reduce risk for its customers for repeat methods of attack. In addition, on the threat landscape, security vendors have been coming out with a number of countermeasures that are evolving almost as fast as the threats themselves. Refer Exhibit 5.31 for trends in these countermeasures).

5.3.4 TRENDS

5.3.4.1 Cost-performance structures

Of the initiatives implemented by BA, resulted in direct cost savings in their own right. Online training, for example, freed up the need for classrooms infrastructure and trainers, while on-line pay slips delivered through ESS directly reduced administrative costs as well as operational costs involved in the generation of those slips. Others had indirect advantages. For example, the converged, IP telephony implementation had the advantage of making the relocation of communications services quicker and easier, for example, when staff had to move due to a last-minute boarding gate change.

An analysis of the turnover of BA from the year 2001 to 2007 shows a decrease in absolute numbers. Refer Exhibit 5.24. Turnover decreased by £786m during this period. However, a bottom line analysis shows an increase in gross profit of over 300% over this period, with net profit also showing a dramatic increase of £324m or 285%. The numbers speak for themselves. IT has enabled BA to not only increase top lines but also the bottom line through effective cost advantages obtained primarily by transaction costs. This has resulted in operating margin – defined as Operating Profit divided by Revenue expressed as a percentage for the FY 07 being 7.1% - which make BA one of the most profitable airlines in the world.

This cost advantages, besides coming from transactional and operational cost optimizations, have also resulted out of judicious spending on the part of the organization. The CRM solution, for example, is OSS (open source software) based leading to significant cost savings. The initiative reduced operational costs by reducing dependency on the contact centre, while at the same time benefiting customers. Quantification of these estimates was done by BA by estimating that every 10 items viewed during a CRM customer service session saves BA a call. BA gets 24 million calls a year to its approximately 15 call centres in Europe and the US. Out

of these, 7 million are information-based, such as customers wanting to know how many hours before check-in they have to arrive at the airport. Each call, handled live by a customer service representative, costs $4.50 to $6. At minimum estimates even, the cost savings are substantial.

The CRM system responded to more than 4.1 million customer service interactions for ba.com during the disruptions caused by the striking staff in January 2007. BA had no prior warning of the disruptions that would lead to a huge usage spike concentrated across a three-day period. Overnight customer interactions rose from a daily average of around 80,000 to more than 735,000 – eight times the usual demand. As a result the usual monthly average of 2.1 million interactions doubled as customers looked for information online. Customers who called by phone were direct to the site with call queue messages, relieving some of the pressure at a time when the call centers were under unprecedented demand. This resulted in savings in terms of potential losses through efficient crisis management. Self service also works since a high portion of calls to the customer service team, and email traffic generated via the Web site, relate to issues of a repetitive nature.

Even the SAN monitoring solution resulted in cost savings. BA estimated that their storage requirements would grow by approximately 20 per cent over the next 3 years. The CA tool enabled BA to adopt a multi tier approach to managing information and to select the most cost effective storage media based on the importance of the information. Frequently needed, live transactional information was stored on the fastest and most reliable storage – the SAN environment whereas archived data could be off-loaded to slower, offline media like tape. This strategy brought about a saving of 10-20% in disk purchases. BA also obtained cost savings from a CA capacity license that enabled them to only pay for the storage they actually utilized. This, besides being a much simpler approach to licensing also staggers the cash outflows as additional software licenses are only to be purchased as the SAN grows. Refer Diagram 5.19 for cost component reductions.

Diagram 5.19 – Cost component reduction
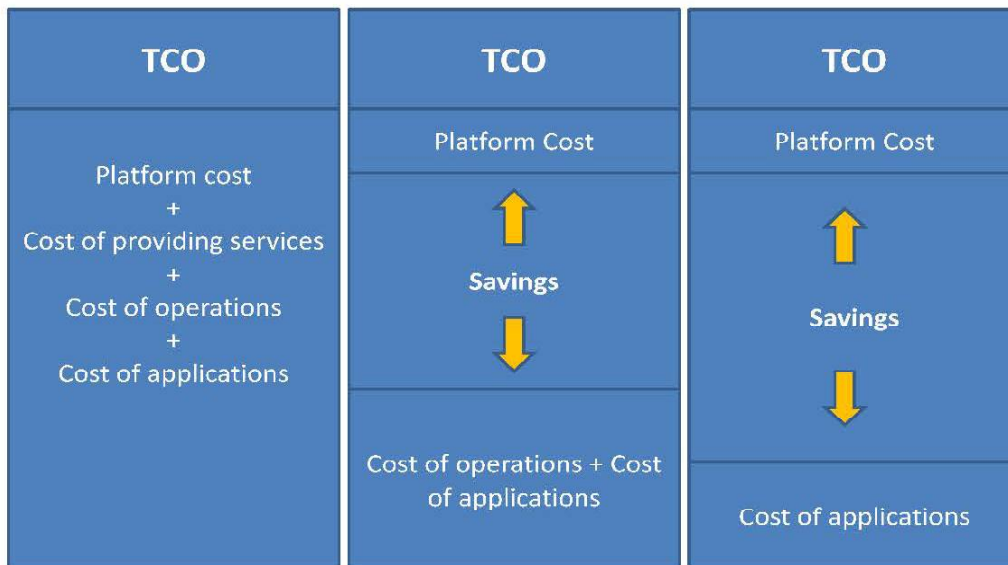
5.3.4.2 Architecture, Enterprise Management, and business continuity

Architecture: The initiatives deployed by BA did obtain it an early mover advantage. However, as self-service technologies such as online check-in become the norm among airlines, BA is looking to change its architecture to SOA that will allow the reuse of resources and enable BA to respond quickly to customer service issues. The key is the integration with the customer experience. SOA enables BA to make short-term changes where flexibility is required, such as changing the seating policy. In traditional applications and architectures – regardless of whether they were web based or not – to make any sort of changes, one had to change the code. SOA allows the flexibility to make the same changes by using rules. For example, seating policy or an upgrade can be based on a set of rules or criteria – which are subject to change in the short term. BA is using an enterprise service bus (ESB) - a distributed middleware system for integrating enterprise IT assets using an SOA-based approach. It is this concept that TCS has implemented for BA with its customer relationship management (CRM) initiative. Refer Table 5.5 for a list of technologies deployed.

Table 5.5 – Technologies deployed in BA

Technology	Product
Operating system	Solaris, AIX, Windows
Database	ORACLE
Enterprise Application Suite	BEA Portal,
Applications	SAP EWS
	Apache / Tomcat
	Lotus Domino
	ORACLE ilearning
	CA Storage Resource Manager
	CA SAN Manager
	Tivoli Secureway
	Cisco MeetingPlace

Enterprise Management and Business Continuity: Ba.com and the associated implementations resulted in a fairly large amount of data – around 200TB currently. BA deployed a storage area network (SAN) in its environment to cater to this rapidly growing storage requirement. The SAN is a Windows-free environment mainly running on Unix platforms like Sun's Solaris and IBM's AIX. They also deployed SAN monitoring tools Storage Resource Manager and SAN Manager from computer associates (CA) to reduce the risk of suffering downtime to any of the critical business systems that rely on the SAN infrastructure, including catering, engineering and cargo systems and the BA.com website. The solution would enable the early detection of SAN degradation before it became a fault and resulted in the loss of service of these applications. Diagram 5.20 below depicts how business continuity planning was done.

Diagram 5.20 – Business Continuity Planning

Refer Exhibit 5.32 for a technology maturation path of operating environments available at the time.

5.3.4.3 Enterprise Integration

The impact of the above is that the enterprise is moving towards full integration. It has embraced technology to improve customer service and reduce cost. BA has tried to apply this principle to every customer contact point whether on the ground or in the air. Technology is playing an absolutely fundamental part in how airlines enrich the customer experience. Diagram 5.21 shows the major effects of Enterprise Integration.

Diagram 5.21 – Major effects of Enterprise Integration
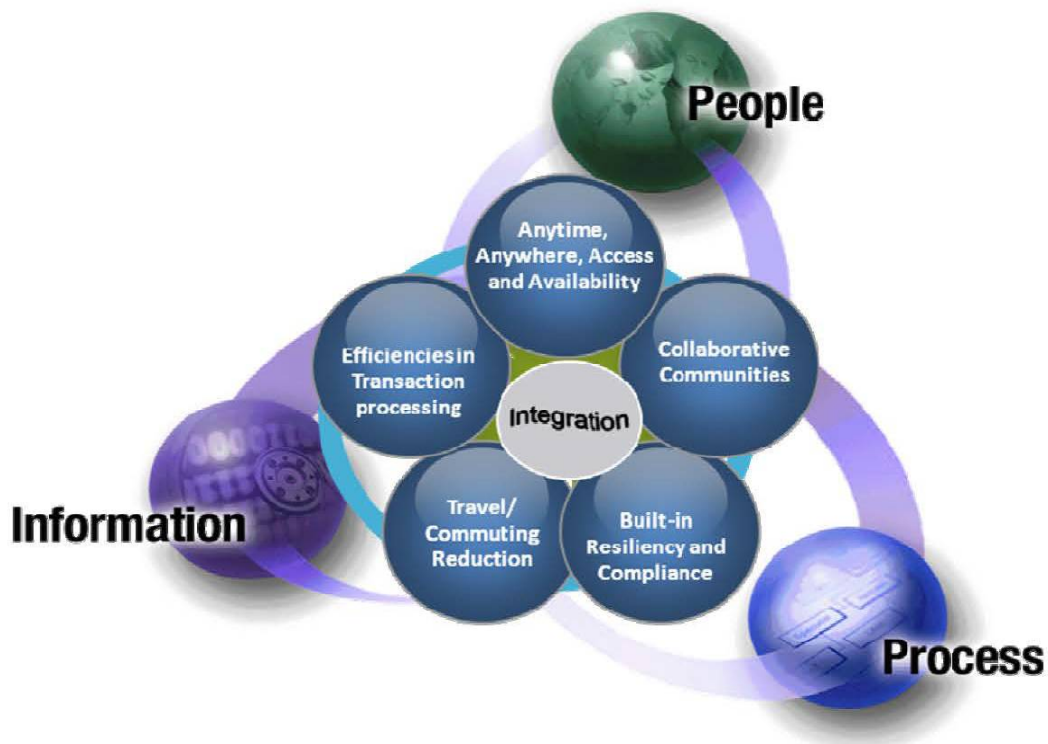
5.3.5 EXHIBITS

Exhibit 5.24 – Turnover of BA since 2001

Turnover
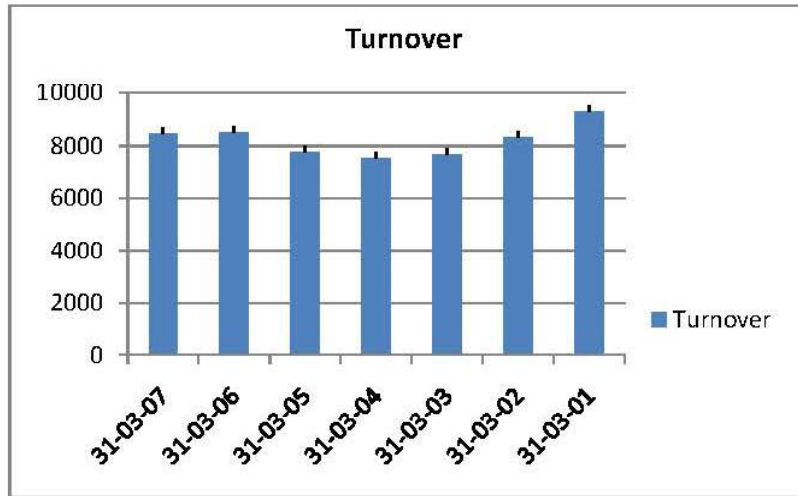
Exhibit 5.25 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

Exhibit 5.26 - Operating profit and passenger load factor

British Airways' operating margin and seat factor

Exhibit 5.26 – Western Europe IT spend and growth pattern

Western European IT Market Growth Patterns

Source: IDC, 2005

Exhibit 5.27 – Areas addressed by IT in BA

Exhibit 5.28 – Categorization of customers

Monetary Value			
High	**Corporate Masses** **Miles**	**High – tier Road Warriors** **Flexibility**	**Global Stars** **Recognition**
	Snowbird **Excess Baggage**	**Captains of Industry** **Status & Prestige**	**Low Tier road warriors** Legroom
	Latin Transfer **Native Language**	**Atlantic Hoppers** **Seamless transfers**	**Domestic Young Bloods** Perks
Low	**Dormant** **Non-air earning**	**Short Term Project** **Convenience**	**Regional Flyers** **Nonstop service**

Low   **Frequency of Travel**   **High**

Exhibit 5.29 – Areas in which BA implemented operational efficiencies to increase competitiveness

Exhibit 5.30 - Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware
Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information
Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information
Spam: Unsolicited or unwanted email messages
Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable
Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders
Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site
Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations
Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers
Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data
Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized
Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

Exhibit 5.31 - Security revenues by countermeasure category
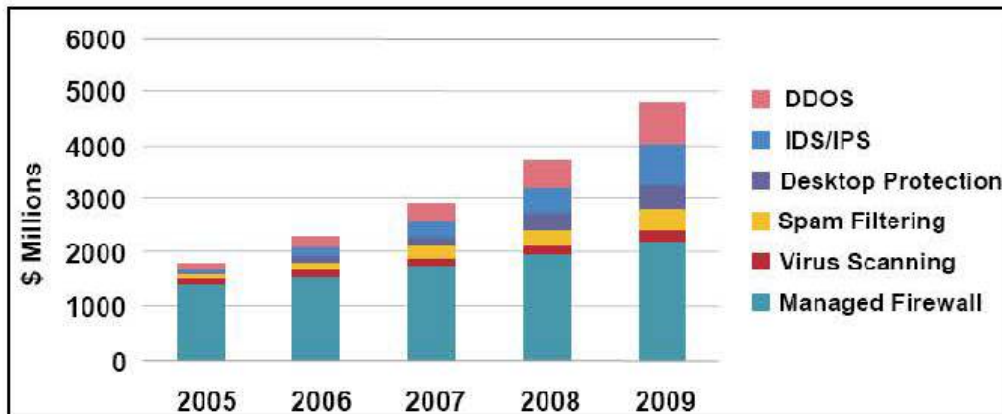
Exhibit 5.32 Technology maturation path
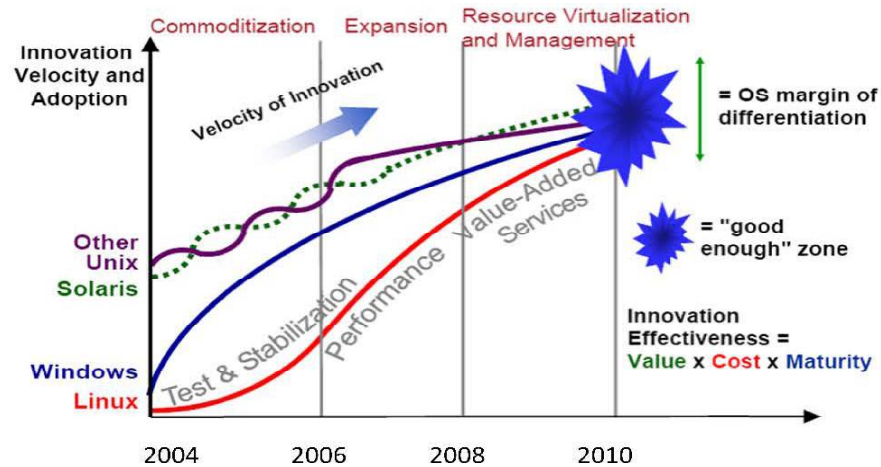
5.4 Case Analysis 3: Scotia Gas (TCS-Case-3)

5.4.1 COMPANY BACKGROUND

Scotia Gas Networks (SGN) is a holding company which operates two of the UK's eight regional gas distribution networks – Scotland Gas Networks and Southern Gas Networks. Refer Exhibit 5.33 for the company's financial performance since inception. These networks provide gas safely, reliably and efficiently to 75% of all Scottish households as well as to commercial and industrial customers via approximately 74,000 kilometers of gas mains. Gas is delivered to seven beach terminals in Great Britain by gas producers like BP and Shell, which operate offshore rigs in around 100 fields beneath the sea around the British Isles. Gas shippers buy gas from the producers at the beach terminals. They then contract with the gas transporters to convey gas to customers' premises (or supply points), where shippers then sell the gas to suppliers. Before gas reaches a home, business or office, it has to travel through part of the national pipeline network of 275,000 kilometers. Southern Gas Networks operates one of eight regional pipeline networks to convey gas through Britain. At the supply points, the

final link in the chain – the gas suppliers – buy gas from the shippers and compete to sell it to domestic, industrial and commercial customers.

UK's gas industry has undergone some changes. Until recently National Grid Transco (now National Grid) owned and operated almost all of the UK's pipelines, at present, there are four players in the industry. National Grid has retained four of the old regional distribution networks – London, West Midlands, East of England and North West England. With around 11m customers, National Grid remains the biggest gas distribution business in the UK. The North of England distribution network is run by a consortium led by Cheung Kong Infrastructure Holdings including United Utilities, operating as Northern Gas Networks Limited. The Wales and the West of England distribution network is run by a consortium led by the Macquarie European Infrastructure Fund, operating as Wales and West Utilities Limited. Scotia Gas Networks, runs the Scotland and South of England distribution networks which, combined, deliver gas to 5.7m customers.

All this means that for the first time in the UK's gas distribution industry, it will be possible for regulator, OFGEM (Office of Gas and Electricity Markets), to 'compare and contrast' the performance of different companies. According to OFGEM, this will allow gas customers, for the first time, to benefit from efficiency gains of the kind that successive price controls have secured for electricity distribution customers. Refer Exhibit 5.34 for SGN's reach in the UK market.

UK is in a period where gas supply patterns are moving to a position where more reliance is placed on imported gas. The decline in UK continental shelf gas reserves and the UK energy policy taking cognizance of climate change is driving this shift towards greater use of imported gas. Refer Exhibit 5.35 for energy usage pattern in UK.

5.4.2 EXISTING IT LANDSCAPE

The technological architecture inherited from the former owner of the two regional networks had been designed for a heavily centralized organization, and was not suitable for SGN's new geography-based business model. The front-office software was largely legacy in nature, and

involved more than 30 different applications – a complicated architecture which did not accurately map to SGN's business processes. With millions of customers relying on the new company for uninterrupted provision of vital utilities, delays and disruption were unacceptable. Moreover, SGN's contract stipulated that the migration away from National Grid systems should be complete within 18 months of the acquisition of the distribution networks.

The merger also brought together two disparate sets of systems that were similar – yet distinct. To ensure that the company could run these two new distribution networks safely, efficiently and profitably, SGN needed to create a new infrastructure capable of supporting existing operations – including the network and its associated assets, employees, customers, technologies, and all the critical linkages between them.

This migration and consolidation took place in three phases and was managed by TCS. The first covered back-office systems such as human resources, finance and logistics, and the deadline for migration was initially six months, although this was later extended to a more realistic nine months. (The sale of each business in June 2005 was conditional on this deadline being met.) In the second stage, the gas distribution networks were given until 30 November 2006 to move away from National Grid Gas's front-office systems, such as workforce management, or face potential fines of up to £10m. The third phase was concerned with operational control of the gas network nationwide. After extensive consultation, it was agreed that Exoserve, a National Grid Gas subsidiary, should run a centralized control room because it would be too expensive and uncompetitive for each individual organization to do this individually. The price paid to Exoserve for its services was based on each firm's revenue.

TCS was selected as the systems integration and consulting partner by SGN. Refer Table 5.6 for a list of selection criteria that were used to make this selection.

Table 5.6 – Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior energy domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology

solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

5.4.3 RESULTS – BUSINESS TRANSFORMATION

5.4.3.1 Outsourcing

To automate their back-end operations, both companies introduced integrated application suites to handle the core enterprise asset management function, but supplemented this with other packages in the more specialist fields such as geographic information systems (GIS). Scotia Gas Networks introduced the Maximo suite from MRO Software (which was acquired by IBM). Rather than implement the software itself, however, SGN chose to outsource all of its operations, including IT, to one of its shareholders, SSE (Southern Energy plc), leaving only 50 staff in-house to focus on legal and license obligations and also set strategy. Their view was to focus on core business competencies and let employees do what they were good at to give the best service available, with a consequent significant reduction in costs. Packaged software was chosen to ensure that there was minimal development cost and maintainability costs.

The functions outsourced were operational – finance, payroll, procurement, and billing. Refer to Diagram 5.22 for a depiction of Core competencies and outsourcing. Refer to Exhibit 5.35 for elements which were not outsourced. The core competencies of the company is shown in the diagram depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced.

Diagram 5.22 – Core competencies and outsourcing

5.4.3.2 Effect of business cycles

To further elaborate this, one can distinguish and categorize industries into cyclical and non-cyclicals. Cyclicals are companies whose success is tied to economic cycles or interest rates. These stocks generally perform well during economic expansions and perform poorly during recessions. Aviation comes into this category. This is in contrast with non-cyclicals, i.e. companies whose success is not tied to economic cycles or interest rates. Examples include agriculture, tobacco, beverage and utility industry stocks, which are tied to products that are desired in any economic cycle. These are also called counter-cyclicals.

Changes in the quantities of gas delivered through the SGN may result in an increase or decrease in the collected revenues, with the impact of changing volumes partly offset by changes in costs or sometimes they may result in an under or over recovery against allowable revenue. Where there is an under or over recovery against allowable revenue, there is a corresponding adjustment to revenues in future period revenues i.e. such changes in volumes simply lead to timing differences as to when revenue is earned. Gas volumes are affected by weather, consumer demand and network availability. In respect of weather this leads to gas volumes being typically higher during the winter months leading to revenues being weighted

more towards the end of the financial year. During this period too, gas demand follows three regular cyclical patterns. Within a 24 hour period, demand follows a well-known and predictable cycle known in the industry as the "diurnal swing". Domestic demand, for example, has a peak at breakfast time and again in the evening, and a trough during the night. Demand also follows a weekly cycle, weekend consumption showing a different pattern to weekdays. Finally, consumption through the year follows a roughly sinusoidal curve related to seasonal changes in temperature. These three cycles are superimposed on each other and are interrelated. Demand is very closely related to temperature, and any of these cycles can be temporarily upset by unusual temperature patterns. Other weather factors, particularly wind, can also distort demand, and other economic factors such as public holidays, or strikes, also disturb the underlying patterns. IT spend is typically counter-cyclical – with the previous cycle and forecasts determining the extent of spend. This is followed by a stable period with focus on maintaining the IT setup, until business considerations make further spend necessary. Refer the illustrated in Diagram 5.23.

Diagram 5.23 – Link between economic cycle and SGN's business cycle
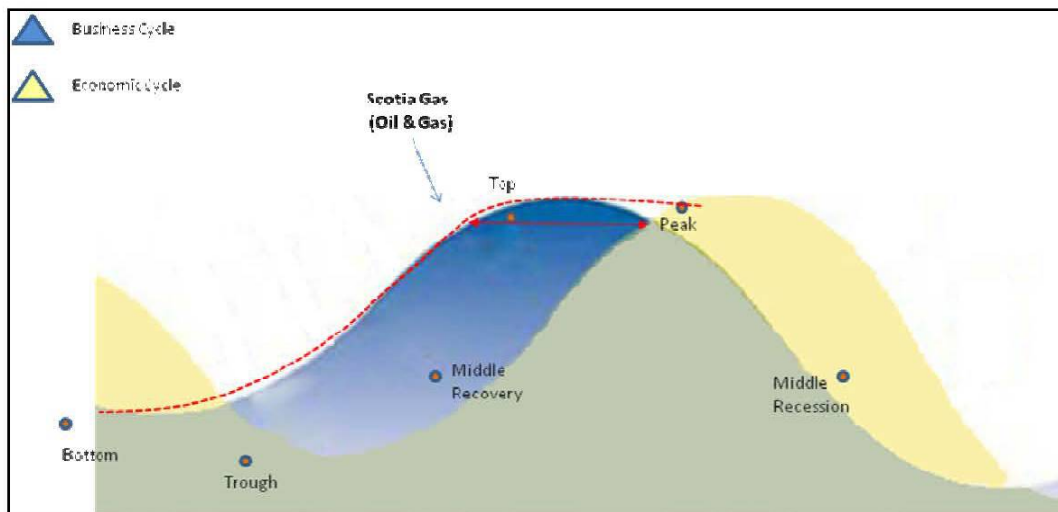
The primary driver for SGN as mentioned earlier during the period under consideration was cost economization through IT. Refer Exhibit 5.36 for the Western Europe IT spend and growth pattern.

5.4.3.3 Transactional Ability

SAP implementation: The implementation and choice of SAP was attractive for several reasons. On the one hand, the vendor provided both back-end and front-end packages that worked together seamlessly, which reduced the need for expensive and time-consuming integration work. On the other, a United Utilities company in the electricity space had already deployed the same applications and so it was possible to clone and modify them for rapid deployment. Scotia Gas Networks pursued a similar strategy, mirroring and tweaking Scottish and Southern Energy's materials management system – though the implementation was on IBM Maximo.

Diagram 5.24 - Stages of transactional efficiency
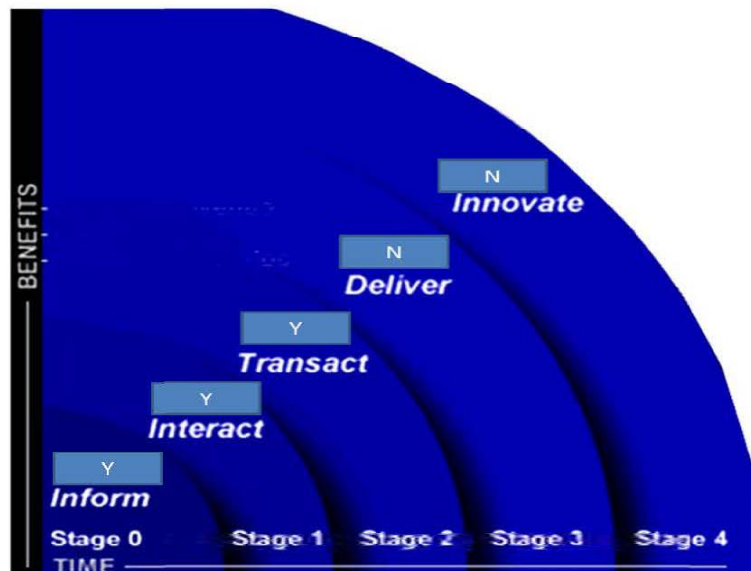
This situation enabled SGN to not only implement the latest technology, but also to reduce the complexity inherent in using as many as 55 National Grid Gas systems that had evolved over time and were, in some cases, more than 20 years old. The problem with this situation was that there were a lot of components and linkages, so that any changes made in the one had implications in testing to make sure everything worked. Consequently a lot of time, effort and cost went into supporting applications. The strategy also gave SGN an opportunity to cleanse their data as part of the migration process rather than have to undertake a separate project, the aim being to improve the quality of corporate information in order to enhance decision-making. It also caused business process re-engineering and streamlining of processes, building

new, less complex ones from scratch in order to try and boost efficiency still further. This they hoped would go towards increasing profitability – which was very important as profits were based on being able to run the business at a lower cost than the figure set by the regulator OFGEM. Refer Diagram 5.24 above for stages of transactional efficiency

Applications such as CRM and ERP systems: Applications such as CRM and ERP systems, while necessary components in a service organization, are data processing mechanisms only. They cannot facilitate scheduling decisions that will ultimately be in the best interests of both the customer and the service organization. To maximize the external impact – in terms of delivery of service, schedule optimization technology is able to simultaneously consider numerous strategic and operational constraints when scheduling an engineer in the field. Refer Exhibit 5.38 which depicts the service response time for SGN customers. As such, it can consistently ensure that the best technician with the right skills and the right tools gets to the customer at the right time to achieve a company's strategic goals. More than just knowing who the customer is, where he or she lives, and what kind of problem he or she has, effective service scheduling will take into consideration such things as which engineer has the skills to fix the specific problem, the distance that the engineer will need to travel to get to the job, and what parts the engineer will need to have on hand.

SGN, through TCS, implemented such ascheduling software from Clicksoftware. This covered the scheduling of more than 1,000 field service engineers across Scotland and the south of England – who earlier had managed as part of a fleet of 10,000 nationally, using the software installed in 2002 for National Grid. The functions covered are emergency services, metering, repairs and maintenance and connections operations, as well as delivering real time optimization to the metering and emergency services divisions to increase technician productivity. The system was fully integrated with maintenance management system. TCS managed the services and consulting part of the contract whereas the actual implementation and integration was done by a company called Syclo.

Integration of legacy with new systems: TCS managed the integration of some of the legacy systems of SGN with its new system using a platform by Webmethods. These were the customer sales and billing information systems. Prior to the integration, a field agent would

have to call up a distribution center or go through support staff to fulfill certain orders or obtain inventory status on a product. Using the web Methods integration platform, it became possible for branch agents to use the new system and view inventory in the distribution centers in real-time, without taking up valuable support staff time.

Integration with Symology's Insight system: TCS helped in integrating the system with the UK´s most successful and widely used Street Works Register Solution - Symology's Insight system. The integration was fairly complex – as all of the street works data for the SGN regions, was stored in the UK wide National Grid Gas Street Works System (also managed using Symology´s Insight system). However, this was a previous version – and one that had a different data format from the newer releases of Insight. This data was required to be extracted and converted to the latest release of Insight. In addition, real-time bi-directional XML/SOAP interfaces were required to be developed between Insight and SGN´s Maximo Works/Asset Management System.

The overall solution was able to manage SGN's whole front-office business - everything from emergency services through repair and maintenance to metering. Jobs can be scheduled centrally and dispatched together with relevant geospatial data to field engineers via mobile devices, helping to maximize workforce efficiency. The solution also provided integration with a number of external organizations via Web Services using service oriented architecture. When street work is required, the relevant local and highway authorities are notified automatically. Requests for emergency work from National Grid can be accepted and processed within four seconds – well within the 15-second service level requirement. With the redesign of its core business processes, SGN was able to reduce its core set of applications from 30 down to just eight – increasing staff productivity and fuelling efficiency in the front office. Over 33 million asset records and numerous other databases to the new platform allowing SGN to make a smooth, efficient transition to the new infrastructure, without any disruption in service. Refer Exhibit 5.37 for depiction of areas in which SGN implemented operational efficiencies.

5.4.3.4 Impact on workers

The impact on workers was interesting. Diagram 5.25 below shows the Impact on workers due to technology. On the one hand, the first wave of transformation had already taken place (and

in some areas was taking place.) On the other hand, the merger caused the availability of multiple technologies for similar functions. This created a high level of complexity that had to be managed. The most important effect therefore was change leadership. Employees who were accustomed to supporting one operating company in one geographic location now had to support two operating companies across locations. SGN started a campaign to emphasize that as a new corporate entity the need of the hour was consolidation and working together. An architecture group and strategy group was created that was given the responsibility to define standards and processes. Common processes were then evolved for development, change, release, and workforce and project management in consultation with TCS.

Diagram 5.25 - Impact on workers due to technology.
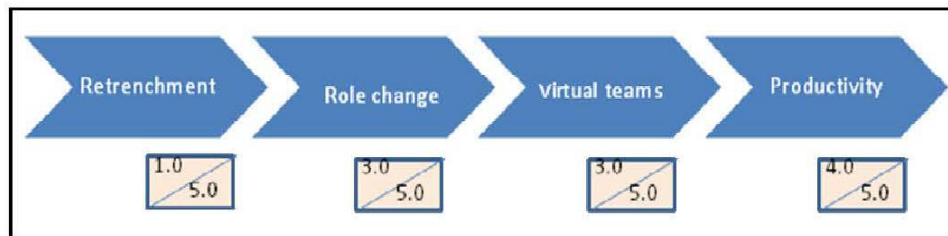
5.4.3.5 Security

SGN was conscious of its data security requirements – not only due to compliance reasons, but also due to the disastrous impact a breach or disruption in service would bring about to its operations. SGN therefore used citrix presentation server and gave access to over 1,500 employees across 60 sites using thin client architecture. This reduced manageability costs for the company. SGN also procured AppSense Performance suite licenses to increase the performance of these Citrix servers and improve software licensing management, application resource usage control, optimized performance, and improved manageability coupled with detailed reporting capabilities. A compliance policy was formulated as well, with the Director of regulations and CFO having the authority to deal with any breach of security. SGN also defined formal HR procedures that had standard operating procedures to handle staff transfers or migration from the company to the service provider.

Diagram 5.26 – Security adoption driving forces
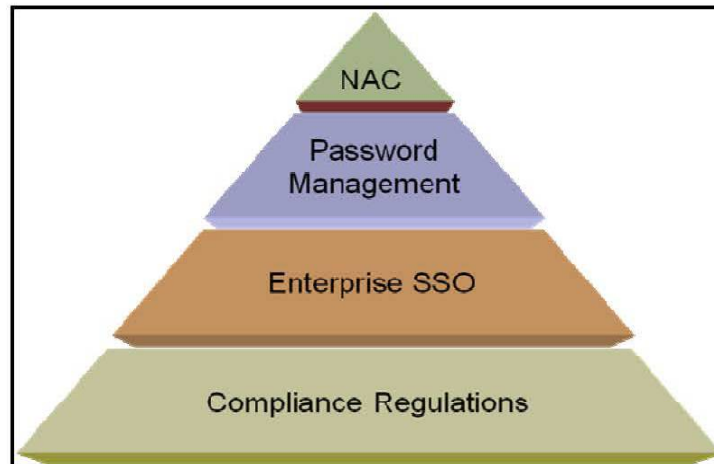
The key drivers for information security are shown in Diagram 5.26 above. Security was (and is) a prime concern for SGN – especially from a compliance perspective. Access to systems by staff was restricted to their authorized area through physical access password and session controls. This prevented any relevant supplier, relevant shipper, electricity generation business, any trading business, its meter-related services business or its meter reading business from having access to the confidential information except in specific circumstances.

These debilitating factors work in reverse for the outsourcing service provider. The provider works to economies of scale. They can more easily hire and train personnel, simply because they need more employees. Vigilant monitoring means keeping up to date on new vulnerabilities, new hacker tools, new security products, and new software release versions. These service providers can spread such costs across all customers. A specialist security provider also has a much broader perspective than a single company as it can learn from attacks against one customer, and use that knowledge to protect all its customers. It also encounters such attacks much more frequently thus enabling it with the relevant experience to reduce risk for its customers for repeat methods of attack. In addition, on the threat landscape, security vendors have been coming out with a number of countermeasures that are evolving

almost as fast as the threats themselves. Refer Exhibit 5.39 for the top security risks and vulnerabilities and refer Exhibit 5.40 for trends in these countermeasures.

5.4.4 TRENDS

5.4.4.1 Cost-performance structures

The overall solution led to the lowest IT costs per employee in the gas industry. Further, TCS did a knowledge transfer exercise to enable SGN to manage its setup in-house – which is further helping them save costs.

Another high cost area was licensing costs. Software licensing was (and is) a major issue facing server-based computing environments due to the fact that licenses have to be bought for every client device that accesses the server rather than just those who would be using a particular application. For example, if a server supports 40 client devices and hosts an application used by just ten people, the organization still has to purchase 40 licenses. Through the ability to set restrictions based on active directory users, groups, client name and IP addresses, AppSense Application Manager is able to restrict access a centrally-held application to the number of licenses purchased. Refer Diagram 5.27 for cost component reductions.

Diagram 5.27 – Cost component reduction
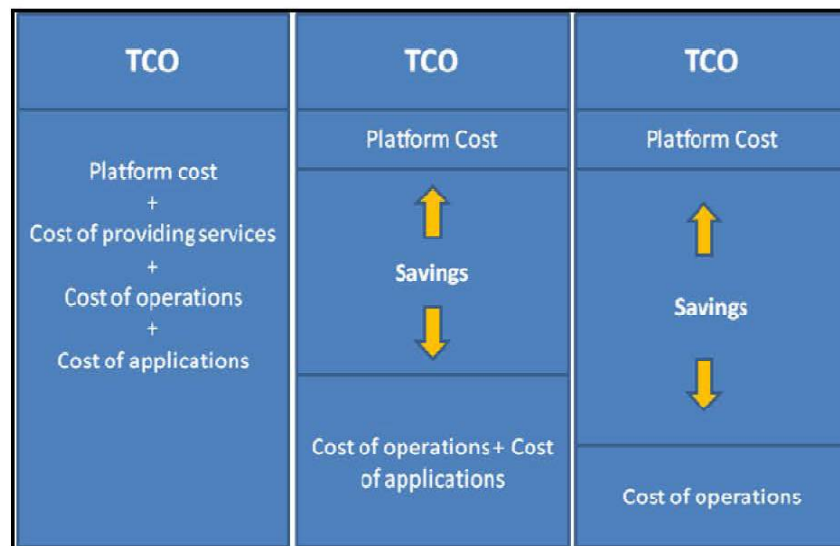
5.4.4.2 Architecture, Enterprise Management, and business continuity

Architecture: SGN from a client-server based architecture, migrated to and incorporated the latest technology trends including server-based computing using thin client architecture. Additionally, they built an SOA into their applications and did EAI. SGN realized that thick (fat) client architecture results in large server farms and a considerable management overhead. Thin client computing enabled SGN to lower the total cost of ownership of their data centre while increasing operational efficiency. This powerful combination of reduced costs and greater productivity made IT an enabler of profitability rather than an inhibitor.

Enterprise Management: Application and user environments are dynamically optimized to ensure maximum hardware utilization with an optimal, consistent quality of service. Refer Table 5.7 for a list of technologies deployed.

With a smaller set of applications, mapped more tightly to improved business processes, SGN benefited from increased efficiency and associated operational savings. Better integration between applications – and between different departments within the company – leads to a more effective use of resources. For example, with a single set of work and asset management systems operating across the whole company, it became possible to organize the workload of the field engineers more effectively – ensuring that the most important jobs are tackled first. This also has the additional effect of increasing customer satisfaction.

Table 5.7 – Technologies deployed in SGN

Technology	Product
Operating system	Windows
Database	ORACLE
Enterprise Application Suite	IBM Maximo
Applications	Citrix Presentation Server Appsense Management Suite Symology Insight Webmethods Clicksoftware clickschedule Serck Controls' SCX6 SCADA platform ThinPrint print management

Business Continuity: SGN evaluated a host of technologies to meet their desired security objectives as well as minimize the costs of implementation as well as the level of risk. From an

earlier perspective whereby isolating their systems could mitigate a significant level of risk for them, with the expansion and integration measures they took, this option no longer remained viable. Refer Exhibit 5.41 for a technology maturation path of operating environments available at the time. Therefore, as part of their business continuity plan, they invested in perimeter security as well as unified threat management appliances called Content Screen. They also setup policies and documented rights structures for access to systems and data residing on their network. They also put in place patch management and anti-virus software on their nodes. Diagram 5.28 below depicts Business Continuity Planning.

Diagram 5.28 – Business Continuity Planning

5.4.4.3 Enterprise Integration

The initiatives taken by SGN were in line with a strategy towards moving the company towards complete end to end integration of processes. This was keeping in line with a strategy of moving towards smart metering provisions for its consumers. Smart metering involves providing consumers (often termed as 'prosumers' or proactive consumers) with near real-time data on their usage to enable them to make better decisions for optimizing their energy consumption. Specifically, when combined with usage based pricing policies such as time of use pricing; the potential for expanding market share becomes evident. Such devices also provide the company with better demand estimation and forecasting. They also allow remote management thus reducing dependence on labor – thereby saving both time and cost. End point monitoring also provides the company with instant information on broken links and

consequently faster call resolution time. Diagram 5.29 shows the major effects of Enterprise Integration.

Diagram 5.29 – Major effects of Enterprise Integration
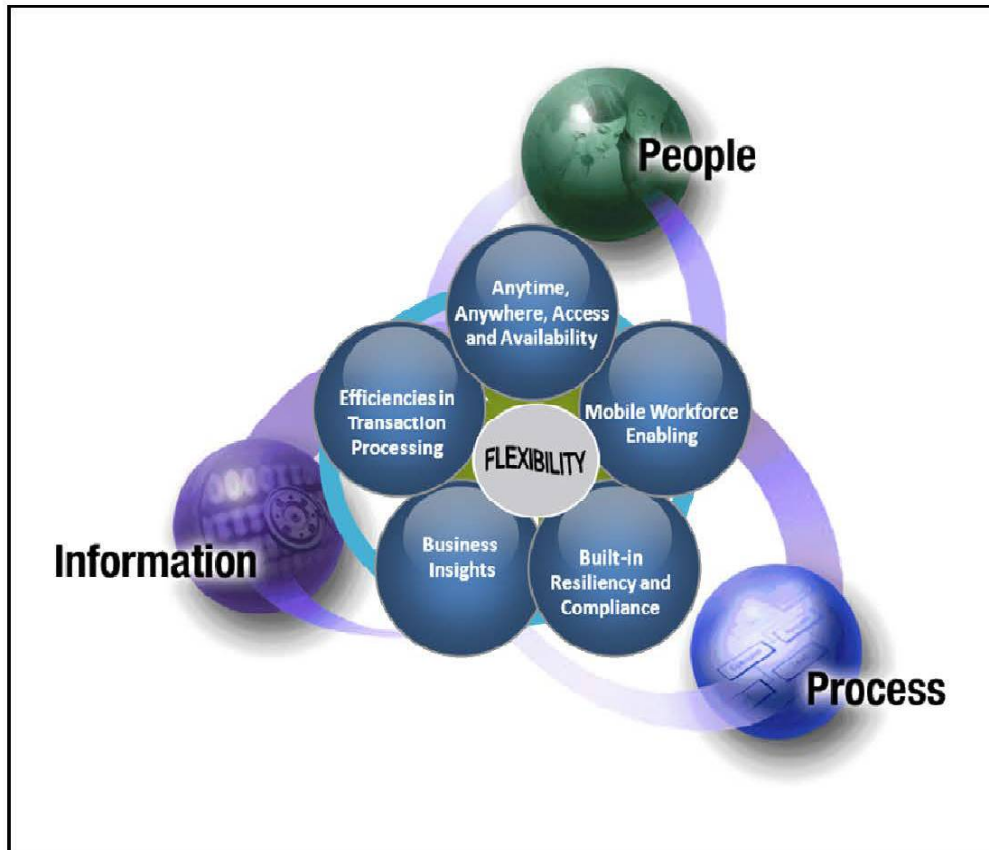
5.4.5 EXHIBITS

Exhibit 5.33 – Turnover of SGN since inception

Key performance indicator	Description	Year ended 31 March 2007	Eleven month period ended 31 March 2006
EBITDA[1]	Earnings before interest, tax, depreciation and goodwill amortisation	£35.4 million	£44.2 million
Adjusted EBITDA[1]	EBITDA excluding replacement expenditure	£91.7 million	£86.8 million
Capital expenditure	Additions to tangible fixed assets	£40.6 million	£58.8 million
Replacement expenditure	The cost of planned maintenance of mains and services	£56.3 million	£42.6 million
Debt to RAV ratio[2]	The Company's debt to RAV ratio	72.5%	72.6%
Employee lost time incidents	Incidents resulting in employees taking time off work (per 100,000 hours worked)	0.29	0.39[3]
Serious or potentially serious RTA's	Number of serious or potentially serious road traffic accidents per 100 vehicles, where the Company driver is deemed to be at fault[4]	0.39	0.65[3]
Customer satisfaction	Results from customer satisfaction surveys (5 = very satisfied) – planned interruptions	4.00[5]	3.97[3]
Customer satisfaction	Results from customer satisfaction surveys (5 = very satisfied) – unplanned interruptions	3.97[5]	3.94[3]
Escapes attendance	Proportion of uncontrolled escapes attended in one hour – percentage (target 97%)	97.4	97.4

Exhibit 5.34 – SGN reach in the UK market
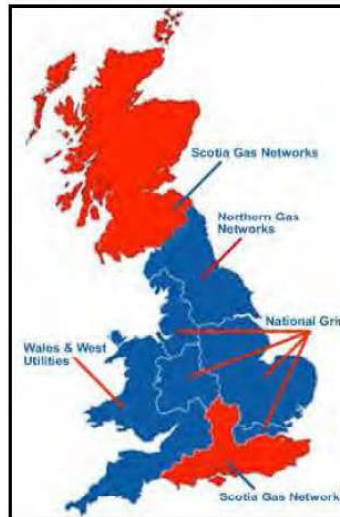
Source: Company documents

Exhibit 5.35 – Energy usage in the UK
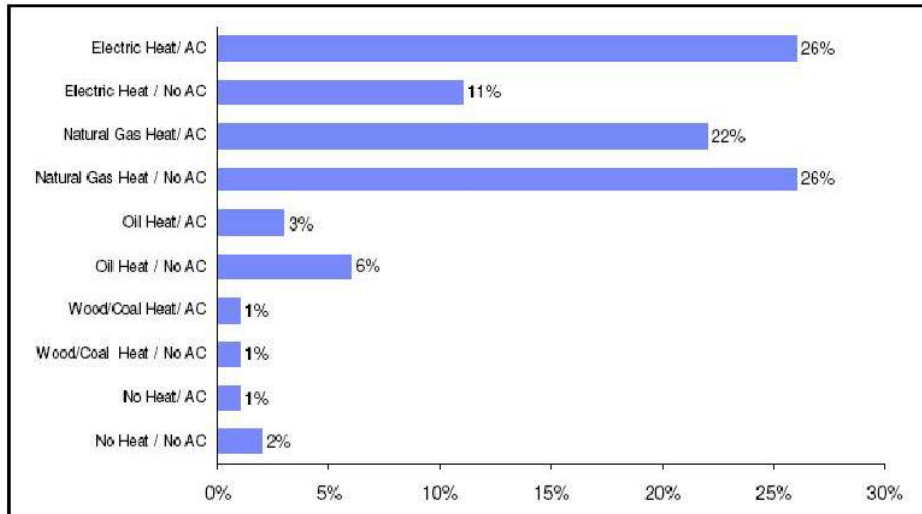
Exhibit 5.35 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

Exhibit 5.36 – Western Europe IT spend and growth pattern
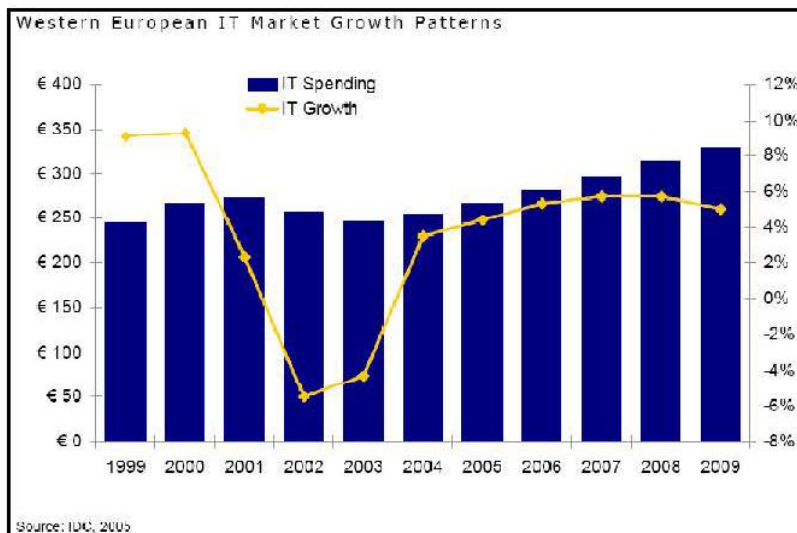
Exhibit 5.37 — Areas in which SGN implemented operational efficiencies

Exhibit 5.38 — Service response times for SGN customers
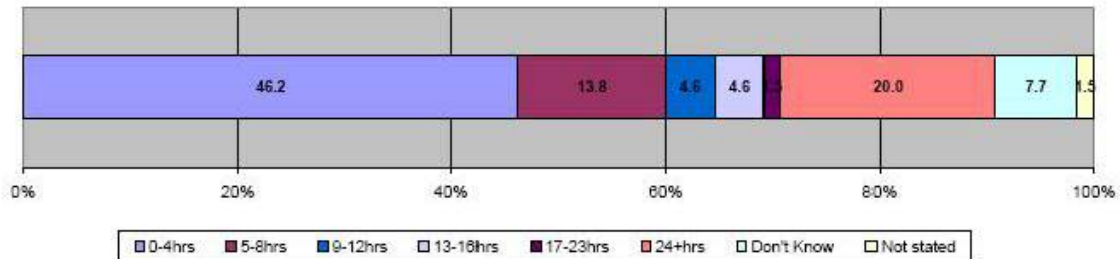
Exhibit 5.39: Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware
Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information
Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information
Spam: Unsolicited or unwanted email messages
Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable
Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders

Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site
Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations
Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers
Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data
Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized
Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

Exhibit 5.40 - Security revenues by countermeasure category
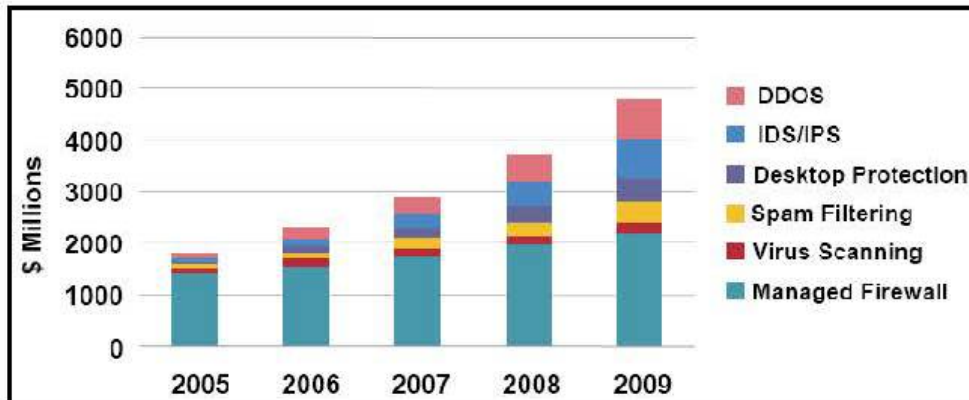
Exhibit 5.38 – Technology maturation path
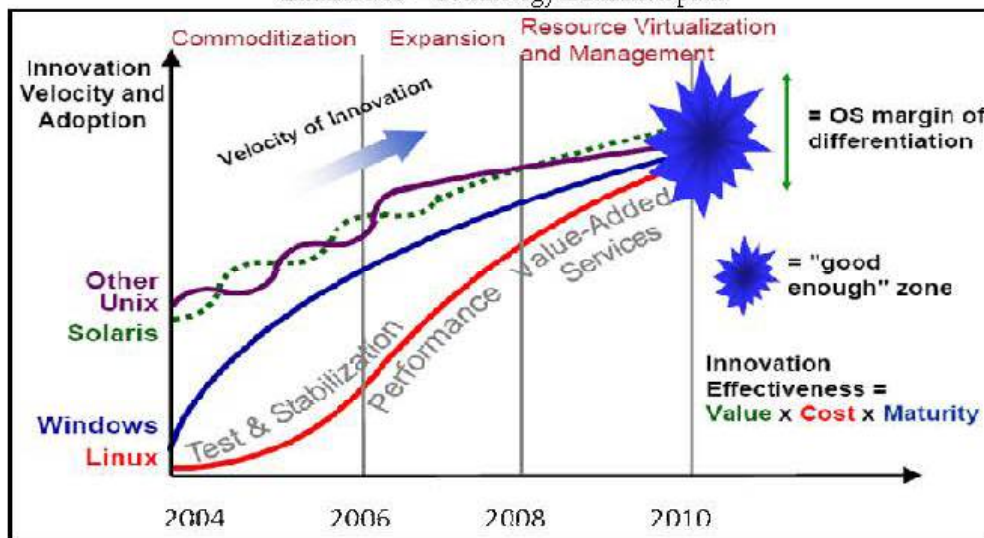
5.5 Accenture

5.5.1 COMPANY BACKGROUND

Accenture Ltd. (NYSE: ACN, ISIN: BMG1150G1116) is a global management consulting, technology services, and outsourcing company with its main business office in Chicago, Illinois, although it is registered in Hamilton, Bermuda. With more than 170,000 employees in 49 countries and reported revenues of US$19.7 billion in 2007, Accenture is the largest consulting firm in the world and is one of the largest computer services and software companies on the Fortune Global 500 list.

Accenture originated as the consulting division of Arthur Andersen, which Arthur Andersen and Clarence DeLany founded in 1913 as Andersen, DeLany & Co. Accenture's origins are in a 1953 feasibility study for General Electric. GE asked Arthur Andersen about the feasibility of automating payroll processing and manufacturing at GE's Appliance Park facility near Louisville, Kentucky. Arthur Andersen recommended installation of a UNIVAC I computer and printer, and GE agreed, which is the start of what became the first-ever commercial computer in the United States.

In 1989, that division split from Arthur Andersen and began using the name Andersen Consulting. Both Arthur Andersen and Andersen Consulting consisted of groups of locally-owned independent partnerships and other entities around the world, each in a contractual agreement with Andersen Worldwide Société Coopérative (AWSC), a Swiss administrative entity.

Through the 1990s there was increasing tension between Andersen Consulting and Arthur Andersen. Andersen Consulting was upset that it was paying Arthur Andersen up to 15% of its profits each year (a condition of the 1989 split was that the more profitable unit - AA or AC - paid the other this sum), while at the same time Arthur Andersen was competing with Andersen Consulting through its own newly established business consulting service line. This dispute came to a head in 1998 when Andersen Consulting claimed breach of contract against

AWSC and Arthur Andersen. Andersen Consulting put the 15% transfer payment for that year and future years into escrow and issued a claim for breach of contract. In August 2000, as a result of a conclusion of the International Chamber of Commerce, Andersen Consulting broke all contractual ties with AWSC and Arthur Andersen. As part of the arbitration settlement, Andersen Consulting paid over the sum held in escrow (then $1.2 billion) to Arthur Andersen, and was required to change its name, resulting in the entity being renamed Accenture.

By 2000, Andersen Consulting had achieved net revenues exceeding US$9.5 billion and had more than 75,000 employees in 47 countries, whereas Arthur Andersen had revenues of US$9.3 billion with over 85,000 employees worldwide in 2001.

The company's performance graph is shown in Exhibit 5.42. The CAGR from 1989-2007 is 16%. Exhibit 5.43 shows the revenues by industry group.

On January 1, 2001 Andersen Consulting adopted its current name, "Accenture". The word "Accenture" is derived from "Accent on the future". Although a marketing consultancy was tasked with finding a new name for the company, the name "Accenture" was chosen by an employee from the Oslo office named Kim Petersen, as a result of an internal competition. Accenture felt that the name should represent its will to be a global consulting leader and high performer, and also intended that the name should not be offensive in any country in which Accenture operates. The choice of name also means that the company appears closer towards the top of any alphabetical lists, and retains the AC letter sequence of its previous identity.

On July 29, 2001, Accenture offered initial public offering (IPO) at the price of $14.50 per share in New York Stock Exchange (NYSE); Goldman Sachs and Morgan Stanley served as its lead underwriters. Accenture stock closed the day at $15.17, with the day's high at $15.25. On the first day of the IPO, Accenture raised nearly 1.7 billion dollars.

Its organizational structure includes divisions based on client industry types and growth platforms. Industry divisions, referred to as Operating Groups, include Products (e.g. consumer packaged goods or industrial equipment), Communications High Technology and Media ('CHT'), Financial Services (e.g. banking, insurance), Resources (e.g. utilities, chemicals,

energy), and Public Service. The growth platforms are respectively titled Management Consulting & Integrated Markets, Outsourcing, and Systems Integration & Technology.

5.5.2 SERVICE AREAS

Management Consulting

- Customer Relationship Management

- Finance & Performance Management

- Human Performance

- Strategy

- Supply Chain Management

Technology Consulting

- Enterprise Solutions

- Information Management Services

- Integration

Infrastructure Consulting Services

- IT Strategy & Transformation

- Microsoft Solutions

- Mobile Solutions

- Research & Development

- Service Oriented Architecture

Outsourcing

- Application Outsourcing

- Business Process Outsourcing

- Infrastructure Outsourcing

Table 5.8 – Operating areas and industry groups

Communications & High Tech	Financial Services	Products	Resources
Industry Groups	Industry Groups	Industry Groups	Industry Groups
Communications	Banking	Automotive	Chemicals

Electronics & High Tech Media & Entertainment	Capital Markets Insurance	Consumer Goods & Services Health & Life Sciences Industrial Equipment Retail Transportation & Travel Services	Energy Natural Resources Utilities

Table 5.9 – Service areas and products

Service	Client Industry	Product
Consulting		
Systems Integration and Technology	Banking	Alnova Financial Solutions-Cost Management System
Outsourcing		Accenture Delivery Suite for Outsourcing
Business Intelligence and Performance Management		BusinessObjects™ XI-Performance Management, Query and Analysis Solution.
	telecommunication	
	Energy and utilities	aspenONE V2006
	Energy	Accenture e-partner-Electronic Billing
Business Intelligence and Performance Management		Enterprise Energy Management-Reduce ENERGY Costs
Enterprise solutions (CRM,SCM)	Education(College Service)	Accenture Supply Chain Performance Assessment
BPO	Heatlh and life sciences	Strategic delivery model-CLINICAL DATA MGMT

There is a misconception that the name change from Andersen Consulting to Accenture was simply the consulting firm's attempt to "hide" from the Enron scandal. This is not accurate given the timing of events. The split from Arthur Andersen was requested by the consulting side in 1998, and finally awarded in 2000; the Enron scandal (starting with the reporting of the infamous "LJM Partnerships") did not occur until well into 2001, with the scandal culminating in the months after that.

In reality, planning for a new name was underway before the arbitration decision was announced (Andersen Consulting partners felt that the word "Consulting" in the name was a drawback, since the firm was moving into non-consulting work such as outsourcing and ventures). Interestingly, internal Arthur Andersen emails in 2001 sent to all employees

discussed future plans for Arthur Andersen to move ahead in the market with 3 names: Andersen Tax, Andersen Audit, and Andersen Consulting now that they had ownership over the name. Arthur Andersen was never able to revive the "Andersen Consulting" name since it was brought down by the Enron scandal before doing so. Accenture is typically listed in the top 100 corporate brands, so the name change appears to have been a positive for the consulting firm. The fact that it is disassociated from the Arthur Andersen name certainly proved to be a positive after the Arthur Andersen/Enron scandal.

In addition, Accenture was absolved and not held liable of any involvement in the Enron scandal in court. Because of Accenture's investment in India, many Indian major players such as Infosys, Tata Consultancy Services, and Wipro, along with other market-setters, such as IBM and Siemens IT Solutions and Services, have become its competitors.

The company's range of services or service mix between consulting and outsourcing services is also changing as shown in Exhibit 5.44.

Exhibit 5.45 shows the area of operations and industries serviced by Accenture.

5.5.3 SUBSIADIARIES

- Coritel BPM is the Spanish subsidiary of Accenture devoted to software development and outsourcing. It was founded in 1984 and currently has 6,500 workers.

- Avanade is a joint venture between Microsoft and Accenture. It is dedicated to enterprise business solutions on the Microsoft platform.

- Navitaire is a subsidiary of Accenture, dedicated to providing specialized solutions to airlines.

- Accenture Business Services for Utilities is a subsidiary of Accenture, dedicated to providing Business Process systems and solutions for Utilities

- Accenture National Security Services is a subsidiary of Accenture, dedicated to providing services directly to United States government and military agencies. It was specifically incorporated as a US subsidiary to meet a congressional mandate that defense contractors be based in the US.

- Accenture Technology Solutions is a subsidiary of Accenture, dedicated to providing technology solutions to the client. The solutions work is mainly outsourced to low-wage developing countries like India, The Philippines and Romania - Accenture India Delivery Centre, Accenture Manila Delivery Center and Accenture Bucharest Delivery Center.

- Accenture SAP Solutions is a subsidiary of Accenture, dedicated to providing SAP solutions to the client. It has taken Coritel BPM SAP resources and turned it into this new unit called: ASAPS.

5.5.4 GLOBAL DELIVERY MODEL

Accenture follows a Global delivery model similar to TCS. Called the Global Delivery Network, it enables Accenture to deliver end-to-end capabilities, mobilizing the right people with the right skills and talents, who leverage proven assets for each precise task. Since all consistently use the same proven processes, methods, and tools worldwide, companies and governments tapping the power of Accenture's Global Delivery Network gain immediate access to a workforce with vast global capabilities. The network enables them to focus on achieving their priorities rapidly, whether reducing cost, augmenting staff and capabilities, or implementing high-value solutions. Accenture deals in all aspects of technology and outsourcing delivery, accelerating from planning through mobilization to operation, to help organizations realize value quickly and clearly, and to achieve and sustain high performance. Refer Exhibit 5.46 for Accenture Global Delivery Centre network.

Accenture delivery center is first a physical place, equipped with the most advanced information technology and most secure infrastructure in the industry today. Every delivery center is continuously linked with every other delivery center in the network to ensure that

business continuity is never an issue regardless of the political or economic climate of any given country. Each center is also a team of people in a fast-expanding network that numbers more than 55,000 smart, deeply skilled professionals. Most importantly, all the professionals in each center share common methodologies, tools, architectures and metrics for the delivery of technology and business process services and solutions. The fact that multi-disciplinary teams in each center all work the same way across locations ensures fast, seamless collaboration and continuous innovation no matter where in the world the client is. Through Accenture's Global Delivery Network, the client has access to a number of services: system integration, application development and outsourcing, infrastructure outsourcing and Business Process Outsourcing. Skillsets consist of all major development platforms, enterprise application suites (SAP, Oracle Products including Oracle eSuite, PeopleSoft and Seibel), databases, middleware and mainframe technology. Industry-specific technology software such as Advantage, Oracle Retail (formerly Retek) and VisualBanker are also available. There are also specialists who focus on the infrastructure services such as IT Spend Management, Service Desk, Data Center Services, Communications Services, Security and Workplace Services to help you lower total cost of IT ownership and operating costs while improving performance. Complementing these technology services and solutions are Accenture's Business Process Outsourcing (BPO) disciplines in Finance and Accounting, Human Resources, Customer Contact, Learning and Sourcing and Procurement, as well as in specialized industry processes. Accenture's BPO services maximize cost reduction from the outset, and drive innovation and high performance for the duration of the outsourcing relationship.

How can thousands of people from different countries and cultures think and work as one? Because Accenture's global workforce is rigorously trained in a common set of methodologies, tools, architectures and metrics, which together are the basis for the Accenture Delivery Suite. Regardless of geographical location, Accenture staff collaborates to deliver high quality, cost-effective services and solutions to clients.

These facilities are strategically located wherever an expansive pool of talented knowledge workers can be tapped, and where clients need specific language skills and geographic proximity to key global or regional markets. Many clients see multiple Accenture teams advance their projects daily, as work migrates from north to south and east to west, circling the

globe in tandem with the workday. They are able to monitor global technology services and solutions being engineered and business processes being delivered efficiently and effectively. Standard tools automate how they create the deliverables that contribute to services and solutions. Architectures provide the frameworks for building robust IT solutions. And metrics allow them to measure performance and identify ways to achieve continuous improvement. These together comprise the Accenture Delivery Suite.

Essentially, the Accenture Delivery Suite brings together innumerable insights and proven practices into a single, coherent, time-tested body of knowledge. Far from fixed and final, the knowledge embodied in the Delivery Suite is continuously expanding and evolving. The result can be seen in the recognized industry-wide external certifications, such as Capability Maturity Model Integration, eSourcing Capability Model and Lean Six Sigma, to name a few.

Accenture's delivery center locations in China, India, the Philippines and Spain have achieved CMMI Level 5 certification, signifying a high standard of process improvement practices. In addition, Accenture Infrastructure Outsourcing in India achieved ISO 20000-1 certification, which defines the requirements for a service provider to deliver managed services.

5.5.5 STRATEGIES OF GROWTH

With the company's emphasis on high performance, there are three growth platforms that represent the capabilities that help Accenture deliver on promises to clients. The first is to grow business consulting. Growing this part of the business is critical for them, they strive to achieve double-digit growth in business consulting. Second, they have identified fast-growing areas like supply chain, customer transformation, security, IT optimization, and finance and performance management, in which they can bring innovation to a wide range of clients. They are also creating new innovations and solutions using emerging technologies such as radio frequency identification, mobility and insight technologies. Through information technology outsourcing—including both infrastructure and applications outsourcing they help clients reduce operating costs, and enable improved enterprise outcomes across a wide variety of business processes. The evolution of service offerings is described in Exhibit 5.47.

5.5.6 EXHIBITS

Exhibit 5.42 – Revenues 1989 - 2007

Year	Revenue
2007	**$ 19,696**
2006	16,646
2005	15,547
2004	13,673
2003	11,818
2002	11,574
2001	11,444
2000	9,752
1999	9,550
1998	8,215
1997	6,275
1996	4,942
1995	4,001
1994	3,220
1993	2,833
1992	2,583
1991	2,256
1990	1,876
1989	1,433
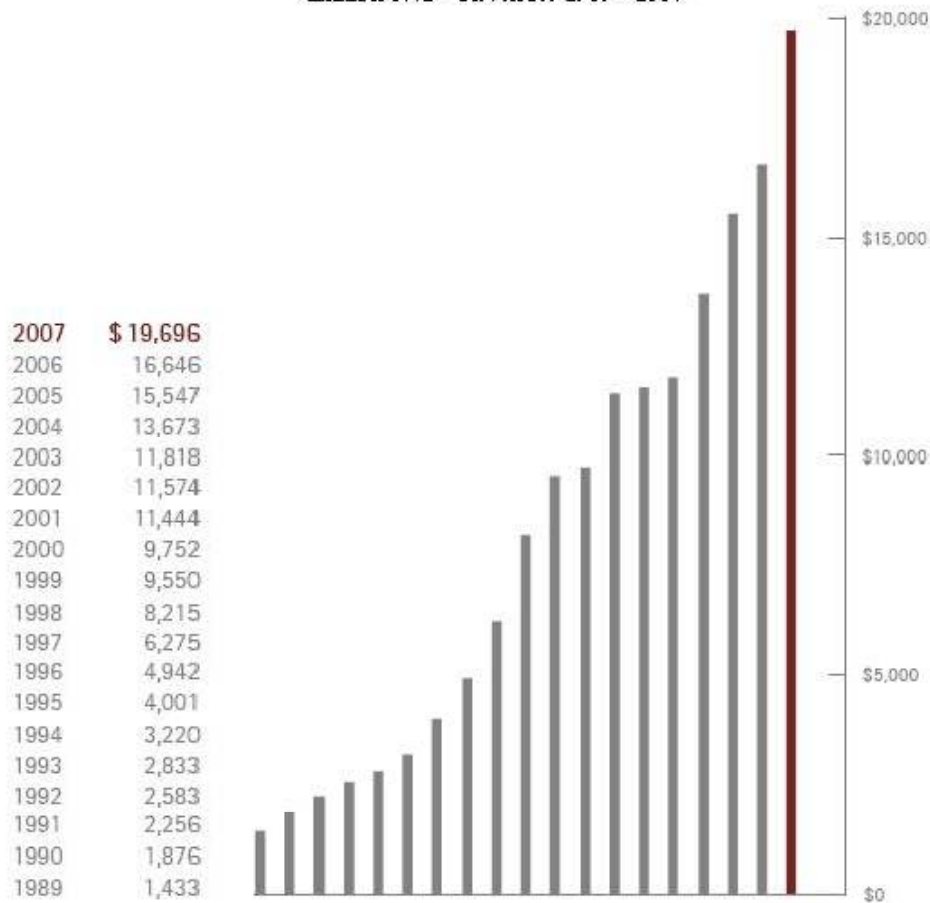
Exhibit 5.43 - Revenues by industry group ($m)

	2004	% change	2003	% change	2002	% change	2001
Communication & High Tech	3,741	14	3,290	3	3,182	(2)	3,238
Financial Services	2,771	18	2,355	0	2,366	(10)	2,627
Government	1,995	26	1,582	20	1,316	31	1,003
Products	2,979	14	2,613	(3)	2,696	3	2,624
Resources	2,178	11	1,966	(2)	2,005	4	1,933
Others	9	(20)	12	20	9	(51)	19
Totals	$13,673	16%	$11,818	2%	$11,574	1%	$11,444

Exhibit 5.44 – Changing offerings mix

Exhibit 5.45 - Area of operations and industries serviced by Accenture

Exhibit 5.46 - Accenture Global Delivery Centre network
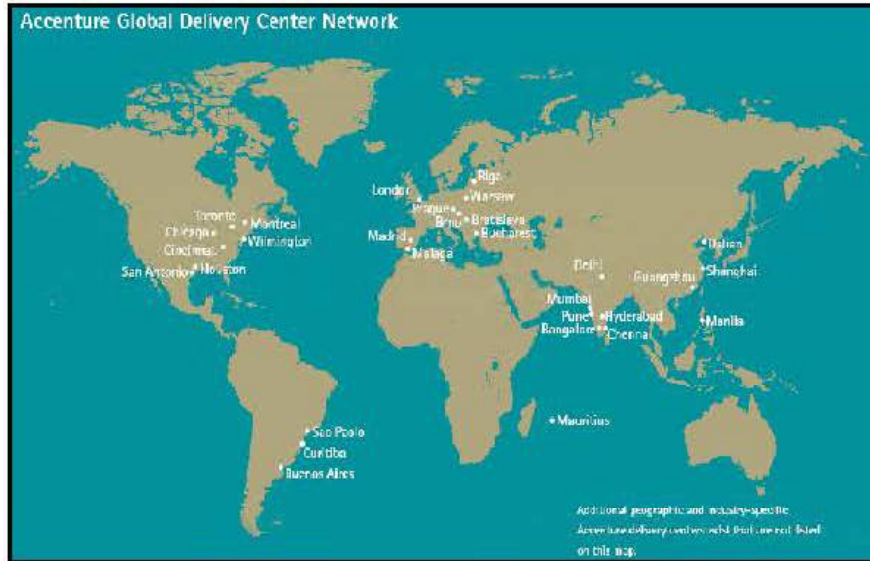
Exhibit 5.47 - The evolution of service offerings

In the 1980s:	In the 1990s:	In the early 2000s:	Today:
Leader in systems integration. Best-in-class delivery of projects, integration of business needs and information technology. Known for flawless execution—delivering solutions on time and on budget.	Leader in business integration—helping clients align their people, processes and technologies with their strategies. Defined the marketplace, building on our flawless execution and focus on business outcomes. Best-in-class delivery of complex, large-scale change programs.	Leader in value delivery. Tangible outcomes for clients that made a measurable impact on top- and bottom-line performance. Grew business process outsourcing (BPO) business and developed global delivery network.	Taking the lead in helping clients become high-performance businesses. Raising the bar again; drawing on previous stages of our evolution. Enabling businesses to outperform their peers, regardless of business or economic conditions. Creating future value.

5.6 Case Analysis 4: British Gas (Accenture Case-1)

5.6.1 COMPANY BACKGROUND

British Gas is UK's largest gas provider. In the UK, in 1948 the Gas Act was introduced. This created a nationalized gas industry throughout England, Scotland and Wales, transforming the way the gas industry operated. For over a hundred years, gas had been manufactured and supplied by a series of private and municipally operated companies. Under the Act, which came into effect in May 1949, over 1000 privately owned and municipal gas companies were merged into twelve area Gas Boards - each an autonomous body with its own chairman and board structure. The area boards became known simply as "the Gas Board", a term which is still used for British Gas. A Gas Council was also set up to act as a link between the area boards and the Ministry of Fuel and Power, although the Council had no direct powers over the boards. The Gas Council was made up of the 12 area board chairmen and had a chairman of its own. The use of gas continued to grow through the 1950s and in 1959 the first trial imports of liquefied natural gas arrived in Britain from Louisiana. An Esso/Shell survey discovered an enormous natural gas field in Holland. Technical advances herald widespread changes. Surveys in the North Sea had indicated the enormous potential of tapping undersea reserves of natural gas. In 1966, the decision was taken to convert Britain to natural gas, and a year later the first North Sea gas was brought ashore at the Easington Terminal. During a ten-year national conversion program every appliance in the country (about 13 million homes and factories and 34 million individual appliances) were converted from town gas to run on natural gas.

The start of the 1970s saw the opening of a national control centre at Hinckley, Leicester, to manage the operation of the growing high-pressure distribution system. The 1972 Gas Act paved the way for greater centralization with the creation of the British Gas Corporation. Taking effect in 1973, the 12 old Gas Boards became regions, each region responsible for a particular geographical area. In 1977 the national program to convert to natural gas was completed. Privatization began with the 1982 Oil and Gas (Enterprise) Act giving the

Government the power to dispose of British Gas's assets and open up the corporation's pipelines to third-party suppliers. The 1986 Gas Act saw the return of the gas industry to the private sector and the company's name changed to British Gas Plc. On 8th December 1986, £9 billion worth of shares were floated on the London stock market and sold around the world.

In 1992, British Gas underwent a wide-ranging Monopolies and Mergers Commission (MMC) inquiry to balance the needs of customers, shareholders, suppliers and employees. When the MMC published its report in 1993, the Government decided to open the domestic gas market to competition by 1996. In parallel with this proposal, British Gas carried out a major restructuring to prepare the UK business for the onset of competition. Five business units were formed, each with a specific national responsibility:

- Public Gas Supply, the domestic market (now British Gas Trading).

- Contract Trading (later named Business Gas, for supplies over 2,500 therms a year)

- Transportation and Storage (later named Transco) responsible for transporting and storage of gas

- Service and Installation (later named Services)

- Retail (later named Energy Centres)

The Exploration and Production and Global Gas divisions continued to operate in the international markets. On 17 February 1997, following shareholder approval, British Gas plc was demerged into two separate companies:

Centrica PLC: British Gas Energy Supply, Services, Energy Centres, Accord Energy and HRL (Morecambe gas field), The gas production business of the North and South Morecambe gas fields were transferred to Centrica plc.

BG PLC: Transco (Transportation and storage business), International, Exploration and Production (excluding North and South Morecambe gas fields,) Research & Technology and Properties.

In December 1999, BG plc completed a financial restructuring which resulted in the creation of a new parent company BG Group plc. The range of products offered by British Gas in Great Britain was extended to include home security, plumbing, and kitchen appliance cover. In September 2000, British Gas entered another new market with the launch of its telecommunications service. Almost one year later, in June 2001, British Gas extended its electrical servicing business into 80,000 more households across Britain with the acquisition of National Homecare.

5.6.2 EXISTING IT LANDSCAPE

BG (Centrica) had a legacy set of systems and applications running – some of which were 17 years old. These included back office functions like Finance and HR, as well as plant maintenance and logistics. These were running on legacy hardware – which also was adding to the costs to maintain it. They desired to replace these legacy systems with contemporary systems to manage their increased load better as well as introduce flexibility into their operations. SAP was selected as the system of choice for this. Accenture was selected for this and the criteria used for the selection are outlined in Table 5.10 below.

Table 5.10: Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior gas domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

Additionally, a number of acquisitions had resulted in disparate systems coming together (particularly in the area of CRM) – which resulted in Centrica not getting a single view of its customers – a primary deliverable of a CRM system. The company's utility products had evolved into commodities that made differentiation difficult, and Internet-fuelled price transparency was further hurting margins and market share as well.

Centrica was maintaining an old website – gas.co.uk – that focused on home energy management rather than being a customer-focused agent that made the most of Internet technology to bridge the gap between the company and its customers. For a customer holding more than one product the company generated multiple bills – which resulted in multiple points of contact in order to handle a customer query since employees serving these customers only had developed skills in one particular application, be it gas, electricity, telecommunications or home services.

5.6.3 RESULTS - BUSINESS TRANSFORMATION

5.6.3.1 Outsourcing

Diagram 5.30: Core competencies and outsourcing
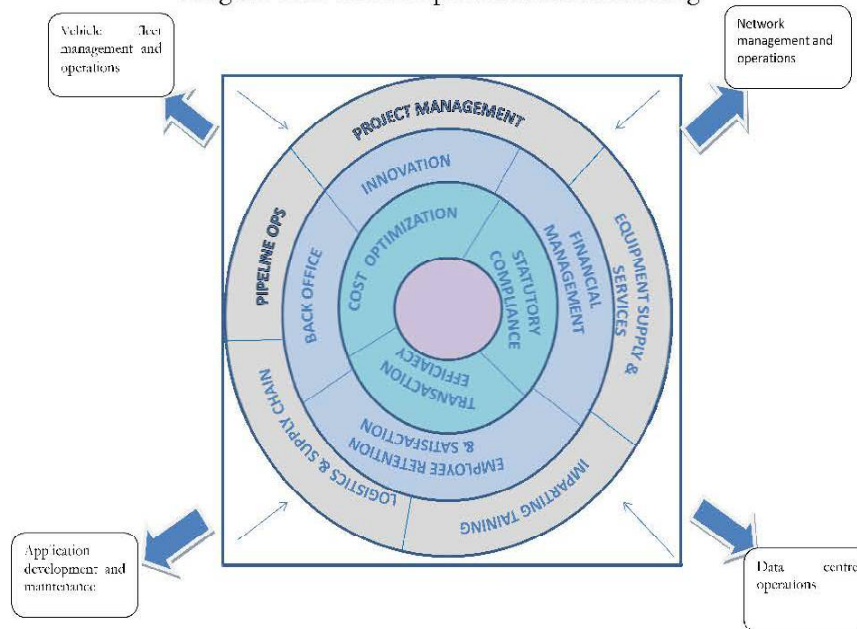
Centrica focused on its core competencies. It had a fleet of 9,500 commercial vehicles that were critical to its operations but required extensive management. It appointed Hitachi Capital Vehicle Solutions to manage its commercial fleet and provide total support to its drivers. This included providing all back-up office functions and a range of dedicated driver help-lines. Targets were agreed against key criteria such as cost, finance, vehicle down-time, compliance, servicing, ministry of transport requirements (MOTs) and telephone answering times. The core competencies of the company is shown in the diagram 5.30 above depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced. Exhibit 5.47 lists the elements that were not outsourced

5.6.3.2 Effect of business cycles

Diagram 5.31 – Relation of economic cycle to BG's business cycle
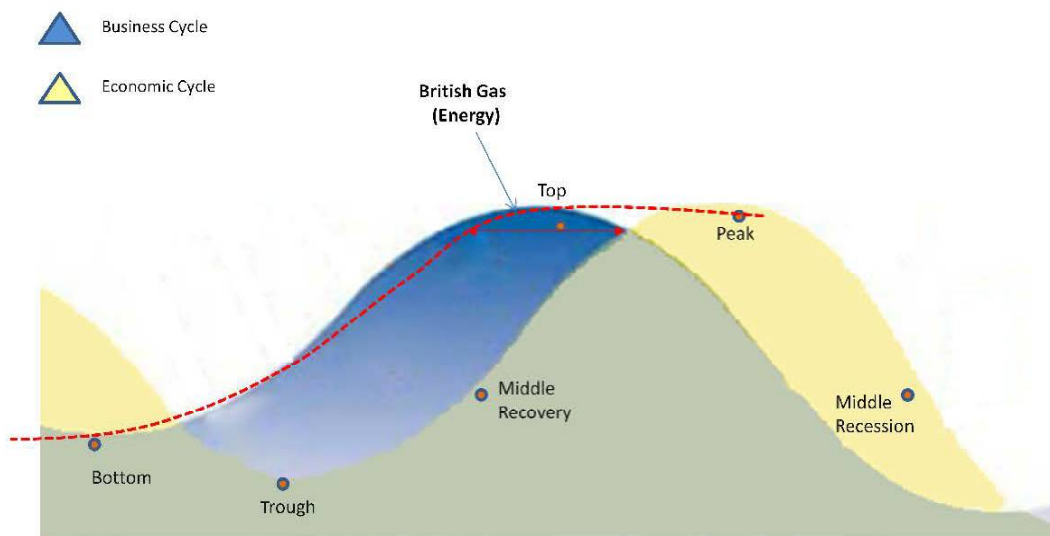
Certain industries are hit hardest during a downturn in the economy. These include construction and allied industries like cement. There are certain favored industries that are not impacted to a great extent during such down-cycles. This is to say, their growth rate slows down to low figures, yet they seldom show negative growth. Gas volumes are affected by weather, consumer demand and network availability. In respect of weather this leads to gas volumes being typically higher during the winter months leading to revenues being weighted more towards the end of the financial year. During this period too, gas demand follows three

regular cyclical patterns. Within a 24 hour period, demand follows a well-known and predictable cycle known in the industry as the "diurnal swing". Domestic demand, for example, has a peak at breakfast time and again in the evening, and a trough during the night. Demand also follows a weekly cycle, weekend consumption showing a different pattern to weekdays. Finally, consumption through the year follows a roughly sinusoidal curve related to seasonal changes in temperature. These three cycles are superimposed on each other and are interrelated. Demand is very closely related to temperature, and any of these cycles can be temporarily upset by unusual temperature patterns. Other weather factors, particularly wind, can also distort demand, and other economic factors such as public holidays, or strikes, also disturb the underlying patterns. IT spend is typically counter-cyclical – with the previous cycle and forecasts determining the extent of spend. This is followed by a stable period with focus on maintaining the IT setup, until business considerations make further spend necessary. Diagram 5.31 above depicts the relation of economic cycle to BG's business cycle. Refer Exhibit 5.48 for the Western Europe IT spend and growth pattern.

5.6.3.3 Transactional Ability

Accenture helped BG implement over 11 SAP modules including Offshore Logistics, Financials (FI), Materials Management (MM), and Project System (PS), as well as 6 interfaces to the other software systems (using Seebeyond) that were part of the overall IT initiative. They also subsequently implemented a data warehouse system to intelligently mine the data present in the SAP system. The SAP system handled the operational aspects, Siebel handled CRM and Seebeyond, acted as the integration layer for the others.

One of the unique challenges faced by Centrica was its widespread reach. Besides supplying gas, Centrica also provided banking services through its subsidiary Goldfish Bank. Also, it acquired the Automobile Association and moved into supplying electricity and phone services. This led to the company's customer base covering nearly 90 percent of UK households in some form or the other. The company recognized through customer feedback a clear need for a single, online resource that would give integrated access to all products and services needed to maintain a household. Although around 250 sites existed in this online space, their offerings were narrow and none was integrated to offer a comprehensive solution. To fill this gap, Centrica made a visionary decision to create house.co.uk (now accessed through

britishgas.co.uk) as a completely new, Internet-based company and reposition British Gas as house.co.uk's flagship brand. Diagram 5.32 below show the stages of transactional efficiency.

Diagram 5.32 - Stages of transactional efficiency
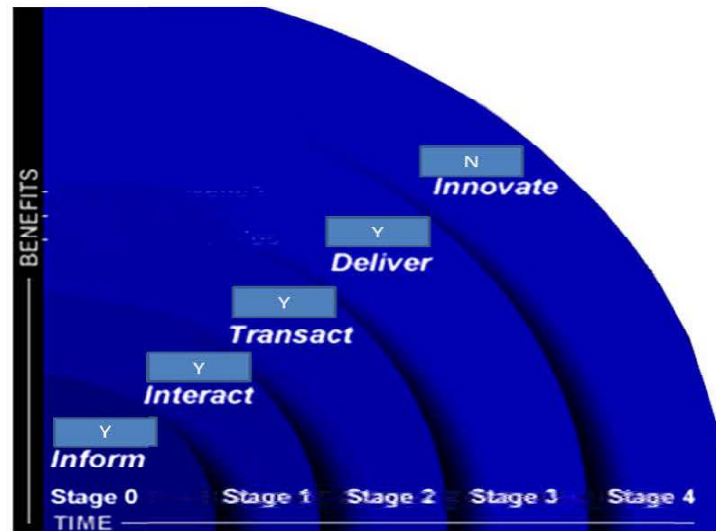
The site was developed by Accenture's interactive design group (IDG) and utilized BroadVision's CRM software and Interwoven's content management solution. One of the most important aspects of this site was that it was integrated with 3rd party websites – Consignia for postal services; Rightmove for house purchases; Charcolonline for mortgages; Experian for local information; Improveline for tradespeople; and Easier2move for online relocation services – all of which provided complementary services that would be used by customers through the house.co.uk portal. The site also required Accenture to develop and implement a full content management system, the first of its kind at Centrica, to support the management of over 1,300 pieces of copy. This allowed non-technical employees to quickly and easily update the site regularly and quickly. The result was a broad-based, easy-to-navigate site that helped Centrica retain current customers and attract new ones by offering a time-saving, no-hassle "one-stop shop" for discounts on bundled utility and home management products, plus simple access to a wealth of estate agents, home-repair and other related services. The fact that the site was able to offer a rich, personalized online experience to its users also played an important role in its operational efficiency.

The company also transitioned and transformed from product-centricity in operations to single-service window operations enabled by technology. Previously there were legacy applications each handling one of the service areas the company provided. Processes within these applications were also pre-dominantly manual with little or no process integration. Data for all these systems resided in legacy databases – which were dissimilar and required specific skills to handle. Post implementation, however, these databases were unified into a single database which lowered operating and maintenance costs as well as brought best-of-breed business practices to the company. For a customer holding more than product, they now offered a single bill, a single payment arrangement and a single point of contact to handle all queries and all concerns, irrespective of their request. This delivered an enhanced customer experience, reduced operating costs, and thanks to the package selection route, instead of the Build option, lower risks.

At the time BG embarked on these initiatives, they had a total of approximately 8,000 engineers and were planning to increase them to 10,000. These 8,000 engineers were handling 7.5 million service calls per annum. In a peak week, more than 160,000 calls to different homes were handled with up to 40,000 calls in a peak single day. These calls concerned with the multiple service offerings and products of gas, electricity, plumbing and drains, and kitchen appliance covers. Different engineers had different skill profiles, and customers also had different service contracts and SLAs. The old systems were no longer able to support the optimal deployment of resources to support these permutations and combinations in an effective and cost-efficient way.

Post implementation, a skills-based job allocation was done using optimization routines. This enhanced customer service, and provided the ability to offer differentiated services to customers based on customer segmentation. It also reduced operating costs, as the right engineer could reach the location quickly on time and a lessening of risk that re-work would be required – a characteristic that occurred frequently because of the inadequacies of the old system. Refer Exhibit 5.49 for an illustration of service level improvements in BG and Exhibit 5.50 for depiction of areas in which British Gas implemented operational efficiencies.

5.6.3.4 Impact on workers

Development of the SAP system radically altered work procedures in BG and extensive employee training was required to help employees fit into their new roles. To aid this process BG employed a Business Change Manager whose objective was to move people from a basic transaction processing mindset to one of adding real value to their roles. This covered changes in the processes and systems, organization and remuneration and included benefits delivery plans so that every individual employee knew exactly why the systems were being changed, the impact the change would have on them personally, how it will change the way they work, how they will use that system and, from a personal point of view, where they would fit in the organization and how they would be paid to use the new capabilities.

Diagram 5.33 - Impact on workers due to technology.

A de-centralization of work also took place with a number of smaller, leaner teams being formed replacing a hierarchical structure predominant in the pre-SAP days. The most important change, however was the realization on people's part that everyone in the company understood what the data could do for them and how to put it to the best use. This was accompanied by a shift in the skill sets and roles of people from a specific function that was not interchangeable to a more generic role – that could serve multiple functions and roles. This improved the employee skill-set base and enabled them to present a face to the customer that represented the company as a whole and not just a department or function. Diagram 5.33 above shows the impact on workers due to technology.

The paradigm shift had other impacts as well. There was an encouragement in the form of training provided to managers to encourage leadership. Frameworks for decision making were created which empowered managers to take decisions and not simply rely on escalating the problem to the next higher level. The whole organization underwent a cultural change in personnel roles supported by technology that made them independently handle customers

effectively. This promoted ownership and accountability on the part of employees. This sense of ownership was further supported through proactive feedback schemes and individual performance metrics including balanced scorecards that emphasized customer value measures. All of these coupled with rewards and incentive schemes promoted higher performance by employees.

This shift also created a single back office for the energy business. From the earlier paradigm where gas and electricity teams worked separately with all of the overheads associated with each, there is now a single cross-functional using SAP. The team size was also reduced naturally as the operational efficiency increased.

5.6.3.5 Security

Centrica used Siemens Insight suite of products to meet their security requirements. The suite conforms to compliance standards and addresses the following needs:

Security management

- Policy, procedures and standards
- Management and assurance
- BS7799/ISO 27001 compliance
- Risk management methods
- Risk assessment
- Project risk
- Legal and regulatory compliance

Continuity services

- Business continuity management
- Civil Contingencies Act
- Crisis management
- IT continuity
- Voice continuity

Technical security

- Technical risk assessment

- Secure network and systems design

- Open Source Intelligence (OSINT) impact assessment

- Security testing

- Voice and telephony security

- VoIP security

Security solutions

- Perimeter security

- Virtual private networks

- Content management

- Wireless networking

The system provides an ITIL (IT infrastructure library) based framework for the above. Specifically, six service elements were implemented to enable Centrica progress through this maturity model and achieve IT continuity. These elements were:

- Continuity reviews, audits and health checks

- Defining resilience and recovery strategies

- Solutions design and implementation

- IT disaster recovery hosting

- IT continuity and recovery testing and

- IT continuity training.

All these were deployed in terms of 6 parameters – Protect, Detect, React, Recover, Resume, and Return (the last process dealing with returning from disaster mode to normal operations. All IT Continuity plans should have an exit strategy that allows them to vacate their ITC disaster recovery centre when the time comes. This is illustrated in Exhibit 5.51.

The drivers affecting Centrica included compliance – Sarbanes – Oxley; single sign on across the enterprise as well as identity and authentication for its systems. Figure 5.34 below shows an illustration of this.

Diagram 5.34 – Security adoption driving forces
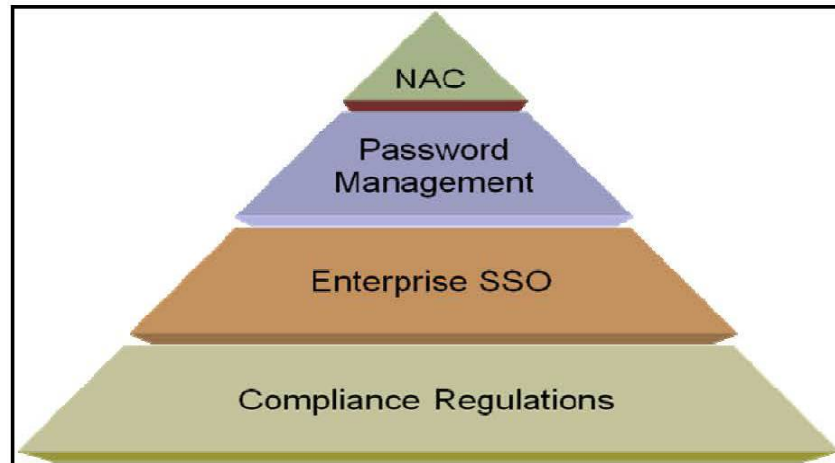
Centrica decided to employ the ITIL approach to security. Comprehensive audits could be undertaken through the deployed HP Openview Identity and access management solution. The solution, besides offering self service options to more than 30,000 users also decreased the users reliance on internal IT staff. This also helped them achieve the compliance objective. Additionally, to keep up with the growing threats, systems were kept up to date through the latest patches automatically deployed through a patch management system. Additionally, the company upgraded its systems to the latest available technology within a short time of it being made available to the market. Refer Exhibit 5.52 for the top security risks and vulnerabilities and refer Exhibit 5.53 for trends in these countermeasures.

5.6.5 TRENDS

5.6.5.1 Cost Performance Structures

The launch of the website house.co.uk gave the company an early mover advantage – with the launch being an industry first. This combined the power of the British Gas brand with Internet technology, giving the company the tool it needed to halt the loss of customers and make significant strides in acquiring new customers. The integrated CRM and content management components gave the company's marketing group a single view of their customers from its

earlier disjoint view, enabling increased use of segmentation and personalization, more effective targeted campaigns, and much stronger one-on-one customer relationships – all contributing to the customer loyalty and retention. The company was also able to increase its revenues through a new ability to cross-sell and upsell its own products and services plus those of its six third-party participants. All these benefits came with operational efficiencies as transaction costs along with support costs reduced due to the online self-service aspects of the website. Refer Exhibit 5.54 and 5.55 for an illustration of these benefits. Diagram 5.35 below shows the cost component reduction.

Diagram 5.35 – Cost component reduction
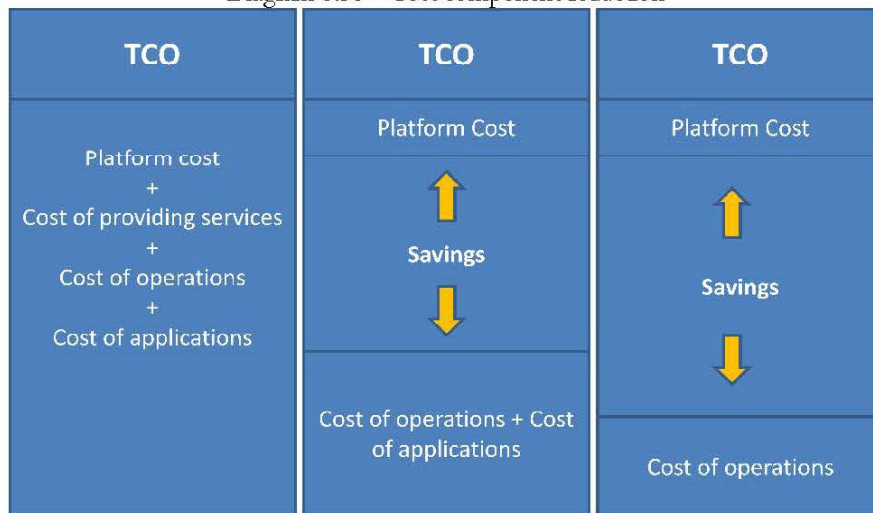
The results speak for themselves – at the end of 2006, Centrica came out with hard RoI figures on the technology investments done. These are presented in Exhibit 5.56.

Company estimates in revenue impact are illustrated in Exhibit 5.56 – which shows projected savings in 2008 to the tune of £200m as well as the initiative impact in the areas of CRM, process improvement and engineer deployments. Further, significant impacts to the top and bottom line were brought about in the following ways – with customer churn reducing to a value of 3% - the lowest in the industry.

The company also established what it termed as a 'virtual call centre' – where the company was dispersed geographically across a number of locations, yet using telephony systems coupled

with customer profiling from the CRM, as soon as inbound calls come in, they can get to know if they are a high-value or low-value customer, and accordingly route them. They route low-value customers into IVR, where there is a lot more automation, and high-value customers are very quickly able to talk to a real person and get the service that they want. These technologies are leveraged to deliver a richer experience and, more critically, an experience with a lower cost to serve the customers.

5.6.5.2 Architecture, Business Continuity and Enterprise Management

Architecture and Enterprise Management: In addition to the legacy systems and network infrastructure that was in use in Centrica, the numerous acquisitions brought a myriad of disparate systems together. All these had to be managed and needed to be available as well as perform adequately. Additionally, the applications that were running on these systems had to be operating in high availability mode as any downtime would result in loss of business and revenue for the company. Centrica decided to undertake the implementation of an enterprise management program to provide service views showing the availability and performance of key business processes and transactions across the organization. This included views of the Siebel CRM solution, a thin client implementation using Citrix Windows 2000 environment with Wyse and Pentium based thin clients, Centrica's main electricity billing system and the AA main break-down system.

Diagram 5.36 – Business Continuity Planning

Centrica chose BMC software to do this for them and followed the BMC service management strategy for this. The solution began with the basics of monitoring the infrastructure and technology using the BMC Software PATROL solution, grouping the individual alerts to show the service availability, and then adding process and transaction monitoring to deliver a full view of Business Service Management.

The final full solution was multi-faceted, using many already implemented BMC Software solutions to help Centrica meet its goals. Custom and off-the-shelf knowledge modules are deployed to servers that monitor several areas including operating systems, databases and log files. PATROL Enterprise Manager (PATROL EM) provides a central point for all technology alerts and information that comes from the knowledge modules. Service views, which display the technology alerts in the context of how these affect service, are sent to a help desk. From there, technology alerts are raised and automatically routed via PATROL EM to the Centrica Service Control Centre. From the Service Control Centre, IT professionals receive trouble tickets and either forward those to third-level resolution groups, or more often, rely on the PATROL solution to diagnose causes and resolve the incidents. Another BMC Software solution, AlarmPoint Voice Server, manages the contact of the on-call resolution staff and if needed, escalates concerns to the service owners and other IS management. AlarmPoint does this via pager alerts, emails, SMS text and voice messages. The enterprise management system starts with the basics of infrastructure and technology monitoring alerts, then groups the individual alerts to show the service availability, and then adds processes and transaction monitoring to give a full view of Business Service Management.

Business Continuity: As part of its business continuity strategy, Centrica adopted nearsite (storage replication within the same city) and remote site storage (storage replication at other geographic locations) for its data centre operations to protect critical customer data. Since the energy business demands protection of data without any downtime, almost all energy companies have DR sites. Most companies are now implementing multiple DR sites to ensure business continuity. Refer Exhibit 5.58 for a technology maturation path of operating environments available at the time. See Table 5.11 below for technologies deployed by Centrica.

Table 5.11 - Technologies deployed by Centrica

Technology	Product
Operating system	AIX, Linux, Windows
Database	ORACLE 9i Rel 2
Enterprise Application Suite	SAP IS-OIL
Modules	Offshore Logistics Financials (FI) Materials Management (MM) Project System (PS) Broadvision CRM Interwoven content management Citrix metaframe presentation server Siebel SeeBeyond BMC Enterprise management

5.6.5.3 Enterprise Integration

After consolidating the back-office and customer facing sides of the organization, recently BG has adopted mobile workforce enablement by providing laptops to all its field workers. These laptops are enabled with GSM/GPRS and Bluetooth in addition to the normal Wi-fi. Engineers use GSM/GPRS in their notebooks to connect to the company's WAN from their home or van, or the customer's house. Once connected, they can obtain service orders, order parts, and check other information that helps them move quickly through their day. And, with a fast-growing network of public wireless LAN hot spots, engineers have an increasing number of places where they can use wireless technology to access the corporate WAN. Once a fault has been diagnosed and the parts ordered, the Bluetooth interface automatically sends data from the notebook to a laser printer kept in the service van, which generates a high-quality report on the work performed, as well as a safety checklist. This improved engineer productivity by 250%. Diagram 5.27 below shows the major effects of Enterprise Integration

BG is moving towards further integrating this workforce as well as all its applications in a phased manner. The advances to date were also broken up into 5 phases or releases as BG termed them. Release 1 and Release 2 involved Siebel, Release 3 involved the introduction of SAP to replace gas and electricity billing systems and Release 4 and 5 integrate the energies business, the telecommunications and home services business to enable the creation of a single British Gas in terms of one unified systems environment.

Diagram 5.27 - Major effects of Enterprise Integration
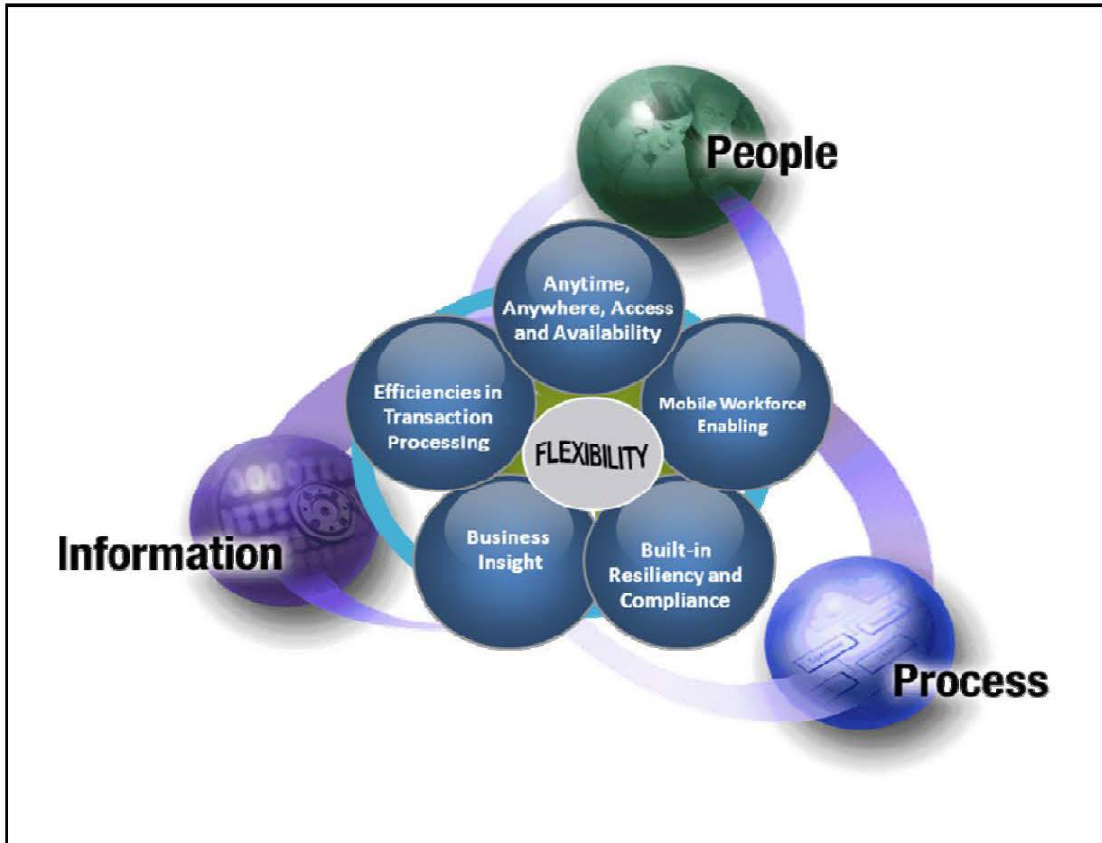
5.6.6 EXHIBITS

Exhibit 5.47 – Elements that were not outsourced

| IT leadership |
| Architecture development and evangelism |
| Business enhancement |
| Technology enhancement |
| Vendor management |
| Innovation and Intellectual property creation |
| Security and compliance |

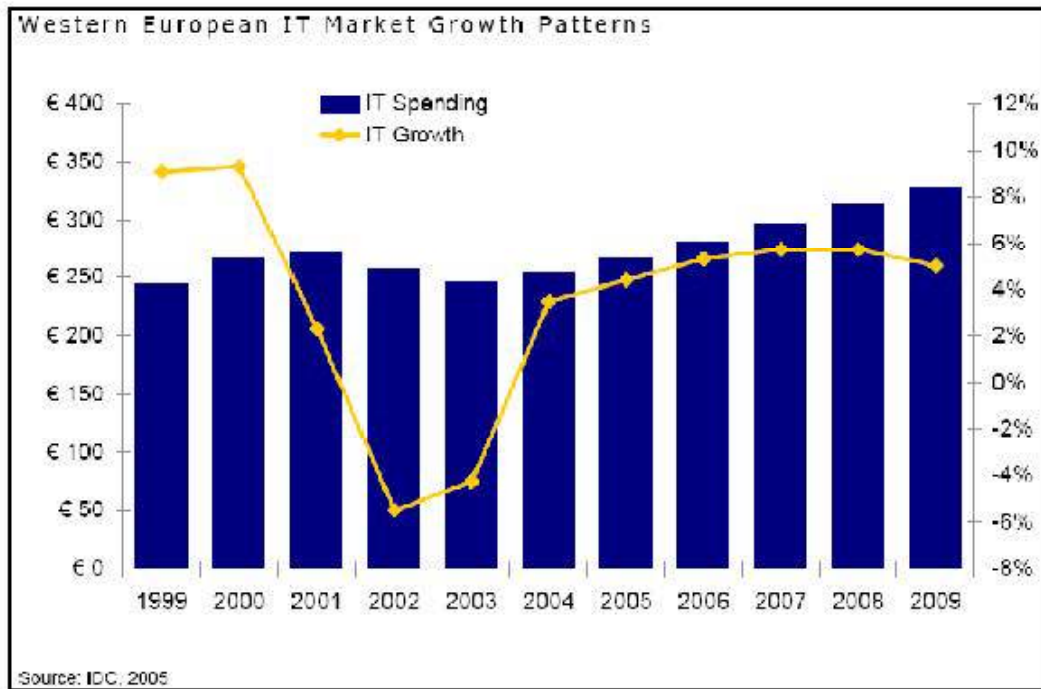Exhibit 5.48: Western Europe IT spend and growth pattern

Exhibit 5.49 – Service level improvements

Service measures	Improvement
Call answering time	48%
Email correspondence handling time	71%
Customer hand-offs	41%
Energywatch complaints (April to June)	25%

Exhibit 5.50 – Areas in which BG implemented operational efficiencies

Exhibit 5.51 – Exit Strategy of IT Continuity Plans

Service Element	Principle					
	Protect	Detect	React	Recover	Resume	Return
Element 1 - IT Continuity Reviews, audits, and health checks	✓	✓	✓	✓	✓	✓
Element 2 - Recovery and resilience strategies	✓	✓	✓	✓	✓	✓
Element 3 - Solutions design and implementation	✓	✓	✓	✓	✓	✓
Element 4 - Disaster recovery hosting	✗	✗	✗	✓	✓	✗
Element 5 - IT Continuity & recovery testing	✗	✗	✓	✓	✓	✓
Element 6 - IT Continuity training	✓	✓	✓	✓	✓	✓

Exhibit 5.52 - Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware

Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information

Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information

Spam: Unsolicited or unwanted email messages

Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable

Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders

Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site

Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations

Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers

Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data

Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized

Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

Exhibit 5.53 - Security revenues by countermeasure category
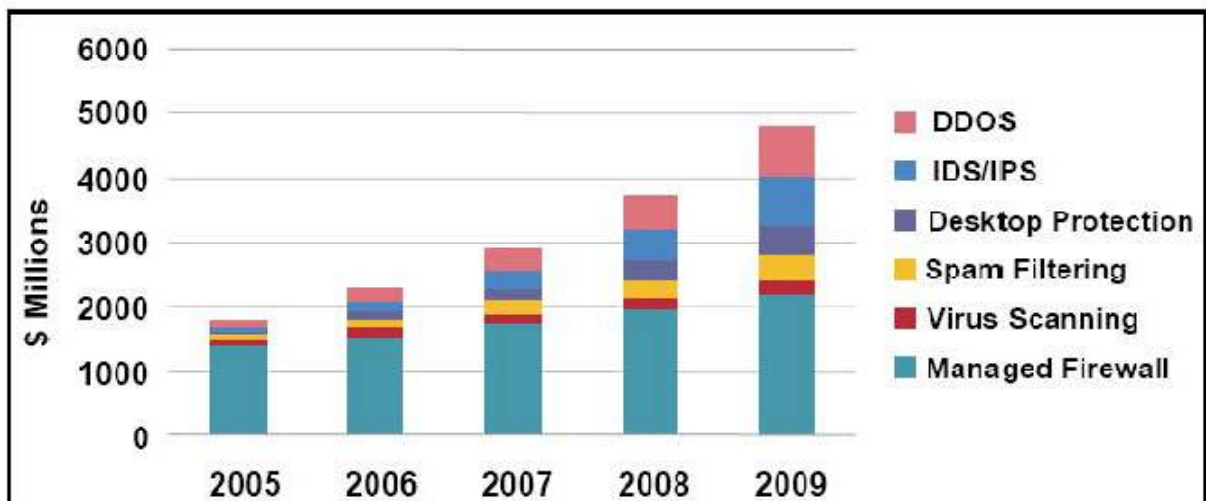
Exhibit 5.54 - Benefits from accurate data analysis
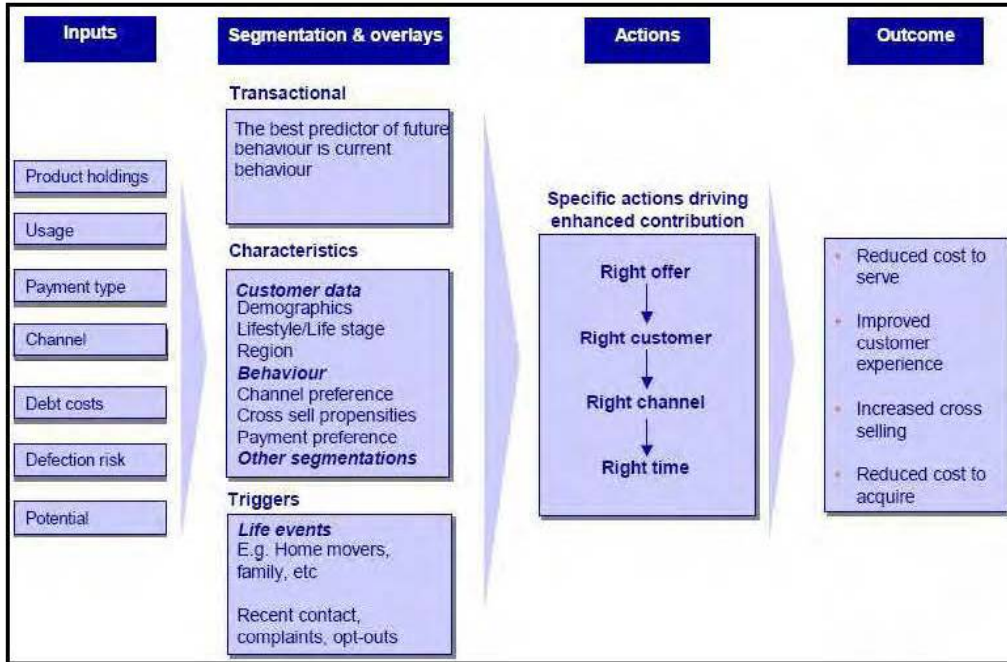
Exhibit 5.55 - Benefits from IT initiatives
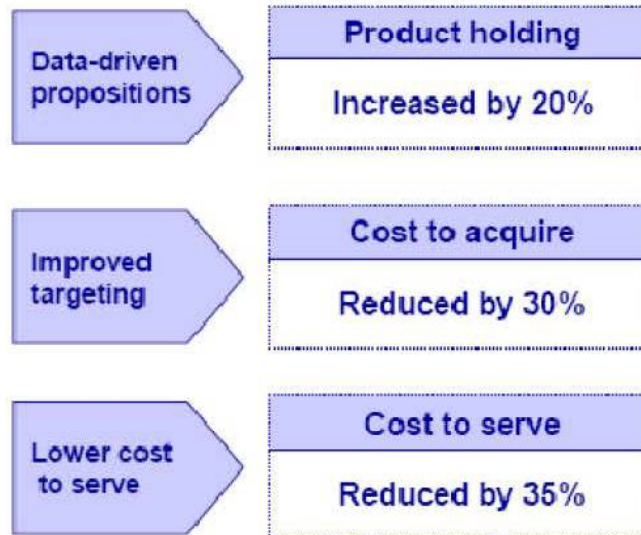
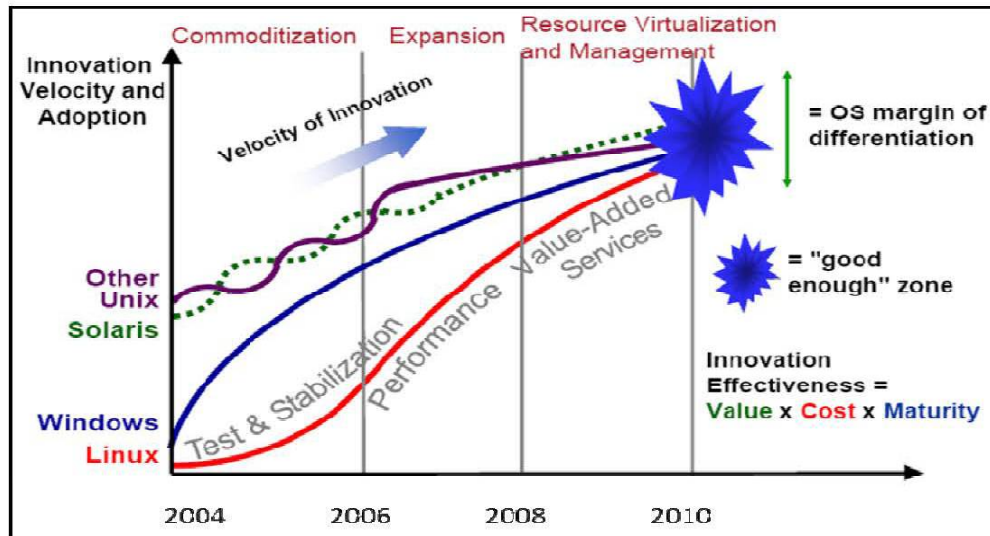Exhibit 5.56 - Cost-benefits to P&L (pre-tax) with project impact
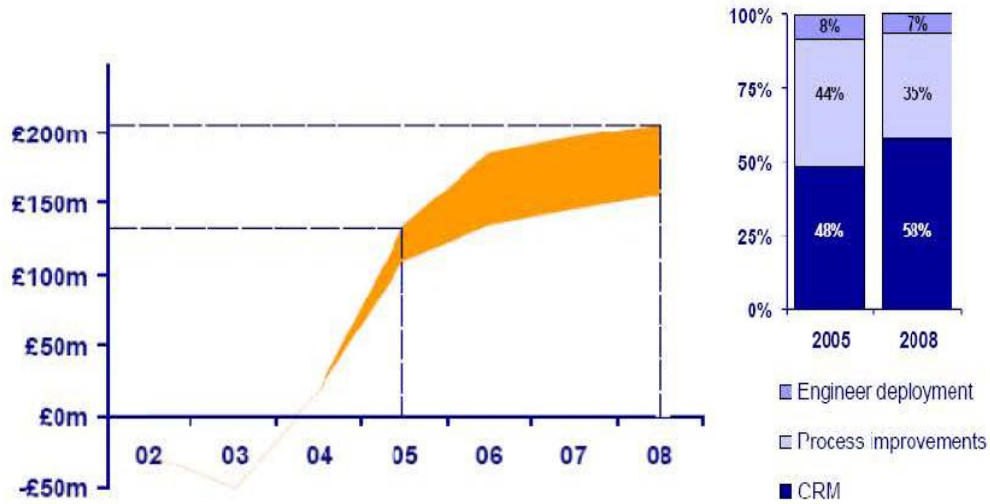
Exhibit 5.57: Operating Profit (£m) BG 2001-2006

Exhibit 5.58 - Technology maturation path

5.7 Case Analysis 5: British Petroleum (Accenture Case-2)

5.7.1 COMPANY BACKGROUND

BP plc (LSE: BP, NYSE: BP), formerly known as British Petroleum, is a British energy company / multinational oil company ("oil major") with headquarters in London, England, UK. The company is among the largest private sector energy corporations in the world, and one of the six "super-majors" (vertically integrated private sector oil exploration, natural gas, and petroleum product marketing companies). On 14 April 1909, the Anglo-Persian Oil Company (APOC) was incorporated to exploit this. In 1935, it became the Anglo-Iranian Oil Company (AIOC). The AIOC became the British Petroleum Company in 1954. From the late 1960s the company expanded beyond the Middle East to the USA (Prudhoe Bay, Alaska) and the North Sea. Both of these fields came on stream in the mid-1970s. In the mid-1970s, BP acquired Standard Oil of Ohio or Sohio, a breakoff of the former Standard Oil that broke up after anti-trust litigation. Lord Browne of Madingley, who had been on the board as managing director since 1991, was appointed group chief executive in 1995. Browne was responsible for

three major acquisitions; Amoco, ARCO and Burmah-Castrol. This turned BP into the second largest independent oil company in the world. British Petroleum merged with Amoco (formerly Standard Oil of Indiana), in December 1998, becoming BPAmoco until 2000, when it was renamed BP and adopted the tagline "Beyond Petroleum," which remains in use today. Refer Exhibit 5.59 for BP's financials 2002-2006.

5.7.2 EXISTING IT LANDSCAPE

The existing IT infrastructure in BP was a mainframe based one with a number of applications running on it performing specific functions. Further, all systems were not networked with each other thus leading to isolated islands of automation. The environment consisted of a desktop and mobile Microsoft environment and servers running a combination of AIX and other flavors of UNIX. The four companies – British Petroleum, Amoco Corporation, Atlantic Richfield (ARCO) and Burmah Castrol merged between 1998 and 2000 to form BP. The new company had more than 100,000 member staff in more than 100 countries. BP integrated these four companies onto a single Microsoft based platform as well in one of the largest deployments of Windows 2000 worldwide. Table 5.12 lists the criteria followed for selection of the consulting company.

Table 5.12: Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior oil and gas domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

## 5.7.3 RESULTS – BUSINESS TRANSFORMATION

5.7.3.1 Outsourcing

From the beginning, BP has been actively setting up new, innovative outsourcing models. The first of these was its decision to outsource its entire accounting process. In effect, BP was proposing to pass responsibility for an entire business-critical function to its consulting firm. Until then, outsourcing had been a realm defined by such things as payroll, cafeteria support and building services; never had a corporation handed off an entire business process to a third party. To allow a continued focus on core operations and competencies and to reduce costs, BP adopted a strategy to outsource non-core operations. In July 1991, 320 BP staff from six different locations transferred to Accenture's new centre in Aberdeen. While BP retained control of financial policy, Accenture assumed responsibility for all other accounting functions, including forecasting of financial performance, joint venture accounting, preparing the management information, preparing group and statutory accounts, and the processing and payment of 15,000 invoices per month. This decision had a transforming effect, not only on BP's accounting practices but on the managerial style of the company itself.

Starting in 1996 IBM was selected as the co-supplier for Accounting and Financial support for the European Refining and Marketing Business. Initially, two distinct delivery models were accepted by BP. The IBM solution required development of a regional hub supporting several countries versus a "single office by country" solution. IBM's solution delivered lower costs, and in 2000, IBM was selected as the sole supplier for the BP European and Marketing business operating in 10 Countries. In 1999, BP selected IBM for a 10 year outsourcing contract for Accounting and Financial Support and SAP support of BP's North American upstream business processes, Gas and Power and some Corporate functions. Over 1500 people were initially transitioned from BP to IBM. IBM currently supports 20 financial process areas in the Americas. This relationship was recently extended through 2013.

Since 1996, the IBM services scope has evolved, adapting to BP's business model which has grown from a geographic to a global model. Over 1600 people currently support the scope in a three tier delivery model. Through initiatives such as global sourcing and process re-engineering, IBM has increased quality while reducing BP's costs. Process standardization,

common systems platforms, and global resourcing have enabled BP to aggressively pursue their Global Financial Infrastructure (GFI) framework strategy as well as geographic Centers of Excellence (CoE).

Diagram 5.38: Core competencies and outsourcing
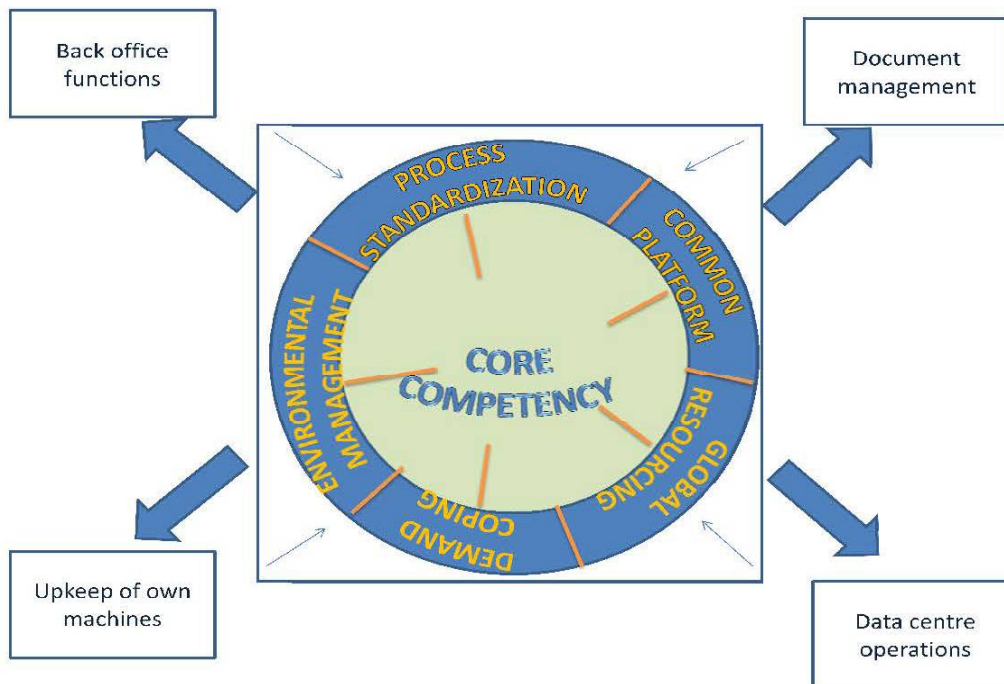
As far as IT outsourcing went, BP outsourced IT in 3 phases. The first of these phases covered data centre management, telecommunications, maintenance, and systems development. It was intended to cover all BP Exploration (BPX) offices around the globe, in eight major sites and 42 businesses. BPX contracted with an alliance of three suppliers. The project included a global agreement to cover the general principles and objectives of the outsourcing arrangement, which each party signed, and site-specific contracts to cover specific deliverables. A major objective of the framework was to ensure that the suppliers would act as a single "virtual supplier." Seamless service was a priority. In spite of each contractor's area of expertise, for each of the company's major business sites, one supplier would serve as the primary contractor and coordinate the services provided by the other two.

The second phase took place in June 1992 when the BP Corporate Center (BPCC) undertook the complete outsourcing of its data center management and of its telecommunications. The

implementation of this strategy took nine months and involved negotiations with three suppliers: two for site services and one for WAN services. The outsourcing agreement also covered some computing for each of BP's business groups. But unlike the BPX project, the BPCC project did not cover application development and support. This phase ended up with mostly a facilities management relationship, which is fairly common in IT outsourcing.

A very unique proposition that BP came up with in 2006 was to outsource the maintenance of employee equipment to the company itself instead of using BP's IT support function. This was a very innovative model and an industry first. According to this plan, BP gave some employees an allowance to buy their own IT equipment and take care of their own support needs. Access to the scheme was tightly controlled during the pilot and those employees that participated had to demonstrate a certain level of IT proficiency. BP provided the employee with the current and licensed versions of Microsoft Windows and Microsoft Office, and still provided IT support for corporate applications like SAP, but left the rest to the employee. The core competencies of the company is shown in the diagram 5.38 above depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced. Exhibit 5.60 lists the elements that were not outsourced

5.7.3.2 Effect of business cycles

In 1992-93, BP faced a major crisis. The company experienced its first losses in its eighty-year history, while morale was battered by downsizing and organizational upheaval. BP had built its exploration and support activities in the North Sea in a market where the price of oil was $25 per barrel. From the beginning, the North Sea had been among the costliest places in the world to drill for oil; production costs had tripled since 1980. The sudden drop in the oil price to around $10 per barrel in the mid to late 1980s made North Sea oil even more expensive, undercutting the viability of BP's production. The cost structure of the business had to change, and change radically. Diagram 5.39 below shows the relation of business cycles and BP's activities.

Diagram 5.39 – Link between economic cycle and BP's business cycle
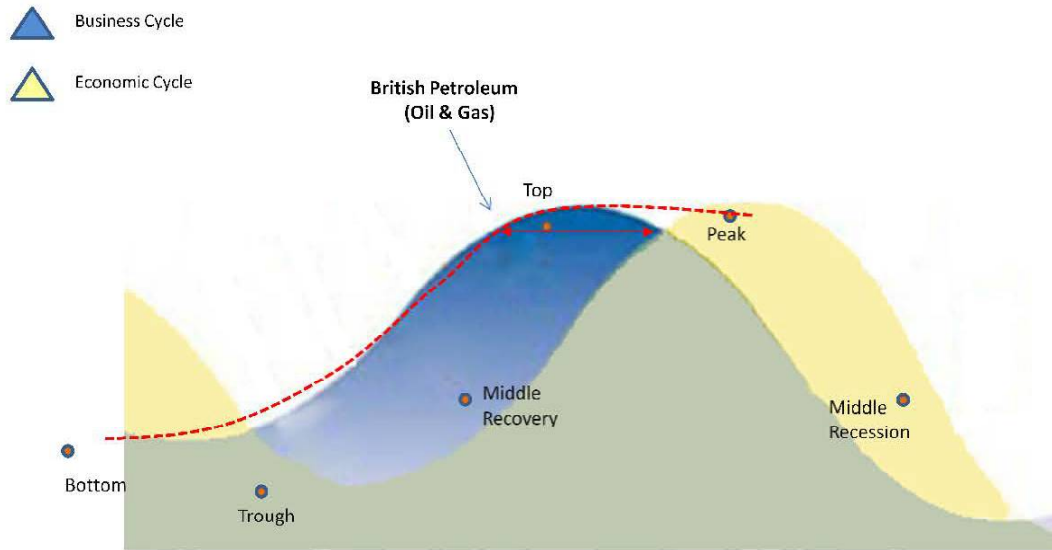
As shown in Diagram 5.40, if one maps a company into a 2x2 matrix with core activities and core assets as the two axes, and threatened and not threatened as the two parameters for each axis, BP would fall into the category where core assets are constantly being redeveloped.

Diagram 5.40 - BP's Growth Trajectory
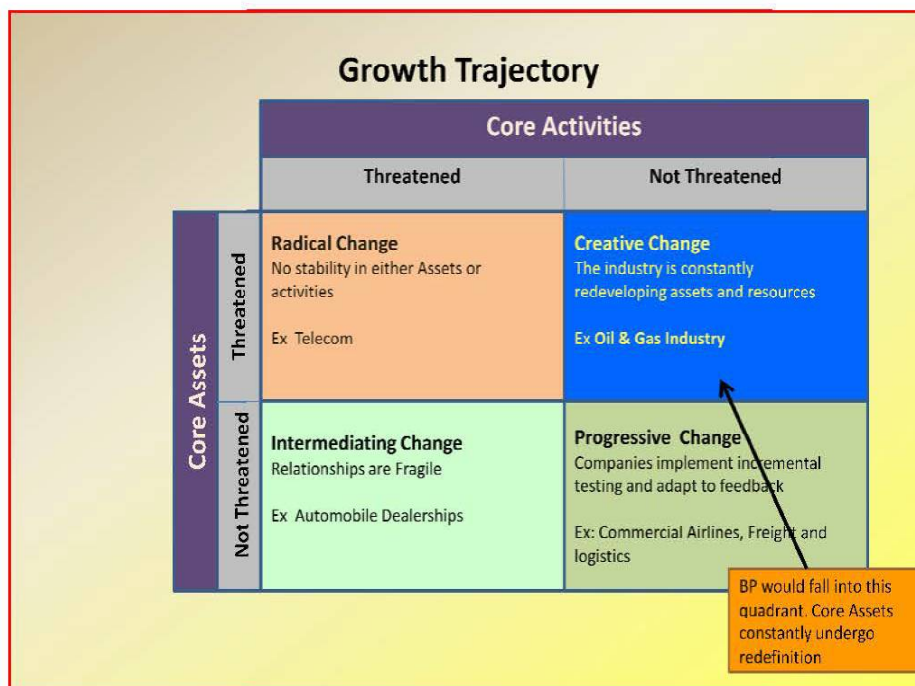
This redefinition happens in repackaging assets. In the upstream sector, Oil rigs are transformed to digital oil platforms enabling remote management of key areas, enhancing employee safety, achieve cost reductions and avoid total closure during natural calamities due to the remote manageability. Further, traditional oil recovery is being redefined as enhanced and optimized oil recovery through techniques like 3D and 4D seismic exploration, horizontal drilling, and de-carbonized fossil fuels. In the mid and downstream sectors, there is an explosion of data both in terms of quantum and data types that needs to be managed. At the same time, safety, security and disaster recovery are important considerations. BP managed this data through enterprise systems like SAP. Simultaneously it managed the content on its corporate website as well as other sites through content and portal management systems. This was further automated using workflow automation systems, and finally, these downstream data management systems were integrated with the upstream controlling systems using EAI applications like Seebeyond. The ultimate aim of these was to keep BP agile and responsive.

Diagram 5.41 - BP's Challenges at the corporate level
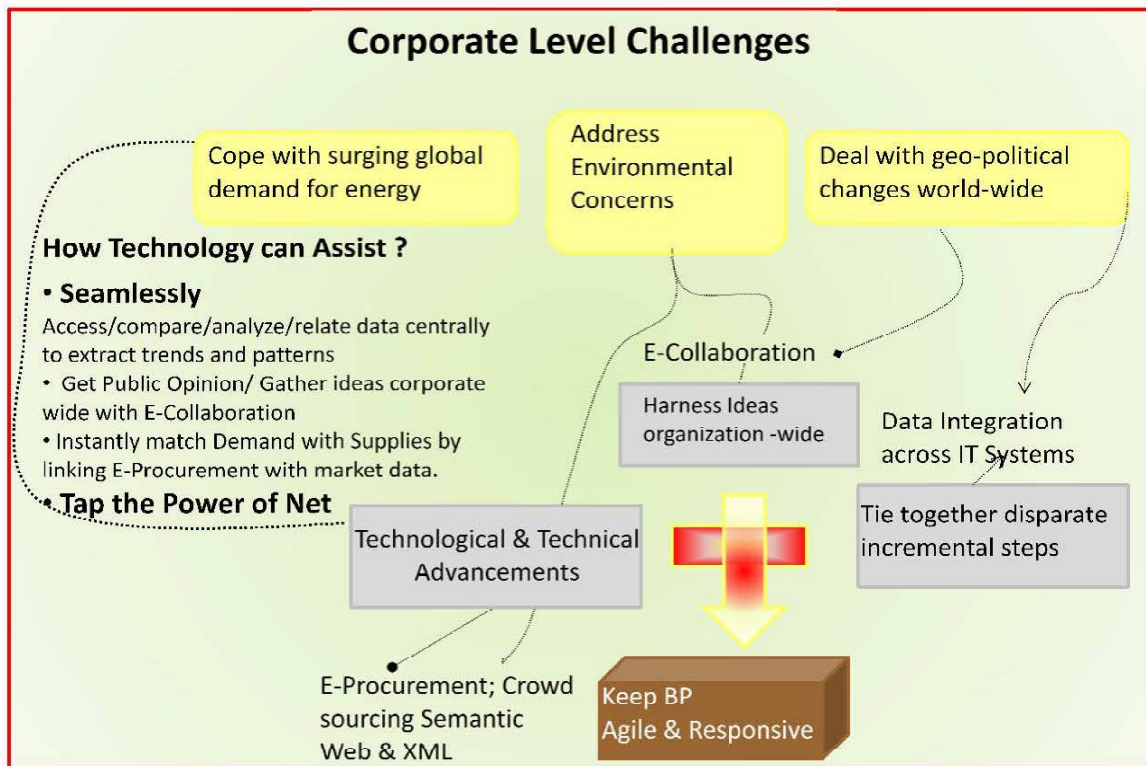
As illustrated in the above diagram 5.41, there were a number of corporate challenges faced by BP. To meet these challenges, BP adopted a layered approach. At the bottom of this were the core operational processes supported by infrastructure and base applications. These operational processes gave their outputs to management processes. Together, these covered processes at the firm level. Subsequently, E-procurement, E-collaboration and data integration took center stage as enablers.

E-procurement enabled quick communication of demand trends across BP's supply chain. For example, the system could send alerts to oil rigs to boost production in response to anticipated increase in demand. At the same time, by reducing inventory carrying costs, and minimizing ordering costs, BP was able to control overheads as well as total spending. Further, this was clubbed by a simplification of the whole procurement process and instant availability of relevant information to concerned parties that further streamlined the process.

In terms of E-collaboration, it became possible to make more informed decisions through the ability to make more accurate demand / supply predictions, as well as drawing upon a knowledge bank that was enabled by business continuity planning. This also enabled employees to find information in response to challenges by using the storehouse of organizational knowledge contained in the system. Additionally, it became possible to focus on and implement new ideas coming from within the organization thus leading to more consistent, less complex information management practices.

Last but not least, in terms of integration across functions, the technology initiatives enabled a 'zero-latency' enterprise through which it became possible to have round the clock operations in retail, as well as respond quickly to environmental changes without too many overheads. Additionally, the system was built on a scalable platform with the possibility of newer systems plugging into the existing EAI architecture. An illustration of this is given in the diagram 5.42. Refer Exhibit 5.61 for the Western Europe IT spend and growth pattern.

Diagram 5.42 - Technologies deployed in BP
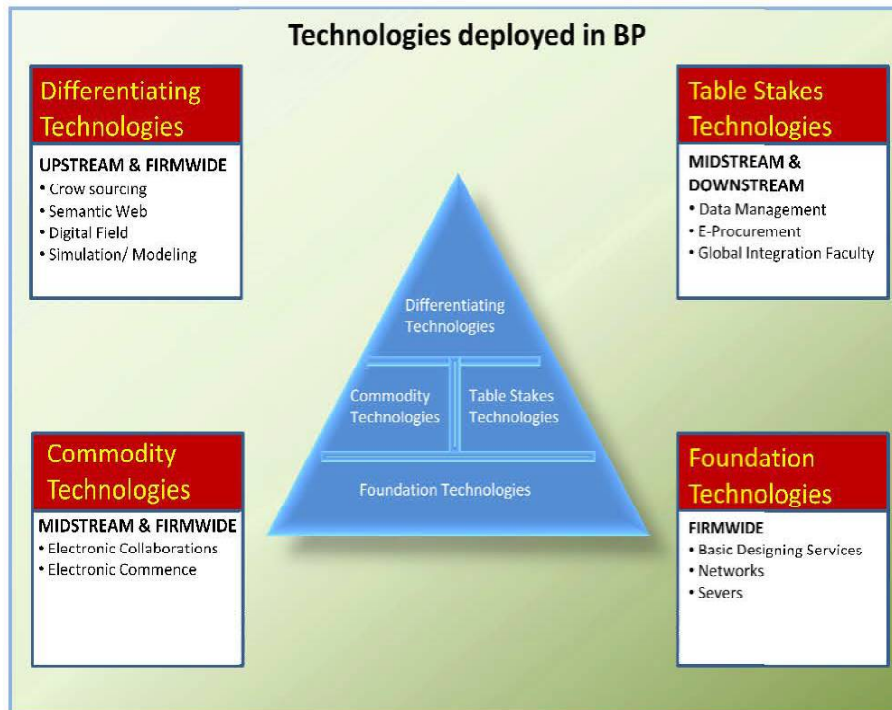

5.7.3.3 Transactional ability

In 1996, BP Oil/Mobil was formed from a joint venture between the European subsidiaries of BP Oil and Mobil and is now part of the energy and petrochemicals giant BP Amoco. BP across all its divisions implemented the SAP CRM solution to tie together all sales, service and marketing functions in one application. The database manages all market and customer information and delivers a systematic management framework for customer and prospect relationships. Thanks to the sophisticated data replication, all sales employees have fingertip access to customer data, and receive up-to-date information about the activities of the different sales units and business areas.

Accenture worked with BP on a ZigBee (consolidating the functions of the radio, networking, sensing and processing components into a single chip) based sensor network to look after its rail cars. This network will keep track of a car's whereabouts with GPS, the sensors monitor a car's temperature, weight and whether it has been hit or impacted. These devices also enable refinery monitoring – in terms of the location of 3,000 workers at BP's Cherry Point oil

refinery in Washington. The Active RFID tags are highly essential in the oil refinery as they inform whether the workers are in the safe zone or not. The devices also do seismic monitoring in the undersea oilfields. Diagram 5.43 below shows the stages of transactional efficiency.

When faced with Hurricane Katrina in August 2005, facilities and 1,500 employees in its Gulf of Mexico Strategic Performance Unit, BP had to manage eight deep-water oil production and drilling platforms that fed thousands of miles of pipelines and more than 100 fuel terminals and offices. When Hurricane Katrina struck, BP needed quick access to accurate storm information and a complete understanding of its people and facilities process, that till that time was managed with paper charts and pushpins that represented storm paths and employee locations. To obtain additional data, the BP crisis team would spend three or four hours pulling data manually from up to 20 databases and Web-based sources. This process was changed by using 3-D satellite imagery of Microsoft Virtual Earth mapping software and real-time weather data with a visual, real-life representation of both BP's people and facilities. In addition to Microsoft's mapping software, the solution used SQL Server 2005 database and the SharePoint Portal Server 2003. The system contained symbols that represented BP's people and assets on a real-time basis that equipped them to respond crisis situations within minutes.

Diagram 5.43 - Stages of transactional efficiency
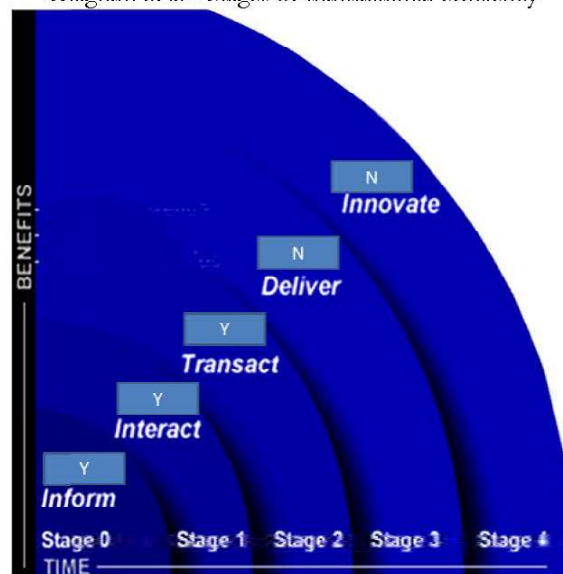
Another facet of initiatives was knowledge management. BP had very clear thoughts on this. They believed that they had to learn better than their competitors and apply that knowledge throughout their businesses faster and more widely than they were doing. Anyone in the organization who was not directly accountable for making a profit should be involved in creating and distributing knowledge that the company could use to make a profit. BP deployed a KM platform on their intranet in the form of a simple framework, which described a learning cycle – before, during and after any event – supported by simple process tools. The lessons from that learning loop were agreed upon by peers across the organization, who had a stake in defining best practices for BP. Finally, the lessons – both specific and generic were incorporated as "Knowledge Assets" on the corporate intranet, where they represent a living focus for BP's experience around strategic and operational areas.

BP also put in substantial work on its portal in conjunction with Accenture. Using the resource description framework and XML, they are working on the next generation of search using semantics – for example, the website would be able to answer the question "can I place an electronic order for BP's products so that I get delivery from the nearest retail shop within 50 km of my location that can be delivered within 72 hours to my home between 2pm and 5pm on working days?"

BP also improved its internal training and saved on delivery costs through E-learning – which Accenture helped it to achieve. BP invited Accenture to assist in the creation of the Digital Skills training program, branded WebLearn, and the development of an eLearning capability for the organization. Through the program BP, employees learned how to access and use the Web as well as communicate in the Web environment. Benefits were apparent. Savings were realized through reductions in the cost of training delivery: eLearning delivers substantial cost savings in terms of trainers, materials, travel and accommodation. Productivity gains were realized through the delivery of the early eLearning programs resulting from the reduced errors, reduced time spent in training, and improved performance. Most important in terms of progress towards the overall vision of a web-based organization, BP has implemented a number of eLearning programs to support the deployment of critical business improvement initiatives. The use of eLearning as a delivery channel has reduced the time to gain competence

of the employees in these areas by 30 - 50%. Refer Exhibit 5.62 for depiction of areas in which British Petroleum implemented operational efficiencies.

5.7.3.4 Impact on workers

BP believed that IT was the key to creating a global organization and delivering higher productivity. As the first step, the IT function in BP underwent changes in 1989. These changes are indicated in Table 5.13.

Table 5.13 - IT changes 1989-1995

	1989	1992	1995
IT Budget	$360m	$170m	$132m
IT Headcount	1400	390	150
IT Applications	170	110	75
% desktop coverage	20%	85%	99%

The changes led to a savings of $460m without any apparent loss of value or functionality. In addition, the role of the personnel also transformed. Refer Table 5.14 for transformations in employee roles.

Table 5.14 – Transformation in employee roles

FROM	TO
Systems Provider	Infrastructure Planner
Monopoly Supplier	Mixed Sourcing
Business Standards	Industry Standards
Decentralized Bias	Centralized Topsight
Systems Analysts	Business Consultants
Craftsman	Project Managers
Large Function	Lean Teams

The most striking transformation, however, was a paradigm shift in the IT function moving from being a system provider to an infrastructure planner. The staff role was to architect, plan and oversee the IT infrastructure – and amalgamate this with business requirements. This resulted in an increase in business acumen – wherein each employee needed to know the business.

Diagram 5.44 - Impact on workers due to technology.

A unique business entity called the Business Transformation Group was created by Accenture and BP to aid the transformation process. Both partners knew that, as business grew, the company would experience waves of change that could hinder the company's ability to sustain high performance if not managed properly. Furthermore, Accenture research showed that high performers excelled in building the skills and aptitude to adapt rapidly to change. Therefore, together, Accenture and BP developed the Business Transformation Group as a way to institutionalize large-scale capabilities and provide BP Angola with ongoing management of change initiatives—whether driven by the company's strategic goals or launched in response to market conditions.

The CRM implementation led to the external sales force being enabled with the latest data on customers, contact persons and sales figures without the need for time consuming queries – thereby empowering proactive fulfillment of customer and prospect needs. In addition, state of the art calendar functionality helped the sales force to better manage their daily schedules and plan new activities thereby improving employee productivity thus leading to an implicit cost saving. The system also enabled direct access to the customer database, solidifying productivity gains in the service, telesales and telemarketing staff in call centers, who could assess customer's situations or actively generate leads at the touch of a button. This produced top line increases for the company.

As the capture of knowledge became a mainstream activity in BP, new roles emerged in the organization business units – the role of "knowledge managers", who proactively sought out and codified lessons and better practices from their parts of the company, whilst simultaneously acting as catalysts and local champions for knowledge management within their business unit. Diagram 5.44 above depicts the impact on workers due to technology.

5.7.3.5 Security

BP, aided by Accenture has implemented a set of best practices linking physical security to IT security across the company, checking, for example, if someone is logged on to their workstation against whether they are physically in the building. This allows it to manage security threats that begin in one part of the business but could go on to affect another area. This is especially important, since being a company with a global network; they are vulnerable to attacks on multiple fronts. For example, physical attacks such as planting explosives at an oil pipe would require criminals to first steal pipeline blueprints stored on information networks. Conversely, if a worm infiltrated the network connections and was used to supply traders with incorrect or manipulated information on the quality of oil the damage to the company could be catastrophic. In fact, to reduce this threat perception and risk, BP took special measures for its mobile workforce. This risk perception is very real as the sophistication and personalization of targeted attacks against global companies and government networks is increasing.

Diagram 5.45 – Security adoption driving forces

Diagram 5.45 above shows the Security adoption driving forces. Because of its size and nature of users, a lot of which were mobile, (though BP was faced by the usual security concerns,) they came up with a novel way of combating threats from mobile workers laptops. They put their laptops directly on the internet instead of on their corporate network. Effectively, they built 3 zones of security – a restricted zone for the backend databases and application servers,

a protected business zone where transaction security was paramount, and an outer zone allowing access to the internet. By doing this they re-defined their boundaries going beyond where other companies normally go – in terms of perimeter defense. Their reasoning behind this was that a user hiding behind a firewall simply created a false sense of security, which not only did not protect the user, but also posed a serious threat to the network as the user may have unknowingly installed a malware on his laptop. Therefore most of its 85,000 laptops are connected straight to the internet, even when they are in an official location. Instead, users are given training on issues like patch management and computer security to equip them with the tools to make their laptops capable of coping with the worst security threats that malicious hackers can create, without relying on a network firewall. This is tantamount to a new model – the 'de-perimeterisation' of security. This makes BP a flag-bearer for the security industry to help companies adopt products to secure every part of their networks rather than just the points that face the outside world. Refer Exhibit 5.63 for the top security risks and vulnerabilities and refer Exhibit 5.64 for trends in these countermeasures.

5.7.4 TRENDS

5.7.4.1 Cost performance structures

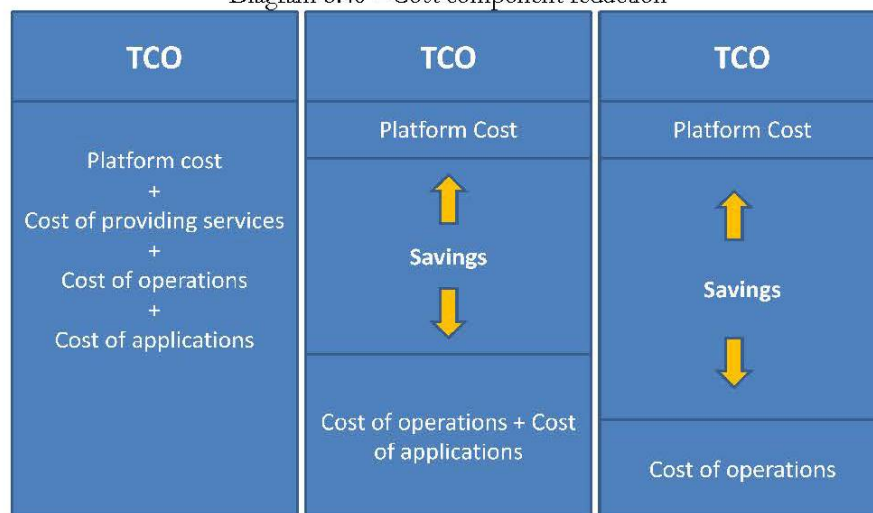BP had a 4 point agenda that was integral to its business plan.

- Grow production 4% p.a. till 2010

- Control cost increases below inflation

- Maintain capital discipline (approx increase $0.5b p.a)

- Divest $3b per year on an average

For the BP business which had almost doubled in size in the North Sea, the Accenture Finance and Accounting outsourcing service model achieved a better than 50 percent reduction in costs. Further, the outsourcing of the SAP application maintenance saved 45% in terms of cost.

BP business managers attributed around $260 million of added value as a direct result of using and applying KM. Similar examples of increased performance have come from the KM application in speeding up refinery turnarounds, developing new oil and gas fields, business restructuring, improving polyethylene plant reliability and accelerating new retail market entry.

Also to counter the undesirable consequences (artificially inflated quotes given by the service provider) of cost escalation involved in the IT outsourcing, the contract focused on precise cost targets. A reduction of costs was the principal objective of the operation. Cost reductions thus superseded all other outsourcing goals and became immediately the suppliers' primary concern.

Diagram 5.46 – Cost component reduction

TCO	TCO	TCO
Platform cost + Cost of providing services + Cost of operations + Cost of applications	Platform Cost — Savings — Cost of operations + Cost of applications	Platform Cost — Savings — Cost of operations

Some incentives were also provided to suppliers to find ways to further reduce costs. And, as in the BPX contract, the BPCC strategy involved dealing with a consortium of suppliers, thus putting each in competition with the others, and alleviating the measurement problems by introducing a form of benchmarking. This resulted in cost control. Diagram 5.46 above shows the Cost component reduction.

The upgrading of desktop OS licenses – though was a substantial expense, yet was treated as an investment. BP estimated that even if employee productivity increased by 2 hours per week, the cost would be recovered within less than 12 months; for, the new platform was more stable than previous working environments, so there were fewer reboots. Additionally, the

platform provided a more flexible mobile working environment to the users. To facilitate this, BP increased the number of home PCs enabled for network access from 2,500 to 10,000. They estimated that more flexible working results in productivity gains of up to four additional ours per person each week. Furthermore, the new platform, due to unification, reduced operating costs by approximately 10 percent for providing services over the full lifetime cost of the service, including support, desk-side maintenance, server systems, and employee movements within the organization.

The CRM system's central information platform enabled sales management and office-based sales employees to access detailed information and analyses for planning, forecasts, and campaigns. Furthermore, they could tap the benefits of campaign management functionality for mailing campaigns, as well as questionnaire/survey management tools for market research.

5.7.4.2 Architecture, business continuity and enterprise management

Traditionally, BP was a mish-mash of mainframe applications. These migrated to client-server architecture in the late 1980s and finally to web-centric technologies in the late 1990s. In 1996 British Petroleum embarked upon a $200-million project to create a common desktop for every user worldwide. The common operating environment was designed to support communication and sharing of knowledge on a global basis. It consisted of Microsoft Windows 95, Office 95, Internet Explorer, Exchange, Windows NT Server, and a range of legacy systems. This successful project helped BP to become an agile learning organization. In January 1999, following the merger with Amoco, BP was faced with the problem of integrating 25,000 new users, most of whom used the Windows 98 operating system. The pragmatic strategic decision was made to move Amoco users onto BP's Windows 95-based common operating environment in order to accelerate rapidly the corporate integration process. One of the advantages was that BP's common operating environment enabled users to be mobile. Work on deploying 25,000 seats and associated servers, along with Microsoft BackOffice-based servers, started in May 1999. BP was conscious that support for the Windows 95 platform, which was already three or four years old out of a Microsoft product lifecycle of 5 years was short-lived. Being unable to adequately accommodate the growing portfolio of electronic business applications that it wanted to use, BP was unable to accommodate its digital business strategies. Users were also having problems interacting with the outside

companies that were using different computer platforms, resulting in problems with sharing information. The options for change were Windows 98, the emerging Windows 2000 environment, or a thin client architecture. In 2001, the company upgraded and unified all its desktops and endpoint computing hosts to a Windows 2000 platform – including servers. 60,000 users were migrated at a cost of several hundred million dollars.

Table 5.15 – Technologies deployed in BP

Technology	Product
Operating system	Windows
Database	ORACLE
Enterprise Application Suite	SAP
Modules	Offshore Logistics Financials (FI) Materials Management (MM) Project System (PS) Maintenance and Repair (MRO) CRM ORACLE Real Application Clusters Share point portal Virtual Earth WebLearn Knowledge Management TIBCO EAI VmWare

In 2001, BP also standardized on TIBCO Software's Enterprise Application Integration (EAI), portal and business–to–business (B2B) integration software to develop and deploy common business practices, seek synergies between the energy trading and supply businesses. In doing so, BP's primary aim was to maximize the amount of business that could be undertaken by its trading and supply businesses through optimizing the efficiency of their most valuable asset: the traders themselves. This was achieved through improved process automation, streamlined trading and risk management processes and decision support provisioning. All of this was made possible by TIBCO's real–time infrastructure software and its accumulation of intellectual capital and best practices.

Diagram 5.47 – Business Continuity Planning

BP then moved towards thin client computing – especially for remote off-shore rigs. This was followed by a VmWare virtualization 'computer in a box' deployment to reduce remote downtime in the event of communications systems failure for off-site locations.

All these solutions are managed by a Tivoli integrated solution. Specifically, the components used are: The updated software components include the IBM Tivoli Access Manager family, IBM Tivoli Identity Manager, IBM Tivoli Privacy, Manager, IBM Tivoli Directory Integrator, and IBM Tivoli Directory Server. Using this software to automate processes reduces cost. BP reduced, for example, the time it took to provision a new user down from five days to 10 minutes. This is done with the dynamic rules engine enhancement found in Tivoli Access Manager. Diagram 5.47 above shows Business Continuity Planning. Refer Exhibit 5.65 for a technology maturation path of operating environments available at the time.

5.7.4.3 Enterprise Integration

BP is one of the best examples of Enterprise integration as it successfully is moving towards full integration across its entire value chain through its IT initiatives. It successfully achieved integration of processes across organizational and functional boundaries to provide competitive advantage. This was achieved through extensive application of IT in the correct manner. End-to-end process integration happened effectively. Organization-wide there was an

integration of people, processes and information. Diagram 5.48 below shows the major effects of Enterprise Integration

Diagram 5.48 – Major effects of Enterprise Integration
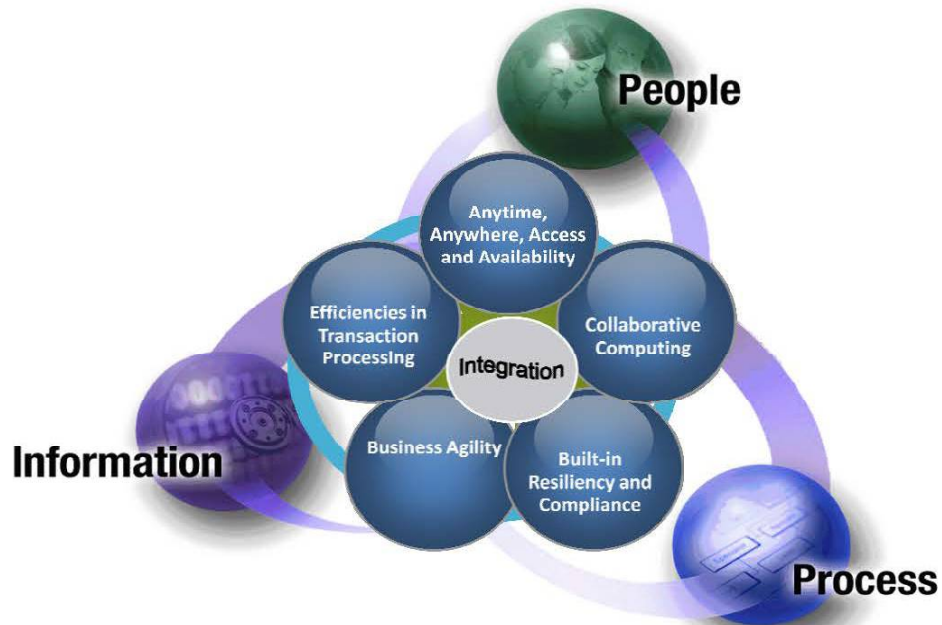
5.7.5 EXHIBITS

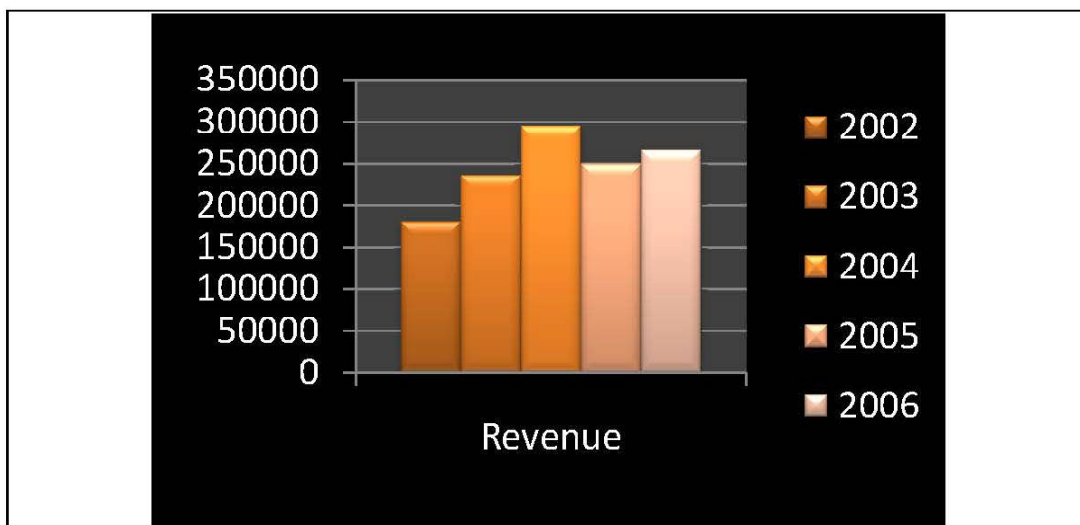Exhibit 5.59 - BP's financials 2002-2006.(in USD million)

Exhibit 5.60 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

Exhibit 5.61 - Western Europe IT spend and growth pattern.

Western European IT Market Growth Patterns
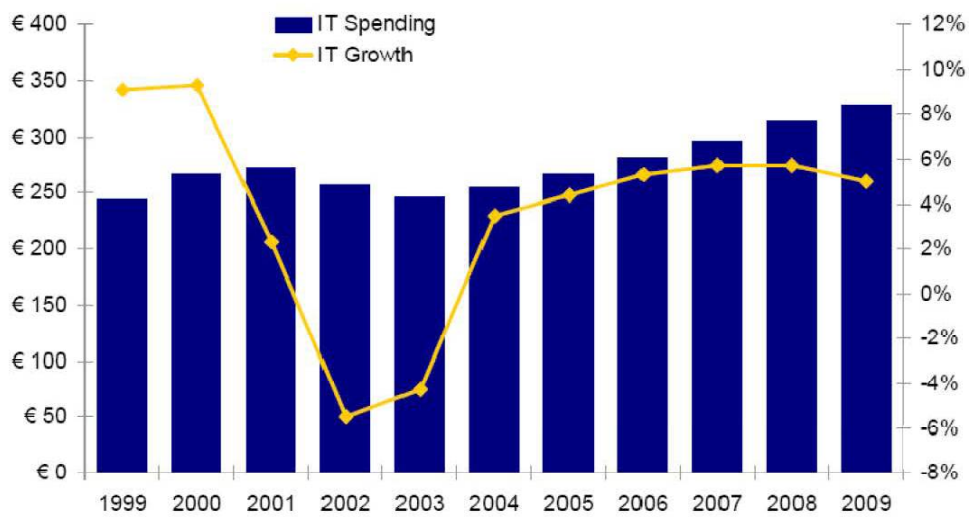
Source: IDC, 2005

Exhibit 5.62 – Areas in which BP implemented operational efficiencies

Exhibit 5.63 - Top security risks and vulnerabilities

| |
|---|
| **Malware:** Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware |
| **Phishing:** Impersonation of the organization through email or electronic means in an attempt to obtain confidential information |
| **Pharming:** Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information |
| **Spam:** Unsolicited or unwanted email messages |
| **Denial-of-service:** Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable |
| **Unauthorized access by outsiders:** Unauthorized access or use of systems or the network by outsiders |
| **Vandalism/sabotage:** Defacement, destruction, or other damage to the organization's systems, network, or Web site |
| **Extortion:** Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations |
| **Fraudulent transactions:** Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers |
| **Physical loss:** Physical loss or theft of computer, storage media, or other devices and any associated data |
| **Unauthorized access by insiders:** Successful access by insiders to system functions or information for which they are not authorized |
| **Insider misuse:** Violation of the organization's policies regarding acceptable use of computing/network resources |

Exhibit 5.64 - Security revenues by countermeasure category.
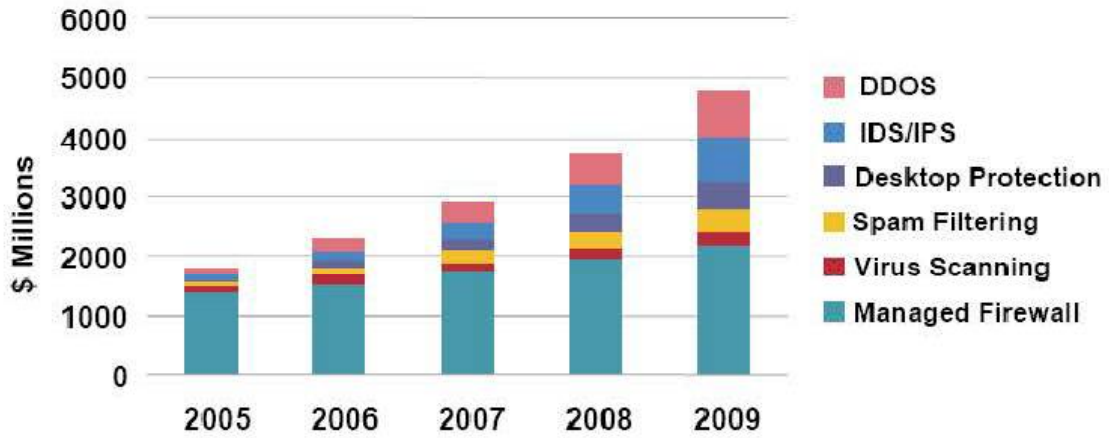
Exhibit 5.65 - Technology maturation path
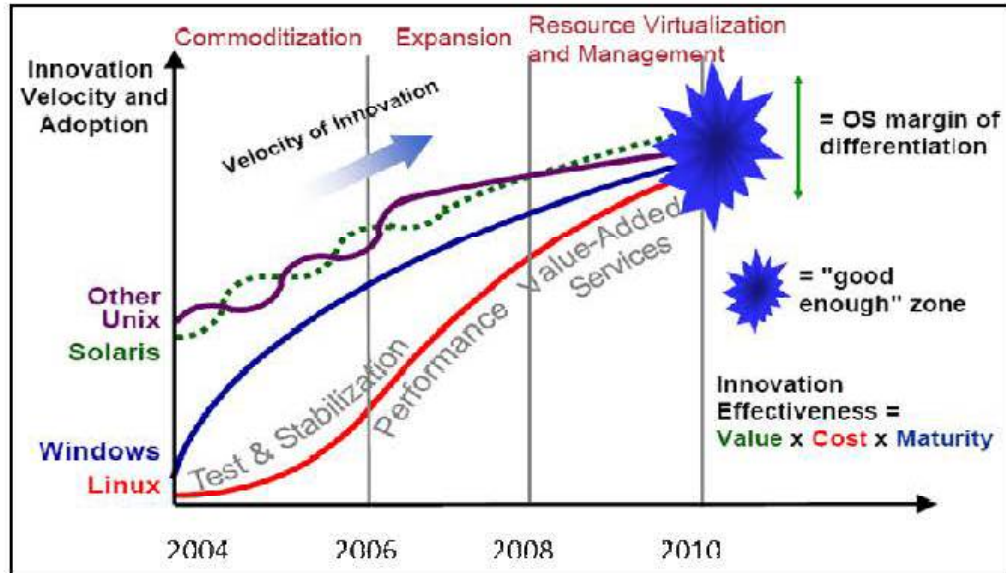
5.8 Case Analysis 6: PetroBras (Accenture Case-3)

5.8.1 COMPANY BACKGROUND

Petrobras, short for Petróleo Brasileiro S.A., is semi-public Brazilian oil company headquartered in Rio de Janeiro. The company was founded in 1953 due to the efforts mainly of the Brazilian President Getúlio Vargas. While the company ceased to be Brazil's oil monopoly in 1997, it remains a significant oil producer, with output of more than 2 million Barrel (unit) of oil equivalent per day, as well as a major distributor of oil products. The company also owns oil refineries and oil tankers. Petrobras is among the world's leaders in the development of advanced technology from deepwater and ultra-deep water oil production.

Petrobras controls significant oil and power assets, as well as related business activities, outside of Brazil in 18 nations in Africa, North America, South America, Europe and Asia. 55.7% of Petrobras' common shares (with vote right) is owned by the Brazilian government, however privately held portions are traded on Bovespa, where it is part of the Ibovespa index. In November, 2007, Petrobras discovered the potentially largest oil and natural gas field in the world, off the coast of Rio de Janeiro. The Tupi oil field, in the Basin of Santos, is estimated to have a volume of approximately 5 billion to 8 billion barrels. Should these estimates prove to be correct, Tupi would be the world's largest new oil source since Kashagan in Kazakhstan in 2000. This would raise the country's reserves by 62 per cent and put Tupi on par with Norway's 8.5bn barrels of proven oil reserves. The Financial Times listed Petrobras as one of the world's 50 largest companies in 2007. Refer Exhibit 5.66 for the company's financials.

In this context, globalization has put paid to the kind of regional legislation that gave a small number of oil producers' exclusive rights to supply specific markets. Already, the multinational oil companies are encroaching on Petrobras' former "territory", and the next year will see the pressure mount as further deregulation takes effect. High time then for the Brazilian oil company to take action to defend its corner.

5.8.2 EXISTING IT LANDSCAPE

The company had over 1,000 legacy custom developed applications supporting its operations. While these were fairly well developed, there was a clear requirement to shift these myriad business applications onto a common platform to support integrated processes and integration of functions. Over time, the applications had undergone a number of functional patches resulting in inconsistent and redundant data, as well as information deficits and a lack of overall view of the organization. In 1999, the company began looking at a complete overhaul of its business setup, including its processes, underlying technology, and employees. The resulting plan was to implement SAP R/3 in five business units: oil production (upstream), processing/refining (downstream), distribution, gas and energy transportation, and international activities. Accenture was selected as the partner for this activity.

Table 5.16 – Criteria for selection of consulting company

| |
|---|
| Expertise on a variety of vendor systems and environments |
| Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support |
| Prior oil & gas domain experience |
| Ability to bring business practices used by the most successful companies to the table |
| Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements |
| A past record of delivering value to clients with on-time and on-budget projects |

5.8.3 RESULTS – BUSINESS TRANSFORMATION

5.8.3.1 Outsourcing

Petrobras outsourced its Application development and maintenance to Accenture as well as some of its processes in a business process outsourcing exercise. Additionally, it also outsourced its facilities management. Thus, a lot of IT activities were outsourced. However, control of the IT function was not given up. Areas that were not outsourced are given in Exhibit 5.67. The core competencies of the company is shown in the diagram 5.49 below depicting that the company consolidated around its core competencies (depicted by the inward
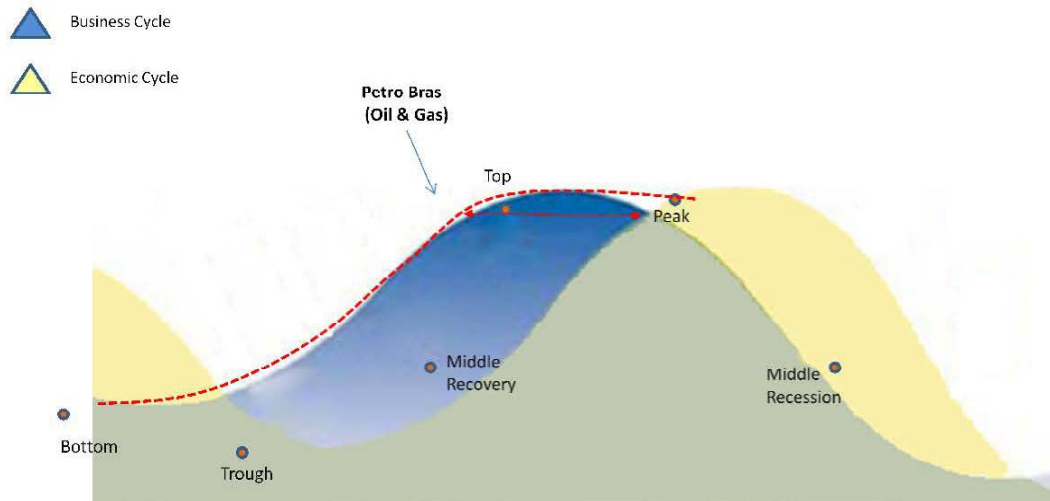
pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced.

Diagram 5.49: Core competencies and outsourcing
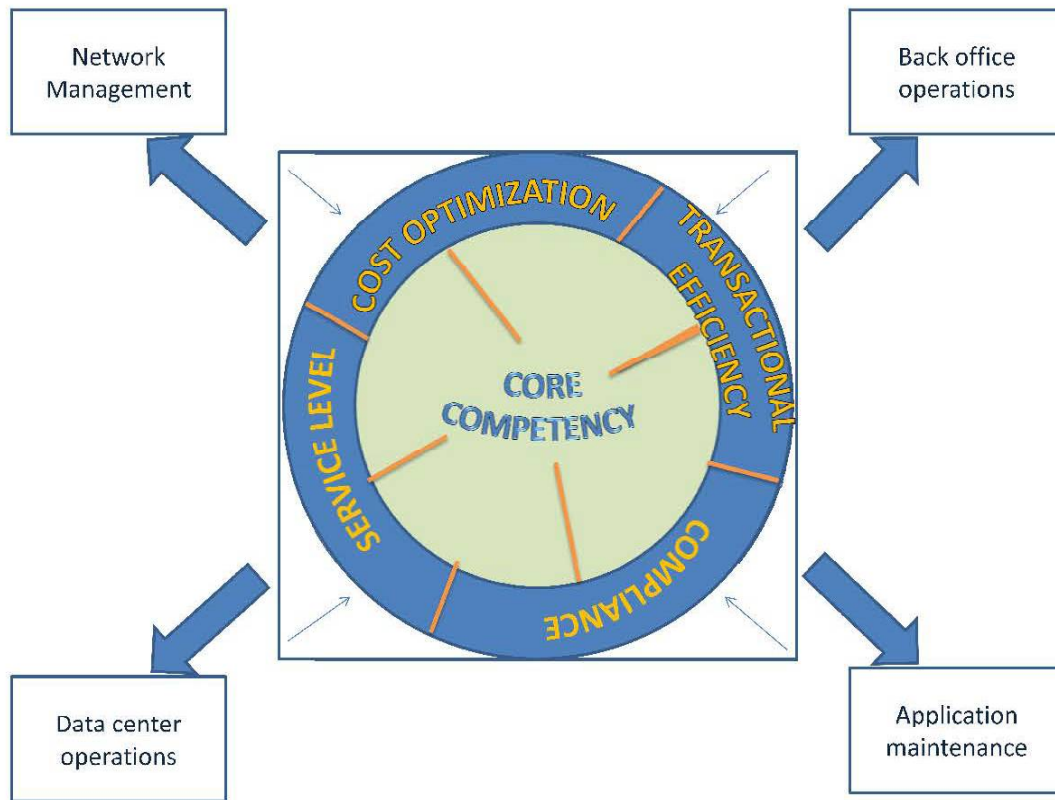
5.8.3.2 Effect of business cycles

Diagram 5.50 – Link between economic cycle and Petrobras' business cycle

Petrobras was affected by changes in the country's business cycle with oil prices changing to a lesser extent than metals and minerals prices in the country. Diagram 5.50 above represents the link between economic cycle and Petrobras' business cycle. However, oil prices were surging due to increased demand and ongoing instability in the Middle East. As a result, production and exploration had reached record high levels in 2003 and were expected to continue in the same vein. This was in tune with the world cycle. The era of low interest rates was over and the world was adjusting to a more expensive cost of capital. This had caused an economic slowdown. Any downturn in the US economy becomes something near or actually a recession, and that puts a damper on oil and gas prices as demand falls both from the US and from the nations exporting to the US – including Brazil. The country, however, is almost completely energy independent. Petrobras stock rose almost 12 times faster than the Dow Jones index between 2002 and 2007. The company's business model was to supply oil and natural gas to refineries in Brazil and sells surplus production in foreign markets. It refined, transported, exported oil, owned petrochemical companies and fertilizer plants, and invested in natural gas transportation and distribution. Hence it was not affected to a great extent by the business cycle and managed to leverage IT to improve bottom its line.

5.8.3.3 Transactional ability

Initial activities included defining the project scope, and selecting an implementation partner. The defined solution was based on SAP R/3 4.6C, and covered SAP R/3 Controlling (CO),

Financial Accounting (FI), Sales & Distribution (SD), Materials Management (MM), Human Resources (HR), Production Planning and Control (PP), Project System (PS), Plant Maintenance (PM), and the downstream elements of the SAP industry solution IS-Oil. Further, since the demand already existed for new Internet-based solutions - particularly in purchasing - Petrobras also integrated the implementation of the mySAP E-Procurement solution into the project from the start. Future e-business initiatives were handled by a joint venture between Petrobras, Accenture and two specialists in the design and sale of electronic marketplaces: SAP Markets and Commerce One. The joint venture focused on both e-selling and on augmenting Petrobras' procurement activities and transferring them to an e-business portal. The focus of the new company was to establish an electronic trading center for products and services for the oil, gas, and energy industries. The functions covered in the centre included RFQ (electronic request for quotation for suppliers), purchases through reverse auctioning, sales through auctioning, and catalog purchases. The benefits were quantifiable. A lot of assets that were tied up in the inventory were freed up leading to a lot of cost reduction. Additionally, the centralized purchasing system helped the company get better prices.

Diagram 5.51 - Stages of transactional efficiency
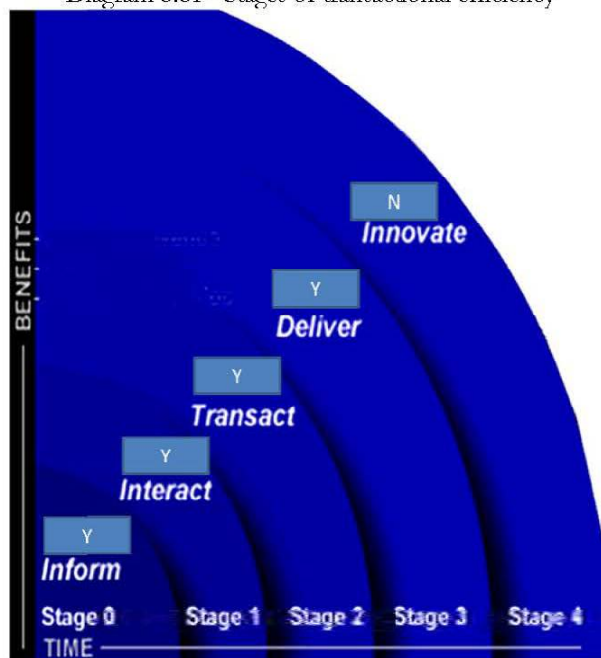
Benefits accruing were the successful implementation of procedures to capture, validate and monitor the data available on the site, ensuring that the interfaces with the ERP were working properly, and providing consistent and valuable information on time.

Design and implementation of a new model for the site allows all companies in the Petrobras corporate group to use the e-commerce client channel solution. The client channel also supported the company's entire order-to-cash process, including price publications, contract negotiations, order processing, products call-off planning and scheduling, products supply management and invoices/ billing inquiry/ printing. Currently, 90 percent of domestic transactions are processed through the site. The technology also gave Petrobras the ability of personalization on the site. Using strategic client segmentation, clients were offered customized transaction menus and data. This made for a lot of ease for them and contributed to repeated usage of the site. Client satisfaction levels increased since the launch of this client channel, and it crossed 95% in 2003. Diagram 5.51 above shows the stages of transactional efficiency

Petrobras also used electronic data interchange (EDI) sourced from vendor Sterling to connect to suppliers and a system from specialty vendor Ci&T for flow data, inventory, refining, and product quality automation processes.

The company wanted to lead from the forefront in terms of technology adoption. Primarily using Microsoft products, employees were trained in the use of Windows Vista and the 2007 Microsoft Office system using free resources available through the Internet and through activities in the technological community. The company was one of the early adopters of these technologies. The products gave the IT team greater data management capabilities. With this larger data management capacity, the Budget Control and Management group of the Technology Management Department can filter and group the requests of internal customers, organize and package the hundreds of requirements, consolidate budgets by area, and easily handle visualization registers by project number, cost center, and date or bill number.

The company wanted to be Sarbanes-Oxley (SOX) compliant as well as conform to the corporate governance requirements of the Basel II standard. To achieve this, it followed the Control Objectives for Information and related Technology (COBIT) standard. This has 4

primary sub-sets (IT, processes, people and environment). One sub-set in this standard – IT – was met by implementing the ITIL (Information Technology Infrastructure Library) framework. However, a great part of the sub-sets, related to IS, required the analysis of the company's existing Information Technology (IT) processes. To do this, a tool called Risk manager was selected to audit the company's IS processes. Using the tool, they were able to reduce around 50% of the IT environments analysis time, because the tool performed both diagnosis as well as gave detailed recommendation for solving the identified non-conformities – a process, if manually done, would have taken considerable amount of time and resources. Refer Exhibit 5.68 for depiction of areas in which Petrobras implemented operational efficiencies.

5.8.3.4 Impact on workers

The implemented initiatives had significant impacts on Petrobras employees. New patterns of work organization emerged and affected individual jobs. Also, new groups were formed in terms of structure, supervision and managerial roles. The organization was restructured with special focus on functional roles. The SAP implementation, for example, changed the roles and functions of employees who had to get used to the new processes. The company brought employee buy-in by conducting extensive training – both through classroom delivery as well as e-learning modes.

Diagram 5.52 - Impact on workers due to technology.

There was a movement away from a large scale, centralized organization to smaller working units. Communication was increasingly limited to computer systems with the rapid transmission of information and immediate access to their national or international offices. This meant that support staff no longer needed to be located within the main production unit. Diagram 5.52 above depicts the impact on workers due to technology.

5.8.3.5 Security

Information and communication security was crucial to Petrobras. Highly sensitive information was commonly passed on between different areas and offices. Besides deploying basic antivirus and anti-spam measures, the company felt that technologies and attacks were becoming more sophisticated every day. A Security model that was essential to the environment was considered a critical factor in an insecure environment that had layers of security placed around it to protect it. Diagram 5.53 below shows the security adoption driving forces. In this context, they found that the security features available in Windows Vista very important. The integration of antispyware and a firewall, the ability to handle user profiles (User Account Control), the control mechanisms for devices that use USB ports, and the new tools to handle Group Policies and network access and shared resources (Network Access Protection) were very consistent solutions when it came to security administration in the company environment. For example, Group Policies for mobile users were used extensively to reduce the chance that viruses would affect their devices when the user connected from their homes or other out-of-office locations via unprotected connections.

Diagram 5.53 – Security adoption driving forces

Another important aspect that affected user and infrastructure performance, as well as the total cost of ownership, was the size of the information files that employees handled. Additionally, newer features inbuilt in the OS including file encryption, the highly improved implementation of offline folders all contribute to the way in which employees perform their day-to-day tasks

in an IT-centric environment. Refer Exhibit 5.69 for the top security risks and vulnerabilities and refer Exhibit 5.70 for trends in these countermeasures.

5.8.4 TRENDS

5.8.4.1 Cost performance structures

The new capabilities in the deployed environment allowed for more agility in the development of everyday tasks, which had a potential cost of opportunity estimated at $1,300,000 per year. Additionally, Excel spreadsheets that used PivotTable reports and lots of graphics or the level of compression achieved with other documents that include graphics or images (such as engineering or operations documents), the newer versions of Microsoft Office helped Petrobras achieve a significant improvement in file size optimization. This had a cost impact as well – the company estimated a savings of 30 percent in storage, which equaled $200,000 per year in the NAS architecture used for file servers globally.

From the systems administration perspective, update management and distribution became much easier and the solution offered more maintenance and support options—all of which were very important towards increasing manageability and enhancing productivity. Windows Server Update Services (WSUS) was deployed for automated patch management on the corporate network.

Diagram 5.54 – Cost component reduction
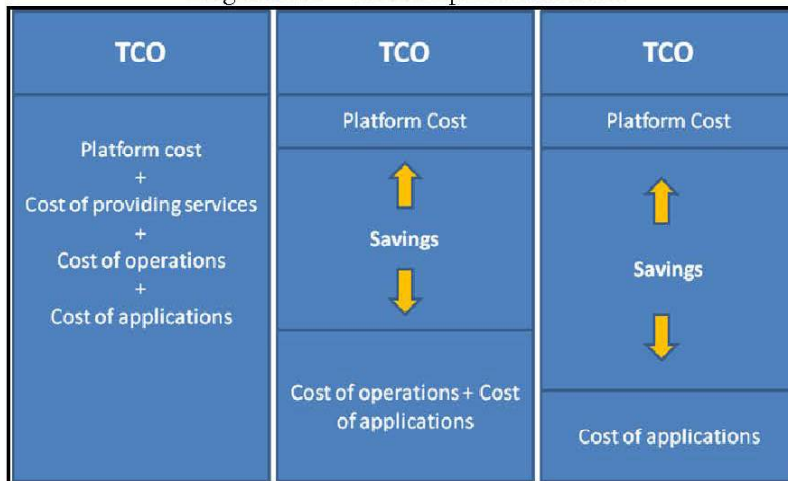
The E-trading initiative enabled the constant delivery of new functionalities that add value to the clients and reduce the costs associated with the order-to-cash processes. Before the client channel went live, costs for servicing the entire client base amounted to some $2 million a year, based on 26 delivery centers supporting the financial and commercial activities of local, regional and central teams. Comparable costs since the introduction of the client channel solution stand at approximately $400,000 a year. In the first year of operation, the new channel delivered cost savings of $500 000 for Petrobras; which rose to $1.6 million in 2005 when all clients were migrated to the solution. Diagram 5.54 above represents the cost component reduction

Two specific processes made a significant contribution to the cost savings:

a. Invoicing. Instead of having to be sent out by telex, invoices were made available to clients securely via the Internet, in almost real time. This resulted in a cost reduction of $400,000 a year.

b. Delivery Scheduling. The efficiencies generated by the client channel in just one delivery center during the 2002 financial year led to a cost reduction of $100 million. Average cost reduction per delivery vehicle for Petrobras was approximately $6 per delivery.

5.8.4.2 Architecture, business continuity and enterprise management

Petrobras realized that maintaining an old-fashioned computer platform led to high maintenance costs, extended service agreements to stretching points, increased men-hour costs, in addition to decreasing productivity. The company applied market best practices by renewing most of its computer platform and changing its existing four-year hardware renewal timeframe to three years. In addition, Petrobras also follows the Intel Stable Image Platform Program (Intel SIPP) that enhances the software stability by ensuring that no changes to the key platform components or drivers for at least 15 months from introduction. This was done with a view to securing smooth technology transitions from one year's platform to the next and to minimizing the costs associated with hardware qualifications. These two approaches

reduced the complexity of the Petrobras's PC infrastructure and made it easier to manage it. A logical extension of this was the subsequent deployment of the latest Microsoft platforms towards a unified approach to systems management.

Diagram 5.55 – Business Continuity Planning

From the IT Management point of view, the joint deployment of Windows Vista and the 2007 Microsoft Office system optimized the management of infrastructure – especially desktops and notebooks, thereby making the company more agile and providing users with opportunities to improve productivity. An example of the cost benefits in provisioning is the equipment administration profile management, which provided a versatile way to provide different grades of autonomy to the users according to their needs and their position in the organization, improving their experience and reducing the requirements from the IT department by virtue of automated profile definitions.

Table 5.17 – Technologies deployed by PetroBras

Technology	Product
Operating system	Windows
Database	ORACLE 8
Enterprise Application Suite	SAP IS-OIL
Modules	Offshore Logistics Financials (FI) Materials Management (MM) Project System (PS) Maintenance and Repair (MRO) ORACLE Real Application Clusters

Accenture in conjunction with Oracle Consulting assisted Petrobras design a high-availability, fault tolerant enterprise computing environment based on Oracle Real Application Clusters as a corporate solution of high availability for Oracle Database throughout the company. It implemented Oracle Database with Real Application Clusters, a high-availability solution that provides users with non-stop access to Petrobras' critical applications. Oracle Real Application Clusters were used to support the increase of data volume without affecting the performance. The clustered environment allowed for transparent fault tolerance whereby stoppages in the high availability environment, scheduled or not, did not affect any users and did not contribute to downtime either.

From a customer service perspective, Petrobras had a number of Customer Support Centers that were responsible for call processing and problem solving, responding to requests from both external customers and in-house personnel. To automate and improve the process in these centres, Petrobras deployed a solution built on the BMC Remedy Service Process Management platform. The solution was integrated to an Oracle database and to HP OpenView, Novation, and IBM Tivoli systems for end-to-end management. It was implemented with four servers: one for production, one for hot backup, one for development, and one for validation. This same structure is used to serve the other companies of the Petrobras Group. Each month, the Customer Support Centers receive about 85,000 requests by telephone, fax, letter, electronic mail, or the Web. These calls are immediately registered in the system, which enables the follow-up at all stages of each request at any time. The system is operated by 90 first-level attendants and over 120 troubleshooting teams of specialists of all Petrobras departments, who, in turn, contract services from the Telecommunications Management organization. The solution has successfully recorded up to 150 simultaneous hits in a single second. Today, over 80 percent of information queries can be resolved at the first level of support and over 90 percent of calls are answered in less than 20 seconds. The solution also facilitates service level monitoring by enabling the time spent for each service, checking customer satisfaction with our services, and identifying where improvements are needed.

Petrobras embraced the latest in terms of consolidation and virtualization technologies to lessen the sheer number of its hundreds of servers to a smaller, more manageable number. In

2003, they realized they needed more servers to accommodate business applications. At the same time their data center had 30 older, obsolete servers that needed to be removed. To commission 60 server machine-equivalents, they procured four VMware ESX Server licenses – one for quality assurance plus three for production – along with Virtual Infrastructure Nodes (VINs) for optimal server management. This saved the cost of physical procurement of 60 servers in addition to the recurring costs in terms of additional space, cooling and power requirements in the data center. The consolidation produced substantial savings – on a 20:1 ratio with each server being more optimally utilized. Additionally, the deployment time reduced drastically as there was no physical procurement process involved. Thus, company's responsiveness to the users increased. Refer Exhibit 5.71 for a technology maturation path of operating environments available at the time.

5.8.4.3 Enterprise Integration

The company is moving towards enterprise integration and is fairly advanced along the technology adoption path. It is achieving integration of processes across organizational and functional boundaries to provide competitive advantage through extensive application of IT in the correct manner.

Diagram 5.56 – Major effects of Enterprise Integration
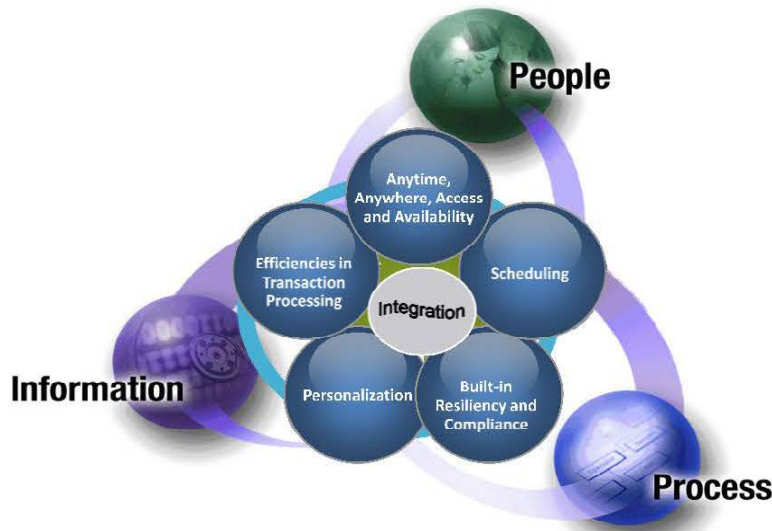
5.8.5 EXHIBITS

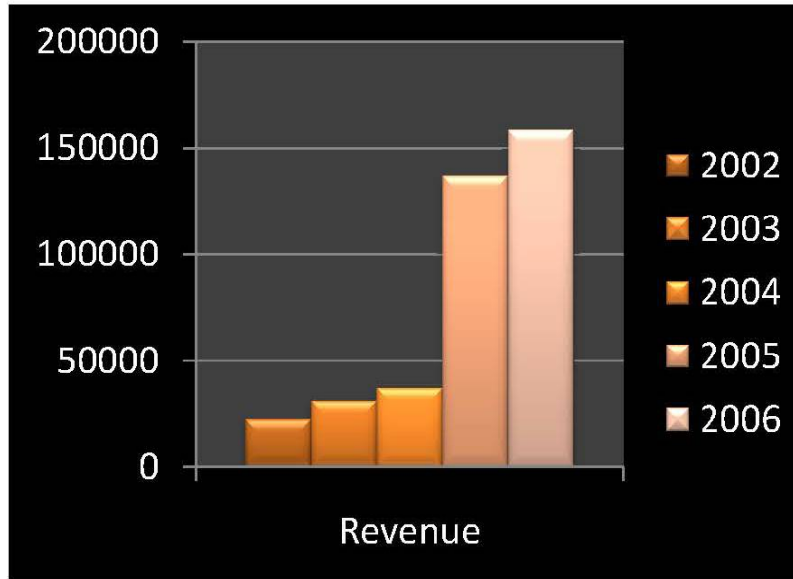Exhibit 5.66 – Petrobras financials 2002-2006

Exhibit 5.67 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

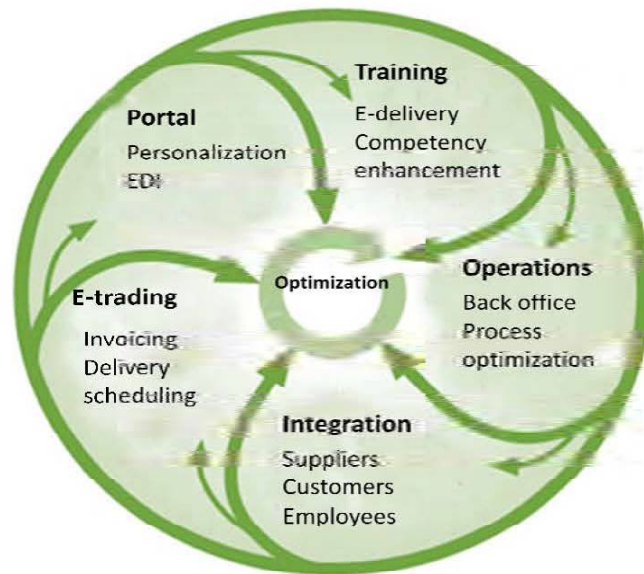Exhibit 5.68 – Areas in which Petrobras implemented operational efficiencies

Exhibit 5.69 - Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware
Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information
Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information
Spam: Unsolicited or unwanted email messages
Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable
Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders
Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site
Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations
Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers
Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data
Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized
Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

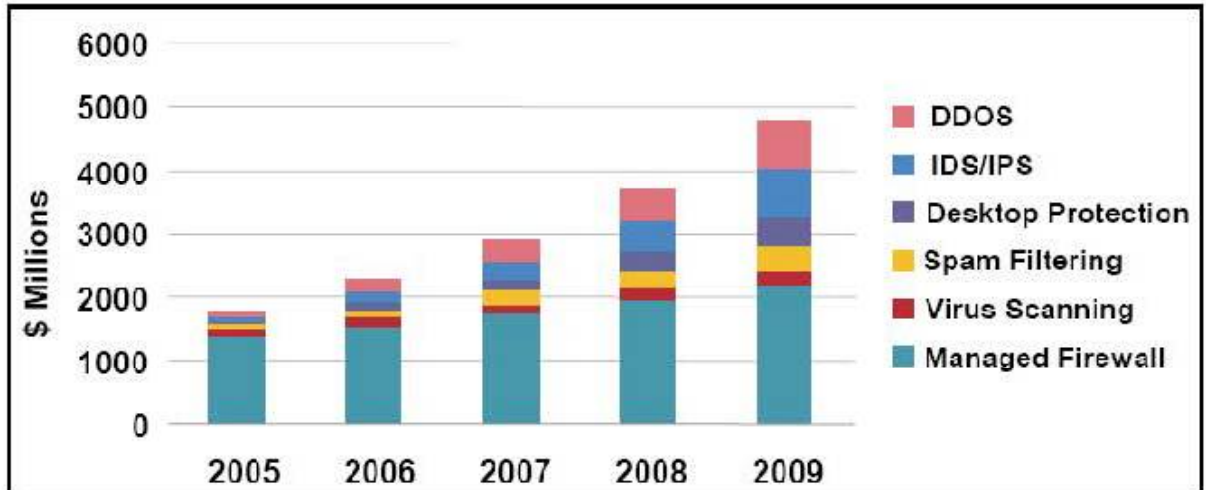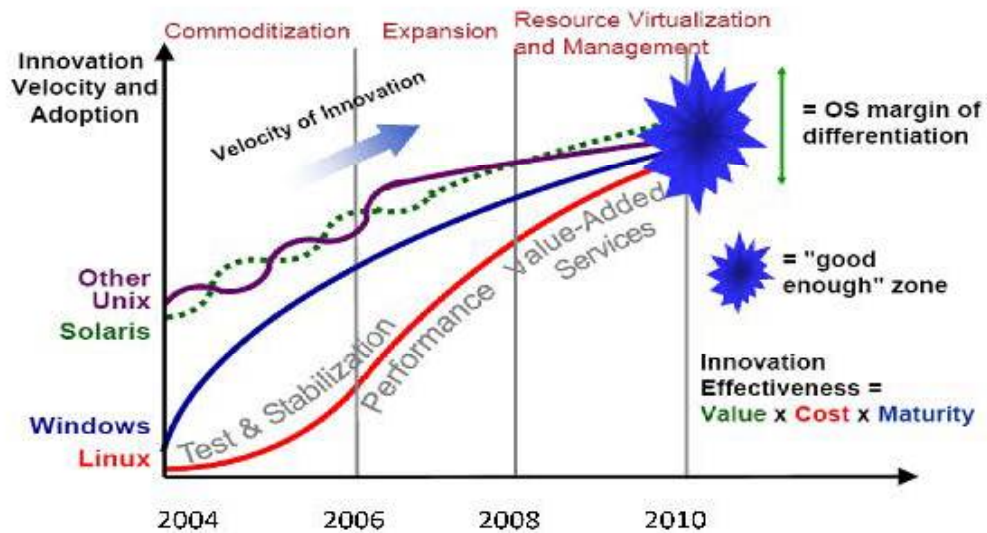Exhibit 5.70 – Security revenues by countermeasure category.

Exhibit 5.71 – Technology maturation path

5.9 Capgemini

5.9.1 COMPANY BACKGROUND

Capgemini (Euronext: CAP) is a major French company, one of the world's largest information technology, management consulting, outsourcing and professional services companies with a staff of 77,669 operating in 30 countries. (Refer Exhibit 5.72). It is headquartered in Paris (Rue de Tilsitt) and was founded in 1967 by Serge Kampf, the current chairman. CEO Paul Hermelin has led the company since his appointment in December 2001.

Revenues for first-half 2007 came in at €4,397 million (Refer Exhibit 5.72), versus €3,784 million in first-half 2006, a rise of 16.2% based on published figures and of 11.5% on a like-for-like basis (constant Group structure and exchange rates). Refer Exhibit 5.76 for the company's analysis of capital.

The Company, founded as an enterprise management and data processing company, was inaugurated as the Société pour la Gestion des Enterprises et le Traitement de l'Information (Sogeti).

- In 1973 Sogeti acquired a majority stake in its major European IT services competitor, CAP.

- In 1974 Sogeti acquired Gemini Computers Systems, a US company based in New York.

- In 1975, following the two major acquisitions of CAP and Gemini Computer Systems, Sogeti renamed itself as CAP Gemini Sogeti.

- In 1981, Cap Gemini Sogeti launched US operations following the acquisition of Milwaukee-based DASD Corporation, specializing in data conversion and employing 500 people in 20 branches throughout the US.

- In 1986, Cap Gemini Sogeti acquired the consulting division of US-based CGA Computer to create Cap Gemini America.

- In 1991, Gemini Consulting was formed by integrating two management consulting firms (United Research and The MAC group).

- In 1996, the name was simplified to Cap Gemini with a new group logo. All operating companies worldwide were re-branded to operate as Cap Gemini.

- In 2000, Cap Gemini acquired Ernst & Young Consulting and simultaneously integrated Gemini Consulting to form Cap Gemini Ernst & Young.

- In 2002, Cap Gemini re-launched its Sogeti brand, creating a new legal entity bearing the original name of the company, headquartered in Brussels, Belgium. The new company delivers IT services to a more limited range of markets.

- In 2003, the firm acquired Transiciel and merged into Sogeti-Transiciel (later consolidated within Sogeti in 2006).

- In April 2004, the Group reverted to Capgemini (its current name).

- In the summer of 2005, because of heavy financial losses, Capgemini sold its North American healthcare consulting practice, including both payer and provider practices, to Accenture but retains its life sciences practice.

- In September 2006, Capgemini acquired a 51% shareholding in Unilever India Shared Services Limited (Indigo), a provider of financial shared services and Sarbanes-Oxley compliance services to the global Unilever Group. Indigo has operating centres in Bangalore and Chennai and employs approximately 600 staff.

- In October 2006, Capgemini agreed to acquire Kanbay International for US$1.2 billion in cash ($29 per share). The acquisition will increase Capgemini's India staff to 12,000 employees. The deal was completed on February 8, 2007.

- In October 2006, Capgemini was given the contract by the British government to design ContactPoint, a database holding information of all children under 18 in England and Wales.

- On February 8, 2007, Capgemini announced the acquisition of Software Architects, a US-based consulting company, to expand its US business.

Capgemini's regional operations include North America, Northern Europe, Asia Pacific and Central and Southern Europe. Services are delivered through four disciplines - Consulting, Technology, Outsourcing and Local Professional Services. The latter is delivered through Sogeti, a wholly owned subsidiary. Capgemini is ranked among the top three outsourcing vendors in the world.

5.9.2 ORIGIN AND EVOLUTION

Founded by Serge Kampf in Grenoble in 1967 and led by CEO Paul Hermelin since December 2001, Capgemini has become one of the top five IT services and consulting companies worldwide.

The long-term growth and the accompanying expansion of its service offering has depended on both acquisitions and organic expansion. Among its most notable acquisitions are Sesa in France (1987) and Hoskyns in the UK (1990), which gave Capgemini a foothold in the outsourcing market, as well as Volmac in the Netherlands (1992) and Programator in Scandinavia (1992), which established its solid base in Northern Europe.

In the 1990s, Capgemini built a world-class management consulting practice, partly through the acquisition of United Research (1990) and the Mac Group (1991) in the US and Gruber Titze and Partners (1993) and Bossard (1997) in Europe. The acquisition of Ernst & Young Consulting in 2000 tripled the size of Capgemini's operations in North America—the world's leading market for IT services—and strengthened the company's position in Europe as well.

As the global IT market has evolved, the Company has increased emphasis on two of its businesses: local professional services and outsourcing. The acquisition of Transiciel in December, 2003 enabled it to double the size of its local professional services unit. Today, the Sogeti unit contributes 15 percent of Capgemini's total revenue.

The Company has also developed an approach they call Rightshore, which relies on both offshore capabilities (including 12,000 people in India as of February 2007 with the acquisition of Kanbay) and near-shore resources in countries including Poland and Spain.

5.9.3 AREAS OF OPERATION

Capgemini operates in the following sectors/ industries:

Table 5.18 - Areas of operation of Capgemini

Services	Industries segments	Solutions
Product Lifecycle Management, Financial Control, Supplier Relationship Management	Automotive	
Extended Retail Solutions, and Global Data Synchronization	Consumer Products, Retail and Distribution	CP-Connect (in collaboration with HP and Intel)
Business Process Outsourcing, SOA, IT Transformation — Strategy & Architecture	Energy, Utilities and Chemicals	Solutions include: 1. Asset management IT systems 2. Asset effectiveness monitoring 3. Automated fault detection and reporting 4. Automated metering 5. Broadband over power line 6. Device self reporting 7. Maintenance, reliability centered 8. Market-based rates 9. Real-time dynamic load modeling 10. SCADA network penetration providing customers with shorter time to market
Transformation consulting, CRM, IT strategy, Finance transformation, Business Intelligence, Business Process Outsourcing, IT outsourcing,	Financial Services	

Asset administration, Sales & service innovation		
Business Strategy and Transformation, Clinical Transformation, Revenue Cycle Management, Supply Chain Management, Health ERP Packages, Outsourcing Services, Payor Services	Healthcare	Work with HP: Enterprise Resource Management, Oracle solutions as well as Customer/Patient Relationship Management, Supply Chain and Content Management solutions.
Business Strategy and Transformation, Financial control services	Life Sciences	
Forecasting, inventory management, financial control services	Manufacturing	
Customer satisfaction	Public Sector	Work with HP: 1. Regional Government solutions using HP's e-government platform combined with Capgemini's CRM transformation expertise 2. Tax & Treasury solutions with an innovative services-led approach using the web and associated technologies to drive out costs 3. Defense & Security solutions to help agencies reduce budgets and create shared services based on a common services architecture
Transforming legacy organizations, New products and services creation, Operational transformation	Telecom, media and entertainment	

Industry-wise business highlights

Automotive

- Works with 14 of the world's 15 largest automotive vehicle manufacturers and 10 of the 12 largest suppliers.

- Ranked as a leading systems integrator in the automotive sector in the U.S. with major enterprise applications providers such as SAP and others.

- Is a leading automotive consultancy as recognized by the Institute of Transport Management and other independent organizations

Consumer Products, Retail and Distribution

- Advises 24 of the world's 30 largest consumer products companies.

- Named as a leading consultant for the consumer products industry by Consumer Goods Technology magazine's annual reader survey.

Energy, Utilities & Chemicals

- Over 75% of the top 20 private and public utilities (Platt's 2006 Top 250 energy company rankings) and 9 out of the top 10 Oil and Gas 'super majors' as clients. Representing 13.1% of total Group revenues in 2006– Utilities represents two thirds of the activity while Energy & Chemicals (oil and gas) represents one third.

- Offers unique industry-specific solutions to help companies meet their market demands.

Financial Services

- Develops the right solutions with the best strategic partners like IBM, Microsoft, Oracle, SAP, Siebel and specialty partners such as Chordiant, Finarch, Guidewire, SunGard, Thomson Financial and TIBCO

- Represents 14% of Group revenues in 2006

- Has over 900 clients worldwide, including the world's top 5 banks

    - 5 of the top 10 credit card issuers

    - 11 of the 15 largest global insurers

    - The 5 top Investment Firms

- 11 of the top 12 asset finance companies

Healthcare

- Gartner, Inc. named Capgemini the #1 Top Consultant and System Integrator, and the #1 Top Outsourcer worldwide in the health provider market

- Kennedy Information, Inc. ranked Capgemini #1 in the provider, payer and life sciences categories in a report entitled "The Global Healthcare Consulting Marketplace."

Life Sciences

- The firm ranks1st in the life sciences category, 1st in the provider category, and 1st in the insurer/payer category in Kennedy's Information ranking of the largest healthcare consulting practices

Manufacturing, Distribution and retail

- Represents 29% of Group revenues in 2006

- MRD client base of over 1,000 companies throughout the world including 70% of the largest general manufacturers

- Client base includes 13 of the largest OEM's, 8 largest networking and telecom equipment manufacturers, the leading computer and electronics manufacturers, and several top aerospace and defense companies

Public Sector

- Client portfolio spanning all sectors of public service across the world, with dedicated public sector units in the various regions.

- Representing 27.8% of total Group revenues in 2006

- Telecom, media and entertainment

- Representing 9.6% of Group revenues and over 16% of consulting and project management activity in 2006

- Has already delivered benefits to 300+ customers worldwide.

5.9.4 FOCUS AREAS

Capgemini works with its clients to develop business strategies and technologies tailored to their particular requirements. The Company offers a wide range of solutions within four key areas of focus:

5.9.4.1 Consulting Services

The consulting services teams focus on six key areas:

Customer Relationship Management – The CRM teams help companies improve interactions with their most important partners—their customers. Capgemini is recognized as a pioneer in the development of CRM solutions, and its alliances with leading technology providers deliver measurably faster, better, and more sustainable results from CRM investments.

Finance and Employee Transformation: In collaboration with its clients, Capgemini makes finance and human resource functions more efficient and more effective. From developing functional strategies to designing operating models, and from defining compliance processes to implementing technical solutions, Capgemini's expertise in the area is recognized worldwide.

Global Sourcing: Capgemini's Global Sourcing model is called Rightshore. With a far-reaching network of onsite, onshore, nearshore and offshore resources, Rightshore cuts across geographies to access the right IT service, in the right place and at the right price. By selecting the most advantageous mix of resources worldwide, Rightshore is known to lower costs and boost business performance.

Operational Research: Capgemini helps companies make better informed decisions by applying modeling, quantitative analysis, objectivity and rigour to minimise risk and uncertainty within complex business problems.

Supply Chain: Capgemini helps build adaptive supply chains that integrate demand and supply management, target customers to boost revenue, and maximize profit and shareholder value.

Transformation Consulting: Capgemini is known to achieve tangible business results, sharing the risks and leading the transfer of skills and knowledge to client organizations.

5.9.4.2 Outsourcing Services

Capgemini's collaborative approach allows organizations worldwide to achieve better, faster and more sustainable results. With over 30 years' experience and a global workforce of over 15,000 outsourcing professionals, Capgemini is currently collaborating on some of the world's largest outsourcing contracts. Leading companies have entrusted it as a results-driven business partner to solve their most complex business problems.

The breadth of Capgemini's outsourcing portfolio extends not just to technology, but also to deep process expertise. The Company offers a full-spectrum of services, including applications outsourcing, infrastructure management, business process outsourcing and transformational outsourcing, to align to a company's business goals.

5.9.4.3 Technology Services

Capgemini helps companies master their IT environments, reduce costs, and mitigate risk. It is known to consistently deliver technology services that exceed client expectations — from agents to SAP, application integration to web services, aerospace to retail. Its technology collaborations are successful because of the substantial advantages it offers:

- Consistent, Reliable Delivery: Capgemini's global network of Accelerated Delivery Centers is ISO9001 certified, its North America and Europe centers operate at CMM Level 3 while its India centers have been assessed across all process modules at CMMi Level 5.

- The Right Alliances: Global alliances with Cisco, HP, IBM, Intel, Microsoft, Oracle, SAP, Siebel, Sun, and industry-specific IT partners provide access to leading-edge technologies while lowering the overall cost of IT ownership.

- Unparalleled Speed: Its worldwide Accelerated Solutions Environments and Accelerated Delivery Centers dramatically reduce the time required to move from strategy to execution.

- Proven Sourcing Advantages: Its Rightshore® approach combines onsite, onshore, nearshore, and offshore sourcing to improve efficiency and quality while delivering cost savings of up to 50%.

- Matchless Vision: Capgemini's thought leadership on industry-defining technology advances and challenges ensures lasting business value.

5.9.4.4 Local Professional Services

Sogeti, a subsidiary of Capgemini, specializes in providing local professional services expertise in three business areas:

- Application Services: Consulting and integration of management applications.

- Infrastructure Services: Technical infrastructure and information technology production.

- High Tech Consulting: Scientific engineering, technical and industrial information technology, mechanics and electronics in major industrial R&D projects.

These information technology services are provided to businesses and public sector organizations. Sogeti employs about 13,500 employees in 11 countries including France, Belux, Germany, The Netherlands, Spain, Switzerland, Sweden, United Kingdom and the US.

5.9.5 STRATEGY

5.9.5.1 Collaborative Business Experience

Capgemini has a unique way of working with its clients, called the Collaborative Business Experience. Collaborative Business Experience is designed to help the clients achieve better, faster, more sustainable results through seamless access to its network of world-leading technology partners, and collaboration-focused methods and tools. Through commitment to mutual success and the achievement of tangible value, it helps businesses implement growth strategies, leverage technology, and thrive through the power of collaboration.

5.9.5.2 Distributed Delivery Framework

Capgemini subdivides its framework into a series of definitions, estimates, and checklists. The Company defines what the client wants, when the client wants it, providing estimates as to what resources can be used at what times for particulars projects. With these estimates in place it defines its overall approach to the implementation detailing various work products and deliverables at the differentstages of the project using its RAPID Methodology. These deliverables and work products are tailored in various stages of RAPID with ownership assignments to different teams.

Capgemini's methodology is known to provide its clients with a built-to-run transition, meaning that at the end of the implementation the company is ready to realize the full potential of their investment.

Using its strong global presence, Capgemini has implemented Oracle software solutions in fifty seven different countries. Based on the past implementations they've discovered the proper balance between onshore and offshore resources. Such an educated alignment of activities is instrumental in delivering on time and satisfactorily. They establish a timeline where the different deliverables are due at different times to continually build momentum and then assign accountability of these deliverables to different sites. The onsite team initiates the project with a clear picture of the abilities and availability of the offshore team.

One of the main success factors for Capgemini has been that it has worked as a unified team. Communication has played a major role as adhesive to forge various teams at different sites to

look as a unified team. Essentially what Capgemini creates is not a "network" of different teams spread across the globe occupied with the same goal but one, unified team with international, round-the-clock capabilities. This has also been accelerated by various proven tools which Capgemini brings to the table.

5.9.5.3 Rightshor program

Capgemini's Rightshor program provides an organization the right resources at the right location at the right time to accomplish everything it needs. Capgemini has employees spread across the globe in its onshore, near-shore and offshore offices which gives it the ability to work around the clock to quickly execute a client's project. Of course many companies, including its chief competitors also offer the same type of service but it is unique because of its proven best practices, its Collaborative Business Experience and its Distributed Delivery Framework.

5.9.5.4 Major acquisitions

Refer Exhibit 3 for 40 acquisitions by Capgemini in its 40 year history. In 2000, Cap Gemini acquired Ernst & Young Consulting. It simultaneously integrated Gemini Consulting to form Cap Gemini Ernst & Young creating the new consulting firm of Cap Gemini Ernst & Young, which was later renamed Capgemini. The transaction enabled the combined Group to:

- become a major player in the US and strengthen its position in Germany

- enjoy an extensive industry coverage and thus be the firm of choice for major worldwide organizations

- expand considerably in consulting, a high added value segment of critical importance which provides clients with the complete range of services they need for their strategic moves

- implement on a larger scale all skills required to help its clients facing the challenges of the "connected economy": strategy consulting, innovation, deployment of "state of the art" technologies, knowledge management, human resources and marketing.

Towards the end of 2006, Capgemini acquired Kanbay- a leading sector focused IT services firm which was founded in 1989.

Diagram 5.57 - Capgemini + Kanbay: a powerful combination

This acquisition is fully in line with Capgemini's expansion strategy.

- The company significantly increased Capgemini's presence in India - almost 89%. The combined company had a headcount reaching 12,000 employees at the end of 2006 in India which therefore made India the second largest country (with 16% of total headcount);

- it strengthened Capgemini's presence in North America and confirmed the Group's ambition in that market;

- it positioned Capgemini as a leader in the Financial Services sector - which accounted for 22% of the global IT market - and enhanced its domain expertise.

The combination of Kanbay and Capgemini helped create a top-tier global IT services firm with unparalleled domain knowledge in the financial services vertical, seamless consulting and technology expertise, and market leading offshore resources.

Diagram 5.58 - Rationale of Kanbay acquisition

5.9.5.5 Developing off-shore capabilities

Diagram 5.59 - Developing off-shore capabilities

The Company has ambitious plans for the coming years. It aims to:

- deliver 8% growth in 2008 and then push it to at least 10%

- increase resilience at the bottom of the cycle

- sustain growth above market

First-half 2007 at Capgemini saw acceleration in the uptake of the Group's resources located in the emerging economies of India, China and Poland. The United States is now largely supplied by the Group's India-based production units, which represent one-third of the headcount deployed on that market. The United Kingdom and Scandinavian markets also experienced a very sharp increase in their utilization of the Group's offshore service capacity, and the same trend is also apparent on a number of major accounts in the other continental European countries.

Against this backdrop, the Group rolled out the first stages of the i3 transformation program, which is set to keep Capgemini a step ahead of changes in the IT services business model over the coming years.

I^3 is a business transformation program designed to help Capgemini deliver on its 2010 strategy as encapsulated by the three strategic pillars of building client intimacy to drive top line growth and long term customer relationships; differentiating services through relevant and targeted innovation; and driving efficiency by leveraging global tools and methods through industrialization. Capgemini has elected to undertake this program to capitalize on the successful turnaround the Group has achieved in the recent years to continue to increase operating margins and grow market share. In essence, i^3 represents the vision of how Capgemini aspires to become an 'Industry Shaper' always delivering value to its clients.

The i3 program focuses on: (Refer Exhibit 5.75)

- industrializing processes and tools and increasing the proportion of work done in emerging countries

- creating strong partnership relations with major clients and

- innovating within the Group's various businesses on a daily basis, and takes its name from these three levers: innovation, industrialization and intimacy.

Diagram 5.60 - Capgemini's ambition- i3 program
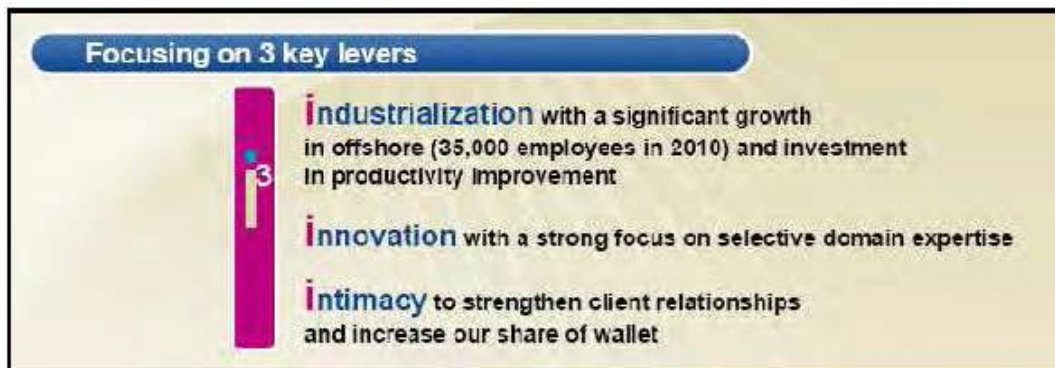
5.9.6 INDUSTRY STANDING OF CAPGEMINI

Capgemini is ranked at 855th in the Forbes 2000 listing, and 12th in the Software & Services category of year 2007. Capgemini performed well in the industry and country sections of this year's ranking, placed in front of all of the major Indian and European competitors, and in front of some of the biggest names in corporate France. The Forbes Global 2000 listing is an annual ranking of the top 2000 corporations in the world based on a composite of sales, market value, assets and profits. Since the inaugural 2005 listing, Capgemini has moved up almost 400 places.

Capgemini's world ranking amongst IT services companies was 6th (Source: Gartner Dataquest IT Services Market Metrics, Shares of World Market, August 2006)

5.9.7 HUMAN CAPITAL

7 - Number of Strategic Business Units: Continental Europe and Asia/Pacific, Western Europe, North America, India, Outsourcing, Sogeti and Financial Services.

8 - Number of different nationalities represented in the Management Team (Australia, France, Germany, Holland, India, Switzerland, the United Kingdom and the United States).

7 - Capgemini's founding values: honesty, boldness, trust, freedom, team spirit, modesty and fun.

80,000 - The Group's total employees today, or 25% more than in 2006.

35.9 years old - Average age of the Group's employees.

25.3% - Percentage of women working in the Group.

4,000 - Total number of recipients of stock options, worth 34 million Euros distributed since 1987.

6,900 - Number of participants at Capgemini University in 2006, 40% more than in 2005; satisfaction rating: 4.3 out of 5.

1 - A unifying intranet site; "Talent", counting 20,000 unique users.

23% - Percentage of offshore staff today (approx. 16,000 in India, 2,000 in Poland, 500 in China and 50 in Morocco).

88,000 - Number of CVs received in India in 2006 to recruit 4,000 people after 16,000 interviews.

40,000   Projected number of employees in India between now and the end of the decade.

350,000 - Number of engineers trained in India every year (as compared to fewer than 20,000 in France).

19 - Total number of languages spoken by employees at the BPO centre in Krakow in Poland.

23,000 - Total number of new recruits expected in 2007.

3,700 - Total number of new recruits expected in France alone in 2007.

5.9.8 EXHIBITS

Exhibit 5.72 - Consolidated Financial statement, H1, 2007

In millions of euros	Consolidated financial statements		
	Full-year 2006	First-half 2006	First-half 2007
REVENUES	7,700	3,784	4,397
OPERATING EXPENSES	7,253	3,603	4,128
OPERATING MARGIN			
- Amount	447	181	269
- %	5.8%	4.8%	6.1%
OPERATING PROFIT			
- Amount	334	139	229
- %	4.3%	3.7%	5.2%
ATTRIBUTABLE PROFIT FOR THE PERIOD	293	71	168
NET MARGIN (%)	3.8%	1.9%	3.8%
EARNINGS PER SHARE			
Weighted average number of ordinary shares	132,782,723	131,568,116	144,414,280
- Basic earnings per share (in euros)	2.21	0.54	1.16
Number of shares at period end	144,081,808	131,753,496	144,819,065
- Earnings per share at period end (in euros)	2.03	0.54	1.16
Weighted average number of ordinary shares (diluted)	147,241,326	146,470,095	159,767,912
- Diluted earnings per share (in euros)	2.07	0.53	1.09
NET CASH AND CASH EQUIVALENTS at period end	1,632	789	452
AVERAGE NUMBER OF EMPLOYEES	64,013	62,230	77,669
TOTAL NUMBER OF EMPLOYEES at period end	67,889	63,680	79,981

Exhibit 5.73 - An International Group from Grenoble to Mumbai

40 - Number of acquisitions made by the Group in 40 years.
32 - Number of countries in which the Group operates.
393 - Number of sites spread across the world, representing a total of 867,000 square meters.
18 - Number of time zones covered by the Group from Los Angeles to Sydney.
109 - Number of consolidated companies in the Group as of 31 December, 2006.

Exhibit 5.74 -Capgemini's 40 acquisitions

CAPGEMINI IN…
40 AQUISITIONS

1970 February
Solame (France)

1970 March
Sorgas (France)

1970 November
Infor-Algoe (France)

1971 August
Perfo-Service (Switzerland)

1972 October
Software International (France)

1973 February
Sesi (France)

1973 July
CAP (Centre of Analysis and Programming), first French computing services firm and a pioneer of computer programming (purchased 49% then 100% in March, 1974).

1973 October
Soref (France)

1975 August
Cap Europe (France)

1976 December
Bossard (France), first French management consultancy (purchased 51% then 100% in January, 1997).

1980 April
Data Logic (Norway)

1981 January
DASD (United States, Milwaukee)

1982 May
Spiridellis & Associates (United States, NYC)

1982 December
Sesa (France), systems integration specialist (purchased 35% then 100% in July, 1987).

1986 January
CGA (United States)

1986 October
Ibat (Germany)

1986 November
GEDA (Italy)

1986 December
Sycomm (United States)

1987 August
ITMI (France)

1988 February
AD&GD (Denmark)

1988 February
Sofcom (Denmark)

1988 May
Data Logic (Sweden)

1988 December
Hiekkamaki (Finland)

1989 January
Comp.Act Data Systems (United States)

1989 February
Systemation Inc (United States)

1989 October
Merit Systems (United States)

1990   January
Gamma International (France)

1990   May
United Research Corp. (United States)

1990   July
SCS (Germany)

1990   July
Hoskyns (United Kingdom), European leader in outsourcing

1991   January
Mac Group (United States), strategic consultant.

1992   February
Volmac (Netherlands), Europe's most profitable computing services firm.

1992   May
Programator (Sweden)

1997   January
Géislogica (Portugal)

1999   April
Beechwood (United States)

2000   May
Ernst & Young Consulting (United States), the consulting division of one of the "Big Five".

2003   October
Transiciel (France), local professional services specialist in IT

2006   August
FuE (Germany)

2006   September
Unilever Shared Services Limited (India)

2007   February
Kanbay International (United States), financial services specialists with a presence in India and the United States.

Exhibit 5.75 – Details of the i3 program

Industrialization: Implement a next generation global delivery model

Objectives

- Triple headcount in India to 40,000 by 2010
- Grow from a locally designed/locally *delivered* operating model to a globally driven/locally *delivered* global operating model
- Establish specialized workforce competencies both on and offshore

Tactics:
- Accelerate the Rightshore® agenda
- Develop client-onshore-offshore partnerships
- Embed standard tools, methods and measures
- Develop skills and capabilities on a broad portfolio of offers tailored to clients needs

Innovation: Develop undisputed areas of Innovation & domain expertise

Objectives:
- Develop a strategic approach to selecting, developing and exploiting innovations from the market, clients and people… establishing the company as market and thought leaders in key growth areas

Tactics:
- Develop global leadership in :
  - Payment systems renewal (Financial Services)
  - Billing applications (Telco)
  - Merchandising and Supply Chain (Retail)
  - Automotive Customer Relationship Management (CRM)
- Invest in critical Emerging Technologies: *Business Application Consulting (BAC); Business Information Management (BIM)*; and *Open Source Services (OSS).*

Intimacy: Bring the full scope of the group's services to key clients

Objectives:
- Fine tune the way Capgemini builds sustained business relationships with clients and staff

Tactics:
- Fine tune the 'account centric management' approach for key accounts to ensure all disciplines and sectors are aligned to meet client needs using a common approach.
- Implement a Client Satisfaction Index

Exhibit 5.76 - Analysis of Capgemini's breakdown of capital

Breakdown of capital
As at December 31, 2006
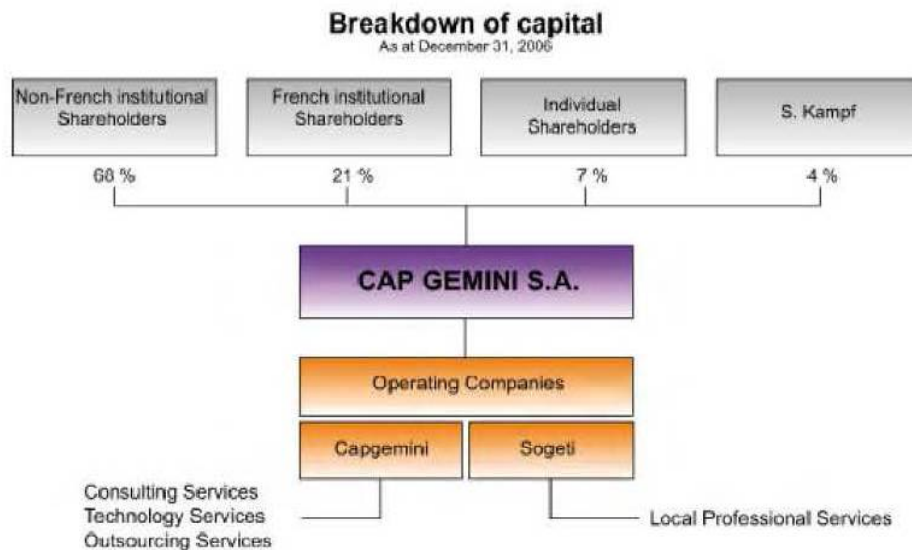
5.10 Case Analysis 7: HPCL (Capgemini Case-1)

5.10.1 COMPANY BACKGROUND

Founded in 1974, Hindustan Petroleum Corporation Limited (HPCL) is India's second largest oil company and one of the largest PSU companies in terms of revenue. Refer Exhibit 5.77 for HPCL's financials performance. It deals with the refining and retailing of petroleum products. HPCL is a Fortune Global 500 company as per the ranking of 2006. It was ranked at position 378. It moved to position 336 for 2007 rankings.

5.10.2 EXISTING IT LANDSCAPE

HPCL used a mix of HP - UX, WIN NT, SOLARIS, NETWARE, and LINUX for data processing, corporate applications, databases and other applications. Netware servers are for office automation & Mail. Large locations like Petroleum House (PH)/Mumbai Refinery (MR) /Vizag. Refinery (VR) typically have about 5+ servers; smaller locations like Zonal Offices (ZO) /Hindustan Bhavan (HB) etc have 3 - 4 servers; still smaller locations make do with about 2 servers - 1 for On Line Information System (OLIS) and one for Office Automation and Mail. Almost all locations have Ethernet LANs implemented excepting some of the remote regional offices. Inter - location connectivity is through a mix of leased lines, VSATs, ISDN, VPN, radio links and even dial-ups in a few cases (only for mail access)

To automate its functions, HPCL used 3 primary systems - the IMS (integrated management system), RIS (Regional Information System) and OLIS (On-line information system). These systems supported operations in the following ways:

IMS was a fully integrated system consisting of the following functional modules:

Financial Management – It provided standard accounting functionality like General Ledger, Profit & Loss, Balance Sheet, unlimited Subsidiary Ledgers & MIS as well as Accounts

Receivable and payables that maintained customer accounts, printed statement of account, did an age analysis and gave exception- reports.

Billing —This operated as a control and audit mechanism. It was used where a central database was not used for invoicing at the points of sale. It established accuracy of the rates charged to customer for each invoice & maintained control on all variations.

Sales Analysis — This provided reporting sales and their performance analysis with objectives and historical for all products by customer, sales area at all levels.

Inventory Management —This maintained stock balances at multiple locations based on all transactions and provides for inventory verification as well as tracked inter-location stock transfers. Multiple MIS and Exception Reports could be generated.

Payroll — This provided for automated time scale increments, computation of overtime, deduction of salary for absence, PF, other statutory requirements.

Materials Management — This was used for receipt and issue of materials and costing. It generated re-orders, material specifications, pending purchase orders follow - up, and provided data to the purchase module.

Purchase —This module maintained description of items and vendor profile and performance. It handled requests, inquiries, financial evaluation, placement of Purchase Order and follow-ups.

These modules were complemented by a decision support system that provided the following functions like the capital budget monitoring, production and yield accounting, and crude tanker chart monitoring, employee advances & claims, and bank account reconciliation.

The regional information system (RIS) helped HPCL's regional offices to maintain current information of all types of dealers and customers related transactions. This system allowed Regional Offices to pick up daily Sales transactions and Inventory of products from all locations enabling them to decide product movements and Sales strategies. It was complemented by a coastal movement & performance analysis (COMPASS) that helped

supply and distribution departments to monitor coastal movement of products and performance analysis of tankers on various parameters.

HPCL also implemented a point of sale system called the retail outlet accounting system (ROAS), which was a PC based solution for use at retail selling outlets that covered functions like billing, stock accounting, sales analysis, and shift analysis. It generated periodic bills for credit customers and maintained receivable accounts.

A corollary to this system was a system made for HP's sister concern Hindustan Petroleum Gas Agency Software (HPGAS) called the LPG dealer's package. This system kept track of vital information like Connections, registrations, LPG cylinder receipts, issues, returns to the plant, with respect to a LPG Dealer. It helped to process refill orders quickly, respond to queries, process and update data, where at the end of week it automatically generated weekly report cum reconciliation of cylinders, which had to be submitted to the concerned LPG Plant.

Last but not the least, the online information system (OLIS) was a software package designed for bulk storage and distribution outlets to assist in total accounting, operations and control. This system generated accurate invoices and other documents on the user's terminal when the product was sold, moved or received and cash collected with the help of extensive input validation, databases and complex billing logic built into the system. It also provided sales and stock accounting, deposit accounting and maintained receivables and payable accounts. It provided functionality for making payments to transport contractors, Government and local bodies for any taxes etc.

While HPCL's IT application deployment was extensive, it was disparate. To unify the islands of information, and to help HPCL in its business management and improve customer service, HPCL implemented an advanced enterprise resource planning (ERP) system based on range of JD Edwards Enterprise One applications from Oracle. The J.D. Edwards platform was integrated with maintenance systems at refineries, electronic weight bridges, and truck loading systems. These interfaces simplified workflows and reduced the need for manual intervention, minimizing human error.

The ERP system was implemented at more than 430 locations across India from 2003 to 2005, and is currently used by over 2,000 employees. CapGemini was selected as the implementation partner. The criteria used for selection are outlined in Table 5.19 below.

Table 5.19 – Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior oil & gas domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

5.10.3 RESULTS-BUSINESS TRANSFORMATION

5.10.3.1 Outsourcing

HPCL, decided to outsource part of its IT operations – like most companies in India. The common thread running through these large organizations is that all of them chose outsourcing as a strategic business decision to garner tangible and intangible benefits in the near and long run. The major driving factor for this was cost. Given the pressures of a competitive market, organizations tend to focus on their core activities — activities that link-up directly with the revenues and hence the profitability. In such a scenario, companies tend to outsource their non-core tasks to focus on business decision-making. And IT infrastructure easily lends itself to outsourcing. HPCL was no exception to this. They outsourced desktop client management, server management, cable management, firewall management, patch management, software license management, IT audits, backbone and connectivity, and IT infrastructure management. This resulted in the company getting the ability to offer services to its clients that were more innovative, significantly more customized, and better aligned with their requirements. They also used a judicious mix of hire-purchase schemes, infrastructure on-demand, and pay-as-you-use options provided by service providers. The core competencies of the company is shown in the diagram 5.61 below depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the

outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced. Refer to Exhibit 5.78 for elements which were not outsourced.

Diagram 5.61 - Core competencies and outsourcing
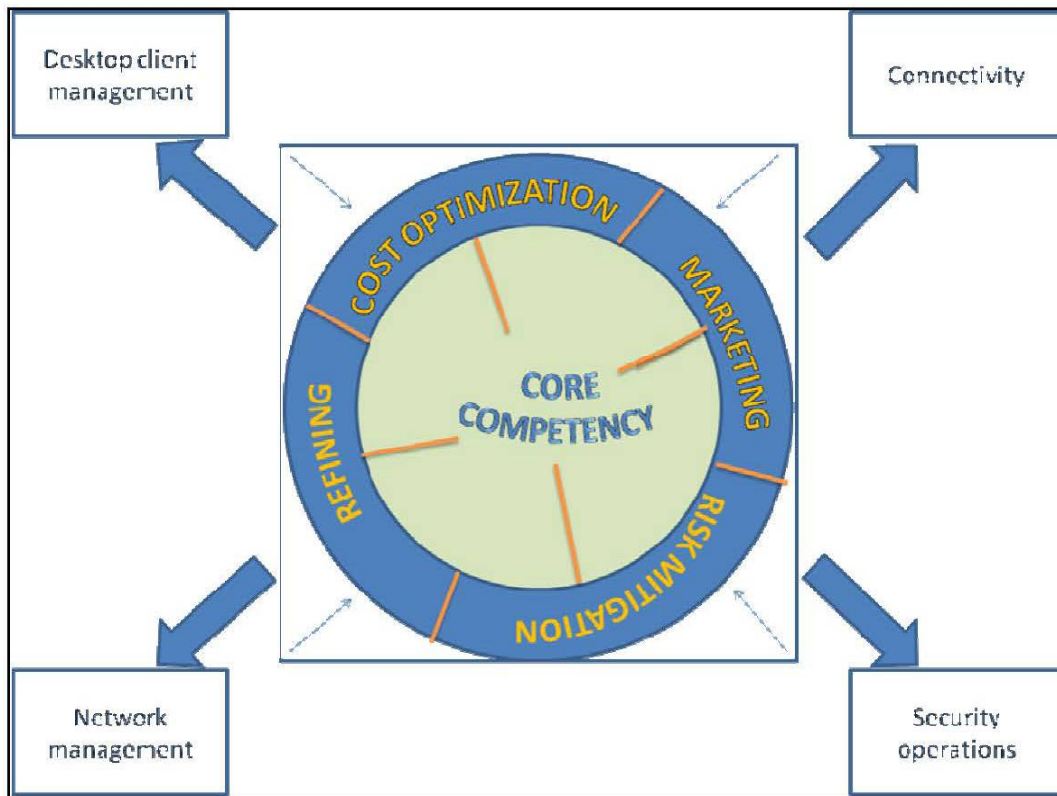
5.10.3.2 Effect of business cycles

HPCL had a desire to be present in every cycle of the business, be it E&P, refining or petrochemicals. The rationale behind this was that with this strategy it could offset the impact of a downward cycle in one sector with its presence in the other. The cut in customs duties and hike in excise duty in the budget in 2005 came as a dampener to refiners and marketing companies while a hike in global crude prices only complicated matters. During this period, HPCL's stock price fell by 18.7 percent as did those of other PSU oil companies. At the same time, arch rival Reliance gained over 5 percent due to its booming petrochemical business. Since refiners were getting import parity prices on their products like petrol and diesel, their

refining margins of 5-10 dollars a barrel remained protected technically and hence pure refiners did not bear a significant adverse impact of rising crude prices. Oil refining companies were adversely impacted by the cutting of import duty on petroleum products like petrol and diesel from 15 per cent to 10 per cent which resulted in lower revenues for refiners as they received import parity prices for petroleum products - the lower customs duty resulting in lower realizations. However, companies like HPCL that were into retail suffered as domestic prices were not increasing in proportion to the increase in crude price. The budget simultaneously raised excise duty on petrol and diesel which further worsened the impact. To counteract these influences, HPCL had to deploy IT and technology initiatives to improve its bottom line. This was done by reducing its GRM to low levels as well as expanding the 9 MMT refinery of Vizag to 15 MMT and exporting the petro-products and E&P activities. HPCL behaved like a typical cyclical – where IT spend happened when the cycle was at a downturn and measures needed to be taken to improve the bottom line of the company. This is illustrated in the following diagram 5.62.

Diagram 5.62 – Link between economic cycle and HPCL's business cycle
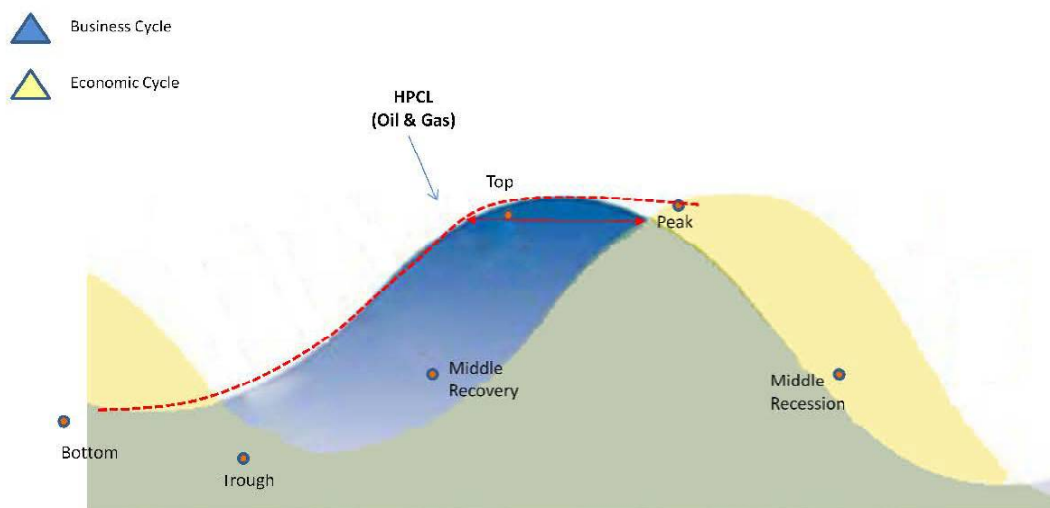
5.10.3.3 Transactional Ability

The real time, on-line availability of information from across all the geographically spread locations of the corporation on a centralized system, enabled HPCL to improve efficiencies in the areas of tracking and monitoring customer receivables, credit management, inventory

management and provide enhanced service to customers and other stake holders. Most importantly, upgrading an integrated business management platform gave HPCL an enterprise-wide view of its finance, manufacturing, human resources, and sales and distribution processes. Online access to information ensured managers could keep track of procurement, inventory, production schedules, and customer orders. The company also standardized business practices, ensuring process consistency across multiple locations – a factor that was missing in the earlier deployments. Tighter control of its business also helped the company improve productivity. In addition, a better understanding of its day-to-day operations assisted senior managers to make faster, better-informed decisions. For example, sales reports were electronically generated and delivered to regional managers and sales officers every day.

Diagram 5.63 - Stages of transactional efficiency
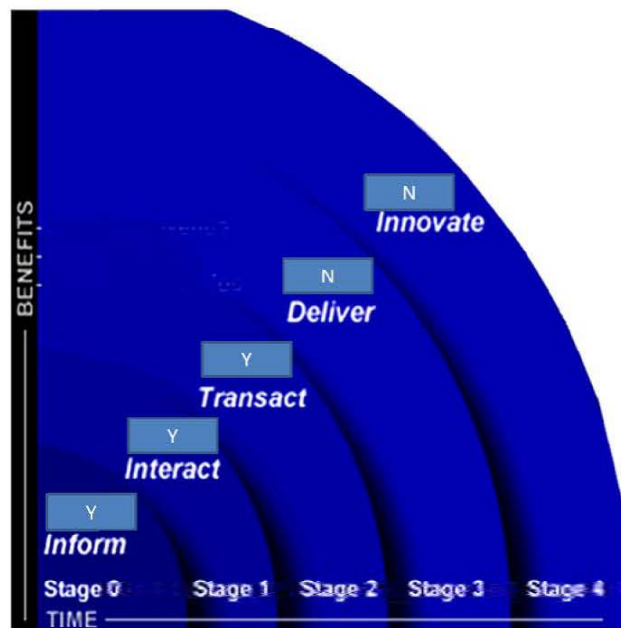
Another initiative was the implementation of a document archival system as an integral part of the ERP system, allowing HPCL to store invoices, purchase orders, checks, and other material. This ensures employees could locate critical documents quickly and efficiently while saving on the physical space requirements to store the hard copies of these documents.

A third initiative was the establishment of an extranet that the company designed in the form of a portal. The portal accessed information stored in the ERP's database to provide clients with dispatch details, account statements, and a history of sales transactions completed over the past three years. Customers could log in to the portal using a secure user ID and password. Separate portals for aviation, direct sales, LPG, and retail customers were established. HPCL realized further efficiency improvement when it streamlined its distribution processes and implemented new notification alerts. For example, the company's dealers and distributors began receiving e-mails and text messages via their cell phones informing them of the impending shipments. This greatly enhanced efficiency of the whole supply chain. The information is sent to dealers and distributors immediately following the generation of an invoice, enabling them to keep track of their orders. Diagram 5.63 above shows the stages of transactional efficiency

HPCL also developed an electronic payment system to promote faster payments to its vendors, contractors, transporters, and other service providers. The system was integrated with the company's bank, enabling payment information to be seamlessly transmitted between the two organizations and ensuring timely payment to suppliers. The company is replicating this model with multiple banks to offer the service to various categories of payees. The ERP communicates directly with the bank's systems to enable payment information to flow securely. The payment is effected by the bank through ECS, account transfer, EFT or by cheque. The implementation of e-payment has brought about transparency in the payment process and at the same time ensured timely payment to all vendors as well as reduced cycle times. The system has also been expanded to include on-line vendor registration through the Internet as well as hosting of tenders on the internet. HPCL is also working on a pilot for E-procurement that would gradually be expanded to cover procurement of a wider range of products and services and is expected to yield substantial cost savings. Exhibit 5.79 depicts the areas in which HPCL implemented operational efficiencies

5.10.3.4 Impact on workers

The organization underwent associated changes with the advent of the ERP. A change management program was established to facilitate a smooth transition to the new system for employees. Comprehensive training was provided to staff during the implementation, followed

by refresher courses post-deployment. Competency development programs for specific user groups such as regional managers, finance staff, heads of terminal/depot/LPG plants, sales officers, project engineers, HR officers and clerical staff were also conducted regularly.

Diagram 5.64 - Impact on workers due to technology.
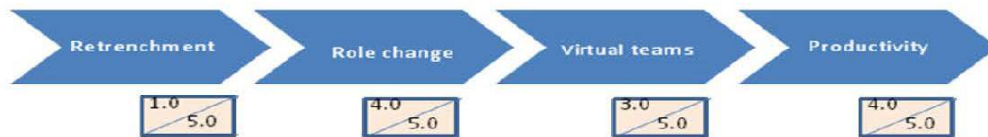
The organization also took initiatives into the e-learning space by organizing virtual training sessions from time to time to allow staff in remote locations to learn about new system features. This reduced travel time and cost for participants and enabled quick dissemination of new information to users. Diagram 5.64 above represents the impact on workers due to technology.

5.10.3.5 Security

HPCL has one of the strongest security setup in the country. Starting from prioritizing it's security policies to mapping business to these policies and installing a number of security related products, HPCL took sufficient measures to make its IT infrastructure secure. The company aimed for a zero incident culture, which believed in dealing with attacks, rather than making a system without attacks – which in today's world is a virtual impossibility. HPCL continuously stays current with emerging technologies and upgrades technology as applicable.

The company devised a wide range of security policies, which were reviewed annually and continuously updated as and when needed or with a change in technology. The security policy covers five major areas – Information System Security Policy statement (ISSP), coverage and objective of the policy, roles and responsibilities of various entities in the corporation with respect of information security. The ISSP covers in detail areas like Security duties and responsibilities, access controls, software security, hardware security, communication security, business continuity planning, e-mail and Internet usage.

Diagram 5.65 – Security adoption driving forces

In HPCL, auditing was performed on a quarterly basis and a trend analysis done as part of a risk assessment based on audit reports. Various processes were used for risk modeling, which included phases like asset gathering, asset valuation and risk management. Qualitative value of asset was derived based on the business impact on the three parameters - loss of confidentiality, integrity and availability. Refer to table 5.20 for a list of software deployed in HPCL.

Table 5.20 - Software deployed by HPCL

Table xxx – security systems deployed in HPCL	
Software	**Vendors**
Anti-virus for access node security	Trend Micro OfficeScan
Anti-virus for storage security	Trend Micro ServerProtect
Anti-virus for SMTP security	Trend Micro IMSS
Anti-virus for Web security	SWS
Anti-virus for Domino	Trend Micro Scanmail
Anti-Spam	Trend Micro
Two Factor Authentication ACE Server	RSA
NIDS	Symantec
Firewalls	Symantec

HIDS	Symantec
IM	Tivoli
Policy and Audit	Nessus/Tivoli
WAP Defense Pro	Radware

Any new business initiative had to go through the clearance of the security function in HPCL. This meant that every contract at the purchase requisition stage itself had to be vetted by the security team, which has a checklist for various aspects like Access, Hardware-Software requirements. Various security hardware devices like firewalls, content filters, NIDS, HIDS, IM, WAP and security management have been implemented for making the entire structure less vulnerable to external attacks. Cisco and Fortinet provides Firewall and NIDS for HPCL. Symantec Enterprise security is used for Security management. HPCL installed various antivirus systems for access node security, storage security, SMTP security with anti-spam , Web Security, and Domino, all provided by different manufacturers. Apart from these security measures, the also deployed biometric access for data centre access and encryption.

Refer Exhibit 5.80 for the top security risks and vulnerabilities and refer Exhibit 5.81 for trends in these countermeasures.

5.10.4 TRENDS

5.10.4.1 Cost performance Structures

The ERP system has substantially reduced the time taken for closing the quarterly, half yearly and annual accounts for HPCL. Tracking of cost of operations has become easy with the implementation of this system. There is an improvement in the management control due to standardization of various business processes.

Diagram 5.66 – Cost component reduction
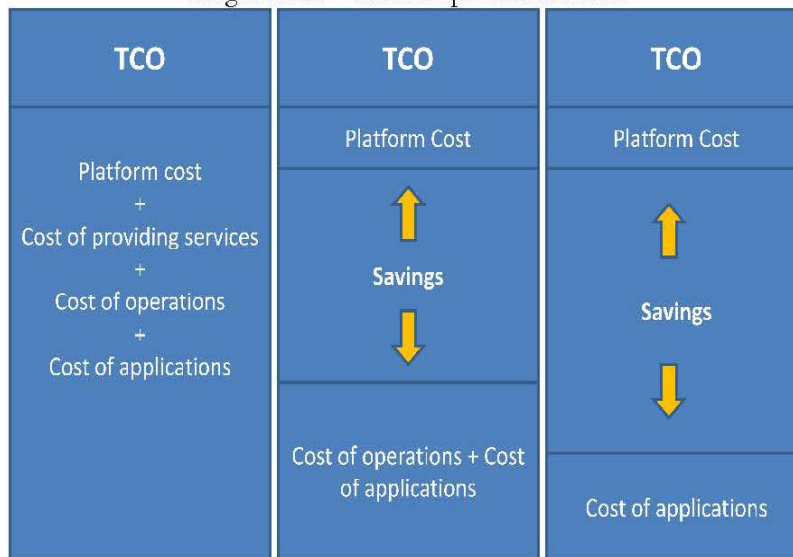
5.10.4.2 Architecture, Enterprise Management, and business continuity

Business Continuity: As HPCL's operations are entirely based on the ERP system, a highly available infrastructure was required. In addition to the routine backups, a separate disaster recovery centre (DRC) was set up to provide backup in the event of an emergency. The DRC mirrored the main server and ensures continuous system operation if the primary site experiences any problems or difficulties. It also enabled the main server to be shut down for maintenance work. HPCL focused on IT service continuity, and IT risk mitigation. HPCL users expected 100 percent network uptime. Managing such a huge network with multiple redundancies was a major challenge to the IT department since subdivisions of the company were totally dependent on the central data center for their day-to-day operations. Networks were required for operation 24/7 and 365 days a year, and therefore they needed to be managed and monitored with proactive corrective action. Refer Exhibit 5.82 for a technology maturation path of operating environments available at the time.

Enterprise Management: HPCL's network has a star-and-mesh architecture connecting over 300 locations. All these locations operate on different bandwidths, and these bandwidths depend on the volume of transactions handled. The primary network is VPN from a single service provider. In addition, the corporation has also implemented a satellite network (VSAT).

Diagram 5.67 – Business Continuity Planning

A state-of-the-art data centre in the Head Office at Mumbai hosts powerful enterprise servers, which manage the entire data and applications in a centralized architecture. The server functions have been consolidated to manage these servers. Some of the server functions are ERP, messaging systems, intranet portal, document management systems, performance management, SCM, mobile computing, the active directory and systems management and information security. These applications are hosted at the central data center in Mumbai.

Table 5.21 - Technologies deployed by HPCL

Technology	Product
Operating system	HP - UX, Windows, SOLARIS, NETWARE, and LINUX
Database	ORACLE and DB/2
Enterprise Application Suite	ORACLE-JDE Enterprise suite
Modules	Offshore Logistics
	Financials (FI)
	Materials Management (MM)
	Project System (PS)
	Maintenance and Repair (MRO)
	ORACLE Real Application Clusters

5.10.4.3 Enterprise Integration

HPCL is striving towards enterprise integration. It is taking all necessary initiatives to bring the company towards integration of internal processes as well as external linkages with suppliers and customers.

Diagram 5.68 – Major effects of Enterprise Integration
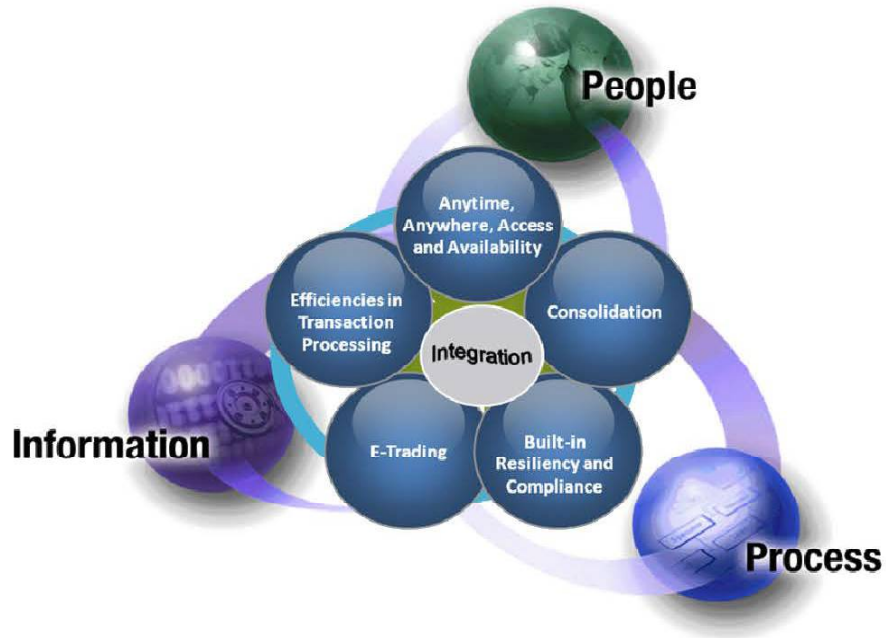
5.10.5 EXHIBITS

Exhibit 5.77 – HP revenues 2002-2006.
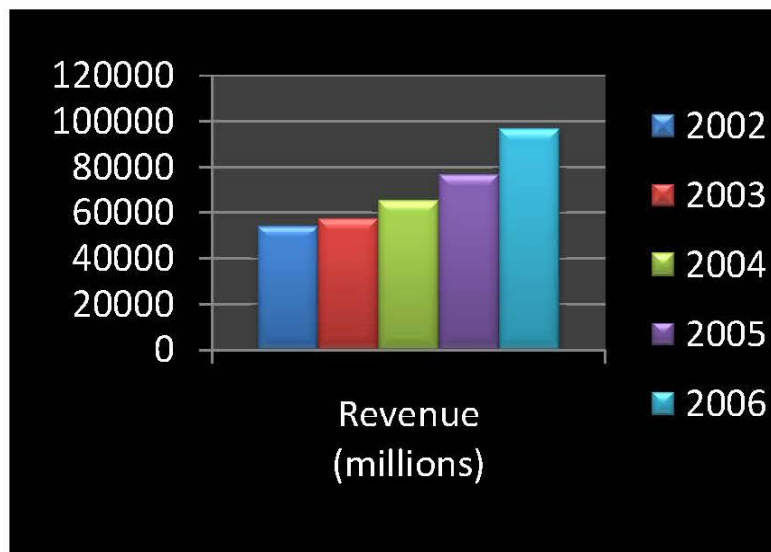
Exhibit 5.78 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

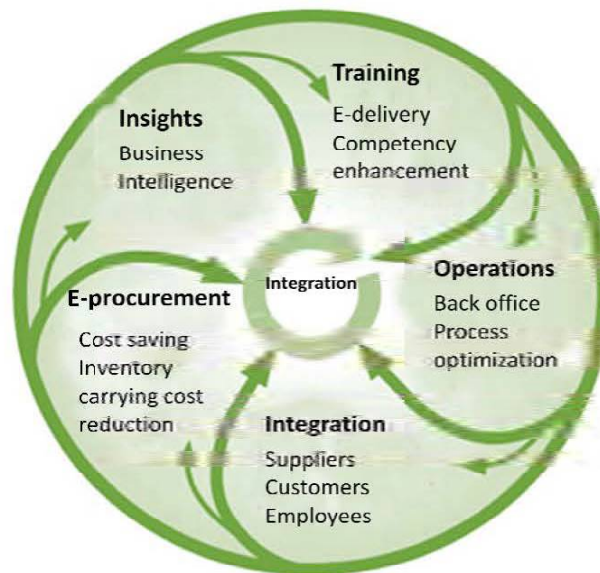Exhibit 5.79 – Areas in which HPCL implemented operational efficiencies

Exhibit 5.80 - Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware
Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information
Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information
Spam: Unsolicited or unwanted email messages
Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable
Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders
Vandalism/sabotage: Defacement, destruction, or other damage to the

organization's systems, network, or Web site
Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations
Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers
Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data
Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized
Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

Exhibit 5.81 - Security revenues by countermeasure category.
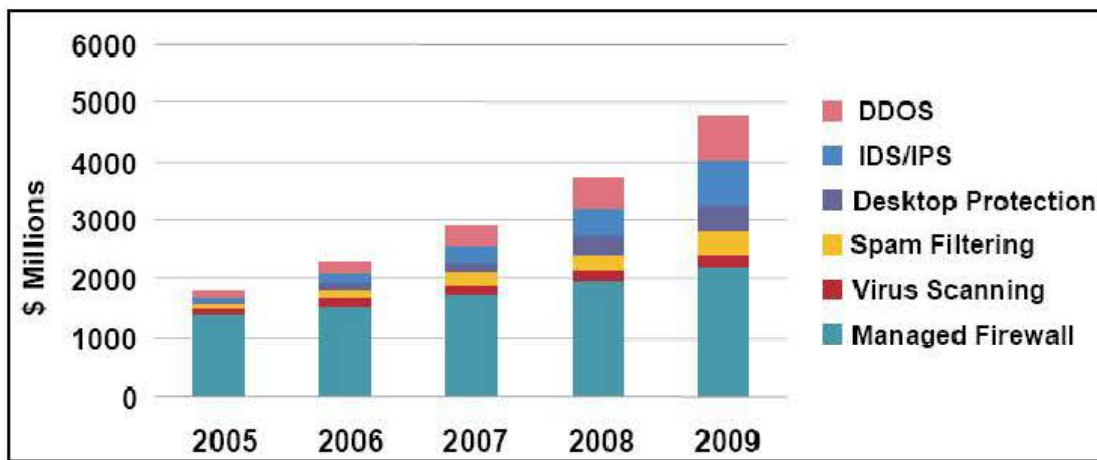
Exhibit 5.82 - Technology maturation path
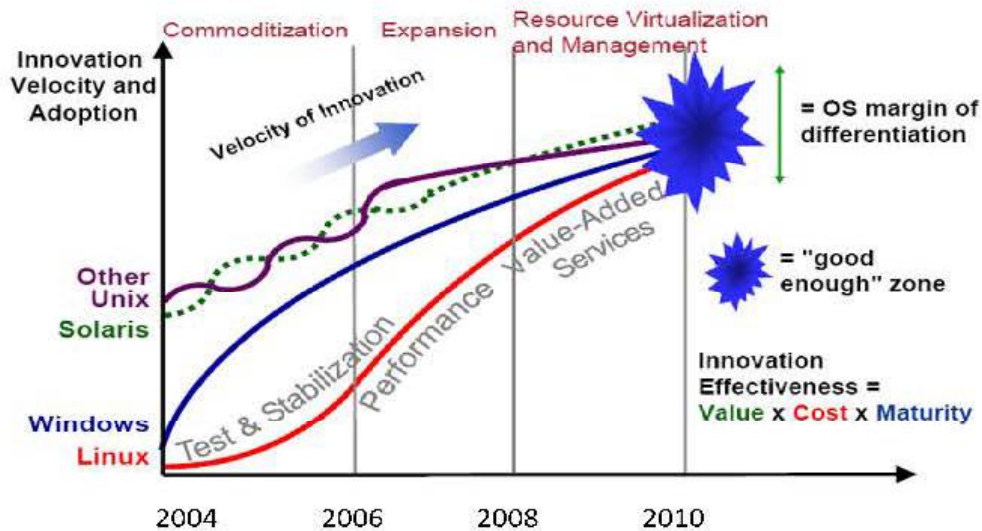
5.11 Case Analysis 8: ERG (Capgemini Case-2)

5.11.1 COMPANY BACKGROUND

ERG is the largest independent Italian group in the energy and petroleum sectors that is quoted on the Italian Stock Exchange. Refer Exhibit 5.83 for diversification and revenues of ERG. It is active in the processing of crude oil, in the distribution of petroleum products and production of electrical power. ERG accounts for 22% of the Italian refining capacity and it is the second operator in Italy in the sector. Its sales in the domestic market account for 9% of the national oil products consumption. Having 2246 employees, it is Italy's largest independent Italian Group in the Energy and Petroleum sector and the most important Italian exporter of petroleum products (mainly, gas, oil and petrol).

Its main activities are logistics and marketing in the domestic market. The ERG logistics system is one of the most extensive in Italy and it is strategically positioned to allow for the distribution of petroleum products throughout the country. Via the subsidiary company ERG Med (100% ERG), into which the ISAB Sud and ISAB Nord refineries in Priolo Gargallo (Syracuse) have merged, ERG manages one of the largest and most efficient refining complexes in Europe. Via the subsidiary ERG Power & Gas (100% ERG), ERG manages and develops the production and marketing of electrical power, steam and gas. In particular, ISAB Energy, certified ISO 14001, produces electricity via a power station with a capacity of 524 MW, which uses as its fuel syngas derived from the gasification of residues from the ISAB Sud refinery. Projects are already underway for repowering the two power plants inside the ISAB Sud and Nord refineries to 99 MW and 450 MW respectively. They will have natural gas as a feedstock. Via the subsidiary ERG Petroli (100% owned by ERG) ERG manages the marketing and logistics divisions; furthermore, ERG Petroli owns important shareholdings in two refineries: one in Trecate, near Milan, and one near Rome.

ERG Petroli distributes oil products throughout Italy via its 2,032 outlets which account for 7% of the national market. Besides this ERG Petroli also sells in the wholesale market, petrol, gasoil, fuel oil, bitumen and GPL through a network of wholesalers both in Italy and

Switzerland. ERG Petroli, also supplies other petroleum companies operating throughout the country with products. ERG Petroli distributes oil products throughout Italy via its 2,032 outlets which account for 7% of the national market. Through ERG Petroleos (wholly owned by ERG Petroli) ERG Petroli is also active in the retail and wholesale market in Spain. ERG is also active in the power space and manages its activities for the production and sale of electricity through ERG Power & Gas (owned 100% by ERG).

5.11.2 EXISTING IT LANDSCAPE

ERG's aim was to take the lead as early adopters of technology thus leveraging IT for strategic advantage. ERG was growing rapidly and needed to go beyond its isolated IT systems and standardize all business processes across Italy. Outdated mainframe and disparate software platforms in place were lacking scalability. ERG's attention was focused on creating one common system, company-wide for Italy enabling all locations to operate in harmony thus maximizing shareholder value by increasing cash flows, employing capital efficiently and stabilizing earnings. Additionally, they were diversifying into becoming a multi-energy company, widening the portfolio of products traded and produced in refining, marketing and logistics, power and gas.

CapGemini was selected as the implementation partner. The criteria used for selection are outlined in Table 5.22 below. Capgemini took ERG through three projects, from Business Process Reengineering to implementation of IS-Oil components and business intelligence using the SAP Business Warehouse. The system was interfaced with GEIS (General Electric Information Services) that allows ERG to receive during the night all the stock movement (purchases) made among the other subscribing oil companies. ERG has now moved to a fully integrated system that is ready for future expansion as the business grows.

Table 5.22 – Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments
Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support
Prior oil & gas domain experience
Ability to bring business practices used by the most successful companies to the table
Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements
A past record of delivering value to clients with on-time and on-budget projects

5.11.3 RESULTS-BUSINESS TRANSFORMATION

5.11.3.1 Outsourcing

Diagram 5.69: Core competencies and outsourcing
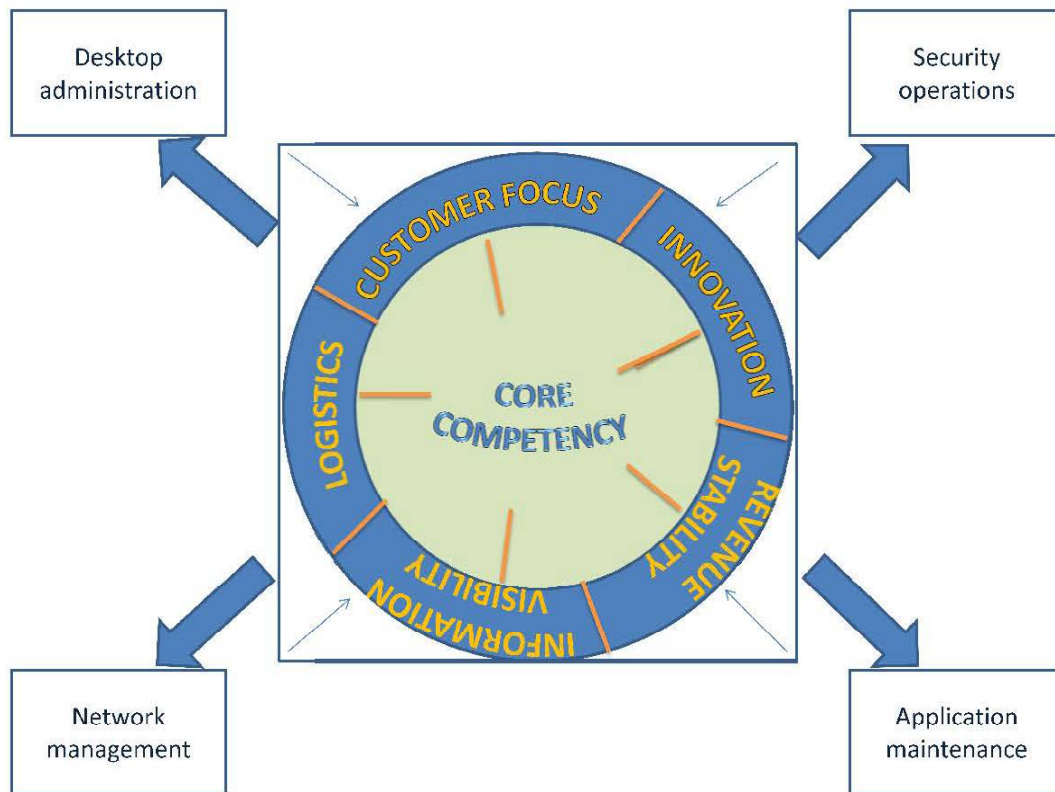
ERG initially chose not to outsource its operations and to perform its tasks in house using its own employees. For this a separate division was established that dealt with the areas of network management, desktop administration, security as well as development. However, in 2005, they decided to outsource these areas to give them cost advantages as well as enable them to focus on their core competencies. While they retained ownership of the assets in terms of hardware and software systems, their operation was outsourced. Strict SLAs governed the agreement. The decision proved to be a good one for them as it gave them substantial cost savings as envisaged. At the same time, they did not outsource the IT visioning for the company. The core competencies of the company is shown in the diagram 5.69 above depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced.

Refer to Exhibit 5.84 for elements which were not outsourced.

5.11.3.2 Effect of business cycles

ERG began in the Oil & Gas space and hence was affected by the business cycles prevalent in oil and gas. These are shown in Diagram 5.70 below. However, one of the primary objectives of the company was to stabilize revenues. To do this they began diversifying into other energy verticals like Power and Wind. These cycles had an impact on their bottom lines with their marketing costs escalating without showing their proportionate returns. Simultaneously their GRM (gross refining margins) reduced as well. To achieve their growth objective, they chose to seek the help of IT through the initiatives they deployed. At the same time, focus on the alternative, clean energy areas especially in their wind power generation sector through their subsidiaries like Enertad helped them ride out the effect and lessen the impact of down-cycles. However, IT- spends overall increased even during down-cycles with the primary aim being to drive down costs and increase the bottom line. Refer Exhibit 5.85 for the Western Europe IT spend and growth pattern.

Diagram 5.70 – Link between economic cycle and ERG's business cycle
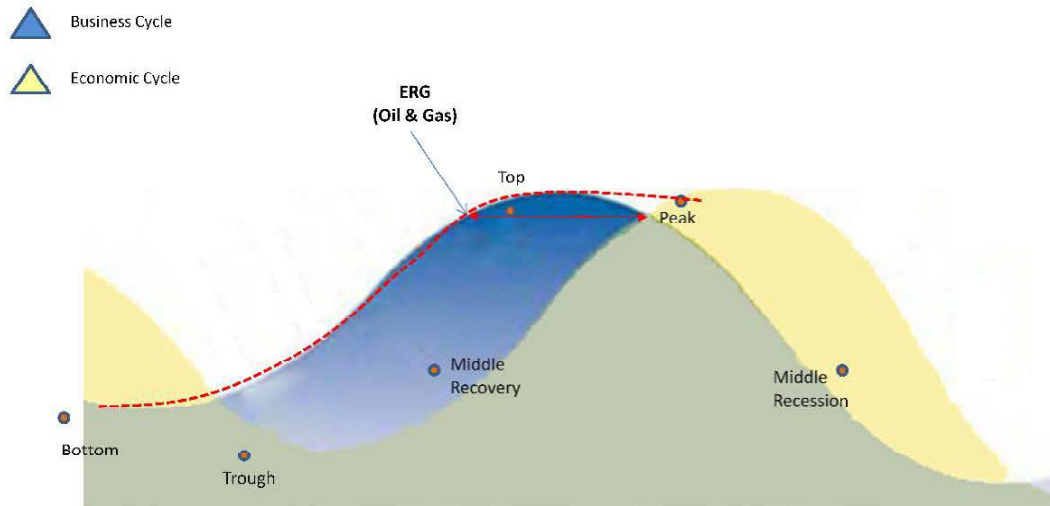
5.11.3.3 Transactional Ability

The initiatives of change began with an extensive business process reengineering exercise. This was preceding the ERP implementation. Capgemini defined an Enterprise Model for ERG's - 'mega process' and 'major processes' comprising:

- strategic planning

- network optimization

- market scenarios

- supply and refining

- operation to production

- distribution

- retail infrastructure

- non-retail sales

- Business infrastructure.

For each of these processes, Capgemini defined and examined ERG's operating procedures for people, processes and technology before selecting SAP Oil & Gas industry vertical solution, IS-Oil. Diagram 5.71 below shows the stages of transactional efficiency

ERG was the first oil and gas group in Italy to implement SAP IS-Oil. The Exchange & Throughput Handling modules for Supply within IS-Oil supported the core business functions of ERG. Capgemini upgraded to 4.6b release modules and implemented new modules euro Conversion, Service Station Retailing, Fleet and Credit Card, Franchising, Real Estate. The non-oil SAP R/3 modules in place at ERG were FI, CO, MM, PM, and PS.

ERG decided to manage directly its service stations (approx. 40). In order to do this, ERG created two companies as new businesses. For these, Capgemini implemented modules FI, CO, MM and the SAP interfaces to take information directly from the field (Pump Sales Meter Data and Retail Shop Cash Registers).

Diagram 5.71 - Stages of transactional efficiency
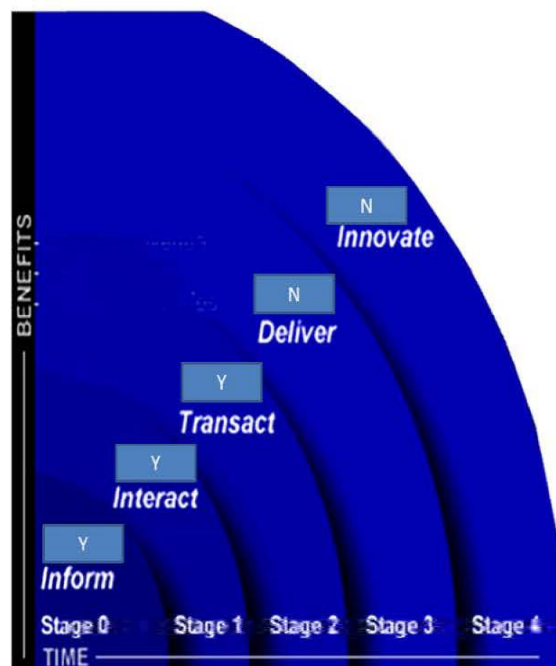
Capgemini received the first customer shipment of BW in the world for versions R2.0A and BC Is-OIL. This project, for ERG, included Data Modules SD MM for Oil (Wet Stock), MM (non Oil - Dry Stock), PM, PS, SSR (Service Station Retailing).

Capgemini interfaced the ERG SAP system with GEIS (General Electric Information Services) to exchange the Bill of Loads with the other Italian oil companies. This allowed ERG to receive during the night all the stock movement (purchases) made among the other subscribing oil companies and permits visibility on information with an updated bill of load. This was the only world-wide area network that allows oil companies to balance their exchanges and acted as a revolutionary concept in terms of information interchange within a vertical.

The benefits ERG due from the SAP and Capgemini Strategic Global Alliance partnership included:

- A wider and broader geographic reach with the ability to provide customer intimacy with local operations in multiple geographical regions.

- Access to a die variety of global sourcing, skills and competencies (facilitated by onshore, nearshore and offshore models.)

- Increased domain knowledge through an Oil & Gas Center of Expertise (CoE) — which is a community of consultants using industry-specific process scenarios and providing helpdesk facilities and access to specialized SAP consultants.

- The SAP IS-Oil solution was the first industry solution installed at the Capgemini Center for Connected SAP Solutions (CCSS). The CCSS provides training & demonstration support in Walldorf, Germany as well as in other European Capgemini offices.

- The deployment gave ERG the technological base to move to a fully integrated system that will be ready for future expansion as the business grows.

- The system offered ERG more focus on its market through enhanced visibility into patterns of data provided by the data mining solution. This led to the more efficient customer handling and improved reporting and information management.

- The system also enabled ERG to get a greater level of visibility into its operations and perform profitability analysis across all its business areas.

- Provided ERG's distributors and partners with the flexibility to implement local marketing programs throughout the distribution network by virtue of the information they could access.

- Provided the marketing department with strategic information inputs to be used for shaping campaigns.

- Enhanced levels of IT and data security

- Enabled real time simulations, comparisons, and analysis to improve business intelligence

- Enabled budget construction based on quantitative and economic elements linked with commercial levers identifying key decision-making variables

Exhibit 5.86 shows the areas in which ERG implemented operational efficiencies

5.11.3.4 Impact on workers

The company wanted to gain visibility into profitability across all business areas and provide distributors and partners with flexibility to implement local marketing programs throughout the distribution network. The challenge was to provide marketing network with strategic support, enhance IT and data security and improve market insight. The company implemented Oracle infrastructure software to create a cost-effective, high-performance IT platform as the foundation for the company's Opera system. The company enabled real-time simulations, comparisons, and analysis to improve business intelligence.

Diagram 5.72 - Impact on workers due to technology.

The organization also faced a number of necessary internal changes because of the implementation. There was a delegation of power and a shift from a hierarchical structure towards smaller teams that worked across boundaries, which were empowered to make decisions supported by IT. This led to the staff most familiar with territory requirements, to

make sales and marketing recommendations quickly – which were accepted. The system also enabled ERG Petroli's data warehousing and mining system to permit what-if analysis of these marketing recommendations—from simulating new discounts to invoicing pricing changes. The simulations were representative of real world situations and this contributed to increasing the employee efficiency, since the possible business results of a decision could be predicted within certain parameters.

ERG also deployed TradeCapture's ICTS Symphony and Transportation Management products to integrate its crude oil and refined products trading business. ICTS Symphony is a fully integrated, multi-commodity trading and risk management system that operates across the entire transaction chain and supports all Physicals, Swaps, Futures, OTC Options and Exchange Traded Options. It pinpoints the value of a position in real-time, precisely tracks the total risk position under any given set of transaction variables and manages all paper and physical transactions in one system. The software eliminated data entry duplication and it benefits its users with improvements in workflow, risk management, identification of trading opportunities and overall efficiency. TradeCapture's Transportation Management system manages all the various oil products transportation phases, ranging from contractual activity to costs finalization. Transportation Management also manages the operational logistics area referred to as "maritime transportation" and "transportation via pipeline." Diagram 5.72 above shows the impact technology had on workers.

5.11.3.5 Security
ERG, over a period of time had deployed a number of enterprise applications. While these applications helped the company to streamline businesses processes, at the same time, if they were not properly managed, they had the potential to create an environment where user information was fragmented and difficult to manage centrally. The company also had a business need to make internal applications available to partners and customers, while assuring the security of critical corporate resources. ERG adopted an application server (middleware) approach towards implementing its security. They used directory based access to define user roles and access permissions across the enterprise. This enabled them to implement initiatives like single sign-on (SSO) across the enterprise and not have to depend on multiple

authentication modes for different applications. The security architecture adopted by them is illustrated in diagram 5.73 below.

Diagram 5.73 – Security architecture at ERG
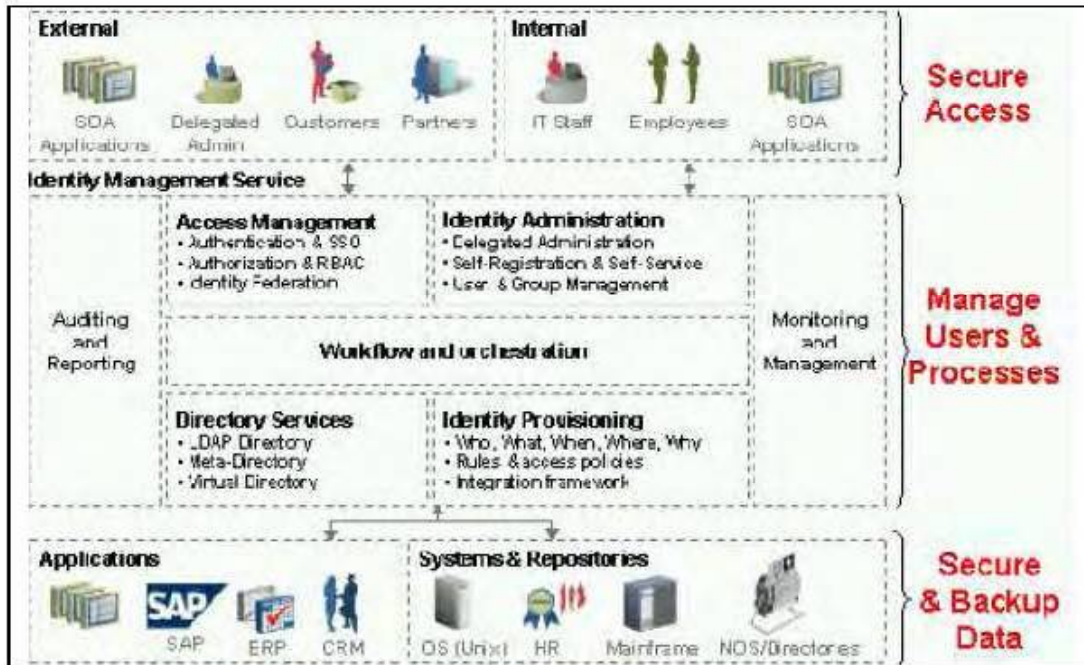
ERG deployed agents on a variety of platforms such as web-servers and proxy servers to centrally control all access requests and, based on centrally stored and managed policies, challenge the end user for authentication according to the required security level. Microsoft Active Directory domain logon via Kerberos tickets and impersonation was deployed such that the authentication manager could actually trust a session initiated in the user's Windows desktop. This eased user administration tremendously. To protect its end point desktops and gateways, they deployed the Symantec suite of products – Mail security, and the Corporate enterprise edition suite. The main drivers for its security model are shown in the Diagram 5.74 below.

Diagram 5.74 – Security adoption driving forces

Refer Exhibit 5.87 for the top security risks and vulnerabilities and refer Exhibit 5.88 for trends in these countermeasures.

5.11.4 TRENDS

5.11.4.1 Cost-performance structures

The choice of architecture had an impact on cost structures reducing the total cost of ownership for the company for purchased hardware. More importantly, however they also realized cost savings in the deployment of the SAP GUI as it was one of the streaming applications that was centrally installed on the servers. Thus, newer releases of the GUI could be provisioned in a fraction of the time and cost to implement on local desktops or mobile devices across ERG's user base. Additionally, since the applications execute on the Citrix server, only minimal data is sent over the network, compared to a traditional SAP client/server architecture. Bandwidth needed to access SAP was thereby reduced by up to 60%, saving money and improving performance over the existing network. Additionally, the security solution deployed helped them avoid downtime and data losses per employee thus raising

productivity per employee. This translated to savings of more than $1,50,000 a year. Diagram 5.75 below shows the cost component reduction

Diagram 5.75 – Cost component reduction
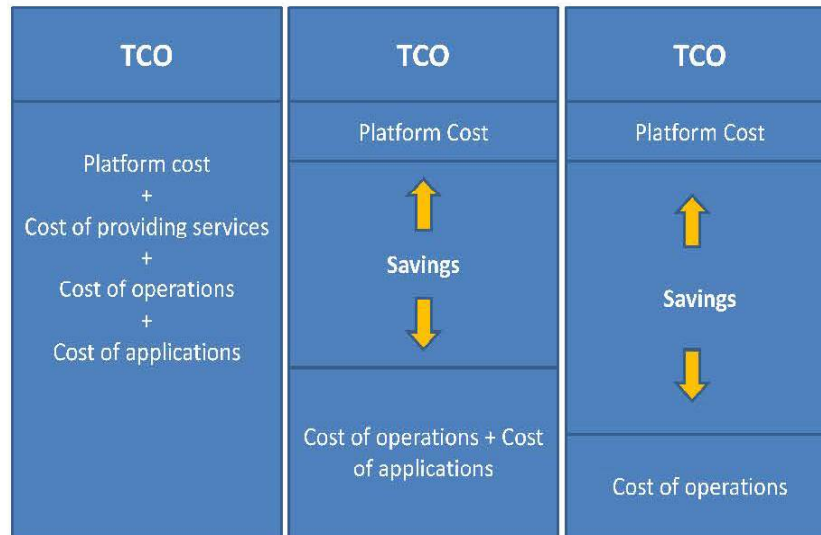
5.11.4.2 Architecture, Enterprise Management, and business continuity

Architecture & Enterprise Management: The company moved from its mainframe based environment to a thin client based one based on Citrix Metaframe Presentation server running on Windows 2003. Clients from multiple locations could get access to streamed applications based on their requirements from a remote server farm. Additionally, ERG went in for virtualization – using VmWare ESX server. This allowed the company to consolidate all the different SAP software components onto a single server, while still being able to maintain each component as a single entity. Additionally the system also handled load balancing requirements across the SAP software components and yet allowed dedicated resource allocation in an implementation of 'on-demand' computing. By virtualizing CPU and I/O capacities, the systems had the flexibility to accommodate changes in workload characteristics, yet retaining scalability. In addition, with all SAP software components residing on a single server, network traffic was minimized – resulting in better overall performance especially in conjunction with the Citrix environment.

Table: 5.23- Technologies deployed

Technology	Product
Operating system	Windows, SOLARIS and LINUX
Database	ORACLE
Enterprise Application Suite	SAP IS-Oil
Modules	Offshore Logistics Financials (FI) Materials Management (MM) Project System (PS) Maintenance and Repair (MRO) Oracle Database Oracle Partitioning Oracle Application Server Oracle Real Application Clusters Oracle Enterprise Manager Grid Control Oracle Developer Suite Oracle Business Intelligence Citrix Metaframe Presentation Server

Business Continuity: ERG chose Tivoli Storage Resource manager to handle the Backup/Recovery and Archiving functions enabling the centralized management of all backup and archiving processes for the entire SAP software landscape. High availability was a key requirement, as the entire operation depended on centralized systems. The design needed to cover two distinct cases: first, the unpredicted failure of system components (either hardware or software), and second, the planned downtime required for system and component maintenance. To simplify matters, both cases required a single outcome. As system maintenance was a regular task performed multiple times every year, it provided an opportunity to practice the procedures for failover to the secondary system. In case of an unplanned system failure, these tested and verified procedures are executed automatically. They adopted a two data center strategy to eliminate single system failure (e.g. power outage, fire, etc). The second data center would come into play in case of major outages like earthquake, chemical disaster in the primary location etc. Each data center was equipped with sufficient machines to run the entire SAP solution landscape. For workload balancing, the production workload was split across the two data centers.

Diagram 5.76 – Business Continuity Planning

The complete environment is located on a Fiber Channel attached storage environment (SAN) and mirrored through the Logical Volume Manager (LVM) to the secondary site. Failovers are implemented automatically if the system detects that one of the resources required for the whole operation (OS, Application server, or Central instance) is failing. The only exception to the mirroring with LVM is the database component which was implemented as a hot-standby. This reduced the fail-over time for the database to seconds. Tivoli Storage Manager (TSM) was also used to set up a fiber-channel based (LAN-Free) backup solution for the major SAP components. Data was transferred from the storage systems directly to a tape library managed by TSM, minimizing the impact on CPU and I/O within the production environment. By focusing less on single points of failure and more on total system availability, the high availability architecture went a long way in ensuring business continuity for the company.

Refer Exhibit 5.89 for a technology maturation path of operating environments available at the time.

5.11.4.3 Enterprise Integration

Diagram 5.77 – Major effects of Enterprise Integration
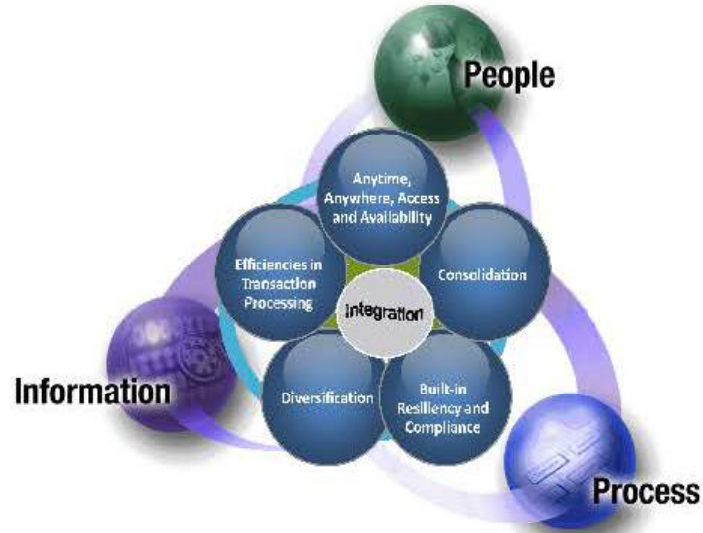
The company is moving towards enterprise integration. It has successfully consolidated and integrated its internal processes and is moving towards external linkages in its operations.

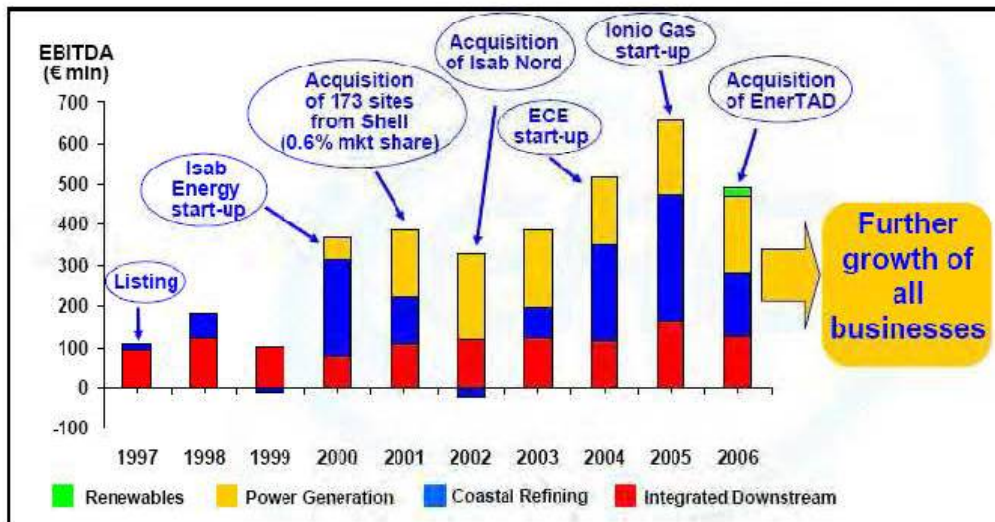### 5.11.5 EXHIBITS

Exhibit 5.83 – Diversification and revenues

Exhibit 5.84 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

Exhibit 5.85 – Western Europe IT spend and growth pattern

Western European IT Market Growth Patterns
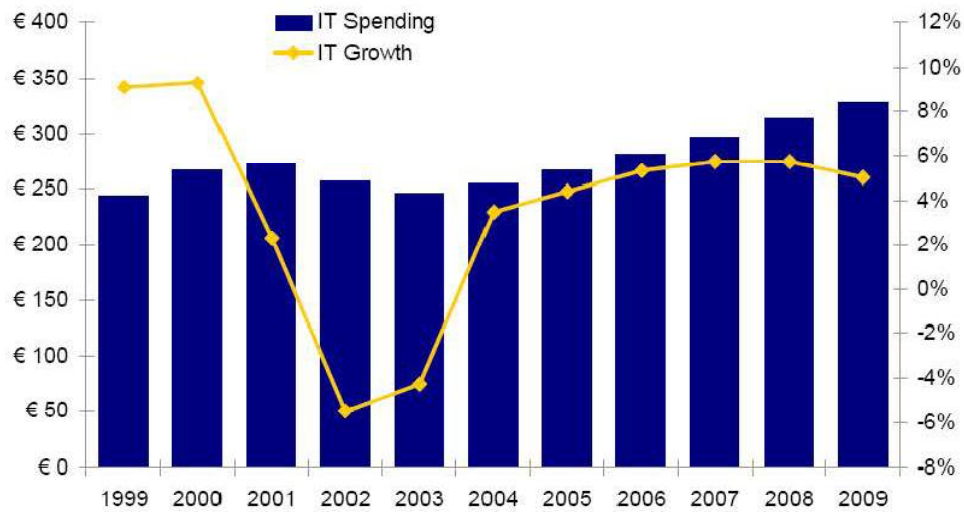
Source: IDC, 2005

Exhibit 5.86 – Areas in which ERG implemented operational efficiencies

Exhibit 5.87 – Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware

Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information

Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information

Spam: Unsolicited or unwanted email messages

Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable

Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders

Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site

Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations

Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers

Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data

Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized

Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources

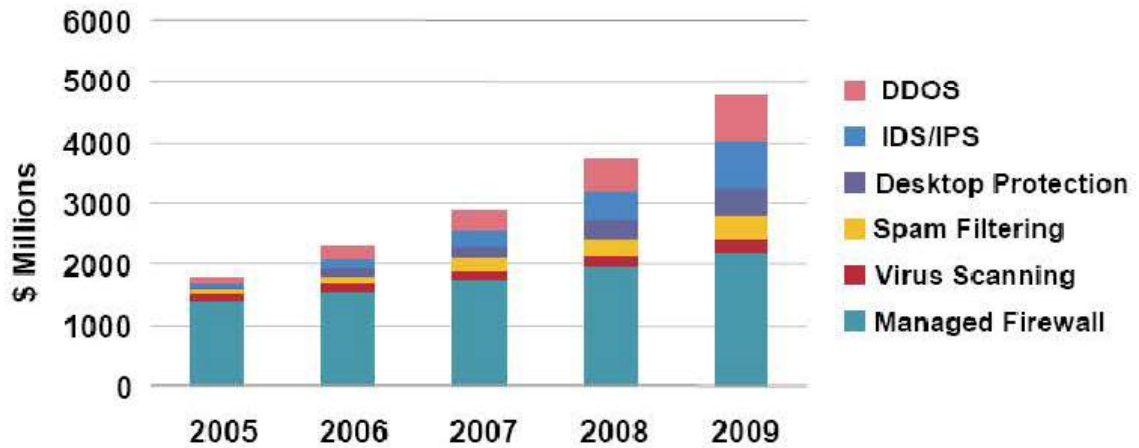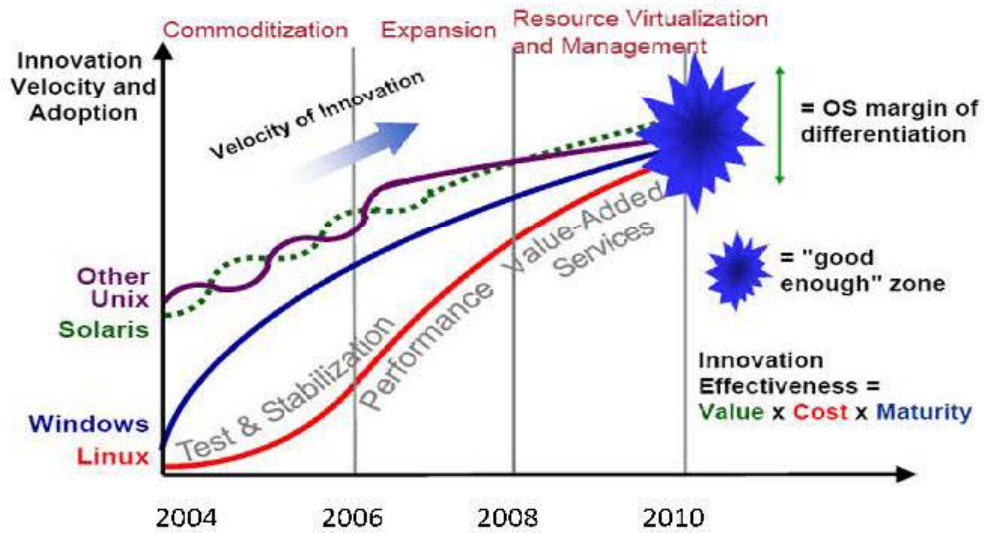Exhibit 5.88 – Security revenues by countermeasure category

Exhibit 5.89 – Technology maturation path

5.12 Case Analysis 9: OMV-Petrom (Capgemini Case-3)

5.12.1 COMPANY BACKGROUND

Petrom is a Romanian oil company, the largest corporation in Romania and the largest gas and oil producer in Eastern Europe. In the late 2004, Petrom was privatized by the Romanian state and sold to Austrian oil company OMV. As a consequence, OMV/Petrom has a de facto monopoly on the oil production of Romania and OMV has now doubled its market share in the Danube region to 18% to become the largest oil and gas company in South-East Europe. As of 2005, it was the largest privatization deal in Romania's history. OMV controls 51% of Petrom's shares. The other shareholders are the Romanian state (40.74%), EBRD (2.03%), and others (6.23%). Apart from its operations in Romania, the company operates in Bulgaria, Serbia, Hungary, Moldova, Kazakhstan, Iran and Russia. In Moldova it operates 73 filling stations, being one of the leading oil companies, alongside Lukoil. In Hungary, there are 2 Petrom filling stations. In January 2006, Petrom purchased OMV's operations in Romania, Bulgaria and Serbia and Montenegro. Refer Exhibit 5.90 for financials of Petron. As a result of the transaction, 178 OMV stations operating at the highest standards belong now to Petrom and will continue to operate under the OMV brand. With significant investments of €500 million until 2010 in the marketing business alone, Petrom will consolidate its leading market position in SEE.

5.12.2 EXISTING IT LANDSCAPE

CapGemini was selected as the consulting company collaborating with OMV in developing the post-acquisition strategy for the Finance and IT division and conducting the implementation. The criteria used for selection are given in Table 5.24 below. The company had a complex IT landscape – OMV was at the forefront of technology having implemented a number of initiatives. The organization was leaner than Petrom. However, Petrom had scale going for it. The company faced the problem of administration, provisioning and maintenance services delivered by multiple third-party providers, not to mention the headache of storing and

retrieving vast volumes of associated documentation. Additionally, there were a number of manual processes supported by a lot of paperwork.

Table 5.24 – Criteria for selection of consulting company

Expertise on a variety of vendor systems and environments

Core competency in providing turnkey solutions ranging from consultancy, design, development, customization, deployment, performance-testing and on-going support

Prior oil & gas domain experience

Ability to bring business practices used by the most successful companies to the table

Expertise coupled with the technology skills to recommend the most appropriate technology solution and configure it to specific requirements

A past record of delivering value to clients with on-time and on-budget projects

The transformation, due to be completed in 2008, represents the largest project ever in Romania to centralize IT and accountancy services.

5.12.3 RESULTS-BUSINESS TRANSFORMATION

5.12.3.1 Outsourcing

Petrom adopted a unique model in terms of outsourcing – whereby it not only outsourced its non-core activities but also some of its core ones. SGS signed a long-term agreement with OMV, Central Europe's leading oil and gas group, to operate OMV's engine test bed facility in Schwechat, Vienna. Under the outsourcing agreement SGS operated the facility which provides engine, gear and injector testing; evaluation of new engines for durability, wear properties, fuel consumption, lubricants and emissions studies. This was later expanded to have SGS operate its tank farms in Austria, starting on November 1st 2006 in Graz. This agreement involves the management of all operations of the tank farm, which stored and handles mineral oil fuels and heating oils. The core competencies of the company is shown in the diagram 5.78 depicting that the company consolidated around its core competencies (depicted by the inward pointing arrows); whereas the outsourced elements are shown by the outward pointing arrows and denote the elements that were outsourced.

Diagram 5.78: Core competencies and outsourcing
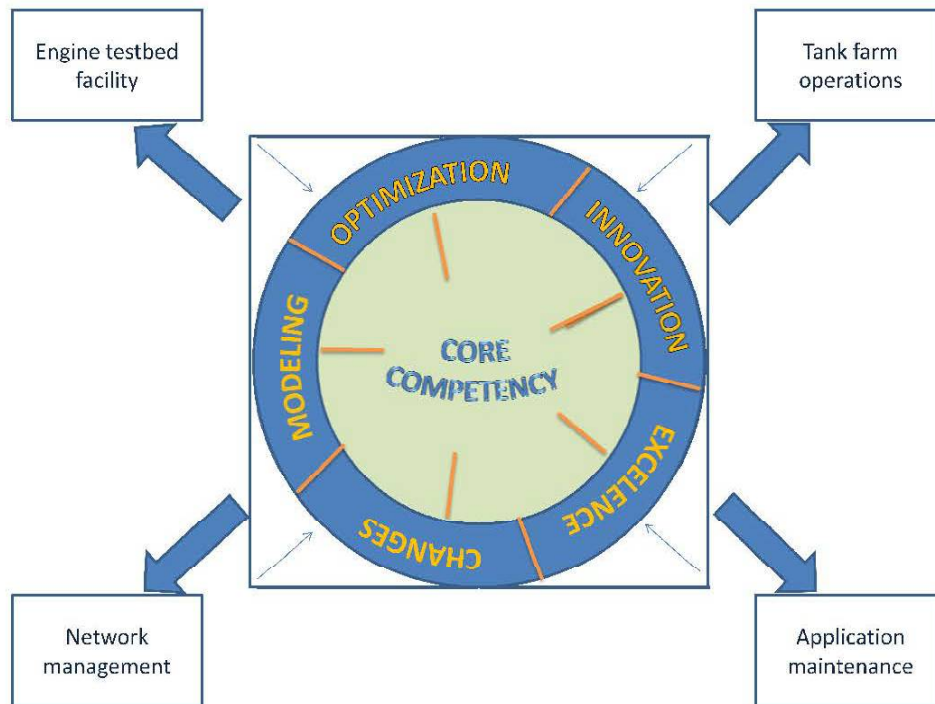
The tank farm provided services for clients and distributors operating in Austria and neighboring Slovenia. On the IT front, they outsourced the operation of their entire corporate network for 5 years to Siemens Information and communications group in Austria. This comprised the operation of all fixed-line, mobile and data communications in Austria and all OMV locations in 15 countries around the world. As part of this full communications outsourcing over 8,000 users in Austria alone were networked with the latest in advanced telecommunications technology. This was the first project of its kind in Austria and was run centrally from Vienna for locations across the world. Exhibit 5.91 lists the elements that were not outsourced.

5.12.3.2 Effect of business cycles

Diagram 5.79 – Link between economic cycle and Petron's business cycle
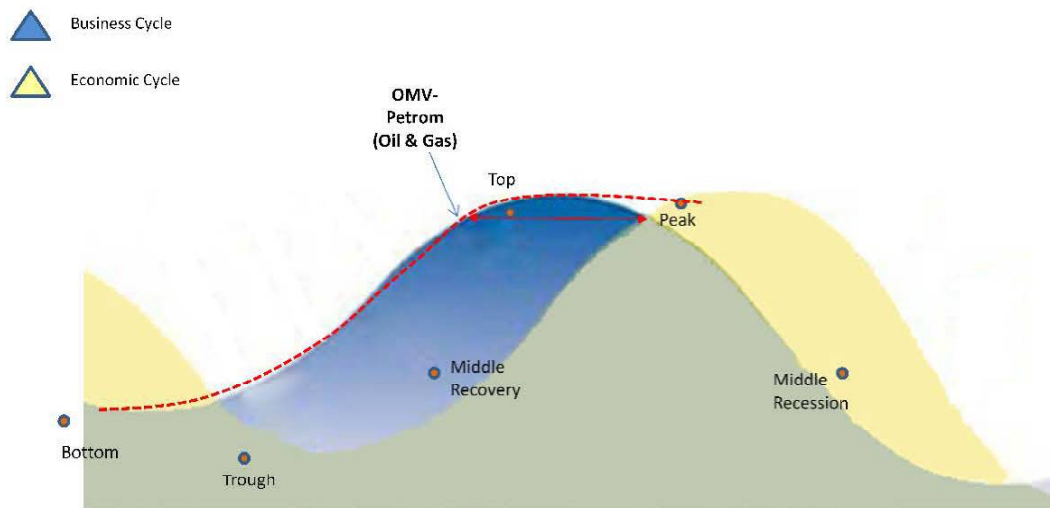
OMV-Petrom operated is an economic climate improved steadily since 2001. At present Romania still has growth-rates of more than 5%. This was more than double the size of the EU average. Inflation and unemployment seem to be largely manageable at under 6% in each case. Some sectors, such as the automotive industry, are booming. The currency, the new Leu, seems to be stable and consolidated. Due to its multi-product presence in multiple sectors of Oil & Gas and Petrochemicals, OMV IT investments were counter-cyclical. For example, in petrochemicals, investment was deliberately made when the plastics industry was at the bottom of its economic cycle in order to benefit from an expected upturn in 2005/06. This was also in tune with global business cycles – where there was an increasing demand for plastics in Asia. This trend accelerated in that region and impacted Europe in the second half of 2003. Due to this factor, the business cycle of Petrom was linked to the business cycle as depicted in diagram 5.79 above and IT investments were made correspondingly.

5.12.3.3 Transactional Ability

The large-scale transformation process centralizing all relevant Finance and IT functions to the biggest Service Center in South-East Europe is at the heart of the program. Based in Bucharest, the Center will maintain all relevant Petrom Finance and IT processes across the entire company. All major processes are aligned, and SAP is implemented in Finance, Logistics and Human Resources as the core IT system. Thus, the entire IT infrastructure of Petrom will

be upgraded to a common international standard. These activities need to be coordinated with relevant partners for areas such as HR or Facility Management, and aligned with requirements of various Business Divisions. Hence, the overall process has to be well structured and organized. Planning the Service Center roll-in comprised intense communication and systems preparation following branch visits and deregistration. Important first steps were implemented, substantially increasing closing speed and reliability during the first months.

Diagram 5.80 - Stages of transactional efficiency
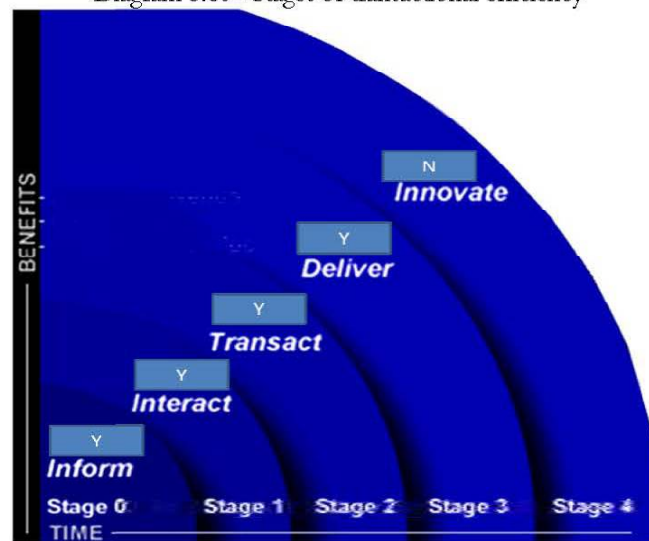
Another initiative implemented was a web analytics solution for their website – which evolved into a portal. OMV's enterprise portal was launched in September 2002. It was unique in the sense that it successfully integrated the company's intranet, extranet and Internet pages through a single site, www.omv.com. Running an effective and successful portal depended on getting timely information to broadly three types of information consumers. The first type – content managers wanted to know how many and what sort of people have seen the content they have published. They wanted to know which the most popular pages were and how long visitors stayed to read them. Portal managers needed figures on the general traffic on the portal: how many people visited, where they came from, which campaigns were the most or the least successful, and other relevant aspects of the portal's usage. Finally, portal administrators wanted to see figures on the current data volume, to be able to forecast trends to ensure that the infrastructure had the capacity to meet the future traffic loads. Therefore,

early in 2003 OMV teamed up with SAS on a project to provide standard and custom statistical reports together with sophisticated analysis of portal activity. This would provide the necessary information for the strategic development and planning of the portal – for example, by enabling OMV to structure content according to the profiles of particular target groups (personalization) and by developing the portal in line with the e-business requirements of both OMV and target groups. These target groups were not necessarily just other companies, but rather interested parties or groups of people with whom OMV was in contact with through the portal: customers, shareholders, employees, suppliers, subsidiaries and joint venture partners, governments, banks, journalists and interested members of the general public. In other words, OMV's portal attracts a highly diversified audience, with different information requirements and a wide range of languages. All the raw data to answer these questions existed in the Web content management logs and in the observation log files. The basic service requirement was to integrate that data and to present it through standard and ad hoc reports. SAS Web Analytics offered key benefits like expandability, scalability and ease of integration making it an ideal choice for Petrom. The project began in 2003 and finished in two months. Petrom was able to get reports on 50 content groups (internal and external) to 15 content managers, covering statistics on the number of sessions, page views, average dwell time and top 25 content pages as well as a set of standard reports meeting portal managers' needs for information on traffic, session duration, forecasts, searches, referrers and so on. Finally, IT reports give the portal administrators the information they need on the current volumes and trends.

In a BI implementation, these reports were archived over time, organized in time-period hierarchies so that the most recent reports were most rapidly accessible. The reporting process happened in two phases. Each day an extract, transform and load (ETL) process moved data from the database and observation logs into SAS data marts. SAS Web Analytics then performed a second extract and load to integrate the data from the Web server logs and to separate the processed data into two Web marts – one for traffic on the external portal and one for the intranet traffic. These processes generated standard reports that could be easily accessed from an ordinary Web browser. the OMV portal had a highly complex technical infrastructure featuring several Web and application servers, load balancers and a clustered Oracle database in a high availability environment.

The web analytics project delivered key benefits and return on investment to the company. For example, search-string analysis enabled OMV to find out what sort of information the different categories of internal and external visitors were looking for, while clickstream analysis reveals how quickly and easily they could find it. By acting on this information, OMV increased the satisfaction of their external target groups as well as the portal usability for employees. For instance, they found one of the most frequent searches being among employees was for the organization chart, they then modified their intranet so that this could be accessed with a single click. The statistics also helped OMV to direct and control its marketing activity. Analysis of referrers demonstrated the effectiveness of online banner advertising and similar activity. Further metrics employed were e-mail campaign analysis, analysis of the success in converting guests to registered users, cost analysis by page view, user and employee, and application-specific analysis.

The second initiative was do with process optimization. OMV's refinery in Schwechat, Austria, is one of the most modern in Europe manufacturing more than 700 products in line with strict environmental requirements. Efficient maintenance was critical to ensuring that the facility ran smoothly and complied with industry-specific safety regulations throughout the plant life cycle. Over 90% of the associated tasks – from repairs to upgrades during ongoing operations to major overhauls – were handled by the external service providers. Moreover, managing interactions with some 50 subcontractors, plus the vast volumes of data and documents involved, was a major challenge. OMV's existing asset-management processes were largely manual and paper based. To overcome this problem, OMV deployed the SAP Service and Asset Management solution. The system, deployed by Capgemini, contained comprehensive service specifications, detailing prices and quality requirements for maintenance tasks – as fixed rates or in terms of time and effort. This information was then used by the external service providers, as well as by OMV's procurement staff. Maintenance agreements were also centrally stored and seamlessly integrated with all the other steps of the maintenance process. The system enabled the external service providers to access through a web browser their tasks, service specifications, and other information. And they could quickly and easily confirm service delivery via the same channel. Photographs of completed work and other relevant documents were bar-coded, enabling them to be automatically assigned to the correct business

objects (such as contracts) when they were scanned into the SAP system – making for easy storage and retrieval.

Another initiative was the migration of all IT applications to the Linux/Oracle operating system. At this time OMV was running its SAP in a very complex IBM system environment. The planned solution had to fulfill two requirements. It had to lower operating costs and facilitate flexible, efficient IT operation.

Refer Exhibit 5.92 for depiction of areas in which Petron implemented operational efficiencies.

5.12.3.4 Impact on workers

The acquisition, the largest in OMV's history, represented the biggest foreign investment ever by an Austrian company. The deal meant that OMV, with 6,500 staff, acquired a former public company with more than 50,000 employees. A transformation of this scale could only be successful if the employees supported the change. Therefore, Capgemini also had to support Petrom in several change management measures such as recruitment and mobilization of, and communication to, more than 1,000 employees. Staff from more than 100 subsidiaries were not only motivated to move to Bucharest but also prepared in advance for their new roles through intensive training programs.

Diagram 5.81 - Impact on workers due to technology.

These measures were the first stage in developing a new corporate culture at Petrom. The next step was establishing a central IT organization towards making ashared-services based organization. In addition, a central master data center within the Service Center was also set up. By centralizing finance operations, transferring legacy systems and relocating staff from branches to Bucharest, the development of the Service Center continued successfully. Simultaneously, the SAP implementation was prepared and future users on the system were

trained in new processes and functionality. Diagram 5.81 above shows the impact technology had on workers.

5.12.3.5 Security

Diagram 5.82 – Security adoption driving forces

Diagram 5.82 above shows security adoption driving forces OMV selected the Syntex IMPACT ERM Suite to help streamline their incident & audit management systems across all organizational elements. The solution provided OMV with a fully-integrated, enterprise-wide, electronic incident, investigation, and action management solution. The suite provided the framework and functionality meet the general needs of OMV as well as the specific and unique needs of each OMV business unit. such as Health, Safety and Environment, Exploration and Production, Refining and Marketing, as well as other business divisions including AMI, Gas and Petrom. The most important transformation was that the solution enabled all levels of the workforce to engage in discovering and resolving exposures, and capturing the wide range of data, which created standardization across the enterprise to reduce and mitigate the risks. The system also reduces losses and improved performance by enabling in-depth analysis of key operational metrics and integrating management system processes at the site, company and enterprise levels. It became possible for OMV to investigate incident, near miss and investigation tracking with critical proactive processes such as corrective action and assessment management, knowledge sharing, and comprehensive analytical reporting for continual process

improvement thus moving it further towards its compliance goal. The solution also manages OMV's initiative to support SEPA (Single Euro Payments Area) compliant cross-border transaction processing solution in Central and Eastern Europe. OMV has commenced migration of its decentralized acquiring operations at filling stations, including several third-party service providers in 12 countries, to a single central SEPA compliant processing platform for approximately 5,000 point-of-sale (POS) terminals as well as POS management and fuel card authorization services. The service provider (Euronet) leveraged its in-country European operations to provide 24x7 operations support including local language customer support to OMV across the 12 Central and Eastern European (CEE) countries. This initiative enhanced the security requirements of OMV since payment transactions had to be secured and the infrastructure deployed had to be able to support ever increasing scale of operations.

Refer Exhibit 5.93 for the top security risks and vulnerabilities and refer Exhibit 5.94 for trends in these countermeasures.

5.12.4 TRENDS

5.12.4.1 Cost-performance structures

The web analytics not only saved the company a lot of time and resources by showing them useful information that helped them serve customers better by improving the usability and quality of the Web site, but also enabled the company to focus on exploiting that information for greater competitive advantage.

Diagram 5.83 – Cost component reduction
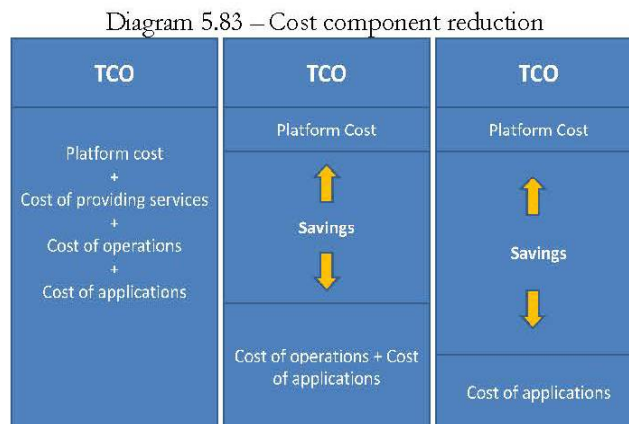
The SAP system, not only enhanced interaction with services providers but also gave the company much greater visibility when it came to planning. The company could foresee work and costs three or four months in advance – enabling them to budget better and enter into long-term contracts with service providers thus gaining cost benefits as well as better service levels. The software also greatly enhanced OMV's document management, increasing productivity. It became possible for the extensive documentation associated with maintenance to be reproduced and reexamined instantly and conveniently – without the need for extra staff to do this work. Quantified, this produced returns on investment within a span of less than two years for every function that was added or upgraded in the system. Further the migration of the SAP to Linux created savings to the tune of EUR 1m per year. Diagram 5.83 above shows the reduction in cost component.

5.12.4.2 Architecture, Enterprise Management, and business continuity

Enterprise Management: The existing SAP systems numbered about 35 – including include SAP for production, SAP for system development, and SAP systems specifically for Eastern European subsidiaries as well as those running the subsidiary refineries. The systems were initially running on a mix of Windows and AIX. However, the company saw it prudent to consolidate these systems on Linux running on an IBM Z-series mainframe. The configuration was designed as a geographically dispersed parallel sysplex (Geoplex). The servers and memories were in the separate locations and were connected to each other redundantly using an ICF (Integrated Coupling Facility) in order to ensure interrupt free fault tolerant operation. The changeover from one location to another occurs completely automatically. The parallel sysplex solution also permits linear scalability through the use of parallel database technologies in order to meet the growing requirements for system performance without changing the architecture. Two IBM RS/6000 SPs with 40 nodes and 20 AIX servers are also used as application servers for certain applications and are linked to the database servers via a gigabit Ethernet. Four disk sub-systems that undertake automatic data mirroring using the peer-to-peer copy function were used for storage. A snapshot function was used for back-up and cloning SAP R/3 systems so that OMV could secure all the data as quickly as possible. System management and workload scheduling tasks were completed using the IBM Tivoli Enterprise. Several systems ran on one server under the z/OS operating system without difficulty. This

brought with it substantial consolidation effects (lower CPU, memory and disk requirements), caused no additional costs and reduced the total cost of ownership.

This setup was changed in 2005 with a migration of the system to cluster via two redundant computer centers at separate locations in Vienna. HP provided its proven ServiceGuard solution, which is fully certified by SAP, for the clusters on the Linux platform as well. The core of the new platform consisted of four HP Integrity rx8620 servers with 16/32 Itanium2 processors as database servers and a series of rx1620/2620s with Itanium2 processors as application servers. Two new EVA8000 HP StorageWorks arrays and the use of the HP MC ServiceGuard cluster software ensured optimal protection against failure and ease of operation. During the migration HP took on full organizational and technical responsibilities, from the set-up of the infrastructure to the completion of the project.

Table 5.25 - Technologies deployed by Petron

Technology	Product
Operating system	HP - UX, Windows, AIX, and LINUX
Database	ORACLE and DB/2
Enterprise Application Suite	SAP IS-Oil
Modules	Offshore Logistics Financials (FI) Materials Management (MM) Project System (PS) Maintenance and Repair (MRO) ORACLE Real Application Clusters

Business Continuity: The company set up two data centers located about 1600 miles away from each other. These data centers were the centralized service hubs for the business units located in their respective areas. In terms of storage, each data center had a mix of SAN, DAS and NAS residing within them from a range of vendors such as NetApp, Hitachi and EMC. The quantum of stagnant data was about 50 percent and the rate of growth was an average of 2 TB of data per day. Having so much data in production systems caused problems. In terms of recovery, for example, it took about 8 to10 hours to recover 200 to 250 GB of information.

Diagram 5.84 – Business Continuity Planning

The company analyzed and went in for a strategy to plan and forecast business continuity on 3 parameters – Information protection, data management and capacity planning. The first of these, information protection dealt with how the data on the storage was to be secured and limited to authentic use. The second, data management was to determine what data should reside on which media and should be available within what time frame. The solution to all these problems was tiered storage – whereby dormant information could be moved to lower cost storage. In such an environment, near line storage hardware is fed stagnant data. The data mover migrates the data automatically from primary to secondary storage. Technologies used were disk-to-disk, snapshot, etc. in order to integrate into the existing processes. The tiers used were Tier 1 on a SAN to host the databases, data warehouses and for online transactions processing (OLTP); Tier 2 in the form of NAS for active data such as file servers, seismic files, Excel spreadsheets and email; Tier 3 based on ATA disk and tape for static data such as reports, images and nearline archiving; and Tier 4 as offline tape for inactive data required for legal retention and compliance. This was replicated across both centers to provide failover capability and business continuity. Refer Exhibit 5.95 for a technology maturation path of operating environments available at the time.

5.12.4.3 Enterprise Integration

OMV was a fairly advanced company in terms of technology whereas Petron was not so. Their integration meant a lot of systems coming together. The company is moving towards enterprise integration and as a first step has consolidated its systems on a single platform. It is

also trying to reach out to external partners and customers through getting various insights into its business.

Diagram 5.85 – Major effects of Enterprise Integration
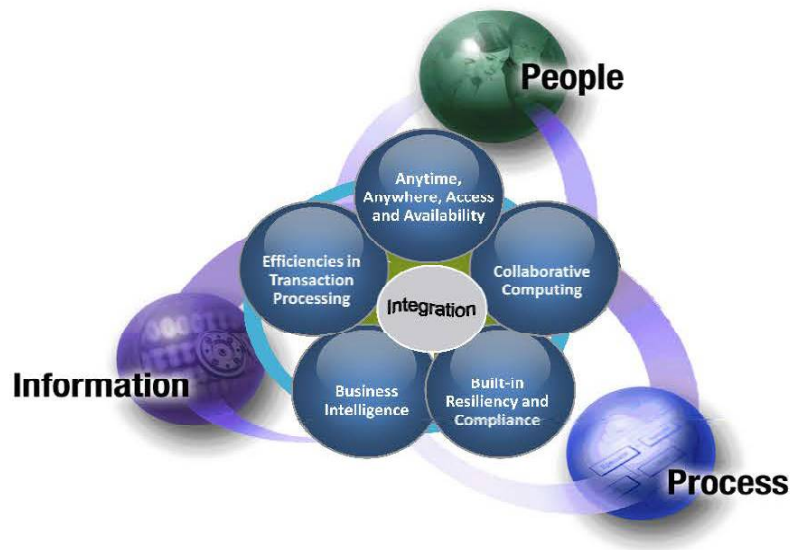
5.12.5 EXHIBITS
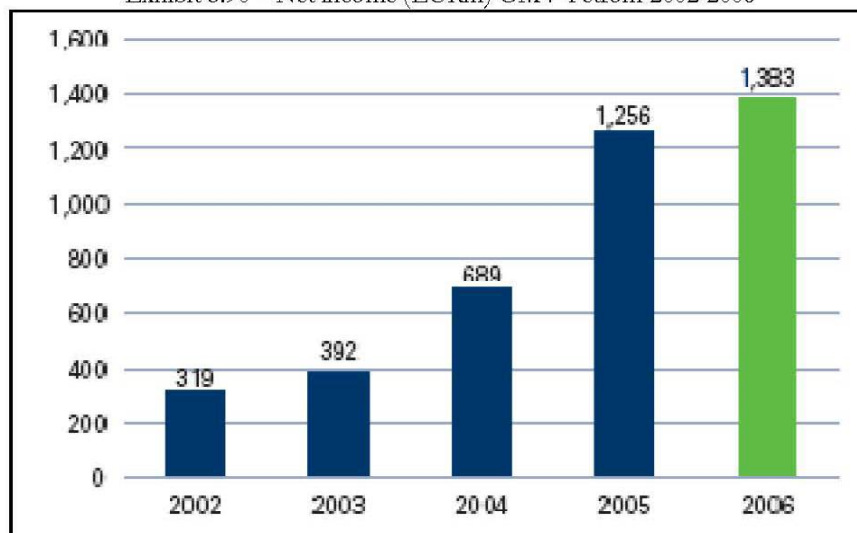
Exhibit 5.90 – Net income (EURm) OMV-Petrom 2002-2006

Exhibit 5.91 – Elements that were not outsourced

IT leadership
Architecture development and evangelism
Business enhancement
Technology enhancement
Vendor management
Innovation and Intellectual property creation
Security and compliance

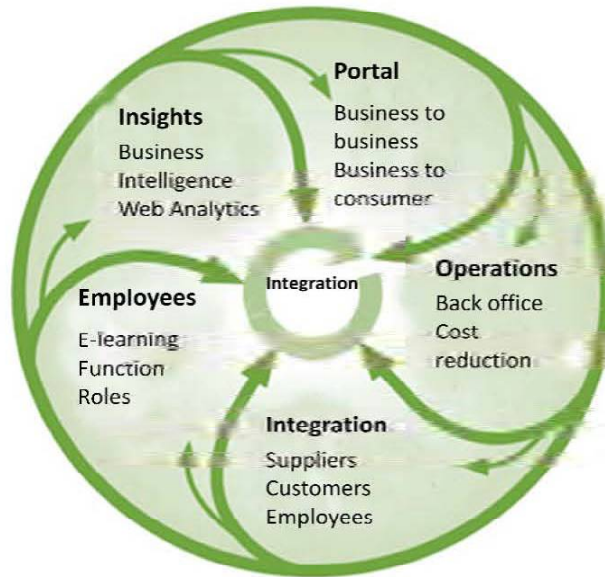Exhibit 5.92 – Areas in which ERG implemented operational efficiencies

Exhibit 5.93 - Top security risks and vulnerabilities

Malware: Infection of the organization's systems or network by viruses, worms, Trojans, adware, or spyware

Phishing: Impersonation of the organization through email or electronic means in an attempt to obtain confidential information

Pharming: Diversion of Internet traffic to an imposter site by means of DNS poisoning or browser address bar attack in an attempt to obtain confidential information

Spam: Unsolicited or unwanted email messages

Denial-of-service: Attempts to overwhelm or overload the organization's network or system resources with the intent to degrade their performance or make them unavailable

Unauthorized access by outsiders: Unauthorized access or use of systems or the network by outsiders

Vandalism/sabotage: Defacement, destruction, or other damage to the organization's systems, network, or Web site

Extortion: Demands for money or other concessions based on threats to use electronic means to harm the organization's network, systems, or reputations

Fraudulent transactions: Fraudulent electronic transactions that result in financial loss or damage to the organization or its customers

Physical loss: Physical loss or theft of computer, storage media, or other devices and any associated data

Unauthorized access by insiders: Successful access by insiders to system functions or information for which they are not authorized

Insider misuse: Violation of the organization's policies regarding acceptable use of computing/network resources
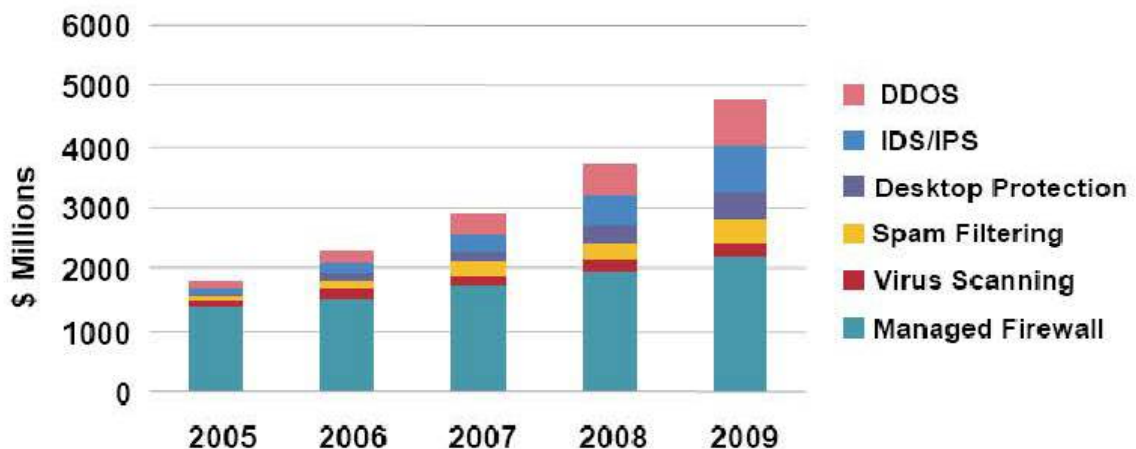
Exhibit 5.94 - Security revenues by countermeasure category

Exhibit 5.95 - Technology maturation path