

Evolution of the Use of IT for e-Business at Century Financial Services: An Analysis of Internal & External Facilitators and Inhibitors¹

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ABSTRACT

The case is based on one of the largest and oldest financial services companies in India, referred to as Century Financial Services. It explores the evolution of the use of information technology (IT) over time, from the use of basic efficiency enhancing systems to the development of advanced B2B and B2C E-Commerce systems. At each stage of the evolution, it describes the external drivers in terms of environmental changes, industry developments, customer demands and competitive pressures. It also presents the organizational factors influencing the evolution, in terms of leadership attitudes, the role of IS professionals, and aspects of organization culture. The case aims to give a comprehensive explanation of how internal and external factors together combined to change the focus of the company towards IT and influenced the adoption of E-Business. The case data was collected between April and August of 2000. Sources of data included past organizational documents, interviews, industry sources and databases, and secondary business literature.

Key Words: Leadership, Culture, IS professionals, IT evolution, E-Business adoption, Strategic IS.

INTRODUCTION

The phenomenon of information technology (IT) adoption is influenced by internal and external factors. Factors external to the organization might include competitive pressures (Grover et al 1993) and environmental changes (King et al 1996). Internal factors could be top management commitment (Neo 1998, King et al 1994, 1996) and culture (Grover 1993). Recent studies have reported that similar factors influence the extent of E-Commerce adoption by organizations. For instance, E-Commerce adoption is influenced by top management commitment, organization culture and IS professionals (Tarafdar et al 2001), competitive imperatives (Iacovou et al 1995) and customer demand (Chwelos et al 2001). In this case we seek to illustrate a framework for explaining how these internal and external factors influence the extent of IT and E-Commerce adoption.

The authors would like to thank the reviewers and the Special Editor for their suggestions and comments.



The case explores the evolution of IT strategy and IT orientation within the Century Financial Services corporation in India; beginning with the introduction of transaction processing systems, to the development of E-Commerce systems which include the use of business to consumer and business to business electronic links, with trading partners and end customers. Within each stage, the external environments and the internal context will be described and their influence on the adoption process and the resulting changes to IT will be highlighted. The first section of the paper presents a background on the company, and describes its operations and relationships with business partners. Subsequent parts of the case describe the evolution of IT, within the context of changes in external and internal factors. This case presents an interesting account of how cultural and environmental factors combined to change the company's orientation towards IT. The descriptions in this case are particularly significant because they are representative of the experiences of many other companies in the financial services in India. Indeed the general findings are very similar to the process of IT modernization, that companies from a number of industry sectors in India have undertaken, after economic deregulation in the 1990's.

The data was collected over a period of four months, primarily through face-to-face interviews with different people in the organization. We interviewed members of the present top management, the IS function and different end user groups. We also sought information from senior people who had been associated with the organization in the past, and who could provide data about the early years. Organizational documents relating to the configuration of past and present IS architectures were also studied. Information about changes in the external context, industry structure and regulations, was gathered from business databases, and archives of newspapers and trade journals.

CENTURY FINANCIAL SERVICES – AN INTRODUCTION

Operations

Century Financial Services (CFS) is one of the oldest financial services companies in India, and was incorporated in 1908. Its line of business is to serve as an exchange for trading in bonds, shares and securities of different companies in India. It is the third largest stock exchange in the country, with an annual turnover of about Indian Rupees (INR) 7000 billion. The company serves as a financial intermediary between corporates and investors. Services are provided through its member-brokers, who trade on behalf of their clients, the retail investors. The operations of the company are confined primarily to the eastern part of India.

Till 1945, CFS performed fairly well and trading volumes increased steadily. Between 1945 and 1960, many industries in eastern India declined. This resulted in a decrease in the volumes traded on CFS. The prospects started looking up again, in the late 70's and 80's, with the revival of some of these industries and the emergence of newer knowledge and technology based industries such as software and precision manufacturing.

The primary function of CFS is to provide a meeting place for companies, brokers and investors. The central operation in the functioning of a stock exchange is that of the "trade". A trade is a transaction that takes place, in order to buy or sell stocks of a specific company by a specific broker. Member stockbrokers carry out trades on behalf of retail investors. Trades have to be squared off against each other everyday, so that the company knows the volume and amount of transactions that are carried out. This process is called "Netting". Trading information for all brokers is collated for a given period of time and payments are made out or

received at the end of that period. This period is called the Trading Cycle. The company is expected to minimize the time within which investors realize the payment on the shares that are sold, and to ensure the accuracy of the prices at which deals are transacted.

Relationships With Business Partners

CFS has a number of partners who interface with many of its functions. Clearing Banks and financial institutions serve as custodians and make monetary payments to brokers on behalf of the exchange. Similarly, depository institutions keep track of individual shares which are bought and sold. They pay out and receive the shares at the end of the Trading Cycle. Depository institutions interfacing with CFS include the Stock Holding Corporation of India (SHCI), the National Securities Depository Limited (NSDL) and the Central Depository Securities Limited (CDSL).

The basic processes, information flows and interfaces for the operations of CFS have been described in Figure 1.

Organization Structure

CFS has about 970 members, who are also its stockbrokers. Historically, the members or brokers have been the most powerful stakeholders in the company. They are the owners as well as the decision makers, and ratify decisions regarding strategic planning, procedures, organization structure, appointments and processes.

CFS has historically been a highly centralized organization. The top management team consists of a Central Board of Members. It is the apex decision-making authority and has 9 elected members from the company's broker community, one of whom is the President, and heads the Board. Besides this, it had 6 public nominees and 3 nominees from the Securities and Trading Board of India (SEBI), which is the government regulatory body responsible for monitoring the functioning of all financial institutions in India. Traditionally, the Board of Members has been the most powerful entity in the organization, and has authorized all final decisions with regard to strategic planning and setting directions.

The day-to-day management of the company is carried out by professional managers who work in various departments, and are headed by an Executive Director (ED). He is the executive head and ensures that the exchange performs its executive and administrative functions. He is answerable to the Central Board. The ED is aided in his work by the Secretary, who is a senior executive and serves as the link between the ED and the different departments.

There are five functional departments, each headed by a General Manager or a Manager, and responsible for a specific aspect of the company's operations. The **Market Operations** function is responsible for post trading activities like settlement of trades, pay in and pay out of the required money, and physical delivery of the stocks if required. The **Listing** department maintains databases on all companies that are listed on the stock exchange. This information is in accordance with information disclosure norms, agreements and clauses framed by SEBI. It includes balance sheets and income statements, and updates on strategic and financial initiatives like mergers, acquisitions and corporate restructuring.

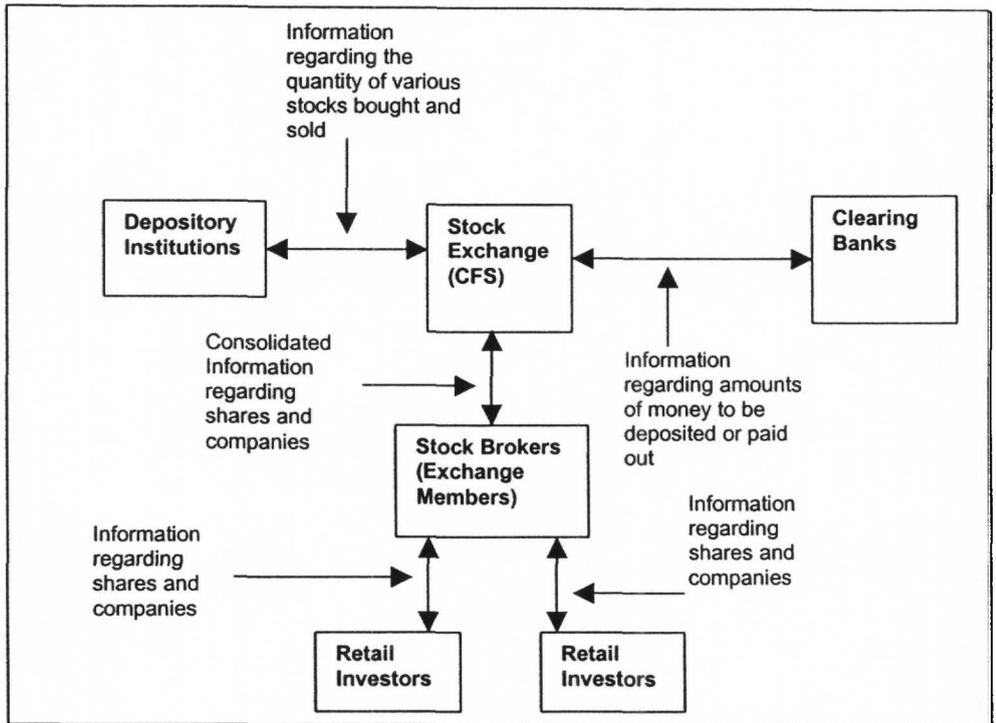


Figure 1.

The **Surveillance** department has to ensure that members carry out their transactions in accordance with the rules laid down by the company. It keeps a watch on the activities of brokers, identifies irregular trading practices and suspends and re-admits member brokers as and when required. This function is an important one, especially because brokers have access to selective information and hence could potentially indulge in malpractice and influence the prices by forming cartels in the absence of any regulation.

The **Accounts** department is responsible for the auditing and accounting tasks. The functions of the **Information Systems and Technology** department are to develop and maintain the systems that support the trading processes, and enable online transactions with its partners.

There are various advisory sub committees, which regulate the working of the departments. They have members from the respective departments, as well as from the Central Board. The **Management sub-committee** looks after different aspects of the management of the company. The **Arbitration** and the **Defaulter sub-committees** have an advisory role in suggesting how disputes between the exchange, its member brokers and the retail investors would be sorted out. The **Disciplinary sub-committee** advises the Surveillance department on framing procedures to ensure that trading activities are carried out in accordance with legal procedures.

The organization structure has been described in Figure 2.

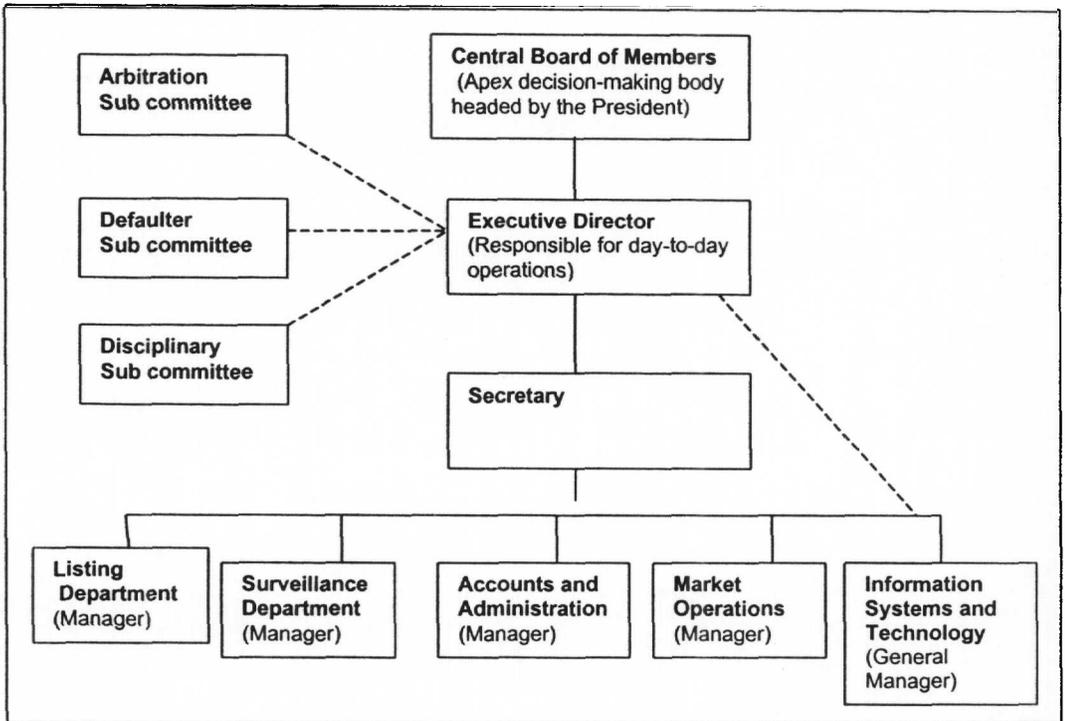


Figure 2

TRANSACTION PROCESSING STAGE: 1985 – 1991

The External Context

Before 1991, the Indian economy was regulated. Private enterprise was not permitted in the areas of banking, loans, securities and deposits. All banks and financial institutions were government organizations and functioned in monopolistic and controlled environments.

CFS was the largest and most significant stock exchange in the eastern part of India, till the early 1990's. The turnover increased during 1986 to 1992, as did the number of transactions and the number of companies that were listed on the exchange, as shown in Table 1.

The company functioned in a virtually monopolistic market and competitive pressures were low. Moreover, CFS was a conservative organization. The top management and the members did not have any plans for expansion beyond the eastern region. There were no business innovations and the company did not proactively introduce any changes in its strategy. In this context, one of the senior brokers observed the following.

“The member brokers are extremely conservative. During the 1990's, we were a leading exchange in the country. At that time, exchanges all over the world were undergoing exciting changes in their operations. These changes were brought about

by advances in information and communications technology. That was a wonderful opportunity for us to build on our strengths and consolidate our position by modernizing our operations. The President at that time was very progressive and wanted to push through certain changes. However, the Central Board scuttled all his efforts. They were just not willing to change."

Year (All the years in the Transaction Processing Stage)	No of members	Avg. daily turnover (INR million)	Avg. No. of transactions per day	No. of companies listed.
1986-1987	200	280	18660	1780
1987-1988	300	350	20540	1869
1988-1989	450	400	23000	2300
1989-1990	550	550	25134	2685
1990-1991	Data Not Available	Data Not Available	Data Not Available	Data Not Available

Table 1

Trading Processes

During this time the prevalent method of trading at CFS was the **Physical Outcry** method. Brokers or their aids would stand inside the trading area and communicate with each other by crying out the prices and bids, after which trades would be transacted. There was no systematic means of storing and disseminating information. Brokers did not have real time information regarding prices of different shares; they relied on their aides inside the trading ring. The retail investors did not know the exact prices at the time of trading and hence unwittingly allowed their brokers to enter into many speculative deals. The problems with this method were a lack of transparency, possibility of cartel formulation and price manipulation, long settlement times and delivery periods, and lack of liquidity of shares. A member broker who had been associated with the exchange for the past 25 years observed that,

"Most of the time, the brokers did not write down the details of a particular transaction at the time of trading, because the trades happened too fast for them to sit and actually write them down. So, at the end of the day, they would attempt to recall from memory and write all the trades that they had carried out, on a piece of paper. A lot of information could not be remembered at the time of writing and there was utter chaos at the time of matching the trades for the purpose of consolidation."

The process of consolidating and squaring off the trades, which was done everyday, was accomplished manually till 1987. Mechanized Netting was introduced in 1987. Subsequently, consolidated trade statements were released every 15 days. This period was called the Settlement Period. Another two weeks of time was allocated for the actual payment and the physical delivery of shares to the retail investor. So the total cycle time, that is, the time in which scrips were delivered, was 30 days. This was called the Trading Cycle. From the early

80's till the late 90's, the Settlement Period was kept at 15 days. The Trading Cycle has been described in Table 2.

Day	Particulars	Activity		
1-14	Monday to the Friday of the next week.	Trading Period	Settlement Period	Trading Cycle
15	Monday of the next week	Netting and Consolidated Statement		
16-30	Monday after 2 weeks	Pay in and Delivery of Securities		

Table 2

The Internal Context

CFS was a market leader in its area of operations. It was in a comfortable financial position and there was no dearth of resources. However, the organization as a whole was conservative in its deployment of resources. It was at the President's behest that IT resources required for introducing mechanized netting procedures were acquired.

IT Orientation of Organizational Leadership: During this period, the President of the Board of Members worked actively towards the introduction of IT in some of the company's processes. He traveled widely, internationally, and was interested in changes that were taking place in the financial services industry worldwide. He wanted to institute a long-term stage wise plan for using IT to modernize and develop the processes of the exchange.

As a result of the President's efforts in this direction, computerization first came to CFS in the 1980's. At that time, transaction slips were used to record all transactions and were exchanged between brokers as ratification of a trade. The slips recorded the names of the buyer, seller and the transaction price, and were matched against each other at the end of the day. Each trade would give rise to one matching. This matching exercise was very cumbersome and involved voluminous paperwork. According to a past president of CFS, who had been a member broker for 40 years,

".....if there were 15000 hundred trades, say, that were carried out each day, there would be 30000 slips to be matched with each other, and there would be 15000 checks to be written....The people entrusted with the job of matching the trades would work till 2 or 3 o' clock in the morning because they were not able to cope with the sheer volume of work and information processing that was involved"

The process of daily netting and squaring off of trades was computerized and centralized after mechanized netting was introduced in 1987. A computer center was set up and an IBM mainframe system installed. All trades at the end of each day were entered into the system, and each broker's position was netted off against all other brokers. The system is described in Figure 3. A consolidated statement was released for each broker at the end of 2 weeks, giving the details of trading activities during that period. CFS was the first exchange in India to introduce this kind of a system. All other stock exchanges at that time used manual netting procedures. In 1991, an Electronic Price Display and Reporting system was introduced, which reported the prices of scrips on an electronic screen on the trading floor. There were no major

information systems introduced for the next 6 years, and the only developments that were made were enhancements to the existing netting system.

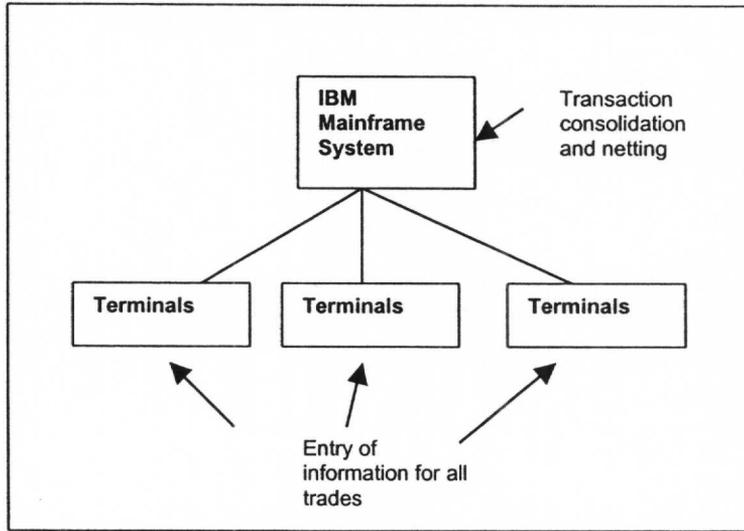


Figure 3

Organizational Attitudes and I.T. Orientation: Even though the President was actively involved in the introduction of the automated systems, the organization as a whole was not positively inclined towards IT. Most other members of the board were conservative in their outlook and did not favor the introduction of IT in any of the processes directly related to trading. After the introduction of the Mechanized Netting and Electronic Price Display systems, the President suggested that an on-line, electronic trading system be developed on a test basis. His plan was that such a system could be used alongside the manual Outcry system, which was used at that time. This would gradually enable the company to modernize its trading systems. This idea met with strong resistance from other brokers and board members. They were used to the existing method, were not IT savvy and were not willing to change their processes. CFS was not an innovative company. Therefore the organizational commitment towards innovation in general was low. So was the commitment to IT innovation.

A second factor that contributed to the reluctance to automate processes was the way in which senior executives and brokers viewed the importance of information. The culture of the organization was such that information was considered to be a source of power and members were reluctant to share it. The environment of the organization was one of secrecy. This was a result of the historical nature of the industry, where speculation was common and information was not shared freely. Hence, any suggestion to introduce IT in crucial processes, which would result in greater transparency of operations, was rejected by CFS.

According to the then President,

“I was going it all alone. The others just refused to acknowledge the benefits that such a system might bring. They were bitterly opposed to it. There was no way that I could convince them.”

During this period, professional relations between the top management and the line managers were not very good. This was because the President and some other members of the Board of Members were innovative and tried to bring about some changes in company strategy and crucial company processes. These changes were against the conservative orientation of the company and were resisted by the organizational members and line managers.

Role and I. T. Orientation of IS Professionals: During this time, the IS department consisted of two junior employees. They were primarily programmers and assisted in entering data, for carrying out the netting process at the end of each day. They also had some preliminary training in application development and maintenance for mainframe systems. However, the thrust and direction for IT deployment were provided by the President. IS professionals did not have the authority to take any independent decisions regarding IT introduction and adoption and did not interact with the top management or other organizational members in this regard. They followed the President’s instructions and did not have any authority to take any but the operational level technical decisions on their own.

The total monetary investment in IT during the period 1986 to 1991 was INR 2.5 million. This was the first time that the company had made any investment in IT. The investment was made in acquiring hardware and software for the Mechanized Netting and Electronic Price Display systems. The then President described this as:

“We were the first exchange to introduce this system. At that time this investment in IT seemed very high to us, given the history of operations of stock exchanges in the country”.

The impact of the Mechanized Netting system was to increase the speed with which trades between brokers could be matched and consolidated. However, it did not bring in any fundamental change in the manner in which the operations of the company as such. Moreover, the system would frequently break down and the manual process had to be resorted to. Similarly, the Electronic Price Display system served to provide prices to the brokers at regular intervals. It did not change the manner in which trades were executed. It did not address for instance, the problems of absence and uncertainty of information that was caused by the physical method of trading shares.

4. STAGNATION STAGE: 1992–1994

4.1. The External Context

The Government of India took a policy decision to deregulate the economy in 1991. This resulted in many regulatory changes in the financial services industry. These changes had two important implications for the strategic and competitive context of CFS. The first major change was that private companies were allowed to enter the banking, mutual funds, portfolio management and investment banking industries. They could offer financial instruments like bonds, mutual funds and fixed deposits, as alternative avenues for investment for retail and

corporate investors. These products and services began competing directly with the services offered by the stock exchanges in the country.

The second major change concerned the corporate perspective of Indian companies. Prior to 1991, there were not many important financial decisions that companies could make, with regard to corporate financial management. Firms were given very little choice with regard to key financial issues. The government regulated the prices at which they could issue equity, the rate of interest at which they could offer bonds, the permissible debt equity ratio, etc. The working of the capital markets was also controlled because foreign exchange rates were fixed and foreign institutional investors could not invest and trade on Indian stock exchanges. Moreover, capital markets were not well-developed and primitive technological and institutional structures made them highly inefficient. The financial reforms were envisaged to alter the structure of the financial sector. Foreign and private companies were allowed to enter the banking business. Private financial companies were allowed to design and offer many new and complex financial instruments. Foreign financial institutions were allowed to trade on the Indian stock exchanges. The Government also had plans for the full and free convertibility of the Indian currency vis-à-vis other currencies. These measures implied that the proper functioning of the capital markets and the stock exchanges would now be crucial to the development and functioning of the Indian financial sector and indeed for corporate financial planning.

The 1992 Stock Market Scam: The average retail savings rate in the Indian economy during the 1980's and 1990's was 20% of the Gross Domestic Product. Till the 1980's, stock exchanges were considered speculative places and most people preferred to invest in bank term deposits and government securities. This was because brokers and large industry houses often colluded among themselves to influence the functioning of the stock exchanges. Markets were therefore volatile. This situation changed after the economic reforms and there was an increase in the number of retail traders.

There was a boom in the stock market during the early months of the reform process. The stock market capitalization of the Bombay Stock Exchange (BSE), which was the largest stock exchange in India at that time, increased from INR 1000 billion in 1990-91 to INR 3500 billion in 1991-1992. This boom was followed by a massive financial scandal. A number of brokers and bankers siphoned off public money from government securities and bonds transactions to speculate on the market. The total worth of financial fraud was at \$1.28 billion. This financial "Scam", as it came to be known, was one of the biggest financial scandals ever in India. It had a devastating effect on India's financial markets and wiped out a quarter of the market's capitalization. It resulted in the resignation of several senior officials and ministers. Thousands of retail investors lost their fortunes when the markets collapsed. This incident clearly showed that existing rules and regulations governing the financial markets needed to be strengthened and rationalized, if the Government were to successfully operationalize its financial reforms. There were many undefined areas in existing regulations, and it was easy to take advantage of them in the changed, more liberal environment.

Formation of the Securities and Exchange Board of India (SEBI): A new regulatory environment was therefore instituted to control and manage the effects of the economic deregulation policies. The Securities and Exchange Board of India (SEBI) was set up in 1993, as the primary regulating body for governing the functioning of various stock exchanges in the

country. It was responsible for regulating activities in the Indian financial markets, framing rules within which various financial institutions were required to function and directing the overall development of the industry. The objectives of the regulations framed by SEBI were to protect the interests of the investors and develop uniform regulations to be followed by all players in the financial markets.

SEBI was authorized to regulate the working of stockbrokers and sub brokers, share transfer agents, trustees, registrars, underwriters, portfolio managers and investment bankers. In this regard it was responsible for prohibiting insider trading, regulating substantial acquisition of shares controlling and identifying fraudulent and unfair practices in the securities markets. It was also responsible for regulating the performance of collective investment and saving schemes such as mutual funds. Finally, SEBI was authorized to develop and execute programs promoting investor education of the capital market.

The regulations framed by SEBI helped to decrease volatility and speculation in the markets. Consumer confidence increased and capital markets, which were earlier perceived to be "high-risk and high-gain" saving options were becoming one of the preferred places for quick increases in retail savings. The volumes traded on stock exchanges in the country increased. The average daily traded volume at CFS increased from INR 550 million in 1989-90 to INR 2500 million during the mid 1990's. It was the second largest stock exchange in the country, after the Bombay Stock Exchange (BSE). The average daily traded volume at BSE at that time was INR 3500 million. The performance of CFS during these years has been described in Table 3.

Year (All the years in the Stagnation Stage)	No of members	Avg. daily turnover (INR million)	Avg. No. of transactions per day	No. of companies listed.
1992-1993	670	3370	22800	3067
1993-1994	680	2580	13000	3067
1994-1995	740	2310	14600	3067

Table 3

The Internal Context

IT Orientation of Organizational Leadership: CFS was historically inclined against business innovation and reluctant to influence and market itself to the increasing number of retail investors who began to invest in the capital markets. At the same time, there was no urgency on part of the company to change its processes or modernize its operations. This was especially significant because business processes in the stock broking industry, worldwide, were undergoing fundamental changes, based on the increasing capabilities of information, telecommunications and networking technologies. The NASDAQ had started operating online securities transactions in the 1980's. Its business processes were such that it enabled investors to accomplish paperless trading, on an online, real time basis. The NASDAQ model was widely regarded as the direction in which stock exchanges would evolve in the future.

In this regard, one senior broker commented that,

“There was the potential for converting our processes to a completely new way of doing things. CFS was the first stock exchange in the country to have automated the function of Netting. We were in a good position to take advantage of that opportunity and adopt advanced information technologies for our operations. Had we been more proactive, we could have been pioneers of this change, in India”

There was a change in the organizational leadership in 1993, and a new President of the Board of Members was elected. He had been a member of the exchange for 30 years. He was conservative and was more comfortable with the pre-1991 financially regulated economic environment than with an economically deregulated industry scenario. He supported the secrecy and information fiefdom that had traditionally characterized the operations of the company. Hence he was reluctant to consider the deployment of IT crucial service delivery processes. In fact, he was technology averse and was strongly inclined against the introduction of IT. No new IT was deployed during the Stagnation Stage.

Additionally, the organization members and line managers were historically opposed to the use of IT, and they found it easy to concur with the opinions of the President. Moreover, the IS professionals belonged to either junior management or worked on a contract basis. They did not have any influence over the IT related decision-making processes. Consequently, no new information systems were developed and no new IT was deployed during this period.

The total financial monetary investment in IT during the period 1992 to 1994 was INR 50,000, much lower than during the previous period. The investment was for maintenance of the existing Mechanized Netting and Electronic Price Display Systems.

5. ADOPTION OF E-BUSINESS : 1995 – 2000

5.1. The External Context

Changes In Regulation And Industry Structure: Increasing powers of SEBI: This period was characterized by two important changes in the regulatory and competitive environment. The first change was concerned with the increasingly stringent regulatory framework that was evolving under the supervision of the SEBI. It proposed significant changes in the rules and operations of the financial markets in India. This was in line with similar changes that had taken place in the financial services industry, internationally.

In this context, SEBI introduced a framework that included regulations regarding the broad nature of trading and settlement systems. It specified rules for information disclosure, settlement processes, and liquidity in the stock exchanges, and surveillance policies and standardization of irregular trading practices. This was accompanied by a move towards modernizing the trading processes that were prevalent in Indian stock exchanges. It was proposed that IT be used to redesign the manner in which stock exchanges carried out their operations. Consequently, it was decided that they would adopt online, real time trading systems, in place of the existing manual ones. This regulatory directive implied drastic changes and had strong compulsions for redesigning crucial organizational processes of all stock exchanges in India. This was especially significant for CFS because it had hitherto ignored any such technological changes. CFS had failed to develop new processes and had continued to operate with inefficient and obsolete manual processes.

The deadline for developing and implementing the new IT based trading systems was specified as the year 1997.

Entry of a new competitor: The National Stock Exchange: Meanwhile, a new stock exchange, the National Stock Exchange (NSE) was set up in 1994. This exchange carried out its operations over the whole country, the first stock exchange in India to do so. NSE offered fully computerized, online, nationwide trading services. Its automated trading system was much more efficient than the existing manual system in CFS. Within two years of its formation, by 1996, its average daily turnover became more than three times that of CFS. There was a trend towards consolidation and more investors began to trade on the NSE because of greater reach, ease of trading, reduced settlement period and greater transparency.

The NSE changed the existing paradigm for the operation of stock exchanges in India, because of the introduction of a completely new method of trading, based on IT and communications technologies. From the very beginning, the company's IT infrastructure was at the heart of the trading system and had been strategically positioned, in order to meet the objectives of countrywide reach and on-line trading.

The trading system of NSE was an automated screen-based system that enabled brokers and retail investors from across the country to trade simultaneously. The main trading server, a fault tolerant STRATUS computer using ORACLE 7, was in Mumbai, a city in western India. Each trading member was connected to the main server through an X.25 VSAT (Very Small Aperture Terminal) link or a 64 kbps leased line link. The client, at the member's premises was a Windows based Pentium P.C., running the front end of the trading software. There were approximately 7000 consoles, distributed between 1000 brokers and investors all around the country. As of May 2001, there were 3000 VSAT terminals in the network, which was the largest private area network in the country, and one of the largest in the world. All the trades were recorded and processed through a system of 15 high-end RISC based UNIX servers, located in Mumbai. Off line back office processing like settlement calculations, surveillance, margin calculation and clearing activities were also computerized. A disaster recovery mirror site was established near the site of the main trading system, to guard against data loss in the case of total failure of the main system. A description of the system has been given in Figure 4.

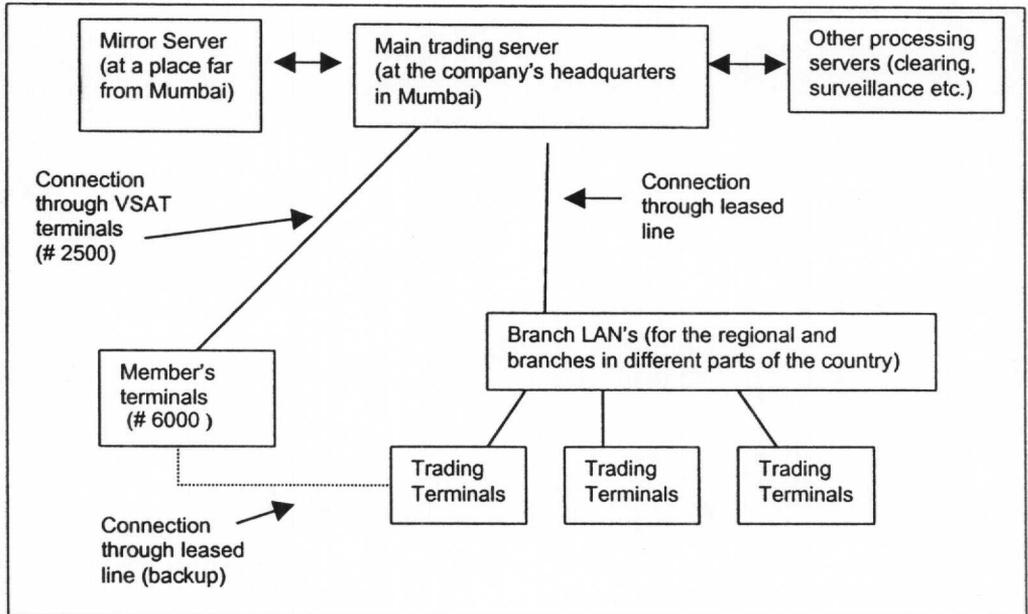


Figure 4

With the introduction of computer based trading by NSE, the basis of competition in the financial services industry changed from regional operations to national operations. Physical proximity to the stock exchange was no longer a necessary condition for trading on that exchange. CFS, with the old **Outcry** method, was beset with problems like a lack of transparency, bad delivery problems and problems in the delivery of physical shares. Customers, faced with a superior alternative, started demanding reduced settlement times, greater transparency in trading, and a more convenient and accessible trading system. Investors shifted in large numbers to the new exchange because of greater convenient. NSE also started supporting Internet based trading services in 2000.

During 1995, BSE introduced an on-line trading system, similar to that of the NSE. Computerized trading services were initially made available in and around Mumbai and were gradually extended to cover the whole country. The average daily traded volume at BSE increased from INR 3110 million in 1993-94 to INR 5700 million in 1995-1996.

At the same time, the performance of the CFS deteriorated. The average number of daily transactions per day decreased from 23000 in 1989-1990 to 11900 in 1995-1996. The average daily turnover decreased from INR 3370 million in 1992-1993 to INR 2680 million in 1995-1996.

The comparative figures for CFS and the National Stock Exchange have been described in Table 4.

Year (All the years in the E- Business Stage)	Avg. daily turnover (INR. million)	Avg. No. of transactions per day	No. of companies listed.
Century Financial Services			
1995-96	2680	11900	3178
1996-97	4370	24405	3241
1997-98	7350	16599	3272
1999-2000	12000	41737	3400
National Stock Exchange			
1995	1000	25,000	3987
1996	10000	10,000	3990
1997	20000	250,000	Data Not Available
1999	30000	400,000	6000
1999-2000	Data Not Available	800, 000	Data Not Available

Table 4

Changes At Century Financial Services – Initiation Of E-Business

Introduction Of C-Star – Business To Consumer Electronic Commerce: In February 1997, CFS introduced a screen based, computerized, on-line Electronic Trading system and the manual trading system was discontinued. The new system was called C-Star. The company's focus towards IT changed. During the earlier years, the use of IT was for low impact areas and served to increase the operational efficiency. However, with the introduction of C-Star, IT became the basis and medium for the service delivery and a strategic resource. Before that, the listing function was computerized in 1996. Finally, the surveillance and the market operations functions were computerized during 1998-99.

The new trading system was an ORACLE based client server system. The main trading server was a COMPAQ TANDEM S 74002 server and housed the central database and the main trading engine. The member-brokers were connected to this trading server via a 64kbps LAN connection. The LAN served those brokers who were located inside or close to the exchange building. For brokers who were located elsewhere in the city, or outside the city, a VSAT or 9.6Kbps leased line or dial up connection was provided. The company had a 12 terminal VSAT network. Each broker had the client software running on the trader WorkStation, which was a Pentium or 486 P.C. running Windows 3.11. Members used this front end for all trade-related activities and also to monitor the prices of various shares. Initially the C-Star services were provided only to those brokers who had their offices within, or in the vicinity of the company's building, and to those within the state where the company was situated. This covered an area of 35,000 square miles.

A second server was connected to the main server. This was also a Compaq Tandem S 74002 server and was used for back end processing of relevant trading parameters by the surveillance

function. It was also used as an online dump, from which the required parameters such as market indices, total turnover etc., could be calculated.

The basic online trading IS architecture has been shown in Figure 5.

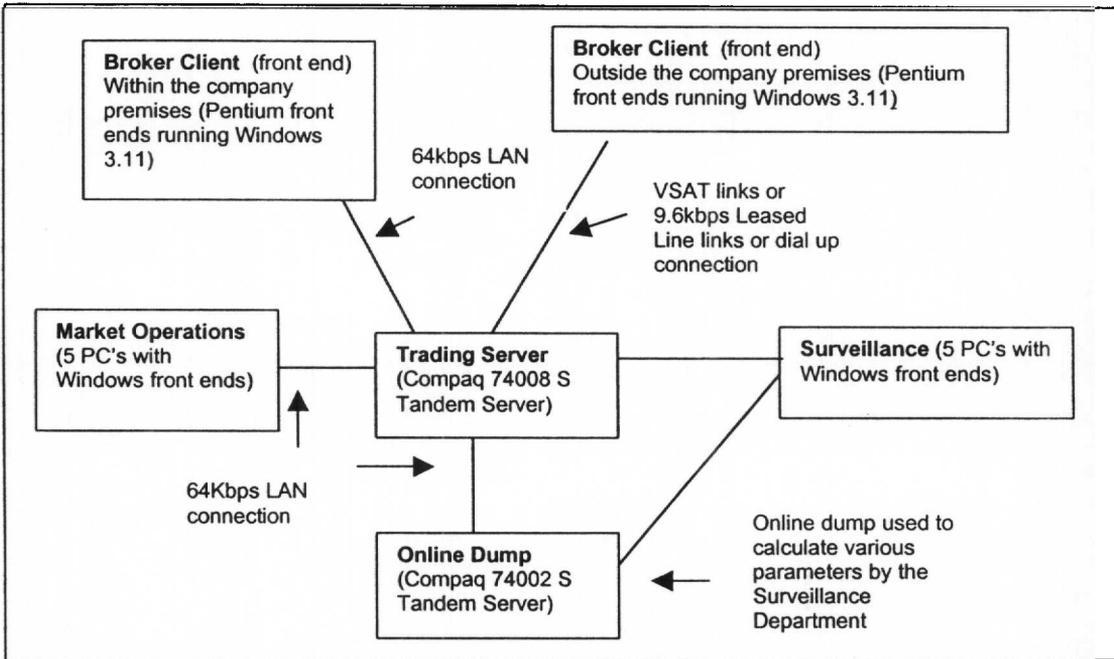


Figure 5

Using C-Star, member brokers would log into the central trading server through a front-end application. This application allowed them to sell and buy shares and also displayed the price of each share. The transactions were captured by the Trading Server. The **Surveillance** and **Market Operations** department also needed real time data about the trades, to carry out their functions. Each of these departments had about 5 or 6 PC's, which carried front-end applications for logging into the main trading server, as well as the online dump.

The Trading Cycle decreased with the introduction of C-Star, as CFS started following a seven-day settlement cycle. All trades for a given period of seven days were netted and collated on the 7th day, and the necessary information was given to the member brokers. Pay-in of securities and the delivery of documents on behalf of the members and retail investors was done by the 11th day, after which these were delivered to the central clearing house. The pay-out of the securities and funds by the clearing house was done on the 15th day. In case of incomplete delivery or non-delivery of securities, the exchange auctioned off the shares and debited the money to the clearing fund of the defaulting member. The revised Trading Cycle has been described in Table 5.

Day	Particulars	Activity
1-7	Wednesday-Tuesday	Trading Period
8	Wednesday	Settlement
11	Saturday	Pay in and Delivery of Securities at the Regional clearing centers
13	Monday	Pay in and Delivery of Securities at the Central clearing centers
14	Tuesday	Pay in of funds through the clearing bank
15	Wednesday	Pay out of securities and funds

Table 5

The nature of operations changed significantly, with the onset of computerized trading. The Executive Director described in this manner.

“After computerization of the trading process, all brokers had instant access to information and they found it easier to make informed decisions on the basis of the latest available information. This situation was substantially different from that in the Physical Outcry Method. Moreover, the Trading Cycle decreased considerably, and we were able to provide better services to our customers and investors.”

Introduction of Dematerialized (DEMAT) Trading – Business to Business Electronic Commerce: In 1999, SEBI regulated that some heavily traded stocks should be traded in dematerialized or paperless form. In this method of trading, there were no physical paper stocks that were exchanged. Instead, each broker had an account in a bank, which would hold information about the different stocks that he had. These shares were called dematerialized (DEMAT) shares. CFS would pass on information about trades to the bank, which would then issue statements and update accounts. This bank was known as the Clearing Bank. CFS partnered with three leading Indian banks for clearing services. These shares were stored in a Depository. CFS had interfaces with two depositories. These were the NSDL and the CDSL.

The IS architecture was upgraded following this directive from SEBI. The introduction of DEMAT trading implied that CFS would have to set up business-to-business electronic links with the depositories, such that all information regarding share accounts of investors could be shared and updated electronically. The company used leased lines and VSAT links to link its transaction servers with those of its DEMAT stock holding depository, which was the NSDL. The NSDL would electronically send and receive information about the volumes of DEMAT scrips which were traded and would send consolidated information about every broker/investor. This information was supplied to the settlement banks, which would update the accounts of individual brokers/investors. A third server was added and used for trading in the DEMAT scrips. This was connected to NSDL, in another city, through a 64 Kbps leased line, as well as a VSAT link. The upgraded system has been shown in Figure 6.

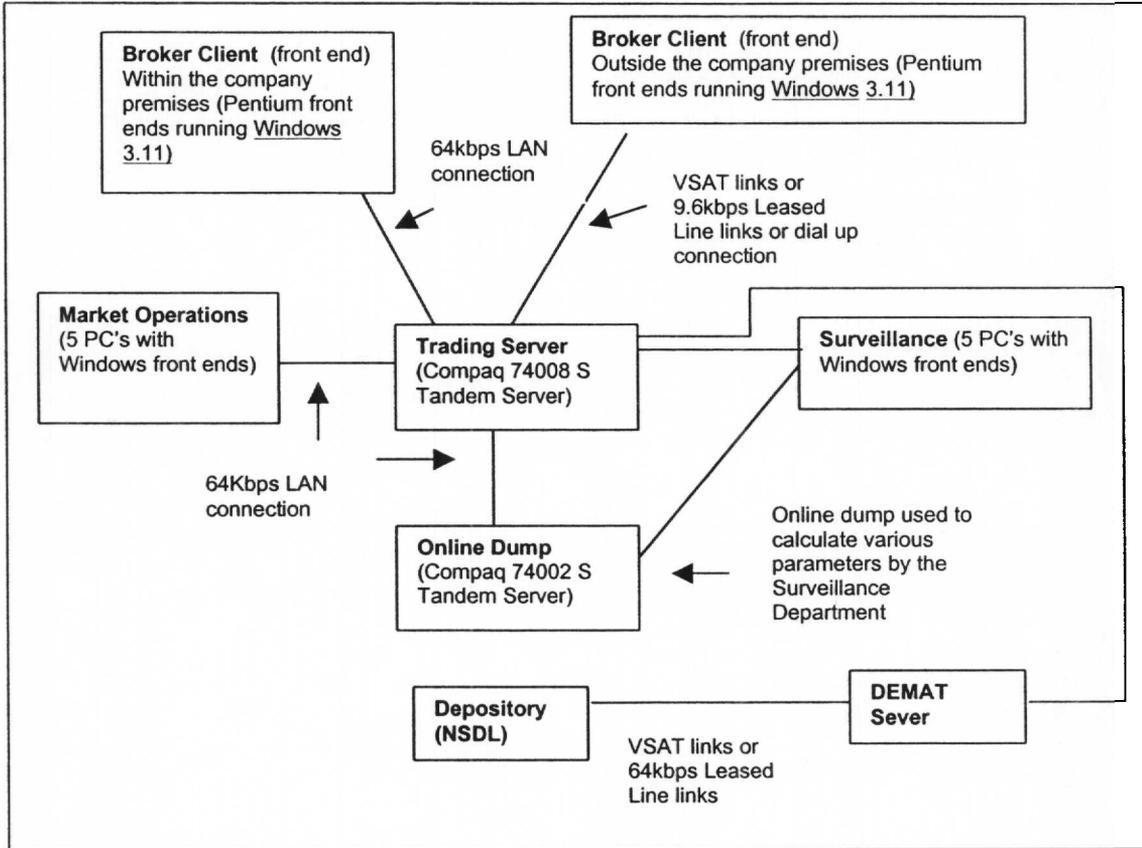


Figure 6

Expansion of C-Star Services: Initially, C-Star was made available to only those brokers who were in the same state in which CFS was located. During 1999-2000, services were extended to provide connectivity to agents and brokers in other parts of the country as well. This was done by means of 64Kbps and 2Mbps leased line links or V-SAT links all over India. Six other cities in different parts of India were chosen for the purpose. The front-end application was provided to all brokers who had access to C-Star. This has been illustrated in Figure 7.



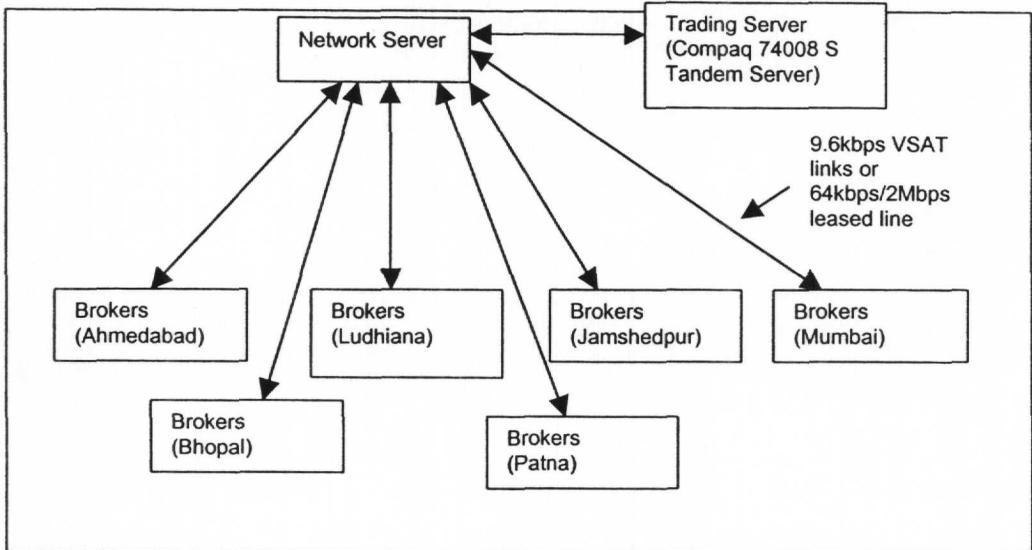


Figure 7

During 1999-2000, the company also developed a website. This was used as brochure-ware for giving information to customers regarding, procedures of the company, requirements for becoming a broker, real timeshare prices of various companies and corporate information.

The volume of operations of the company had increased between 1987 and 1992. It decreased in 1994-1995, after the NSE started its operations. It almost doubled in 1997-98, after the introduction of the C-Star system. The average number of transactions per day, which had decreased considerably in 1994, increased significantly in 1997-98. The average daily turnover jumped from INR 4370 million to INR 7350 million with the introduction of the new system, as described in Table 6.

Year (All the years in the E-Business Stage)	No of members	Avg. daily turnover (INR million)	Avg. No. of transactions per day	No. of companies listed.
1995-1996	876	2680	11900	3178
1996-1997	890	4370	24405	3241
1997-1998	902	7350	36599	3272
1999-2000	910	12000	41737	3400

Table 6

The introduction of the new system was a major E-Business development effort for the company. The total monetary investment in IT during the period 1995 to 2000 was INR 100 Million. This was spent on the basic C-Star system, networking infrastructure and on regular upgrades, training and maintenance. 50 of the 200 employees in the organization were trained in IT and maintenance. The size of the systems department increased to 8. There had been a two-fold increase in the daily traded volume after its introduction. The settlement time had also been halved. Processes had become user friendly and more efficient. A breakdown in the

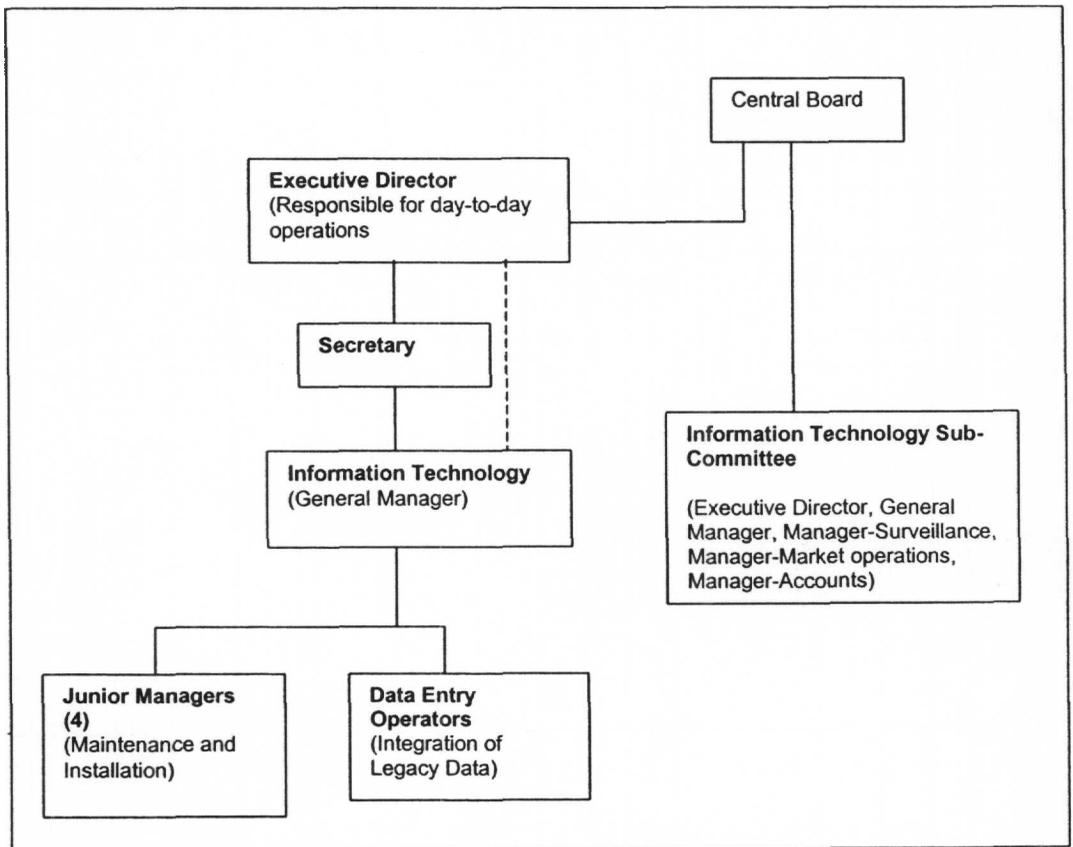
Electronic Trading system would result in a complete stoppage of trading. One hour of system outage would result in the loss of INR. 2 billion.

The Internal Context

Role and IT Orientation of IS Professionals: The structure of the IS department underwent significant changes, as the company evolved towards a more sophisticated level of the use of E-Commerce in its critical processes. A new organizational post was created to oversee the development and installation of the online trading system, in late 1995. This was the post of a General Manager of Systems and IT. He reported to the Executive Director and the Secretary. The creation of the new position was in response to the deadline given by SEBI that computerized trading would have to start by 1997. Four other junior managers were also recruited in the systems department. They had professional training in application development, database management and network configuration. They handled various operational (hardware and software) aspects of installation and maintenance of the different machines. Additionally there were 3 data entry operators, who had been trained and transferred from other departments. Their work was to help in the integration of the legacy data into the new systems.

An IT subcommittee was set up to oversee and co-ordinate various decisions regarding the installation of the new system. The sub committee was headed by the Executive Director and included the General Manager and the heads of all the other functions. The committee reported to the Board of Directors. The new IS organization has been described in Figure 7.

Figure 7



The significance of the IS department greatly increased during this time. However, the interfacing functions were characterized by friction and acrimony. The members of the Central Board had reluctantly agreed to have some of the critical processes characterized, primarily because of the SEBI directives and the rapid growth of NSE. However, they viewed the IS department as a threat to their information fiefdom. Moreover, even though on paper, the IT sub-committee had the authority to take all IT related decisions, in reality it was not allowed to suggest any major IS initiatives without the approval of the Board. Consequently, the General Manager (IS) was politically powerless. He did not have a good rapport with the members of the top management team and was unpopular with them. In 2000, there was a move by the Executive Director to remove him from his position.

The junior managers and professionals in the IS department lacked knowledge and awareness of current developments in IT and E-Commerce. They were not aware of requirements of support from end users and were indifferent towards the end users' need in general. Many times they could not provide solutions to problems face by end users. In general, they were perceived by other managers and end users as not being very capable.

Consequently, the IT department was regarded with suspicion by other employees. Even though its importance and significance in the organization had increased drastically, consequent to the increased overall criticality of the IS infrastructure, its executive powers had not. IS professionals were regarded as a necessary evil that existed only because the trading operations were necessarily required to be computerized. They had no powers to make independent decisions and worked in a "Command and Control" system.

Organizational Leadership, Organizational Attitudes and IT Orientation: There was no significant change in the orientation of the president and the Board towards the deployment of E-Commerce. They remained content to follow the directives from SEBI and resisted any proactive initiatives for evolved forms of electronic trading. The overall organization culture also did not change significantly during this period and line managers continued to remain indifferent to potential future uses of IT and E-Commerce for the company.

This was one of the reasons why, even though there had been a significant increase in IS expenditure from previous years, the investment was small as compared to other firms in the industry. It was 0.3% of the revenues. In contrast, the IS expenditure of some of the other financial services companies was more than a hundred fold, about 4-5% of the revenues. This was borne out by the observations of the one senior broker who had been with the exchange for more than 20 years,

"The members did not want to invest. It was very clear that they were doing it to comply with regulations. They invested the minimum that was required, to set up the electronic trading system"

6. LOOKING AHEAD: THE FUTURE OF STOCK BROKING

6.1. The Expanding Role Of I.T And E-Business

The period between 1991 and 2000 has been very significant in terms of changes in direction and operations, both for the Indian financial sector and CFS. The future of the industry is going to be characterized by a number of major trends.

E-Business has emerged as an important strategic imperative for firms in the financial services. Banks, financial institutions and stock exchanges have drastically changed their operations and have incorporated E-Commerce capabilities in their processes. In fact, one of the primary reasons for the success of the NSE is that it was able to harness IT and networking technology to create a paradigm shift in the industry structure: something which the existing stock exchanges had not been able to do.

6.2. Changes In The Value Chain – Internet Enabled Trading

Rapid developments in E-Commerce technologies have also made it possible for stock exchanges and financial services companies to design new products and services and deliver them through new channels. Demographic changes have altered the manner in which clients and partners want to access and use the products and services offered by the company. This has implications for business-to-consumer and business-to-business electronic links for stock exchanges. For example, Internet based trading and wireless enabled trading are now possible for customers trading on the NSE. This has been made possible through a complex network of banks, depositories and the NSE. The consolidated services are provided by the ICICI bank, which is one of the largest banks in India.

Customers can open a share account with ICICI bank and trade on the NSE using the Internet. The bank liaises with the clearing banks for the NSE. Hence it provides customers with comprehensive, online connectivity with the stock exchange as well as with their own stock accounts. All the participating companies and institutions are linked through a vast business-to-business electronic infrastructure. This has changed the structure of the value chain for the stock broking industry, by removing one link of intermediation between retail investors and the stock exchanges. NSDL, the leading depository in India supports fully electronic links with all stock exchanges. It provides services all over India and can process half a million transactions a day, on a real time basis. It has provisions for business-to-business connectivity over the Internet and has incorporated the extensive use of cryptographic, security enhancement protocols. The changed value chain value chain for stock exchanges has been depicted in Figure 8.

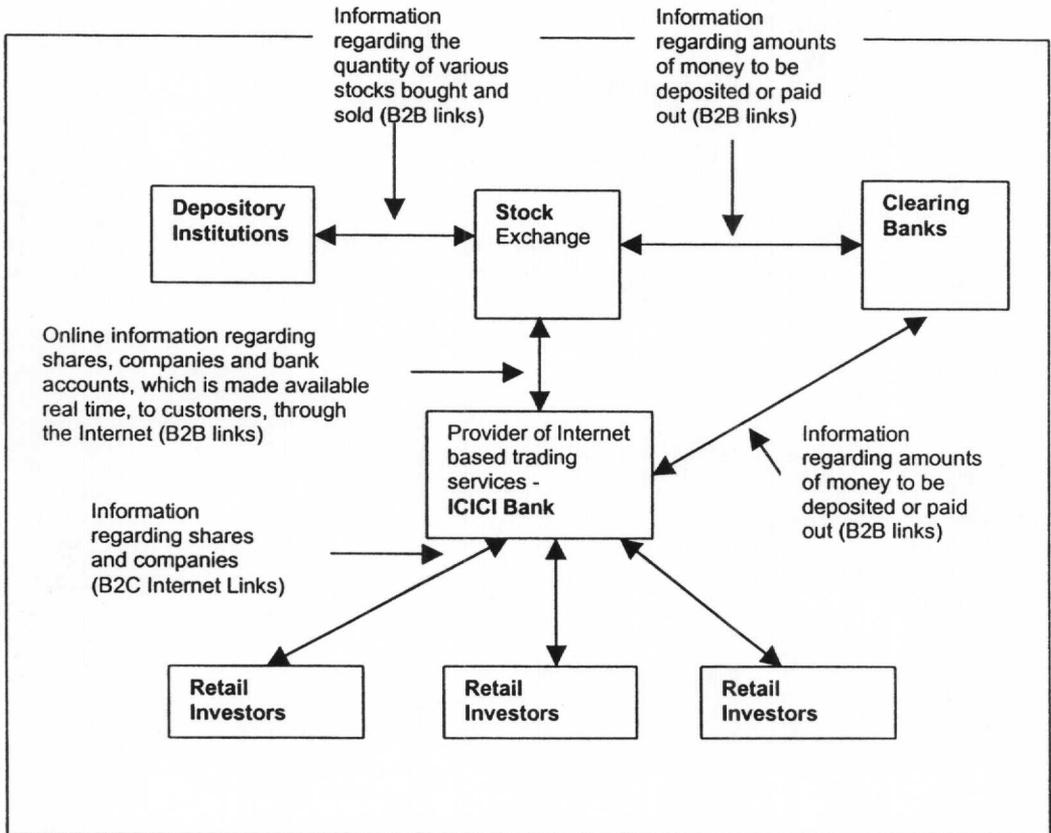


Figure 8

Changes In The Industry Structure – Consolidation

Another important trend is that of consolidation among different stock exchanges in India. As of December 2001, there were 24 stock exchanges in India. 20 of these exchanges are regional stock exchanges, with allocated areas of operation. The others can offer nationwide trading services. All of the nationwide exchanges and most of the regional exchanges have adopted the screen based electronic trading system. In an effort to consolidate the fragmented and less liquid stock exchanges into national level markets and hence to widen their reach, 15 regional stock exchanges have promoted the Interconnected Stock Exchange of India (ISE). This is primarily so that the costs of acquiring the massive technology infrastructure required of a nationwide exchange can be shared. ISE, which began operations on a limited scale in 1999, has advanced computer and communication equipment. It plans to offer a number of advanced services such as online risk management and electronic fund transfer with banks.

The two most important challenges in the capital markets are those of governance and enforcement. There is broad agreement that the management of stock exchanges needs to be separate from the membership and the right to trade on those exchanges. SEBI continues to address its responsibility of developing an institutional capability for the efficient treatment of problems relating to detection and investigation of fraudulent practices. This would imply continued specification of broad procedures and processes, and monitoring their adoption. This

might include mandated use of more evolved forms of IT in the functions of CFS and other exchanges.

6.4. Century Financial Services-Future Plans

CFS has been planning for further investments in E-Business. During 2001, the IT Steering committee submitted a report outlining suggestions for possible future directions and strategic E-Business initiatives for CFS. The first of these proposes offering of membership and trading rights to some of the smaller regional exchanges in India. Brokers trading on these exchanges, and hence the retail investors would then be able to trade directly on CFS through C-Star. This would increase the reach of operations of CFS. A second proposal has been to develop Investor Service Centers in different cities, for retail investors. This is to address the information uncertainty that persists in the communication links between the retail investors and the member brokers. Even though the introduction of C-Star has enabled the flow of real time information between member brokers and the exchange, retail investors who do not have access to the Internet on a continuous basis, still have to rely on the information provided by their brokers, while deciding on their trades. The Investor Service Centers would serve as information points for these investors. They would also record and forward to the company, consolidated information on complaints and grievances of investors. Finally, given that IT has emerged as the medium for delivery of products and services in the financial services industry worldwide, the IT Steering committee has proposed the introduction of Internet based trading facilities to retail investors. The implementation of these proposals would require significant investment in IT capability upgradation, along with a change in the leadership attitude towards IT.

Evolution of the Use of IT for e-Business at Century Financial Services: An Analysis of Internal & External Facilitators and Inhibitors

Research Note

Case Synopsis

This case traces and analyzes the evolution of the role of IT at one of the largest stock exchanges in India, over a sixteen-year period, from 1985 to 2001. We promised confidentiality to the company at the time of data collection; hence we have referred to it as Century Financial Services (CFS). The change in organizational focus towards IT, beginning with the use of basic efficiency enhancing systems and culminating in the adoption of business-to-consumer and business-to-business systems has been described, along with an analysis of the facilitators and inhibitors that influenced these changes.

Sections 1 and 2 provide an introduction to the company, a brief history and a description of basic business processes and value chain in the stock broking industry in India. This explanation forms the backdrop of descriptions of future decisions that are taken by CFS with respect to IT deployment. Sections 3, 4 and 5 describe the operations of the company between 1985 and 1991, 1991 and 1994, and 1995 and 2001, respectively. In each section, relevant external and internal factors that caused changes in the nature of IT have been identified. The external factors include the competitive context, the macro economic changes and changes in the industry structure. Internal factors consist of the attitudes of the leaders and managers towards IT, elements of organization culture and structure, and the role of IS professionals introducing IT. Section 7 concludes the case with a description of possible scenarios of the future of the financial services industry and with an emphasis on the absolutely essential and strategic use of IT/ E-Commerce that is implied by these scenarios. Emerging trends in the value chain and the industry structure have been explained, with the case concluding with the description of the future plans of CFS.

Teaching Purpose and Objectives

This case can be used in a variety of MBA and executive courses in management of information systems, strategic management and general management. The case addresses the following theoretical and conceptual key issues:

1. To illustrate the contribution of external factors such as environmental, regulatory and competitive changes in forcing unwilling organizations to upgrade and evolve their use of IT and to change their focus towards IT.
2. To illustrate the role of internal factors such as organization structure, leadership and culture in the adoption of IT and E-Commerce.
3. To underscore the potential of the role of IS professionals in influencing organizations to take IT and E-Commerce deployment decisions.

Questions to aid the Analysis

1. Explain and analyze the introduction of IT in CFS for the first time, during the period 1985 to 1991. Highlight the facilitating role of organizational leadership and organization structure in your analysis.

This question addresses the role of structure, leadership and culture in the adoption of IT. The first systems were introduced at the behest of the President. The organization structure was centralized and the President was the head of the most powerful decision making body, the Board of Members. Hence the orientation and attitude of the President was a major determinant of the overall orientation of the organization towards IT adoption.

2. What were the external pressures and opportunities that the company faced between 1992 and 1994? Explain and analyze the reluctance to introduce new IT between 1991 and 1994, in spite of these pressures and opportunities. Highlight the inhibiting role of leadership preferences and organization culture.

This question illustrates the role of organizational culture as possible inhibiting factors in the adoption of IT. This period was characterized by changes in government policy and regulation, as well as technological changes in the financial markets and stock exchanges worldwide. This presented an opportunity for CFS to adopt IT and reengineer its existing processes. However, the President did not have a favorable attitude towards IT introduction. Since the decision-making processes were centralized, this was reflected in an overall inclination of the organization not to adopt any new IT during this period.

3. Why did CFS finally adopt E-Business and introduce the online trading system during 1995 to 2000? Explain and analyze the drivers that led to the adoption of the B2B and B2C systems.

This question illustrates the contribution of environmental and competitive factors as facilitators for the adoption of E-Business. It also highlights the inhibiting roles of organization structure and culture and describes the potential influences of IS professionals. A new competitor emerged, and there were further regulatory changes. Because of its refusal to have introduced technological changes, the performance of CFS deteriorated. These factors forced the company to adopt EC. There was no change in the inclination of the leaders and managers.

4. Describe and analyze the different roles of IT in the three different periods described in the case.

This question analyzes the different roles of IT in the three time periods. In the period 1985 to 1991, IT was used in Transaction Processing. During the time 1992 to 1994, there was stagnation in the role of IT and no new applications were developed. Between 1995 and 2000, sophisticated E-Commerce applications were adopted, and IT became the medium of delivery of products and services.

5. Should CFS rethink its attitudes and biases as far the adoption of IT is concerned? What management strategies would you suggest the company adopt, in order to successfully negotiate such an exercise?

The financial services industry is highly information intensive and IT/E-commerce are the means of delivery of products and services. Therefore CFS should take a proactive stance towards IT adoption, rather than play catch-up in response to competitive and regulatory pressures. There are three areas, which are required to be addressed. First, the leadership bias against IT should be overcome. A favorable leadership orientation in a centralized organization would result in an overall organizational inclination towards the proactive adoption of E-Business. Secondly, greater powers should be given to IS professionals. IS professionals should also interact more closely with line managers, in understanding and

addressing their problems, educating and generating awareness. Thirdly, the cultural orientation of line managers should be changed. A close working relationship between IS professionals and line managers would help in this regard. IS professionals would need to be aware and capable of solving end user needs and willing to address their problems. This would be a means to overcome the historical bias and distrust of IT/E-Business.

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