

Analysis of e-Business Models and Business Process Simulation for Internet Banking

THESIS

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CERTIFICATE

This is to certify that the thesis entitled “**Analysis of e-Business Models and Business Process Simulation for Internet Banking**” and submitted by **Neeru Maheshwari** ID No. **2001PHXF416** for award of Ph.D. Degree of the Institute, embodies original work done by her under my supervision.

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“We act though comfort and luxury were the chief requirements of life, when all that we need to make us happy is something to be enthusiastic about” – Albert Einstein

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ABSTRACT

The benefits of living in a fast changing Information society become evident if e-business practices are implemented effectively, offering companies exposure and access to global markets and consumer access to customized, high quality services. Such practices are facilitated by innovative and effective e-business models. However, the business literature defines business models from different viewpoints, each focusing on different components and tools. This leads to a fragmented and confusing picture regarding the form and role of e-business models and the factors that distinguish successful business models. This research aims at stressing the need for following a more holistic approach when studying and analyzing the e-business models, so that a comprehensive study of factors that constitutes successful e-business model adoption can be achieved. A study of Indian banking sector has been done in order to prove the appropriateness and importance of the proposed approach in the context of Internet banking.

Business model is one of the important concepts in the Internet and electronic business world. This research has the ambition to give this term a more rigorous content. The objective is to propose a theoretical business model framework and to define critical success factors, based on an exploratory study in order to find out and compare the performance indicators used by Indian banks which are competing with similar businesses models for doing business in the Internet era. In order to survive in competitive economic environments, banks need to continuously improve their business processes. The Internet enables companies of all sizes to develop new online business models, which means improving and altering the ways in which companies operate and interact with business partners, customers and suppliers.

The world of banking has assumed a new dimension at the dawn of 21st century with the advent of technology banking. The emerging electronic economy and computer technology are causing a paradigm shift in the way businesses are done and banks are increasingly leveraging technology for increasing their competitiveness through product

differentiation, price reduction and value addition from improvement in speed and accuracy of transactions. A detailed discussion on the technology front, especially the advent of Internet banking is carried out in the study. What is in there for Indian banks, how can they gain out of this new delivery channel and what is the current status of Internet banking in India is pointed out.

It is apparent that developing dynamic models of business processes prior to their radical change could increase the success of Business Process Reengineering (BPR) projects. Simulation has an important role in modelling and analyzing the activities in introducing BPR since it enables quantitative estimations of influence of the redesigned process on system performance. An example of “business to consumer” Internet banking process modelling using simulation tool iGrafx Process is presented. The main objective of the research is to investigate the potential benefits and outcomes of introducing new banking processes. It can be assessed in advance by using simulation modelling.

With hot winds of competition blowing across the Internet banking industry, developing a close, symbiotic relationship with customers has become highly important than ever before. Banks have to come out with innovative measures to satisfy the needs of their present customers acquire new ones and at the same time adopt procedures to win back the lost customers. This problem gets compounded as customer expectations for quality, service, performance, reliability and value are increasing rapidly on a continuous basis. The study looks in to the new possibilities created in this arena by looking at the efforts being made by Internet banks to develop and foster a relationship with their customers and to identify how the customers are adopting it.

In the course of analysis, a Business model framework has been developed which consists of factors that were found to have an impact on the Internet banking in India. Towards developing this business model framework, this research has set some principal objectives: (i) compiling a review of the existing knowledge on e-Business models, (ii) Identifying the major elements that are to be considered while designing a business model for any business (iii) Analyzing and validating the importance of these elements

like value proposition, customer relations, Infrastructure and Revenue for the development of business models in the context of the Internet banking in India.(iv) Analyze the effect and impact of Information Technology on the level of productivity and profitability in Indian Banking sector (v) Examining the conventional processes followed at the Banks and reengineering the processes for Internet banking using simulation (v) Identifying a systematic representation of factors that influences the Internet banking adoption from customer's perspective. It also emphasizes the societal factors as an integral part of Internet banking. The thesis concludes by presenting the future research directions and further developments.

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LIST OF ABBREVIATIONS

ATM	: Automatic Teller Machine
ACH	: Automated clearing house
B2C	: Business to Consumer
BMs	: Business Models
BPR	: Business Process Reengineering
BVA	: Business Value Added
BSRs	: Basic Statistical Returns
BBE	: Books Evidence act
B-Web	: Business Webs
B2C	: Business-to –consumer
CBS	: Core Banking Solutions
DNS	: Deterred net settlement
EMM	: E-business Maturity Model
ECS	: Electronic Clearing Services
EDI	: Electronic Data Interchange
EFT	: Electronic Fund Transfer
GDP	: Gross Domestic Product
HTTP	: Hyper Text Transfer Protocol
ICT	: Information Communication & Technology
IT	: Information Technology
IS	: Information Systems
IB	: Internet Banking
ISP	: Internet service providers
ISO	: International Organization for Standardization
ITFs	: Internal Transfer of Funds
INFINET	: Indian financial network
I-Banking	: Internet Banking
IFS	: Interactive Financial Services
IP	: Internet Protocol
IDRBT	: Institute for Development and. Research in Banking Technology

OT	: Outward Transactions
OUB	: Oversea Union Bank
OCBC	: Oversea Chinese Banking Corp
MBPS	: Mega Bits Per Second
NVA	: Non-Value Added
NPL	: Non Performing Loans
PC	: Personal Computer
PSU	: Public Sector Units
P2P	: Person to Person
PDA	: Personal Digital Assistant
RBI	: Reserve Bank of India
RTGS	: Real time gross settlement system
ROI	: Return on Investment
SBM	: Strategic Business Model
SBI	: State Bank of India
SET	: Secure Electronic Transaction
SSL	: Secure Sockets Layer
SWIFT	: Society for Worldwide Interbank Financial Telecommunication
TOS	: Terms of Service
TT	: Telegraphic Transfers
TraM	: Transaction Manager
TCP	: Transfer Control Protocol
WWW	: World Wide Web
URL	: Uniform Resource Locator

INTRODUCTION

1.0 INTRODUCTION

In the new millennium, the single most dominant event which has completely changed the world is the birth of Internet. It has changed the outlook of whole set of industries and markets and has already had a great impact on consumers and is all set to have a very exciting future. It has helped companies improve services, reduce costs, open new channels and transform the competitive landscape. The arrival of Internet is revolutionizing the way business is carried out and is having a tremendous impact on all industries- the way they work and how they provide services to the customers. The internet and the technology enabling have helped companies to create an altogether new channel of business, collectively called e-Business. e-Business is primarily any kind of transaction done partly or completely over a network. However, it is not only buying and selling of goods and services over the internet, but also servicing customers, collaborating with business partners so as to create new markets. e-Business has changed the way many companies do business. To them, e-Business is no longer an alternative but an imperative. However, many companies are struggling with the most basic problem of identifying the best approach for establishing and doing business in the digital economy. Some companies are transforming their businesses entirely to the web. Some are establishing subsidiaries, and then spinning them off as separate online business. Others are investing in or merging with online startups. The bottom line is that there is no simple prescription and almost no such thing as an established e-Business model for companies even within the same industry.

The biggest challenge most companies face is not about how to imitate or benchmark the best e-Business model in their industry but how to fundamentally change the mindset of operating the traditional business. The organizations going for e-Business adoption don't realize that just having an online presence and getting a costly consultant and even costlier hardware and software is not e-Business. It is an overall strategy of redefining old

models with the aid of technology which acts as a catalyst for new creative ideas about how to do the business. It also offers new ways of doing business rather than mere extensions of existing business practices. The essence of e-Business is to change organizations from product-centric to customer-centric. One of the most important processes of e-Business is extracting valid, previously unknown, and comprehensible information from a large database and using it for profit. However, as enterprises pursue e-Business strategies, they become aware that the costs and benefits of e-Business initiatives are significant, and they strive to grasp the financial impacts and economic factors that contribute to their success.

This chapter is designed in the following format. Background of the research is described in Section 1.1. Scope of the research work and objectives of the research study are presented in Section 1.2. A brief review of research methodology is presented in Section 1.3. Section 1.4 presents Chapterisation scheme.

1.1. BACKGROUND

Over the past two decades, business processes have changed dramatically in response to powerful social, economic and political forces that have brought globalization, increased competition and technological advances. Old ways of working have been replaced by new ones, new businesses have appeared and prospered and companies have merged, outsourced and formed strategic alliances to meet these challenges. In the new world of business that has emerged, adaptation to constant change proves an important ingredient for success. At the same time, Information technology (IT) has become the predominant element in many business deployments. Global competition, technology advancement and increasing customer expectations are only a few of the factors that are placing unprecedented demands on business enterprises. To be successful, companies need to develop innovative strategies that capitalize on both the power of the Internet and the changes in market demands. It is becoming increasingly evident that established business models, techniques, structures and philosophies are becoming irrelevant in responding to

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market requirements. Thus, it is not surprising that many businesses are forced to rethink their business strategies and business models (Kraemer et. al., 2000).

e-Business is “a secure, flexible and integrated approach to delivering differentiated business value by combining the systems and processes that run core business operations with the simplicity and reach made possible by Internet technology” (Daniel, 2000). e-Business can be described as the new business logic that operates in a world without boundaries. It necessitates redesigning business processes and the use of information and networking technologies. Business goals made possible by e-Business include improving efficiencies, increasing speed of transactions, expanding markets, enhancing business partnerships and most importantly, providing additional value for clients (Turban et al., 1999). It accelerates the marketing, buying and selling of all kinds of products and services. e-Business can have a dramatic impact on business performance, including return on investment, by boosting revenues, cutting cycle times and cost, enhancing customer service and broadening market share. It is redefining commerce, transforming industries and eliminating the constraints of time, space and distance. The opportunities are infinite and the potential rewards are vast.

Some of the areas where e-Business is witnessing rapid growth in global market as well as in India are banking and financial services, tour and travel, stock trading, health care and education, etc. With the Indian Parliament passing the IT act 2000, the legal infrastructure for e-Business is already in place. Organizations such as Tata Motors, HLL, Asian Paints, CRISIL, ICICI Bank, etc., are in the process of adapting to e-Business arena and others are planning their moves to leverage potential opportunities. According to a NASSCOM survey, in 2002-2003 the e-Business transactions in India touched Rs.1400 crores. Further, due to improvements in telecommunication infrastructure and PC penetration, the transactions may soon cross Rs.13, 000 crores (Joseph, 2002). However, e-transition poses a great challenge for Indian corporate. It is a business opportunity to be seized, but seized carefully. There are risks that have to be addressed, including legal and regulatory issues such as conflicting jurisdictions, taxes and intellectual property rights and security issues such as data confidentiality, privacy,

fraud and industrial espionage. Moreover, organizations must move ahead but they must do so holistically. It must be integrated into business organization so that it meshes with the vision and corporate strategy. As organizations attempt to capitalize on their existing capabilities through the Internet, they necessarily disrupt their embedded processes. This process of leveraging strengths and disrupting habits underlies the migration to e-Business—a migration from market place to market space.

1.1.1 Business Models in the Digital Economy

The rapid growth of electronic markets complementary to traditional physical markets has exposed new methods of delivering goods and services (Bane et al., 1998). However, fast movement from the physical to the digital environment affects the structure of the markets itself. It is widely acknowledged that there is an ever-growing literature on business models by academics, research centers and consultants. Some speak about “Internet business models”, some about “e-Business models” or “Business models on the Web”, and others speak generally about business models. The interest in business models is currently fuelled by Information and Communication Technology (ICT) that changes dramatically the way activities are performed within and across firm boundaries. This is why within the last few years, the discussions about business models and the impact of the Internet on them have become more topical. Existing literature in the area offers a wide range of definitions for business models. The research on e-business models is primarily driven from the management and information systems research point of view and there is an organizational and/or technological emphasis in most studies. The former accentuates the importance of revenues from innovative business practices, while the latter focuses on the role of information and communication technologies in supporting or hindering such organizational growth. While both perspectives are valuable, they can be criticized for missing the influence of additional important factors that may have an impact on the adoption of business models. These models need to address both organizational and network strategy issues as it is the focal point around which business is conducted and business operations are improved.

There are a number of studies, which have been carried out on various aspects of e-Business (Linder et al., 2001).¹ Developing e-Business models is not simply about the adoption of new technologies, it also concerns changes in work practices, customer/supplier relationships, the way products are delivered to consumers, in marketing practices and changes in staff skills needed to support e-Business. Accordingly, e-Business models signify new opportunities for re-organizing the way businesses are currently practiced. However, only a limited number of studies are available on e-Business models in Indian context. The literature only provides some insight into e-Business models for different sectors but the practical applications are not thoroughly explored. So, there is a need to develop new modeling methods in the domain of business models for managing organization in the Internet era.

In spite of the huge thrust of research in the area, there is no standardization of how a business model is defined, how to develop it, and what components come under it, which is the principal business models, how to transform business models, etc. A large amount of research work in e-business concerns the investigation and the analysis of business models. However, the current business literature on e-business models appears to be highly diverse, which constitutes the "vehicle" to carry out effective and successful e-business practices. The existing management concepts and tools may not be sufficient anymore. In other words, there is no consolidated knowledge considering various aspects of business models. They use it to describe everything from how a company earns revenue to how it structures its organization⁴ (Linder, 2001). A clear description of business model is essential for effective communication both within and outside the organization. This research aims at stressing the need for a holistic approach when studying and analyzing e-business models, so that a comprehensive study of what constitutes successful e-business model adoption can be achieved.

The study of e-business model is imperative because it can be an adequate methodology and foundation for managerial tools and Information technology requirements to react to the increasingly dynamic business environment. As product life cycles become shorter, intense competition and the use of ICT is essential, managers have to find new ways to

maneuver and decide in this complex environment. They have to understand the new opportunities, integrate them into their existing business models and share them with other stakeholders. The e-business model framework proposed in this research and the tools that are build on it are a first step to facilitate management under uncertainty.

1.1.2 Indian Banking: Surviving the Impact

The opening of Indian economy in 1990's brought in its wake forces of market competition in small measures in the economy and all sectors including Banking sector were exposed to such forces for the first time. IT is playing an active role in improving the productivity in banking industry. This revolution has brought about a fundamental transformation ushering in, as Alvin Toffler describes it, "The Fourth Wave". Perhaps no other sector has been affected as much as banking and financial services. It has become the most important factor for dealing with the intensifying competition and the rapid proliferation of financial innovations. The liberalization in the banking sector in 1991 necessitated the need for bringing measures to cut down cost, to increase efficiency, to provide better, value added, customized and cost effective services to the customers. In this research the banking sector has been chosen for study because of its unique potential to be a very large user of e-Business and given the kind of changes banking industry in India is experiencing, a thorough study on IB and a framework to analyze the critical success factors and strategic issues involved in e-business transaction was felt appropriate.

Banks have been traditionally organized around product lines, such as deposit accounts and loans. With loose co-ordination among departments and customer information didn't flow easily across the organization. To remedy this problem, banks attempted to create a single customer interface, which forced them to integrate their databases and e-initiative systems. Once this was accomplished, banks adopted Customer Relationship Management (CRM) tools to improve their customer retention and to help up-selling and cross-selling. All this required significant investments in personal computers as well as the integration of complex systems. New product combinations and services, such as, automated teller machines (ATM), Internet use, etc. were made available.

Banks around the world have made huge investments in computer hardware, software and Information technology equipment. With enormous investments, the question of payoffs from IT has become increasingly important. Yet in the mid- and late- 1990s, a number of studies found it difficult to establish a clear link between the perceived increase in efficiency due to computer use and the associated productivity growth (Pohjola, 2002). Mooney et al. (1996) summarized the findings by stating that results ranged from 'instances of insignificant or negative relationships between IT and various performance ratios . . . to bimodal distribution of impacts for firms operating in the same industry . . . to conclusions of significant returns on investment' .

This controversy generated a great deal of discussion and analysis in both the academic and policy circles. Two specific questions were raised. First, do IT investments improve productivity? Second, if they do, why don't the aggregate numbers reflect that? A number of studies linked the improved performance of the economy to the IT revolution.

The focus of most of the studies examining the IT performance relationship has been on the developed countries, where the impact of IT on growth seemed more prominent and the data is easily available. Very few studies have looked at the issue in a developing country like India where the lack of a consistent and adequate data set precluded the extension of these works.

This research partially aims to extend the literature in this area in at least two ways. First, it will analyse the effect of IT in Indian Banking sector. Second, it will estimate the impact of IT on the level of productivity and profitability in the Indian banking industry as no systematic effort has yet been made in this regard. Given the paucity of studies on the developing countries, like India, this research contributes to the existing literature by estimating the impact of IT investment in the banking sector in India. The scope and the research objectives for this thesis are formulated with the intent of focusing investigations in the under researched areas.

1.1.3 Internet Banking: Business Process Simulation

Model building in banks is an answer to the problem of the customers who have been taken off by the global bankers, commencing from the advanced countries of the world. In the ambit of the extensive technology used in a way to adapt IB structured form of decision making is becoming the need of the banking industry. To streamline the decision making capabilities both, in domestic and international banking setup, the use of modular devices as per the organization capabilities of the bank is the answer to the effectivity in the operational and strategic intervention. The banking business as such runs on trusts. The compatibility with the customer through a fiduciary relationship is the continuous answer to the banking problem. Several researchers have conducted their studies to construct, use and validate several models applicable in banks. Since the on bank and off banks activities in the advanced country are streamlined and in majority of cases inter institutional businesses are also standardized. These models gave an impact generating results. The model building in banks were extensively in the B-B (Business to Business) e-commerce interventions with an advantage to negotiate the cost of banking services, broadening their supplier base and streamlining advance and deposit function of the bank using e-commerce devices. Domestic banking industry in our country is not very vibrant and capable to adapt these models. However the technology friendly larger bank like ICICI has been experimenting to successfully adopt B-B models for growth and development in their business.

The studies in Indian Banking are limited to justify to what extent these B-B models could be in a position to intensify or extensify the branch banking which laid the foundation of Indian Banking revolution as a post nationalization measure. Off late, it was found from the experiences of the bankers globally that the B-B models can be extended as B-C (Business to Consumer) which is more pervasive in the Indian context since B-B model could answer to the problems of Indian banking in a partial manner. Herein this study, the researcher is enthused to find some of the exploratory software that is adopted in the banking sector in the advanced country of the world. Perhaps no innovation is reported to use this software in Indian context. As an alternative to this thought, in the pretext of the above, Indian Banking need, to either modify B-B models in

practices in advance banking setup to B-C models in domestic banking activities. Even today the customer focused segments are not been worked out. We should now build a B-C model in order to identify both domestic and international investor and transact with them both in operational and strategic intervention. The researcher with all efforts have found certain parameters by making the banking activity customer friendly, working out the cost and time required for these service and still vying with the idea of developing this worked out exercises into a customer focused model. This also provides a scope for other researcher to take out this idea to explore further possibility. While considering the growth of banking industry to cater the needs of an average middle class Indian having access to technology friendly banking a suitable B-C, model has to be adopted. This may require restructuring the organizational setup of the bank or going for complete reengineering by modifying the departmental activities incorporating the IB habits. The researchers has explored the possibilities to calculate, under certain assumptions the cost of various banking processes since the Indian banking is saving oriented than investment oriented, the use of B-B model has various limitations except some possible use in highly sophisticated, technology friendly, international banking service providers in commercial capital of country only. The banks that are providing IB facilities from these cities have to standardize their banking patterns in order to co exist with the banking norms of such advanced countries with whom they are transacting. But to spread these banking activities to a customer focused segment bicker certain fundamental limitations. Process simulation throws light on some of the potential benefits that a bank would reap on the implementation of this model in terms of cost and time they invest for such activities. This model finds a best fit in the Indian banking sector. However, it would also serve without much modification the global banking market as well.

1.1.4 Internet Banking: Customer/ Societal Perspective

In the current scenario, banks find that they have to constantly innovate and update to retain their demanding and discerning customers and to provide convenient, reliable, and expedient services. It has opened up new demographic divide, the young technology savvy customer and others. For today's ever changing, dynamic, more demanding customer who is exposed to both the information and choice overload, the definition of

* | satisfaction has changed from reliability, responsiveness, and assurance to the communication techniques of a service provider. People now have a wide variety of options to choose from, right from insurance policies to bank accounts. The Banking sector witnesses greater challenges in sustaining brand loyalty, as the offerings are intangible. The banking and financial services sector is a prime example of the customer churn caused by increasing brand variety. Technology is taking banking closer to the customers, but it is also making the bank less human. For customers it is the realization of their anywhere, anytime, anyway banking dream. This has prompted the banks to embrace technology and offer IB to meet the increasing customer expectation. However, the success of IB adoption requires a nod from the people involved in utilizing IB services because their doubts may affect the adoption of this much hyped IB services. The question that haunts the inquisitive minds of customers is to be properly taken care of by the banks. The conscious customer wants to know, "What will be the level of reliability in service, performance, network availability, personal interaction, timely execution and security of these IB services?" * * *

Despite the numerous studies conducted to investigate the acceptance of IB and its impact on the banking industry (e.g. Booz-Allen & Hamilton 1997; Seitz and Stickel 1998), not many were conducted from the perspective of consumer acceptance. Consumer acceptance is important in determining the feasibility and successful implementation of new, technology-based banking services (Dover 1993) and the customer perspective study done in this research will provide greater insight into their intentions to adopt Internet banking services. The objective is to identify and understand the attitudinal, perception, inhibitors, motivators, social and behavioral control factors that are significant in explaining intentions to adopt Internet banking services in India. The findings will assist banks in understanding the key factors that influence the adoption and help in understanding the theoretical constructs of the framework in the adoption of Internet banking. (18) * * *

1.2 SCOPE OF THE RESEARCH WORK

The aim of the present work is to analyze and compare various e-Business models so as to identify appropriate metrics for assessing the particular business model. It is proposed to take up the case study of Indian Banking sector and identify factors that contribute to the improved performance of the Internet banking operations. With almost all the major banks in India migrating (or in the process of migration) to full fledged Internet banking, Computer simulation studies are planned to study the factors which may enable a successful migration of traditional banking business to e-Business. Impact of Internet based banking operations on customers is also proposed to be studied.

1.2.1 The Objectives of the Study:

- To study, analyze and compare various e-Business models and identify appropriate metrics for assessing business models.
- To analyze the profitability and productivity of Internet Banking in India.
- To investigate the factors for the successful reengineering of various banking processes and process simulation for the migration of traditional business to an e-Business.
- To study the implications of Internet banking adoption on the society from customer's perspective by analyzing the consumer preferences based on quality, reliability and serviceability aspects.

1.2.2 Hypotheses of the Study:

The hypotheses tested in this study follow from the objectives:

1. The review of literature in e-Business provides business models with diverse components and parameters, which are not sufficient to conduct effective and successful e-Business practices in the current business environment as there is no standardization of a business model definition and its components.
2. The Private, Public and some foreign banks in India started offering or are likely to offer various financial services to the customers through Internet banking because it is a cheaper and quicker mode.
3. The increased IT investment and e-initiatives in Indian banking system is not only enabling the banking system in the country to increase their productivity but also to gain competitive advantage and earn higher profits than they would have otherwise made.
4. Reengineering and migration from traditional form of business to Internet business is helping banks to save cost, time, human and other resources.
5. By and large customers (predominately from metro cities) are switching to Internet Banking but security, privacy etc still happens to be major concern.
6. Internet Banking customer are showing a distinct preferences for performance, serviceability etc. while choosing Internet Banking service providers.

1.3 RESEARCH METHODOLOGY

Since the research focuses on more than one aspect of Internet banking, the objectives are multiple and varied. Subsequently, the research methodologies adopted are a mix of various statistical and econometric tools including mathematical modelling, econometric toolkits, TSP, univariate analysis, questionnaires, interviews etc.

Firstly, the literature review was studied with some specific objectives like the origin, place and role of business models and how the various definitions, components, taxonomies, methodology for changing, factors and guidelines for evaluating e-business models are analyzed. It is a study that critiques, analyzes, and extends the existing literature, which intends to develop a new framework or a conceptual model by adopting mathematical modelling.

Next, the research focuses on analyzing the productivity and profitability aspect of Internet banking. For which a through study on IB has been done with respect to performance, cost efficiency, and other characteristics. The search was executed to collect information from the Internet using a combination of knowledge of banks web sites by using univariate statistical analysis. Further to analyze the productivity of banks a Cobb-Douglas production function approach is employed. The data related to Information Technology (IT) is obtained by asking questions to the top level executives who are directly involved in Internet banking. The questions are well defined, and some of the responses are open-ended also. The methodology adopted for analyzing the Banking Sector is primarily based on secondary data available from various sources including annual report of Reserve Bank of India (RBI) on banking, annual report of various private sector banks, web sites of major banks, other economic and banking reports, journals and newspapers, sites on the net related with banking like Indian Banking Association, National Institute of Bank Management, archival data, published statistics, indiainfoline, banknet.com, bankersindia.com etc. Looking at the objective of the study, the processed data has been analyzed in detail by using various parameters presented in the literature review, which are relevant in the modern competitive

environment and are gaining wider acceptability. The data collected has been analyzed using Statistical software packages like, TSP and Econometric Toolkit.

To analyze the use of business model in Indian banking sector major components derived from the literature review of the research has been taken and is evaluated using Likert's scale. A series of interviews were conducted that aimed at investigating the relevance of business model research, assessing the model's fidelity with real world phenomena and exploring possible uses of the business model concept in various banks. The data collected through the questionnaire is used to evaluate the Internet banking facilities provided by the banks.

Further to investigate and analyse the factors for reengineering of various processes followed at banks a simulation tool (iGrafx) has been used which can generate reports regarding the duration of each transaction, costs, resource utilization, etc. This tool was used in many BPR projects for simulation as it plays a vital role to analyze the existing business processes, to develop a new one removing the unnecessary cardinalities, and to make qualitative and quantitative estimations that would help to decide whether to implement the process or not. In this, different banking processes like account opening, loan process in general and car loan process in particular and electronic fund transfer has been studied. Considering the concepts available in the literature a new model has been designed which would help banks to effectively re-engineer their numero-uno process and good use of the technology and market situations to their advantage. The process model has been designed based on an in-depth study done on some of the leading banks in India. After analyzing the existing process adapted by banks, an appropriate process referred as "AS IS model" has been chosen which will serve as a reference for the simulation analysis. For the purpose of re-engineering, the AS IS model is critically analyzed to know the pros and cons of the activities. After considering the AS IS model as a base model, efforts are also made to re-engineer the necessary activities so that the cost related to the activity gets reduced and on the other hand the benefits for the customer and the bank increases. This reengineered model is referred as "TO BE model".

We collected the data from the banks about the process flow and a rough estimate of the process is drawn and verified by a panel of experts comprising of top level bank officials.

Lastly, an attempt has been made to investigate the implications on the adoption of Internet banking on society by examining the behavior of customers in the event of new technology introduction. The data was collected by administering a questionnaire in the six capital cities of India where IB was highly intensive. The research questions were addressed by analyzing the questionnaire data.

1.4. CHAPTERISATION

Following this introduction chapter where we present background of the research, scope, objectives and hypotheses being tested. Chapter 2 consists of a review of literature. The review includes the origin, the definition, the elements, attributes and relationships of the business model, and their applicability in the context of the organization.

IT has played a major role in shaping the future of major industries and banking is no exception. In the third chapter the application and avenues that IT has provided in the Indian Banking sector is highlighted and a framework is presented to analyze the critical success factors and strategic issues involved in Internet Banking transactions. The advent of Internet Banking related issues and what it means specifically in the Indian context is discussed in detail. What is the performance of Internet banks over non-Internet banking in India and why are banks going for an additional channel is looked into through profitability and productivity analysis. Also is it really profitable to go for an additional delivery channel and how to successfully integrate this new channel in the current model has been discussed.

In the fourth chapter we go one step further down from where we left in the second chapter and carry out a comprehensive analysis of Internet banking facilities provided by various banks and study the application of business model in Internet banking. The

criteria adopted for evaluation are based on value proposition, customer relationship, infrastructure and revenue model.

After the profitability and productivity being analyzed, we start looking at some strategic issues confronting the banking sector. In the fifth chapter we take a look at one of the important issue of reengineering the various bank processes in the banking industry in India. With intensifying competition and development of newer channels, there is a pressing need for banks to restructure their processes and develop more vibrant banking system. The chapter presents the simulation model of different Internet banking processes that could be used to evaluate the potential benefits. The model is verified and factors for successful migration from the traditional to the e-business are outlined.

Last but not the least, the growing significance of adoption of Internet banking by customer has also thrown up lot of implications for banks as such. In the sixth chapter we present the study of the consumer behavior on the adoption of Internet Banking in India. Societal implications in terms of region/geography, culture, regulation, policy, economic and social structure are also discussed. Later on the chapter the comparative study of Internet-based banking services available in thirteen banks in India has been done and suggests recommendations for customers who are searching for Internet-based banking service providers for their electronic-based activities on the basis of various quality parameters.

Chapter 7 concludes the thesis by revisiting the main findings of the theoretical, development, survey and experiment stages of research and raising issues which are likely to be fruitful areas for future study.

**REVIEW OF
LITERATURE**

2.0 INTRODUCTION

We live in a competitive, rapidly changing and increasingly uncertain economic environment that makes business decisions complex and difficult. Companies are confronted with new information and communication technologies, shorter product life cycles, global markets and tougher competition. In this hostile business environment, firms should be able to manage multiple distribution channels, complicated supply chains, expensive IT implementations, and strategic partnerships and still stay flexible enough to react to market changes. Astonishingly, the concepts and software tools that help managers facilitate strategic business decisions in this difficult environment are still scarce. The tools that allow managers to assess, understand measure, change, communicate, and simulate their business models and the exact way they should execute it are also to be identified. Every manager does have an intuitive understanding of how his business works and how value is created. In other words, he does have an intuitive understanding of the company's business model, even-though the model influences all important decisions. In many cases he or she is rarely able to communicate it in a clear and simple way (Linder and Cantrell 2000). Deciding or changing on a particular business issue becomes very difficult if it is not clearly understood by the parties involved. Therefore, it becomes necessary to think of a set of tools that would allow business people to understand their business model, its essential elements, tools that would let them easily communicate it in order to become aware of business opportunities. Surprisingly, the mainstream appearance of "business model" is a relatively new phenomenon. This found its first peak during the Internet hype, at the beginning of this millennium. A query in Business Source Premier, a leading electronic database for business magazines and scholarly business journals, shows that this concept appeared in 1960 in the title and the abstract of a paper in the Accounting Review (Jones 1960). But as Figure 2.1 shows, the boom of the expression "business model" came in 1990s, with

144 occurrences in abstracts and 29 appearances in the title of peer-reviewed articles in 2003 in the Business Source Premier database of scholarly business journals (Stähler 2002). The term is found in numerous variations, such as “new business models”, “e-Business models” or “internet business models”. However, it can be said that the expression was inflated through journalists, business people and academics that used it in relationship with e-Commerce, start-up companies and high tech companies. It seems that the executives, reporters, and analysts who used the term “business model” never really had a clear idea of what it meant. They sprinkled it into their rhetoric to describe everything from how a company earns revenue to how it structures its organization (Linder and Cantrell 2000).

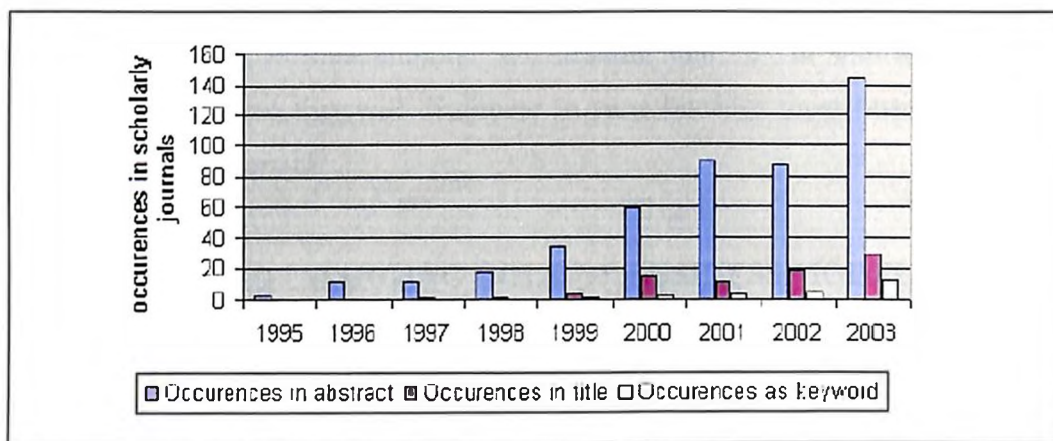


Figure 2.1: The growth of the expression business model

Source: Stähler, P. (2002), Business Models as a Unit of Analysis for Strategizing, International Workshop on Business Models, Lausanne, Switzerland

Since the research in the field of business model is very vast and varying so it is essential for us to concentrate into each aspect of business models. There is still no common understanding of how a business model is defined, how to develop business models, what are the principal business models, how to transform business models, etc. In other words, there is hardly any consolidated knowledge, considering various aspects of business models.

The chapter is divided into various subsections, which presents the main research views on several aspects of Business Models: The first step to this research is a thorough review of the existing literature on business models so as to give an insight into the various facets like the research approaches in the field of business models which is presented in section 2.1. In section 2.2 an effort has been made to analyze the definition of the concept of business models in literature. The components and elements of Business model are discussed in section 2.3. The classifications of business models i.e. the taxonomies are described in section 2.4. In section 2.5 methodologies for changing and evaluating business model are presented. Finally, the various aspects of the business models mentioned above have been critically observed and analyzed are presented in section 2.6. For facilitation we use the term business model interchangeably with the different expressions used by various authors. We assume that "e" in e-business model is a temporary phenomenon that will disappear in time because most business models will have some ICT component.

2.1 e-BUSINESS AND CHANGING ROLE OF BUSINESS MODELS

The Internet in course of time has emerged as a significant interactive medium for conducting business. The faster easier and cheaper access to the Internet has made it the most sought after service for its users. The users communicate or access information without geographic or temporal limitations, access dynamics and interactive content on a real-time basis and interact instantaneously with a people at little or no cost. This along with macro-economic trends has revolutionized the conduct of business. These trends are important to assess, in order to understand the dynamics of e-business. According to A.T. Kearney (2000), in the new economy, customers also demand speed, immediacy, security and mass customization. In the early stages of e-business price was considered the most important competitive weapon against brick and mortar companies. In fact, the success of most of the dotcoms was largely dependent on the lower rates they had to offer on ordinary products. By consolidating their logistic and other major activities they could cut down their expenses, thus cut down the prices as well. When more and more companies join the e-revolution, the strategy of low prices may no longer be valid and

drives the companies toward diminishing revenues, which might prove unhealthy in the long run. In early 2000, we saw the downfall of NASDAQ stock exchange and the business magazines also reporting a number of dot.com companies going bankrupt.

Investors have understood that, the projections of e-innovators were unrealistic and they were based upon the assumption that, there would be only few competitors and that; the whole world could be reached through the Internet. They were followed by an overwhelming number of rivals in the form of competitors coming from all parts of the globe. They soon realized that the Internet is not an automatic channel to all different nationalities. In order to customize e-services to suite all different markets turned out to be a much more expensive task than expected. The business model concept has become popular because today's managers have multiple choices when it comes to defining their value proposition, configuring their value network, choosing their partners, looking for ways to reach the customer and many other similar decisions. This has not always been the case and is essentially the outcome of the interaction between increasingly rapid technological change and globalization (Archibugi and Iammarino 2002). Today's business is characterized by intense use of e-business, fierce global competition, rapid change resulting in increasing complexity, high risk and greater uncertainty than before. In the last decades Science and Technology (S&T) has experienced an impressive progress. Competition compelled companies to pursue profits through two primary means. First one is the conquest of new markets by geographical expansion and the introduction of new products. Secondly by cutting costs through adoption of new technologies and new skills. Hodgson (2003) explains that, in the quest for innovation, the frontiers of S&T led to new knowledge and enquiry. Furthermore, he argues that, because "services are generally more diverse than manufactured goods" diversity also increases with the increasing relative size of the service sector.

2.2 RESEARCH APPROACHES IN THE FIELD OF E-BUSINESS MODELS

The factors that determine the impact of business model on firms have to be identified. It is important to first actually define the term "business model" and how it has evolved in

the past few years. Another factor that determines the impact of business model is the place it occupies in the professional world.

Business Model: A Focus to Reality

As the term business model intuitively suggests, it has something to do with business and something to do with models. According to the Cambridge Learner's Dictionary (Cambridge 2003) the definitions for the two separate terms are:

Business: the activity of buying and selling goods and services, or a particular company that does this, or work you do to earn money.

Model: a representation of something, either as a physical object which is usually smaller than the real object, or as a simple description of the object, which might be used in calculations.

By combining the two we get the simple understanding that, a business model is a representation of how a company buys and sells goods and services and earns money. A business model helps to understand, describe and predict the "activity of buying and selling goods and services" and "earning money" for a particular company. Alternatively, the business model is an abstract representation of the business logic of a company. Often this term is confused with "business modeling" used as a research and industry term (Gordijn, Akkermans et al. 2000).

It must also be mentioned that there is an ongoing discussion on the difference between strategy and business models (Stähler 2002; Seddon and Lewis 2003). The difference between strategy and business model is that they address similar problems in a sustainable way on different business layers. A business model is the translation of a company's strategy into a blueprint of the company's logic of earning money (Figure 2.2).

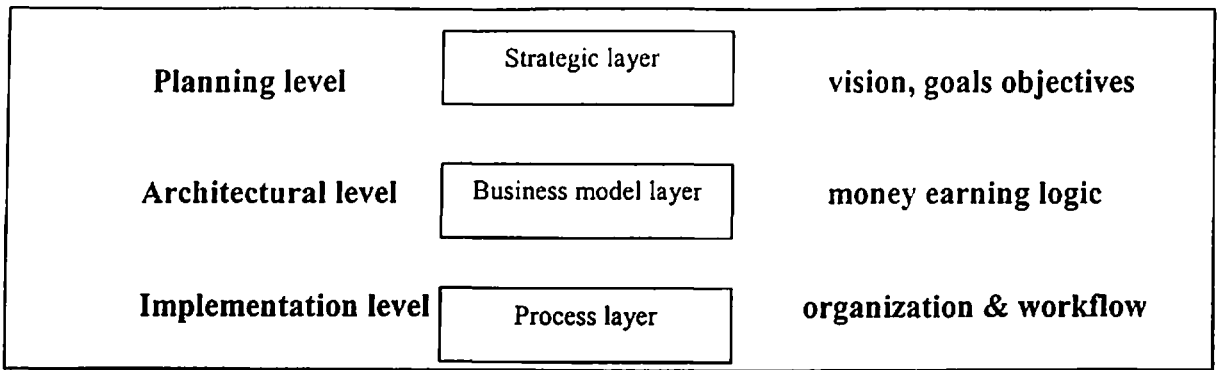


Figure 2.2: Business Layers

Source: Seddon, P. B. and G. P. Lewis (2003), Strategy and Business Models: What's the Difference, 7th Pacific Asia Conference on Information Systems, Adelaide, Australia.

Furthermore, there is a business model process going from design to implementation, illustrated in Figure 2.3. The business model design translates a strategy into a business model blueprint. Then the business model has to be financed through internal or external funding (e.g. venture capital, cash flow, etc.) and finally it has to be implemented into a business enterprise.

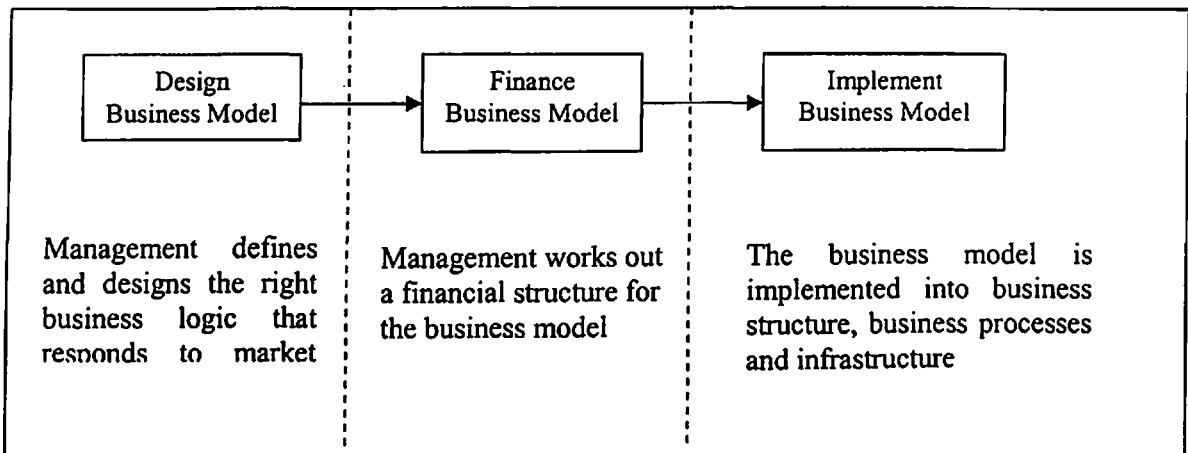


Figure 2.3: Business Model Steps

Source: Kalakota and Whinston, Frontiers of Electronic Commerce, Addison-Wesley Publishing Company.

Another important confusion related to the concept of business models is that, many people speak about business models when they really mean parts of a business model (Linder and Cantrell 2000). An online auction, for example, is not a business model, but a pricing mechanism, as such, forms the part of a business model. Similarly, an online

community is not a business model in itself, but part of the customer relationship. Or take revenue sharing, this is not a business model in itself either, but a way of exploiting partnerships to address the customer and distribute the resulting revenues.

In our opinion a business model has to be understood as a more holistic concept that embraces all such elements as pricing mechanisms, customer relationships, partnering and revenue sharing, in an integrated manner.

In a nutshell we can describe a business model:

- As an abstract conceptual model that represents the business and money earning logic of a company.
- As a business layer (acting as a sort of glue) between business strategy and processes.

But, the business model...:

- Is not a guarantee for success as it has to be implemented and managed
- Is something else than the company's business process model (Gordijn, Akkermans et al. 2000)

After having defined a business model, it is now of interest to define the contents of a business model. This can be equated with the quest of defining a generic business model with all its elements, types and relationships.

The Place of Business Model in the Company

In order to get a better understanding of the business model and its role, it is important to explain how it is positioned in the company. As mentioned in the previous section, it can function as a conceptual link, forming a triangle between strategies; business organization and ICT (Figure 2.4). Often there is a substantial understanding gap between these three “words”. The business model concept can serve as a federator, gluing this triangle of forces.

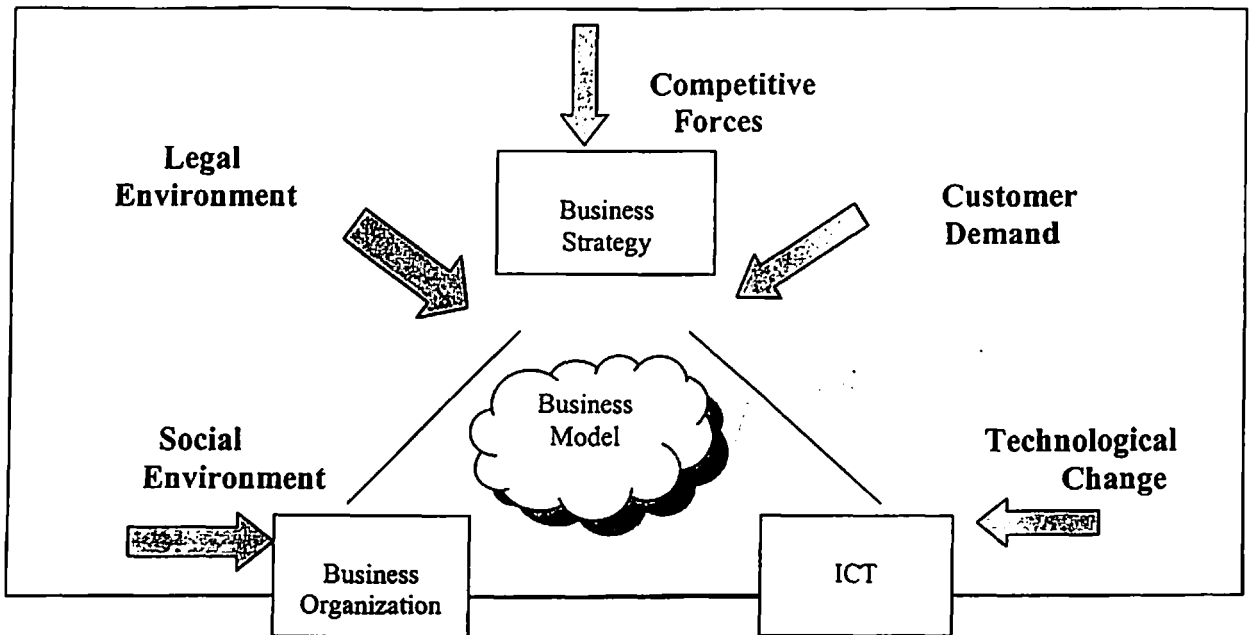


Figure 2.4: Environment, Business Models, Strategy, Process and Information Systems

Source: Fensel, D. (2001), *Ontologies: Silver Bullet for Knowledge Management and Electronic Commerce*, Heidelberg, Springer-Verlag.

As illustrated above business strategy, business organization and ICT look at the firm from different angles on different business layers. Business people position the company in the market, define the direction and formulate objectives and goals, whereas business process and ICT designers have to understand and implement these visions into something more concrete. In order to guarantee a smooth implementation of business visions and alignment between the different groups, firms require a very clear communication of concepts and understandings between the implicated parties. By using a business modeling approach, one can create a shared and common understanding of what a company does to earn money and facilitate communication between people and heterogeneous and widely spread application systems (Fensel 2001). The triangle and the business model are subject to continuous external forces. Among others, these forces include competition, legal, social or technological change and changes in customer demand. It is the manager's role to design or adapt a company's business model, by responding to these external forces.

The first element described in the triangle is business strategy, which is having an enormous domain where little consensus exists, and a variety of schools reign. Strategy means providing a company vision, designing an organization that achieves a fit between internal strengths and weaknesses and external threats and opportunities (Learned, Christensen et al. 1965), positioning the company in the market (Porter 1985), defining a set of goals and objectives (Drucker 1954; Kaplan and Norton 1992), the steps to achieve them and the way to measure them. At large, the business model and strategy talk about similar issues but on a different business layer. The vision of the company and its strategy are translated into value propositions, customer relations and value networks (Figure 2.5).

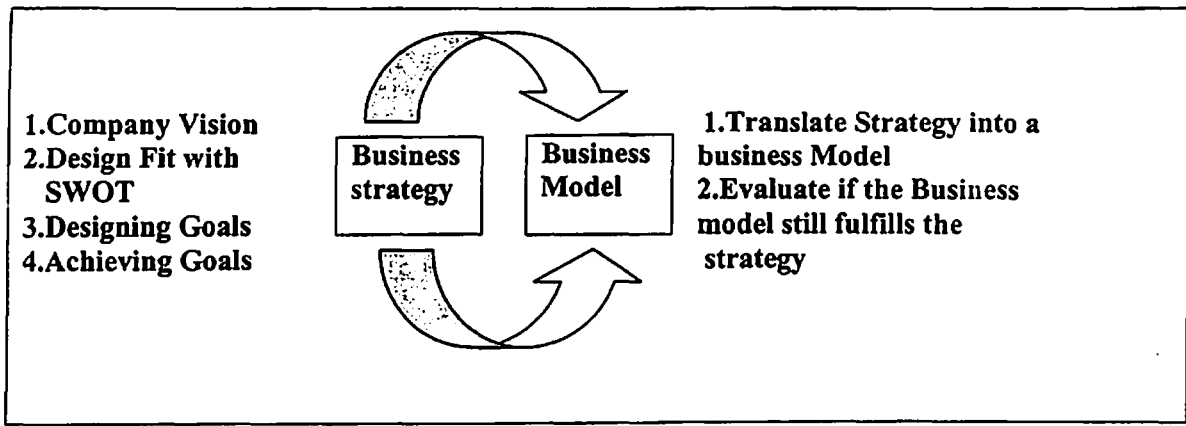


Figure 2.5: Business Strategy and Business Model

Source: Learned, E. P., C. R. Christensen, et al. (1965), *Business Policy: Text and Cases*. Illinois: Irwin, Homewood.

The second element of the triangle surrounding business models is the organizational side. Similarly to strategy and business model layer, the business organization layer talks about similar issues (e.g. structure) but addresses them from a different angle. The business organization is about the "material" form. The conceptual business model takes in the world, such as departments, units and workflows (Figure 2.6). This is not to be confused with the business model, which illustrates a company's money earning logic as a set of concepts. Yet, the business organization and business model are closely interrelated. Changes in the business model bring up organizational questions, which are illustrated by the fact that, companies didn't really know how to structurally cope with

their new online outlets in the 90s. When a large number of companies started selling over the Internet, they used different organizational approaches regarding their new online channels in the form of creating entirely new departments, or by keeping an existing IT department in charge and by creating completely new companies in which they had a majority stake. An optimized business organization is a result of good understanding of the infrastructure aspects of a business model.

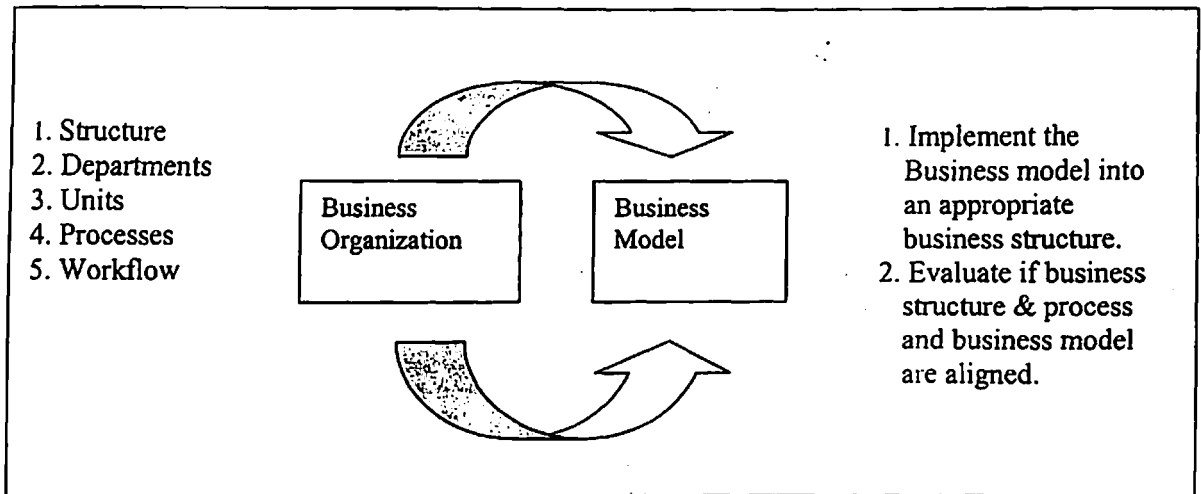


Figure 2.6: Business Organization and Business World

Source: Drucker, P. (1954), *The Practice of Management*, New York, Harper Collins Publishers.

The last element in the triangle is technology, or more precisely ICT. Under ICT, all the information and communication technology are used in the company which includes hardware, such as PCs, servers, PDAs and mobile phone as well as software and tools, such as websites, CRM applications, management information systems etc. Since ICT has been a strong enabler for a variety of innovative business models, the link between ICT and business models is particularly strong. When communication and coordination costs dramatically decreased because of shrinking ICT costs, this had a great indirect impact on business models. It became much easier for companies to work in networks and offer joint or complementary value propositions by including informational aspects into their products and services. In general, the technology people deal with the contribution of ICT in improving a company's business model. Simultaneously business people handle the technological consequences that a change in the business model could have (Figure 2.7).

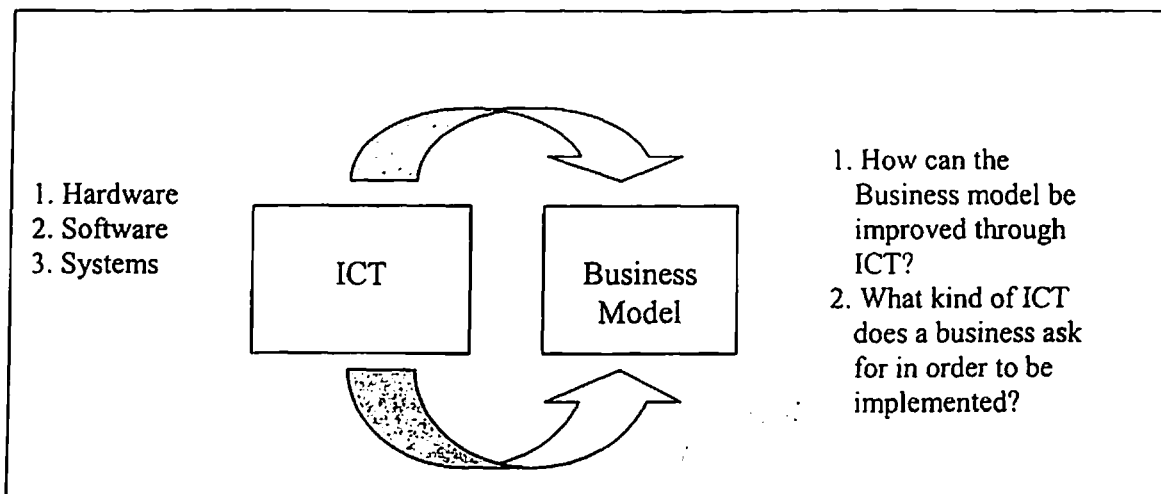


Figure 2.7: ICT and Business Model

Source: Drucker, P. (1954), *The Practice of Management*, New York, HarperCollins Publishers.

Besides relating to the elements in the triangle, a company's business model is continuously subject to external pressures that oblige it to constantly adapt their business model to a changing environment. Some of these forces directly or indirectly influence a business model like technological change, competitive forces, change in customer demand and change in the social or legal environment. The accelerating growth of ICT has raised the interest for changing traditional business models or developing new business models to effectively exploit the opportunities offered by technological innovations. That is why, within the last few years, the discussions about business models and the impact of the Internet on these models have become more topical as research interest. This research is a thorough review of the existing literature on business models. Therefore, in the following sections, analysis of how the concept of business models has been defined in literature, how business models have been classified, what components they are composed of and what modelling efforts have been put into business modeling has been discussed. Further, analysis of the literature has been discussed that mentions business models as a business design tool, as a change methodology and as a means to evaluate and measure. In other words, there is hardly any consolidated knowledge, considering various aspects of business models. Table 2.1 illustrates the primary researchers in the field and the various aspects of the work in this area undertaken by the researchers.

Authors	Definition	Taxonomy	Components	Change Methodology	Evaluation Measures
(Afuah and Tucci 2001; 2003)	X		X		X
(Alt and Zimmermann 2001)		X	X		
(Amit and Zott 2001)	X				
(Applegate 2001)	X	X			
(Bagchi and Tulske 2000)					
(Chesbrough and Rosenbloom 2000)			X		
(Gordijn 2002)				X	X
(Hamel 2000)			X		X
(Hawkins 2001)	X				
(Linder and Cantrell 2000)	X	X	X	X	
(Magretta 2002)	X		X		
(Mahadevan 2000)			X		
(Maitland and Van de Kar 2002)			X		
(Papakiriakopoulos and Poulymenakou 2001)				X	
(Peterovic, Kittl et al. 2001)	X		X	X	
(Rappa 2001)	X	X			
(Stähler 2002)			X		
(Tapscott, Ticoll et al. 2000)	X	X		X	
(Timmers 1998)	X	X			
(Weill and Vitale 2001)	X	X	X		

Table 2.1 Research Approaches in the field of Business Models

The above table summarizes the contributions of the researchers on business models. The first column of the table name author and year of contribution and the following columns reveal the major business model areas covered and whether a specific author has contributed to this area. The "definition" column shows if an author provides a short comprehensible definition of what a business model is. The "taxonomy" column indicates which authors propose a classification of business models. The "components" column points out authors that go beyond a simple definition and classification of business

models by presenting a conceptual approach to business models, proposing a set of business model components. Simply put, they specify of what a business model is composed of. The "change methodology" column points to authors including a time and change component in their business model concepts. Finally, the "evaluation measures" column indicates authors that try to define indicators to measure the success of business models.

2.3 BUSINESS MODELS – DEFINITIONS

While business model is one of the most discussed terms of the business, and lately the technology as well, it is also one of the least understood terms. As evidence, one can refer to the numerous different definitions that have been provided for the term. In what follows, we present most widely spread definitions. In literature, we can find several definitions that explain what the purpose of a business model is in simple but quite comprehensive words. The second column of Table 2.1 covers business model definitions researchers adopt while defining the approach of business models by specifying its primary elements, and possibly their interrelationships. Paul Timmers (1998) was one of the first to explicitly define and classify business models. He defines a business model as "an architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various actors; and description of the sources of revenues". In order to understand how a company realizes its business mission he adds a marketing model that is the combination of the business model and the marketing strategy of the business actor under consideration.

In their business model definition Linder & Cantrell (2000), define a business model as "the organization's core logic for creating value". A quite similar definition is provided by Petrovic et al (2001) as well as Auer & Follack (2000), who share the view that "a business model describes the logic of a "business system" for creating value that lies behind the actual processes".

Being influenced by Timmers, Weill and Vitale (2001) define a business model as “a description of the roles and relationships among a firm’s consumers, customers, allies and suppliers that identify the major flows of product, information, and money, and the major benefits to participants”.

Hawkins’s definition (2001) describes a business model as “the commercial relationship between a business enterprise and the products and/or services it provides in the market. More specifically, it is a way of structuring various cost and revenue streams such that a business becomes viable, usually in the sense of being able to sustain it self on the basis of income it generates”.

According to Applegate (2001), “a business model is a description of a complex business that enables study of its structure, the relationships among structural elements, and how it will respond to the real world.”

Rappa (2001) refers more or less to the same elements with the above two definitions: “a business model is the method of doing business by which a company can sustain itself—that is, generate revenue. The business model spells-out how a company makes money by specifying where it is positioned in the value chain.”

Amit and Zott (2001) provide a transaction-based definition of Business Models. “A business model depicts the content, structure, and governance of transactions designed as to create value through the exploitation of business opportunities. A business model includes the design of: transaction content (goods/ services; resources/ capabilities); transaction structure (parties involved; linkages; sequencing; exchange mechanisms) and transaction governance (flow control). A business model describes the steps that are performed in order to complete transactions.” A series of authors introduce a financial element into their definitions.

Magretta (2002) provides the most simplistic but also comprehensive definition of what a business model is. She views it as a “story that explains how an enterprise works”.

Nevertheless, she goes one step further discriminating the Business Model concept from the strategy concept, even though many people use the term interchangeably. Thus, she explains that business models describe, as a system, how the pieces of a business fit together, but do not factor in one critical dimension of performance, usually competition, as strategy does.

Elliot's definition (2002) also focuses on commercial relationships as well as cost and revenue streams. He defines "a business model specifies the relationships between different participants in a commercial venture, the benefits and costs to each and the flows of revenue. And business models seek to address a simple equation: profits = revenues - costs."

KMLab Inc., (2000, in Chesbrough & Rosenbloom, 2002), Betz (2002) and Dubosson-Torbay et al (2002), require the business model to depict internal resources and workings of the firm.

Osterwalder & Pigneur (2002) conceive the business model in a quite different way. They view it as the missing link between strategy and business processes. More specifically, they consider a business model as the "conceptual and architectural implementation (blueprint) of a business strategy and represents the foundation for the implementation of business processes and information systems". Their working definition of business model is as follows: "A business model is nothing else than a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenues streams."

Afuah and Tucci (2003) states that each firm that exploits the Internet should have an Internet based business model. They understand it as a set of Internet- and non-Internet-related activities that allow a firm to make money in a sustainable way.

Tapscott et al. (1998) talked for the first time about a new generation of business models that encompass not only the organization itself but also its “fellow travellers”. Enabled by network technologies, organizations are encouraged to move from an introverted “M-form” to the “E-Form” that is based on the forming of business ecosystems. The major dimensions of strategic action that an E-form organization must integrate are customers, markets, products, processes, organizations (structures and relationships), shareholders and financing, social values and government policy. Tapscott et al., (2000) refer to a business innovation model in the form of ‘business webs (b-webs)’, which are “inventing new value propositions, transforming the rules of competition, and mobilizing people and resources to unprecedented levels of performance. A b-web is a distinct system of suppliers, distributors, commerce service providers, and customers that use the Internet for their primary business communications and transactions”.

There exists no generally accepted definition of business model in the e-Commerce literature. The term is defined differently by many authors and there is little consensus as to the attributes of business models. Timmers (1999) observes that “The literature about Internet e-commerce is not consistent in the usage of the term ‘business model’ and moreover, often authors do not even provide a definition of the term”. Thirteen different definitions of business model have been discussed above which clearly stated that the language used to describe business model leaves the reader to still wondering what a business model is. Rappa (2003), Afuah and Tucci, (2001) and Turban et al (2002) refer to business models as ‘methods’ by which firms do business. Timmers (1999), and Dubosson-Torbay et al (2002) refer to business models as ‘architectures’, whilst Krishnamurthy (2003) states that, “A business model is a path to a company’s profitability”. Others refer to business models as descriptions or specifications (KMLab Inc, 2000, in Chesbrough and Rosenbloom, 2002); Gordijn et al, (2000a&b); Weill and Vitale, (2001); Elliot, (2002); Hawkins, (2002). Rayport and Jaworski (2001) add to the confusion in the preface to their book with the statement “While many believe that Internet businesses do not have business models, we strongly disagree”. This statement suggests that firms can choose whether or not to have a business model however it is apparent even from the diverse terminology used by other authors that a business model,

be it a method, an architecture, a path, a specification or a description, exists for every firm; it is just a matter of articulating it. A study of the definitions reveals that all authors are intending that the business model depict the way the business operates.

An examination of the above table reveals that the definitions do differ significantly in scope. At one extreme the business model is said to contain detail of the internal workings of the business including operational and organisational infrastructure along with how the business intends to create value and distribute it. Those who see the business model as equivalent to the enterprise model support this view. Persson and Stirna's(2000) survey revealed that enterprise modelling was useful in creating "a multifaceted 'map' of the business as a common platform for communicating between stakeholders." Consistent with this view Gordijn et al (2000a) propose that the business model should illustrate the business essentials necessary for e-Commerce information systems requirements engineering. These business models must represent the internal workings of the business and therefore have the potential for translation to programmable system.

The other perspective of business models that emerges from the literature focuses only on the relationship of the business with other entities in the value network. This abstract notion of how the business operates within its value network recognizes that the business model must be considered together with the marketing model, (Timmers, 1999) and the business strategy (Elliot, 2002; Weill and Vitale, 2001). Timmers (1999) states that, "...it is useful, beyond business models, also to define 'marketing models'." (Timmers, 1999) implying that the marketing model is not part of the business model. Elliot (2002) states "Business strategies specify how a business model can be applied to a market to differentiate the firm from its competitors..." Weill and Vitale (2001) draw a distinction between business models and business strategies and suggest that the business model and business strategies must be compatible. The common factor evident in all definitions contained above is the requirement that the business model depict the business in relation to the other entities that form part of the value network. Although some definitions are inclusive of internal business processes and others are not, they all require a description

of how the firm expects to generate revenue and how it relates to the other entities in the value network. This suggests that the essential focus of a business model is the interaction of the firm with its market place.

2.4 COMPONENTS OF BUSINESS MODELS

In the former part of the chapter, we have found various significant elements of business model based on the review conducted on the definitions of business model as given by many researchers. Now, we further analyze the classification of business model into various components as given by many researches and find significant elements of business model utilizing the above analysis. While defining what business models actually are has brought some order into the confusion and many authors have gone further to define of what elements business models are composed. This is the first step to making business models a tool for business planning that help managers understand and describe the business logic of their firm. In this section an attempt has been made to present an overview of the existing literature considering different aspects of business components, also referred to as “elements”, “building blocks”, “functions”, “attributes” or pillars of business models. Some definitions of business models are quite explicit in terms of their attributes however the more abstract definitions merely allude to the attributes that need to be included.

Hamel captures the essence of a business model in his definition, as a business model is nothing more than a business concept that has been put into practice. (Hamel, 2000) but does not provide any guidance as to what to include in the model itself. The latest literature is no more working on Business Model definition, but instead it has started decomposing business models into their “atomic” elements (Afuah et al., 2001; Hamel, 2000; Petrovic et al., 2001; Weill et al., 2001; Rayport et al., 2001).

Hamel (2000) has created his own framework for discussing the components of a Business Concept (another way he uses to refer to a Business Model). This framework (Fig 2.8) comprises four major components, customer service, core strategy, strategic

resources and value network, each of which is decomposed to several subcomponents. The four major Components are linked together by three “bridge” components namely customer benefits, configuration and company boundaries. The Hamel framework is presented as below:

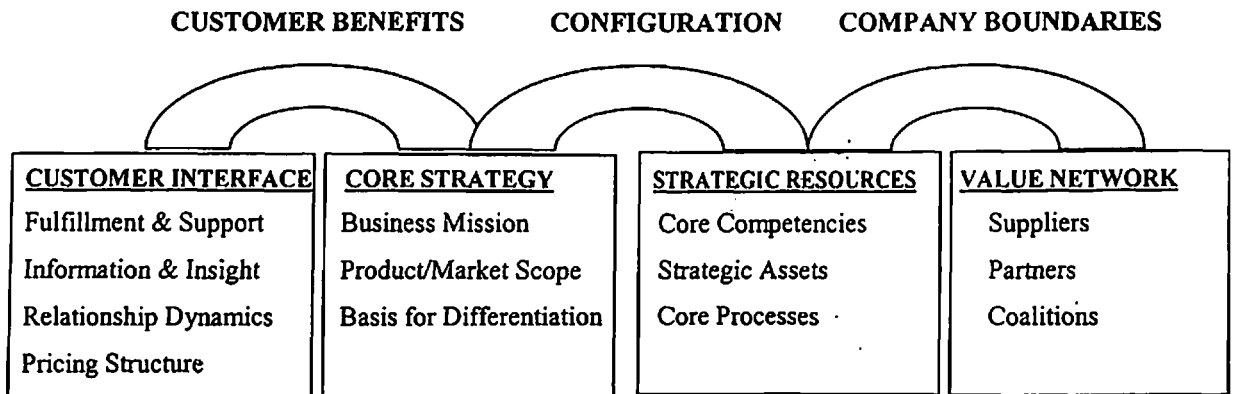


Figure 2.8: Hamel Framework

Chesbrough and Rosenbloom (2000) specify a set of components through their definition of a Business Model’s functions, which are: Articulate the value proposition, Identify the market segment, Define the structure of the value chain within the firm, Define the cost structure and profit potential, Describe the position of the firm within the value network, formulate the competitive strategy.

Linder & Cantrell (2000) have defined the following principal components of a Business Model:

- **Pricing Model**, e.g. cost
- **Revenue Model**, e.g. subscription
- **Channel Model**, e.g. Direct-to-Customer
- **Commerce-Process Model**, e.g. Auction
- **Internet-enabled Commerce Relationship**, e.g. Value Network
- **Organisational Form**, e.g. Stand-alone business unit
- **Value proposition**, e.g. More value at the same cost

Afuah and Tucci (2001) specify the following components of a business model: (1) Customer Value, (2) Scope, (3) Pricing, (4) Revenue Source, (5) Connected Activities, (6) Implementation, (7) Capabilities and (8) Sustainability.

According to Alt and Zimmermann (2001), a business model has six generic elements, the first four defining vertical dimensions of a business model and the rest two defining the horizontal dimensions that affect all business models: (1) Mission, (2) Structure, (3) Processes, (4) Revenues, (5) Technology and (6) Legal Issues.

From Evolaris's and Petrovic et al (2001), a Business Model can be divided into seven sub-models: Value Model, Resource Model, Production Model, Customer Relations Model, Revenue Model, Capital Model, Market Model

Weill & Vitale (2001) decompose e-business into four levels. This decomposition allows them to focus on different degrees of business models complexity as well as to operate in reverse and compose an e-business implementation from its component parts, understanding the capabilities required for each. The "atomic" elements specified per level of decomposition are presented in Table 2.2.

<u>Level 1: Atomic Business Model</u>	
1)	Strategic Objectives
2)	Sources of Revenue
3)	Critical Success Factors
4)	Core competencies necessary for Implementation
<u>Level 2 E-Business Model</u>	
5)	Roles and Relationships among a firm's customers, allies and suppliers
6)	Flows of Product, Information, Money
7)	Major Benefits to Participants – Value Proposition

Table 2.2: Atomic Elements per Decomposition level (Contd..)

<u>Level 3 : E-Business Initiative</u>	
8)	Customer Segments
	a. Target Audience
	b. Value Proposition to Customer
9)	Channels to those segments
10)	IT infrastructure for Implementation
<u>Level 3-4: Intermediate Level</u>	
11)	Position in the Industry Value Chain or Net
12)	Organizational form necessary for Implementation
13)	Owner of the 3 critical assets (may be different for each critical asset):
	a. Owner of Customer Relationships,
	b. Owner of Data,
	c. Owner of Transaction
14)	Key Information required to succeed
<u>Level 4 : E-Business Implementation</u>	
15)	Financing
16)	Pricing
17)	Recruitment
18)	Marketing
19)	Incentives

Table 2.2: Atomic Elements per Decomposition level

Weill & Vitale (2001) specify “atomic” elements based on a number of different business perspectives. They identify five ways to represent a business, differentiating on the analytical focus, and identify key information required for each of them. The atomic elements per representation way are presented in Table 2.3.

Representation Approach	Key Information Required
1. Business Strategy	<ul style="list-style-type: none"> o Targeted Customers o Product & Service Offerings o Unique and Valuable Position o Choices and Trade-Offs
2. Organizational Form or Structure	<ul style="list-style-type: none"> o Hierarchy of Authority o “Shape” of the Organization o Network of Organizations o Mechanisms for Rights Management and Conflict Resolution
3. Business Process	<ul style="list-style-type: none"> o Key set of activities to produce an outcome o Who (departments, people, roles) conduct these activities o Design and Evaluation of Activities o Competitive advantage embedded in activities
4. Value Chain	<ul style="list-style-type: none"> o Value added by the firm to its inputs o Value-adding activities that fit with those of other players o Boundaries between the firm and other players of the chain o Value chain fit within the competitive market landscape
5. Core Competencies	<ul style="list-style-type: none"> o Intellectual and Service strengths o Sources of competitive advantage

Table 2.3: Atomic Elements per Representation Way

Osterwalder and Pigneur (2002) refer to Business Model components through their definition of the four main pillars, which concern principal issues that a business model has to address: Product Innovation, Customer Relationship, Infrastructure Management and Financials.

The above research approaches go in detail, analyzing the main constituents of a Business Model. Of course, there were some researchers who identify the main parts of the primary business model, rather than the basic elements.

Kraemer et al. (2000) identify the following components for defining a business model: 1) Direct sales, 2) Direct customer relationships, 3) Customer segmentation for sales and service, and 4) Build to order production.

According to Mahadevan (2000), a business model is a unique blend of three streams that are critical to business: (i) the value stream, which identifies the value proposition for the business partners and the buyers; (ii) the revenue stream, which is a plan for assuring revenue generation for the business; and (iii) the logistical stream, which addresses various issues related to the design of the supply chain for the business. Weill & Vitale consider this as a complete business model and include it in their proposed taxonomy. They further consider it as one of the principal dimensions in the analysis of a business model.

Finally, Magretta (2002) identifies two parts for a business model: (i) the business activities associated with making (design, procurement, manufacturing, etc), and (ii) the business activities associated with marketing (customer identification, selling, transaction handling, distribution, and delivery).

2.5 TAXONOMIES OF BUSINESS MODELS

A great research effort has been directed towards classifying business models, and mainly business model over the web, and grouping them under certain categories. The business models belonging to the same category usually share some common characteristics, such as the same pricing policy or the same customer relationship model. Anyway, as the criteria for classifying business models differentiate per researcher, the final resulting taxonomies are quite different. Many authors put forward categories of business models. They are referred to as taxonomies, categories, business types and business designs.

Two broad categories that permeate the literature are:

- Presence in physical and/or Internet based markets i.e. pure-play or bricks-and-clicks
- Buyer type, (i.e. B2B, B2C, P2P).

Beyond these classifications based on transaction channel and customer type respectively, the consensus ends. Business models are classified according to degree of innovation and functional integration (Timmers 1999), the revenue model, value offering (e.g. information, product or service) and pricing model to mention a few. In general the descriptions consist of unstructured narrative making it difficult to distinguish one model from another and difficult to appreciate the underlying resource and infrastructure requirements of each.

Bambury (1998) offers an empirically derived taxonomy of both “transplanted real-world business models and native Internet business models” identifying eight transplanted real-world business models and six native Internet business models. Rappa (2003) proposes nine major categories of business models with no fewer than twenty-seven sub-categories. He acknowledges that “Presently there is no single, comprehensive and cogent taxonomy of web business models one can point to.”

Below Table 2.4, 2.5, 2.6 are a compilation of the business model categories identified in the literature. It indicates that authors take vastly different approaches to differentiating between business models. Authors including Weill and Vitale (2001), and Eisenmann (2002) have broad categories whereas others such as Rappa (2003) and Bambury (1998) distinguish business models on one characteristic i.e. the pricing model or the nature of the product on offer.

Kalakota and Robinson (1999) do not use the term ‘business model’, rather they list seven e-business designs that they then refine adding detail that relates to business strategy. Krishnamurthy (2003) does not provide a clear listing of business models;

rather she distinguishes between pure-play and bricks-and-clicks business models and then identifies thirteen pure-play business models.

A study of these business model categories provides an awareness of the ways that businesses are utilizing electronic commerce but they do not provide a framework by which business models can be compared. Hawkins (2002) observes that the literature lacks "...the systematic development of taxonomies and frameworks" and that "Recent attempts to create taxonomies of business models mostly amount to no more than random, unrelated lists of business activities that just happen to occur on Internet platforms." This view is supported by the collection of business model categories listed in table, most of which are unstructured and appear to be developed in an ad hoc manner with no direct reference to the business model attributes proposed by the respective authors.

Researcher	Criteria
Bambury (1998)	<p>Translated Real-World Business Models</p> <ul style="list-style-type: none"> <li>• Mail-order model <li>• Advertising -based model <li>• Subscription model <li>• Free trial model <li>• Direct marketing model <li>• Real estate model <li>• Incentive scheme model <li>• B2B <p>Native Internet Business Models</p> <ul style="list-style-type: none"> <li>• Library model <li>• Freeware model <li>• Information barter model <li>• Digital products and digital delivery model <li>• Access provision model <li>• Website hosting and other models

Table 2.4: Categories of Business Model(Contd..)

Researcher	Criteria
Kalakota & Robinson (1999)	<ul style="list-style-type: none"> • Category killer • Channel reconfiguration • Transaction Intermediary • Infomediary • Self-service innovator • Supply-chain innovator • Channel mastery
Eisenmann (2002)	<ul style="list-style-type: none"> • Online Portals • Online content providers • Online retailers • Online brokers • Online market makers • Networked utility providers • Application service providers
Krishnamurthy (2003)	<p>B2C</p> <ul style="list-style-type: none"> • Direct sellers Intermediaries • Advertising-based models • Community-based models • Fee-based models <p>B2B</p> <ul style="list-style-type: none"> • EDI/Extranets • B2B Marketplaces <p>C2C</p> <ul style="list-style-type: none"> • Auctions • Peer-to-peer <p>C2B</p> <ul style="list-style-type: none"> • Idea collectors • Reverse auctions • Complaint centers • Paid advertising models

Table 2.4: Categories of Business Model

Type of Model	Subcategories	Description
Brokerage Model	<ul style="list-style-type: none"> • Buy/Sell Fulfillment • Market Exchange • Business Trading Community • Buyer Aggregator • Distributor • Virtual Mall • Metamediary • Auction Broker • Reverse Auction • Classifieds • Search Agent • Bounty Broker 	They bring buyers and sellers together and facilitate transactions. Usually, a broker charges a fee or commission for each transaction it enables.
Advertising Model	<ul style="list-style-type: none"> • Generalized Portal • Personalized Portal • Specialized Portal • Attention/Incentive marketing • Free Model • Bargain Discounter 	The broadcaster, in this case a web site, provides content and services (like email, chat, forums) mixed with advertising messages in the form of banner ads. The banner ads may be the major or sole source of revenue for the broadcaster.
Infomediary Model	<ul style="list-style-type: none"> • Recommender System • Registration Model 	Some firms function as information intermediaries by either collecting data about consumers or collecting data about producers and their products.
Merchant Model	<ul style="list-style-type: none"> • Virtual Merchant • Catalog Merchant • Click and Mortar • Bit Vendor 	Wholesalers and retailers of goods and services.
Manufacturer Model	<ul style="list-style-type: none"> • Brand Integrated Content 	Manufacturers can reach buyers directly and thereby compress the distribution channel.
Affiliate Model	<ul style="list-style-type: none"> • Banner Exchange • Pay-per-click • Revenue Sharing 	The affiliate model provides purchase opportunities wherever people may be surfing. It does this by offering financial incentives (in the form of a percentage of revenue) to affiliated partner sites. This provides purchase-point click-through to the merchant via their web sites.

Table 2.5: Taxonomy of Business Models (Contd..)

Community Model	<ul style="list-style-type: none"> • Voluntary Contributor Model • Knowledge Networks 	The community model is based on user loyalty. Users have a high investment in time and emotion in the site. In some cases, users are regular contributors of content and/or money.
Subscription Model	<ul style="list-style-type: none"> • Content Services • Networking Services • Trust Services • Internet Service Providers 	Users are charged a periodic daily, monthly or annual fee to subscribe to a service.
Utility Model	<ul style="list-style-type: none"> • On-demand 	The utility model is based on metering usage, or a “pay as you go” approach. Unlike subscriber services, metered services are based on actual usage rates.

Table 2.5: Taxonomy of Business Models

The above taxonomy has the limitation of being based on only two “atomic” elements of business models: that are 1) revenue source and 2) position in the value chain. Thus, this taxonomy is based on a limited and unclear picture of business models.

A review made in the term “Business Model” and related terms in Electronic markets has made Alt & Zimmermann (2001) to distinguish two broad categories of Business Models: the Business-to-Consumer (B2C) and the Business-to-Business (B2B) models. These categories are quite generic, but they can be further decomposed based on the industry that they concern and the purpose for which they are designed.

Roussell et al. (2000) identify the typology of B2C models: as content sites, portals, direct-sell sites, brick-and-click ‘e-tailers’, dot.com e-tailers, e-marketplaces.

On the other hand, Timmers (1998) has focused his research efforts on B2B models. Specifically, he espouses a “systematic approach to identifying architectures for business models” via a value-chain deconstruction and reconstruction – that is identifying value-chain elements – and identifying possible ways of integrating information along the value chain. His analysis framework includes value-chain deconstruction (D), interaction patterns (I) and Value-chain Reconstruction (V). By combining interaction patterns with

value chain integration, finally lists eleven (11) possible architectures of business models.

These are described in the Table 2.6:

Business Model	Description
E-Shops	This is a web marketing of a company or a shop. In the first instance, this model is constructed to promote the company and the goods or services produced by them.
E-Procurement	This is electronic tendering and procurement of goods and services. It includes electronic negotiation and contracting and possibly a conducive and collaborative work in specification.
E-malls	In its basic form, it consists of a collection of e-shops, usually enhanced by a common umbrella, such as a well-known brand. It might be enriched by a common – guaranteed – payment method.
E-auctions	They offer an electronic implementation of bidding mechanisms may also be also known from traditional auctions.
Virtual Communities	The ultimate value of virtual communities comes from the members (customers or partners) who add their information to a basic environment, provided by the company operating the virtual community.
Collaboration Platforms	These provide a set of tools and an information environment for collaboration between enterprises. This can focus on specific functions, such as collaborative design and engineering, or on project support to a virtual team.
Third-party Marketplaces	An emerging model that is suitable, if companies wish to leave web marketing to a third party. They offer a user interface to the suppliers' product catalogues, and several allied features, such as branding, payment, logistics, ordering and ultimately the full-scale implementation of secured transactions.
Value-Chain Integrators	They focus on integrating multiple steps of the value chain, with potential to exploit the information flow between those steps, as further added value.
Value-Chain Service Providers	These specialize in a specific function for the value chain, such as electronic payments or logistics, with the information of making that into their distinct competitive advantage.
Information Brokerage	This model includes the provision of information services and consultancy to add value to the huge amounts of data and available on the open networks or coming from integrated business operations, such as information search.
Trust and Other Third-party Services	Trust services concern a special category of third-party services that are provided by certification authorities, electronic notaries and other trusted third parties.

Table 2.6: Business-to-Business Models (Contd...)

Business Model	Description
Information Brokerage	This model includes the provision of information services and consultancy to add value to the huge amounts of data and available on the open networks or coming from integrated business operations, such as information search.
Trust and Other Third-party Services	Trust services concern a special category of third-party services that are provided by certification authorities, electronic notaries and other trusted third parties.

Table 2.6: Business-to-Business Models

Weill & Vitale (2001) further identified eight (8) atomic e-business models (Table 2.7) each of which describes the essence of a different way to conduct business electronically. Atomic e-business models are considered as the building blocks of e-business initiatives. Thus, understanding the characteristics of these atomic business models allows analysing what is necessary to make them work in combination as an e-business initiative.

Atomic Business Model	Description
Content Provider	Provides Content (information, digital products, and services) via intermediaries.
Direct to Customer	Provides goods or services directly to the customer, often bypassing traditional channel members.
Full-Service Provider	Provides a full range of services in one domain (e.g. financial, health, industrial, chemicals) directly and via allies, attempting to own the primary consumer relationship.
Intermediary	Brings buyers and sellers together by concentrating information.
Shared Infrastructure	Brings multiple competitors together to cooperate by sharing common IT infrastructure.
Value Net Integrator	Coordinates activities across the value net, by gathering, synthesizing, and distributing information.
Virtual Community	Creates and facilitates an online community of people with a common interest, enabling interaction and service provision.
Whole-of-Enterprise/ Government	Provides a firm-wide single point of contact, consolidating all services, provided by a large multiunit organization.

Table 2.7: Atomic e-Business Models

Linder & Cantrell (2000) categorizes their Business Models using two important dimensions:

- Model's core profit-making activity, which may include making money by selling goods and services or acting as intermediary.
- Relative position on the price/value continuum, which can range from high value, premium-priced innovations to low-priced, standardized offerings.

The Table 2.8 presents the main categories of BMs included in Linder & Cantrell's (2000) taxonomy and provides some examples for each category.

Business Model Category	Examples
Price Models	Buying Club One-stop, low-price shopping Fee for advertising
Convenience Models	One-stop, convenient shopping Comprehensive offering Instant gratification
Commodity-Plus Models	Low-price reliable commodity Mass customized commodity Service-wrapped commodity
Experience Models	Experience selling Cool brands
Channel Models	Channel maximization Quality selling Value-added reseller
Intermediary Models	Market aggregation Open market-making Multi-party market aggregation
Trust Models	Trusted operations Trusted product leadership Trusted service leadership
Innovation Models	Incomparable products Incomparable services Breakthrough markets

Table 2.8: Taxonomy of Business Models

Applegate (2001) identifies four (4) digital business model categories and give a number of examples under each category (Table 2.9):

Business Model Category	Examples
Focused Distributor Models	Retailer Marketplace, Aggregator Infomediary Exchange
Portal Models	Horizontal Portals , Vertical Portals , Affinity Portals
Producer Models	Manufacturer, Service Provider, Educator, Advisor, Information and news services, Custom Supplier
Infrastructure Provider Models	Infrastructure portals

Table 2.9: Taxonomy of Business Models

Tapscott et al. (2000) identify five primary types of business webs, which can also be considered as BM types. These BMs are differentiated along two primary dimensions: Control and Value Integration. The five types of b-webs and their key features are illustrated in the following Table 2.10.

Type of B-Web	Description	Sub-types	Features
Agora	They represent markets where buyers and sellers freely negotiate to assign values to goods and services produced by them.	<ul style="list-style-type: none"> ▪ Open Markets ▪ Sell-side Auctions ▪ Buy-side Auctions ▪ Exchanges 	<ul style="list-style-type: none"> ▪ Dynamic pricing ▪ Liquidity converting goods into a desirable Price
Aggregation	A company, positioning itself as a value-adding intermediary between producers and customers.	<ul style="list-style-type: none"> ▪ Retailers 	<ul style="list-style-type: none"> ▪ Selection and ▪ Convenience ▪ Needs Matching
Value Chain	The Context Provider structures and directs a b-web network to produce a highly integrated value proposition.		<ul style="list-style-type: none"> ▪ Process Integration ▪ Supply Chain Management ▪ Product Design
Alliance	It strives for high value integration without hierarchical control.	<ul style="list-style-type: none"> ▪ Online Communities ▪ Research Initiatives ▪ Development Communities 	<ul style="list-style-type: none"> ▪ Creative collaboration for a common goal
Distributive Network	They serve the other types of b-webs by allocating and delivering goods from providers to users.	<ul style="list-style-type: none"> ▪ Data Network operators ▪ Logistics Companies ▪ Banks 	<ul style="list-style-type: none"> ▪ Allocation / Distribution ▪ Network Optimization

Table 2.10: Taxonomy of B-Webs

2.6 METHODOLOGY FOR CHANGING BUSINESS MODELS

The necessity of changing the way, in which firms make business and provide value in an effort to survive in a high-tech market, has been recognized by both academics and managers. Nevertheless, there isn't a well-established methodology for changing the firm's business model to an e-business model. In the last few years, as the knowledge and the interest of firms in the construct and the application increase, more and more research and consulting work has been focused on defining a methodology for change, from traditional business model to e-business models.

Tapscott et al. (2000), having stressed the importance of following a b-web strategy, that is strategy for designing a new type of business model based on a network structure, are the first to identify six (6) steps for changing a current BM to a b-web type BM.

- **Describe the current value proposition from the customer's viewpoint:** Define what value is offered, delivered, and consumed. In order to do so, a customer-down approach to the current value proposition is adopted.
- **Disaggregate:** Disaggregation entails: identifying the key participants; describe what each participant contributes and how. This process also pinpoints the weaknesses and opportunities for further improvement.
- **Envision b-web-enabled value:** This step concerns the definition of future scenarios for the new value proposition through brainstorming and other design techniques. It serves as a guide for the principal possibilities for changing a business model.
- **Reaggregate:** This step entails repopulating the categories of value contributors and reassigning contributions to them based on the definition of the new value proposition. The re-aggregation may concern; a) shifting responsibilities from one type of contributor to another, b) identifying new value contributions and assigning them to existing b-web participants, c) redefining the way in which old values are delivered.
- **Prepare a Value Map:** To visualize the new value-creating system, construct a value map, including the key participants and the most important value exchanges

among them.

- **Do the b-web Mix:** The new business model will correspond to one of the five b-web types: Agora, Aggregation, Value Chain, Alliance or Distributive Network. Beyond its core organizing principle, a specific b-web will (or should) incorporate aspects of other types in its b-web mix. In designing the b-web mix, a business has to consider how each type or subtype might contribute to enhancing customer value, providing competitive differentiation and advantage, and reducing costs for all participants.

The final step in Tapscott et al. (2000) proposed methodology for creating new business models resembles the Weill & Vitale (2001) prompt, for mixing more than one business models in order to define a new e-business initiative.

In 2001, Evolaris e-Business Competence Center started developing a methodology for changing business models that is based on the three learning stages, as well as a number of system theories, such as System Dynamics, Thinking in Networks and Action Research. At the first sight, Petrovic et al. (2001) identified six (6) prerequisites that the methodology for changing e-business models has to comply.

- It should be able to **handle complex systems**.
- It should be able to **support the structuring and sharing of knowledge** that is mainly mapping the mental models that lie behind business model.
- It should be able to predict the outcomes more accurately through **support of risk-free experiments** that is challenging mental models through simulation or other inference engines.
- It should **create a learning environment** for managers to support the change of mental models.
- It should support **iterative expansion and change**.
- It should be **grounded on theory and practically applicable**, as a tradeoff between rigor and relevance is posed.
- It requires **inter-action** as an integral part of the process itself.

- It is based on the researcher's professional values rather than methodological considerations.
- It has to support structured reflection of learned lessons and academic discourse.

Later, Auer and Follack (2002) made the first explicit description of this methodology. This methodology is based on the identification of three main phases for improving existing business models, which were discussed in Table 2.11.

Phase	Title	Aim
1	Understand	<ul style="list-style-type: none"> • Corresponds with the Mapping of Mental Models. • Help the company and the researcher to understand the Business Model.
2	Identify the Internet's Influence	<ul style="list-style-type: none"> • Can be seen as a Challenge of the existing Mental Models. • Identify the impact of the Internet on each variable of the company-specific business model.
3	Change	<ul style="list-style-type: none"> • Concerns Improving/Changing the Mental Model. • Take part in the change process and document the effects.

Table 2.11: The Three Phases of Improving Business Models

Phase I: Understand

- a) Identify the Business Model from different angles
- b) Identify the key factors of the Business models

Phase II: Identify the Internet's Influence

- a) Identify the influence of the Internet on the BM's variables
- b) Recognize and interpret all the possibilities for changing the problem situation

Phase III: Change

- a) Develop an action plan

In order to change Business Models, Linder & Cantrell (2001) proposed changing one or more of the dimensions of an operating model framework. More specifically, the methodology to change a Business Model concerns changing the answers provided to the questions of this framework. In the Table 2.12, the left column includes the questions posed for defining an operating Business model, while the right column lists possible answers that can change the Business Model.



How do we get and keep customers? What's our distinctive value proposition?	
Who are our customers and what are their needs? Customer Segments	<ul style="list-style-type: none"> • Expand Geographically • Narrow or broaden target market • Identify new niches • Develop new segmentation concept • Micro-segment the market • Serve only profitable customers
What do we offer them? Value Proposition	<ul style="list-style-type: none"> • Shift from product to services • Shift from services to experiences • Leverage knowledge to tailor offerings • Bundled or unbundled offerings • Productize knowledge • Improve value, Price or both
How do we reach them? Channels	<ul style="list-style-type: none"> • Intermediate channels • Disintermediate channels • Multiply channels • Redefine channel concept • Virtualize or Physialize concepts
How do we Price? Pricing Policy	<ul style="list-style-type: none"> • Shift from discounts to stable pricing • Shift to dynamic pricing • Shift who pays • Change pricing mechanism
How do we deliver distinctly	
How do we execute? Activities & Value Chain	<ul style="list-style-type: none"> • Increase operating scale • Vertically integrate • Outsource value chain activities • Consolidate value chain activities • Link value chains with suppliers • Link value chains with customers • Open source
What are our distinctive capabilities? Competences & Assets	<ul style="list-style-type: none"> • Leverage technology for new applications • Turn operating knowledge into service offering • Protect or license proprietary information
How is financial structure Distinctive?	<ul style="list-style-type: none"> • Significantly increase or reduce leverage • Spin out undervalued business • Transfer assets to partners with cheap capital • Privatize

Table 2.12: Guidelines for changes on the Operational Model Framework

Mahadevan (2000) proposes a process for arriving at an appropriate (future) business model- internet-based e-commerce that involves choosing the right mix of alternatives. He further emphasize that the Internet economy divide the overall market space into three broad structures: portals, market makers, and product and service providers that are presented in Table 2.13

Market Structures			
Business Model Building Blocks	Portals	Market Makers	Product/ Service Providers
Value Streams			
Virtual Communities	✓	✓	✓
Dramatic Reduction in Transaction Costs		✓	✓
Gainful Exploitation of Information Asymmetry		✓	
Value-Added Market-Making Process	✓	✓	
Revenue Streams			
Increased Margins over Brick and Mortar Operations			✓
Revenue from Online Seller Communities	✓	✓	
Advertising	✓	✓	
Variable Pricing Strategies			✓
Revenue Streams Linked to Exploiting Information Asymmetry		✓	
Free Offerings	✓	✓	✓
Logistical Streams			
Dis-Intermediation			✓
Info-mediation	✓		
Meta-Mediation		✓	

Table 2.13: Potential Applications of Business Models streams for the Three Market-Structures

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Gainful Exploitation of Information Asymmetry		✓	
Value-Added Market-Making Process	✓	✓	
Revenue Streams			
Increased Margins over Brick and Mortar Operations			✓
Revenue from Online Seller Communities	✓	✓	
Advertising	✓	✓	
Variable Pricing Strategies			✓
Revenue Streams Linked to Exploiting Information Asymmetry		✓	
Free Offerings	✓	✓	✓
Logistical Streams			
Dis-Intermediation			✓
Info-mediation	✓		
Meta-Mediation		✓	

Table 2.13: Potential Applications of Business Models streams for the Three Market-Structures

The alternatives presented under each stream (value, revenue and logistical streams) merely indicate the possible options available to an organization, based on the market structure it has adopted. Given that, a business model is a unique blend of three streams, the factors presented in the above table affect the choice of a business model.

Papakyriakopoulos et al. (2001) employ a set of analytical tools in order to construct the proposed business model for a digital interactive advertising marketplace. They present their work in the form of a sequence of steps, each of which makes reference to both the data collection method and the theoretical and analytical constructs employed. The steps are:

- **Examining the relationships developed by key players currently in the market**
- **Defining current business objectives for each key player**
- **Identification of current value flows in the marketplace**
- **Identification of key competitive drivers in the market**
- **Synthesis of the current business model**
- **Embedding the innovative technology framework into the current business model**
- **Defining requirements for technological capability development for existing key players**
- **Defining the mediating functions performed by the service provider**
- **Developing a new co-operation scheme in the marketplace: exploiting the existence of the new service provider**
- **Synthesis of the proposed business model**

2.7 FACTORS FOR EVALUATING BUSINESS MODELS

Hamel (2000) who conceptualized business innovation underlined the importance of creating a business model that not only promises but, really makes money based on specific evidence. To measure such a potential, he further identified four factors that determine the wealth potential of a business model.

- **Efficiency:** The extent to which the business concept is an efficient way of

delivering customer benefits;

- **Uniqueness:** The extent to which the business concept is unique.
- **Fit:** The degree of fitness among the elements of the business concept; and
- **Profit Boosters:** The degree to which the business concept exploits profit boosters comprising increasing returns, competitor lock-out, strategic economies, and strategic flexibility that has the potential to generate the above-average returns.

Gordijn and Akkermans (2001) evaluated the economic feasibility of an idea in quantitative terms, based on an assessment made on the value of objects for all actors involved. Feasibility of a business model implies that, all actors involved can make a profit, achieving a considerable increase in their economic utility. Here, the evaluation approach is, to take into account, the net in and out flows of value objects. Specifically, this approach creates profit sheets based on either the actor or activity level. Value objects in the profit sheet are assigned a value expressed in monetary units. In such an approach, the use of “what-if scenarios” can help companies to make a sensitivity analysis for the business model the emphasis is made with respect to financial parameters such as monitoring converting the impact of customer behaviour. In many cases, the sensitivity analysis such done can potentially be of greater interest, than the numbers themselves.

The approaches for the Business Models are limited to value flows that can be expressed in terms of money exchanged. However, there are a great variety of cases in which the value flow cannot be expressed in monetary units. Instead they are assumed in terms of other non-monetary benefits, for the concerned actors. The above approach is an effort to evaluate business models, taking into consideration only one of the elements, that is, the “value exchanged”. For the aforementioned reasons, the above approach intends to have a limited application scope.

Another attempt of defining the framework for assessing and appraising business models was made by Afuah and Tucci (2001). They confer two primary reasons for defining such

a framework: a) determining which business model alternatives are best, and b) making an analysis and assessment of competitors based on the business models formulated and implemented. This approach defines three levels, while measuring performances of a business model:

- **Measures of profitability**
- **Profitability prediction**
- **Business model component attributes**

Afuah and Tucci (2001) declare that by appraising each one of the business model components, the firm will be able to understand which components and linkages are strong or weak compared to that of competitors. Nevertheless, the above approach makes no references on how the linkages are indeed appraised. Moreover, it gives emphasis on comparison with competitors. This does not refer to comparison of alternative business models under different scenarios.

Weill and Vitale (2001) further refer to key factors that have an influence on the profitability and viability of e-business models. Their focus was on the following factors:

- **Level of ownership** for the customer relationship, data and transaction
- **Firm's access to key information** about customers, products, markets and costs
- **Conflicts raising from combination of atomic models** to e-business initiatives
 - a.* Channel Conflict
 - b.* Competency Conflict
 - c.* Infrastructure Conflict
 - d.* Information Conflict

Moreover, they propose a set of questions to be made for assessing the viability of an e-business initiative; which is presented as:

- 1) What are the combinations of atomic e-business models?
- 2) What are the sources of revenue, and are they realistic?
- 3) What customer segments are targeted?
- 4) What is the value proposition to each customer segment?
- 5) Who owns the relationship, data, and transaction?

- 6) What is the likely intimacy of the customer relationship?
- 7) What are the channels to reach the customer, and are they capable of supporting the required richness of information provision and capture?
- 8) What are the critical success factors?
- 9) What core competences are needed to succeed?
- 10) What key information is necessary to succeed?
- 11) What IT infrastructure capability is required?
- 12) What conflicts are inherent in the e-business initiative?

Using the degree of ownership for data, relationships and transactions as the criterion of evaluation Weill & Vitale put the “atomic” BMs in a descending order of potential profitability. They proposed a framework for evaluating e-business initiatives, taken into consideration four components i.e. a combination of atomic models which is delivered via one or more channels to targeted customer segments supported by a tailored IT infrastructure capability. This framework has the purpose of identifying the risks and the potential pressure points for a firm wishing to move to e-business.

From the review of approaches in the evaluation of Business Models, it was obvious that, the definition of a framework is highly dependent on the purpose of evaluation. Four primary evaluation purposes have been identified:

1. Comparison with competitors on the issue related to Business Models.
2. Assessment of alternative Business Models for implementation by the same firm,
3. Identification of risks and potential pressure points for a firm going to innovation,
4. Evaluation of an innovative business idea, in terms of feasibility and economic viability.

Hamel (2000)’s evaluation factors are well defined and can be applied, no matter what research approach is adopted, for defining business model and its components.

In this chapter a critique of the examined literature is also included, to explain some of the limitations or gaps in the approaches of the current research. Despite many references to business models, few articles have focused on this concept. The most-cited paper in the

recent literature is by Timmers (1998), which has a classification scheme for business models for e-commerce. Rappa (2000) extends that scheme, noting that "the business model spells out how a company makes money by specifying where it is positioned in the value chain." He identifies different types of business model, in different categories.

Chesbrough and Rosenbloom (2002) point out that "while the term 'business model' is often used these days, it is seldom defined explicitly." Their paper specified six functions of a business model; viz., to articulate the value proposition

1. to identify a market segment
2. to define the structure of the firm's value chain
3. to specify the revenue generation mechanisms
4. to describe the position of the firm within the value network
5. to formulate the competitive strategy.

However, their work had a sparing contribution on what a business model does; how does it do?

Afuah and Tucci (2000), covering this topic abruptly, could hardly converge on one full example of a business model. Dubosson-Torbay et.al (2002) point out, that their research "neglects the customer aspect." Alt and Zimmerman (2001), focusing on Internet, noted that, the term "business model" was not consistently defined, and that a consensus on the elements of business models was invariably lacking.

Several writers have produced typologies of business models focusing internet. Bienstock et.al (2002) offers a "complete taxonomy" of web business models, based on four key dimensions: number of buyers, number and type of sellers, nature and frequency of product offering, and price mechanisms. Vassilopoulou et.al (2002) proposed a framework for the classification of e-business models, and Betz (2002) had yet another taxonomy, developing six generic types of business model. Dubosson-Torbay et.al (2002), in a more detailed article than the others, presented a more flexible multidimensional classification scheme.

Roger Clarke (2004), in a discussion of the adoption of open-source software, created a framework for e-business models, in the form of four questions:

1. Who pays? (consumer, producer, or third parties?)
2. What for? (e.g. goods, services, expertise, assurances of quality or security.)
3. To whom?
4. Why? (e.g. perceived value, or being locked in.)

Answers to those questions, according to Clarke, would form a business model - But again, it was a static model.

Several writers, including Chesbrough and Rosenbloom (2002) and Magretta (2002), emphasize the need for flexibility in a business model for a newly established enterprise. They pointed out many successful businesses changes in their initial model. Therefore, a model whose assumptions are transparent was easily reviewed, than a model lacking explicit linkages among its elements.

To summarize, on business models, there is a focus on producing taxonomies or categorizations, or on stating what business models include or exclude. There were broad agreements between various definitions in only two areas: that a business model (i) focuses on the mechanisms for generation of revenue in the value chain, in terms of (ii) broad principles, rather than detail to be found in a full business plan. There was no consistent agreement on the other aspects of a business model.

While deliberations were made on "what does a business model actually look like?", only Chesbrough and Rosenbloom (2002) and Afuah and Tucci (2000) offer detailed descriptions. But the concepts of a business model adopted by them are so detailed that, others might describe such a model as a business plan.

Bearing in mind the use of the term "model" in systems theory, and that many of the above articles were from ICT-oriented journals, one might have expected to find a business model defined in systems terms - with inputs, processes, and outputs. But, to the contrary, only Betz (2002) used such an approach but in a general sense.

2.8 CRITICAL ANALYSIS AND OBSERVATION

• Business model definitions:

After having seen the research developments in the realm of business model, its definition, various elements and components of business model and the taxonomy, we will expound on its various aspects in a holistic manner and make a critical analysis on the various facets of business model. A comprehensive study done for different models of e- business by various authors has given an idea about several components and elements of e-Business. It has been compiled and assessed by giving values for various attributes in the Table 2.14 given below. One of the forms of evaluation is by reviewing the literature available related to the definitions of business model given by various researchers. This is achieved here by tabulating various common elements present in the definitions of business model as given by many researchers along with the researchers' names. Finally, the review results in finding a proper definition for business model. Two ways are adapted to analyze various definitions provided by various researchers.

Researcher(s)\Element	1	2	3	4	5	6	7	8	9
Linder and Cantrell	*		*				*		
Petrovic et al.	*		*						
Aver and Follack	*	*	*			*			
Applegate		*		*					
Magretta					*				
Timmers					*	*	*		
Weill and Vitale				*			*		
Hawkins	*			*		*	*		
Elliot				*		*	*	*	
Rappa			*			*	*		*
Osterwalder and Pigneur	*			*	*		*		
Number of times the element is used	5/11	2/11	4/11	5/11	3/11	5/11	7/11	1/11	1/11

Table 2.14 Literature reviews of business model definitions

The “*” symbol across researcher’s name in the table denotes the use of the corresponding element in the definition.

1. Value Creation
2. Business Structure
3. Organization's logic
4. Relationship among various elements
5. Architecture
6. Cost
7. Revenue Generation
8. Customer Benefits
9. Value Chain

As the above analysis shows, revenue generation, value creation, relationship are among the most vital elements of business model. These terms have been used by most of the authors. This shows that these elements are key factors in defining the Business Model.

The following table is an extended version of the previous one and it differs from the former in the sense that the term used by the authors have been described or just mentioned. Here, the value zero refers that the researcher in their paper has not mentioned the element, one refers to mention of the element, two refers to description of the element and three refers to the conceptualization of the element in the business model. This section contains the review of various definitions of business models given by various researchers in another way. The Table 2.15 illustrates significant elements of business models covered by different authors and how exactly they have been treated. The various authors in the business model domain define elements differently in depth and rigour. For example, Hamel's (2000) approach covers all the elements but stays relatively noncommittal on their description. On the other hand, Gordijn's (2002) value-exchange-centric model does not cover many customer-related issues but is very rigorous in defining the value configuration and value exchanges of a company. The values provided in the above table represent respectively whether a particular element has or has not been mentioned, described or modeled by the researchers mentioned above. As given in the table, the various elements considered for review are value proposition, target customer, distributional channel, customer relationship, value configuration, capability,

partnership, and cost structure and revenue model. The review is based on the definitions given by the researchers Stahler, Weill and Vitale, Petrovic, Kittl et al., Gordijn, Afuah and Tucci, Tapscott, Ticoll et al., Linder and Cantrell, Hamel and Chesbrough and Rosenbloom.

In the last row, all the values corresponding to a particular element are summed up and divided by the number of researchers are given. These values indicate the significance of the elements.

Authors/ Business Model Elements	Value Proposition	Target Customer	Distributional Channel	Customer Relationship	Value Configuration	Capability	Partnership	Cost Structure	Revenue Model
Stahler	2	0	0	0	2	0	2	0	2
Weill and Vitale	2	2	2	0	0	2	0	0	2
Petrovic, Kittl et al.	1	0	1	1	1	1	0	0	1
Gordijn	1	1	0	0	3	0	3	3	3
Afuah and Tucci	2	2	0	2	3	2	0	0	2
Tapscott, Ticoll et al.	0	0	0	0	3	0	2	0	0
Linder and Cantrell	1	0	1	1	1	0	0	0	1
Hamel	2	2	2	2	2	2	0	2	2
Chesbrough and Rosenbloom	1	1	0	0	1	0	0	1	0
Number of times the element is mentioned	8/9	5/9	4/9	6/9	8/9	4/9	3/9	4/9	7/9

(0 = element not existing; 1 = element mentioned; 2 = element described; 3 = element modeled)

Table 2.15: Analysis of e-Business model: Literature Review

*Value
Customer*

Following this approach, the significant elements of a business model are value proposition, customer relationship, value configuration and revenue model. These elements have been identified in contrast to the previous approach where revenue generation, value creation, relationship were considered as the key factors. Modeling helps firms develop business visions and strategies, redesign and align business operations, share knowledge about the business and its vision and ensure the acceptance of business decisions through committing stakeholders to the decisions made.

Some researchers perceive these models as a pure business concept that explains the logic of making business for a firm (Timmers, 1998; Linder & Cantrell, 2000; Petrovic, 2001; Rappa, 2001), while some others consider it as a link between strategy, business processes and information systems (Nilsson, A.G., Tolis, C., Nellborn, C. (1999); Osterwalder & Pigneur, 2002). The difference between these two interpretations of Business Models concerns the relationship of these models with the concepts of strategy, business processes and technology. While in the first interpretation, these three concepts are included in the description of the models; the second interpretation considers them as inter-linked components, set in different levels of a pyramid construct (Figure 2.9). In this case, a business model is considered as the conceptual and architectural implementation (blueprint) of a business strategy representing the foundation for the implementation of business processes and information system.

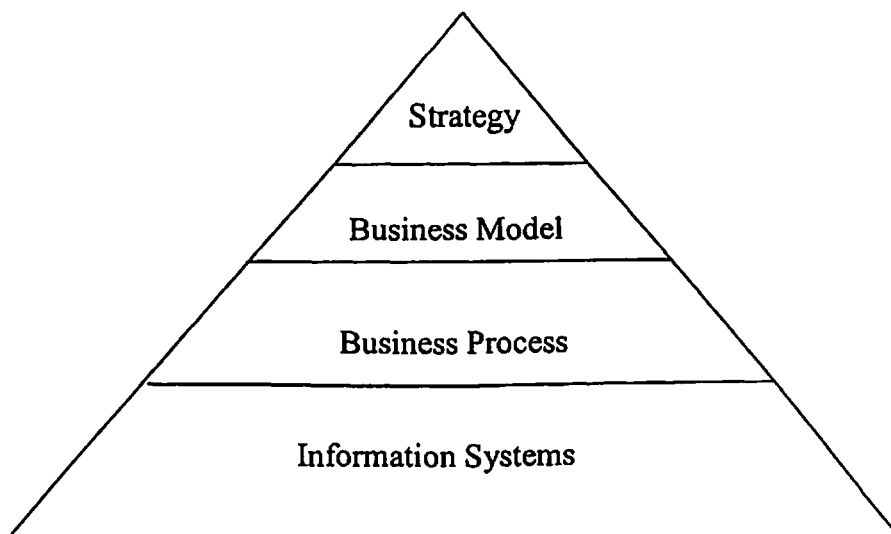


Fig 2.9: Business Strategy

Timmers (1998) and Weill and Vitale (2001) define a Business Model by stating the core components of its architecture, which are almost the same for both. The two principal business centers, Evolaris eBusiness Competence Center and Accenture Institute of Strategic Change, define, in essence, the purpose and importance of a Business Model for its firm that is describing the core logic for making business. Rappa (2001) and Hawkins (2001) define Business Models from a financial perspective by giving emphasis on cost and revenue streams.

The definitions of Osterwalder and Pigneur (2002) can be considered as the most complete one, since it includes description of the architecture and components, statement of the logic for creating value, and identification of the goal for generating profit.

Although Tapscott et al. (2000) do not provide any clear definition of Business Models, their approach emphasizes on the feature of “network”, which will be prevalent in almost all future Business Models. That is mainly due to the emergence of ICT applications that enable business networking in value chains and nets. Their approach is declarative of how technology’s evolution has managed to change the definition and conception of primary business constructs, as the Business Model is.

- **Components of Business Model**

We have analyzed the definitions of the various business models in the previous section. After mentioning these elements it becomes imperative to scrutinize its components too. The following section opines about the various components that have been taken into account by various researchers in studying the facets of business model. This section contains the review of various components of business models given by various researchers. The following Table 2.16 identifies significant components of business models based on these definitions. The explanation about the table is given below.

Researcher(s) \ Element	Strategy	Pricing	Capabilities	Channel	Market	Revenue	Value Network	Value Proposition	Customer Relations	Cost	Process
Alt and Zimmermann						*				*	*
Affuah and Tucci		*	*			*			*		
Chesbrough and Rosenbloom	*						*	*		*	
Hamel	**	*	*		*		**		**		
Weill and Vitale(i)	*	*	*	*	*	*	*	*	*		
Weill and Vitale(ii)	**		**				**				**
Osterwalder and Pigneur	*		*			*		*	**		*
Evolaris's					**	*		**	**		*
Linder and Cantrell		*		*		*	*	*			*
Methlie	*			*		*					
Kreamer			*				*		*		
Mahadevan						*		*			
Magretta	*	*				*					
Number of times the element is used	9/13	5/13	7/13	3/13	4/13	9/13	8/13	7/13	9/13	2/13	6/13

Table 2.16 Literature review of Business Model Elements Classification

The “*” symbol in the table indicates that the corresponding element has been used in the classification. The “**” symbol indicates that the corresponding component has been described by the researcher(s) in the classification. As given in the table the review is based on the literature given by the researchers Alt and Zimmermann, Affuah and Tucci,

Chesbrough and Rosenbloom, Weill and Vitale, Osterwalder and Pigneur, Evolaris's, Linder and Cantrell, Methlie, Kreamer, Mahadevan and Magretta.

In the last row, all the values corresponding to a particular component are summed up and divided by the total number of researchers. These values indicate the significance of the various components of business model. Following this approach, the significant elements of a business model are strategy, revenue, capabilities, value network, value proposition and customer relations.

Figures 2.10 to 2.23 given below graphically represent Table 2.16 and show which of the nine business model elements have been used by the other authors. Furthermore, the heights of the bars indicate if specific element has been simply mentioned or described.

The graphs show that the authors can be classified among three rough categories. The first contains the authors that mention a relatively large number of business model components, but do not describe them further (Chesbrough and Rosenbloom, Linder and Cantrell, Petrovic, Kittl et al.). The second embraces the authors that go a step further and describe the elements they mention in more or less detail (Hamel, Stahler, Weill and Vitale), whereby Hamel demonstrates a very holistic view of the business model. The last category includes the authors that either describe or conceptualize the business model elements they mention (Tapscott, Afuah, Gordijn) but leave some "business model blind spots" compared to the nine elements used in this dissertation. For example, Tapscott, Ticoll et al. though conceptualizing the Value Configuration, limit themselves to a network-centric approach.

The graphical way of comparison of the literature about business model components is be as follows:

On the vertical axis, the numbers "1" and "2" represent the following:

1 – Similar element mentioned

2 – Similar element described

On the horizontal axis, the numbers from 1 to 12 represent the components of business models as follows:

1. Structure
2. Strategy
3. Pricing
4. Capabilities
5. Channel
6. Market
7. Revenue
8. Value Network
9. Value Proposition
10. Customer Relations
11. Cost
12. Process

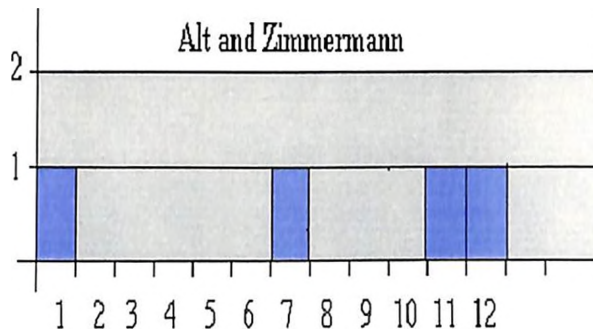


Figure 2.10: Comparison of BM component by Alt and Zimmermann

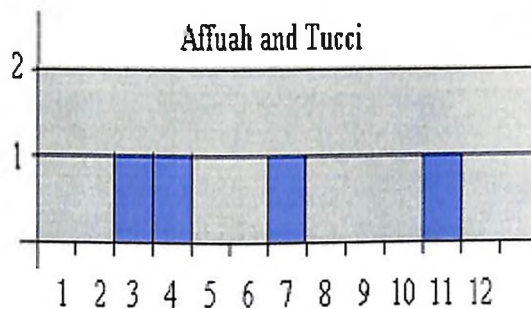


Figure 2.11: Comparison of BM component by Affuah and Tucci

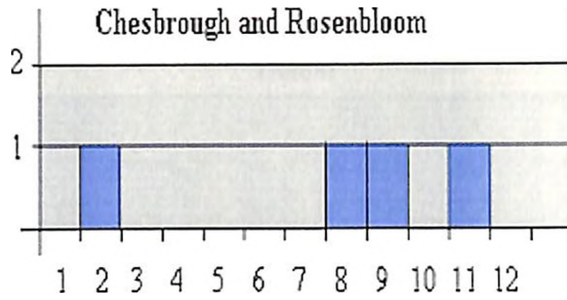


Figure 2.12: Comparison of BM component by Cherbourg and Rosenbloom

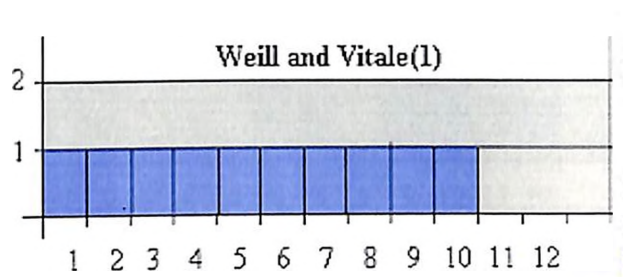


Figure 2.13 Comparison of BM component by Weill and Vitale (1)

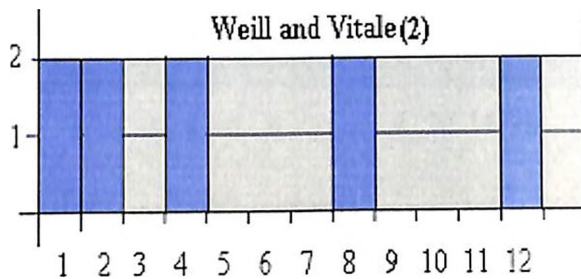


Figure 2.14 Comparison of BM component by Weill and Vitale (2)

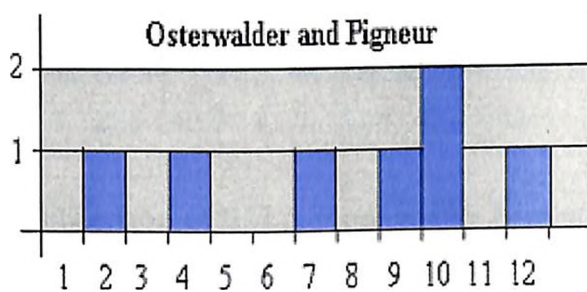


Figure 2.15: Comparison of BM component by Osterwalder and Pigneur

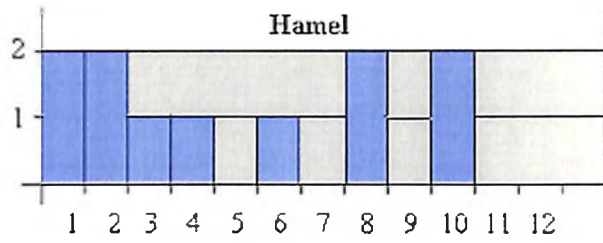


Figure 2.16 Comparison of BM component by Hamel

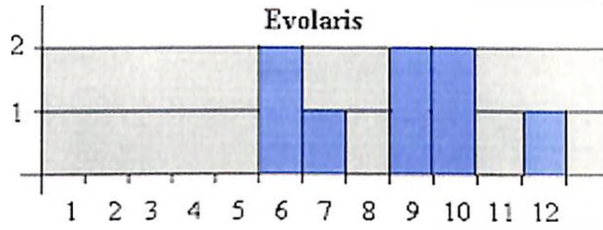


Figure 2.17 Comparison of BM component by Evolaris

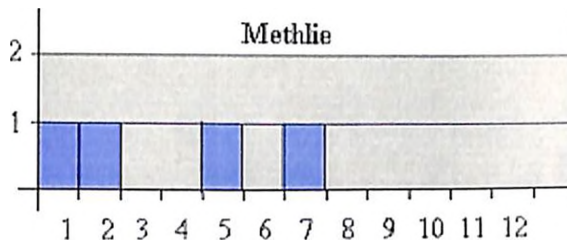


Figure 2.18 Comparison of BM component by Methlie

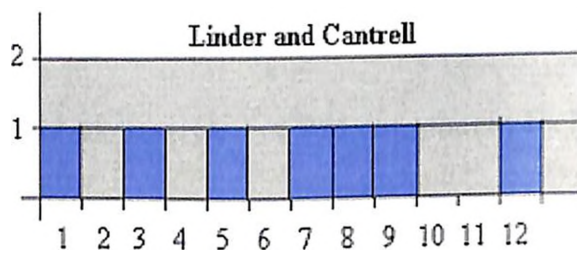


Figure 2.19 Comparison of BM component by Linder and Cantrell

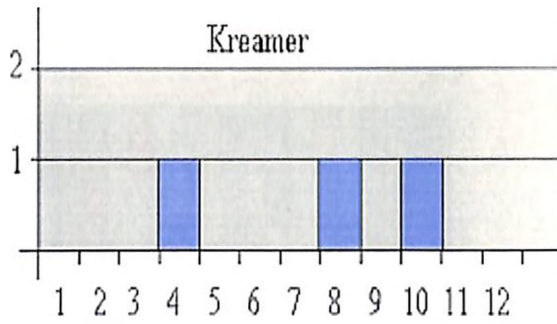


Figure 2.20 Comparison of BM component by Kremer

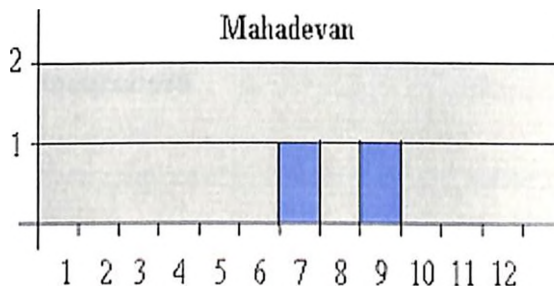


Figure 2.21 Comparison of BM component by Mahadevan

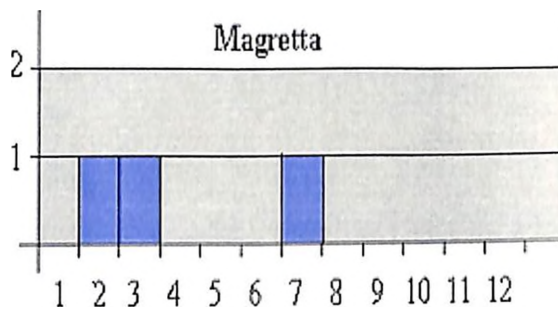


Figure 2.22 Comparison of BM component by Magretta

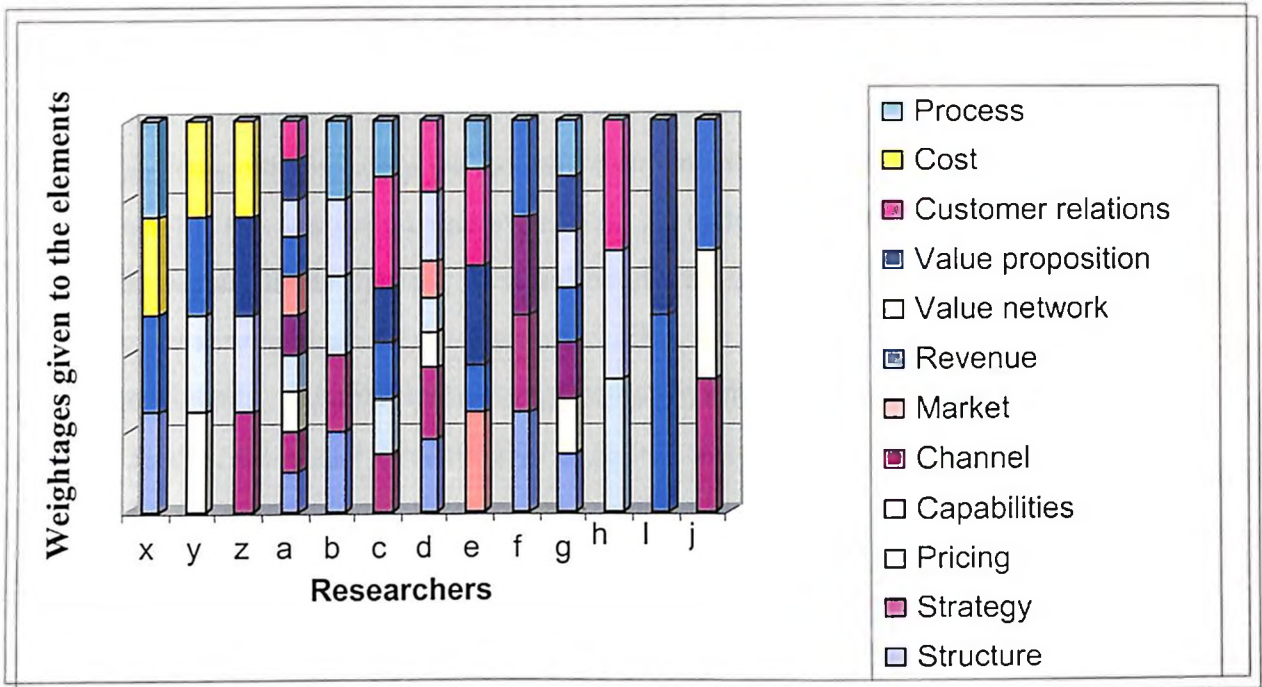


Figure 2.23: Comparisons of analysis of the business model elements

Here the researchers have been represented by alphabets as follows:

x is Alt and Zimmermann,

y is Affuah and Tucci,

z is Chesbrough and Rosenbloom,

a and b are Weill and Vitale

c is Osterwalder and Pigneur,

d is Hamel

e is Evaloris

f is Methlie

g is Linder and Cantrell,

h is Kreamer,

i is Mahadevan and

j is Magretta

The bar graph shown above is a pictorial representation of the various components of business model that have been taken into consideration for study by the researchers. Across the x-axis are the various researchers who have either specified or detailed or

conceptualized the components of business model. Bars along the y-axis represent the business model components that have been considered for the study by that particular researcher. Each component of business model has been given a different color and each author has concentrated only on certain components. The weightage given for each component by the individual researcher can be deduced from the varied bar lengths across the y-axis. If the bars are of equal length we understand that they have all been given the same weightage by the researcher. Else, we say that the author has mentioned some components, detailed some components or conceptualized them. As the above analysis shows, the major element that is to be considered while designing a business model for a business in general are **value proposition, customer relations, Infrastructure capabilities and revenue aspects.**

In the following passage we will realize the two interpretations of business models and analyze the extent to which researchers have used the elements and components in their papers. This will give an insight into the actual key factors describing the Business Model. A lot of business model components have been mentioned erstwhile. In trying to know how the researchers ascertained these components, we find several approaches to identify them. By analyzing the components of BMs we will be able to derive the most important factors in defining the Business Models.

From the reviews on e-business research made by the researcher so far, it has been made clear that, each researcher uses their own way for identifying the Business Model components. The prevalent approaches followed for defining such components are:

- Decomposing a business initiative into levels of analysis, from the more general to the concrete (from e-business implementation to atomic business models), and identifying primary components that have to be specified in each analysis level (Weill & Vitale, 2001).
- Identifying ways to represent a business and defining key information required for each representation way (Weill & Vitale, 2001).

- Decomposing a Business Model to sub-models that link together to build a Business Model (Petrovic et al., 2001; Linder & Cantrell, 2000).
- Identifying principal issues or major components of a BM and decomposing them to subcomponents (Hamel, 2000; Osterwalder & Pigneur, 2002).
- Define vertical and horizontal dimensions of Business Models (Alt & Zimmermann, 2001). Whatever approaches were made for identifying Business Model components, it has been observed that, there is a set of fixed (standard) components identified by almost all researchers, and they include: Market Structure (actors, roles, objectives, capabilities, assets), Value Proposition (for customers and partners), Scope (market segment), Activities, Processes and Core competencies (capabilities, assets), Pricing Policy and Revenue Streams, Strategy (alliances, competitive advantage, position in the value chain and net), Regulation, and Technology. Nevertheless, each researcher uses his own approach for bundling the components that they have identified and thus creating their own framework for analyzing Business Models.

It is very vital to classify the business model to understand its hidden facts more lucidly. It aids us in discovering new dimensions to the available models. The following paragraph deals with the taxonomy framework of the various business models.

- **Taxonomies**

The taxonomy frameworks of Business Models that are presented in the literature may get differentiated based on two factors:

1. Criteria posed for classifying Business Models,
2. The objects classified, whether they are entire business initiatives possibly combining multiple business models (Timmers, 1998; Rappa, 2001) or atomic business model that can be incorporated into an e-business initiative (Weill & Vitale, 2001).

From the two different taxonomies, presented above, we have discerned the following four sets of criteria:

1. Revenue and Position in Value Chain (Rappa, 2001),
2. Interaction Pattern and Value Chain Integration (Timmers, 1998),
3. Core Activities and Price – Value Balance (Linder & Cantrell, 2000),
4. Control and Value Integration (Petrovic et al., 2001).

The existence of multiple sets of criteria betrays that there are no established criteria for classifying business models, but some criteria, such as Value Integration, may be used in various taxonomy frameworks. Moreover, most taxonomy frameworks seem to be narrowly defined for e-Business models, based on millions of Business Model examples that appear on the Internet. Only Tapscott et al. introduce a rather generic taxonomy of Business Models that could apply not only to e-business, but any type of business featured by a network structure. The tools used for designing and analyzing business models focus on relationships, objects (flows) exchanged, actors and processes activities. Thus, they do not illustrate all components of Business Models, but only those that refer to BM's main components, as they are defined by Timmers (1998). In this competitive world, it is difficult for any company to survive and hence they are forced to take up new business models for their firm to gain an edge over their competitors. These researchers have studied the business models thoroughly and have come up with innumerable methodologies for changing the business models. The upcoming passage comments on the ways of changing a company's business model.

- **Methodology for Changing BMs**

Neither in academic nor in business field can we find a standard methodology driving the process of changing a business model from its current status to a new improved one via the technology vehicle. An exception may stand for Tapscott et al. (2000), whose methodology is quite explanatory, providing not only steps but also guidelines of how executing each step. Nevertheless, their final step is tightly linked with and thus limited to the taxonomy of Business models. Linder and Cantrell (2000) have made a worthwhile research attempt to introduce such a methodology grounded on a well-established

theoretical framework. However, the steps of their methodology are described in quite general terms, and no guidelines or advice is provided for the core part of this methodology that is making the change.

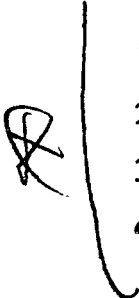
Petrovic et al. (2001) provide a general framework rather than methodology, thus it cannot guide a changing process. This approach is based on their identification of components. That means that if a different set of components is adopted, then the framework will not work or will be subject to changes. Nevertheless, Petrovic et al. have made a considerable contribution by defining a set of change models, classified based on the level of change introduced by the new business model.

Finally, the approach of Papakiriakopoulos et al. (2001) has provided a methodology in steps deriving from their experience with a real case study. The limitation of such an approach concerns the driver of the change that is specifically a technology innovation and not any business of a new service provider that takes on all the newly generated services and functions.

After realizing the methodologies, we ought to analyze the factors that play a major role in evaluating the business models since they are at the root level of any strong business model.

- **Factors for Evaluating BMs**

From the review of approaches in the evaluation of Business Models field, it has been obvious that the definition of a framework is highly dependent on the purpose of evaluation. Four primary evaluation purposes have been identified:

- 
1. Comparison with competitors in Business Model terms,
 2. Assessment of alternative Business Models for implementation by the same firm,
 3. Identification of risks and potential pressure points for a firm going to innovation,
 4. Evaluation of an innovative business idea in terms of feasibility and economic viability.

Hamel (2000)'s evaluation factors are well defined and can be applied no matter what

research approach is adopted for defining business model and its components.

Afuah and Tucci (2001) discuss three different evaluation approaches, which are based on: Measures of Profitability, Profitability Prediction and Metrics for assessing Business Model Attributes.

The first two approaches have the major limitation of assessing only the financial dimension of a business model, while the third approach is highly dependent on, and thus restricted by, the definition of Business model and its attributes.

Weill and Vitale (2001) propose three principal evaluation factors, which are decomposed to sub-factors that are actually used in evaluation. Their contribution extends through an effort to assess the impact of a specific factor (ownership) on each one of the Business Models of their taxonomy. However, this effort has not been continued for other factors as well.

Gordijn and Akkermans (2001) approach for evaluation is restricted to profitability and the only component assessed is the value exchanged between actors. The limitation gets stronger since the value exchanged has to be expressed in monetary units.

2.9 CONCLUSION

The Business model field is discussed from both a business and a technological point of view. Each researcher focuses on several dimensions like the components or types of atomic or generic business models, or building methodologies and identifying evaluation factors. As the research interests in this area are of diverse scope, there is neither a widely accepted definition nor conformity on methodologies for building or changing business models. The Business Model research area has strong interrelationships with the research areas of technology innovation and strategy. The definitions of business model revealed that although definitions differ in scope they all require the inclusion of value network relations. The most prominent difference in the definitions is the inclusion or exclusion of internal operations and resources of the business creating a dichotomy of business

model definitions. There are no established criteria for classifying business models, but instead taxonomies are proposed using several, usually two, components (dimensions) of Business models. The research question is whether these approaches are complete and correct and whether the usages of these criteria instead of others corresponding to other components of BMs, and whether an alternative criterion can be used. Anyway, it is expected that as the number of criteria grows, the taxonomy issue gets even more complex. Another research question concerns whether there exists any generic taxonomy of business models that would concern not only e-business models but also any other type of business models, such as m-business models. An analysis of business model attributes provided further understanding of the concept of 'business models'. As with the business model definitions, two views are taken; those that include attributes relating to internal operations and those that propose only value network related attributes. There is a trend towards business models that belong to dynamic market on which the alliances and networks of companies are established when needed. Also, we can see competing trends towards integrated even tighter co-operation along competing value chains. Tapscott methodology seems to be generic enough not only for changing traditional business models to e-business but also to any new type of business models. The research question is whether it can indeed be applied for guiding change from traditional business to Internet business. The research work made in the aspect of business models evaluation and assessment is not mature enough, since it includes few and recently made efforts for defining: a) purposes of evaluation b) dimensions of business model that can be assessed, such as profitability and viability, and c) factors that can be used as evaluation criteria.

More scientific work is needed in this area, so that an evaluation framework and methodology is developed. No established knowledge and no common practice for building and even more for assessing business models exist. Whoever wishes to build a business model should select one from several approaches, justify why using that instead of another similar, and use that as foundation for building his model. The confusion becomes greater, when the discussion comes into evaluation. If no agreement is reached on what is a business model, it gets even more difficult to assess business models that are defined in a diverse way.

Any business model is as good as the technology that supports such a model. It is possible for a company to come up with the best business model but if it has no technology to support the devised model then the company adopting such a model would not succeed. The studies on e-business signing a process of adoption of continuous change, everyday there is a new and varied business models getting developed by companies. These take birth of the basic frameworks and the chart out unique selling propositions. They modify and change their business strategy as per the market they operate in, under the constraints they work. The web has already proved that, traditional business models storefront operations may contribute inadequately. It requires a constant long standing effort to develop an ideal e-business model, given to experience the rapidity with which companies and markets are changing. Ultimately, the business model that takes up a comprehensive and holistic view on the way the market it operates, have got a greater priority to succeed. The comprehensive study done for various models of e-business by different authors has given an idea about various components and elements of e-Business and has been compiled and assessed by giving values for various attributes in the tables above. A table illustrates what elements of the models different authors cover and how exactly they have been treated. The various authors in the business model domain define elements differently in depth and rigour. Following this approach, the significant elements of a business model are Value proposition, Customer relationship, Infrastructure management and revenue model. Several authors showed that with the success of ICT, organizational transformations are taking place in industries and companies. The e-Business Model approach proposed in this research shall help a firm to structure its organization in a way to become more efficient, more flexible and responsive to customer demand, to forecast possible future scenarios and therefore to stay competitive in the Internet era.

INTERNET BANKING IN INDIA

3.0 INTRODUCTION

It is a fact that world is becoming extensively technology driven. Across every sector of society, from government to consumer as well as in every endeavor, from work to play, technology is transforming our way of life. The manifestation of the concept in financial services sector is becoming all pervasive. The tremendous advances in technology and the aggressive infusion of Information technology (IT) have brought a paradigm shift in banking operations. For the banks, technology has emerged as a strategic resource for achieving higher efficiency, control of operations, productivity and profitability. For customers, it is the realization of their anywhere, anytime, anyway banking dream. This has prompted the banks to embrace technology to meet the increasing customer expectation and face the tough competition. The recent trends show that most brick and mortar banks are shifting from a product-centric model to a customer-centric model as they develop their new e-banking capabilities. They have, over a long time, been using electronic and telecommunication networks for delivering a wide range of value added products and services. With the popularity of PCs, easy access to Internet and World Wide Web (WWW), banks increasingly use Internet as a channel for receiving instructions and delivering their products and services to their customers. This form of banking is generally referred to as Internet Banking (IB), although the range of products and services offered by different banks vary widely both in their content and sophistication (RBI, 2004).

In the five decades since independence, banking in India has evolved through four distinct phases. The growing competition, growing expectations led to increased awareness amongst banks on the role and importance of technology in banking. The arrival of foreign and private banks with their superior, state-of-the-art, technology-based services pushed Indian banks to follow suit by going in for the latest technologies so as to meet the threat of competition to retain their customer base. Indian banking industry today is in the midst of an intensive exposure to revolution. Future of banking and

finance hinges around exploiting the opportunities endowed to technology explosion. This requires combined efforts of all participants in the financial system. The collective goal should be, to make use of synergies between technology and finance to maximize the benefits to society.

The IT revolution brought a fundamental transformation, as Alvin Toffler describes as, "fourth wave". Perhaps no other service sector was affected by advances in technology as much as banking and finance. It has become the most important factor to deal with the intense by of competition and financial innovations. It has enabled, in general, raising the efficiency of financial intermediation in the face of ever-rising volumes of transactions, falling margins and empowered customer expectations. IT has basically been used under two different avenues in banking. One is communication and connectivity and other is business process reengineering. IT enables sophisticated product development, better market infrastructure, implementation of reliable techniques for control of risks and helps the financial intermediaries to reach geographically distant and diversified markets. Further, IT, along with communication networking systems, has a crucial bearing on the efficiency of money, capital and foreign exchange markets. Electronic-based banking systems such as banking telephone system, Automatic Teller Machine (ATM), Electronic Fund Transfer (EFT), digital signatures, smart cards and IB have been implemented by many banks in India since 1990. Many customers use these basic services and demanding for more advanced electronic-based banking services via the Internet from their banks. However, many banks in India are going through initiation, preparation and transformation from electronic-based banking service to IB at the beginning of the 21st century. Although benefits from providing Internet-based banking services and features remain to be determined, many banks are evaluating and preparing for the transformation into IB in order to capture emerging group of customers in the Internet market. The objective of the chapter is to elaborately explain the entire gamut of application of e-business in Indian banking sector and to develop a framework to analyze the critical success factors and strategic issues involved in e-business transaction. An attempt is made to examine the performance of Indian banks in terms of providing banking products and services through their web sites.

The chapter is broadly divided into two parts:

In Part I, section 3.1 talks about the burgeoning, impetus and different phases of IB. An overview of literature relevant to Internet-based banking services in United States, United Kingdom, Europe, Asia Pacific and India has been presented in section 3.1.3. The next section deal with “push and pull view” which gives a broader view of impact of technology on banking is depicted in section 3.1.5. Database and Research methodology are presented in section 3.1.6. Later, it presents a detailed analysis of IB with respect to profitability, cost efficiency, and other issues involved in employing the technology are analyzed and presented in section 3.1.7.

3.1.2

Part II specifically discusses the Productivity Analysis of IB by adopting Cobb-Douglas oriented approach which is presented in section 3.2. The next section 3.2.1.2 concludes with data analysis, major findings, recommendations and limitation for Internet-based banking.

3.1 THE BURGEONING OF INTERNET BANKING

The emergence of IB is a distinct area in banking which is seen by many researchers and executives as the most important commercial trend of our time. With the rapid adoption of networking technology by companies, the world is witnessing amazing changes in the way that business is done. IB has been redefining all facets of banking in a revolutionary manner. It is crucial to the effective functioning of organizations, especially in a world where companies have to deal with suppliers, customers, partners and their own units distributed across the world. The new business reality created by IB is no longer a projected vision of technocrats. It is a new “world order”, with millions of dollars exchanged between parties daily. IB is already playing a significant role in determining corporate strategy and in creating value. It is also already playing an important role in changing society, as we know it today. To be competitive in today’s marketplace, companies need to expand commercial activities beyond national borders. The global network of electronic infrastructure has played a significant role in this expansion but the technology itself is not the factor driving the business revolution. The revolution is driven by the interaction of IT and customer demand. Customers are not only adapting to new

technologies, they are demanding more and more global competition. Instead of playing a catch-up game with this unknown monster, it is necessary that conscious and deliberate initiatives be made by academics and leaders in industry to tame it.

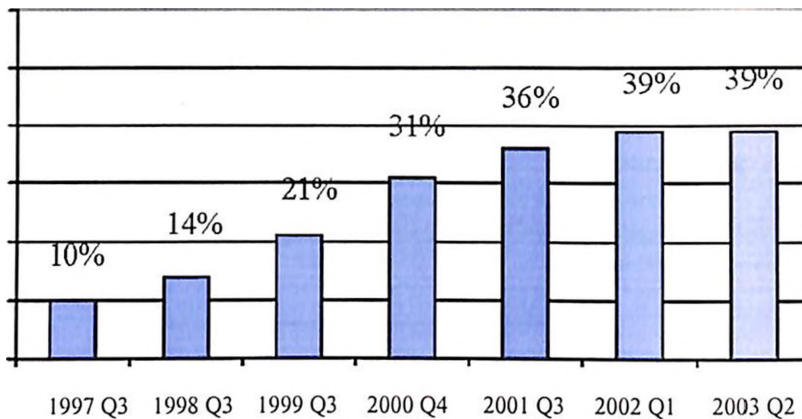


Figure 3.1: Internet Bank Usage

Source: Business India, February' 2003

3.1.1.1 Impetus for Internet Banking

The business strategist Michael Porter identified five competitive forces which tend to drive down the profitability of any industry as comprising: barriers to entry, many small suppliers, many small buyers, few substitutes and few competitors (Hubbard et al, 1996).

Applying this version of Porter's Five Forces Model (Porter, 1985) to the banking industry, (Li, 1997) observed that, one of the critical factors – barriers to entry – exists in banking. (Foster *et -al*, 1999) observed that, competitors can come from any industry to "disintermediate" banks (i.e., eliminate banks as the interface between customers and suppliers). Product differentiation is very difficult for banks. Most of the products sold in retail banking are constrained by legal or industry regulations often readily imitated (Nemzow, 1999). Most countries have de-regulated their banking sector (Lyell, 1997, Carew 1998, Lucia, 1998) so government policies no longer form a strong entry barrier to banks' competitors. Technological know how in banking also provides little protection to existing banks (Stemper, 1990). As Li (1997) argues the only significant entry barrier is likely to be the brand name of the service providers in retail banking. However, as

Morath (2000) observes, many non-banks, but identifiable, names such as Microsoft are entering the banking arena, posing a major competitive threat.

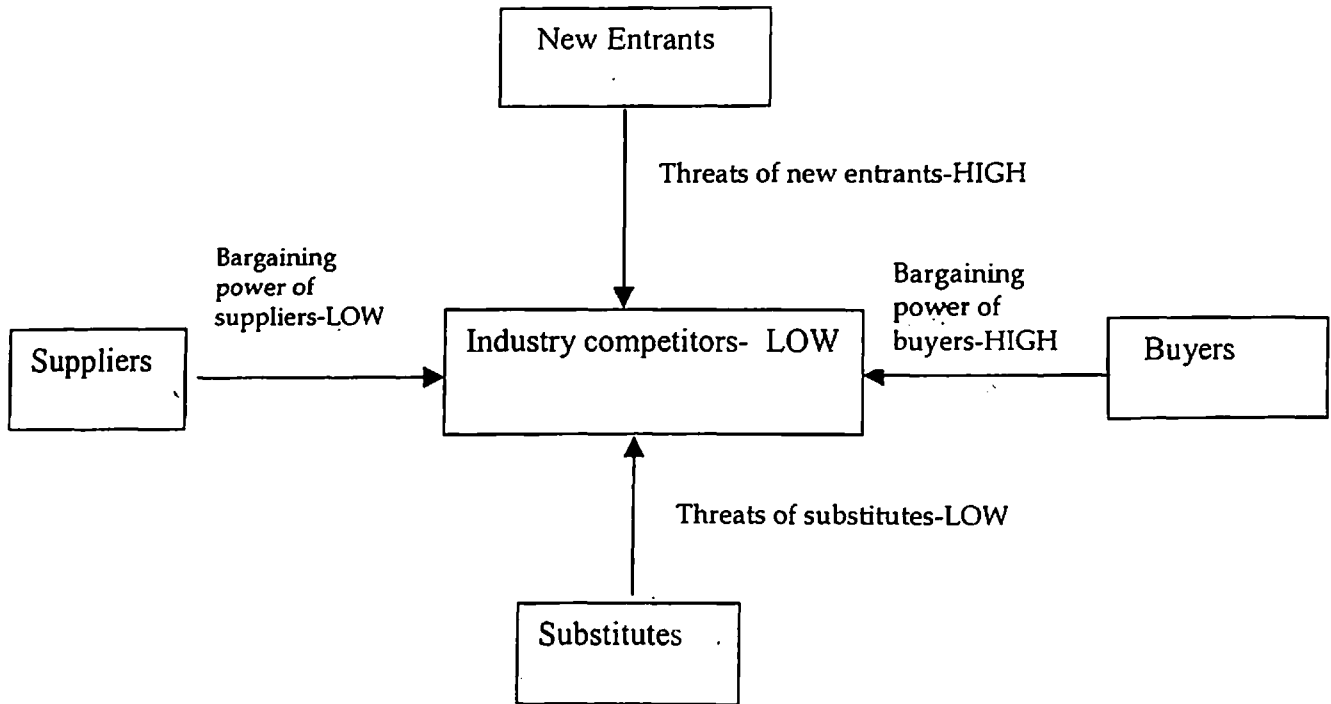


Figure 3.2: An application of Porter’s Five Forces model to the banking industry

Source: Kotler, P. and Armstrong, G. [1997] “Principles of marketing”, 5th ed., Prentice Hall.

Griffin (1996) observes that since 1980s, banks have been emerging to remain significant in terms of assets, ensure that there are a small number of significant players in the industry. Theoretically, the bargaining power of suppliers would be high in this industry, as there are a small number of fairly large players in the industry (Kotler, 1997). However, the tendency of banks to amalgamate, rationalizing operational costs (Cronin, 1998) and thus diminishing the number of banking organizations in any country, is being offset by means of the development of online banks and financial intermediaries in areas such as home lending (Fellenstein et. al, 2000). As (Mishra, 2001) observes, the Internet has leveled the playing field. By contrast, the bargaining power of consumers is increasing. Switching costs are becoming lower (with IB gaining momentum) and consumer loyalties are harder to retain (Nemzow, 1999). The threat of substitutes to banking in terms of competition from the non-bank financial sector is increasing rapidly. The application of Porter’s model to the banking industry shows clearly that this sector,

which has now reached the mature stage of its lifecycle, is under threat. Dial (1995) points out that banking demonstrates the typical attributes of an oligopoly – such as risk avoidance and relatively undifferentiated customer service – which have made it susceptible to encroachment by software giants such as Microsoft, who are attempting to replace banks as intermediaries (Kalakota et. al, 1998). Some specific factors, which have conspired to create the new competitive environment for banking, include: changing consumer needs and perceptions, globalization, technological innovations, and competition from non-banking entities (Aveling 1989, Kalakota et. al, 1997, Morath 2000). Increasingly, consumers expect online services from their financial institutions (Constantine 2000). The trend toward electronic delivery of products and services is particularly important to the financial services industry, where the shift is partly a result of consumer demand, but is also partly a result of the ruthlessly competitive environment (Geyer, 1997). Banking institutions are countering their competitors by leveraging eCommerce technologies and various service offerings online (Morath, 2000).

Electronic banking was first introduced by large companies to simplify the management of their salary and payroll problems (Crede 1995, Kalakota and Whinston 1997, Carew 1998). By contrast, home banking is a comparatively recent concept, which is essentially a 'spin-off' of the Web (Stamoulis 2000). Though many banks offered 'home banking services' from a PC during the 1980s and 1990s, the concept was initially a failure due to the lack of a critical mass of PCs and computer literate customers, as well as to the somewhat limited user interfaces initially available (Lucia and Peters, 1998). Home banking, however, is gaining in popularity with increasingly literate consumers and a wider installed PC base (Stemper, 1990, Carew 1998, Wood and Fellenstein, 2000). Banks initially used dial-up services or provided software, which was both expensive to customers and lacking in user-friendly features (Kalakota et. al, 1998). Later, on-line services were set up from retail branches to provide subscriber-based online services, although these still lacked generic features and a user-friendly interface (Denny, 1998). With the evolution of the Internet and the www, online banking becomes crucial to growth in the sector (Sathye, 1998). Consumer behavior in banking changed partly as a result of changes in the amount of spare time available to individuals (Seitz et. al, 1998).

They observe that mobility; independence of time and place, and flexibility has become key words in consumer banking. (Stamoulis, 2000) points out that the Internet is increasingly considered a strategic weapon by banks, which are leveraging it as a distribution channel to offer complex products. At the same quality, they can provide services from their physical branches, at a lower cost, to potential customers. (Timmers, 2000) supports this view, highlighting the key features of the Internet – such as 24-hour availability, immediate access, and the absence of physical borders. Indeed, the Internet has been one of the key drivers in promoting eCommerce in the banking sector (Jeevan, 2000).

3.1.2 INTERNET BANKING SERVICE

IB service is defined as banking service that allows customers to access and perform financial transactions on their bank accounts from their computers with Internet connection to banks' web sites using web browser software. Since 1995, Internet has become less expensive and available for customers to access information, exchange products and services world wide from their personal computers and modems at home and/or work. The increasing population of Internet customers and demand for payments via the Internet has an impact on banking services provided by many banks and force them to extend their banking services to customers on the Internet. Many new Internet-based banking services have been initiated and launched into the market and attract both old and new customers to continue their services with the banks.

3.1.2.1 Four Phases of Internet Banking

A bank typically considers four phases in developing an Internet presence:

- Phase One: Marketing and Promotion
- Phase Two: "Light" Interactivity
- Phase Three: Full Transactions and Services
- Phase Four: Strategic Usage

While most banks migrate from phase to phase in the order given, some skip Phase one and two altogether and move directly to Phase three i.e. transactions and services. The Table 3.1 highlights some of the key distinctions of the four phases.

	Phase One Marketing and Promotion	Phase Two Light Interactivity	Phase Three Full Transactions and Services	Phase Four Strategic Usage
Focus	Marketing Web site	Customer acquisition	Banking functionality	Strategic change
Primary Services	<ul style="list-style-type: none"> • Published information on bank services • Branch / ATM map • Customer service e-mail 	<ul style="list-style-type: none"> • Loan calculators • Credit card applications • Savings, checking account applications • Financial Planning articles, advice 	<ul style="list-style-type: none"> • Account look-up, balances, transfers • Bill payment • Car loans, credit cards, mortgage • Statement review • Cleared check presentment 	<ul style="list-style-type: none"> • Sophisticated cross-selling of new services • Customer profitability analysis • Bill presentment & payments
Primary Benefit	Provide information to current and prospective customers	<ul style="list-style-type: none"> • Reducing paperwork • Low-cost ways to attract and impress customers 	<ul style="list-style-type: none"> • Retention of existing customers • Attracting high-value customers • Reduction in service costs 	<ul style="list-style-type: none"> • Increased service offerings • New revenue opportunities • Increased margins

Table 3.1: Phases of Internet Banking

Source: www.financeindia.com

The resources required to pursue these phases are highly dependent on a bank's back-end processing system and technology infrastructure. There is not necessarily a correlation between bank size and the phase in which the bank is currently operating.

3.1.2.2 Internet Banking Site: Classifications

Broadly, the levels of banking services offered through Internet can be categorized in three types:

- (i) The Basic Level Services use the banks websites which disseminate information on different products and services offered to customers and members of public in general. It refers to banking services and financial transactions commonly requested by customers via the Internet. It may receive and reply to customers queries through e-mail, at the basic level, IB can mean the setting up of a web page by a bank to give information about its product and services.
- (ii) In the next level are Simple Transactional Websites which allow customers to submit their instructions, applications for different services, queries on their account balances, etc, but do not permit any fund-based transactions on their accounts.
- (iii) The third level of IB services are offered by fully transactional websites which allow the customers to operate on their accounts for transfer of funds, payment of different bills, subscribing to other products of the bank and to transact purchase and sale of securities, etc. (RBI, 2004).

3.1.3 LITERATURE REVIEW OF INTERNET BANKING

In India not many studies have been conducted on the current status of IB. Thus very less literature is available on this subject in Indian context. Therefore this study reflects the current status of IB by private, public and foreign banks operating in India. There are numerous papers that sought to study the growth of IB internationally, for instance, Sathye (1997) surveyed the status of IB in Australia. The study found that only two of the 52 banks started IB services at that time. However still there was a lot of room for IB to expand in Australia.

Booz Allen Hamilton (1997) conducted a global survey covering 386 retail and corporate banking institutions in 42 countries to assess the strategic impact of IB on the financial service industry. According to the study, there is a huge perception gap between North

American/European banks and Japanese banks regarding the future of IB. North American and European banks expect IB to become the most important retail channel within 10 years, but Japanese banks expect traditional branches to remain the most important channel. The study also indicates the rapid growth potential of IB. Many of the banks that responded have plans to upgrade the functionality of their Internet service offerings.

England (1998) conducted the first important study that estimated the number of U.S. banks offering IB and analyzed the structure and performance characteristics of these banks. They have found no evidence of major differences in the performance of the group of banks offering IB activities compared to those that do not offer such services.

Furst et. al. (1998) a U.S. based study found out a significant shift by consumers and businesses to electronic payments. In response to developments in electronic payments and remote banking, banks have greatly increased their investment in technology, particularly in retail banking. The gains from technological advancements in banking and payments are likely to be substantial, both from the point of view of individual financial institutions and economy-wide. In this environment, banks should review and, if necessary, adjust their risk management practices in tandem with upgrading their technology activities.

Furst et. al. (2000) presented data on the number of national banks in U.S. offering IB and the products and services being offered. Only 20 percent of national banks offered IB in the third quarter of 1999. However, as a group, these Internet banks accounted for almost 90 percent of national banking system assets, Banks in all size categories and 84 percent of small deposit accounts offering IB tend to rely less on interest-yielding activities and core deposits than do non-Internet banks. Also, Institutions with IB outperformed non- Internet banks in terms of profitability.

Guru et. al. (2000) examined the various electronic channels utilized by the local Malaysian banks and also accessed the consumers reactions to these delivery channels. It was found that IB was nearly absent in Malaysian banks due to lack of adequate legal

framework and security concerns. However over 60 percent of the respondents were having Internet access at home and thus represented a positive indication for PC based and IB in future.

DeYoung (2001a) investigated the performance of Internet-only banks and thrifts in the U.S. The empirical analysis found that the newly chartered Internet-only banks substantially underperform the established banks at first, but these performance gaps systematically diminish over time as new banks grow older and larger. The study suggested that the Internet-only banking model may be feasible when executed efficiently.

DeYoung (2001b) found that the average one year old Internet-only bank earned significantly lower profits than the average one year old branching bank, due to low business volumes and high non-interest expenses. It supports the proposition regarding the Internet-only banks, fast growth but low (or no) profits.

Jasimuddin (2001) found that within one year of the introduction of Internet service in Saudi Arabia, Saudi banks had at least decided on their Internet presence. 73% of the Saudi banks possessed their own web sites and 25% of the web sites were offering full services over Internet. The banks viewed the Internet as a key alternative delivery channel.

Suganthi et. al. (2001) conducted the review of Malaysian banking sites and revealed that all domestic banks were having a web presence. Only 4 of the ten major banks were with transactional sites. The remaining sites were at informational level. There are various psychological and behavioral issues as trust, security of Internet transactions, reluctance to change and preference for human interface which appear to impede the growth of IB

Furst et. al. (2002) provided a comparative study of Internet and non-Internet banks in U.S. and found that institutions with IB outperformed non-Internet banks in profitability. Also, banks in all categories of size offering IB tended to rely less on interest yielding activities and deposits than non-Internet banks do.

Koedraben et. al. (2002) investigated, designed and developed an Internet based retail banking prototype that meets the requirements of the Thai customers. It found that more than half of the sample Internet users in Thailand are very interested in using the IB services. The main features needed are balance inquiry, bill payment, fund transfer, business information, and payment for goods purchased. The prototype was then developed and validated. The survey from the executives of four Thai banks revealed that there was a potential growth for retail IB in Thailand.

Corrocher (2002) investigated the determinants of the adoption of Internet technology for the provision of banking services in the Italian context and also studied the relationship between the IB and the traditional banking activity, in order to understand if these two systems of financial services delivery are perceived as substitutes or complements by the banks. From the results of the empirical analysis, banks seem to perceive IB as a substitute for the existing branching structure, although there is also some evidence that banks providing innovative financial services are more inclined to adopt the innovation than traditional banks.

Hasan (2002) found that online home banking has emerged as a significant strategy for banks to attract customers. Almost 75 percent of the Italian banks have adopted some form of IB during the period 1993-2000. It also found that the higher likelihood of adopting active IB activities is by larger banks, banks with higher involvement in off-balance sheet activities, past performance and higher branching network.

Janice et. al. (2002) based on interviews with four banks in Hong Kong noted that banks view the Internet as being a supplementary distribution channel for their products and services in addition to other forms of distribution channels such as ATMs, phones, mobile phones and bank branches. Basic transactions and securities trading are the most popular types of operations that customers carry out in IB.

Awamleh et. al. (2003) found that banks in Jordan are not fully utilizing concepts and applications of web banking. In comparison to developed international markets, it is fair to say that this sector is largely undeveloped. Indeed, only two banks offered limited

number of services through their web. The major challenge facing further development of web banking in Jordan is, for example, the high cost of telecommunication. Another element is the non-availability of information technologies, packages, solutions, and human resources, which facilitates optimum use of technology. The study revealed that Jordanian banks have been successful in the introductory phase of web banking. However Jordanian banks are required to move towards web banking usage with a view to conducting real financial transactions and improving electronic customer relations.

There are a series of papers that observe that IB has revolutionized the banking industry and the banking industry is under pressure to offer new products and services. However, to succeed in today's electronic markets a strategic and focused approach is required. In the Indian context many publications throw light over the importance of IB and also its prospects for the Indian banking industry. However these papers don't identify key differences between Internet banks and non-Internet banks.

Unnithan et al. (2001) studied the drivers for change in the evolution of the banking sector, and the move towards electronic banking by focusing on two economies Australia and India. One of the findings stated that Australia is a country with Internet ready infrastructure as far as telecommunication, secure protocols, PC penetration and consumer's literacy is concerned. India, by comparison, is overwhelmed by weak infrastructure, low PC penetration, developing security protocols and consumer reluctance in rural sector. Although many major banks have started offering IB services, the slow pace will continue until the critical mass is achieved for PC, Internet connections and telephones. However, the upsurge of IT professionals with growing demands is pressuring the government and bureaucracy in the country to support and develop new initiatives for a faster spread of IB.

Rao et. al. (2003) provided a theoretical analysis of IB in India and found that as compared to banks abroad, Indian banks offering online services still have a long way to go. For online banking to reach a critical mass, there has to be sufficient number of users and the sufficient infrastructure in place.

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Agarwal et. al. (2003) explored the role of e-banking in e-democracy. With the development of asynchronous technologies and secured electronic transaction technologies, more banks and departments were using Internet for transactional and information medium. Initiatives such as E-SEVA and FSCs are the milestones towards achieving comprehensive e-governance.

Mookerji (1998), Pegu (2000), Gupta (1999) and Dasgupta (2002) found that IB is fast becoming popular in India. However, it is still in its evolutionary stage. By the year 2006, a large sophisticated and highly competitive IB market will develop. Almost all the banks operating in India are having their websites but only a few banks provide transactional IB.

3.1.4 INTERNET BANKING IN VARIOUS COUNTRIES

In order to understand basic IB services available around the world, this section presents review on IB services in the United States, United Kingdom and Europe, Asia Pacific, Thailand and India.

3.1.4.1 Internet Banking in the United States:

According to Stegman (1999), an average cost for conducting one full banking transaction service over the counter inside the Bank in the United States is US\$ 1.07 in 1999. The use of new technological-based via on-line banking service has reduced similar transaction cost to US\$ 0.04 via telephone, to US\$ 0.27 via ATM, and to US\$ 0.01 via Internet-based personal computer. An Internet-based transaction has become economical and efficient for the U.S. banking industry to reduce cost and improve service quality for their existing and potential new customers worldwide. The demand for on-line banking via the Internet has increased to 4.8 million customers in 1997 and to about 7.8 million customers in 1998. Most of the forecasts for on-line banking predict that this growth rate will continue beyond the year 2000. By 2001, there were more than 14 million customers who used banking on-line service via the Internet. Other financial service providers such as investment providers, mutual funds and brokerage houses also have offered on-line service via the Internet to their customers in the US and around the world.

3.1.4.2 Internet Banking in the United Kingdom and Europe:

In the United Kingdom, IB services are available and provided by twelve IB services providers. The Egg, for example, is an IB service provider (exclude current account features) that has more than 150,000 customers visited their web site during October 1999 to July 2000. The IB services providers in the U.K. have encountered an increasing demand for cross boarder payment transactions for smaller amount of cash and payment over the Internet. Many banks continue to develop and launch new banking services on the Internet in order to satisfy and meet their Internet-based customer requirements in term of time, ease of use, security and privacy in the U.K. (Birch and Young, 1997; Mathew and Dagi, 1996; Gandy and Brierley, 1997). In June 2001, the U.K. and eight other western European countries : France, Spain, Portugal, Germany, Switzerland, Holland, Luxembourg, and Scandinavia have become leading nations in providing IB services in Europe. Germany also has been rated as the nation that has the highest number of IB services providers in Europe (BlueSky International Marketing, 1999). Although the UK has smaller number of IB sites on the Internet than in Germany, but it has been rated as the highest quality and functionality at no additional charges to their customers in Europe. However, there are two banks in the U.K. that charge additional fees for IB services:

- (1) Natwest has a one-time charge of 30 pounds per customer, and
- (2) NPBS has 2.99 pounds per month after a free introductory period of six months.

3.1.4.3 Internet Banking in Asia and Pacific:

IB in Asia and Pacific are new and gaining awareness in many countries such as China, Hong Kong, Singapore and India. **In China**, the Internet penetration into business and home has an impact on the development of on-line banking system of China financial reform plan in 2000. Many new e-businesses are emerging and become vital issues for China's financial and strategic policies. China has decided to take advantages of financial restructuring process and Internet revolution in Asia. China's central bank has initiated and encouraged the development of electronic-based banking service since May 31, 2000. The new electronic-based banking system focuses on the Internet and telephone based technologies to provide financial transaction services. It provides twenty-four hour

access to customer bank accounts, transfer transaction between accounts, personal financial consulting, online stock trading, shopping, and utilities fee payments. Speed, convenience and lower prices have become major factors that enable growth on online banking in China.

In Hong Kong, the financial gateway to the East, it is among the first countries in Asia that provide IB services via the Internet since 1990. However, on August 1, 2000, Hong Kong Bank (HSBC) launched its first Internet based retail banking services called online@hsbc to the public. It provides deposits, stock trading, bill payment and foreign exchange services for qualified customers at discounted transaction fees. HSBC also has decided to reduce online stock trading commissions from 0.5 to 0.25 for the Internet-based service in order to increase visiting rate and profit from online@hsbc. HSBC continued to extend the online@hsbc services to its major depositors until the end of 2000. By the first half of year 2001, HSBC delivered and started a Chinese language internet-based banking service to the customers.

In Singapore, Internet-based banking service has been implemented in Singapore since 1997. For examples, Oversea Union Bank (OUB), DBS Bank, Citibank, Hong Kong's Bank of East Asia, Oversea-Chinese Banking Corp. (OCBC) offer IB service called "finatiQ" to their customers in Singapore. The concept of "finatiQ" is to provide Internet-based banking services to customers at their convenience time from their personal computers and Internet connection via modems. Many new Internet-based banking service providers are emerging in Singapore and Hong Kong, therefore, the challenges for banks in Singapore are to grow and gain new market share in the new cyber market in Singapore and neighboring countries. Therefore, in Asia and Pacific, many banks, credit card companies such as VISA, and computer vendors such as IBM have formed alliance in order to develop Internet-based banking service standards for their customers. Example is the Interactive Financial Services (IFS) alliance founded in Singapore with alliance from banks in Singapore, Australia, Indonesia, Korea, Hong Kong, Taiwan and India. Through IBM global network standard, members are able to provide and exchange their IB services to their alliance customers. In the future, the alliance intends to develop new

services such as securities trading, smart cards, e-invoice and loan applications. It also plans to offer banking services through interactive television. The alliance also intends to develop standards and services that are compatible with those of the Integration Financial Network, an electronic financial consortium owned by eighteen major North America banks. This will eventually allow seamless and interactive banking across these banks and other e-Business services around the world (Mun, 1998).

3.1.4.4 Internet Banking in Thailand:

Banks in Thailand have entered into IB service since 1995. However, many Thai banks have been striving to compete with foreign banks by providing better services to meet new IB service challenges. With high rate of NPL (Non Performing Loans) and economic crisis on-hand since 1997, many Thai banks are forced to reduce cost via reduction of human resources. Many experienced workers have retired with early retirement package offered by the bank. Remaining employees with less experience have more work to do and work faster within shorter service hours. As a result, customers have to wait longer in line and suffer from error prone transactions at the over the counter services inside the banks. The open and closing time of bank service hours also have been changed from between 8:30 a.m. and 4:00 p.m. (7 ½ hours) to 9:30 a.m. to 4:00 p.m. (6 ½ hours). Therefore, the top four banks have decided to initiate, explore and attempt to launch IB service as a mean to reduce waiting time, errors, and costs and improve customer satisfaction since 1997. Their IB services allow customers to access and inquiry about their own accounts and perform simple frequently asked transactions via the Internet from their computers at work or home at their convenience time. However, the feed back from customers in terms of satisfaction, complaints, and suggestions remain unknown and needed to be discovered in order to improve or disprove of IB services. The remaining nine Thai banks are in early stages of planning, developing and implementing their first IB services to their customers.

3.1.4.5 Internet Banking in India:

Indian banking industry, today, is in the midst of an IT revolution. The technology changes have put forth the competition among the banks. It is going through radical

changes. Market forces such as demographics, the Internet, the globalization, branding all are providing catalysts to alter the traditional ways services delivered. Advances in technology and aggressive infusion of ICT to banking brought in a paradigm shift. For the banks technology emerged as a strategic resource for achieving higher efficiency, control of operations, productivity and profitability. For customers it is the realization of their banking dream anywhere, anytime, anyway. This has prompted the banks to embrace technology to meet the increasing customer expectation. New private sector banks and foreign banks have an edge over public sector banks as far as implementation of technological solutions is concerned. However, the latter are in the process of making huge investment in technology. This has led to increasing total banking automation in the Indian banking industry. ICICI and HDFC banks have taken a lead in introducing IB in India. After ICICI, Citibank, Indusland, HDFC were early ones to adopt the technology in 1999. The financial reforms that were initiated in the early 90s and the globalization and liberalization measures brought in a completely new operating environment to the banks. Costs of banking service through the Internet form a fraction of costs through conventional methods.

Channel	Cost per transaction (Rs)
Teller	Re.1 per transaction
ATM	45 paise
Phone banking	35 paisa
Debit cards	20 paise
Internet banking	10 paise per transaction.

Table 3.2: Relative Costs per Transaction for the Indian Banks

Source: India Research (2000) by Kotak Securities Estimates

The cost-conscious banks in the country have therefore actively considered use of the Internet as a channel for providing services. Fully computerized banks, with better management of their customer base are in a stronger position to cross-sell their products

through this channel. As per an Internet survey conducted by NASSCOM the Indian Internet market grew steadily in terms of subscribers. There is a growth of 45% in March 2005 compared to the 2.1 million active subscriber base in March 2004. The survey also forecasts that the number of Internet subscribers in the year 2005-06 is likely to reach 8.7 million, with the user base to grow over 55 million. India's Internet user base is growing at a rapid pace. India's Internet population grows to 31 million by March 2006 from 12.7 million in 2004. Banking and finance market has got the largest share i.e. 28 percent among the other sectors of economy in using information technology. Thus there is a lot of scope for banking institutions to expand their IB services to have a more sophisticated customer base. Five years from now, majority of the transactional services will be provided by way of Internet. Net-based banking comes at only 10 percent of the operating costs of conventional banking practices and services. As banks are going to play a key role in IT enabled services involving electronic money transactions we feel that banks should consider IB in a big way. A cost comparison study done by IBM global services consulting group clearly shows the advantage of using Internet as medium for banking services over other traditional mediums. As per the recent survey done by IBM global services, traditional banks spend 60% of the revenue generated to run a branch, whereas, the cost of providing the same services via Internet comes out to be less than 15%. This is a huge savings for banks and consumer. Definitely the consumer is the principal beneficiary of the IB. He will access the same services with more efficiency at low cost. IB will have two-fold effect, first, it will reach the remote consumer and second it will create the awareness among consumer about benefits of investment in different banking products. Investment in-turns boost the markets and economy. A research shows that a large urban population use Internet for gathering information about different products like personal loan, credit card, insurance etc., thus reducing cost of printing, promotion and distribution.

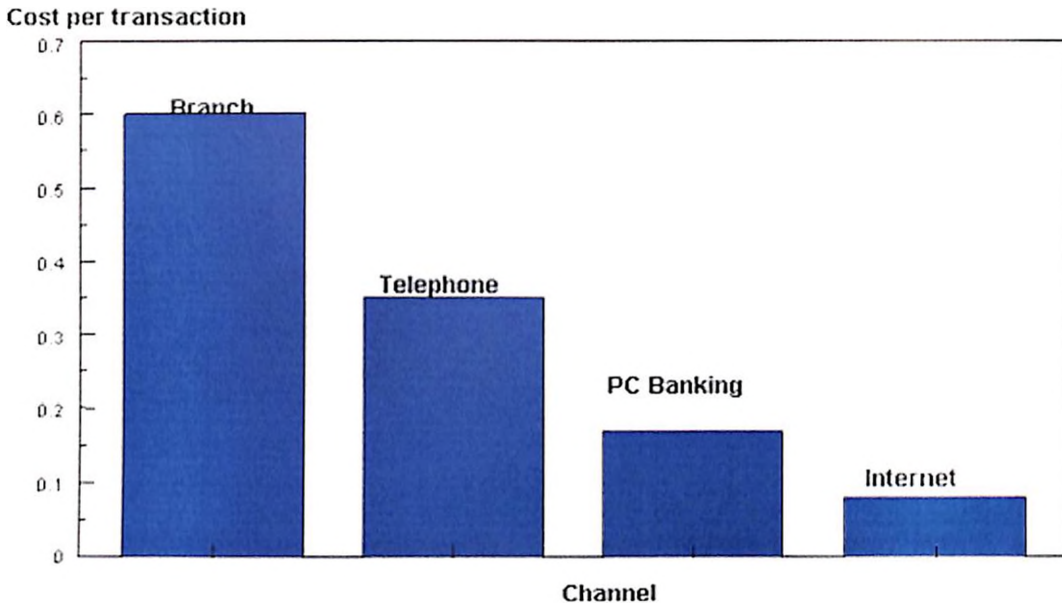


Figure 3.3 Cost of Internet banking over other mode of Banking

Source: IBM global services consulting group

3.1.5 CUSTOMER PUSH AND PULL

Initially, ATMs were used as a differentiator to woo customers to newer banks. Today technology has already hit the critical mass in terms of customer transactions. About 70 % of transaction in private banks like ICICI bank, HDFC bank and UTI bank and some foreign banks operating in India are off-branch transactions. For every 100 transactions, 45 are done through ATMs, 25 through phone and Internet and rest 30 through branches. In the case of public sector banks, the proportions may be the reverse: less than 30 % transactions are made through non-branch channels.

Transaction Category of Public Sector Banks

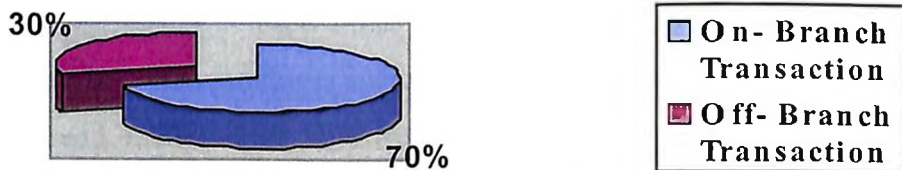


Figure 3.4 Transaction Category of Public Sector Banks

Transaction category of Private Sector banks

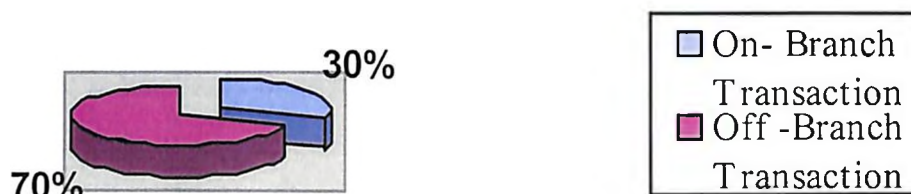


Figure 3.5 Transaction Category of Private Sector Banks

Source : Business Today, Feb'2005

Given the dramatic ability of new channels to reduce the cost of transactions for banks, and the increasing customer demand for convenience, public sector banks exhibit the game of catch-up. Not only are they feverishly increasing the number of ATMs, they are also scrambling to set up robust IT backbones. There is a stampede for core banking solutions (CBS), which help integrate all the customer channels- from branches to ATMs to Internet and mobile banking on a real time basis. Setting up CBS is like changing the engine of an old car. This is what enables a bank to instantly update customer's account and offer seamless service across channels. A customer can draw money from an ATM and use his debit card. A few minutes later, his account will automatically reflect the balance reductions. It also allows customer to call for a chequebook over the phone or IB. Information is instantly transmitted to the central office from where chequebooks are custom printed and dispatched. The CBS strategy varies from bank to bank. For instance, State Bank of India and Bank of Baroda want to reengineer business processes before introducing new technology. But a few other banks prefer to put the technology in place first and change their business processes accordingly. In south, Andhra Bank has avoided the CBS altogether and has opted for a cluster approach for implementing its IT platform. Punjab National Bank is rolling out its CBS at the lightening speed. By March 2004, it rolled out CBS at 500 branches and proposes to extend this up to 1,550 by March 2006. The SBI networked over 2,500 branches and computerized around 14,000 branches- both

own and associate banks. By March next year, it proposes to roll out CBS in 1000-1500 branches. Going global sounds like a big time game but the ground reality is that the public sector banks have to run hard to stay in the same place. ICICI bank, HDFC bank and various foreign banks have invested heavily in several channels simultaneously. This served as a strong customer attraction and retention tool. Once a customer adopt a multi-channel banking, he is less likely to go to a competitor.

3.1.5.1 Strategic upper hand: Comparison among Private, Public and Foreign Banks

While foreign banks were the real pioneers in the ATMs and phone banking, ICICI was probably the first one to use strategic deployment of technology to dramatically increase the access to customers. Starting the subsidiary of financial institutions like, ICICI bank it could not have increased its scale of operations without technology. So it drew up an ambitious plan for putting an enormous number of offsite ATMs during 1990s. Today with nearly 1800 ATMs, some 5.5 m IB accounts and a mobile customer base approaching a million ICICI bank is accessible to customer to all worthwhile retail markets. It's not easy for competitors to lure their customers. In fact there is a demographic shift, with younger salary earners gravitating to technology savvy banks. Customers who might have several bank accounts for the sake of convenience are now pulling their accounts together. As a result, average sizes of net deposits are rising. The dramatic increase in the customer base of new generation private sector banks have even made the foreign banks to sit up and note. Citibank, for example, has encountered by starting Suvidha, which allows ordinary people to bank with them but using technology banking. This helps them keep servicing costs down, simultaneously expanding access to a large pool of customers. For public sector banks, spread across the country, an investment in online and ATMs is more defensive. It was an attempt to avoid losing customers to more aggressive private sector rivals. Their advantage is that since they have a strong networking of branches, putting up ATMs doesn't need additional investment in real estate. Moreover, having come into the technology game late, they are able to buy the latest ATMs and other hardware at cheaper rate compared to the pioneers: The new private and foreign banks had matured their InfoTech architecture as early as

ready in the 1990s. Now as the volume of barriers grows they are reaping the benefits of their investment. To that extent, the public banks are handicapped. But they have the advantage of acquiring the latest technology to grow faster encashing the advantage of branch banking.

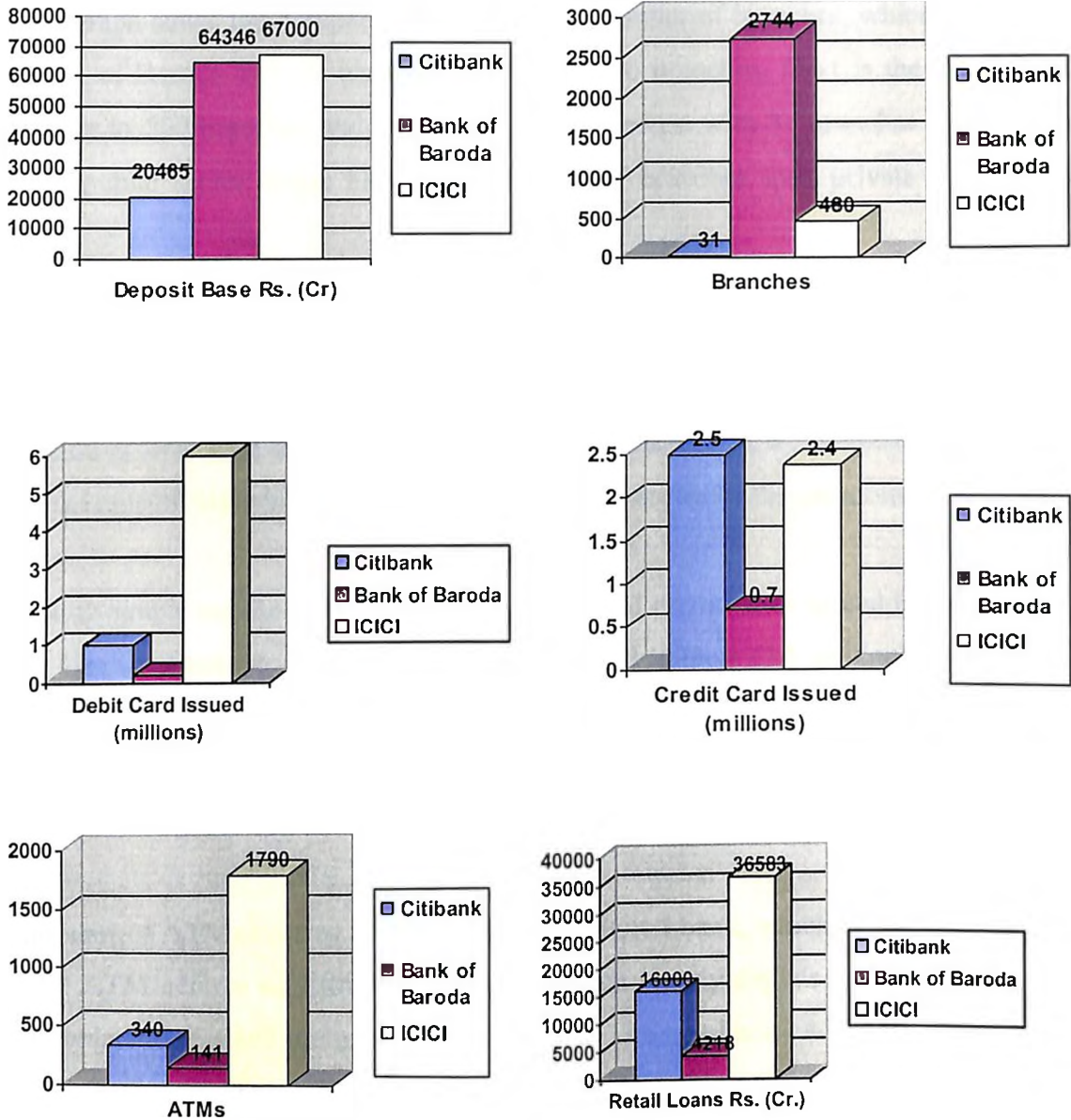


Figure 3.6: Comparing Private, Public and Foreign Banks

Source : Business Today, Feb'2005

3.1.5.2 Interpretation:

- The first graph depicts the current deposit base of the banks mentioned. It shows that ICICI bank has the highest deposit base of 67000 crore rupees. The Bank of Baroda also has a formidable deposit base of 64346 crore of rupees followed by the Citibank with 20465 crore rupees which is nowhere near the deposit base of the other two banks.
- Second graph states the comparison based on the number of branches, which shows that the Bank of Baroda has the highest number of 2700 branches. Next is the ICICI bank with close to 500 branches and the Citibank is the lowest with 31 branches. This shows still the public sector banks have more number of branches over private and foreign banks.
- When the banks were compared based on debit card issued, the third graph lucidly shows that ICICI bank had issued a maximum of 6 million cards to its customers. The distinction is clear with the fact that only 0.5 to 1 million cards were issued by BOB and Citibank respectively which clearly states that private sector banks are more prone to IB.
- The fourth graph has the bars showing the number of credit cards issued by each of the banks. The Citibank has a huge chunk of credit card holders (2.5 million) immediately followed by ICICI bank with 2.4 million customers and HDFC bank with a noteworthy 2 million customers. Bank of Baroda has got the least number of credit card holders (7 Lakhs).
- The number of ATMs centres is close to 1800 for ICICI bank, which is far ahead of 350 and 150 ATM centres of Citibank and BOB, which clearly depicts that still the public sector banks emphasized more on branch network. The number of ATMs for ICICI bank is practically incommensurable and this bank has made great strides in the areas of retail banking, credit and debit cards.
- The last graph shows the retail loans rendered by these banks. The retail loan sanctioned by the banks compared is maximum for ICICI with 36,000 crores. Next is Citibank which

offers 16,000 crores followed by BOB lowest with 4,000 crores.

- Though the Bank of Baroda has a healthy deposit base and a colossal number of branches to its credit, it has really not seen ATM as a revenue maker. It ought to broaden its technological infrastructure in order to vie with its competitors.
- Albeit the Citibank has a very low deposit base, it has topped the number of credit cards issued to its customers and has ventured into retail banking which could promote the bank's growth in the long run.

3.1.6 DATA BASE AND RESEARCH METHODOLOGY

The primary data for the study was collected from some of the major banks in India through the questionnaire followed by on-site and telephonic interview is used as a research methodology. Secondary data were collected from various sources including annual report of Reserve Bank of India (RBI) on banking, web sites of major banks, other economic and banking reports, various surveys, journals and newspapers, sites on the net related with banking like Indian Banking Association, National Institute of Bank Management, archival data, published statistics in Business World, Business standard, indiainfoline, bankersnet.com, bankersindian.com etc and special journals/magazines on the subject as per the list appended. The data collected has been analyzed using Statistical software packages like TSP and Econometric Toolkit. All the web sites of the banks have been explored during this period. The financial data for the purpose of making comparative analysis relates to 2003-04. For the purpose of the study a sample of 82 banks is considered, out of which 25 are foreign banks, 27 are public sector banks and 30 are private sector banks. However, the IB services of some foreign banks which are providing services in India but were are not accessible at their websites due to language problem or the other, are excluded for the purpose of studying. In addition, using univariate statistical analysis, we investigate the profile of banks offering IB relative to other banks with respect to profitability, cost efficiency, and other characteristics.

3.1.7 AN INSIGHT INTO THE INTERNET BANKING IN INDIA

In India, slowly but steadily, the Indian customer is moving towards IB. A number of banks have either adopted IB or are on the threshold of adopting it. The banks started IB initially with simple functions such as getting information about interest rates, checking account balances and computing loan eligibility. Then the services were extended to online bill payment, transfer of funds between accounts and cash management services for corporate. Recently, banks have started to facilitate payment for e-commerce transactions by directly debiting bank accounts or through credit cards. It will add to the revenues of the banks. This study is an attempt to examine the performance of Indian banks in terms of providing banking products and services through their web sites. It also tried to analyze the current state of IB in India and also identifies key differences between Internet banks and non-Internet banks operating in India and to help fill significant gaps in existing knowledge about the IB landscape. We use the term “Internet bank” (I-banks) to mean a bank offering its customers the ability to transact business with the bank over the Internet. We do not confine the term to Internet-only or “virtual” banks, as this kind of bank is not present in India. Customer transactions on the Internet can be as simple as online balance inquiry or credit application, but can also include such services as electronic bill presentment, insurance, and brokerage. “Non-Internet banks” (non I-banks) refer to banks that do not offer transactional IB, even if they have a Web site.

In order to find out the overall impact of Internet banking on the Indian banking sector, we have developed few hypotheses, which will try to test the issues discussed above.

3.1.7.1 Hypotheses:

Hypothesis 1:

Newly setup private sector banks are likely to go for IB and existing banks would turn to fully transactional Internet services

Hypothesis 2

Larger the bank, more likely to choose to offer IB services.

Here the word larger means the bank being bigger in terms of the assets it has, the no. of employees working in the bank and the size of the deposits. This hypothesis can be supported by the following data.

Hypothesis 3

Banks with relatively high on recurrent expenses on fixed assets and premises is more likely to offer IB.

Hypothesis 4

New generation banks will probably go for IB as they have higher Return on equity, accounting efficiency and Return on assets.

3.1.7.2 Profile of Banks:

India has 30 private sector banks (21 old and 9 new), 27 public sector banks and 25 foreign banks operating in India. The chapter studies the current state of IB services offered by private, public and foreign banks operating in India. Most of the banks are having websites. However, only 37 banks are providing transactional banking services in one form or the other. Table 3.3 and 3.4 shows the adoption rates of the Internet banks.

Banks	No.
Banks with Websites	65
Banks with Transactional Sites	37

Table 3.3: Profile of Indian Banks

Source: Websites of the individual banks available at www.banknetindia.com/banklinks.htm

3.1.7.3 Adoption Rates of Internet Banks:

Type of Banks	No. of Banks	No. of banks with websites	No. of banks with Transactional sites
Private Sector Banks	30	26	14(46.6)
New	9	9	8(88.8)
Old	21	17	6(28.5)
Public Sector Banks	27	23	13(48.1)
Foreign Banks	25	16	10(40.0)
All Banks	82	65	37(45.1)

Table 3.4: Adoption Rates of Internet Banks

Source: www.rbi.org.in

From the data given below it is clear that almost all the private sector banks have websites and around 88.8 percentages of them are transactional websites.

3.1.7. 4 Classification of Internet banking websites:

Type of Banks	Entry Level websites*	Transactional Websites		Total no. of Bank websites
		Partly Transactional**	Fully Transactional***	
Private Sector	12	5	9(30.0 %)	26
Public Sector	10	8	5(18.5 %)	23
Foreign Banks	6	1	9(36.0 %)	16
All Banks	28	14	23(28.0 %)	65

Table 3.5: Classification of Internet banking websites

Source: www.rbi.org.in

In the table, * indicates Entry Level Internet Banks include those banks that are not providing any transactional service,

** Partly transactional Internet banks include those banks providing less than BASIC services and

***Fully transactional Internet banks include those banks providing BASIC plus PREMIUM services of IB.

Figures in bracket denote the percentage of number of fully transactional web sites to total number of commercial banks in India.

As evidenced from Table 3.5, total number of banks offering IB services in one form or the other are 37, however, only 23 banks provide IB in true sense. Out of total public sector banks nearly 18 percent banks offer fully transactional banking services while in the case of private sector a good number (9 of 12) of them are fully transactional i.e. 30 percent of them and 36 percent of foreign banks are offering fully transactional IB services. It can be seen from the above data that the extent of IB is more in the case of private banks than other banks and the banks having Internet services are mostly providing fully transactional services, which substantiates our hypothesis.

3.1.7. 5 Position of Foreign Banks providing Internet banking services in India:

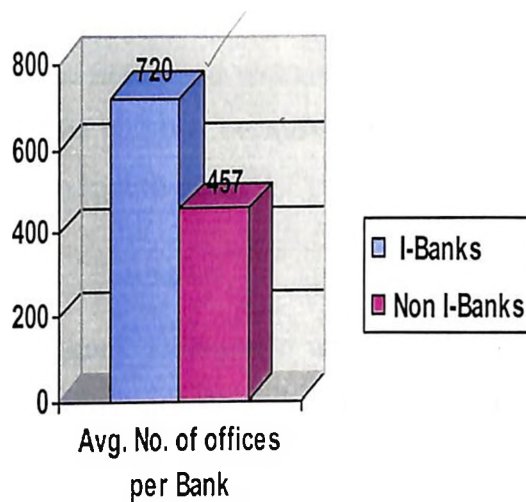
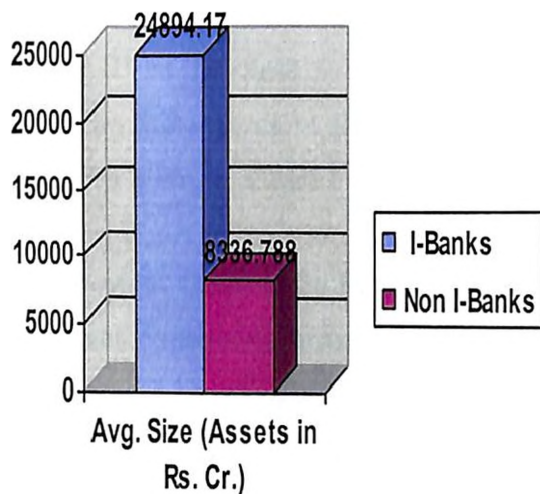
No. of Banks	Banks with Websites	Accessible Websites of I-Banking in India
25	16	10

Table 3.6: Position of Foreign Banks providing I-Banking services in India

Source: www.rbi.org.in

There are 25 foreign banks offering IB services in different countries in one form or the other. However, the IB services of some foreign banks out of 16 that are providing IB services in India were not accessible through their websites either due to language problem or the other. As out of the 10 banks offering IB services in India 9 are fully transactional banks.

3.1.7. 6 Comparison of Key Attributes of I-Banks and Non-I banks:



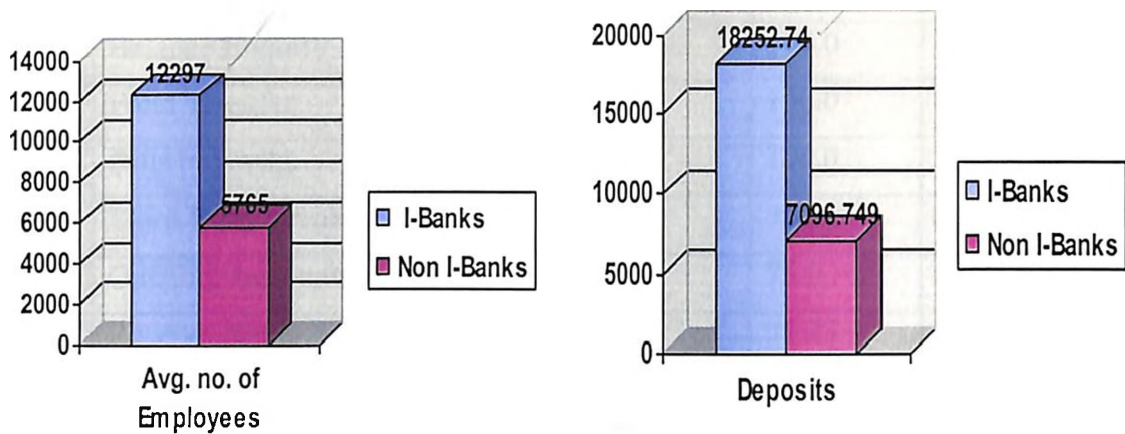


Figure 3.7: Comparison of Key attributes of I-Banks and Non-I banks

The graph shows that I- banks have about 24894.17 Cr of assets compared to 8336.78 Cr of the non I- banks. The I-banks are larger in terms of the no. of employees (12297) compared to the 5765 of the non I-banks. The deposits handled by the non I-banks (7096.74 Cr) are much less in comparison with the 18252.74 Cr of deposits handled by I-banks.

As a group, I-banks had on average 198 percent more assets, 113 percent more employees, and 58 percent more offices and 157 percent more deposits than non I- banks.

From the above data it is evident that larger the bank it is more advantageous for the bank to go for IB as the costs will be divided upon all the assets and work will be simpler to handle. But this statement shouldn't be mistook to the fact that because bank is larger, it is going for a larger extent of e-banking in proportion to its assets.

3.1.7.7 Services Offered by Internet Banks

IB involves consumers, using the Internet to access bank accounts to undertake banking transactions. At the basic level, IB can mean the setting up of a web page by a bank to give information about its product and services. At an advance level, it involves facilities of accessing accounts, funds transfer, and buying financial products or services online. This is often called "transactional" online banking the range of services offered by transactional Internet Banks (expressed as percentage of total transaction).

Service Code	Types of Service	All Banks	Foreign Banks	Private Banks	Public Banks
1	Balance Enquiry	95.5	100.0	93.3	92.3
2	Fund Transfer	77.3	100.0	86.7	38.5
3	Bills Payment	75.0	100.0	73.3	46.2
4	Third Party Transfer	45.5	50.0	53.3	30.8
5	Opening Accounts	40.9	75.0	26.7	15.4
6	Receive Alerts	29.5	31.25	40.0	15.4
7	Requests and Intimation	79.5	68.75	93.3	76.9
8	Cash Management Online	9.1	6.25	6.7	15.4
9	E-Shopping	38.6	43.75	53.3	15.4
10	Credit Card Payments	22.7	31.25	13.3	23.1
11	Standing Instructions	81.8	68.75	93.3	84.6
12	Loan Applications	29.5	43.75	33.3	7.7
13	Customer Correspondence	100.0	100.0	100.0	100.0
14	Insurance	6.8	12.5	6.7	3.0
15	Demat Holding	25.0	18.75	53.3	23.4
16	Brokerage	4.5	6.25	6.7	3.0
17	Investments	28.7	37.5	26.7	11.0
18	Online Remittance of Fund	11.4	12.5	20.0	0.0
19	Tax Advisory Services	13.6	6.25	6.7	0.0
20	Financial Planning	34.1	56.25	40.0	0.0
21	Linking A/cs Online	4.5	6.25	6.7	0.0
22	Market News Online	6.8	12.5	6.7	4.0
23	Trading Online	16.2	21.0	26.7	14.0
24	Foreign Exchange Trading	2.3	0.0	6.7	2.0
25	Foreign Exchange Rates Update	27.3	50.0	20.0	7.7
26	Tds enquiry	9.1	6.25	20.0	0.0
27	One View A/c	4.5	6.25	6.7	0.0

Table 3.7: Range of Services Offered by Transactional Internet Banks (Contd..)

Service Code	Types of Service	All Banks	Foreign Banks	Private Banks	Public Banks
28	Net Worth Statement	4.5	12.5	0.0	0.0
29	Demonstration of I- Banking	65.9	75.0	60.0	61.5
30	Privacy Statement	84.1	87.5	100.0	61.5
	BASIC	68.2	100.0	66.7	30.8
	PREMIUM	68.2	100.0	66.7	30.8

*BASIC includes balance enquiry, funds transfer and bill payment.

**PREMIUM includes BASIC and at least three other services.

Table 3.7: Range of Services Offered by Transactional Internet Banks

Source: www.rbi.org.in

As shown in Table 3.7, nearly 68 percent of the transactional banks provide BASIC services of IB, 96 percent provide account balance enquiry service and more than 70 percent offer the services of funds transfer between accounts and electronic bill payment. However, foreign banks are likely to provide these services more effectively as compared to private and public transactional banks. Majority of foreign and private banks provide third party funds transfer facility in contrast to public banks.

A look at IB services beyond the above services reveals the pattern of services offered by banks of different categories. If the services of customer correspondence are concerned, there are hardly any differences among the banks. Nearly 41 percent of the banks provide service for new account set up. However private and public banks lag behind foreign banks in providing these services. Similarly, in respect of the services of online trading, demat holdings and e-shopping, private banks out performed foreign and public banks. It is the determinant of how the private sector banks compete with the foreign and public banks for business customers.

It also contains information on the extent to which particular business loan applications, credit card payment, financial planning, online insurance, brokerage, linking of accounts

(one can view all the accounts in the same bank in one statement) market news and net worth statement investment trading- were offered online. A number of foreign banks offer these services in contrast to private and public sector banks. However, foreign transactional banks are inefficient in providing the services like demat holdings, e-shopping, standing instructions, requests and intimations. There are some new IB services offered by foreign banks including recurring transfer of funds between the accounts, along with the net worth statement to the customers. The position of public sector banks is not very good in case of providing the range of Internet services and products. Some public sector banks are inefficient in providing the services of demat holdings, brokerage, Investments, online remittance of funds, tax advisory service, financial planning, linking a/cs, online market news, online trading, foreign exch. trading, tds enquiry, one view a/c and providing net worth statement.

Nearly 75 percent of the foreign transactional banks provide demonstration of IB on websites, while 60 percent of private and 62 percent of public banks did so. All banks provide customer correspondence for the purpose of gaining new and retaining existing online customers. To get a clear range of Internet services available at banks of different sizes, two menus of IB are defined, as already mentioned earlier in the chapter viz, Basic and Premium. Foreign banks are offering Basic as well as Premium IB services. Around 67 percent of the private transactional banks and 31 percent of public transactional banks offer Premium and Basic IB services.

An issue of concern for adoption of IB presently is the level of security or risk associated. Both banks and customers stand to benefit from the collection and integration of large amounts of personal information over the Internet that enhance the ability of the banks to offer a wide range of products according to individual demands. But the collection, analysis and distribution of information raise questions related to protecting personal privacy. A fundamental step that many banks are taking to address on-line privacy is to post a statement of their policies about the collection and use of customer information. The database includes information on the number of transactional banks that had such a statement on their sites. The above table also shows that most of the transactional banks

included a privacy policy statement on their sites. Indeed, all the private sector banks include privacy statement on their sites and 88 percent of foreign banks and 62 percent of public banks did so.

3.1.7.8 Internet Bank and Non-Internet Banks: Comparison of Performance

This study makes use of univariate comparisons between I-banks and non-I bank characteristics for 2003-2004 data and the difference between them exist in terms of funding, sources of income and expenditures and measures of performance. For each pair of observations in a table, a probability (p) value is provided for the hypothesis. A lower p-value indicates a greater likelihood that the two figures compared represent real differences between categories of banks studied. (Internet vs. non-Internet etc.).

3.1.7. 8.1 Income and Expenses:

	Non-Traditional Income (%)	Expenses (%)	
	Non Interest Income/ Net Operating Revenue	Premises & Fixed Assets/Net Operating Revenue	Staff expenses to operating expenses
Private Sector Banks			
Internet Banks	52.8	68.5	47.3
Non- Internet Banks	44.1	24.1	67.8
p-value	(0.51)	(0.11)	(0.31)
Public Sector Banks			
Internet Banks	37.3	47.4	62.1
Non- Internet Banks	36.4	21.8	73.0
p-value	(0.31)	(0.46)	(0.41)
Foreign Banks			
Internet Banks	46.0	30.5	31.0
Non- Internet Banks	33.5	41.2	37.0
p-value	(0.36)	(0.36)	(0.49)
All Banks			
Internet Banks	42.0	38.1	56.3
Non- Internet Banks	36.7	21.0	69.0
p-value	(0.44)	(0.48)	(0.39)

Table 3.8: Comparison of financial performances of Indian Banking

Source: www.rbi.org.in

In the Table 3.8 the numbers in parentheses are p-values for the difference of means tested for Internet and non-Internet bank values in each cell. Non-Internet banks are those banks with non-transactional web sites.

First column shows the ratio of non-interest income to net operating revenue, which is a rough proxy for the amount of revenue generated by non-traditional activities. I-banks generated substantially, around 42% of their income from non-traditional activities compared to non I- banks. This pattern is consistent with a strategy of using the Internet to target businesses for affluent consumers. It is believed that, these customers are interested, not only in loans but also, in other services yielding further avenues.

Banks maintaining their branch networks may be expected to have the greatest incentive to adopt IB. The findings are consistent with the hypothesis, public and foreign banks spent less in building and equipment compared to their net operating revenue. Among private I-banks, these expenditures were higher for non I-banks. Difference may indicate that, private sector banks with high costs of maintaining a branch network are motivated to adopt IB by the prospect of future cost savings. Most of the Private Internet banks were established after the liberalization process started in 1991. Newness may also be the reason for high cost of building and equipment expenditures. Further research can establish whether IB is likely to reduce costs associated with physical branch networks, and whether relatively high branch-related expenses are a causal factor in the adoption of IB.

Large banks with lots of branches spend lot of money on the recurrent expenditure on the physical assets like the rent for the premises, electricity and other routine maintenance charges. Banks can avoid all these expenses by having a centralized facility providing IB which will be beneficial for the bank as well as the customers. Though the initial cost for the setup of these facilities may be more, but on a long run the savings on the recurrent expenditure would be much more. In the data given above I-banks in all the sectors have higher expenses on premises and physical assets but at the same time staff expenses are lower for I-banks in all the three sectors. Banks going for IB can reduce their staff

expenses as the physical requirement of staff is reduced and the work is computerized, staff expenses will automatically reduce. In the case of staff expenses to operating expenses it is relatively higher in Public banks in contrast to Private and Foreign sector banks as still in public sector banks the policy is more of labor intensive. The high staff expenses are because of more number of branches that require more administrative staff to control. But if the banks go for IB they need to have more of technical staff as compared to clerical and administrative staff.

3.1.7.8.2 Performance Analysis:

Table 3.9 compares profitability, accounting efficiency and Return on assets of I-banks and non I- banks.

	Profitability (%) Return on Equity (ROE)	Accounting Efficiency (%) Non Interest Expense to Net Operating Revenue	Return on Assets (ROA)
Private Sector Banks			
Internet Bank	19.0	44.2	1.97
Non Internet Bank	16.6	31.0	0.74
P- value	(0.28)	(0.54)	(0.37)
Public Sector Banks			
Internet Bank	13.4	48.0	0.96
Non Internet Bank	14.7	50.2	0.58
P- value	(0.64)	(0.61)	(0.49)
Foreign Banks			
Internet Bank	17.0	47.5	1.72
Non Internet Bank	0.2	52.4	0.38
P- value	(0.26)	(0.62)	(0.42)
All Banks			
Internet Bank	19.2	51.3	2.32
Non Internet Bank	18.3	51.1	0.97
P- value	(0.38)	(0.61)	(0.46)

Table 3.9: Performance Analysis of Indian Banks

Source: www.rbi.org.in

Numbers in parentheses are p-values for the difference of means for Internet and non-Internet bank values in each cell.

Non-Internet banks include banks with non-transactional Web sites.

It can be seen from the above table that the I-banks in the private sector have better ROE, ROA and accounting efficiency when compared to the Non -I Banks in the same sector. Private Banks would opt for IB as they would view it as a way of improving their profits and this fact is supported by the above data. Both Private and Foreign I-banks are more profitable than non-I banks. Whereas I- banks in public sector are less profitable than non-I banks. However I- banks in public and foreign sector also are less efficient than non-Internet banks, as measured by the ratio of non-interest expense to net operating revenue (i.e. accounting efficiency), a commonly used measure of cost efficiency. Public and Foreign I- banks are low on the accounting efficiency compared to the non I-banks in those sectors. If the Public and Foreign I-banks can increase their accounting efficiency it will be beneficial for them also to go for IB as they are already doing good in Return on Assets and Return on Equity.

3.2 COBB-DOUGLAS ORIENTED APPROACH

In this section two important issues have been analyzed. Have investments in e-initiative increased productivity in the banking system in India? And Have investments in e-initiative improved Indian bank's profitability. The first question asks whether e-Business has enabled the banking system in the country to produce more 'output' for a given level of 'input'. The second question considers whether banks are able to use e-Business to gain competitive advantage and earn higher profits than they would have otherwise. A number of studies have used the theory of production approach to evaluate the productivity of e-Business investment. By assuming a production function, it is possible to econometrically estimate the contribution of each input to total output in terms of the gross and net marginal product. Following Hitt and Brynjolfsson (1996) and Prasad and Harker (1997), the following two productivity-oriented testable hypotheses can be derived:

H1: e-Business investment makes positive contribution to output (i.e., gross marginal product is positive)

H2: e-Business investment has zero net marginal product, after deducting all costs.

Analysis of e- Business initiatives, will be tested through a **Production Function** for the above listed Banks for the period 1999-2004. The estimation of the impact of e-Business investment has been approached in three different ways: production function estimation, growth accounting and applied growth theory. As cost-benefit analysis of e-Business investment is difficult to perform due to the absence of measures of actual benefits of IT/e-Business investment, production functions that relate IT-investment to overall productivity or output measures are seen as the best alternative. This has led to an extensive use of production theory in the e-Business investment. Using this theory, each firm is modeled by a multifactor production function $y_t = P(x_1(t); \dots; x_k(t))$, where $x_1(t), \dots, x_k(t)$ are the k inputs used to produce value added output of a firm in time t.

Very few studies analysed the contribution of the IB to the productivity in the banking sector. Most of the research confirmed the positive contribution of the IT investment to the productivity of organisations and countries. There has been a debate on whether the investment in IT resulted in enhanced productivity. Some works demonstrated both at the industry level (Jorgenson and Stiroh, 2000) and at the firm level that there is a positive contribution from IT investment toward productivity. Following a similar methodology on the relationship of IT investment and productivity at the industry level (Brynjolfsson and Hitt, 1996; Prasad and Harker, 1997; Black and Lynch, 2001) few studies estimated a standard Cobb-Douglas production function with cross-sectional data. Few research studies paid attention to the IB relationship with productivity in the banking sector: At the theoretical level, Litan and Rivlin (2001) summarised how the Internet has the potential to increase productivity growth including the reduced transaction costs, increased management efficiency especially in the supply chain, increased competition which will force the banks to be more productive in order to be competitive, increased effectiveness of marketing and pricing, and finally increased customer choice, convenience and satisfaction.

To analyse the productivity relationship with IT investments in the banking sector it is decided to employ a Cobb-Douglas oriented approach which is the most widely used

methodology in analysing the relationship between Information Technology and Productivity:

$$Y = F(C_{IT}, C_{NIT}, L_{WEB}, L_{NWEB}, j) \quad (3.1)$$

Where Y is the output of the firm, C_{IT} is e-business capital, C_{NIT} is non-e-business capital, L_{WEB} is e-business labour, L_{NWEB} is non e-business labour and j is the bank in banking sector. Total labour is separated into e-Business labour and non e-Business labour. The former include all those involved in the design, implementation, and operation of telematics based systems for production activities. The latter group includes product and service specialists and general support staff. Similarly, capital data is divided into e-Business capital and non e-Business capital. e-Business capital includes all production computer systems, peripherals, communication systems, and software. The cost of system development, physical operation, and maintenance is also included in e-Business capital. Non e-Business capital includes the rental costs of all premises, non-data processing office fixtures and equipment, and all other miscellaneous operating expenses.

Then estimate the output elasticities of the factors included in equation 1 employing the following expression:

$$Q = e^{\beta_0} C_{IT}^{\beta_1} K_{NIT}^{\beta_2} L_{WEB}^{\beta_3} L_{NWEB}^{\beta_4} \quad (3.2)$$

Where β 's are the associated output elasticities. β_1 is the output elasticity of the e-business capital and β_3 is the output elasticity of the e-business labour.

The empirical analysis of the contribution to productivity of the IB on the augmented Cobb-Douglas function expressed in logarithmic including an additive error:

$$\log Y = \beta_0 + \beta_1 \log C_{IT_HARD} + \beta_2 \log C_{IT_SOFT} + \beta_3 \log C_{NIT} + \beta_4 \log L_{WEB} + \beta_5 \log L_{NWEB} + \mu \quad (3.3)$$

Equation 3.3 does not allow the analysis of the interaction effects between C_{IT} and L_{WEB} as well as the analysis of the increasing or decreasing effects of the contribution of e-business labour to productivity.

Consequently also estimate that contribution implementing the functional form defined by Goss (2001):

$$\text{Log } Y = \beta_0 + \beta_1 \log C_{IT} + \beta_2 \log C_{NIT} + \beta_3 \text{NET} * \log C_{IT} + \beta_4 \text{NET}^2 * \log C_{IT} + \beta_5 \text{NET} + \beta_6 \text{NET}^2 + \beta_7 \log L_{TOTAL} + \varepsilon \quad (3.4)$$

Where NET is a measure of the e-business labour usage

3.2.1 VARIABLE CONSTRUCTION IN THE COBB-DOUGLAS APPROACH

First we defined the output variable as the net output of the bank. We obtained the data from RBI report, Business today database and Individual Banks database. Because of lot of missing data in the databases and in the survey collected data, our sample was restricted to some banks only, which provided complete information on the net output, investment on IT and Internet working hours.

C_{IT} is defined as the part of the capital stock represented by IT investments, including within this category the hardware, the software and communications investments corrected by depreciation and price inflation.

Using the approach of Brynjolfsson and Hitt (1996) C_{NIT} non e-business capital which is defined as the difference between the capital stock and C_{IT} . This includes the rental costs of all premises, non-data processing office fixtures and equipment, and other miscellaneous operating expenses.

L_{WEB} is defined as the stock of e-business labour of a bank which makes use of the Internet. We corrected this estimation by the number of work hours the employees make

use of the Internet for personal and not related with work businesses. L_{NWEB} non e-business labour is defined as the difference between the annual work hours employed in a firm and L_{WEB} . Finally, for NET we used the same definition as Goss (2001), the percentage of e-business labour.

3.2.1.1 Control Variables:

We used cross-section data and consequently couldn't reflect the bank fixed effects usually studied through panel estimations. This is a strong limitation of our work, nevertheless and in order to alleviate this problem we included a number of control variables. First, we included the Industry using dummy variables. Second, we included R&D activities as a dummy variable that took a value equal to one when a bank had developed any R&D program. The third control variable we included in our model was employee training in Information Technologies. For this variable we constructed two items representing respectively, the IT training level of non IT employees and the IT training level of IT employees.

3.2.1.2 Sample description:

Our empirical research was based on two main data sources:

A personal survey was done to a nationally representative sample of 13 banks (6 Public sector+4 private+3 foreign banks). The target respondent was the IT specialist and in case this position does not exist in the bank, then the manager who is looking in that area. The survey collected data on the IT of the banks, including the level of investment, the specific technologies implemented or the diffusion of the technologies. Personal interviews were used to administer each survey. Before the survey took place, we collected some financial information from the Business Today, Business India database on the banks, basically the net output, and the adjusted stock capital. Because of missing data of some of the banks both in the database and in the survey collected data, our sample was restricted to the 13 banks only, which provided information on the net output, e-business capital and e-business labour.

The cross section OLS estimation of an augmented Cobb-Douglas production function is:

$$\log Y = \beta_0 + \beta_1 \log C_{IT_HARD} + \beta_2 \log C_{IT_REST} + \beta_3 \log C_{NIT} + \beta_4 \log L_{WEB} + \beta_5 \log L_{NWEB} + \beta_6 R\&D + \beta_7 \text{training_IT} + \beta_8 \text{training_rest} + \mu \quad (3.5)$$

The production theory proves or shows that e-Business will create benefits by reducing production costs for a given level of output. In order to analyze the impact of e-business investment, the production approach has also been used for testing the two productivity based hypotheses mentioned below.

3.2.1.3 Estimation Results:

In this analysis, output is taken to be the sum of total loans and deposits (Table 3.10(a)). The coefficients of e-Business capital and e-Business labour are positive and statistically significant. This provides support for the H₁ hypothesis, which states that e-Business investment makes positive contribution to output. The coefficient of non e-Business labour is also positive and statistically significant. The marginal product of e-Business labour is highest at 5.79 followed by that of e-Business-capital at 3.84. The marginal product of non e-Business labour is 1.85. These figures indicate that each one of these three variables is associated with increase in the output of the bank. For instance, with every rupee invested in e-Business labour, output increases by Rs. 5.79. The fact that both e-Business and non e-Business labour coefficients are statistically significant is perhaps reflective of the Indian banking industry where the emphasis on service delivery means that labour is considered to be a highly worthwhile investment.

Variable	Coefficient	Ratio to output	Marginal product
(a) Dependent variable: total loans + total deposits			
e-Business capital	0.0148 (4.22)	0.0039	3.84
e-Business labour	0.0178 (3.21)	0.0028	5.79
Non- e-Business capital	-0.0098 (1.80)	0.0026	-3.48
Non- e-Business labour	0.0167 (3.34)	0.0086	1.85
Adj. R ² =0.60 (OLS)			
99 per cent (2-step WLS)			
(b) Dependent variable: Net Income of Bank			
e-Business capital	0.0086 (3.02)	0.0058	1.46
e-Business labour	0.0058 (2.56)	0.0021	2.67
Non- e-Business capital	0.0019 (1.04)	0.0016	1.36
Non- e-Business labour	0.0136 (2.94)	0.0052	2.72
Adj. R ² =0.51			
99 per cent (2-step WLS)			

Table 3.10: Productivity based analysis

The reported results are obtained with 2-step Weighted Least Squares (2SWLS).

The figures in parentheses are the absolute values of the t-statistics.

Non e-Business capital has the negative sign and is statistically insignificant. Given the negative productivity with investment in non e-Business capital, we find no support for hypothesis H₁ and conclude that non e-Business capital investment impacts negatively on bank productivity. The rejection of hypothesis, H₁ for non e-Business capital means that we can also reject the stronger hypothesis H₂ for this variable. As both the e-Business and non e-Business labour are flow variables, every rupee of e-Business and non- e-Business

labour costs a rupee. With positive excess returns, the hypothesis H_2 cannot be rejected for the labour variable.

As far as H_2 is concerned with capital expenses, the marginal product of e-Business capital is positive while that of non e-Business capital is negative. Hence the calculated value will be positive indicating that we cannot reject H_2 for e-Business capital.

Table 3.10 (b) shows the case where net income is used as the output. The results are qualitatively similar to those reported in Table 3.10 (a). IT-capital and labour have a statistically significant impact on bank productivity; while non-IT capital has a statistically insignificant impact. Hypotheses test results are again similar to those described in Table 3.10(a).

The non e-Business labour marginal product is 2.72 which is higher than the e-Business labour's marginal product value (2.67). This shows that non e-Business labor is broadly defined and it includes more number of product and service specialists, and general support staff. The employment of non e-Business labour is higher in the beginning of IB as they require more of general staff than the specialist because most of the banks that started offering IB services have established after liberalisation. For maintaining their traditional branch network they require to have more of general staff but after some period of time the e-Business labor will definitely increase. The increases in Net income of the bank or the amount of the other input i.e. e-Business labour, increases the marginal product of a non e-Business labor, also more capital makes labour more productive at the margin.

Thus it can be concluded that investment in e-Business capital and e-Business labour have definitely led to an increase in productivity in the banking sector.

Dependent Variable: LOGY				
VARIABLE	COEFFICIENT	S.E.	T Statistic	PROB.
C	3.9	0.38	8.72	0
LogL _{WEB}	0.16	0.04	6.41	0
LogL _{NWEB}	0.17	0.06	4.25	0
LogC _{IT_Hard}	0.07	0.03	3.22	0.01
LogC _{IT_Rest}	0.03	0.02	2.56	0.03
LogC _{NIT}	0.3	0.03	6.67	0
R&D	0.7	0.16	3.99	0
Training_IT	0.23	0.08	2.91	0.01
Training_Rest	0.16	0.08	1.95	0.08
R ²	0.67	F Statistic		56.43
Adjusted R ²	0.65	Prob(F Stat.)		0.00
S.E. Regression	0.74	Log Lik.		-400.72

Table 3.11: Output Elasticities of various Control Variables

The results reported in Table 3.11, confirm hypothesis 1, being β and β_2 are positive and significant and representing a positive contribution of e-business capital to productivity. Precisely, the output elasticity of e-business hardware Capital is 0.0700 ($P < 0.05$) and the output elasticity of e-business Rest Capital is 0.0295 ($P < 0.05$). Also the contribution to output of the Internet work hours is positive and significant with an output elasticity of 0.159197 ($P < 0.001$), confirming also the Hypothesis 2. These results are in line with what was found in other researches which employed a similar methodology

None the less the C_{IT} coefficient in this first regression is slightly larger than the coefficient in similar studies. One possible reason for this larger coefficient is the different construction of the C_{IT} variable. Elasticities of C_{NIT} and L_{NWEB} are also positive and significant. We realized that the coefficient for L_{NWEB} is slightly larger than the coefficient for L_{WEB}, implying that non Internet hours are more productive than Internet hours, even after adjusting L_{WEB} for the hours of Internet effective work. This result poses the question on whether the Internet is a productive technology and if not, why this

technology does not contribute to the productivity growth as expected. The addition of the output elasticities of the production factors (β_1 to β_5) is 0.59, which is significantly different from 1 ($p < 0.01$), implying decreasing scale returns. Finally, the coefficients of the control variables were in line with what was expected: It is observed that banks with R&D activities and banks with IT training programs for IT employees are more productive, while IT training programs for the rest of employees have not significant contribution to productivity ($p = 0.0802$). Probably, IT training programs to IT employees is a proxy for more complex and more productive information technologies. This effect, not only reflects different network externalities, but what is more important in this research also different patterns of heterogeneity in the benefits derived from the information technology adoption. Adjusted R^2 is 65%, which is a reasonably good value taking into account that this study is very limited by its cross-sectional and not panelled nature, which prevents our model from capturing the idiosyncratic aspects of banks.

3.2.1.4 Biases of estimations:

From an econometric point of view, the results reported above have some limitations. First, Table 3.11 shows in most estimations of Cobb-Douglas production functions (Kennedy, 1985), this study also suffered of multicollinearity, which would not produce biased estimations, but still will affect the standard error.

	LogQ	LogC _{IT}	LogC _{NIT}	LogL _{WEB}	LogL _{NWEB}	Train. IT	Trai. Rest
LogY	1.000						
Log C _{IT}	.562**	1.000					
Log C _{NIT}	.690**	.674**	1.000				
LogL _{WEB}	.508**	.381**	.390**	1.000			
LogL _{NWEB}	.694**	.495**	.629**	.477**	1.000		
Train.IT	.237**	.152**	.149**	.125**	.164**	1.000	
Train.Rest	.211**	.215**	.139**	.277**	.128**	.115*	1.000
R&D	.345**	.171**	.261**	.170**	.244**	.114*	.134**

Table 3.12: Correlations

A second problem was heteroskedasticity. This problem is solved by using White estimators, related to the heteroskedasticity, another typical problem in the estimation of production functions was the endogeneity between output and production factors: An increase in the level of factors would yield an increase in output, but is also possible that an increase in output produces an increase in the level of factors. The endogeneity problem is corrected by applying the Hausman test in the version of Davidson y MacKinnon (1989, 1993), namely using auxiliary regressions. We suspected that C_{IT} and L_{WEB} were endogenically correlated to the output. If this was true, the estimations reported in Table 3.12, were biased and not consistent. To contrast the endogeneity problem we needed to define a set of instruments correlated with the suspicious variables but not correlated with the error term in equation 3.5.

Attending to correlations the Instrument we selected for CIT was the existence of Electronic Interconnection with trading partners (Dummy variable, which takes value 1 when the bank is interconnected with trading partners through EDI) and correlation with $\log C_{IT}$ is 0.14 ($p=0.002$) and with the error term is 0.077 ($p=0.097$) and the instrument selected for L_{WEB} was the existence of web site of the bank (Dummy variable, which takes value 1 when the bank has a web page) and correlation with $\log L_{WEB}$ is 0.337 ($p<0.001$) and with the error term in equation 3.5 is 0.006 ($p=0.898$). Results from Hausman test show that it is not possible to reject the hypothesis that both C_{IT} and L_{WEB} are not endogenous. Consequently, the OLS estimations reported are still applicable.

Finally, the estimation of the production function of Goss (2001) is done. This function reflects the interaction effects between the investment on e-business Capital and the Internet usage. Doing this analysis we search for potential complementarities among these two variables. Moreover the estimation of the Goss function let us study the increase or the decrease of the marginal productivity of the Internet depending on the levels of the Internet usage. Results of this estimation are reported in following Table 3.13.

Dependent Variable: LOGY				
White Heteroscedasticity Estimations				
VARIABLE	COEFFICIENT	S.E.	T Statistic	PROB.
C	2.08	0.35	5.89	0
LOGL _{TOTAL}	0.39	0.04	10.6	0
LOGC _{IT}	0.07	0.03	2.59	0.01
LOGC _{NIT}	0.19	0.03	7.14	0
NET*LOGC _{IT}	-0.5	0.36	-1.51	0.13
(NET ²)*(LOGC _{IT})	0.63	0.5	1.28	0.2
NET	3.86	1.18	3.28	0
NET ²	-4.6	1.53	-3.02	0
Training _{IT}	0.23	0.07	3.28	0
Training _{Rest}	0.12	0.07	1.72	0.09
R&D	0.64	0.15	4.38	0
R ²	0.66	F Statistic		67.68
Adjusted R ²	0.65	Prob(F Stat.)		0.00
S.E. Regression	0.71	Log Lik.		-492.96
Square Resid.	227.43			

Table 3.13: Quadratic and Interaction Effects of Internet Productivity

First result we observed in this estimation is that there are not significant interaction effects and complementarities between the e-business Capital (C_{IT}) and the Internet usage (NET). The second important result from this estimation is the decreasing marginal productivity of the Internet: In fact the variable NET^2 has a negative and significant coefficient ($p=0.0026$). The usage of the Internet for work related tasks increases the output until a given level of Internet usage (in our sample, $NET=0.8351$ or the 83.51% of the total hours), above this point the Internet makes a decreasing contribution to output. The findings suggest that the potential enhancement of production due to the Internet is quite large. The Cobb-Douglas function approach adopted to perform the analysis leads

to the following major conclusions. First, the research verifies the positive contribution of e-business investment toward the productivity which confirms the results found in previous literature. More innovative are the results related to the disaggregation of IT investment into hardware, software and communication investment. The results of our empirical analysis also show how banks investing in hardware technologies would have a greater impact on revenues than banks investing in software and communication technologies. Therefore the main productive leverage is given by hardware limiting the software and communication just to a marginal influence on productivity. According to this result banks considering the return of an investment in IT will prefer to devote their budgets to hardware rather than to software and communication technologies. The conclusion is related to the contribution of the Internet toward productivity. By this empirical research we confirm that the Internet has a positive contribution to the productivity of the bank. We also found that this contribution decreases as long as the usage of the Internet at work increases resulting thus in decreasing marginal productivity. But perhaps the most shocking result is that non-Internet hours are more productive than Internet hours. Indeed, employees are more productive at work when they do not use the Internet than when they use it. This result is quite surprising, especially because in the estimation of Internet hours at work -we have already corrected for those hours the employees used the Internet at work but for personal duties.

3.3 CONCLUSION

The Indian Banking industry is going hand by hand with the technology. e-business which has changed the way of doing business has a greater impact on the way the banking is being done in India. The tremendous advances in technology and the aggressive infusion of IT had brought a paradigm shift in banking operations. For the last 10 years, technology has been the driving force in the Indian banking industry. As foreign and private banks poured huge sums of money to counter the branch advantage of public sector banks, they discovered that technology gives them a large competitive advantage. The coming years will be seen even more investment in banking technology, but reaping ROI will call more for strategic thinking. For banks it's a way to achieve higher

efficiency, control of operations, productivity and profitability. In order to compete private, foreign and public banks have adopted IT with a lightening speed. Now the technology has become another name of banking in terms of ATMs, I-Banking, Tele-Banking and Mobile Banking. Today's flicking banking customer will settle for nothing less. He demands that bank should roll out the world-class product and services. For customers it is the realization of their anywhere, anytime, anyway banking dream. This has prompted the banks to embrace technology to meet the increasing customer expectation. IB has revolutionized the banking industry and the banking industry is under pressure to offer new products and services. The Internet leverages the investment in IB and increases profitability. In conclusion, the key drivers to achieving profitability for an institution implementing IB are the ability to increase site traffic to increase cross-sales and transaction activity. This is influenced by the "site stickiness" value of an institution's e-banking web site and by the successful adoption of target marketing tools and data mining techniques, migrating simple, but labor-intensive banking activities to the web including funds transfer, account balance and rate inquiry, stop payment, check ordering, address change requests, etc., increasing on-line bill payment penetration, streamlining the loan application and fulfillment process, utilizing a portal to provide proactive services to web users who tend to be an institution's most profitable customers and cost effective target marketing. The question raised at the beginning of this study was whether or not IB is profitable. Clearly, the answer to the question depends on a variety of factors, and it is not possible to blindly state that IB is always profitable. Very small banks with fewer than 15,000 customers only offering a limited set of IB services are not likely to achieve profitability unless they are able to persuade a very substantial portion of their customers to bank online. However, above this size, the indications for profitable IB are good. With relatively conservative assumptions about customer uptake, increased customer retention and cross selling potential and savings through lower transactional costs, we have found that, in the majority of cases, IB is profitable. IT driven solutions are the backbone of any modern business. The power of IT lets us meet growing customer expectations and intense competition for market share. Customer expectations are no longer confined to how well you serve them, but also when and where. Multiple delivery channels are the norm. Our IT solutions group is focusing upon alternate

channels. IT also lets us comply with the changing regulatory and corporate governance environment. In short, our IT initiatives have played a huge role in transforming the banks into a more responsive organization ready to meet the challenges of a globalised economy. The threat from foreign banks and new generation private banks is here to stay. Our IT plans allow us to meet the competition successfully and at the same time offer our 90 million customers a state-of-the art world class banking experience.

**BUSINESS MODELS USE
AND INTERNET
BANKING**

4.0 INTRODUCTION

Studying the use behaviour of the models in banking industry has gathered momentum, reflecting the business implications. The business models (BM) as the key drivers are continuously subjected to external forces. They usher to comprise legal, social, technological, infrastructural and market changes. In Internet Banking (IB), the RBI plays a major role in continuous transformation, through a workable Business Process Model. While observing trends in Indian Banking, researcher used some fundamentals of basic science taught at elementary level. Here, laws of physics are correlated to understand and perceive the nature of growth, sustainance and subsequent development of the Indian banking. Market forces are the catalysts to alter the ways the services are delivered. Mega trends like demographics, globalization and branding play major roles in transformation. Historically, Indian banking used to run in a frictionless environment. It maintained a linear speed in providing almost similar products/ services: deposits and loans. This phenomenon simulates physics fundamentals: laws of motion. Newton's first law states that when no force is applied to an object, it either remains at rest or continues its motion at constant speed in a straight line. Indian banking sector was still, till late 90s'. But as according to second law, when force is applied to an object, the motion of the object, direction and magnitude, changes in direct relation, proportion to the force. In economics, this factor or force may be simulated to cost, which comprise resources, competition and perceived limits of energy (the ability to do work), generated by future of Indian banking in the midst of IT revolution. Banking technology has intensified the competition among the banks, increasing automation. Truly, at this junction, private and foreign banks are exerting a gravitation force to the dynamism. As per the third law the gravitation force is inversely proportional to the distance between two masses, in Indian banking, these two masses can be compared as the old public sector banks (PSU) and the private and foreign banks. The generalization of business and physics laws indicate, the organization as the mass, which includes:

(i) Customers prospects such as, sales, revenues and costs

(ii) Environment comprises the economic, social, technological, infrastructure, competitive and supportive aspects. Acceleration is the movement towards the goal. So, force (cost) is taken as the key factor to achieve the objective.

To meet the dynamic, demanding and technology-savvy customers, the business model has to be flexible to suit their needs. Traditional drivers such as reliability, responsiveness, assurance influence perceived quality. Flexibility, convenience, efficiency, enjoyment, cost, transact, entry and exit are major themes in online environment. In today's net economy, definition of satisfaction is almost changed. This depends on web dispositions, making it proper to analyze the features, speed of download, content, navigation, interactivity and security. Communication is important in altering consumers' belief and attitude. This is essential in fostering satisfaction, as the basis for future market. Satisfactions as behavioral intentions are influenced by the communication techniques adopted by the service provider. Web enables two-way communication, making perception of quality important. Banks are providing more and more services online. Indian customers are adjusting to the transition from "brick and mortar" to "click and mortar" banking. Inadequacy in net infrastructure is a constraint for virtual banking. This addresses how the banks perform with existing infrastructure, PC penetration rate, security protocols and consumer attitude towards transition. With weak net-to-ready infrastructure, banks providing IB services have a long way to go. For IB to reach a critical mass there has to be a sufficient number of users with user-friendly infrastructure. Negative aspects of net economy reflect security concerns, risk of obsolescence, impersonalisation and lack of control.

This chapter is organized in the following format. Section 4.1 presents business models of Internet banking. Elements of business model for banking and analysis of Indian banks are discussed in the Section 4.2. Section 4.3 presents the evaluation of the Internet banking facilities provided by various banks. Wheel diagram representation of the evaluation is presented Section 4.4. Business models in Indian banking specially

manager's perspective are described in Section 4.5. Section 4.6 presents the analysis of the findings followed by conclusion which is mentioned in Section 4.7.

4.1 BUSINESS MODELS OF INTERNET BANKING: AN INTERNET COMMERCE MARKET STRUCTURE MODEL

A range of business models available for IB. Some follow a typical business model, whereas other combines two or more such models. IB deals with selling services to businesses or to customers or both. Thus, by analyzing business models, it is obvious that online banking follow the merchant model, being based on retailed goods or services. Shape of businesses is determined by transaction costs. They determine economies of scale, outsourcing, and the nature of partnerships. Banking is under pressure as new competition unbundles the existing services at a reduced cost.

4.1.1 Subscription model

This model is used where users are charged a periodically: daily, monthly or annually- to subscribe a service. The banks may charge initially to open an IB account on monthly or yearly basis. As most banks do not charge for opening an account, this could be approached as a revenue generation models. The trust services come in the form of membership associations, abide to an explicit code of conduct, while members pay subscription.

4.1.2 Advertising Model

The broadcaster, in this case a web site, may provide personalized contents to the user mixed with advertising messages, in form of banner ads. The banner ads can be an additional source of revenue for the broadcaster. Banks advertise their products, such as cards, loans etc. by using banners or other advertisements invariably paying a fee for the advertisement space. Third-party vendors often select sources of revenue derived from diffusing consumer information and developing detailed profiles of individual customers for use.

4.1.3 Brokerage Model

They bring buyers and sellers together to facilitate transactions. In this, a broker charge commission for each transaction it enables. This model could be adopted by the bank, in initiating services where it can act as intermediaries. Services include fixing prices for agricultural commodities, financial instruments, or unique fine art and antiques. Web popularize auction model and broaden applicability to a wide array of goods and services.

4.1.4 Pay your bills online

Bill payment online let customers pay telephone, mobile, electricity, insurance and credit card bills. Customer is to log his account, register for the service and give billing details. Banks earn small revenue on the transaction for each service.

4.1.5 Demat Services

The bank acts as a depository participant (DP) enabling customer's to trade shares electronically, with the depository (share brokers) who holds shares in the digitalized form. A DP transfers securities as per the investor's instructions electronically without actually handling securities actually. It will maintain the accounts of securities transactions periodically. It provides a statement of holdings, similar to a passbook. Banks charge their customer for opening and closing a demat account, for dematerialization and rematerialization of every share as custody charges.

4.1.6 ATM Services

The ATM network allows customers to withdraw cash, deposit cheques and use it as a debit card in ATM centers across the country and at selected merchant establishments. Banks usually do not charge for use of there or group solicited ATM cards except nominal amounts for withdrawals. State Bank of India (SBI) has over 3800 ATMs in India, the largest network in the country, further expanding fast. It gives two cards SBI cash card and SBI domestic card. There is no need to carry cash as it can be used both to withdraw cash and make payments in selected retail outlets, in own network of 3800 ATMs plus alliances of 1135 ATMs of UTI Bank and 870 ATMs of HDFC Bank. SBI

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does not charge for using the ATMs but charge for accessing UTI and HDFC ATMs, @ Rs. 7/- for balance enquiry and Rs. 18/- for cash withdrawal.

4.1.7 Electronic Funds Transfers (EFT)

EFT is a generic term for describing any transfer of funds between parties or depository institutions. This happens via electronic data systems, where money gets transferred without check or draft. Banks offer the facility of funds transfer directly or to either their accounts in other banks. They charge a small fee for this, which is similar to commission for a demand draft. Among few banks using this model in India is SBI, which offers a facility called e-rail. This facilitates booking of railways ticket online where customers are required to register on www.irctc.co.in and book their tickets online, giving payment advices to SBI, to onlinesbi.com. After logging to site and selecting the payment amount, it will be debited to the customers account. After returning to the site, PNR will be displayed. The ticket can then be delivered or collected by the customer.

4.1.8 Technology providers

The technology infrastructure is an integral part of the Internet commerce edifice. A few banks are considering to spin-off their web technology resources and start-up new business as Internet technology providers.

4.1.9 Content providers

The strength of the contents of the medium is critical in attracting websites visitors and commercial users. Banks feed their web sites with the corporate profile, product and pricing information and application forms details along with the accompanying charges, if any.

4.1.10 Service Providers: Primary and Retail

Most banks operate a website with a catalogue of their products and services for promoting and communicating mission and goals. Banks worldwide offer e-banking/web banking/ IB, facilitating their customers adjust and reconcile personal finances to execute transactions via the Internet.

4.1.11 E-brokerage

Some bank sites act as information brokers, providing access to rates, indices, economic information and reports pertaining to the whole banking industry than giving information on their organization only. An e-brokerage may get activated through an agent who presents a variety of products rates them and facilitates purchasing as a means to trading. A special type for e-brokerage is also in operation designated, as information brokerage websites giving access to databases of special interest of topics.

4.1.12 E-services providers

Virtual banks can offer cheaper rates, as they are capable to manage with a lower labor and premise costs. The comfort of remote, self-service banking often augment the quality service perceived making the services rendered highly popular. These activities are hardly carried from brick-and-mortar premises. They are realized in the virtual world. Usually, they provide services for Internet commerce. Seldom, e-services providers may be fully virtual.

4.1.13 Infomediary Model

Data about consumers and their consumption habits are valuable, especially when that information is carefully analyzed and used to target marketing campaigns. Data about producers and their products are useful to consumers when considering a purchase. Some banks function as infomediaries (information intermediaries) assisting buyers and sellers to understand the given market. They 'accommodate' the context in a manner that adds value to its content components as the context providers.

4.1.14 E-marketplaces

There are banks that host an e-mall putting forward their brand name as a guarantee for on-line shopping trust. A bank could also serve as an e-auction house because it can assure the securitization of the bidders, but banks in India are yet to enter this area. e-Marketplaces are running for many product categories, creating value making trading more efficient. There are three types of marketplaces: those controlled by sellers, controlled by buyers, and controlled by neutral third parties (Berryman 1998).

4.1.15 Enablers

Banks are building payment infrastructure with various security mechanisms like SSL, SET because there is tremendous potential for profit, as payments will pass through the Internet. The challenge for banks is to offer a payment backbone system. This opens support for multiple payment instruments such as credit cards, debit cards, direct debit to accounts, e-checks, digital money. This tends to be scalable enough to allow for a stable service regardless of the workload. Certification authorities enable secured transactions by managing the distribution and circulation of digital certificates. Banks are qualified for the role of a certification authority to their customers following the services. Security and trust infrastructures obviously fall within the scope of banking.

4.2 ELEMENTS OF BUSINESS MODEL FOR BANKING AND ANALYSIS OF INDIAN BANKS

The significant elements of a BM are identified from the literature review. After customizing the elements of BM for banking sector, the following are finally identified as "value proposition, customer relationship, infrastructural capabilities and financial aspects". The explanation of these elements and their necessity are mentioned below.

The alphabetical listing of banks taken for the study:

- ABN Amro Bank
- Allahabad Bank
- Bank of Baroda
- Bank of Punjab
- Canara Bank
- Centurion Bank
- Corporation Bank
- Federal Bank
- HDFC Bank
- Oriental Bank of Commerce
- ICICI Bank

- Standard Chartered Bank
- State Bank of India
- Union Bank of India
- UTI Bank

The banks considered for our study are combination of private, public and foreign banks. The following banks are evaluated based on each of the factors given below out of a score on the Likert's scale of 1-5 where 1 means the lowest score (i.e. Most undesirable) and 5 means the highest score (i.e. Most desirable). The above mentioned banks were evaluated on the basis of the criteria mentioned below:

1. Value Proposition

- a) Services Provided
- b) Product Innovation
- c) Schemes and Benefits

2. Customer Relationship

- a) Ease-of-use and Design Layout
- b) Security
- c) Customer Support

3. IT Infrastructure

- a) Strategy
- b) Capabilities
- c) Technologies Used



4.2.1 Value proposition:

Value is the intrinsic worth obtained by the investor, directing towards the corporate mission. This consists of economic, social and environmental components. Therefore if we consider the organization as an independent entity then both revenue generated and the value to customer comes under this proposition. It includes pricing, product innovation, cost, revenue and market share. It is an overall view of a company's bundle of products and services that are of value to the customer. Products and services of Indian

banking have been traditionally around mass banking products. Common deposit products are savings bank, current account, term deposit account and lending products are cash credit and term loans. Further, remittance products include issuance of drafts, telegraphic transfers, bankers cheque and internal transfer of funds. The tremendous advances in technology and the aggressive infusion of information technology have brought a paradigm shift in banking operations. Banking product has undergone a change. IT revolution has made it possible to provide ease and flexibility in operations to customers. Now the banks are using IT as a new distribution channel to offer new products and services ranging from brokerage, tax advisory services, financial planning, insurance, e-Shopping, cash management online, market news online, to trading online etc. The technology infusion allows bank to improve the internal processes, allowing them to cut cost, enabling cross-sell, building global delivery platform, enhanced customer convenience, coupled with lower cost platform. It is achieved through various *services provided, product innovation and offering schemes and benefits* so as to have competitive edge over market. The services provided by the above mentioned Internet banks are analyzed and evaluated on various criteria as this help in developing a better BM for Internet banks.

4.2.1.1 Services Provided:

To analyze the services, we evaluated the following: Can a customer manage his/her account without assistance, have bill payment services, order checks or open an account online, and search for branches or ATMs. The leader in online services was **ICICI Bank**; no other sites are really compared to their offerings. Some outstanding features not shared by the other sites include: real-time updates, migrating to other institutions' data for a complete financial picture; prepaid-postage envelopes to mail deposits; and the ability to order, design and customize checks (including the checkbook cover). An additional feature was the ability to download and print your cancelled checks. A customer can sign up for service online with **ICICI Bank** which other bank seldom offer. **HDFC Bank** was the only bank to provide a detailed explanation of the customer expectations. In addition, only **HDFC Bank and ICICI Bank** provides wireless options. The majority of sites allowed the user to order checks online. But other accounts management options were

available sparingly. **ICICI Bank, SBI, HDFC Bank and UTI Bank** have integrated their database to their website which the users could make use of. Bank branches and ATMs facility can be located, either through address search or text listing. Bill payment was an optional feature in most of the sites, but **ICICI Bank** offers it free of charge. However, **Standard Chartered Bank** has introduced mobile-based bill payment.

4.2.1.2 Product Innovation:

Bankers are bringing ATMs, cash, and even foreign exchange to customers' doorsteps. Indeed, product innovation has become the hottest banking game. **State Bank of India** provides facilities like e-rail, e-pay, telebanking, demat services and "safe deposit locker" facility to its customers. They provide gold banking, development banking, international banking, NRI banking, banking for small scale businesses etc. We can leverage our new house or car these days, with banks like **ICICI Bank** and **Standard Chartered Bank** ready to extend the lease for upto 5 years. Loans are available to all car owners for almost all brands of cars manufactured in India that are up to five years old. Several banks are even bringing ATMs to customer doorsteps. **ICICI Bank, State Bank of India and Bank of India** now have mobile ATMs or vans that go in a particular route in the city and stationed at strategic locations for a few hours every day. This saves the bank infrastructure costs operating one mobile ATM instead of multiple stationary ATMs. **Federal Bank** offers banking ombudsman scheme, share holder information and mobile banking facility. **Bank of Punjab** offers innovative types of banking such as mobile banking, kiosk banking, family e-banking, mobile wallet etc. **Standard Chartered and Visa** have launched India's first mobile credit card, 'm-Wallet'. With leap in credit card technology, users find shopping easier and can pay for their purchases from selected outlets through mobile phones than credit cards. **Standard Chartered Bank** has introduced real time settlement in banking. Some banks combine savings deposit account with a fixed deposit. A Sweep-In account has a cut-off of Rs 25,000. Any balance amount gets automatically transferred to fixed deposit earning the customer a clean 2 per cent more. **ICICI Bank** carried out the world's first ever securitization of a micro finance portfolio last year. The bank securitized Rs 4.2 crore for Bharatiya Samruddhi Finance

Ltd for crop production. Innovation gives banks a first mover advantage until their rivals catch up.

4.2.1.3 Schemes and Benefits:

State Bank of India provides gift cheques facility to its customers. It also provides features like recharging pre-paid mobile phones of ORANGE, HUTCH and AIRTEL, topping of mobile phones of the above vendors at select centers and paying fees in select / reputed colleges. **UTI Bank** offers salary power scheme that has many benefits like anywhere banking, international debit cum ATM card, priority banking, flexi (2-in-1) encash deposits etc., **Bank of Baroda** offers many features like online payment of bills and taxes, online railway reservation, insurance and medical facilities etc., **Canara Bank** offers new features like remote customer terminal, computerized information center etc. **Centurion Bank** presents all resident individuals above the age of 60 years unique term deposit schemes for their benefits. This scheme offers you an opportunity to earn extra interest (as compared to the interest offered to a normal fixed deposit in the bank). It also allows customers to avail the benefits of exclusive Life Insurance Products & Mutual Funds. **HDFC Bank** offers gold card scheme. **ABN Amro Bank** offers many benefits such as free drafts, free courier services, free standing instructions, free international travelers cheques, free draft cancellations etc.

4.2.2 Customer relationship:

The customer relationship describes linkages a company establishes between itself and the customer. It can be achieved by *designing easy layout, offering good customer support and instill customer confidence by ensuring security mechanism*. This is one of the crucial aspects to be considered while designing a business model. This includes the customer relationship management (CRM) and how companies create trust, loyalty, branding and communication tools the company uses to get in touch with the customer. New age channels like ATMs and net banking opened up a demographic divide that segregates the young and old service users. The IB targets anywhere, anytime, anyway banking. Young, technology savvy customers are prone to speed banking. This has prompted the banks to meet increasing customer expectations. The banks are identifying

new unnoticed segment of remotest rural areas. ICICI banks virtually provide banking services to rural India. India is much under banked under serviced. A country of 1.1 billion has about 240 million account holders. But, if one excludes those with multiple accounts, in metropolitan and urban branches, the number drastically come down. Small towns have a vast untapped accessible potential market. Banks are going for a phased approach and concentrating on brand building. Targeting is increasingly focusing on lifestyle variables: activities, interests and opinions. India's financial sector is boom in a growing economy where million people will join workforce and need bank accounts since 35% of our people are below 18. Banks need to plan for a basic survival skill. Globalization of financial markets may be the acquiring of ability to protect their turfs when foreign banks invade India. But Indian banks are also going abroad and competing in other markets. IB provides a platform to serve millions who are not banking now. Today customer is exposed to both information and choice overload. People now have a wide variety of options to choose from; insurance policies to bank accounts. Since the offerings are intangible the services sector witnesses greater challenges in sustaining brand loyalty.

4.2.2.1 Ease-of-use and Design Layout

On evaluating the fifteen banks' IB facilities for ease-of-use, we considered a number of factors viz. the ease to find product or service information, to conduct transactions, to find help and contact information. There were no clear leaders in the ease-of-use category, although there were some distinguishing characteristics between the top- and the bottom-end of the scale. The majority of the banks were easy to locate from at least one popular search engine, such as Yahoo or MSN. An exception was **Union Bank of India**, which was not listed in the results of any of the search engines. Most websites included clearly marked contact information, whether as a separate page or as a part of the site design. The ability to locate product information varied. The **Oriental Bank of Commerce** site was so exhaustive that it was easy to get lost. **Federal Bank's** home page was a login screen for current customers, and a prospective customer needed to scroll to the bottom of the home page to locate hyperlinks accessing product information. **Tier One Bank** provided a method of evaluating the different checking account options against

a customer's needs. Every website offered a demo for their online banking products, and all sites were approximately equal when rating the ease of making a transaction in this web-based environment. In analyzing the design and layout, we considered a number of factors again like ease of navigation throughout site, presence of broken links, consistent color scheme of site, and overall look and feel of the site. Most important among these factors was the ease of navigation throughout the website. It was vital for customers to find the information they needed with a minimum number of clicks. In conjunction, it was also important that the path to the desired information was clear and easy to follow. To accomplish these goals, a banking website must have a clean, organized homepage with easy to locate buttons or links to allow access to more specific information, such as personal services or loan information. Websites for **ICICI Bank, HDFC Bank, SBI, Corporation Bank, UTI Bank and Oriental Bank of Commerce** were organized into clean sections, with definite points as to where to begin a search for specific information. Sections were listed either at the top or the left side of the screen. In particular, **Oriental Bank of Commerce** used pop-up menus that listed sub-categories. This made it simple to get to the desired information quickly, with less risk of being directed down the wrong path. One concern of the lesser ranked sites, such as **Federal Bank's** website, was the presence of information overload. **Allahabad Bank's** website suffers a bit from too much clutter, but that was a result of poor design.

4.2.2.2 Security

In e-banking security demand a big portfolio. Along with security, encryption, and managerial issues also affect a bank becoming too cold and distant to customer. Some feel that banks that offer IB are becoming cold and impersonal with customers. For security, we analyzed each of the websites, on whether they were using security methods (such as SSL) offered security/privacy guarantees. Most of the IB services had adequate protection to secure customer's information from unauthorized hackers. Any access to customer accounts is protected by a secret password, SSL, data encryption schemes, and digital certificates (e.g. VeriSign). Although all of them had privacy statements, but half of these had a security statement, including **ICICI Bank, HDFC Bank, Corporation Bank, SBI, Centurion Bank, Bank of Baroda, Bank of Punjab and UTI Bank.**

Security statements outline bank's security policies and describe security measures taken to establish information assurance to users. It is an important part of any bank site to assure its security. Among them, some sites, such as SBI, included security guarantees where the banks would cover 100% improperly removed funds.

4.2.2.3 Customer Support

SBI provides services like help line, e-poll, e-rail and demat services to its customers. It also provides code of ethics for the benefit of its customers. **ICICI Bank** with its net banking service called 'Infinity' goes a step forward by allowing the account holder to transfer funds into another person's account within the bank. Also one can intimate about the loss of an ATM Card over the net when using Infinity. Moreover, corporate can issue letters of credit and make enquiries regarding bills sent for collection via this service. A special feature on Infinity is the facility for nicknaming all accounts to avoid remembering lengthy account numbers. In terms of safety, **HDFC Bank** allows one to have three login attempts after which a new password is given while **ICICI Bank** will disable the password after five login attempts. Considering the fact that these services are offered without charging a fee, the effort is commendable. Both HDFC and ICICI have free demonstrations, which are self-explanatory and can guide a first time user on how to use the facility. There are others who also have the facility like, which is the latest entrant in the bandwagon and also offers features like grievance redressal, citizen's charter, telebanking, customer terminal etc. **Corporation bank** provides Hindi version of its website.

4.2.3 Infrastructure operations:

This describes the arrangement of activities and resources that are necessary to create value for the customer. These can be achieved by having a partnership, which is voluntarily initiated in cooperative agreement among companies reflecting the abilities to execute a repeatable pattern of actions that is necessary in order to create value for the customer. This includes the *strategy, capabilities and technologies* the company uses to implement the business model. IT infrastructure includes Internet servers, software, ATMs and call centers etc. It also includes the relationship with partner and suppliers.

The relevance of products and services are decided not on emotional imagery, but the perceived value. In this context, introducing new products and services entail creating need-based value propositions, prioritizing target market.

4.2.3.1 Strategy:

A common strategic move for Internet banks reviewed was the “prominent tactics of promotions” comprising limited special offers, free checking, or free gifts, as **ICICI Bank**’s offer of a free Rakhi delivered for opening a checking account during that time. Promotions are usually displayed in center or near top of the website, in larger type. **HDFC Bank** and **Centurion Bank**’s sites used flash to periodically change the promotion features. **State Bank**, **ICICI Bank**, **Federal Bank** and **Corporation Bank** did not emphasize promotions at their sites. Most commonly used was a Branch and ATM Locator, which enable customers to find the branch or ATM closest to a specific address. Some banks, such as **Oriental Bank of Commerce**, ask customers for an address or zip code, so that search engine can locate a branch or ATM. The smaller banks simply used a static map with icons to show locations. Another common feature was a calculator to enable a user to determine various rates. **ICICI Bank** and **State Bank** had an extensive array of calculators to determine mortgage rates, retirement plans, or auto leases. **Corporation Bank** devoted a page to children, offering activities that are both educational and fun. **Oriental Bank of Commerce** feature links for entertainment and travel, to plan a vacation, deals for air tickets and hotels. Sites of **Bank of Baroda**, **Bank of Punjab**, and **UTI Bank** were designed for the users, making them their home page.

4.2.3.2 Capabilities:

ICICI Bank is the aggressive deployer of ATMs and has seen its base surge from 125 ATMs in January 2000 to 1,290 ATMs today. Their customer’s base has grown from two millions to five millions in the last two years. **HDFC Bank** is the next big player, which is aggressively using ATMs to their advantage. Though **HDFC Bank** has half of ATMs compared to **ICICI Bank**; its ATMs are among the highest transacting ones in the world. In the case of **UTI Bank**, the ATMs have added a fillip to the bank’s customer base. Some banks have gone a step ahead to share their ATMs with other banks. While ATMs

attract customers, there is also one more critical aspect to consider the immense cost savings from which a bank can benefit due to a transaction taking place over an ATM vis-à-vis a branch. Typically, it costs a bank close to Rs 50 per transaction if conducted in a branch and the same if done through an ATM costs about Rs 15. A close look at the volume of ATM transactions conducted reflects the level of success of this delivery channel.

4.2.3.3 Technologies used:

To evaluate the technical sophistication of these services, we evaluated the following: use of flash or animation, an option to choose either a text version or a graphic version, and make use of common Internet technologies. Most sites were designed in HTML with graphics, java scripts, with a few dynamic HTML content (e.g. Stock quotes). **Federal Bank** is among few sites using macromedia flash in its self-help tutorials to demonstrate functions of its online banking to users. None of the reviewed bank sites had an option to choose a graphic or a text version of the website since most of sites were not bandwidth intensive and loaded fast enough for 56k modem users.

4.2.4 Financial Aspects:

Analysis of the financial aspects of any business entity signals the organization's performance. The following are some of the inevitable factors in assessing the financial performance of any bank.

- Revenue
- Cost
- Net Profits

4.3 EVALUATION OF THE INTERNET BANKING FACILITIES PROVIDED BY VARIOUS BANKS

Evaluations of above banks were made on values proposition, customer relationship and infrastructural capabilities. A questionnaire had been passed and the responses are considered for evaluation of these banks. The questionnaire consists questions directly

focusing on issues corresponding to evaluation of the banks on several criteria such as security issues, strategies, customer support etc. The *Services Provided* factor is evaluated by finding whether the banks provide downloadable application forms, online application for loans, calculators and branch/ATM locators etc. The *Security* factor is evaluated depending on the type of encryption, level of trust and loyalty i.e., by displaying the security sign on the bank's website and whether the bank provides any tips to its customers or not. The *Schemes and Benefits* is evaluated based on whether the bank has any special offers and gifts for its customers on special occasions, whether it allows online payment of bills etc. The *Technologies Used* criterion is the score based on the usage of latest technologies like flash etc. and the choice between graphical and text version. The *Strategy* factor is evaluated based on the level of stickiness of the bank offers, level of customization offered, collaboration of the bank with other companies etc. The *Product Innovation* is evaluated on whether the bank offers mobile banking facilities, provides real time updating of data, and offers demo option to its customers etc.

Each individual rank has been given based on a survey conducted. 176 subjects to the study were asked to rate the various services offered, customer relationship aspect and technologies used in the IT infrastructure. Each of them ranks the bank individually and then the mean of all the ranks were calculated which resulted in a fractional number. The decimal is rounded to nearest whole number. The average rating is calculated by dividing total score by the number of factors involved in calculating the ranks. (E.g.: in the first row, the average rating = $22/9 = 2.44$). Like wise, industrial average is calculated by dividing the sum of the ranks of all banks divided by the number of banks taken into account for the survey.

Name of Bank	Value Proposition			Customer Relationship			Infrastructure Capabilities			Total Score	Average Rating
	Services Provided	Product Innovation	Schemes and Benefits	Ease-of-use and Design Layout	Security	Customer Support	Strategy	Capabilities	Technologies Used		
Allahabad bank	1	2	2	3	4	3	3	2	2	22	2.44
Bank of Baroda	5	4	3	3	4	4	5	2	2	32	3.56
Bank of Punjab	4	4	3	2	4	3	5	2	2	29	3.22
Canara Bank	3	3	2	3	5	4	4	3	2	29	3.22
Centurion Bank	4	3	2	3	4	3	5	3	3	30	3.33
Corporation Bank	2	4	3	4	5	4	5	4	4	35	3.89
Federal Bank	4	2	3	2	5	3	3	2	1	25	2.78
Global Trust Bank	3	3	2	4	5	2	3	3	3	28	3.11
HDFC Bank	4	5	4	4	5	4	4	4	5	39	4.33
ICICI Bank	3	5	4	5	5	5	4	5	5	41	4.56
State Bank of India	2	5	3	3	5	4	5	5	3	35	3.89
Union Bank of India	3	3	3	2	5	2	3	2	2	25	2.78
UTI Bank	4	3	3	4	4	3	5	4	3	33	3.67
Standard Charter	4	4	3	4	3	3	4	2	3	30	3.33
ABN Amro	4	4	4	4	3	4	3	2	3	31	3.44
Industrial Average	3.33	3.6	2.93	3.33	4.4	3.4	4.07	3	2.87		

Table 4.1 Evaluation of Various Internet Banks

Based on the evaluation reported in Table 4.1 the following findings are highlighted.

Most of the banks offering IB facility in India had high overall scores indicating high-quality of their services at all the functional and interactivity levels. The overall scores

indicate that, banks considered for evaluation scored within the range of 22 – 41; with the highest score 41 for **ICICI Bank** and the lowest score for **Allahabad Bank**. The banks, which have good scores, include **ICICI Bank, HDFC Bank, State Bank of India, Corporation Bank** and **UTI Bank**.

The industrial averages for various factors taken into consideration lie in the range 2.87 – 4.4. The Table 4.2 gives the overall ratings of the Internet banks. Total score and average rating are shown for all the banks that are evaluated for their performance in IB.

Name of Bank	Total Score	Average Rating
Allahabad bank	22	2.44
Bank of Baroda	32	3.56
Bank of Punjab	29	3.22
Canara Bank	29	3.22
Centurion Bank	30	3.33
Corporation Bank	35	3.89
Federal Bank	25	2.78
Global Trust Bank	28	3.11
HDFC Bank	39	4.33
ICICI Bank	41	4.56
State Bank of India	35	3.89
Union Bank of India	25	2.78
UTI Bank	33	3.67
Standard Charter	30	3.33
ABN Amro	31	3.44

Table 4.2: Total score and average rating obtained by various Internet banks

Table 4.3 contains either a “+” symbol or a “-” symbol for the cells depending on whether the value of that criteria for that particular bank is above or below the average rating respectively. Each bank contains a mixture of “+” and “-” values for the criteria considered for evaluation. For example, the sub field 1 of customer relationship for

Allahabad Bank is “-” as the value for that field is 3 whereas the average rating for that field is 3.33.

Name of Bank	Value Proposition			Customer Relationship			Infrastructural Capabilities			Average Rating
	1	2	3	1	2	3	1	2	3	
Allahabad Bank	-	-	-	-	-	-	-	-	-	2.44
Bank of Baroda	+	+	+	-	-	+	+	-	-	3.56
Bank of Punjab	+	+	+	+	-	-	+	-	-	3.22
Canara Bank	-	-	-	-	+	+	-	+	-	3.22
Centurion Bank	+	-	-	-	-	-	+	+	+	3.33
Corporation Bank	-	+	+	+	+	+	+	+	+	3.89
Federal Bank	+	-	+	-	+	-	-	-	-	2.78
Global Trust Bank	-	-	-	+	+	-	-	+	+	3.11
HDFC Bank	+	+	+	+	+	+	-	+	+	4.33
ICICI Bank	-	+	+	+	+	+	-	+	+	4.56
State Bank of India	-	+	+	-	+	+	+	+	+	3.89
Union Bank of India	-	-	+	-	+	-	-	-	-	2.78
UTI Bank	+	-	+	+	-	-	+	+	+	3.67
Standard Chartered	+	+	+	+	-	-	-	-	+	3.33
ABN Amro	+	+	+	+	-	+	-	-	+	3.44

+

Above Average Rating

-

Below Average Rating

Table 4.3: Relative representation of the evaluation of various Internet banks

As the above table shows, Allahabad Bank has below average ratings for all the criteria and the number of fields with “+” and “-“values varies along with the overall rating for the banks. If the overall rating for a particular bank is more, the number of fields with “+” value for that bank is also more in most of the cases.

4.4 WHEEL DIAGRAM REPRESENTATION OF THE EVALUATION

The following figure is the wheel diagram drawn for various banks based on the criteria specified below. The circle below is divided into 9 sectors, indicating 9 sectors viz: A polygon is drawn for each bank by joining the ratings obtained by the bank for each criterion. As explained above, the ratings range from 0-5 based on the evaluation procedure followed. The weightages assigned were plotted from the center (0) to its circumference (5). The area occupied by a particular bank is represented proportionally to the average ratings obtained.

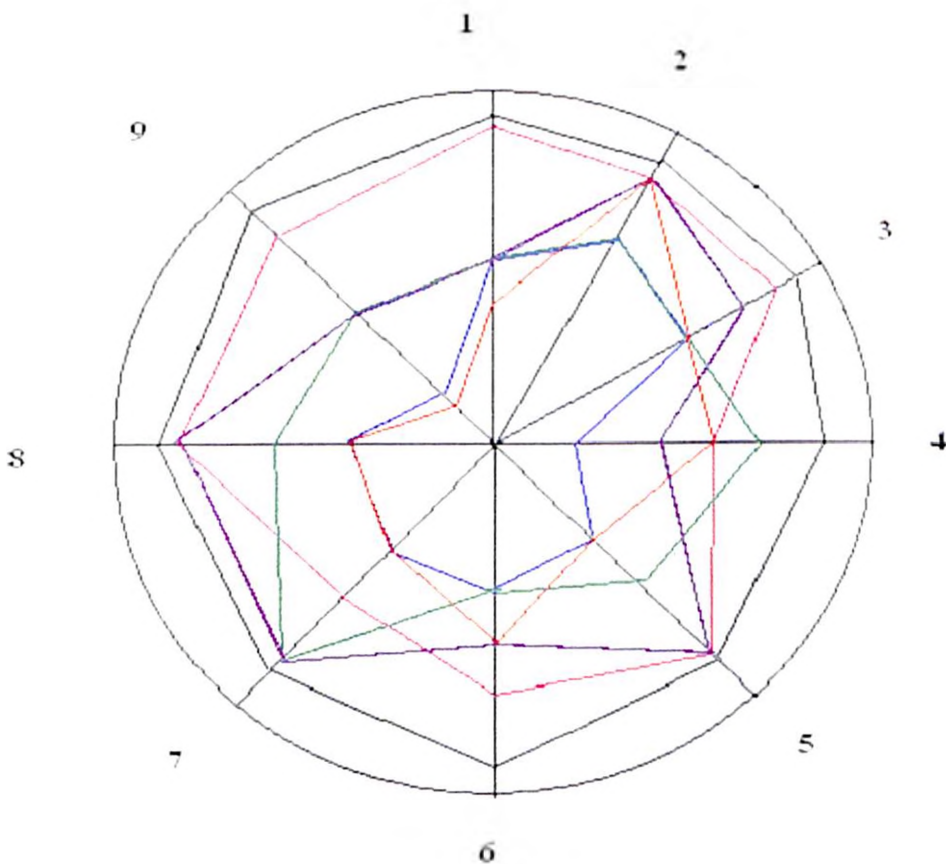


Figure 4.1 Evaluations of Banks Using Wheel Diagram

The numbers 1 to 9 in the above figure represent the following criteria.

1. Ease-of-use and Design Layout
2. Security
3. Customer Support

4. Services Provided
5. Product Innovation
6. Schemes and Benefits
7. Strategy
8. IT Infrastructure
9. Technologies Used

4.5 BUSINESS MODELS IN INDIAN BANKING: MANAGER'S PERSPECTIVE

A group of Top managers (18), Assistant managers (13) and Consultant (9) were interviewed to get a feedback on this research from managers from public, private and foreign banks. Semi-structured interviews were conducted to investigate relevance of business model, assessing the model's fidelity with real world, exploring possible uses of business models in selected banks. Interviews were largely personal. Few were telephonic and e-mails with constraints of time. The subjects belong to ICICI Bank, Bank of Baroda, HDFC Bank, and SBI and Andhra Bank etc. Interrogating business people on the business modeling in banks is insofar problematic as it is theoretical constructs that can hardly be evaluated by practitioners. During this analysis, the researcher had to present the subjects some examples, to describe them the business logic involved with the models, on which the information were sought. The interviews were conducted in parts. The first part composed of questions on the use of models and tool; the second part consisted a short explanation of the model and the third part comprised the questions discussing the views in getting indirect feedback to present a business model, emphasizing information on their capabilities and completeness. Finally, the study was laid to investigate, in what areas and the way business models can make maximum contribution. The questionnaire is presented below:

Questions Domain	Questions Asked
Use of business concepts & tools	<ul style="list-style-type: none"> • How do you plan the general business objectives of your company? • Do you use any conceptual tools to plan your business or to sketch the general direction in which your firm is heading?
Fidelity with real world phenomena	<ul style="list-style-type: none"> • In your opinion, what elements are missing in the model presented before? • How such a Business model helps you define business indicators? • How such a model helps you or a group of managers make better decisions? • How such models improve some parts of strategic planning? • How the model makes it easier to choose and design appropriate information systems? • Could it be able to foster innovation in a company with such a model? • Do you think such a model could improve business process design? How. • Could it be helpful to have such a model to communicate your business (for making decisions, to communicate with employees)? • Do you think that the business models were used as strategic device to re-invent the business? • Is it another distribution channel, used to support existing infrastructure? • How the Indian banks have been using the Internet in enhancing banking product/service?

Among the banks participated in the survey, some did not respond even though general impression goes that the interviewees are quite receptive to the topic of business models.

4.5.1 Use of formal concepts and tools

The interview explored if the bank managers used the above models in business planning operations. This aimed at a detailed insight to business concept.

Respondent from Canara bank said: *"I'm very happy that somebody tries to define the term business model. It was one of the most valued terms. Everything was a business model. Everybody asked me what a business model is. I could never really define it. It is good that somebody is looking at this"*. Responses from ICICI bank, clarify *"it took quite a lot of work to use these concepts, but it was very helpful; what was not satisfying was that we didn't exploit them sufficiently once the work was done"*. The manager at the SBI mentioned that, *people at their bank are conceptually strong and have practical experience to implement the technology*.

Another manager mentioned, *"At the end of the day, there stays very little time for doing prospective business planning"*. Most of the new banks made business plans during initial phase. Some of them compared the business model framework to the business plan approach and saw it as a quite useful checklist, particularly, for those adapting IB. A surprising finding was that a large number of banks relied on trial and error, to introduce BMs aspect to their business. They are not aware of the exact meaning of business model but adopting it as parity to their competitors.

4.5.2 Completeness of Business Model

Interviews focused to capture bankers' impression of business model by presenting and explaining the essence of business models. The objectives were to find out, how the modular structures are suitable to describe the commercial activity of a bank. The questions on the model framework were meant to study the completeness of business model by finding out the elements missing in the model presented". Experience showed that, the subjects of the research gave important feedback on the composition of the

framework. But, due to time constraint the researcher was not in a position to evaluate the completeness. Subjects were found happy while sharing them with the models like Amazon.com and Baze.com. Four responses insisted on the importance of the relationships between the structured elements. According to them it helped to understand how the elements of a business model interact.

The manager of a public sector bank at the Union Bank of India stated, *"People can start to see where some of the complexity is. It helps you visualize the relationships, you know, with clients and with suppliers"*. One of the consultants told about the bank value of the modeling in representing the relationships among the components of the integration. *"Everything that helps to understand the vision of the whole is great. Also the relationships, the complexity, how things relate play a very important role"*. Furthermore, three respondents insisted that, the modeling could become more useful and interesting to visualize cost relationships: *"if you work with such a tool you should be able to have the whole cost calculation if you click on infrastructure"* or *"if you have factors, how will some factors influence the final result, the whole? When you make projections it is funny how some factors have an influence on the end result"*. *The manager at the Centurion bank revealed that the market infrastructure solutions help them to tackle the challenges of globalization, exponential transaction growth, regulatory change and new technologies.* One of the interviewed consultants acknowledged the difficulties of working with absolute numbers and suggested, *"It would be interesting to calculate the impacts, for example with relative values"*. *A major concern of a manager of a foreign bank was that, models create redundancies: "the problem I think is redundancy. Matrixes bring redundancies. My fear is that, if you click on these elements you will find the same thing behind the elements"*.

4.5.3 Use of Business Models

The interview focused to investigate possible uses of the presented framework. The subjects were asked the following open-ended questions:

1. Could a business model help bank to define business indicators?
2. Could a business model help you or a group of managers make better decisions?

3. Could a business model improve strategic planning?
4. Could a business model make easier to chose and design a proper information system (e.g. software purchases like customer relationship management (CRM) or core banking solutions...)
5. Could it be made to foster innovation in a bank using such a model?
6. Do you think such a model could improve business process design in banking?
7. Could it be helpful to have such a model to communicate your business?

Two important issues isolated from these questions were: transparency and communication. They appeared in several answers of the interviewees also. Two managers and two consultants mentioned about the transparency aspect in their response. The manager at HDFC mentioned: *"it is important to make things transparent to show where cost and risks come from. Transparency is very important."* Communication was another recurring theme throughout the answers and explicitly addressed in the last question on communication. Four subjects reflected: *"it's also about transparency. Somebody puts up the sheet and says this is our company and this is the way it works. Not everybody understands the same thing under the functioning of a company"*. The manager of Oriental bank of commerce was less enthusiastic about the business model in improving decision making. They opined, *"It helps in communicating, in that sense it may improve decision making. But at least this way people talk about the same thing"*. A manager at Standard Chartered Bank said that, the modeling *"can be very helpful, if not too complicated and adapted to specific managerial levels for decision making: employee and customer communication; customer presentations; and training purposes (employees and customers)" and that "it is a very useful instrument to initiate discussions with employees and customers about process improvements. This helps in the internal or external communication of business decisions"*.

- **Defining indicators**

While top bankers seemed favorable to business model to define business indicators, they invariably stressed the financial indicators. They pointed out the strength of transparency on costs. They also insisted on the financial relationships indicating

change in parameters of the use conveniences of the model and their influence on cost and profit. While modelling cost structure and profitability, it was properly integrated with infrastructure and customer relationship.

- **Effective decision-making**

Mixed responses were obtained to the question on decision making through tools based on the business model. Many of the subjects saw an indirect influence of use of business model on decision making through effective communication. They shared their experiences in using conceptual models to communicate at all levels in banks. The General Manager of State Bank of India said, *“Successful banks usually have a strong management behind”*. As regard modeling, they noticed that it may help people deliberate on issues to improve decision making. *ABN Amro Bank was more favorable, but questioned the availability of business data, “the framework help better to set priorities. However, to better support the decision process, availability of business data needs has to be ensured”*. Furthermore, he stressed the importance to *“introduce such a business model framework within reasonable means and resources”*.

- **Improving strategic planning initiatives**

Contributions of business model in “improving strategic planning” were perceived well by the subjects contacted. Banks experienced the use of business model to outline the steps to achieve a strategic goal. *The manager at the Corporation Bank mentioned “Strategic planning involves a lot of risk to be taken at the senior levels”* They also saw the advantage of a business model and stated that the need has to be identified on the kind of skills required and subsequently device a cost/revenue prototype.

- **Designing the Information systems**

Information systems (IS) design aspects were sparingly responded by the subjects, as all of them were not much aware on this aspect. Mixed answers were split among supporters and opponents. *A manager at Global Trust bank made a worthwhile*

response that “we are able to understand new technology and define our requirements and help design IS that will help us serve better.” They also have felt strong about necessity to describe business logic of a company to further improve the IS design.

- **Extensive innovation**

For some subjects, the human capability aspect of innovation was accentuated. A proponent stated: "What is important for thinking through. That is what takes time. If we look at the value proposition it is the thinking behind it that is important. If we are in front of investors, the important thing is that, it is innovative, that there's a prototype, and it was tested and comes over technically. And that thinking takes time". The assistant manager at Bank of Baroda opined “the banks that employ emerging technologies become the leading, next-generation technology solution providers in the finance sector.”

- **Improving communication**

Use of business models improves communication between bankers and customers. The manager at SBI said, “We feel that, technology development or to sustain the core competency in a dynamic environment, requires a special amount of discipline and communication.” Interaction with customers, analyzing feedback and customer support was found to be important aspect while considering the business model for them.

- **To improve business process flow**

Almost all the subjects expressed that business model help people to keep in mind the whole activities that they often forget, when designing business processes associated with complex problems.

- **Internet Business model as a marketing tool**

Internet has inbuilt advantages for hosting advertisements and allied marketing campaigns. This is without incurring pre-incremental cost for prolonged exposure,

compared to traditional media. Pre-designed, web-based advertisements are posted in Internet server, available at any time. Investments are limited to the initial development cost, while the maintenance is much less. The Assistant manager at the Allahabad bank said that, "we are committed to developing a vision of the future and the practical means to leverage opportunities created by that future." Banks make full use to promote their website besides advertising on television, radio and newspaper. They collect customer transaction data mining of the customers' profile and use pattern. This information is used to promote the products/services through Internet. For example, HDFC Bank uses emailing to inform and alert customers regarding their existing and new products/services, ushered in the market from time to time.

- **Internet Business model and Distribution Channel**

Introduction of IB goes back to the days of introduction of ATMs two decades ago. ATMs offered customers convenient access to limited array of financial services. Primarily, they ensure safety of deposits, liquidity services, and account balances. Internet offer appropriate distribution channel for banking. Basic banking, such as account enquiry and fund transfers are common transactional services, offered on websites of all the banks studied. It was noted that, not all banking products, and not all banking customers, adapt well to the Internet as banking channel. Fund transfers, bill payments, and credit card applications do not require personal contact or presence at branch and suited for Internet delivery. But, closing a home mortgage and personal financial planning are complex transactions. This typically requires a secure physical space and/or person-to-person communication. It is also impossible to get cash over the Internet. Cash withdrawal is still to be done via bank branches or ATMs. Because of such limitations, IB can only form a supplementary distribution channel for banks. Therefore, banks could hardly rely on it entirely. At the same time, it is not likely, that traditional banks could really retain a large market share in the long run, without offering IB option accompanied to customers' increasing expectations.

Today, it is rather not possible to grow a successful bank without a transactional website. Bank response to launching IB is the reduction of branches and employees,

since online customers reduce administrative work. As the transactions over the Internet are increasing at the expense of face-to-face transactions, the banks are swiftly determining and implementing major changes in the division of labor. As noted by Citibank and Standard Chartered Bank, the functional and structural roles of bank branches are changing. They are moving from traditional “teller-transaction-processing” centers to “relationship centers,” offering the moves on personal financial planning and complex transactions. Banker’s skills are also getting regenerated and upgraded from transaction processors to financial advisors. Banks encourage their customers to perform the basic teller transactions through the self-service machines, ATMs and IB. They have gradually changed the layout of their offices to add more self-service machines, while reducing the teller counters. Further, atmosphere of branches are becoming cozier and friendly such that, customers feel relaxed in discussing personal and confidential financial plans with the banker. Banks may periodically review the retail framework. As noted by ICICI Bank, IB appeals to technically savvy customers. Senior customers are friendly with teller system and a bit apprehensive of technology banking. Banks, therefore, need to relocate or reposition their branches to cope customers both traditional and modern.

- **Products/Services best suited for Internet Banking**

It was revealed that, funds transfer and balance enquiry form major part of IB transactions. Securities trading through net were 20-25% of overall transactions. Services on net were often the duplication of branch services but, allowed banks to introduce new initiatives. Citibank is using the Internet to offer account aggregations. This organizes, in one place, all data from customer’s multiple relationships with affiliated banks, insurance companies, and brokerage firms. Before the financial deregulation, customers tend to have relationships with few financial institutions. Account aggregation was less necessary. With the Internet, the logistics of collecting and sending data to customers are cost-effective and easy. ICICI Bank and Citibank do not see any barrier to the kind of products and services that they provide or new markets they can tap. They look to extend their capabilities through partnerships and consortiums.

4.5.1 Response to the use of Business Models:

Questions	Top Managers	Middle Managers	Consultants
Business indicators	Financial indicators(5) ,Transparency(3)	Infrastructure (6)	Customer relationship()
Decision making	Communication (7)	Model Framework(3)	-----
Strategic planning	Skills required (4)	Skills required (1)	Skills required (2)
Designing Information Systems	Business logic(2)	Business logic(3)	-----
Increasing Innovation	Thinking(6)	Experimentation(2)	Creativity(3)
Improving Communication	Feedback(4), customer support(3)	customer support(2)	Feedback(1)
Improve Business Process Flow	Streamlining the supply chain(5)	Streamlining the supply chain(3)	-----
As a Marketing tool	Advertisement(4)	Advertisement(7)	-----
Distribution channel	Supplementary distribution channel(5)	Review the distribution channel (4)	Relocation or reposition(2)

Table 4.4: Responses of the use of Business models

() the number in the parentheses indicates the number of responses

4.5.2 Analysis of the Study

The main strengths of the business model that came out of the interviews were threefold:

- a) Its ability to create a transparent big picture of a business and to externalize the relationships and dependencies of the business elements.
- b) Its use is comparable to the use of a commonly understood language to enable communication.
- c) Its use can stimulate approaching and understanding the fundamental questions of a business.

After analyzing the results of the interviews conducted and the important aspects that are brought into light from the interviews, we can understand that a IB is an emerging concept and is very new to people, banks are not clearly following specific business models for their migration towards IB. This emphasizes the need to design newer and better business models for the migration of traditional banks to Internet banks. From the

above it is clear that, BMs are indicators of business in the form of financial indicators.

Transparency is always considered important factor at top level. Infrastructure and customer relationship gather importance at the middle and lower level in bank. In

decision making, communication plays a vital role in getting the responses of the customers and then analyzing and evaluating them to make better decisions in the future.

Strategic planning demands the skills for a better understanding of the core competency of the bank. In designing Information systems business logic plays a vital role. While

carrying the implementation of innovations, the managers differed in opinion both at middle and lower levels. They believe that, the thinking changes due to BMs but the

managers at the middle level believe that, it's the experimentation with new methods that matters the most. The consultants believed that the creativity comes into the picture. Top-

level managers opine that, BMs support feedback from the customers and ameliorate support. Whereas, the customer support is important at middle level and feedback at the

lower level, matters most. The managers at both top and middle levels opined that business models help in streamlining the supply chain. The managers again at both top

and middle levels agreed on the fact that BMs provide a marketing tool in the form of advertisement. The managers consider BMs as a supplementary distribution channel in

contrast to the consultants insistent on relocation or reposition. Opinions among respondents are unanimous in projecting banking business models. A key challenge for the banks is to find what works uniquely on the Internet and to blend with the advantages of brick and mortar to form the clicks and mortars. Although the banks are interfacing with an increasing number of customers to access financial and banking services online. There is convincing evidence that the conventional bank branches were not fully disappear in the future. However, the role of the branches will continue to evolve. With the ever-changing patterns in customer demand, banks have to continuously monitor and change the branch layout and relocate their products and services among all the distribution channels. ICICI Bank is well positioned to increase its IB market in India because of its progressive approach to the use of Internet. It really has the brand advantage and a right profile of customers to kick-start its IB initiatives.

4.6 CONCLUSION

The chapter deals with study, analysis and design of business models for e-business migration. We have identified significant elements of business models that are to be considered for evaluation by review of the literature available on definitions and components of business models as given by various researchers. Identifying the significant elements of business models has helped in the study of the business models of several public, private and foreign banks and their evaluation, which in turn helped in coming out with proper business model for e-business migration. ICICI bank stands first in the evaluation where as Allahabad bank stands last. The analysis has showed that security concerns and lack of awareness stand out as the reasons for non-adoption of innovation of Internet banking by Indian customers. Bank managements could build awareness by emphasizing the benefits of Internet banking vis-à-vis telephone and brick and mortar (branch) banking and educate customers about security concerns.

PROCESS SIMULATION OF INTERNET BANKING

CHAPTER 5

PROCESS SIMULATION OF INTERNET BANKING

5.0 INTRODUCTION

Business renovation is a key aspect of Internet banking (IB) and a high-level strategy for managing change that cannot be handled by continuous improvement and organizational restructuring methods. Business process modeling and the evaluation of different alternative scenarios for improvement are usually the driving factors of the Business Process Reengineering (BPR). The study investigates business process simulation as a tool for deriving new knowledge about current business processes, such as additional in-depth understanding of how the process is executed and identifying sources of the problems observed during the process execution. It tried to investigate the potential benefits and outcomes of IB transitioning that can be assessed in advance by using simulation modeling. Survival in the current competitive environment is impossible without giving due consideration to engineering new business processes. Only real reengineering (a reevaluation and redesign of key business processes with the appropriate technological improvements) will gain long-term results. Banking has traditionally remained a protected industry in a developing economy like India. However, a combination of developments has compelled banks to change the old ways of doing business. The banking industry needs to move fast the short-term faddism of incremental improvements and reductions and institute meaningful reengineering if they really intend to stay competitive for long-term survival. It requires re-engineering of the existing processes to the extent of serving the purpose of the organization in an efficient way. Internet, which is most widely, used medium, acts as an enabler for implementation of the processes designed. The change in the information technology sector has enabled banks to have an online business presence and hence offer innovative and improved ways of customer servicing. The focus is now on creating and maintaining a cordial relation among various business partners. With the implementation of these processes, the organization would definitely gain competitive advantage. Hence, the re-engineering of such

processes would primarily focus on improving the relationship between the business partners. Development of dynamic business models with a futuristic thought would cater to the changing needs of the market without much change in the operations of the organization. With the changes taking place everywhere, banking industry has not been left alone. It would be reasonable if we could attribute this change to the prevailing competition and continuous growth of corporate world.

Business model of an organization is a mechanism by which it intends to generate revenue and profits. Times are changing and organizations must continuously rethink their business design. The success or failure of an organization depends on how well its business design matches their customers' priorities. Many organizations are today using the Internet to adapt, and in some cases revolutionize their business models and create innovative forms of customer relationships services. All these are possible primarily due to the new electronic paradigm of the market space created by the Internet.

It provides a detailed explanation of the process of reengineering the conventional processes followed at the banks so that the insignificant activities in the process are given up and efficiency of operations is achieved. The account opening process and the loan process are the basic processes undertaken by any bank. Apart from these two basic processes, Electronic Fund Transfer (EFT) has also been studied. The scope of the study is to reengineer the conventional account opening process, loan process in general and car loan process in particular. Keeping all the above concepts in mind, a new model has been developed which would help banks to effectively re-engineer their numero-uno process of EFT, car loans, and good use of the technology and market situations to their advantage. This process model has been designed based on an in-depth study done on some of the leading banks both public and private in India. As a result of the detailed study the appropriate process has been chosen to serve as a reference for the simulation model. The simulation model plays a vital role to analyze the existing business processes, to develop a new one removing the unnecessary cardinalities, and to make qualitative and quantitative estimations that would help to decide whether to implement the process or not. The chapter presents the entire process of loan procurement in any bank which has a tier structure similar to the design and simulation of this

model. This study presents iGrafx process (Micrographix) software as a suitable tool for process mapping and simulation modelling in BPR projects. One of the main advantages of this modelling technique is its simplicity; even the people who have never seen the models of business processes before can easily understand this technique. This process is very powerful in simulations. It can generate many useful reports regarding the duration of each transaction, costs, resource utilization, etc. at the end of the simulation. This tool was used in many BPR projects for simulation. Some of them are "Simulation Modelling towards E-Business Model Development" and "The Role of Simulation in e-Business Transformation" (Vesna Bosilj Vuksic). This tool is so far used only in B2B (Business to Business) processes but in this study we used iGrafx for B2C (Business to Consumer) processes. Nowadays, Banks are investing heavily to transform their traditional business into Internet business, but most of them lag behind in adopting the Internet in their processes. The indirect process is usually considered as unstrategic and is therefore overlooked. However, savings in this area can be huge. Knowledge of established processes and of what banks are actually spending is very worthwhile. While small companies could gain competitive advantage and extend their customer base by using e-commerce, it must be stressed that the key business driver for large companies should be the implementation of an e-procurement process. Model building in banks is an answer to the problem of the customers who have been taken off by the global bankers, commencing from the advanced countries of the world. In the ambit of the extensive technology used in a way to adapt IB structured form of decision making is becoming the need of the banking industry. To streamline the decision making capabilities both, in domestic and international banking setup, the use of modular devices as per the organization capabilities of the bank is the answer to the effectivity in the operational and strategic intervention. The banking business as such runs on trusts. The compatibility with the customer through a fiduciary relationship is the continuous answer to the banking problem. Several researchers have conducted their studies to construct, use and validate several models applicable in banks. Since the on bank and off banks activities in the advanced country are streamlined and in majority of cases inter institutional businesses are also standardized. These models gave an impact generating results. The model building in banks were extensively in the B-B e-commerce interventions with an advantage to negotiate the cost of banking services, broadening their supplier base and streamlining advance and deposit function of the

bank using e-commerce devices. Domestic banking industry in our country is not very vibrant and capable to adapt these models. However the technology friendly larger bank like ICICI has been experimenting to successfully adopt B-B models for growth and development in their business. The studies in Indian Banking are limited to justify to what extent these B-B models could be in a position to intensify or extensify the branch banking which laid the foundation of Indian Banking revolution as a post nationalization measure. Off late, it was found from the experiences of the bankers globally that the B-B models can be extended as B-C which is more pervasive in the Indian context since B-B model could answer to the problems of Indian banking in a partial manner. Herein this study, the researcher is enthused to find some of the exploratory software which is adopted in the banking sector in the advanced country of the world. Perhaps no innovation is reported to use this software in Indian context. As an alternative to this thought, in the pretext of the above, Indian Banking need, to either modify B-B models in practices in advance banking setup to B-C models in domestic banking activities. Even today the customer focused segments are not been worked out. We should now build a B-C model in order to identify both domestic and international investor and transact with them both in operational and strategic intervention. The researcher with all efforts have found certain parameters by making the banking activity customer friendly, working out the cost and time required for these service and still vying with the idea of developing this worked out exercises into a customer focused model. This also provides a scope for other researcher to take out this idea to explore further possibility. While considering the growth of banking industry to cater the needs of an average middle class Indian having access to technology friendly banking a suitable B-C, model has to be adopted. This may require restructuring the organizational setup of the bank or going for complete reengineering by modifying the departmental activities incorporating the IB habits. The researchers has explored the possibilities to calculate, under certain assumptions the cost of banking since the Indian banking is saving oriented than investment oriented, the use of B-B model has various limitations except some possible use in highly sophisticated, technology friendly, international banking service providers in commercial capital of country only. The banks that are providing IB facilities from these cities have to standardize their banking patterns in order to co exist with the banking norms of such advanced countries with whom they are transacting. But to spread these banking activities to a customer focused segment

bicker certain fundamental limitations. Process simulation throws light on some of the potential benefits that a bank would reap on the implementation of this model in terms of cost and time they invest for such activities. This model finds a best fit in the Indian banking sector. However, it would also serve without much modification the global banking market as well.

The chapter is structured as follows. Section 5.1 talks about the research methodology, literature review on BPR. Section 5.2 mentions the influence of IT and BPR on e-business implementation. In Section 5.3 business process modelling and information systems modelling is presented. Simulation modelling tool iGrafx Process is described in Section 5.4. Examples of modelling various processes of banks like account opening, loan procurement and EFT are provided in Section 5.5. Then the applicability of simulation modelling and evaluating alternative business process strategies is investigated. Finally, Section 5.6 outlines the main findings and provides concluding remarks.

5.1 RESEARCH METHODOLOGY

The research was carried out in five phases to make it more effective and efficient and to come up with more meaningful inferences and make critical analysis on the result to improvise in future developmental activities. They are:

- 1) **Literature Review:** The data used in this research work were collected by means of personal contacts with some of the bank officials to know how they feel about the various processes like opening of an account, loan and EFT process and their expectations of what could be re-engineered to make the process flow more effective. Data were collected by means of distributing questionnaires and having personal interview with some of the officers in this regard. The general satisfaction levels of the employees were also found out in order to make the process cater to the needs of the customer in real sense and towards the satisfaction of the bank officials.
- 2) **Design and Simulation of AS IS Model:** With the data collected from the banks about the process flow, a rough estimate of the process was drawn and was verified by a panel of experts comprising of major top level bank officials. The data on cost

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and time about personal experiences of banks officials were recorded. This data was then used for developing simulation process. Slight modifications were made with major signs of problems creeping up and the AS IS model got finally simulated.

- 3) **Critical Analysis of AS IS Model:** For the purpose of re-engineering, the AS IS model was critically analyzed to know the pros and cons of the activities comprising the model. An activity based cost analysis was carried out to know the cost versus benefit details pertaining to an activity and to make a decision whether an activity needs modification or not.
- 4) **Design and Simulation of TO BE Model:** Taking the analysis into account and the AS IS model as the base model efforts were made to re-engineer the necessary activities so that the cost related to the activity gets reduced and on the other hand the benefits for the customer and the bank has increased.
- 5) **A Comparative Study to derive inferences:** A comparative study with an unbiased eye was carried to better understand the benefits of the new model and the drawbacks of the old model.

5.2 BUSINESS PROCESS REENGINEERING

In today's life, business means competition. Every business will contend to offer not only a better and more reliable product but also providing a better customer service. In the mean time, they are enforced to minimise their overhead costs. These can only be achieved through developing a better information system, a highly reliable infrastructure and a more efficient management system. e-Business born to bring a fresh air in bottleneck business's information system to provide an integrated system which is capable to handle far more complex transactions and yet providing a highly dependable system. But, how about their "traditional" management system, "traditional" staff and how will "change" affect them. In today's global economy worldwide customers are more sophisticated and demanding. IT, used for the past 50 years to automate manual tasks, will be used to enable new work models. The successful organization will not be "technology driven," rather it will be "technology enabled." Its goals

are customer oriented; for example, it's about processing a contract in 24 hours instead of two weeks or performing a telecommunications service in one day instead of 30. Reengineering is about radical improvement, not incremental change. In many ways, IB is not unlike traditional payment, inquiry, and information processing systems, differing only in that it utilizes a different delivery channel. Any decision to adopt IB is normally influenced by a number of factors. These include customer service enhancement and competitive costs, all of which motivate banks to assess their IB strategies. The benefits of IB are widely known and will be summarized briefly in this chapter taking various processes into consideration like accounting opening, loan process and EFT process model. IB can improve a bank's efficiency and competitiveness, so that existing and potential customers can benefit from a greater degree of convenience in effecting transactions. Consequently, financial institutions are therefore becoming more aggressive in adopting IB capabilities that include sophisticated marketing systems, remote-banking capabilities, and stored value programs. Internationally, familiar examples include telephone banking, automated teller networks, and automated clearinghouse systems. Such technological advances have brought greater sophistication to all users, commercial and "the man in the street". A bank may be faced with different levels of risks and expectations arising from IB as opposed to traditional banking. Furthermore, customers who rely on IB services may have greater intolerance for a system that is unreliable or one that does not provide accurate and current information. The challenge for many banks is to ensure that savings from the IB technology more than offset the costs and risks involved in such changes to their systems.

5.3 BUSINESS PROCESS MODELLING

The growing interest among academic and industrial communities in organizational change and business process re-engineering has resulted in a multitude of approaches, methodologies, and techniques to support these design efforts (Wastell et al, 1994), (Harrison and Pratt, 1993). Many different techniques can be used for modelling business processes in order to give an understanding of possible scenarios for improvement (Ould, 1995). There are also many software tools on the market that use these modelling techniques. In (Kettinger et al, 1997) the empirical review of existing methodologies, tools, and techniques for business process change was conducted. A reference framework was developed to assist positioning of

tools and techniques that help in re-engineering strategy, people, management, structure, and technology dimensions of business processes. According to (Curtis et al, 1992), a modelling technique should be capable of representing one or more of the following modelling perspectives: *functional* (represents what activities are being performed), *behavioural* (represents when and how activities are performed), *organizational* (represents where and by whom activities are performed) and *informational* (represents the informational entities – data). A deeper analysis of simulation modelling techniques suggests that these techniques are appropriate to address at least the functional, behavioural and organizational perspectives (Banks et al, 1997).

5.3.1 Information System Modelling and BPR

Business processes can be defined as a series of logically connected activities that use the company's resources. Davenport and Short (1990) define a process as "a structured, measured set of activities designed to produce a specified output for a particular customer or market". It gives a strong emphasis on how work is done within an organization. Some common elements can be identified in a majority of definitions. These elements relate to the process itself (usually described as transformation of input, work flow, or a set of activities), process input and process output, usually related to creating value for a customer, or achieving a specific goal (Paul et al, 1998).

The awareness of IT capabilities should influence the design of business processes. In addition to the investment in information technology, a new type of information system models should be designed. The structure of information system model could be divided into the static and the dynamic part. The static structure of the model consists of functions, human and other resources, while the dynamic part consists of data, processes and events. The dynamic structure of information systems demands the implementation of process-oriented methods and tools.

Process models are often developed by using graphical software tools that show business processes, activities and participants with flow diagrams and process charts. A disadvantage of these tools is that they are unable to perform process analysis. Process modelling tools

must be able to show interconnections between the processes and to conduct a decomposition of the processes. These tools must help users to conduct "what-if" analysis and to identify and map no value steps, costs, and process performance (bottleneck analysis). They should be able to develop "AS-IS" and "TO-BE" models of business processes.

Important initial activities for BPR projects are the acquisition of descriptions of the concerned business systems and the development of "AS-IS" model of the bank's processes. "AS-IS" model (model of current business processes) provides BPR participants with the information needed to decide what to change, how to change and what will be the result of the change. The next phase is the development of "TO-BE" models which represent both existing and alternative processes. It must be validated and tested before the implementation. It can be used to predict characteristics that cannot be directly measured, and it can also predict economic and performance data that would otherwise be too expensive or impossible to acquire.

5.3.2 Simulation Modelling and BPR

Simulation has an important role in modelling and analyzing the activities in introducing BPR since it enables quantitative estimations on influence of the redesigned process on system performances (Bhaskar et al, 1994). The simulation of business processes represents one of the most widely used applications of operational research as it allows understanding the essence of business systems, identifying opportunities for change, and evaluating the impact of proposed changes on key performance indicators. The design of business simulation models is proposed as a suitable tool for BPR, it will incorporate the costs and effects of e-business implementation and will allow for experimentation and analysis of alternative investments. Some of the benefits can be directly evaluated and predicted, but the others are difficult to measure (intangible benefits). Some intangible benefits might be: improved image of a company as a whole, increased market share, better relationships with partners, and increased customer satisfaction. This research investigates some of the benefits and outcomes of introducing new processes (time and cost savings, workload reduction and increased throughput) that could be measured in advance, by simulation modelling.

Recent development in simulation software made simulation particularly suitable to use in BPR (Van Ackere et al, 1993). A re-engineering business process involves changes in people, processes and technology over time. As these changes happen over time, simulation appears to be a suitable process modelling method. Simulation is often called a technique of last resort because it is used when the system to be modeled is too complex for analytical models (Oakshot, 1997). The interaction between people with processes and technology results in an infinite number of possible scenarios and outcomes that is not possible to predict and evaluate using widely popular static process modelling methods. Kettinger et al (1997) mention simulation as one of the modelling methods in their survey on business process modelling methods.

The reasons for the introduction of simulation modelling into process modelling can be summarized as follows:

- simulation enables modelling of process dynamics,
- influence of random variables on process development can be investigated,
- anticipation of reengineering effects can be specified in a quantitative way,
- process visualization and animation are provided,
- communication between clients and an analyst is facilitated by simulation models.

Modern simulation software tools are able to model dynamics of the processes and show it visually, which then can enhance generating the creative ideas on how to redesign the existing business processes. Modelling elements are connected with links, which describe the process flow. Each activity is placed in one or more departments that represent an organizational unit, which performs these activities. IGrafx Process also offers a wide range of possibilities for describing a process: different possible splits of the process flow, many possible settings for events generation, schedules may be customized, it is possible to use custom attributes etc. BPR is an organizational method, which demands radical redesign of business processes in order to achieve higher efficiency, better quality and more competitive production (Hammer and Champy, 1993). BPR has become one of the most popular concepts in the organizational management creating new ways of doing business (Tumay, 1995). Many leading banks nowadays have conducted BPR in order to improve productivity and gain competitive advantage. It is well known that Internet business might bring several advantages to a company. However, existing practical business applications have not always been able to

deliver the benefits they promise in theory. Prior to adopting IB, banks need to assess the costs needed for setting up and maintaining the necessary infrastructure and applications, and they need to compare it with the expected benefits. Although the evaluation of alternative solutions might be difficult, it is essential because it reduces some risks associated with BPR projects.

5.4 SIMULATION MODELING WITH IGRAFX

This study presents iGrafx Process software as an appropriate tool for process mapping and simulation modeling in BPR projects. One of the main advantages of this modeling technique is its simplicity; even the people who have never seen the models of business processes before can easily understand this technique. iGrafx Process is very powerful in simulations. It can generate many useful reports regarding the duration of each transaction, costs, resource utilization, etc at the end of the simulation.

Fig 5.1 shows basic modeling elements of the process maps technique that is used by iGrafx Process. An activity is an individual step of a process map presented as a symbol in a flowchart. Each activity can set or determine the following information:

- **Inputs:** an activity can have one or more inputs that arrive by the way of incoming connection lines.
- **Resources:** a resource is a person, machine, or other asset that may perform the activity. An activity can use several resources or more than one kind of resource simultaneously.
- **Task:** the task information covers the duration that the activity takes to complete, its associated costs, activity base, and schedule.
- **Outputs:** the outgoing connection lines from an activity attach to other activities for further processing.

Modeling elements are connected with links, which describe the process flow. Each activity is placed in one or more departments that represent an organizational unit, which performs these activities. iGrafx Process also offers a wide range of possibilities for describing a process: different possible splits of the process flow, many possible settings for events generation, schedules may be customized, it is possible to use custom attributes etc. Overall iGrafx is one of the most comprehensive tools for the re-engineering of the business processes and

simulation of results in a controlled environment. The results of the simulation can directly be interpreted from the report generated which would give a clear picture in terms of cost, time, task in queue and the resource utilization.

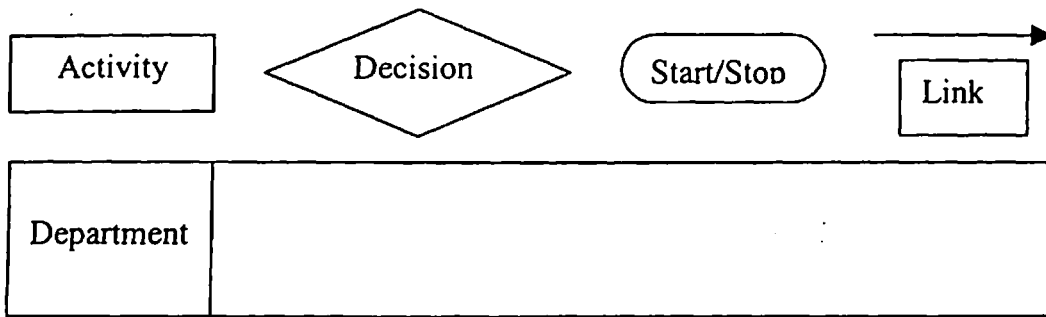


Figure 5.1: Basic modeling elements of iGrafx

The process model is initially designed in the iGrafx professional with all the inputs in terms of time and cost most importantly provided for each activity. Once the process model is complete it is simulated using the iGrafx Process where the entire process is traced first and simulated there after. The results are then put to critical analysis by the developer and inferences are drawn to support them.

Businesses today are facing competitive and economic pressures that continue to increase at an accelerating rate. These pressures have led to improvement initiatives such as BPR, Six Sigma, and Lean. At the same time, customer demands and regulatory requirements have created a host of standards to which businesses must comply, such as ISO, Sarbanes-Oxley, and Basel II. In an effort to meet the challenges, disparate parts of the organization are deploying solutions that aim to help them meet their own distinct objectives. These factors have created an unsustainable environment in which best practices are not leveraged, communication is not facilitated, and learning curves are steeper and longer than necessary. Additionally, application developers that are tasked with implementing automated solutions often receive inconsistent, incomplete requirements which require significant translation efforts from the business view to an implementation view.

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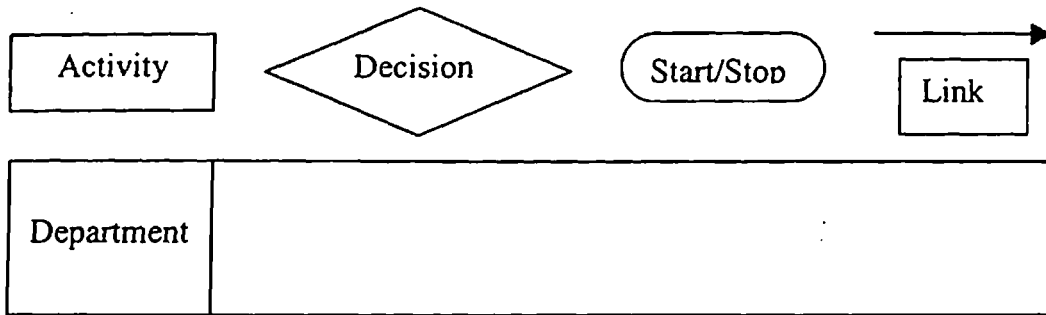


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5.4.1 Terminology used in the iGrafx processes:

Total Elapsed Time (Time): The amount of time that elapsed between the simulations starting and ending times.

Service Time (Avg Serv, Tot Serv): The actual amount of time the transaction is being processed. This is a combination of working time, waiting for resource time, and blocked time, but not inactive time.

$$\text{Service Time} = \text{Working Time} + \text{Waiting for Resource Time} + \text{Blocked Time}$$

Waiting Time (Avg Wait, Tot Wait): The wall clock time that a transaction waits to be processed.

$$\text{Total Wait} = \text{Total Resource Wait} + \text{Total Block} + \text{Total Inactive time}$$

Transaction Formulas:

Total (Tot): The combination of all of the completed transaction statistics.

Average (Avg): The total divided by the count of completed transactions.

Transaction Count:

Total # Transactions (#Trans): The number of transactions that have completed the process. This doesn't include the transactions that are still in the process when the simulation ends. Even if a transaction leaves and re-enters a department, it is counted only once in the department's total.

Transaction Time Statistics (Time Tab)

The time that a transaction spends being processed can be categorized as either working, waiting for resource time, blocked time, or inactive time.

Working Time (Avg Work, Tot Work): The time spent in working for the duration of an activity.

Waiting for Resource Time (Avg Res Wait, Tot Res Wait): The time a transaction spends at an activity waiting for a resource that is currently busy with another transaction or out of service.

Blocked Time (Avg Block, Tot Block): The time a transaction spends blocked at an activity. This can occur when an activity batches by time or by gate, during a delay duration, or when a capacity limit is reached. Blocked time does not include any time spent waiting for a resource at an activity.

Inactive Time (Avg Inact, Tot Inact): The time a transaction spends at an activity waiting because the necessary resources or the activity are not in schedule (i.e., inactive).

Cycle Time (Avg Cycle, Tot Cycle): The wall clock time that it takes a transaction to complete. This is a combination of working time and waiting time.

$\text{Cycle Time} = \text{Working Time} + \text{Waiting for Resource Time} + \text{Blocked Time} + \text{Inactive Time}$

Resource costs can be allocated to one of the following categories:

Task: The cost category is inherited from the activity's task.

VA (Value-Added): Use of the resource contributes to the creation or delivery of a product or service.

BVA (Business Value Added): Use of the resource does not contribute directly to the creation of a product or service but is necessary to the operation of the business.

NVA (Non-Value Added): Use of the resource does not contribute to the product, service, or business.

Basic Time Statistics:

There are 4 basic time statistics:

Blocked Time: The time accumulated waiting in collection and in delay.

Resource Wait Time: The time accumulated waiting to obtain a resource.

Work Time: The time accumulated doing work.

Inactive Time: The time accumulated waiting for a resource that is inactive or out of schedule.

5.4.2 Assumptions:

For the sake of convenience the following assumptions are made while building the various models:

- 30 days per month
- Only Sundays holidays
- 2 more holidays are considered (as Saturday is a half day)
- 6 days x 7 hours of work (10AM-5PM)
- 4 Sundays in a month
- Net Working days $(30-6) = 24$ days
- Salary per month:
- **Loan process:**
 - Rs.15750 basic salary for the account and the loan officers
 - Rs.18900 basic salary for the Branch Office Manager (BO)
 - Rs.25200 basic salary for the Zonal Office Manager (ZO)
 - Rs.33350 basic salary for the Head Office Manager (HO)
 - Rs.10, 000 basic salary for the clerk
 - Rs.15288 basic salary for the other staff
- **Car loan process per month:**
 - Rs.15750 basic salary for both the officers
 - Rs.18900 basic salary for the manager
- Rs.20/hour Internet Cost: This cost incurred on the internet may be decreased by making an efficient use of advanced and sophisticated technology.

- Queuing theory is applicable in the AS-IS models of the processes whereas it's not applicable in the TO-BE models. Queuing order determines which transaction leaves an activity input queue first. The First in First out queuing order is chosen.

5.5 SIMULATION PROCESS

In the following section three basic banking processes, the account opening process, the loan process in general and Car loan in particular, EFT (EFT) has been studied and reengineer the necessary activities so that the cost related to the activity gets reduced. This simulation is done with the help of iGrafx tool.

5.5.1 The process of opening an account

Overview of the Account opening process:

A rational earner would prefer future consumption to present consumption. This leads to the need for savings of the current income for future consumption. Bank accounts are one of the most widely used conventional means of saving.

Bank Accounts can be of three types:

1. Savings account
2. Current account
3. Term deposits

In this real time world, there has been an increasing need for faster accomplishment of financial transactions. At the same time there arises a need for security. Nowadays bank accounts have become one of the important eligibility criterions for availing services like safety lockers, credit cards, demat account, house loans etc. Thus the account opening process has become one of the major functions of a bank. So there is a need for reengineering the conventional process so as to make an efficient use of the opportunity available. This has been the driving force for the study of this process.

We first study the conventional account opening process followed in banks and develop an AS-IS model. We then try to find out the insignificant activities involved and build a reengineered model suitably called the TO-BE model. We then make comparisons of the

inputs and the outputs of the two processes. The banks can implement this model and avail strategic advantage, thereby making use of the current technology. In the design and simulation of such a model the factor of cost effectiveness reducing the cost incurred for undertaking a transaction in a process and time taken for completing one such transaction. For example, the valuable time invested in guiding the applicant to fill the application form is reduced by the use of Internet, thus reducing the opportunity cost of the time invested. Hence we have the spread increasing and on the other hand the time for any such transaction. Thus the basic focus would be on the assessment of savings based on the time and cost incurred for one such transaction at any instant. This has led to the development of a standard AS-IS model apart from a more efficient TO-BE model. Here the major assumption made is that the process of account opening starts with the customer feeling the need for the same unlike in previously evolved processes.

5.5.1.1 AS-IS Model:

The AS-IS model is the traditionally followed process for Account opening, loan processes and EFT. Customers of bank can transfer funds from one branch of a bank to another branch of any bank located in a different centre and credit to the account is made on the next day.

The AS-IS model for the account opening process starts with the customer feeling the need for an account with the bank. The customer thus goes to the accounts department of the bank and consults the concerned officer. He directs him to fill the application form. The customer fills the form and attaches the documents and then submits it to the officer. In Indian Banks e.g. current accounts are approved for parties recommended by the banks on proper introduction with a minimum sum of Rs 5000 for computerized branches and Rs 3000 and Rs 1000 for non-computerized metro/urban and non-computerized semi urban/rural branches respectively. The officer then verifies the application and the attached documents. If they are valid, the officer gives the customer an A/C number and updates the database and at the same time asks the customer to deposit the minimum amount required to maintain an account with the bank. The minimum amount to be deposited is according to the statutory requirements. The customer collects the deposit form from the cash-receipt counter and submits it to the concerned officer along with the cash. The officer deposits the amount into the customers

account and gives him the counterfoil. Simultaneously, the passbook and the database are updated by the officer. The customer is then handed over the passbook. There ends the process and then simulation is carried out. The following are the details of the AS-IS model. The following chart and table shows the activities involved, transaction statistics in terms of time and money, resource usage.

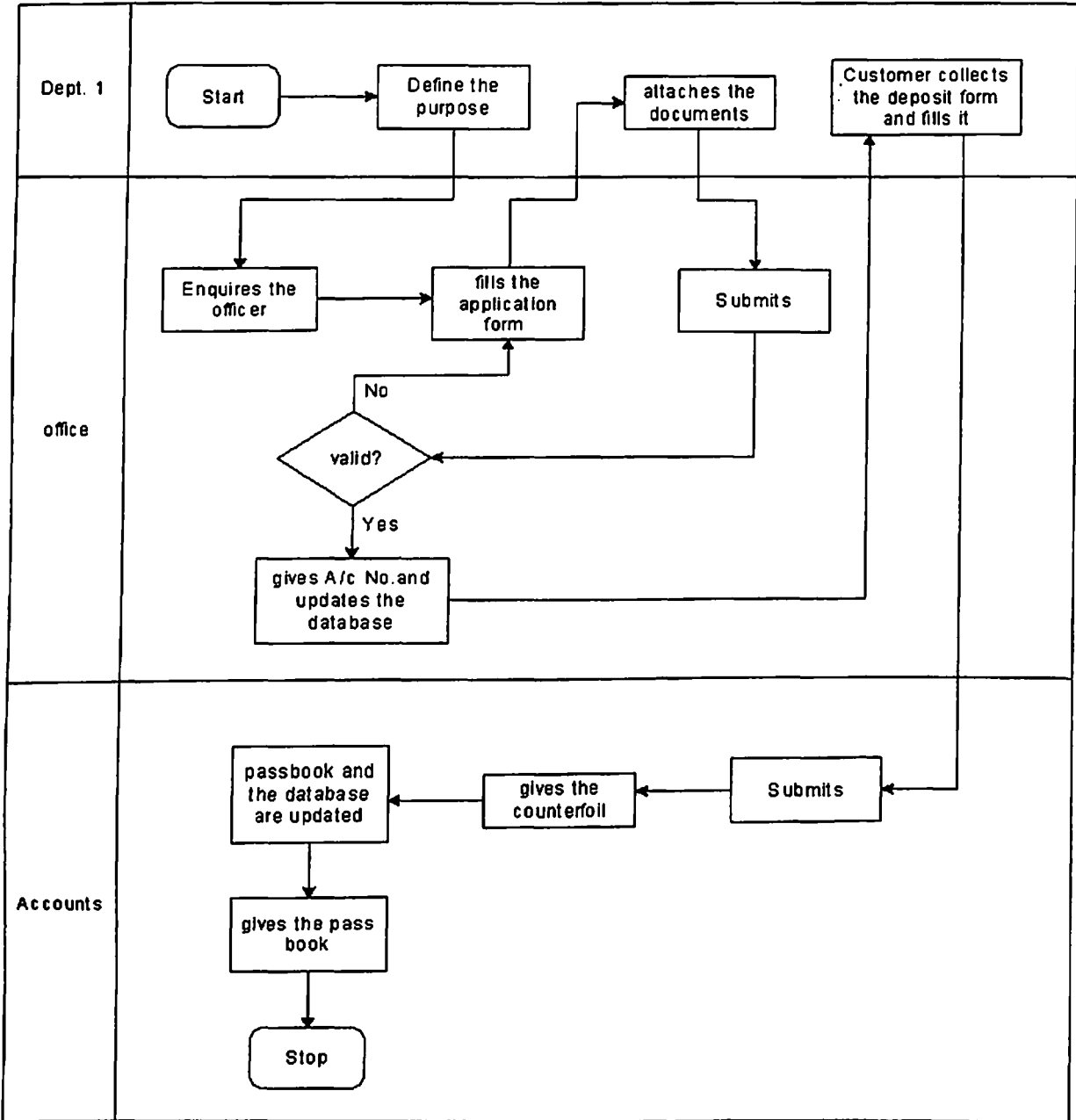


Figure 5.2: AS-IS process model of opening an account

Activity	Resources	Task	Output
Start	Customer	-	None
Define the purpose	Customer	5-10 mins	None
Enquires the officer	Customer	5-10 mins	50% Y 50% N
Fills the application form	Customer	1-2 mins	None
Attach required documents	Customer	5-10 mins	None
Submits	Customer	1-2 mins	None
Valid?	Officer	15-20 mins	None
Gives the A/C no. and updates the database	Officer, Internet	5-10 mins	None
Customer collects the deposit slip and fills it	Customer	1-2 mins	None
Submits	Customer	1-2 mins	None
Officer gives the counterfoil	Officer	1 min	None
Passbook and the database are updated	Officer, Internet	2-3 mins	None
Gives the passbook	Officer	0-1 mins	None
Stop	Customer		None

Table 5.1: AS-IS Model Inputs

Resource	Count	Cost/hr
Customer	1	Rs.0.00
Officer A	2	Rs.86.52
Internet	1	Rs.20.00

Table 5.2: Resource Usage (Rupees)

*#Trans	Avg Cycle	Avg Serv	Avg Work	Avg Res Wait	Avg Block	Avg Inact	Avg Wait	Avg Serv Wait
1	37.09	37.09	37.09	0.00	0.00	0.00	0.00	0.00

Table 5.3: Transaction Statistics – Minutes

* This indicates the no. of times decisions are to be taken. In some of the cases the start and the end stages also come under this count.

#Trans	Avg Cost	Avg VA Cost	Avg BVA Cost	Avg NVA Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg OT Cost
1	153.72	153.72	0.00	0.00	153.72	0.00	0.00	0.00

Table 5.4: Transaction Statistics (Rupees)

5.5.1.2 TO-BE Model:

The above statistics show that the technology like Internet was used to a little extent and it's less than the usage of the labor. The AS-IS model is reengineered to build a TO-BE model. This model is built by omitting the insignificant activities. The TO-BE model starts with the customer feeling the need to open an account with the bank. The customer gets connected to the bank's website. If the individual is not aware of the URL of the bank's site, he finds it out by means of search engines. Once he gets connected to the website he opens the accounts page. He follows the guidelines and decides whether to avail a current account or a savings account. He fills the form and submits the filled form online. After getting the acknowledgment he exits the website. Later, the officer obtains the form and processes the form and sends intimation to the customer. Customer then after receiving the intimation from the bank goes to the bank collects the deposit form and fills it. He submits the form at the counter and receives the counterfoil from the officer. Officer issues passbook and account number to the customer. The following chart and the tables show the activities involved, resource usage and transaction statistics- time in minutes and cost in Rupees.

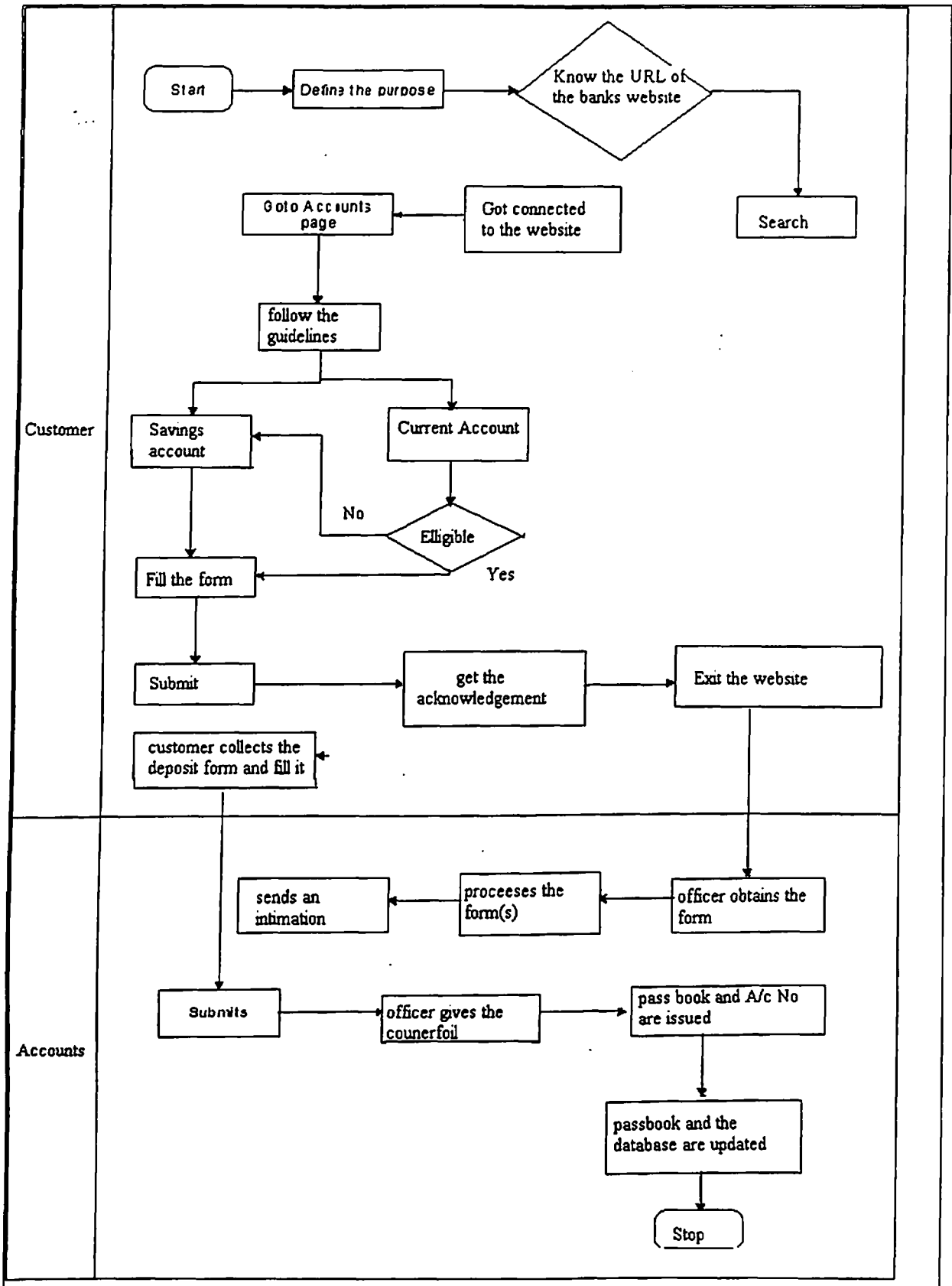


Figure 5.3: TO-BE process model of opening an account

Activity	Resources	Task	Output
Start	Customer	-	None
Define the purpose	Customer	1-60 secs	None
Knows the URL of the bank's website	Customer, Internet	1 sec	50%Y 50% N
Searches	Internet	1-2 mins	None
Get connected to the website	Internet	1-2 mins	None
Go to Accounts page	Internet	5-10 secs	None
Follow the guidelines	Customer, Internet	0-1 min	None
Savings account	Internet	2 secs	None
Current Account	Internet	2 secs	None
Eligible	Internet	1 min	50% Y50% N
Fill the form	Customer, Internet	3-5 mins	None
Submit	Internet	0-1 mins	None
Get the acknowledgement	Internet	2-5 mins	None
Exit the website	Customer, Internet	1-60 secs	None
Officer obtains the form	Officer, Internet	1-60 secs	None
Processes the form	Officer	5-10 mins	None
Sends an intimation	Officer, Internet	2-3 mins	None
Customer collects the deposit slip and fills it	Customer	1-60 secs	None
Submits	Customer	1 min	None
Officer gives the counterfoil	Officer	1-60 secs	None
Passbook and A/C no. are issued	Officer	4-5 mins	None
Passbook and the database are updated	Officer, Internet	1-60 secs	None
Stop	Customer	-	None

Table 5.5: TO-BE Model Inputs

Resource	Count	Cost/hr
Customer	1	Rs.0.00
Internet	1	Rs.20.00
Officer A	1	Rs.86.52

Table 5.6: Resource Usage (rupees)

*#Trans	Avg Cycle	Avg Serv	Avg Work	Avg Res Wait	Avg Block	Avg Inact	Avg Wait	Avg Serv Wait
2	17.45	17.45	15.05	2.40	0.00	0.00	2.40	2.40

Table 5.7: Transaction Statistics (Minutes)

* This indicates the no.of times decisions are to be taken. In some of the cases the **start** and the **end** stages also come under this count.

#Trans	Avg Cost	Avg VA Cost	Avg BVA Cost	Avg NVA Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg OT Cost
2	34.02	34.02	0.00	0.00	34.02	0.00	0.00	0.00

Table 5.8: Transaction Statistics (Rupees)

5.5.1.3 A Comparison between AS IS Model and TO BE Model:

Comparison Criterion	AS-IS Model	TO-BE Model
Cost per Transaction	Rs.153.72	Rs.34.02
Transaction Time	37.09 mins	16.21 mins
Resource Utilization		
Customer Utilization	34.64%	39.81%
Officer Utilization	36.82%	32.32%
Internet Utilization	20.01%	69.65%
Queuing Theory	Applicable	Not Applicable
Validation	Manual	1Tier Online Validation
Feedback	Printed Acknowledgements	Real Time Messages
Customer Satisfaction	Medium	Very High
Probability of Crash	Medium	High
Risk of Fraudulency	Medium	Very Low
Margin for Banks	Low	Very High
Investment	Moderate	High Initially
Maintenance	Low	Moderate
Availability Banking	Working hours	24x7 hours

Table 5.9: Comparison Chart

5.5.1.4 Inference:

We see that there is an increase in the utilization of customer after reengineering from 34.64% to 39.81% and a drastic rise in the utilization of the Internet from 20.01% to 69.65%. And a significant fall in the utilization of the officer is also observed i.e., from 36.82% to 32.32%.

There is a significant reduction in the cost per transaction, which amounts to approximately 77.8%. This reduction is due to the decrease in the utilization of the officer as seen above. As in the AS-IS model the cost is incurred only due to the bank officers and as there is a decline in their utilization in the TO-BE model, there has been a significant decrease in the cost. And a reduction of approximately 56.29% in the time taken to accomplish the process is also been observed because of the increase in the usage of technology.

5.5.2 Loan Process: In General

5.5.2.1 AS-IS Model:

The actual process starts here with the customer feeling the need for him to go for a loan from a financial institution such as a bank. This involves the definition of the purpose for himself for which he would procure a loan if necessary, the estimation of the amount to be borrowed and the selection of the bank. In a direct sense the process starts after the customer submits a completely filled application for the purpose. But when all the activities put together is seen as a solitary process we need to consider the above mentioned activities in relevance to the customer before the actual process gets triggered. The process can happen in a hierarchy ranging from the branch office where the customer actually approaches for the loan to the zonal offices and then finally over to the head office if required. Each of these is attached with some powers and limits of sanctioning/dealing with loan proposals. The loan limit will depend upon the repayment capacity of the borrower and the required term. If the limits are not within the specified limits of their office then proposal gets on to the next higher authority, i.e. the Head Office being the final one and the highest authority. Processing the proposal received from the customer and thorough analysis of the same is done and then sent to the delegated authority. The time taken for a bank to grant a loan may depend on the location of the bank. If the bank is located in a major city the process may take lesser time. It may also depend on the type of the bank because private sector banks may do it faster than others.

The simulation of 30 days performance was carried out with the assumption that the process starts every 1-7 hours during the working time of the bank. The process shows that the loan procedure last for about 26.17days and the average cost is Rs.5575.54. The quantitative results of the simulation are presented no matter how precise and deep the simulation is, are only one aspect of this Business Process analysis. The basic difference between the existing processes and the model developed is that the re-engineered process has some insignificant activities eliminated and some influencing activities included giving the process model a new shape with the data used in both processes remaining same. The subtle efficiency of this

process is seen with the cost and time factors considered. The following table shows the resources of various activities involved, their usage, costs involved.

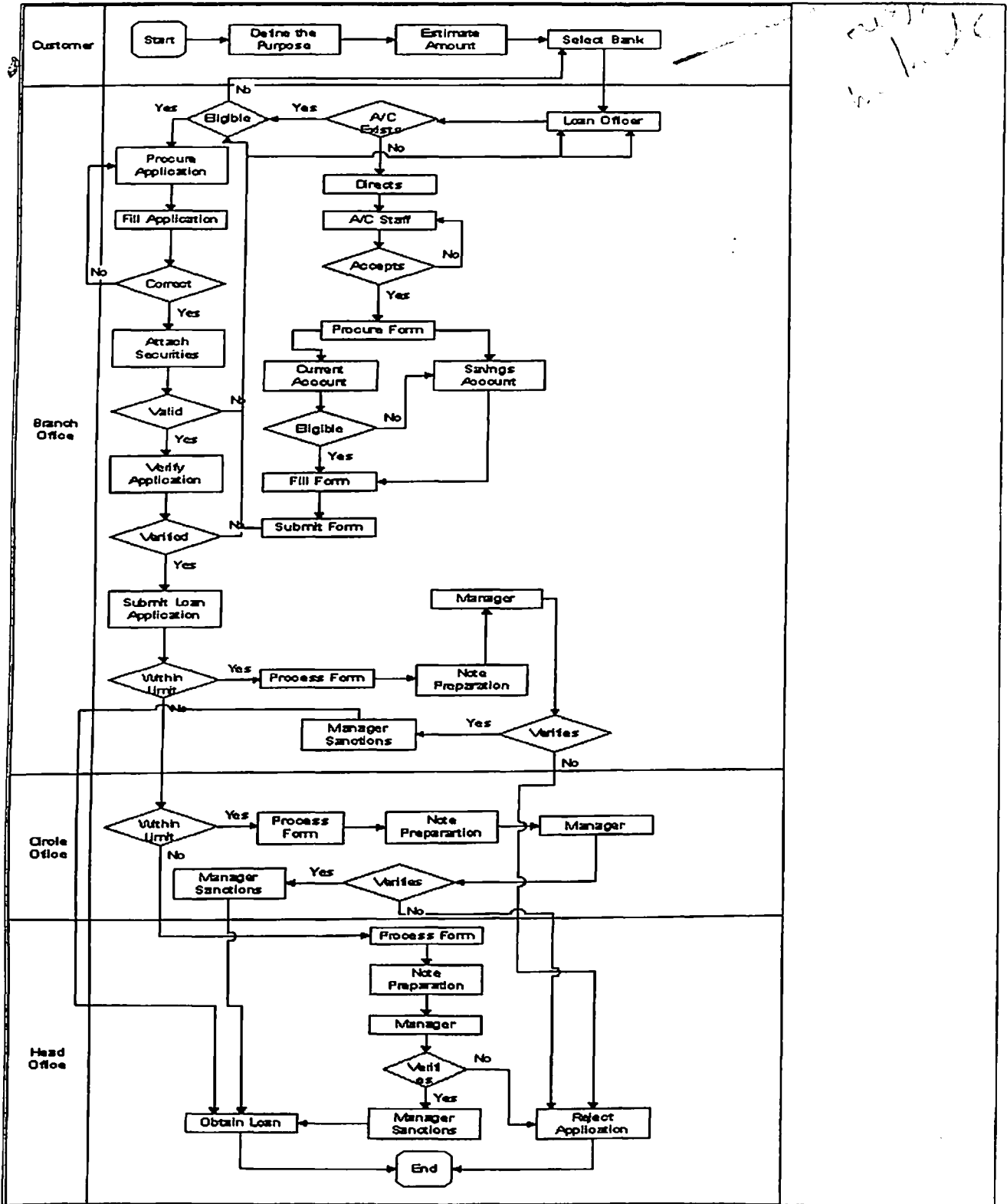


Figure 5.4: AS-IS process model of lending a loan

Activity	Resources	Task	Output
Start	Worker	-	None
Define the purpose	Worker	1-2 days	None
Estimate the amount	Worker	1-2 days	None
Select the bank	Worker	1-3 days	None
Loan officer	Loan Officer	3 hours	None
Account exists	Loan Officer	10-45 mins	50%Y 50%N
Directs	Loan Officer	1-20 mins	None
Account staff	Account Officer	1-30 mins	None
Procure the form	Worker	1-10 mins	None
Savings Account	Worker	3 mins	None
Current Account	Worker	3 mins	None
Eligible	Account officer	0 secs	50%Y 50%N
Fill the form	Worker	10-20 mins	None
Submit	Worker	5-10 mins	None
Eligible	Loan Officer	10-45 mins	50%Y 50%N
Fill the application	Worker	10-20 mins	None
Attach securities	Worker	10-20 mins	None
Valid	Loan Officer	10-20 mins	50%Y 50%N
Verify application	Loan Officer	10-20 mins	None
Verified	Loan Officer	20 mins	50%Y 50%N
Submit loan application	Worker	5-10 mins	None
Within limit	Staff	10-20 mins	50%Y 50%N
Process form	Staff	7-105 hours	None
Note preparation	Staff	7-14 hours	None
Manager	BO Manager	8-10 hours	None
Verifies	BO Manager	2-3 hours	50%Y 50%N
Manager sanctions	BO Manager	8 hours	None
Within the limit	Staff	10-20 mins	50%Y 50%N
Process the form	Staff	7-105 hours	None
Note preparation	Staff	7-14 hours	None
Manager	ZO Manager	8-10 hours	None
Verifies	ZO Manager	2-3 hours	50%Y 50%N
Manager sanctions	ZO Manager	8 hours	None
Within the limit	Staff	10-20 mins	50%Y 50%N
Process the form	Staff	7-105 hours	None
Note preparation	Staff	7-14 hours	None
Manager	HO Manager	8-10 hours	None
Verifies	HO Manager	2-3 hours	50%Y 50%N
Reject Application	Staff	10 mins	None
Manager sanctions	HO Manager	8 hours	None
Obtain loan	Worker	30 mins	None
End	Worker	-	None

Table 5.10: AS-IS Model Inputs

Resource	Count	Cost/hr
Worker	1	0.00
Consultant	2	0.00
Staff	15	84.00
HO-Manager	1	155.4
ZO-Manager	1	138.18
BO-Manager	1	103.74
Account-Officer	1	86.52
Loan-Officer	1	86.52

Table 5.11: Resource Usage (Rupees)

*#Trans	Avg Cycle	Avg Serv	Avg Work	Avg Res Wait	Avg Block	Avg Inact	Avg Wait	Avg Serv Wait
2	26.17	7.8	7.74	0.11	0.00	28.31	28.44	0.11

Table 5.12: Transaction Statistics – Days

* This indicates the no. of times decisions are to be taken. In some of the cases the start and the end stages also come under this count.

#Trans	Avg Cost	Avg VA Cost	Avg BVA Cost	Avg NVA Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg OT Cost
2	5575.54	1430.94	5725.02	419.58	6590.22	0.00	084.06	0.00

Table 5.13: Transaction Statistics (Rupees)

5.5.2.2 TO-BE Model:

With the actual process starting from the customer's side when the need is realized the customer chips into the website of the selected bank if the URL is already known else he searches for the correct address from any relied source (any search engine may be used). Once he has successfully dropped himself into the online banking premises of the bank there is one query to be answered. Are we dealing with the existing account holder or a completely new customer. If we are dealing with a new customer then latter needs to be directed to the account opening page where he will be presented with an account opening wizard which would guide him through the entire process of establishing a new relation with the bank. Now, if he is existing customer of the bank then he is eligible to apply or transact any sort of credit with the bank. This can be the primary assumption when the actual process starts that to transact with the bank the customer needs to hold an account in the same bank. The two types of accounts namely the current account and the savings account are also taken into consideration while opening a new account. Once the customer is done with this process he is given a username and a key to authenticate him into the loans page to download the relevant application format. This can be another assumption that not everybody visiting the online bank is given access to the application format but for the account holders. Unlike this everybody is granted access to the guidelines and the requirements to associate themselves with the bank.

Once the account holder authenticates him he scans through the entire guidelines sheet and then downloads the application format for loan processing. Having done with the above activity he fills up the application furnishing correct and relevant details as per the format. He attaches all the necessary documents to support the data on the application form which would serve as a handy instrument to analyze and evaluate the customer's application at the banker's end. Having submitted the complete application, (he might need to again send the hardcopy of the relevant details to the bank with details like signature etc.) the customer logs out stopping his initial participation in the process. This gives way for the direct loan process of the banks to start.

Yet another important assumption to be said here is that the customer's application is automatically sent to the branch office where he holds his account. With the loan process starting when the customer ends his initial participation the branch office of the bank receives proposals only from account holders of its own branch. If the proposal meets the limits pre-specified for each branch it would be handled by the branch itself. Suppose if the proposal limit exceeds the limits of the branch it moves up towards the circle office wherein the same process is repeated for checking whether the proposal falls under the umbrella of the circle office limits failing which the proposal is processed by the head office.

Once the proposal is reviewed and analyzed by the committee and sent to the higher authority usually within a weeks' time from the date when the proposal was received. But for practical reasons to reduce the time of processing the proposal is thoroughly analyzed by an expert committee and then a note is prepared which would summarize and identify the crux of the proposal which is then sent to the Branch Manager/CMD (it never goes to the CMD unless it's a big loan applied for a huge organization) of the bank for his recommendations. Once the proposal is approved by the concerned authority then changes are made to the limits of the proposal if any and then sent to the concerned authority for his consent. At this point of time when the proposal is sanctioned the account holder becomes a borrower. The specified limit of the proposal is credited to the borrower's account in quick time and intimation is sent to the borrower about the status of the proposal. Incase the proposal fails to meet the basic requirements or the terms and conditions of the bank then it is rejected and the account holder is intimated.

The process of loan procuring ends with either a credit into the applicants account or with the applicant's proposal getting rejected. There may be some inconsistencies and redundancies in the data provided but for experimental reasons these could be ignored. The following are the tables showing the resources of various activities involved, their usage, costs involved.

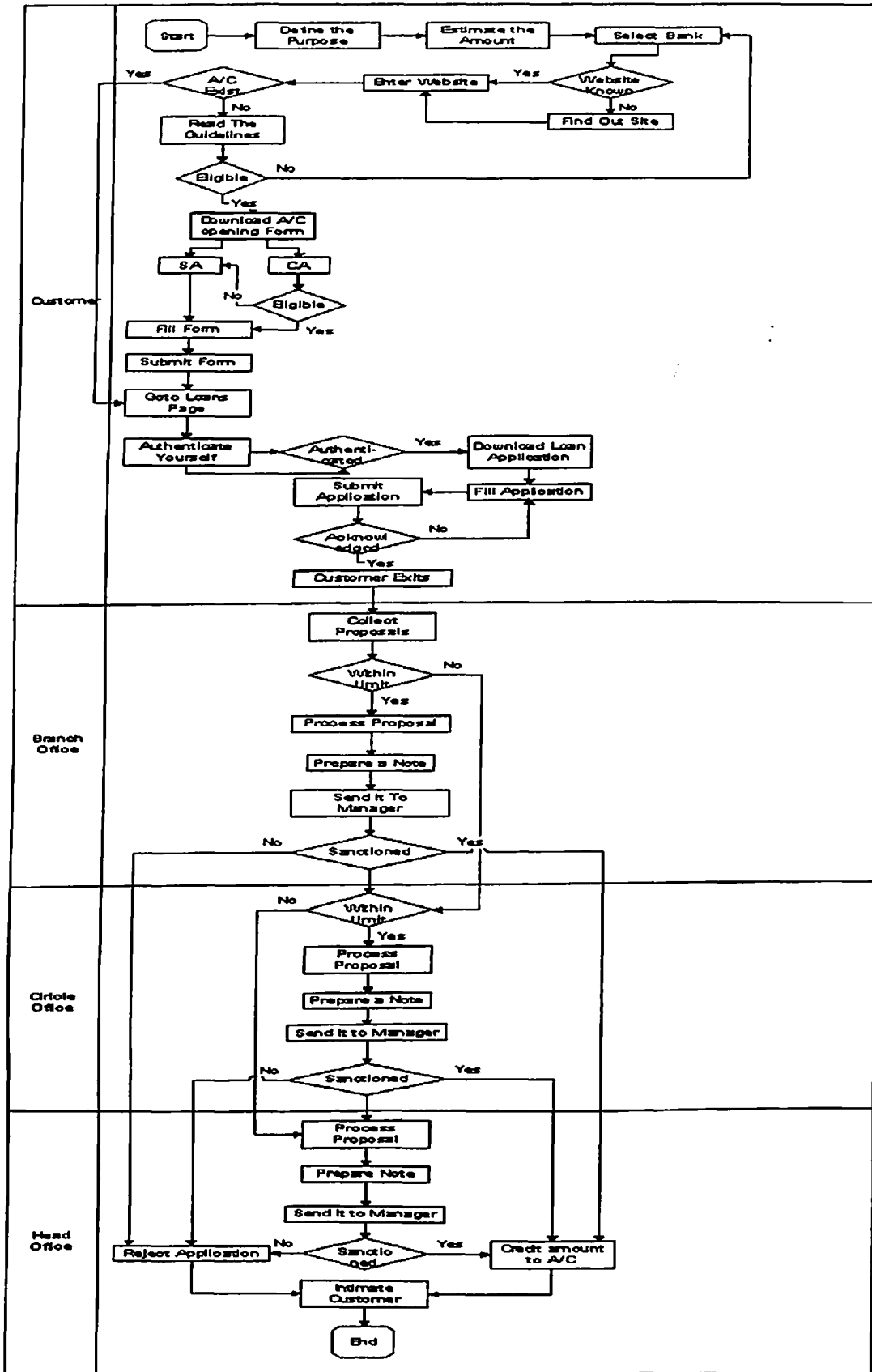


Figure 5.5: TO -BE process model of lending a loan

Activity	Task	Output
Start	-	None
Define the purpose	1-2 days	None
Estimate the amount	1-2 days	None
Select the bank	1-3 days	None
Website known	10 secs	50%Y 50% N
Find out site	2-3 mins	None
Enter Website	1-60 secs	None
A/C Exists	1-2 mins	50%Y 50% N
Read the guidelines	1-5 mins	None
Eligible	1-2 mins	50%Y 50% N
Download A/C opening form	1-60 secs	None
SA	10 secs	None
CA	10 secs	None
Eligible	1-2 mins	50%Y 50% N
Fill form	1-10 mins	None
Submit form	1-2 mins	None
Go to Loans page	1-60 secs	None
Authenticate yourself	1-2 mins	None
Authenticated	1-60 secs	50%Y 50% N
Download Loan application	1-2 mins	None
Fill Application	1-10 mins	None
Submit Application	1-2 mins	None
Acknowledged	1-60 secs	50%Y 50% N
Customer Exists	1-60 secs	None
Collect proposal	10-15 mins	None
Within limit	10-20 mins	50%Y 50% N
Process proposal	7-42 hours	None
Prepare a note	7-14 hours	None
Send it to the manager	8-10 hours	None
Sanctioned	2-3 hours	50%Y 50% N
Within limit	10-20 mins	50%Y 50% N
Process proposal	7-42 hours	None
Prepare a note	7-14 hours	None
Send it to the manager	8-10 hours	None
Sanctioned	2-3 hours	50%Y 50% N
Within limit	10-20 mins	50%Y 50% N
Process proposal	7-42 hours	None
Prepare a note	7-14 hours	None
Send it to the manager	8-10 hours	None
Sanctioned	2-3 hours	50%Y 50% N
Intimate the customer	5-6 mins	None
Reject the Application	2-3 secs	None
Credit amount to the a/c	5-10 mins	None
End	-	None

Table 5.14: TO-BE Model Inputs

Resource	Count	Cost
Worker	1	0.00
Consultant	2	0.00
Staff	15	84.00
Internet	1	20.00
HO-Manager	1	155.4
CO-Manager	1	138.18
BO-Manager	1	86.52

Table 5.15: Resource Usage (Rupees)

*#Trans	Avg Cycle	Avg Serv	Avg Work	Avg Res Wait	Avg Block	Avg Inact	Avg Wait	Avg Serv Wait
4	13.86	4.81	4.79	0.006	0.00	17.05	17.05	0.006

Table 5.16: Transaction Statistics – Days

* This indicates the no. of times decisions are to be taken. In some of the cases the start and the end stages also come under this count.

#Trans	Avg Cost	Avg VA Cost	Avg BVA Cost	Avg NVA Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg OT Cost
4	2614.64	617.82	2366.7	329.28	2707.74	0.00	607.32	0.00

Table 5.17: Transaction Statistics (Rupees)

5.5.2.3 A Comparison between AS IS Model and TO BE Model:

Comparison Criterion	AS-IS Model	TO-BE Model
Cost per Transaction	Rs.5575.54	Rs.2614.64
Transaction Time	29.54 days	12.69 days
Resource Utilization		
Customer Utilization	18.38%	26.72%
Officer Utilization	45.86%	30.00%
Internet Utilization	0.00%	98%
Queuing Theory	Applicable	Not Applicable
Validation	Manual	3 Tier Online Validation
Feedback	Printed Acknowledgements	Real Time Messages
Security	Slightly Vulnerable	Algorithm based
Customer Satisfaction	Medium	Very High
Probability of Crash	Medium	High
Risk of Fraudulency	Medium	Very Low
Margin for Banks	Low	Very High
Investment	Moderate	High Initially
Maintenance	Low	Moderate
Availability Banking	Working hours	24x7 hours

Table 5.18: Comparison Chart

5.5.2.4 Inference:

We also see that there is an increase in the utilization of customer after reengineering from 18.38% to 26.72% and a drastic rise in the utilization of the Internet from 0.00% to 98%. And a significant fall in the utilization of the officer is also observed i.e., from 45.86% to 30.00%. There is a significant reduction in the cost per transaction, which amounts to approximately 53.10%. This reduction is due to the decrease in the utilization of the officer as seen above. As in the AS-IS model the cost is incurred only due to the bank officers and as there is a decline in their utilization in the TO-BE model, there has been a significant decrease in the cost. And a reduction of approximately 57.04 % in the time taken to accomplish the process is also been observed because of the increase in the usage of technology.

5.5.3 Car Loan Process

Overview of the Car loan Process

The legal definition of loan is “A transfer or delivery of money from one party to another with the express or implied agreement that the sum will be repaid regardless of contingency and usually with interest.” Acting as a provider of loans is one of the principal task for financial institutions. The banks provide the facility of loans, which are generally funded by the deposits made by the customer of the bank. Other institutions avail the facility of loans by issuing of debt contracts; such as bonds is a typical source of funding.

The key asset or loan products offered under the consumer finance umbrella is broadly classified into two categories – namely ‘Secured’ and ‘Unsecured’ products and each of these categories have individual product lines within them. The Secured Loans category includes products like Home Loans, Auto Loans, Loans against Securities, Two Wheeler finance etc. On the Unsecured side we have products like Credit Cards, Personal Loans etc. This model focuses on the study and simulation of the car-loan process. The bank provides a part of the funds required for the individual to acquire the car. There was a time not so long ago when the average middle-class Indian had to toil hard for a good number of years to acquire basic amenities like the refrigerator, a television, and a car. Fast forward to the 21st century, the Generation-next India, growing up in the thick of the information revolution, the connectivity boom, coalition politics, IT enabled everything, the rise of the service economy and where living off debt is a well-accepted norm of life. If recent statistics on consumer finance are any indication, the last few years have been trend setting. Unlike his earlier predecessor, the middle-class has donned a new outlook; he attaches no social-stigma in borrowing for his spending. This paradigm shift happened due to two factors:

- Economic Liberalization - The soft interest rate regime and low inflation have delivered a double booster dose to consumer spending.
- Rising competition in recent years led to a huge growth in loans to finance purchase of consumer durables and housing

The overall demand for car loans, durables and two-wheelers has seen a 45-50% jump since January '05. Car finance has been growing by around 45%, while home loans grew by 50%.

This fact has been the driving force for simulation of the car loan process. The model simulates the traditionally followed process for lending car loans called the AS-IS model. Based on the study done on the AS-IS model, an attempt is made to reengineer the process by increasing the use of current technology. Keeping all the above concepts in mind, a new model has been developed which would help banks to effectively re-engineer their various credit lending processes. For example, the valuable time invested in discussing the terms of the loan processes is reduced by the use of Internet, thus reducing the opportunity cost of the time invested. Hence we have the spread increasing and on the other hand the time for any such transaction. Thus the basic focus would be on the assessment of savings based on the time and cost incurred for one such transaction at any instant. This has led to the development of a standard AS-IS model apart from a more efficient TO-BE model. Here the major assumption made is that the process of loan procurement starts with the customer feeling the need for the same unlike in previously evolved processes.

5.5.3.1 AS-IS Model:

The AS-IS model is the traditionally followed process for car loans. In the first phase AS-IS model of the car loan procurement process was developed. The actual process starts with the customer feeling the need for him to go for a loan from a financial institution such as a bank to buy a car. It involves the definition of the purpose for the customer for which he would procure a loan if necessary, the estimation of the amount to be borrowed and the selection of the bank to which he would put forward his proposal. The branch office, the zonal office and the head offices of the bank have limits of sanctioning/dealing with the loan proposals. As the proposals for car loans rarely go beyond the limit of the branch office we assume that the entire process takes place in the branch office of the bank.

As stated earlier the process starts with the customer defining the purpose and selecting the bank. The customer then approaches the loan officer for a car loan. The pre-requisite for obtaining a car loan from a bank is the existence of the customer's account with the bank. If

the customer presently doesn't hold an account with the bank he is directed to open an account, either savings or current account with the bank. He is directed to the Account opening and maintenance department. If the customer is already an account holder of the bank, the loan officer checks the eligibility of the customer. An individual who intends to obtain a car loan has to be at least 21 years old. The individual has to be earning to be eligible for a car loan. We broadly divide the income earners into three categories:

- Permanent employees of reputed establishments
- Professionals and self-employed who are income tax assesses
- Persons engaged in agricultures and allied activities

There are also a few other conditions that must be satisfied. The age of second-hand vehicle should not be more than 3 years and vehicle to be certified by Automobile Association of India/reputed Automobile Engineer/Value acceptable to the Bank as to the market value. Generally, the proposed amount for loan should not exceed two times the net income of the applicant. However, it also depends on the current financial standing of the person concerned. Once the amount is within the limit, the terms of interest and the maturity of the loan is discussed. The bank finances both the new and old car loans. The terms of interest and the maturity differ with the type of car as well as period of repayment. If the applicant's proposal satisfies all these conditions, he is now ready to fill the form and submit it. The officer guides him in filling the form. Once the application is filled and submitted it's ready for processing. If the processing of the application is completed with good satisfaction of the officials the application is sent to the sanctioning officer. If the application is approved the applicant is intimated and then the draft or BC is prepared favoring the dealer who has submitted his quotation. In this model i.e., the AS-IS model, the usage has been relatively more of labor and less of Internet. So the goal of the process of reengineering may be increasing the usage of Internet and reducing the usage of labor which is costlier than Internet service. The AS-IS model of the car loan process is as follows. The following chart and the tables show the activities, resource usage, and transaction statistics-time in days/hours/minutes/seconds and cost in Rupees used by the process.

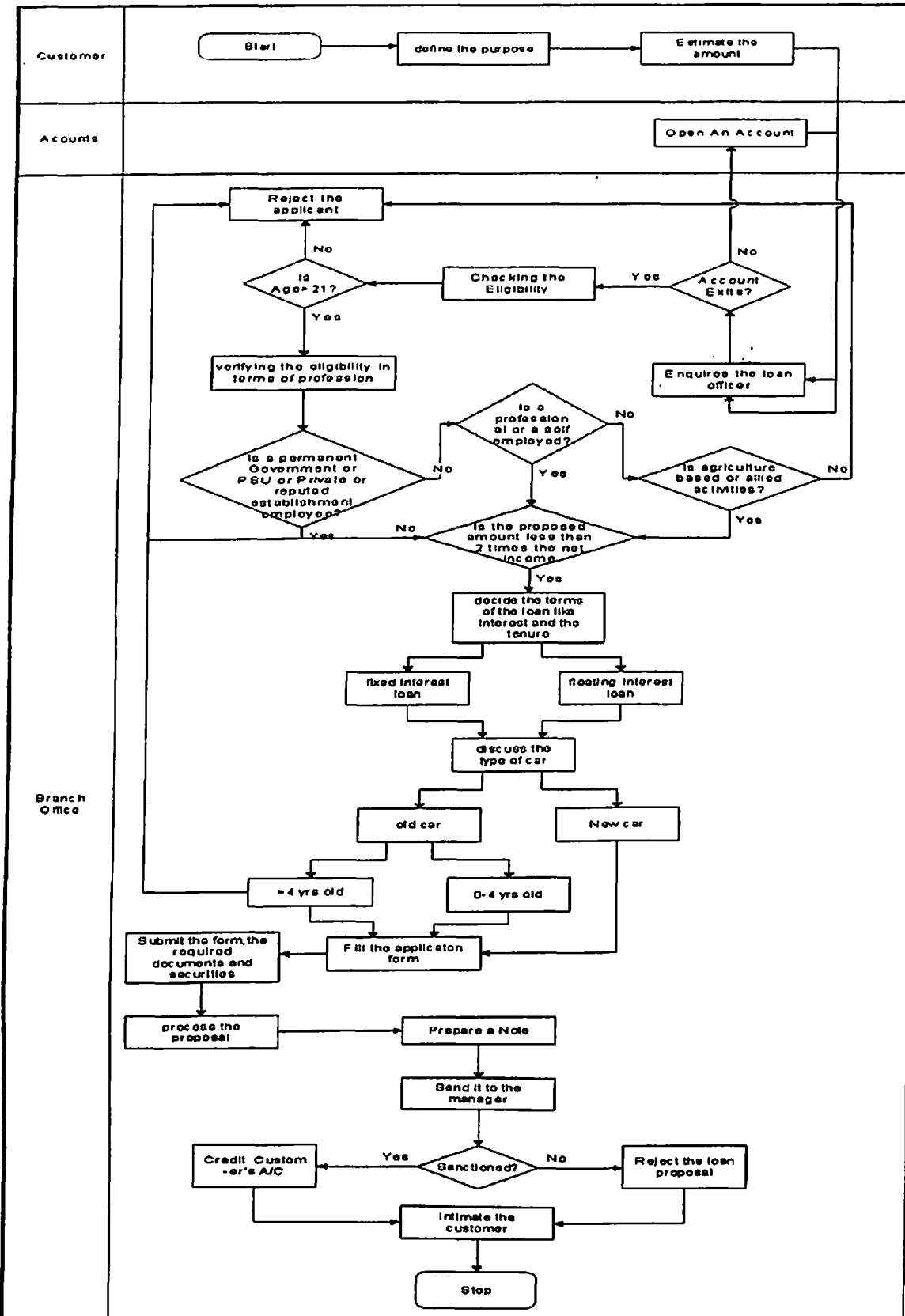


Figure 5.6: AS-IS process model of Car Loan

Activity	Resources	Task	Output
Start	Customer	-	None
Define the purpose	Customer	1-2 days	None
Estimate the amount	Customer	1-2 days	None
Enquires the officer	Customer	5-10 mins	None
Account Exists?	OfficerA	2-3 mins	50% Yes 50% No
Checking the eligibility	Customer, OfficerA	5-10 mins	None
Is Age>21	Customer; OfficerA	1-60 secs	90% Yes 10% No
Verifying the eligibility in terms of profession	OfficerA	2-3 mins	None
Is a permanent Govt. or PSU or Private or reputed establishment employee?	Customer, OfficerA	5-10 mins	30% Yes 70% No
Is a professional or a self employed?	Customer, OfficerA	5-10 mins	30% Yes 70% No
Is agriculture based or allied activities?	Customer, OfficerA	5-10 mins	30% Yes 70% No
Is the proposed amount < 2(net income)	Customer, OfficerA	1-2 mins	90% Yes 10% No
Decide the terms of the loan like interest and the tenure	Customer, Officer A	5-10 mins	None
Fixed interest loan	Customer, Officer A	2-3 mins	None
Floating interest loan	Customer, Officer A	2-3 mins	None
Discuss the type of car	Customer, Officer A	4-5 mins	None
Old car	Customer, Officer A	2-3 mins	None
>4 yrs old	Officer A	1-60 secs	None
0-4 yrs old	Officer A	1-60 secs	None
New Car	Customer, Officer A	2-3 mins	None
Fill the application form	Customer		None
Submit the form, the required documents and securities	Customer, Officer A	1-2 hrs	None
Process the proposal	Officer A	7-14 hrs	None
Prepare a Note	Officer A	6-7 hrs	None
Send it to the manager	Officer A	1-2 mins	None
Sanctioned?	Manager	7-10 hrs	80% Yes 20% No
Credit Customer's A/C	Officer A	2-3 mins	None
Reject the loan proposal	Officer A	2-3 mins	None
Intimate the customer	Officer A	7-14 hrs	None
Customer drops the plan	Internet	30-35 mins	None
Stop	Officer A		None

Table 5.19: AS-IS Model Inputs

Resource	Count	Cost
Customer	1	0.00
Officer A	2	86.52
Manager	1	103.74

Table 5.20: Resource Usage (Rupees) :

*#Trans	Avg Cycle	Avg Serv	Avg Work	Avg Res Wait	Avg Block	Avg Inact	Avg Wait	Avg Serv Wait
8	9.40	2.20	1.37	0.86	0.00	6.19	7.08	0.86

Table 5.21: Transaction Statistics – Days

* This indicates the no. of times decisions are to be taken. In some of the cases the start and the end stages also come under this count.

#Trans	Avg Cost	Avg VA Cost	Avg BVA Cost	Avg NVA Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg OT Cost
8	2024.84	2024.84	0.00	0.00	2024.84	0.00	0.00	0.00

Table 5.22: Transaction Statistics (Rupees)

5.5.3.2 TO-BE model:

The TO-BE model is the result of reengineering the AS-IS model. The process of reengineering involves the omission of some of the insignificant activities from the AS-IS model. We try to reduce the amount of resources used up by the process by omission of the activities. The TO-BE model of the car loan process starts with the customer getting connected to the bank's website. Now, if the customer holds an account with the bank he directly opens the car loans page of the website. Else he opens the accounts page, fills the appropriate application and submits it. He receives an acknowledgement then after which he goes to the loans page. Either way, after opening the loans page, the customer goes through the guidelines and the requirements for obtaining a car loan. He then fills the application and submits it. He then gets acknowledged and exits the website.

We, here assume that the submitted applications directly reach the branch office of the bank. The application is processed by the Loan Monitoring Department after assessment and the report is prepared. In case of any recommendations a note is prepared and is sent to the next higher authority for review and analysis. Finally if the process gets completed with good satisfaction of the officials the note is sent to the sanctioning officer. The TO-BE model of the car loan process and the tables showing the resources, which are used as inputs to this process, are as follows.

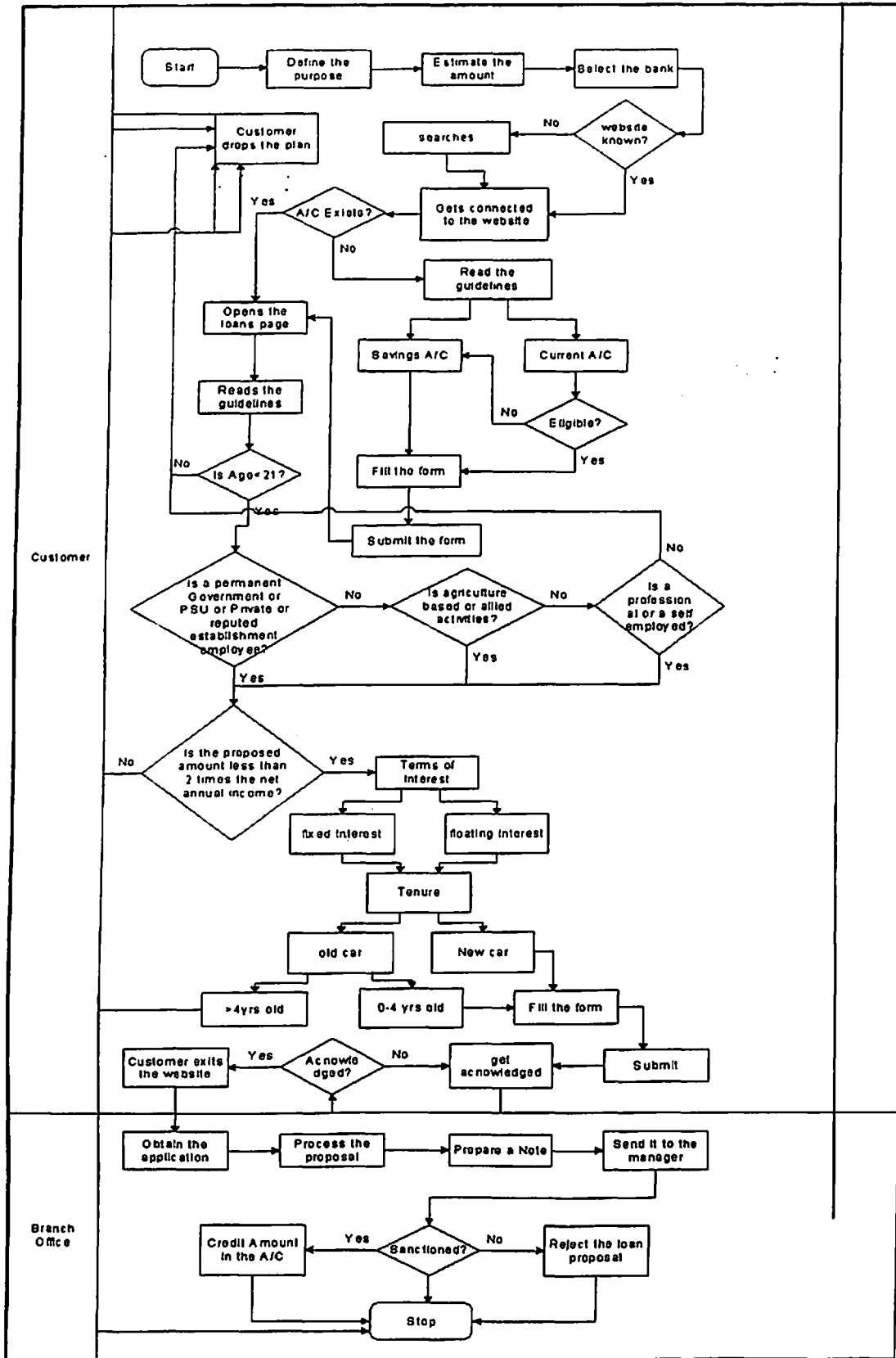


Figure 5.7: TO-BE process model of Car Loan

Activity	Resources	Task	Output
Start	Customer	-	None
Define the purpose	Customer	1-2 days	None
Estimate the amount	Customer	1-2 days	None
Select the bank	Customer	1-2 days	None
Website known?	Customer	1-2 mins	None
Searches	Internet	5-6 mins	None
Gets connected to the Website	Internet	1-2 mins	None
Account Exists?	Internet, Customer	-	50% Yes 50% No
Read the guidelines	Internet, Customer	1-5 mins	None
Savings A/C	Internet	1-2 secs	None
Current A/C	Internet	1-2 secs	None
Eligible?	Internet	1-2 mins	50% Yes 50% No
Fill the form	Internet, Customer	3-4 mins	None
Submit the form	Internet	5-10 mins	None
Opens the loans page	Internet, Customer	1-2 mins	None
Reads the guidelines	Internet, Customer	5-10 mins	None
Is Age>21	Internet, Customer	1-60 secs	90% Yes 10% No
Is a permanent Govt. or PSU or Private reputed establishment employee?	Internet, Customer	2-3 mins	30% Yes 70% No
Is a professional or a self employed?	Internet, Customer	2-3 mins	30% Yes 70% No
Is agriculture based or allied activities?	Internet, Customer	2-3 mins	30% Yes 70% No
Is the proposed amount<2(net income)	Internet, Customer	2-3 mins	90% Yes 10% No
Terms of interest	Internet	1-60 secs	None
Fixed interest loan	Internet	1-60 secs	None
Floating interest loan	Internet	1-60 secs	None
Tenure	Internet	1-60 secs	None
Old car	Internet	1-2 mins	None
>4 yrs old	Internet	1-60 secs	None
0-4 yrs old	Internet	1-60 secs	None
New Car	Internet	1-2 mins	None
Fill the form	Internet, Customer	4-5 mins	None
Submit	Internet	5-10 mins	None
Get acknowledged	Internet	5-10 mins	None
Acknowledged?	Internet	1-60 secs	50% Yes 50% No
Customer exits the website	Internet	1-60 secs	None
Obtain the proposal	OfficerA, Internet	10-20 mins	None
Process the proposal	OfficerA	7-14 hrs	None
Prepare a Note	OfficerA	6-7 hrs	None
Send it to the manager	OfficerA	1-2 mins	None
Sanctioned?	Manager, Internet	7-10 hrs	80% Yes 20% No
Credit Custom-er's A/C	OfficerA, Internet	5-10 mins	None
Reject the loan proposal	OfficerA, Internet	5-10 mins	None
Customer drops the plan	Internet	30-35 mins	None
Stop	OfficerA	-	None

Table 5.23: TO-BE Model Inputs

Resource	Count	Cost/hr
Customer	1	0.00
Internet	1	20.00
Officer A	2	86.52
Manager	1	103.74

Table 5.24: Resource Usage (Rupees)

*#Trans	Avg Cycle	Avg Serv	Avg Work	Avg Res Wait	Avg Block	Avg Inact	Avg Wait	Avg Serv Wait
10	5.73	1.63	1.27	0.35	0.00	4.09	4.46	0.35

Table 5.25: Transaction Statistics – Days

* This indicates the no.of times decisions are to be taken. In some of the cases the start and the end stages also come under this count.

#Trans	Avg Cost	Avg VA Cost	Avg BVA Cost	Avg NVA Cost	Avg Lbr Cost	Avg Eq Cost	Avg Oth Cost	Avg OT Cost
10	443.10	443.10	0.00	0.00	443.10	0.00	0.00	0.00

Table 5.26: Transaction Statistics (Rupees)

5.5.3.3 A Comparison between AS IS Model and TO BE Model:

Comparison Criterion	AS-IS Model	TO-BE Model
Cost per Transaction	Rs.2016.84	Rs.443.10
Transaction Time	10.11days	5.70 days
Resource Utilization		
Customer Utilization	25.25%	35.36%
Officer Utilization	78.35%	39.51%
Internet Utilization	-	64.80%
Queuing Theory	Applicable	Not Applicable
Validation	Manual	1 Tier Online Validation
Feedback	Printed Acknowledgements	Real Time Messages
Security	Slightly Vulnerable	Algorithm based
Customer Satisfaction	Medium	Very High
Probability of Crash	Medium	High
Risk of Fraudulency	Medium	Very Low
Margin for Banks	Low	Very High
Investment	Moderate	High Initially
Maintenance	Low	Moderate
Availability Banking	Working hours	24x7 hours

Table 5.27: Comparison Chart

5.5.3.4 Inference:

We also see that there is an increase in the utilization of customer after reengineering from 25.25% to 35.36% and a drastic fall in the utilization of the utilization of officer from 78.35% to 39.51%. There is a significant reduction in the cost per transaction, which amounts to approximately 78%. This reduction is due to the decrease in the utilization of the officer as seen above. As in the AS-IS model the cost is incurred only due to the bank officers and as there is a decline in their utilization in the TO-BE model, there has been a significant decrease in the cost. And a reduction of approximately 39.71% in the time taken to accomplish the process is also been observed because of the increase in the usage of technology.

5.5.4 Electronic Funds Transfer

The EFT is the ongoing inconvenience of accepting, processing and handling monthly payments by cheque, cash or other paper instruments. It is designed to dramatically improve customer services and reduce the inherent cost of processing paper transactions. A means by which pre authorized debits and credits are electronically transmitted from a customer's account to the business accounts. The software enables one to utilize it for one's financial needs without having to become involved in the detailed regulatory or technical aspects of automated clearing house (ACH) item processing. The businesses can use this software to create daily reports of all transactions so that records can be tracked and reconciled quickly and easily.

A wide range of payment instrument like EFT, ECS, E money, smart card and credit card cater to the needs of different types of economic transaction. At the level of Inter-bank payments and settlements, real-time and online fund transfers play a major role both in local as well as inter-city transaction. The spread and the reach of the modern system enable equal and convenient access from both small and big centers alike.

IT and EFT system have emerged as the twin pillars of modern banking development. Not only have the services or products offered by banks moved way beyond conventional banking but access to those services has become a round the clock round the week routine, legal issues relating to electronic transaction processing at banks are very many and the need to address them by amending some of the existing acts and by promoting legislation in a few hitherto unexpected areas has assumed critical urgency. Necessary legislative support was essential to protect the interest as much of the customers as of the banks/branches in several areas relating to electronic banking and payment system. It was specially required to establish the credibility of FCS and EFT schemes based on the electronic message transfer. In 1995 RBI had set up the committee for proposing legislation on EFT and other Electronic payments.

The IT act 2000 is a general purpose legislation covering many issues like secure electronic records and signatures acceptance of digital signatures, duties of certification authority, liability of network service providers, computer crime and data protection. The act deals with electronic contracts and they are being promoted by the Government of India primarily to

facilitate introduction of electronic data interchange in the commercial sector. However they are equally applicable for EFT already launched by the RBI and being increasingly resorted to by the user banks of VSAT based network, the INFINERT (Indian financial network) The IT act in a nut shell caters to the following requirements;

- Authentication of Instruments.
- Countermanding of Instructions
- Operational security of system.
- Check against fraud Technical failure and errors.
- Evidence Data Protection and Record preservation.

The act governs the law relating to electronic contracts, electronic records, digital signatures certification authorities and the use of electronic records and signatures in Government records. It also regulates the activities of network service providers. The amendment in evidence act 1872, The Indian Penal code 1860, the RBI act 1934 and the banker's Book of Evidence act of 1881 have been made in order to legally recognize the cyber medium and its nuances. The amended evidence act also contains the definition of an electronic document. The act also enable acceptance of authenticated computer printouts taken from the computerized land records.

The Banker's Book of evidence act is amended as to include ledgers day books, cash books account books and other records kept in microfilm, magnetic tape or any other form of mechanical or electronic data retrieval mechanism, in the definition of banker's book further an authenticated printout of any entry in the books of a bank on micro film electronic media etc is also to be accepted as evidence. The provisions made in the IT act 2000 seek to clarify the legal position on several issues in electronic transactions which would equally apply to banking transactions called out on computer and communications networks.

Chapter III of the IT act 2000 deals with Electronic Governance. The act gives legal recognition to the information on electronic records i.e. information which is rendered or made available in an electronic form and accessible so as to be usable for a subsequent reference. It also gives legal recognition to digital signature, also permits the use of electronic

records and digital signatures in government credits agencies, in filling any form application or any other document with any office, authority, body or agency receipt or payment or grant of any license. By means of such electronic form in electronic banking the cyber law has a very vital role to play at the application level, because of the critical nature of the financial data transfer. Under section 93 of the IT Act read with the third schedule of the act, the banker's books evidence act is amended to bring the latter in consonance with the IT regime. By this amendment, Sec 2(3) BBE act has which defines "Bankers Books" now been substituted to include "Print-out of data stored in a floppy, disc, tape or any other electromagnetic data storage device". Sec 2(8), which defines "certified copy", has been now substituted by a definition by which "a printout of data stored in electronic form" is acceptable as evidence. Sec 2-A has also been added which provides for safeguards that are to be adopted in giving such printouts. This section enables a 'printout' to be used as evidence provided it accompanies a certificate issued by

- a. The principal accountant or branch manager;
- b. The person in-charge of computer system with particulars as to accuracy's, integrity etc., and a further certificated stating that such computer system was operated properly at the material time etc.,

This provision is to enable the smooth transfer of storing data in bulky volumes of paper to simpler electronic devices. This will help the Banks to save time in accessing distributing relevant information save space, which is required to store information;

The financial messages should have the following features;

- a. The receipt of the message at the intended destination (data transmission)
- b. The content of the message should be the same as the transmitted one (data integrity)
- c. Sender of information should be able to verify its receipt by the recipient (data acknowledgement)
- d. Recipient of the message could verify that the sender is indeed the person (data authenticity)
- e. Information in transit should not be observed altered or extracted (data security)

f. Non repudiation (non--repudiation of data)

There should be an appropriate agency/institution as certification agency appointed by RBI for key management and authentication. There should also be an institutional arrangement for appropriate assessment of participants of the financial network in terms of their credit worthiness, financial soundness etc, and this assessment provides valuable input to the banking sector.

The act is tuned to establish authenticity of transaction through signature in absence of paper digital signature needs to be replaced, legal rules are required to define under what circumstances a person can be bound in respect of an electronic instruction purported to have been issued by him. Generally authentication is achieved by security procedure. Cryptography technology and process used to encrypt and subsequently decrypt information to prevent its beings read by unauthorized party is a major component of the complete data security system, The act deals with electronic contract as a form in which an offer and an acceptance may be expressed and legal recognition of contracts formed in an electronic medium. It also deals with issues relating co digital signature and liability of network service provider.

The act also provides for criminal penalties for intentional damage or destructions of Information system or data, intentional "trespass" into a system and tampering with data, interrupting network services and intentionally introducer viruses into computers or computer networks, after invention of computers and information technologies the development in the banking sector has been tremendously huge. The banking sector with in the last 10 yeas has developed rapidly in its operations. The survival depends on the ability of the companies to become global networked businesses, leveraging their networks to foster interactive relationship with all their constituencies like prospects customers, partners, suppliers and employees. Compared to traditional method of doing business e-Banking offers numerous significant benefits, including enhanced productivity and faster access to a wide range of useful information. In addition user can now interactively tailor their applications, access to services, and information-gathering processes to meet their specific, individual requirements. The service all tendered at a very course transaction cost. Only with this development in the technology is the facilities like ECS, EFT are made possible. A real time gross settlement

system (RTGS), which is regarded as the centerpiece of an integrated payment, would up to promote an integrated national payment system covering;

- a. Wide array of payments products and services with a mix of papers and e-payments;
- b. ATM, smart/credit transactions.
- c. National clearing system on Deferred net settlement (DNS) basis
- d. National Deposit versus payment system
- e. Cross currency clearing and settlement system.
- f. Money market dealing system.
- g. Debit and capital market segments.
- h. A National on line Government Account system
- i. National currency management and accounting system

At present banks use a codebook for the purpose of coding and decoding messages. For transmitting messages involving transfer of huge sums, the sending branch codifies the message and the receiving branch decodes the message after its receipt with the help of the cipher codebook. Though the public telephone/wireless network is used the code is adopted only for inter-branch transfer of the same bank. It is necessary that a common code for encryption is used and adopted for all banks involved in inter-bank transaction. The passing of Information technology act has made the e-banking more easy to the people. The act takes care of the admissibility of electronic records along with paper-based document within the preview of the Indian Evidence act. Indian penal codes, banker's book of evidence and to the RBI act 1934. The act gives legal recognition for transactions carried out by means of Electronic data Interchange and other means of electronic communication commonly referred to as "e-commerce."

5.5.4.1 AS-IS Model:

This model would typically portray the current model followed in most of the banks to get along with providing the EFT service to the customers. This model was developed after a literature survey done on various banks through questionnaires and personal interviews conducted with the bank officials. In the traditional way the EFT process was done since its emergence into the banking service chart there were eight major players taking part in the

process. They were the sender, sending bank, sending service branch, sending EFT center, receiving EFT center, receiving service branch, beneficiary bank and the receiver. In the following paragraphs we would be looking into the basic flow of the traditional banking EFT process.

The traditional EFT process starts with the customer approaching a particular bank for his proposal for transferring funds from one account to the other. Once the customer has decided to transfer money he approaches the concerned official and procures the EFT application and fills it. Apart from the application the customer goes through an agreement given by the bank in regard to the transfer process which would clearly state the Terms of Service (TOS) from the bank's side. Once the customer is done with the agreement and the application he submits both of them to the respective officer. The bank then issues a receipt in acknowledgement of the receipt of application from the customer. The application is then forwarded to the servicing branch of the bank where the Datafile containing all such money transfer requests are consolidated and prepared. A list of Outward Transactions (OT) is then prepared by the bank and the Datafile is then transferred to EFT centre of the corresponding bank. This is done electronically by means of a floppy transfer or by means of a magnetic tape transfer. Simultaneously there is transfer of the same data physically also in order to have a provision for the verification of data transfer. Once the Datafile reaches the sending EFT centre it is reconciled and validated for correctness and accuracy. Acknowledgements are generated in case the validations are successful and in case they fail a request is sent to the bank to send the Datafile again. Following the acknowledgement generation the datafiles are consolidated, sorted and sent to the receiving EFT centre where it is validated again for correctness and accuracy and a report is generated based on the consolidated data from the datafiles.

The reports are then forwarded to the beneficiary bank finally which make payment to the customers either by paying them with cash or by crediting their respective accounts. Once the payment is made by the beneficiary bank it generates an acknowledgement which traverses the same path backward towards the sending bank as a feedback stating the status of the transaction that had happened. Once the sending bank receives the acknowledgement from the beneficiary bank the EFT process is deemed to have completed successfully. It should be

noted that the sending bank can generate only one datafile for a day. More than one datafile generated would not be considered under normal circumstances.

Hence the datafile would contain all the application details that the bank had received during the past deadline. In this model there is very limited deployment of the Internet resources and hence in the re-engineering of this model efforts have been made to increase the usage of Internet and reduce the usage of labor power in the banks so that we would be able to cut down cost for a single transaction to a large extent. With a strong belief that the cost of transaction could be reduced either by increasing the Internet usage or by decreasing the physical labor involved in the banks to process these applications an effort has been to carry out both the acts simultaneously to witness a drastic decrease in the cost per transaction happening in the bank. In the following page we would be going through the designed model which depicts the current model used in various banks at present.

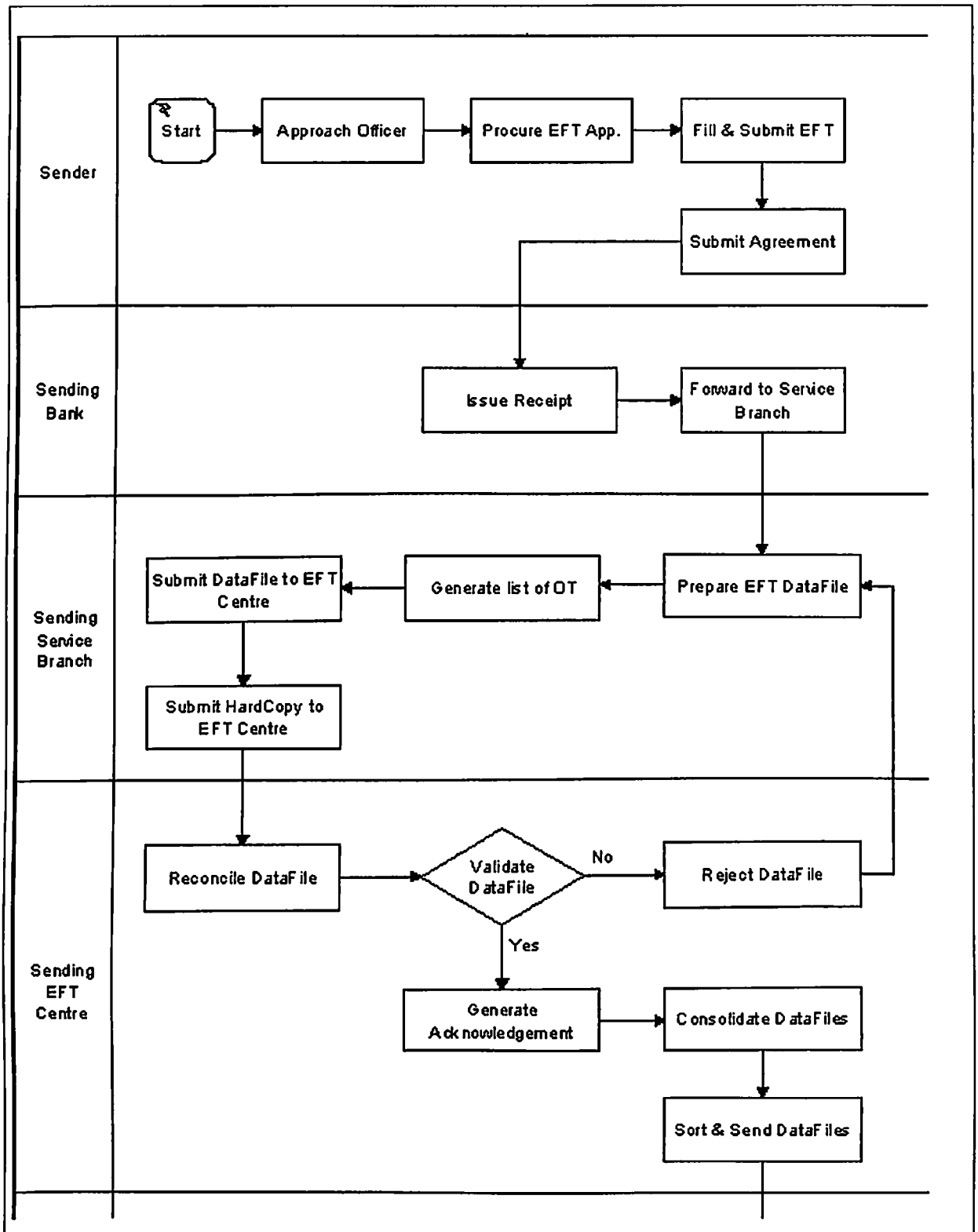


Figure 5.8: AS-IS process model of EFT (Contd.)

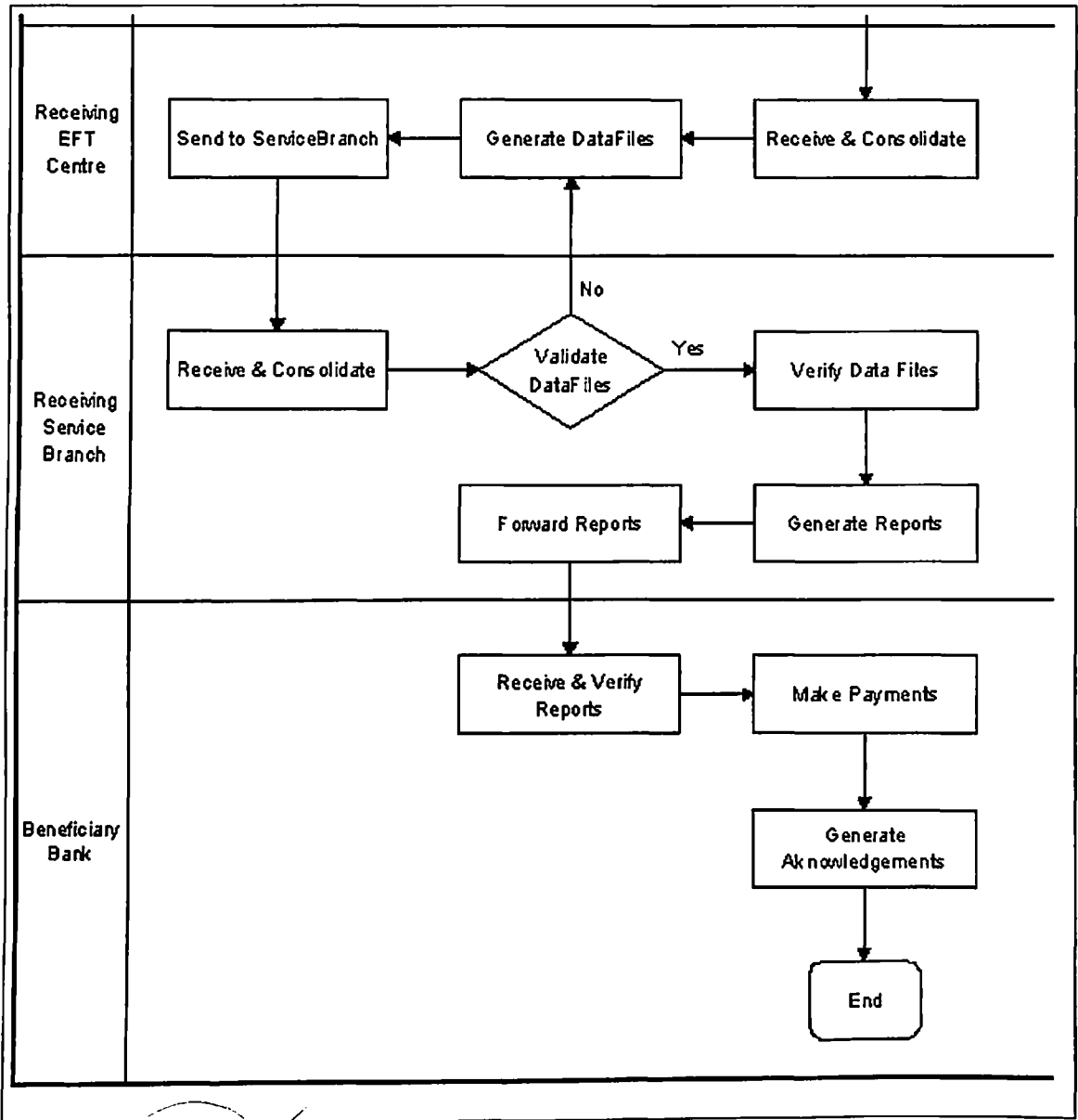


Figure 5.8: AS-IS process model of EFT

Handwritten signature and scribble

Activity	Resources	Tasks (mins)	Output
Start	Customer	2	None
Approach Officer	Customer	3	None
Procure EFT Application	Customer	2-4	None
Fill & Submit	Customer	4-7	None
Submit Agreement	Customer	4	None
Issue Receipt	Officer, Printer	2-10	None
Forward to Service Branch	Officer	5-10	None
Prepare EFT Datafile	Officer	20-40	None
Generate list of OT	Officer, Printer	5-10	None
Submit DF to EFT Center	Officer, Internet	10-15	None
Submit hardcopy to EFT	Officer	20-30	None
Reconcile Datafile	Officer, Internet	5-10	None
Validate Datafile	Officer	10	50% Y 50% N
Reject Datafile	Officer	5	None
Generate Acknowledgement	Officer, Printer, Internet	10	None
Consolidate Datafile	Officer	5-10	None
Sort & Send Datafile	Officer, Internet	10-15	None
Receive & Consolidate	Officer, Internet	5-10	None
Generate Datafile	Officer, Printer	10-12	None
Send to Service Branch	Officer, Internet	2-5	None
Receive & Consolidate	Officer, Internet	5-10	None
Validate Datafile	Officer	10-20	75% Y 25% N
Verify Datafile	Officer	10-15	None
Generate Report	Officer, Printer	10-15	None
Forward Reports	Officer, Internet	20-30	None
Receive & Verify Reports	Officer, Internet	10-15	None
Make Payments	Officer, Internet	5-10	None
Generate Acknowledgement	Officer, Printer, Internet	10-15	None
End	Officer	3	None

Table 5.28: AS IS Model Inputs

Resources	Count	Cost
Customer	1	Rs.42.00/use
Internet	1	Rs.20.00/hour
Officer	8	Rs.299.88/hour
Printer	6	Rs.10.50/user
Worker	1	Rs.0.00

Table 5.29: Resource Usage

The above two table shows us the inputs which were given in terms of resources used for an activity, the time taken to complete and activity and in some cases a probability stating the path that would be chosen for simulating the process in case there are multiple paths to get the process done. Usually the probability is found useful when there is a validation happening and we use a diamond shape box for showing the validation process in simulation model. Following are the results generated by the iGrafx report generation client in support of our argument in this chapter.

16.55

Table 5.30: Elapsed Time (Hours)

Trans	Average Cycle	Average Service	Average Work	Average Res.Wait	Average Block	Average Inact	Average Wait	Average Serv.Wait
1	16.55	4.41	4.41	0.00	0.00	12.13	12.13	0.00

Table 5.31: Transaction Statistics (Hours)

Hence for the completion of one successful EFT transaction the bank takes 18.55 hours which would mean that they are approximately taking 2.5 days according to the banking working hour assumption of 7 hours per day which is pretty normal under the present circumstances.

Since this chapter mostly concentrates on the time and the cost aspects of engineering we would next look into the cost perspective of the traditional model.

Trans	Average Cost	Average VA Cost	Average BVA Cost	Average NVA Cost	Average Lbr Cost	Average EQ.Cost	Average Other Cost	Average OT Cost
1	1842.12	0.00	1626.24	215.88	1698.90	59.64	82.74	0.00

Table 5.32: Transaction Statistics (Rupees)

From the above tables we can infer that in the worst case the time taken for the completion of one transaction is 16.55 hours or 2.5 banking days and the cost incurred with the transaction is Rs.1842.12 most part of which is constituted by the labor cost associated with paying salaries to the bank employees. In the traditional model, the work has dominated the process proceedings which has exceeded far beyond the limits which could be clearly witnessed from the time and cost results of the simulation. Though there may be accuracy and correctness and the probability of making an error is less in manual works, taking a long time for a contingent process such as the EFT would certainly bring down the level of customer satisfaction and loyalty towards the banks.

5.5.4.2 eZmoney Transfer TO-BE Model :

Reengineering of the traditional model would make us land up with the TO-BE model which takes in consideration the various BPR constraints and serve the customer community with a better service and option of easy banking. This model was developed after a critical analysis was done on the traditional model as to which activities need changes and which activities do not.

Theory and Assumptions

- 100 mbps or more Broadband Connection

- A dedicated connection between the apex bank of the country and the participant banks through an Inter-Organizational Information system network.

With changes made to the entire architecture of how EFT process is carried over the Internet the number of players were drastically reduced to four namely the sender, sending e-banking system, TraM and the receiving e-banking system. In the following paragraphs we would be looking into the architecture followed, some basic terminologies that we need to understand to have a clear picture of the Process Reengineering that has been done and the process flow of the simulation model.

The following are the components of the TO-BE model simulation architecture:

- 1) **Sender:** Normally the customer or anybody who wishes to transact through the eZmoney transfer system.
- 2) **Sending e-Banking System:** This is an embedded architecture within the sending bank's IB portal. This is same for all the banks participating or who wish to provide this service to their customers.
- 3) **Transaction Manager (TraM):** This is a part of the process software which lies with the apex bank of the country for recording transactions happening through this eZmoney transfer system. The data from this system would come handy in case of any discrepancies in the transaction that has already happened.
- 4) **Beneficiary e-Banking System:** Similar to the sending e-Banking system wherein the standards for the transaction process is defined by the apex bank.

The process flow of this model is pretty simple after understanding the above terminologies clearly. The process is initiated by the customer and gets terminated with the customer. Once the customer feels the necessity to make an e-Transfer with the eZmoney transfer system he enters the bank's IB portal and authenticates himself for identity. We use the digital signature

to internally verify the identity of the customer once he provides the system with the username and the password for his account. After getting authenticated the user fills up the form available online for this service request and also reads through the online agreement available with the form. The user then submits the form and waits for the acknowledgement from the IB system. Once the user gets an acknowledgement from the system he/she quits but the actual process starts after the customer quits. Once the form reaches the sending e-banking system where it is thoroughly validated for the accuracy and the correctness in the form entry by the customer and once this is done there is an acknowledgement which is backfired to the customer. If the validation fails there is no acknowledgement but a prompt asking the user to refill and resend the application and the agreement. Succeeding the validation stage the datafile is prepared from the sending bank which needs to be sent to the TraM which is a part of the apex bank's IB portal. Unlike in the traditional model the sending bank is empowered to send any number of datafiles but normally equal to the number of EFT request received in real time. Once the datafile pertaining to the particular transaction reaches the TraM there is a cross validation that is done to check the validation schema of the sending bank and that of the data from the latter. With the successful completion of validation at this stage the data pertaining to transactions are recorded in the TraM and sent to the beneficiary bank for further validation and clearance. The Beneficiary bank may make payment in the two ways as discussed in the traditional model. There are high speed routers used to identify the shortest and the most efficient path between the TraM to the participating banks.

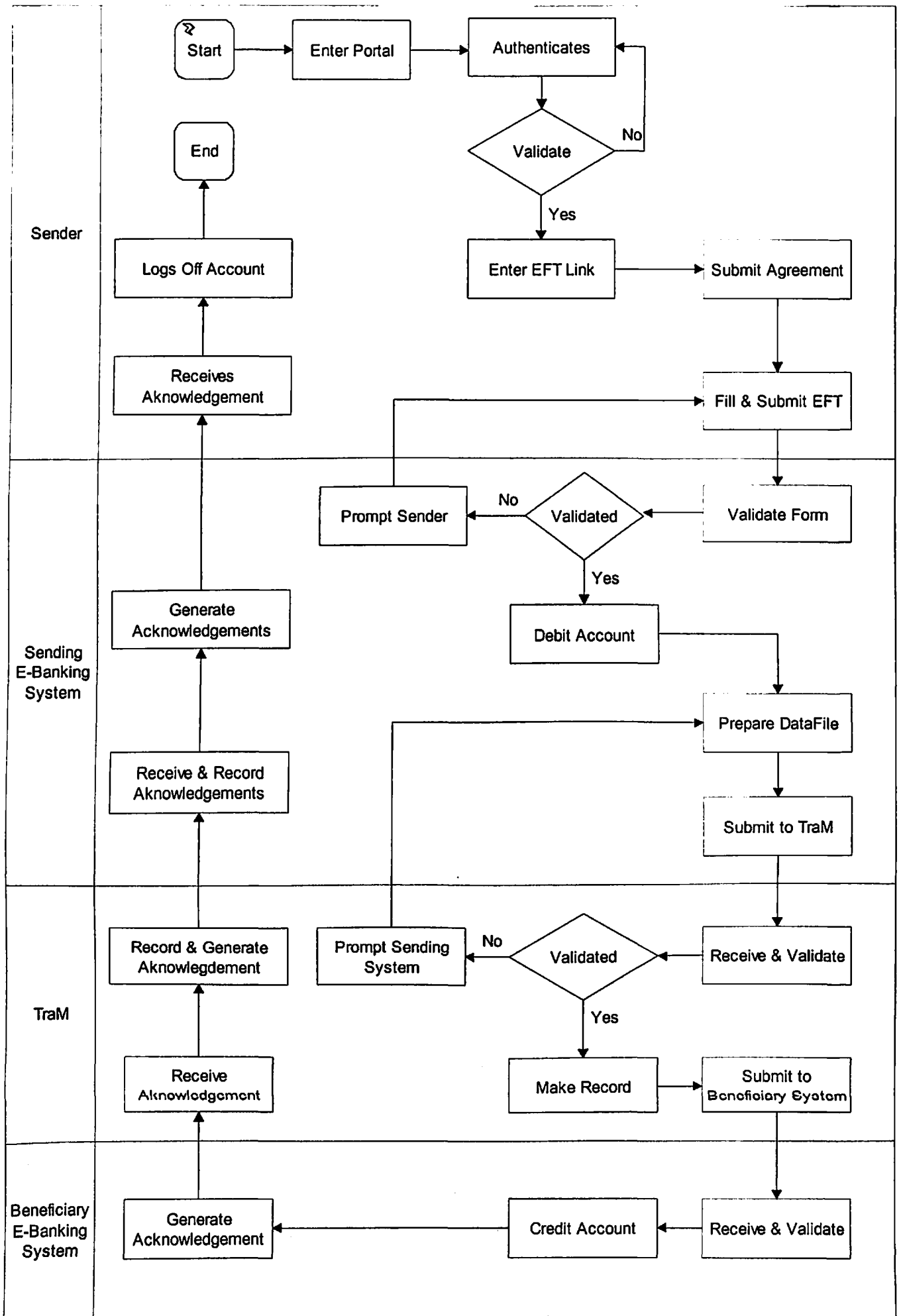


Figure 5.9: TO-BE process model of EFT

Activity	Resources	Tasks (Seconds)	Output
Start	Customer	2	None
Enter Portal	Customer, Internet	5-10	None
Authenticate	Customer, Internet	10	None
Validate	Customer, Internet	1	90% Y 10% N
Enter EFT Link	Customer, Internet	5-10	None
Submit Agreement	Customer, Internet	180-300	None
Fill & Submit Form	Customer, Internet	120-300	None
Receives Acknowledgement	Customer, Internet	5	None
End	Customer	2	None
Validate Form	Internet	5	None
Validated	Internet	1	90% Y 10% N
Prompt Sender	Internet	2	None
Send Acknowledgement	Internet	5	None
Debit Account	Internet	2-10	None
Prepare Datafile	Internet	60-120	None
Submit to TRAM	Internet	120-180	None
Receive & Record Acknowledgement	Internet	5	None
Generate Acknowledgement	Internet	5	None
Receive & Validate	Internet	60-120	None
Validated	Internet	1	90% Y 10% N
Prompt Sending System	Internet	2	None
Make Record	Internet	120-140	None
Send to beneficiary system	Internet	120-180	None
Receive Acknowledgement	Internet	5	None
Record & Generate Acknowledgement	Internet	5	None
Receive & Validate	Internet	60-120	None
Credit Account	Internet	2-10	None
Generate Acknowledgement	Internet	5	None

Table 5.33: TO BE Model Inputs

Resources	Count	Cost
Customer	1	Rs.0.00
Internet	1	Rs.20.00/hour
Worker	1	Rs.0.00

Table 5.34: Resource Usage

The above two table shows us the inputs which were given in terms of resources used for an activity, the time taken to complete and activity and in some cases a probability stating the path that would be chosen for simulating the process in case there are multiple paths to get the process done. Usually the probability is found useful when there is a validation happening and we use a diamond shape box for showing the validation process in simulation model. Following are the results generated by the iGrafx report generation client in support of our argument .

10.17

Table 5.35: Elapsed Time (minutes)

Trans	Average Cycle	Average Service	Average Work	Average Res. Wait	Average Block	Average Inact	Average Wait	Average Serv.Wait
1	10.17	10.17	10.17	0.00	0.00	0.00	0.00	0.00

Table 5.36: Transaction Statistics (Minutes)

Hence for the completion of one successful EFT transaction the bank takes 10.17 minutes which would mean that they are approximately taking 10 minutes according to the banking working hour assumption of 24 hours per day which is a result of the deployment of the Internet resources. It concentrates on the time and the cost aspects of engineering. We would next look into the cost perspective of the future model and make a comparison between the

obvious differences found in these models to prove that investments in IT would always lead to apposite outcome in today's scenario of doing business online.

Trans	Average Cost	Average VA Cost	Average BVA Cost	Average NVA Cost	Average Lbr Cost	Average EQ. Cost	Average Other Cost	Average OT Cost
1	18.48	15.12	2.94	0.00	0.00	0.00	18.48	0.00

Table 5.37: Transaction Statistics (Rupees)

From the above tables we can infer that in the worst case the time taken for the completion of one transaction is 10.17 minutes and the cost incurred with the transaction is Rs.18.48 most part of which is constituted by the Internet usage cost to make transactions online. In the future model, paper work has been eliminated in the process proceedings which has exceeded far beyond the limits which could be clearly witnessed from the time and cost results of the simulation.

These low figures could be attributed to the almost complete removal of the labor cost from the total cost incurred for a transaction. This could also enable a bank to re-pool their resources into some other beneficial process rather than investing in such a process. Since transactions happening over the Internet are always faster the time result of the simulation is self-explanatory. Finally the officials in the banks come into picture when the customer needs to be intimated about his transaction through mail. This model has all potential to revolutionize and improvise on the way transactions are carried out over the Internet.

5.5.4.3 Comparison between AS IS Model and TO BE Model:

Comparison Criterion	AS IS Model	TO BE Model
Cost per Transaction	Rs.1842.12	Rs.18.48
Transaction Time	18.55 hours	10.17 minutes
Customer Utilization	1.10 %	29.30 %
Officer Utilization	11.94 %	No Officer Present
Internet Utilization	37.15 %	100.00%
Printer	2.74 %	No Printer Present
Queuing Theory	Applicable	Not Applicable
Validation	Manual	3 Tier Online Validation
Feedback	Printed Acknowledgements	Real Time Messages
Security	Slightly Vulnerable	Algorithm based
Customer Satisfaction	Medium	Very High
Probability of Crash	Medium	High
Risk of Fraudulency	Medium	Very Low
Margin for Banks	Low	Very High
Investment	Moderate	High Initially
Maintenance	Low	Moderate
Availability	Banking Working hours	24x7 hours

Table 5.38: Comparison Chart

5.5.4.4 Implementation

This section looks into proposing the possible implementation methodologies and technology specific architectures for the EFT process to come to practice from paper works. The author proposes the some aspects of implementation to take importance in obvious sense. They are as in the following sub sections.

5.5.4.4.1 Architecture

It proposes 3 tier *client server architecture* to implement this model which has a good effect. The prototype of the architecture model would look similar to the following.

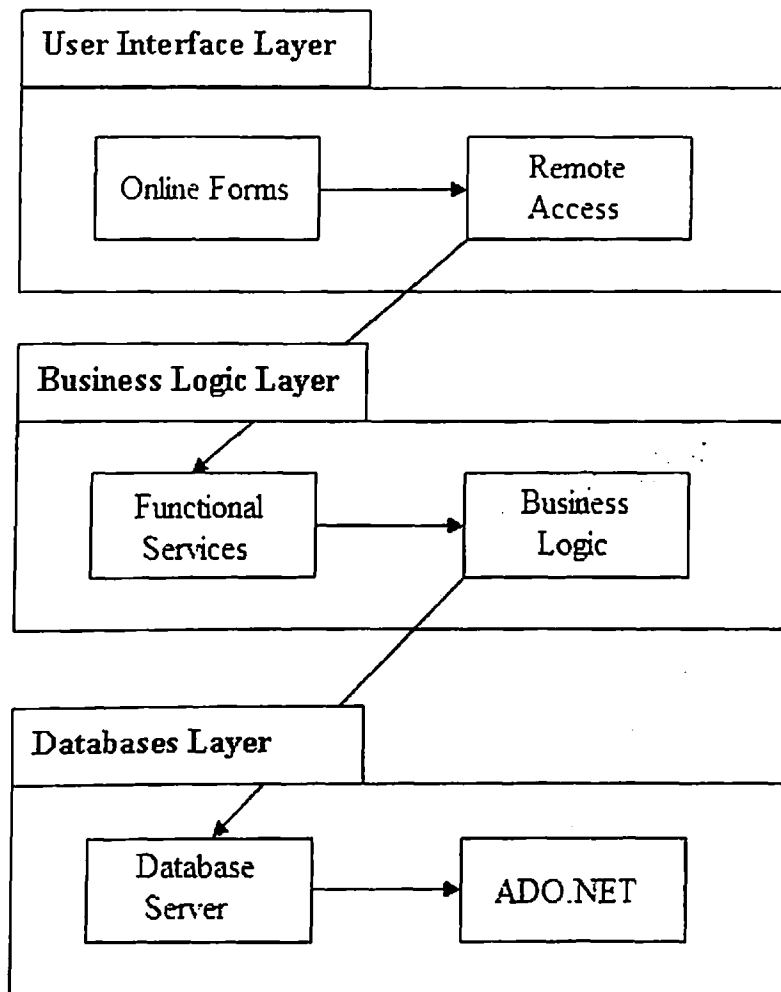


Figure 5.10: Architecture

The proposed architecture would ease the implementation with the business logic lying at a central place, the database present in another location other than the business logic and finally the user interface would be presented to any user when he/she logs into the system for making a transaction. The advantage of this architecture is the inter-independence of all the above discussed three layers. In case of a crash of the database server only that server needs to be recovered and the rest of the two layers present in different locations are safe enough to make the system work provided all three layers have integration.

5.5.4.4.2 Security

Transfer of banking data from one place to another need to be taken care since it involves a lot of monetary information which are very critical. Encryption techniques with a proper

mould of the traditional ways of protecting the data from illegal replication would certainly serve the purpose. It is a good practice to use keys to have access to critical data. The author proposes the use of *DES algorithms* for encryption and the *RSA algorithm* for decryption purposes. Both the sender and the receiver would have a public key and a private key for accessing data over the network. When the sender wants to send data to the receiver then he uses the public key of the receiver to encrypt data to the latter. This would mean that the receiver is the only person who can have access to that data apart from the sender himself. This would ensure that there is no spoofing of data during its flow and integrity is maintained to the greatest possible level. In addition to the usage of keys there could a *digital signature* that each user can have to claim their identity over the Internet. The one main advantage of these digital signatures is that they cannot be forged since they are based on the public key encryption.

5.5.4.4.3 Protocol

It is recommended that we use the SSL protocol for secure transactions over the Internet. This protocol encrypts the communication between the browsers and the servers. The SSL version 3.0 is the most common protocol being used for electronic transactions and even the giants in the industry have implemented this protocol in browser developments and in other products. *Secure Sockets Layer* is protocol that operates at the TCP/IP layer. This means that any application that relies on TCP/IP such as the Web (HTTP), UseNet news groups (NNTP) and e-mail (SMTP) can be secured by SSL. The reason for choosing this protocol ahead of any other protocol is that this supports a variety of encryption algorithms and authentication methods. In case we need to change our encryption algorithms for various reasons it is possible with the implementation through this protocol. The web pages secured by SSL the URL starts with *https* rather than *http* (e.g.: <https://www.bank.com/> as opposed to <http://www.bank.com>). Once the URL contains the https notation then all transaction between the client and the server are encrypted and security can be assured to a good level.

5.5.4.4 Process Flow

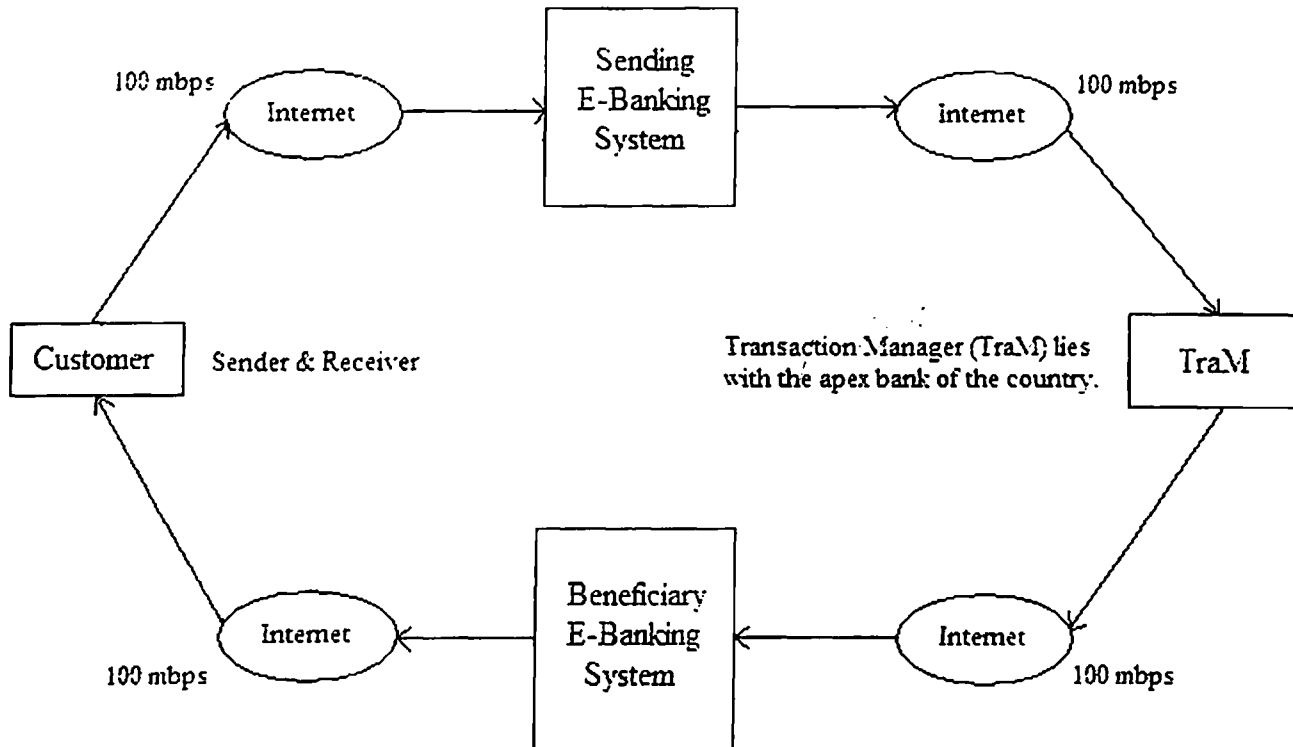


Figure 5.11: Process flow diagram

5.6 CONCLUSION

Implementation of this model would mean a bank can strategically take advantage over its competitors providing its customers with better services. However this model developed does not prove the end to the development of a model. An industry such as the banking should look in for the development of such models which would ensure them continuous development of the organizational resource bank and in providing better and quicker services to the customer's needs which stands as the biggest task in today's world. The reengineering of traditional processes followed in the banks gives them a competitive advantage because it reduces the time and other assets invested, cost incurred for the processes undertaken. This fact is evident from the statistics provided for the above processes. The resources thus saved vis-à-vis time, capital and human capital can be put to use in other tasks to achieve optimum use of the resources available. This would obviously increase customer satisfaction helping in

attracting new customers and retaining them. Initial investment required for reengineering process is high, but the margins are also equally significant. In addition to the margins, the bank will have many intangible benefits and use of Internet by banks will enable the customer to avail the bank's online services round the clock. Real time response of the bank to the customer's queries and grievances is possible with the usage of Internet.

IB represents a shift in the business doctrine as it alters traditional business processes, relationships, and operational models. The corporate value chain links the different processes and players in the domain of Internet business. Therefore, most traditional banks will no longer be able to conduct business in the traditional way. One of the means of accomplishing these goals is BPR, which uses additional features included in simulation modeling methods and tools. Simulation modeling is the "cost-effective" method of exploring "what-if" scenarios quickly and finding a solution to or providing a better understanding of the problem, as this method is supported by a number of software tools that provide a graphical representation of the business processes through executable models. The benefits realized from an investment in simulation methodology and tools are both tangible and intangible. Most savings are seen in the reduction of the amount of time required for manual calculations, a decrease in the amount of time required to perform analyses, an improvement in the quality of solutions, and an increase of reusable corporate assets (business models, business rules, and knowledge). Concerning the supply process/network chain issues, the general acceptance of the simulation approach provides both tangible and intangible benefits to internal and external business process activities. Internal benefits are quality, time, cost reduction, innovations, customer service, and product performance, which create long-term profitability for the organization. In a bank network, benefits are determined as loan procurement plan; EFT optimal amount and rate of interest, optimal time; the most effective bank and payback policies; commission charged for transferring money from one bank to other bank etc. In this study, various processes of the banks were modeled using the simulation modeling tool. The opportunity for "Car loan procurement model and EFT" development was explored. The IB environment and its characteristics were examined, followed by an evaluation of the impacts of IB on the various processes. Costs and benefits of future IB implementation were analyzed and different models compared. The results of the research indicate that business process

modeling and discrete event simulation are valuable mechanisms for realizing the actual business value of B2C e-commerce. The business process model permitted the description of the loan procurement process, EFT and facilitated the evaluation of the process through simulation. Although only a “prototype” of the model was developed, it illustrated that the introduction of IB would require organizational and technological changes. A change in technology mostly concerns new IT and IS implementation. Banks changes should help to remove or reduce non-value adding activities in the various processes, maintain or reduce time and cost, and increase productivity of the supply chain process through improvements to various stages. Advances made in the loan and EFT process have greatly reduced time and costs involved in the loan procurement and money transfer life cycle. The improvements made in the different processes were evaluated. The model is going to be accepted by banks and was impressed enough to plan to make simulation modeling an integral part of business renovation plans. The benefits of the developed model should be explored through further study. The most critical issues of Internet adoption have been recognized, although there are still factors to be identified and analyzed.

**INTERNET BANKING
AND SOCIETAL
IMPLICATIONS**

6.0 INTRODUCTION

The Indian banking sector used to run in a frictionless environment by providing similar kinds of traditional products and services which used to revolve around deposits and loans, but the technology changes have put forth the competition among the banks to offer new services. This has led to increasing total banking automation in the Indian banking industry. Indian banks, led by new private sector and foreign sector banks are using IT as a new distribution channel for traditional banking products and services, and to expand into new areas by offering new products, and services. IB has revolutionized the banking industry and the way the banking has been in the past. But it's a business and it is all about to understand your customer. The success of any business depends on how the customers perceive and value your products and services.

The new net economy is defining the markets and has opened up new demographic divide, the young technology savvy customer and others. Its only technology which has allowed the Indian banks to reach out to ever un-noticed segment i.e. the rural India. Today's ever changing, dynamic, more demanding customer who is exposed to both information and choice overload, the definition of satisfaction has been changed from reliability, responsiveness, assurance to the communication techniques of a service provider. The services sector witnesses greater challenges in sustaining brand loyalty, as the offerings are intangible. The banking and financial services sector is a prime example of the customer churn caused by increasing brand variety. Technology is taking banking closer to the customer, but it is also making the bank less human. This has prompted the banks to embrace technology to meet the increasing customer expectation. In fact many benefits seem to have accrued to customer, not directly led to gains for the Banks. Although Indian banking industry is performing well from the past few years, still it is unable to gather enough response from the consumers towards the adoption of the IB.

This chapter is divided into two parts:

In Part I, section 6.1 deals with the societal implications on the adoption of the IB, where various research questions have been framed and tested to find out what drives them to go for IB services. We first characterize the determinants of consumer adoption of IB using survey data from India in major metros and try to examine the behavior of customers in the event of new technology introduction in section 6.1.3. Next section 6.1.4 gives sufficient evidence that proves adoption of IB is influenced by sex, age, marital status, and degree of exposure to IB as well as the characteristics of the banks they deal with.

Part II of the chapter deals with specific quality factors of IB service providers which are presented in section 6.2 of the study. An attempt has been made to analyze the consumer preferences based on quality, reliability and serviceability aspects towards the adoption of the IB, and their awareness pertaining to various banks offering these services are presented in section 6.2.3. Lastly section 6.2.4 deals with some of the limitations of the study which is followed by recommendations presented in section 6.2.5

6.1 SOCIETAL IMPLICATIONS ON THE ADOPTION OF INTERNET BANKING (e-BUSINESS MODEL)

The definition and discussion on e-business models has, to date, focused primarily on organizational and technical factors. In contrast, societal factors, that is, factors related to the general societal context influencing the shape and adoption of e-business models in practice, have not been adequately addressed. Developing models for conducting e-business is not simply about the adoption of new technologies. It also concerns changes in work practices, in customer/supplier relationships, in the way products are delivered to consumers, in marketing practices and changes in staff skills needed to support e-business. It is projected that new business models are expected to influence people's everyday life as much as they will affect work and employment. The consideration of the societal factors plays a vital role to the success of any business and has an effect on its increased market share through the word of mouth, despite the fierce competition. The new e-business models lead to new business practices that affect the behavior of



individuals, and society as a whole, towards innovative products and services. The societal e-factors identified over here have been grouped in the following categories: factors related to Region/Geography, Culture, Legal/Regulatory/Policy, Economic, Ethical & Professional factors, as well as factors related to Social Capital/Social Networks and Social Structure. These factors influence, directly or indirectly, the way in which e-business models are perceived, implemented and evaluated.

6.1.1.1 Region/Geography

Geography is in general, defined as “a large land area that has particular geographic, political or cultural characteristics that distinguishes it from others whether existing within one country or extending over several”. In the context of this thematic priority, region/geography is a term that encompasses issues that are highly related to specific geographic areas and that may be linguistic singularities of specific regions, environmental issues and other country specific issues that can be associated with the rest of the identified categories in the societal thematic area. Hence a consumer’s adoption behavior is influenced by the region he stays in.

- 1 Language - Vocabulary
- 2 Environmental issues
- 3 Country – specific issues

6.1.1.2 Culture

Culture is, most of the times, seen as a multidimensional and convoluted phenomenon that addresses issues that deal with “the patterns of behavior and thinking that people living in social groups learn, create, and share”. Thus, culture is considered to be the characteristic that distinguishes human groups since it includes, amongst other things, their values, beliefs, rules of behavior and rituals. Therefore, in the context of this thematic area, culture is based upon the concept that “people living together in a society share culture”. More precisely, culture is perceived so as to encompass issues related to common rules of behavior that members of one group share amongst them. These issues are values, beliefs, ideas, attitudes, religion and other factors that have been identified here and can be seen below:

- 1 Values/ Beliefs
- 2 Religion

3 Acceptance/ Maturity of people

4 Ideas

5 Awareness

6 Attitudes

7 Communities

8 Change

9 Social Support

10 Word of Mouth

6.1.1.3 Legal/ Regulation/ Policy

The terms legal and regulation portray the official rules, laws or order stating what may or may not be done or how something must be done that have been issued by a government department or agency that has the force of law. All these issues are addressed in this category: legal/regulation/policy, which also encompasses issues related to role of the policy makers, the regulatory frameworks, reliability, confidentiality, freedom of information and e-democracy and others that can be seen, in the list, below: Hence all these factors govern in whether a person is interested in going for IB services or not.

1 Security

2 Policy makers / "Policy Intermediaries"

3 Privacy

4 Regulatory framework- Jurisdictions

5 Freedom of Information

6 Taxation

7 Reliability

8 Infrastructure

9 Confidentiality

10 e-Democracy

11 Regulation

6.1.1.4 Economic

In this category, concern is with the issues that are related to the economic conditions of a country, seen from a macro perspective. More specifically, in this category, we consider issues related to the structure of the markets and their competitive characteristics as well as the overall economic environment in a regional and national level. Generally it is the high income class people who prefer new technologies because of their affordability.

1 Market structure (concentration, competition)

2 Access

6.1.1.5 Ethical & Professional

Considering that "ethics, in general, are concerned with the moral character of voluntary actions that affect other people". Ethics in the context of the e-business models and in

association with the societal thematic area suggest the exploration and analysis of ethical issues such as computer crime or abuse, responsibility, anonymity and so on. Furthermore, in the same perspective, professional issues deal with the responsibilities and roles along with the level of professionalism of the agents in the context of e-business.

- | | |
|------------------------------------|----------------|
| 1. Identity Crisis Issues | 2. Anonymity |
| 3. Responsibility & Roles | 4. Free Speech |
| 5. Computer Crime / Computer Abuse | 6. Trust |

6.1.1.6 Social Capital / Social Networks

A social network is a set of nodes (e.g. persons, organizations) linked by a set of social relationships (e.g. friendship, transfer of funds, overlapping membership) of a specified type. This definition permits the introduction of social context in the analysis of business models and provides multi-layered perspectives to the investigation of factors affecting their sustainable adoption.

6.1.1.7 Social Structure

Sociology indicates that social structure is “the way in which society is organized into predictable relationships and patterns of social interaction”. Consequently, in the context of our analysis the term social structure indicates the way in which a human society is related and organized. Thus, social factors, income level, education status, social class are some of the elements that are seen to influence the way of living, the decision making and the possibilities of the members of a society.

- | | |
|-------------------------------|----------------------|
| 1. Social Factors | 2. Wealth |
| 3. Income Level | 4. Ethnic background |
| 5. Education Status | 6. Social cohesion |
| 7. Social class (social rank) | |

The proliferation of e-business model for IB will undoubtedly result in fundamental shifts in the way in which citizens conduct their banking activities. Many of these activities previously performed in ‘traditional’ basis, for example going to the bank branches for doing various transactions, will in the Information Society be conducted in fundamentally

different ways. For example, customers will increasingly have the opportunity for conducting all the transactions through Internet, by just having an Internet account. Similarly, bankers will have increasing opportunities to leverage the capabilities of Internet to create complex product bundles, or to merge offerings from previously independent vertical markets in an effort to increase their sales, to diversify their operations, offer personalized products and services, and to expand their market grasp. These changes are expected to drive citizens towards two opposing directions. On the one hand, they will provide new opportunities for increasing the quality of life in the Information Society for those individuals that are in a position to understand, adopt and leverage these societal shifts. On the other hand, the same changes result in social exclusion and the risk of isolation for those that will not be prepared to follow the trends. Through this contribution, it can support policy makers in considering important societal factors that will ensure that opportunities are not missed and the digital divide and other similar social exclusion threats. Thus, societal aspects of current e-business model for IB have been presented here as a crucial element in achieving sustainable adoption of research and development outcomes.

Identification and theoretical validation of these factors can be derived which influence, directly or indirectly, the way e-business models are perceived, implemented and evaluated. Indeed these factors are related to both the social environment (in particular issues of culture, geography, ethical factors as well as the factors relating to social capital and networks) and to the business environment (legal and economic factors that form the macro business environment). It is clear from the detailed description of the factors, as described earlier in the chapter, that the social aspects of e-business are closely related to four other key themes in e-business adoption: individual, organizational, industrial and technical factors (e.g., culture can be studied at the individual, organizational and societal levels; security has a social dimension but its implementation relies on technological capabilities and organizational policies or industrial standards, and so on). Through the study, we can draw useful conclusions about the relative importance of these factors and the ways in which they take shape in different business contexts. Such conclusions can facilitate a systematic study of the societal aspects of e-business and help us understand their practical implications and influence the adoption of e-business to the benefit of a

customer. Hence, in order to understand the crucial behavior of the Indian customers on the adoption of IB, a survey has been conducted.

6.1.2 LITERATURE REVIEW AND DEVELOPMENT OF RESEARCH QUESTIONS

Adoption is the acceptance and continued use of a product, service or idea. Consumers go through “a process of knowledge, persuasion, decision and confirmation before they are ready to adopt a product or service. The adoption or rejection of an innovation begins when “the consumer becomes aware of the product”. Hence, for adoption of IB, it is necessary that the banks offering this service make the consumers aware about the availability of such a product and explain how it adds value relative to other products of its own or that of its competitors. An important characteristic of any adoption of an innovative service or product is creating awareness among the consumers about the product or service. Hence if Indian consumers are not adapting to the IB, it may be because they are not aware about such a service being available and the added value that it offers. These observations lead us to the following research question:

Q1: Indian consumers are not adapting to the IB services because they are unaware of the service and accompanies benefits.

The second factor that leads to adoption of innovative service or product by customers is the ease of use. So if the Indian consumers are not adapting to the IB, it could be because Internet sites are not easy to operate. Hence the following research question:

Q2: Indian consumers are not adopting IB because they do not find it easy to use.

The third factor that affects adoption is that to what extent the existing mode of service or product delivery fulfils the customer’s needs. Adoption of new technologies often encounters resistance to change from present ways of operating. For the customers to change to the new technology, it must fulfill a specific need. Unless it is fulfilled, they

may not be prepared to change from present ways of operating. Hence, the following research question:

Q3: Indian consumers are not adopting IB service because they do not want to change from conventionally familiar ways of transacting.

The fourth important factor that consumers consider before adopting an innovation is the level of risk involved. In the context of IB, it refers to the security and reliability of transactions over the Internet. So, IB will not be adopted unless considered safe and secure. Observations above, lead to following research question:

Q4: Indian consumers do not intend to adopt IB service because they are concerned about safety and security of transactions over Internet.

Fifth important factor is the availability of access to computers/ Internet as a prerequisite for adoption of IB. More extensive is the access to computers/Internet, greater possibility of use of IB. Lack of access to Internet is one of the reasons for slow growth of IB. Hence, access to Internet may be one of the reasons for the spread of IB in India.

Q5: Indian consumers are not adopting IB service because their access to computers/Internet is not very extensive or abrupt.

Q6: Indian consumers having accounts in more than one bank are more likely to adopt IB.

Sixth important factor that governs adoption of IB services is that if a person has accounts in more than one bank, then they are more prone to use IB services due to their various needs. Hence the research question

Q6: Indian consumers having accounts in more than one bank are more likely to adopt IB.

Seventh important factor that governs adoption of the IB services lies in the peoples belief that Information technology has a very strong impact in the Banking Industry that is evident from the various changes taking place in it. Hence the research question

Q7: IT has a very strong impact in the Banking Industry

Eighth important factor is whether the customer understands the basic purpose of any bank going for IT these days and hence the research question

Q8: Banking industry is adopting IT due to the following reasons

- To increase revenue
- To reduce operating costs
- To increase customer service
- To increase the effectiveness in dealing with the suppliers
- To increase the information flow
- To enhance company brand and corporate image
- To improve business process flow

Ninth important factor helps to predict the future behavior of the customers on their readiness to adopt the IB services. Hence the following research question

Q9: If the tentative time period for adopting to IB services is less, then it implies that most of them are finding IB services useful.

Now, these research questions are based on demographic factors

In India, men are more computers savvy than woman. IB requires computer skills and Internet communication. Hence the research question may be formulated as:

Q10: Males are more likely to adopt IB than females.

While looking at the age factor, younger generations are more likely to adopt IB due to their familiarity with network technology. Hence the research questions

Q11: Younger generations are more likely to adopt IB than older generations.

Having said that the proficiency in computer technology and network communications would have a positive impact on IB, education enhances the proficiency in network

technology and increase the probability of IB adoption. Education at University or above level facilitates access to computer and the students relying on Internet communication. This argument applies across different majors degrees regardless of art or music.

Q12: People with Higher Education (University or above) are more likely to adopt IB than those without university degrees.

It is found that, banking intensity of high-income group is higher than low income group. Hence, the incentive of IB adoption is larger for high-income group.

Q13: High-income group is more likely to adopt IB than low-income group.

Those who visit banks frequently are considered to be keen customers and have a greater interest to adopt IB as they can save the time and cost of greater visiting to the branches.

This proposition is rooted in the banks' intention to substitute most of branch activities with IB. Furthermore, IB facilitated to offer many new services, which were hardly offered on branch levels, such as life-time financial portfolio management services.

Q14: The customers who frequently visit bank branches are more likely to adapt to IB.

There is answer for this question

6.1.3 RESEARCH METHODOLOGY

The population for the survey consisted of individual residents of India. The total sample size was fixed at 300. The study was limited to capital cities of population more than 50 lacs, which are the commercial hubs, where IB is highly intensive, more no of professionals lived and also there is more education level (according to Census 2001). From each city few banks has been selected depending upon the availability of data (with respect to public, private and foreign sector) which are more technology driven, which performed well in terms of IB services. It was purely a stratified sample. Personal visits were made to some of the places like Delhi, Kolkatta and Hyderabad and responses were taken. The email ids of the consumers who were willing to participate were collected

from the senior personnel of the banks customer service department and questionnaires were mailed to these respondents. The sample size of the various cities has been fixed according to pro-rata basis population (Census 2001) mentioned below:

Cities	Sample size as per the population pro-rata Census 2001	Response received
Mumbai	82	61
Kolkata	65	36
Delhi	62	55
Bangalore	29	28
Hyderabad	28	27
Chennai	34	30
Total	300	237

Table 6.1 : Pro- rata sample size population

Source: Population Census 2001

6.1.3.1 Survey instrument

A 18-item questionnaire was used to measure the key constructs identified. Every question in the questionnaire focused directly on a specific issue and it was ensured that questions have brevity and clarity. Multiple choice questions, of both single and multiple responses were used. The questionnaire consisted of initial demographical details of the respondents. The questionnaire was then pre-tested among 20 individuals. The pre-testing brought to light some of the problems in the questionnaire completion. These problems were then sorted out.

Question No 1 was concerned to find out where the respondents had their accounts. Awareness was measured at question no 2, which asked whether any of the banks of the respondents provide IB service. Questions 6 and 11 were about access to their Internet account and frequency of visits made to their banks. The type of response they had on their banks services was captured through question no 8. Those who were using the service, were asked at question no 10, how did they find the available service. In question no 12 they were asked to judge what factors affect adoption of IT and also were asked to verify why banks go for IT in question no 13. Also they were asked if they had any plans

of using the service in the future, and if yes what criteria are they looking for and at last were asked to seek out what could be the possible reasons for not using IB services. A model has been developed for the adoption of IB.

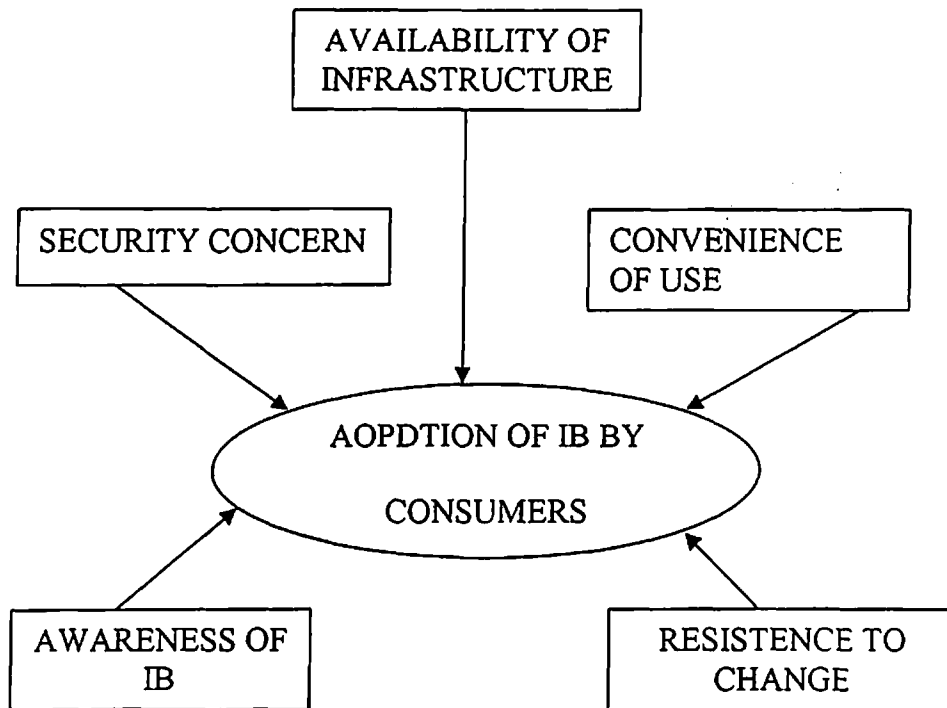


Figure 6.1: A Model for Adoption of IB

6.1.3.2 Response received

The questionnaires (300) were sent during June-July 2004 and were received after follow up. This has response rate of 83.66 percent. This response rate was far beyond expectations and above the acceptable response rate. Of these, 14 questionnaires were discarded as they were either fully incomplete or answered the demographic questionnaires only. The remaining 237 questionnaires filled-in all respects were used for data analysis. The response rate of the respondents is shown in Table 6.2

Questionnaires mailed /interviewed personally	Responses received	Response rate%
300	251	83.66

Table 6.2: Response rate of the respondents

The respondents were asked to put forth their views on what drives them to go for IB exactly. It is quite clear from the results that most of the respondents i.e. around 55 stated that it is convenience which drives them to go for IB. Also for majority of them IB is acting as a cheap tool for conducting banking and also as a sake of dignity. Interestingly, around 60 customers stated that the banks itself are motivating them to go for IB. This is a very good sign of the banking sector, which is encouraging people to go for newer ways of transacting, and this should be encouraged by other banks also.

Drivers of IB	No of Respondents
IB is compatible to banking needs	25
IB is easy to use	38
IB is a cheaper way to conduct banking	50
IB is self service	36
IB makes conducting banking transactions easier	60
IB is a convenient way to manage finances	17
Other family members /colleagues are using IB	40
IB is compatible to life style	49
IB offers greater control over finance	27
Using IB is a sign of modernity	37
Bank offers additional benefits for IB users	49
Bank encourages individual to use IB	60
Total	488(*)

Table 6.3: Respondent's response of IB drivers

NOTE (*) the total may not come to 237, because the same respondents might agree to more than one factors.

6.1.3.3 Testing the Research Questions

Measure:

Respondents were interviewed through a questionnaire focused on banking habit and the adoption of IB. The various aspects covered by the questionnaire are:

Category	Questions
Demographics	<ol style="list-style-type: none"> 1. Sex 2. Age 3. Education 4. Marital status 5. Personal income 6. Area of residence
IB Experience	<ol style="list-style-type: none"> 1. Exposure to the IB recommendation 2. Type of recommendation 3. Have they ever used IB before?
User Group (IBU)	<ol style="list-style-type: none"> 1. Timing of adoption (month/year) 2. Banks dealt with 3. Main reason for IB adoption 4. Frequency of IB 5. Recently used IB services 6. Initial reason for IB adoption 7. IB selection criteria 8. Main banking method prior to IB
Non-user Group (NU)	<ol style="list-style-type: none"> 1. Reason not to use IB 2. Do they plan to use? 3. IB selection criteria if they plan to use IB
General banking	<ol style="list-style-type: none"> 1. Frequency of OTC visit 2. Frequency of visit to banks' homepages

The profile of sample survey is presented in the following tables. Table 6.4 to 6.6 gives information about the demographic characteristics of the respondents.

Respondents characteristics	No of respondents who answered	Percentage (%)	No of respondents practicing IB
Age			
18-25	93	39.2	69
26-40	114	48.10	84
41-65	23	9.7	17
Over 65	7	2.9	6
Total	237	100	176
Sex			
Male	124	52.3	100
Female	113	47.6	76
Total	237	100	176

Table 6.4: Respondents Characteristics – Age and Sex

Respondents characteristics	No of respondents who answered	Percentage (%)	No of respondents practicing IB
Education			
Junior school	Nil		
Senior school	Nil		
Undergraduate	106	44.7	76
Postgraduate	131	55.2	100
Total	237	100	176
Income			
Below 25000 Rs	Nil	--	--
25000-100000	23	9.7	7
100000-175000	66	27.8	77
175000-250000	62	26.1	44
Above 250000	71	29.9	48
Other	15	6.3	--
Total	237	100	176

Table 6.5: Respondents Characteristics – Education and Income

Respondents characteristics	No of respondents who answered	%	No of respondents practicing IB
Place of residence			
Mumbai	61	25.7	41
Kolkatta	36	15.1	27
New Delhi	55	23.2	34
Bangalore	28	11.8	25
Hyderabad	27	11.3	23
Chennai	30	12.6	26
Total	237	100	176

Table 6.6: Respondents Characteristics – Place of Residence

From the above Tables 6.4 to 6.5 it is evident that, out of the 124 male respondents 100 of them have adopted to IB, which is a greater percentage when compared to women. All the respondents who adopted to IB are young and between the ages of 18-40. Very few of the elderly customers have responded. Considering income levels of the respondents the higher income people adapted to IB. Data also indicates that 169 out of 199 respondents who belong to high income group (>100000) were IB adopters. The education of the respondents was also quite evident from the profiles indicating that most of the IB adopters were postgraduates (100 out of 131). Hence from these results the research questions 10-13 are supported.

Q10: males are more likely to adopt IB than females.

Q11: younger generations are more likely to adopt IB than older generations.

Q12: people with higher education (university or above) are more likely to adopt IB than those with less education.

Q13: High-income group is more likely to adopt IB than low-income group

The following Table 6.7 gives a brief account on how frequently the people make use of the banking services by visiting their bank branches.

Frequency of Using Banking Services	No Of respondents	Percentage	No of IB Adopters
Once A Week	32	13.33	32
> More Than Once A Week	-		-
Once A Fortnight	84	35.4	78
> More Than Once A Fortnight	-		-
Once A Month	67	28.3	47
> More Than Once A Month	-		-
Never	54	22.8	19
Total	237	100	176

Table 6.7: Frequency of using banking services

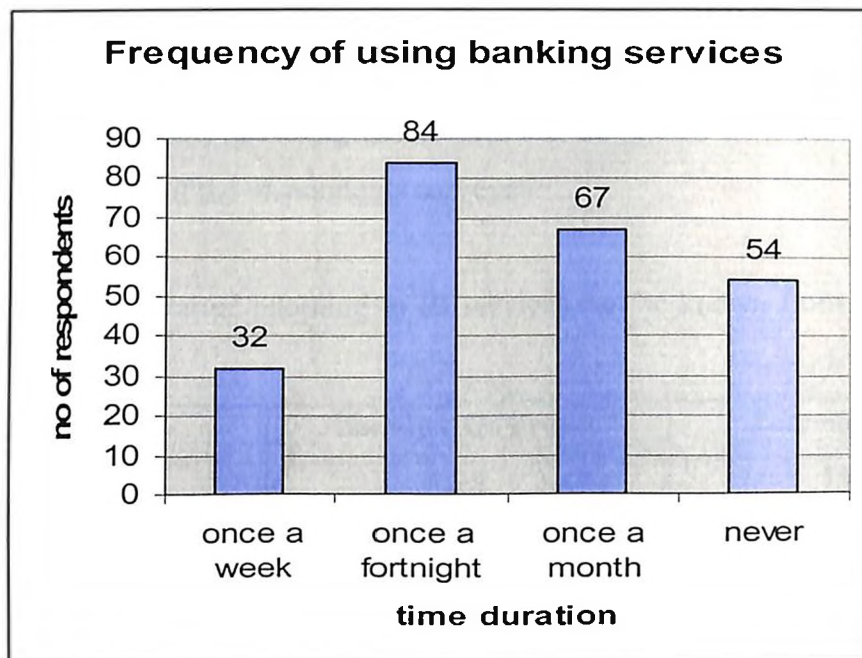


Figure 6.2: Frequency of using banking services

The Fig 6.2 shows that majority of the respondents encounter banking services once in a fortnight (84), and the no of IB adopters (78) are the maximum from this group. Followed by people who do it once a month (67), which is followed by people who do it for once a week (32). Attention has to be given to those people who never use their banking services

(54). This could be because they do not save money or some body else would do it for them.

Hence the Research Question 14 is proved which states.

Q14: The customers who frequently visit bank branches are more likely to adopt to IB.

The Table 6.8 gives a brief idea of the number of IB users from the sample of 237 respondents.

User Profiles From The Sample		
NU	NNU	TOTAL
176	61	237

(NU-Number of Users of IB

NNU- Number of Non-Users of IB)

Table 6.8: User status

The total no of respondents not using IB services can be known from the above table as 61 amounting to 25.7% of the respondents surveyed.

The time since people started adopting to IB services can be known from the following data in the Table 6.9

Duration	Number Of People	Percentage (%)
LESS THAN A WEEK	28	11.81
1-2 YRS	41	17.29
2-3 YRS	48	20.25
3-4 YRS	22	9.28
4-5 YRS	19	8.01
> 5 YRS	18	7.59
NOT YET	61	25.73
TOTAL	237	100

Table 6.9: Time since people have adopted IB

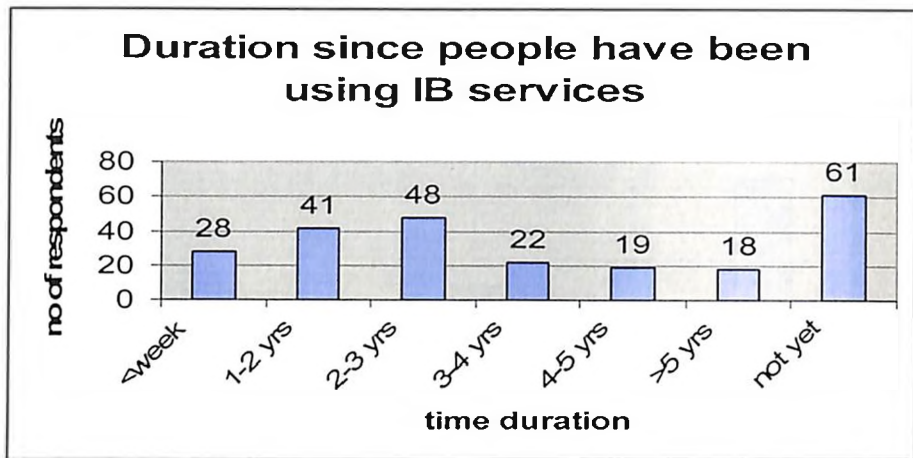


Figure 6.3: Time Duration of using the IB Services.

From the data given in the Table 6.9 it can be analyzed that around 41 respondents adopted IB 1-2 years ago and 48 of them have adopted 2-3 yrs ago, 41 of them are early adopters to IB (3-5 yrs) and unfortunately there are around 61 who are still in favor of the traditional methods.

Among the total no of IB users (176), the Table 6.10 gives an insight to the level of frequency of using their internet accounts

Frequency of Using Internet Account	Number of People	Percentage (%)
Once A Week	38	21.6
> More Than Once A Week	15	8.43
Once A Fortnight	32	18.07
> More Than Once A Fortnight	-	-
Once A Month	27	15.66
> More Than Once A Month	-	-
Never	64	36.14
Total	176	100

Table 6.10: Frequency of using Internet accounts

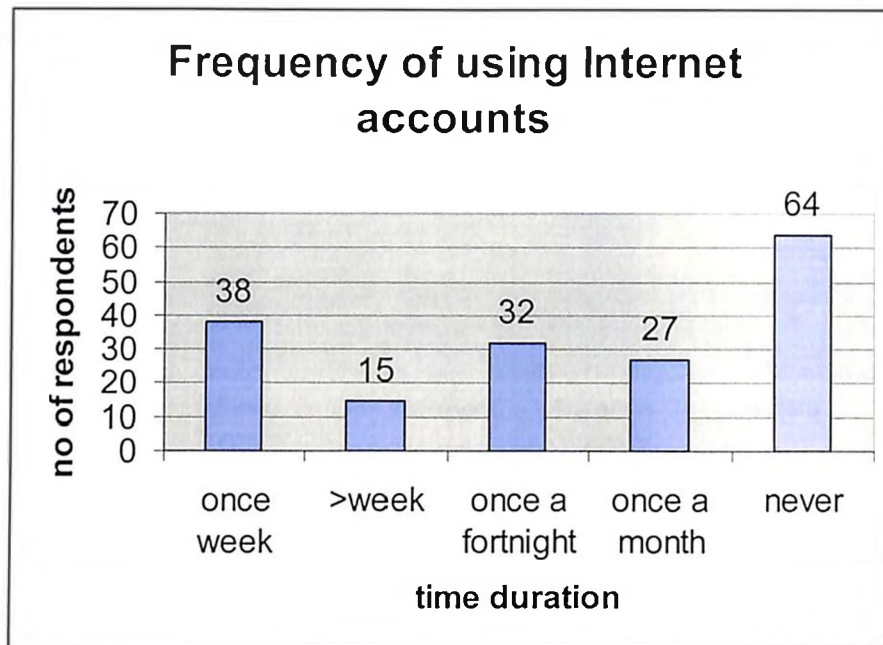


Figure 6.4: Frequency of using Internet Accounts

It is clear from the Table 6.10 and Fig 6.4 that 38 respondents operate their accounts once in a week, 15 respondents operates more than once a week, few of them i.e.32 and 27 use their accounts once a fortnight and once a month and there are 64 respondents who do not use their accounts, in spite of being aware of the services. This clearly shows that they are still reluctant to use IB services.

The different kinds of services for which the respondents use their internet accounts are listed below in the Table 6.11.

IB Services	No of Users	Percentage (%)
Money Transfer	34	19.27
Bill Payment	25	14.4
Balance Enquiry	103	59
Others	14	7.22
TOTAL	176	100

Table 6.11 - Profile of services used by the respondents

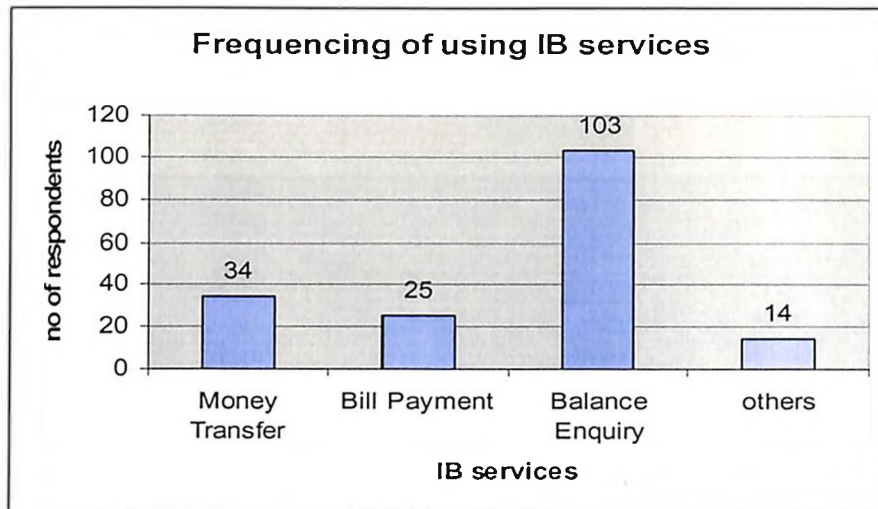


Figure 6.5: Frequency of using IB services

Among the users of IB 59% of them use company websites just to know the balance, 14.4% of them use it for paying their bills and 19.2% for money transfer but it's relatively very low.

From the above results it is clear that there are still 61 of the respondents who have not turned up for IB services and among the users of IB, there are some people who are not very much interested in using it. The following table 6.12 clearly defines the various reasons for not showing interest in IB services

Propositions On IB	Number of People	Percentage of people
Difficulty In Use	71	29.92
Security Concern	121	51.18
Resistance To Change	97	40.94
No Internet Access	74	31.4
Benefits of IB Not Clear	78	33.07
Not offer training to use IB	60	25.19
Privacy concerned	73	30.70
Not offer incentive to use IB	80	33.70

Table 6.12: Views of personnel on eight propositions of IB

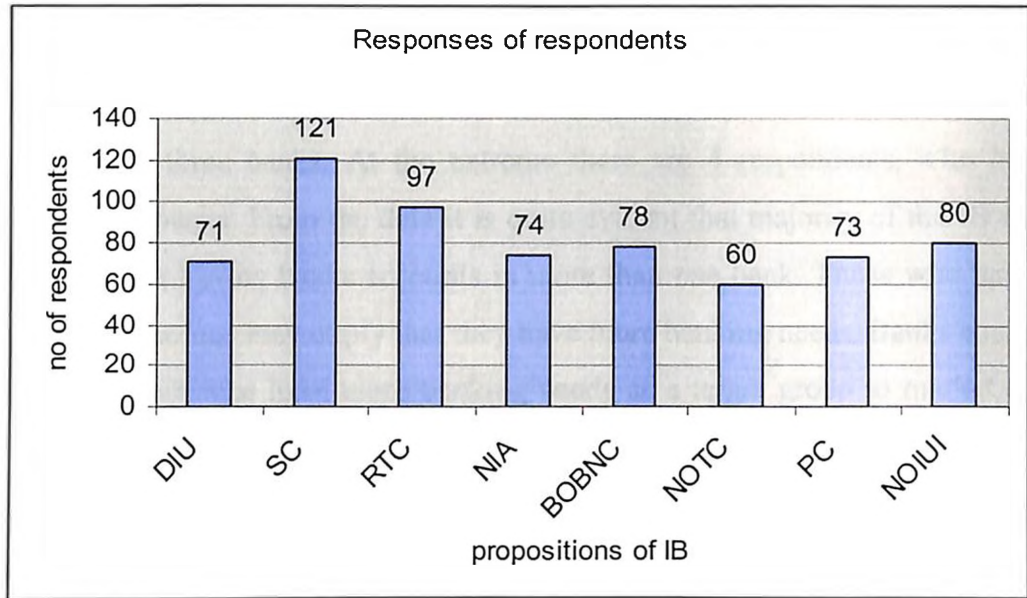


Figure 6.6: Response of respondents

NOTE: DIU=Difficulty in Use, SC= Security Concern, RTC=Resistance to Change, NIA= No Internet Access, BOBNC= Benefits of IB Not Clear, NOTC= Not offer training to use IB, PC= Privacy concerned, NOIUI= Not offer incentive to use IB

The bar chart clearly shows that 121 people are worried about security concerns, 78 of them are not clear about the benefits of IB, 97 of them are resistance to change and 71 of them believe that IB services are difficult to use, 74 of them say that they don't have internet access and at last 60 of them point out that banks don't provide training to use IB services. This clearly supports the following Research Questions

- Q1: lack of knowledge (awareness) of such a service and its benefits.**
- Q2: Service available being not easy to use or perceive it difficult to use.**
- Q3: resistance to change from current modes of operation.**
- Q4: fear of security of doing banking transactions over the Internet.**
- Q5: non availability of access to computers/ Internet.**

Let us now try to understand how the research question 6 can be analyzed by the discussion given below along with the Table 6.13.

Q6: Indian consumers having accounts in more than one bank are more likely to adopt IB.

Over 85% of the respondents had accounts in more than one bank, of which 41.7% (99) had accounts in three banks. At the extreme there are 4 respondents, who had their accounts in five banks. From the data it is quite evident that majority of the IB adopters are those who are having banks accounts in more than one bank. Those who have more than one bank accounts may imply that they have more banking needs. Banks could focus on those customers who have more banking needs as a target group to market their IB services.

No of Banks in which customers have account	No of People (NU+NNU)	IB Adopters
1	36 (14.9%)	16 (8.4%)
2	61 (25.9%)	36 (20.48%)
3	99 (41.7%)	93 (53%)
4	37 (15.7%)	27 (15.6%)
5	4 (1.5%)	4 (2.4%)
TOTAL	237	176

Table 6.13: Number of Accounts

6.1.4 Findings of the Study

Findings with respect to each of the five prepositions are discussed below:

6.1.4.1 Security concerns

Table 6.12 shows that, 121 respondents are keen on security aspects of IB system. In spite of secured systems being available, customers are still facing problems for the transactions online. So banks should come up with better secured systems like digital signatures, encryption etc and create trust among customers mind. Hence the research question Q4 proved.

6.1.4.2 Awareness of IB: Accompanied Benefits

Table 6.12 shows that 78 of the respondents are not adequately aware of the IB services, in spite of that all the banks where these people had their accounts were providing IB services. Hence this proves the research question Q1.

The list of the banks is given below in Table 6.14.

S.No.	BANK
1	CANARA BANK
2	UCO BANK
3	PUNJAB NATIONAL BANK
4	CENTURION BANK
5	STANDARD CHARTERED BANK
6	UTI BANK
7	ABN Amro BANK
8	ICICI BANK
9	BANK OF BARODA
10	CORPORATION BANK
11	HDFC BANK
12	STATE BANK OF INDIA
13	CITI BANK
14	ALLAHABAD
15	GLOBAL TRUST BANK

Table 6.14: List of banks

6.1.4.3 Ease of use

It is observed that 71 respondents feel difficult to use IB services and have their own problems to quote: some banks require downloading of software, before IB can be used.

It appears that, the problem of difficulty in use can be ameliorated by customer education.

Hence this proves the research question Q 2.

6.1.4.4 Resistance to change

Table 6.12 shows that, 97 respondents are not ready to change from traditional banking services. This could be due to customer inertia, need for personal interaction especially among the age group of 40 yrs. as more and more customers migrate to IB, the resistance of the remaining customers could disappear. This proves the research question Q3.

6.1.4.5 No access to computers/Internet

Among all factors, 74 of the respondents clearly show non-adoption of IB is least cited since most customers have access, at home or at office or at both. Hence only to some extent the research question Q5 is proved.

6.1.4.6 Information Technology affect on Banking Industry

Additional results have also been gathered from the respondents pertaining to various factors that IT has an affect in banking industry. These results have been summarized in the form of a Table 6.15.

Variable	Total	Totally Disagre	Disagree	Neutral	Totally Agree	Agree
IT helps bank	237	6	9	30	120	72
Faster enquiry	237	14	18	18	127	60
Reduces product / service time to market	237	15	16	35	105	66
Increases efficiency	237	19	19	58	120	21
Expands customer base	237	10	12	38	138	39
Attracts more profitable customers	237	17	11	104	63	42
Improves promptness	237	25	13	33	150	16
Transaction time is reduced	237	14	12	18	160	33
Easy handling of transactions	237	12	16	37	150	22
Increases customer satisfaction	237	16	0	51	87	83
Encourages people to patronize the bank	237	17	12	45	140	23

Table 6.15: Respondents views on the IT factors on banking industry

From the above data it is clear that most of the respondents (192) believe that IT helps a bank. A very few of them (15) agree that there would be no effect of IT. Majority of them have felt the IT has a very good effect on the Banking industry. Hence this proves the following research questions

Q7: IT has a very strong impact in the Banking Industry

The respondents were also asked few questions to find out why banks generally go for adopting internet mode for offering its services.

Statement	Totally Disagree	Disagree	Neutral	Totally Agree	Agree	Total
To increase revenue	15	16	46	89	71	237
To reduce operating cost	14	23	27	116	57	237
To increase customer service	0	14	33	136	54	237
To increase the efficiency in dealing with suppliers	12	18	37	118	52	237
To increase information flow	0	14	23	125	75	237
To enhance company brand and corporate image	0	13	33	121	70	237
To increase customer loyalty and retention	0	20	45	127	45	237
To improve business process flow	10	15	42	123	47	237

Table 6.16: Respondents views on banks need to adopt IB

From the above Table 6.16 it is clear that 160 respondents believe that banks go for IB to increase their revenue. Others either do not agree or show neutral response. 173 respondents believe that the main purpose is to reduce the cost, where as 190 of them

believe that for the sake of increasing customer service banks go for IB. 170 of them see that it is for increasing efficiency in dealing with the suppliers, majority of them(200) feel that it is to increase the information flow. 191 of them view that it is enhancement of the brand and corporate image, finally-170 of them believe that on the whole banks go for IB to improve their business flow. Hence this proves the following research questions

Q8: Banking industry is adopting IT due to the following reasons

- To increase revenue
- To reduce operating costs
- To increase customer service
- To increase the effectiveness in dealing with the suppliers
- To increase the information flow
- To enhance company brand and corporate image
- To improve business process flow

6.1.4.7 Tentative time period to use IB service available in India

is the data required?

No	Tentative Time Period To Use	Respondent	Percentage%	Accumulated Percentage%
1	6 Months	12	20.45	20.45
2	1 Years	14	22.72	43.17
3	More Than 1 Years	18	29.54	72.71
4	Never	17	27.27	100
TOTAL		61	100	100

Table 6.17: Tentative time period to use IB service available in India

The results indicate that twenty percent (20%) plan to use IB within the next six months, twenty two percent (22%) plan to use within one year, twenty nine percent (29%) plan to use IB more than one year, and twenty seven percent plan not to use IB. The accumulated percentage results also suggest that forty three percent (43%) of respondents plan to use

IB within one year, and overall of seventy two percent (72%) plan to use IB even though it may take longer than one year. These findings suggest that majority of customers who are or are not aware of IB services available are interested in new Internet-based banking services on the Internet and are willing to use or explore IB within a period of less than one year. Hence this proves the following research questions

Q9: If the tentative time period for adopting to IB services is less, then it implies that most of them are finding IB services useful.

Finally the respondents were asked to rank the various banking channels, which they have been using till now and the results are as follows:

Table 6.18 compares four banking channels on the frequency of their use. Automatic Teller Machines (ATM) are the most popular channel for banking transactions. This may be due to the user friendliness, accessibility, and capability of ATMs. ATMs can be easily found on streets, shopping malls, and even outside bank branches. In addition to the convenience and accessibility, one can perform a wide range of banking transactions on an ATM. Thus, ATM has been widely accepted by people. Branch Counter was the second most popular channel to perform banking transactions. Almost all banking services can be performed through the bank branch counters. This is especially true for the elderly, which constitute for the largest group of branch counter users. They are relatively conservative in accepting new technologies. Some of whom are illiterate therefore must need help from the bank's staff for completing their banking transactions. Another reason would be the presence of campus branch counter(s).

Branch Counter	ATM	Phone Banking	IB
188/237	200/237	104/237	154/237
79%	84.2%	44%	65%

Table 6.18: Response of customers to the different modes of banking

Phone Banking was the fourth most frequently used by potential adopters of IB. When compared to IB, this may be because users of IB find that IB provides a clearer interface (visual) than Phone Banking (audio). However, Phone Banking has some advantages over IB. For example, Phone Banking users do not need to own a computer or have access to the Internet, instead, they can use any phones (including fix-line phone, mobile phone, and coin-phone on the streets) to make banking transactions.

6.1.5: ANALYSIS OF THE FINDINGS

The analysis shows that security concerns and lack of awareness stand out as the reasons for non-adoption of innovation of IB by Indian customers. Bank managements could build awareness by emphasizing the benefits of IB vis-a-vis telephone and brick and mortar (branch) banking and educate customers about security concerns on the lines suggested in this chapter. Further, the delivery of financial services over the Internet should be treated as a part of overall customer service and distribution strategy. The relationships developed could then be used as a gateway for delivery of product information. These measures could help in rapid migration of customers to IB, resulting in considerable savings in operating costs for banks. Security is a burning issue and even single adverse media publicity can damage consumer concerns which restore their confidence in the system. A quick response to such negative publicity can ease customer concerns and restore their confidence. Major Banks continuously provide such update to the customers. Some good and customer friendly banks often undertake to indemnify the losses incurred through unauthorized use, except under certain deviated circumstances. Such approaches help build customer confidence. In addition, the information on security aspects needs to be presented in simple and non-technical form. Issues like awareness of the service and benefits, difficulty in use, resistance to change, and customer education are also controllable from a managerial perspective

The results presented in this chapter provide strong evidence that IB adoption behavior is affected by individual characteristics like demographics, the exposure, information seeking behavior and general banking behavior. Moreover, the demographics are less important than banking-specific behavior in adoption decision of a new banking

technology. In establishing the social norm of IB, the government plays a significant role by narrowing the socio-economic gaps. IB seems to be a national phenomenon in India nowadays where favorable behavior towards new technology of a country outweighs individual characteristics. Because of this reason, many of the demographic variables do not find any significant difference in adopting IB. Finally, the analysis provides evidence on the possible consumer inertia and risk aversion when a new banking technology is introduced as non-IB users identify their reasons to delay the adoption as being happy with the existing banking methods (*inertia*) and the aspects of uncertain security (*risk-aversion*). If the security issue is one of the main concerns for both adopters and non-adopters, appropriate public policy and regulation are required to mitigate the potential loss of welfare in case of financial accidents on the Internet as well as to optimize the speed of adoption. In last, the framework postulates that a customer's intention to adopt Internet banking is determined by three factors. They are (1) *attitude*, which describes a person's perception towards Internet banking; (2) *norms*, which describe the social influence that may affect a person's intention to use Internet banking; and (3) *perceived behavioral*, which describes the beliefs about having the necessary resources and opportunities to adopt Internet banking. Intention to adopt Internet banking services, in return, is expected to affect the actual adoption of Internet banking.

6.2 STUDY OF THE SPECIFIC QUALITY FACTORS OF INTERNET BANKING SERVICE PROVIDERS

In the last part we have seen the behavior patterns of the respondents towards the adoption of the Internet banking, now in this section we shall examine their awareness pertaining to various banks offering IB services. We will also try to measure the quality of the services provided by various banks. The Internet banking customers such as internet shoppers and e-commerce businesses who use Internet for their daily business and banking activities via personal computer may face with the following questions when they have to determine which Internet banking services would be best for them:

- (1) Which bank(s) provides Internet banking services in India?
- (2) Which banking services and features are available on the Internet?
- (3) What are the fees and charges for each internet-based transaction?
- (4) Which bank is the best Internet-based banking service provider in India?

In order to answer questions stated in the previous section, this study focuses on the comparison of Internet-based banking services available in thirteen banks in India. The findings will be used to address the four research questions and make recommendations for internet-based banking customers who are comparing which bank and services to be selected for conducting their daily electronic-based activities via the Internet in India. The purpose of this part is to help fill significant gaps in knowledge about the Internet banking landscape in India. The study presents data drawn from a survey of commercial banks websites on the number of commercial banks that offer Internet banking and the products and services they offer.

6.2.1 QUALITY OF IB SERVICES

Quality can be interpreted as "Customer's expressed and implied requirements are met fully". This is a core statement from which eminent definitions of quality have been derived. They include: "the totality of features and characteristics of a product or service that bears on its ability to meet a stated or implied need" [Paul R. P. (2000)], "fitness for use" Chanaka & Paul (2000), and "conformance to requirement". It is important to note that satisfying the customers' needs and expectations is the main factor in all these definitions. Therefore it is an imperative for any company to identify such needs early in the development cycle. The ability to define accurately the needs related to design, performance, price, safety, delivery, and other business activities and processes will place a company ahead of its competitors in the market. However, the eight dimensions of quality presented by Garvin (1987) is simple and can be applied for measuring Internet-based banking services. The eight dimensions of quality include:

- (1) Performance
- (2) Feature
- (3) Reliability
- (4) Conformance
- (5) Durability
- (6) Serviceability
- (7) Aesthetics
- (8) Perceived quality

Hence in the following study the idea has been taken from Garvin quality model and it is slightly modified as per the requirement of the study. In general, IB products are offered in a two-tiered structure. A basic tier of IB products includes customer account inquiry, funds transfer and electronic bill payment. A second or premium tier includes basic services plus one or more additional services. The list of IB products and services is not inclusive.

The basic Internet services available by many banks for their customers may include:

- (1) Inquiry about outstanding balance
- (2) Inquiry about credit card and ATM card
- (3) Inquiry about currency and exchange rate
- (4) Inquiry about bank interest rate
- (5) Inquiry about news and business information
- (6) Inquiry about economic data and information.
- (7) Fund transfer between accounts
- (8) Transfer payment for public utilities
- (9) Print account statement
- (10) Provide LC, BC, FCD and Miscellaneous Services
- (11) Change password and user id
- (12) E-Phone banking on the Internet
- (13) E-cash card on the Internet
- (14) Web-shopping on the Internet

The Premium Internet services available by many banks for their customers may include:

- 1) Brokerage.
- 2) Cash management.
- 3) Credit applications.
- 4) Credit and debit cards.
- 5) Customer correspondence.
- 6) Demat holdings.
- 7) Financial advice
- 8) Foreign exchange trading.

- 9) Insurance.
- 10) Online trading.
- 11) Opening accounts
- 12) Requests and intimations.
- 13) Tax services.
- 14) E-shopping.
- 15) Standing instructions.
- 16) Investments
- 17) Asset management services etc.

An e-saving account service, for example, allows customer to make inquiry about saving account and to perform multiple transactions, such as, withdraw, transfer, and print their statement via Internet-based computers and printer from home and/or work place. By using e-saving account, both customer and the banks can save their time and costs in waiting line and traveling expense for updating savings deposit passbooks over the counter inside the bank.

6.2.2 RESEARCH MODEL

In order to answer the four research questions stated in section 1, research model adopted for this study is modified from Garvin's eight dimensions of quality model. Due to the introductory stage of IB services in India, it is vital for the banks to assess preliminary performance, reliability, serviceability, features and perceived quality that satisfy their customers and able to maintain their services. This study, therefore, focuses on five dimensions of quality: performance, reliability, serviceability and features and perceived quality dimensions. The performance, reliability, serviceability and features dimensions are used to address research questions number 1, 2 and 3. The perceived quality dimension is used to address research question number 4.

6.2.2.1 Independent Variables:

The five dimensions of quality from Garvin model are transformed into five independent variables in this study: performance, reliability, serviceability, features and perceived

quality. The definition and unit of measures of each independent variable is presented below.

6.2.2.2 Dependent Variables:

The overall quality of IB service for each bank perceived and rated by customers is used as dependent variable. The outcome ranking result is used to determine the best IB service in India.

6.2.2.3 Mathematical Representation of Research Model:

The mathematical representation of research model for this study is displayed as follows,

$$Y = X_1 + X_2 + X_3 + X_4 + X_5$$

Where,

Y = Overall Quality of IB Services (IBS),

X₁ = Performance of IBS

X₂ = Reliability of IBS

X₃ = Serviceability of IBS

X₄ = Features of IBS

X₅ = Perceived quality of IBS

6.2.2.4 Definition and Unit of Measure of Dependent and Independent Variables:

This section presents definition and unit of measure for each dependent and independent variables implemented in the research model.

- (1) Performance (X₁) is the operating quality of each IB service and feature offered by each bank. Example, if Internet service and feature that does not operate according to customer's reasons for using it on the Internet, then it is rated as poor, such as, inaccurate outstanding balance when you select "inquiry about outstanding balance". The scale from 1 to 5 is used as unit of measure for performance where 1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent performance.

- (2) Reliability (X_2) is the frequency of which each IB service and feature fail. Example, high frequency of failing service is rated as poor. No failing service is rated as excellent. The scale from 1 to 5 is used as unit of measure for reliability where 1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent in reliability.
- (3) Serviceability (X_3) refers to speed, courtesy, and ability to correct or repair each Internet service and features. Example, no ability to correct inaccurate inquiry about outstanding balance is rated as poor. Ability to quickly correct inaccurate inquiry outstanding balance feature within one day is rated as excellent. The scale from 1 to 5 is used as unit of measure for serviceability where 1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent serviceability.
- (4) Feature (X_4) refers to services that available on IB and allow customer to make transaction. Such as Inquiry about Outstanding Balance, Fund Transfer between accounts, Print account statement, Provide LCC, BC FCD Miscellaneous Services, etc. The scale from 1 to 5 is used as unit of measure for feature where 1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent features.
- (5) Perceived quality (X_5) refers to how customers clearly understand and have complete information with products and services such as acknowledge about IB by each bank. The scale from 1 to 5 is used as unit of measure for performance where 1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent perceived quality.
- (6) Overall quality (Y) refers to quality that customers perceive from the overall products and services available and provided by the banks. The scale from 1 to 5 is used as unit of measure for performance where 1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent overall quality.

Additional information from overall ranking result is used to determine the best IB services in India.

6.2.3 RESEARCH DESIGN

Five independent variables and one dependent variable from research model are used to design Questionnaires. The questionnaire is designed and divided into eight sections as follows:

Part I Awareness of IB services in India

Part II Rating and Ranking of IB Services in India

Part III IB Services and Features Available in India

Part IV Rating for four Basic Inquiry Services on the IB Services

Part V Performance Rating of IB Services Available in India

Part VI Reliability Rating of IB Services Available in India

Part VII Serviceability Rating of IB Services Available in India

Part VIII Fees and Charges for IB Services Available in India

The major findings and recommendation are presented as follows:

i) Awareness of IB Services in India

The Table 6.19 indicates that seventy four percent (%) of respondents are aware of IB service in India. However, twenty five percent (%) of respondents neither know nor understand IB services. These findings suggest that majority of customers in India are not aware of IB services available. All banks that provide IB services, therefore, should increase promotion, awareness and understanding programs to local customers in India.

No.	Name of the Bank	Provide IB Services	
		Aware	Not Aware
1	ICICI	44	3
2	SBI	32	5
3	HDFC	32	4
4	PNB	12	4
5	BOB	11	6
6	ABN Amro Bank	8	5
7	Allahabad Bank	7	4
8	Canara Bank	6	7
9	UTI Bank	5	5
10	Standard Chartered Bank	6	3
11	Global Trust Bank	4	7
12	Centurion Bank	4	4
13	Corporation Bank	5	4
TOTAL		176	61
AVERAGE PERCENTAGE		74.2	25.7

Table 6.19 Awareness of IB Services in India

ii) Rating and Rank of IB Services in India

Table 6.20 suggests that ICICI and SBI is the number one IB services provider bank in India. HDFC and PNB have been ranked number 2 and 3 respectively. BOB, PNB and Standard Chartered Bank have very close rating of 3.85, 3.33, 3.23 and ranked number 4, 5, and 6 consecutively. The remaining banks are in its early stage of development and introduction of IB services to their customers. In the given table rank (*) is assigned based on the highest rating score.

No	Name of the Bank	Sector	Mean Rating Score	Standard Deviation	Rank (*)
1	ICICI	Private	4.74	0.96	1
2	SBI	Public	4.71	1.30	1
3	HDFC	Private	4.69	1.51	2
4	PNB	Public	3.85	1.60	3
5	BOB	Public	3.33	1.65	4
6	Standard Chartered Bank	Foreign	3.23	1.65	5
7	Global Trust Bank	Foreign	3.20	1.80	6
8	Corporation Bank	Public	3.00	1.92	7
9	UTI Bank	Private	2.39	1.92	8
10	ABN Amro Bank	Public	2.31	2.00	9
11	Centurion Bank	Foreign	2.08	2.01	10
12	Allahabad Bank	Public	1.83	2.12	11
13	Canara Bank	Public	1.80	2.12	12

Table 6.20: Rating and Rank of IB Services in India

iii) IB Services Features Available in India

All the banks are providing IB services to the customers. The Table 6.21 suggests that ICICI, SBI, HDFC are among the most visited IB services websites on the Internet in India.

NO	IB Services and Features	No of Respondents												
		1	2	3	4	5	6	7	8	9	10	11	12	13
		ICICI	SBI	HDFC	PNB	BOB	ABN Amro	ALLAHABAD	CANARA	UTI	STANDARD CHARTERED	GTB	CENTURION	CORPORATION
1	Inquiry about outstanding balance	20	18	18	4	5	4	6	4	3	3	1	1	1
2	Fund transfer between accounts	11	8	15	8	2	5	2	3	3	2	2	1	1
3	Transfer payment for public utilities	8	8	9	3	1	4	2	2	2	3	3	1	1
4	Print account statement	6	3	8	2	1	3	4	1	4	4	1	1	1
5	Inquiry about credit card and ATM card	11	12	9	7	5	6	2	3	6	6	1	2	1
6	Inquiry about currency and exchange rate	12	7	8	2	6	2	2	1	4	6	1	2	1
7	Inquiry about bank interest rate	9	7	8	7	4	3	3	4	2	2	1	1	1
8	Inquiry about news and business information	5	9	9	2	3	2	4	1	2	3	2	1	1
9	Inquiry about economic data information	5	7	10	5	2	2	2	2	4	1	2	2	2
10	Web shopping on the internet	4	6	5	1	2	1	2	2	1	1	1	2	2
11	Change user id and password	6	4	2	1	2	3	1	2	2	4	1	1	2
12	e-phone on the internet	5	7	6	1	1	2	2	2	1	1	2	2	2
13	e-cash card on the internet	5	5	5	5	2	1	2	3	3	2	1	1	1
Sub total		107	101	112	48	36	38	34	30	37	38	30	12	13

Table 6.21: Respondents awareness on I B services and features

iv) Rating Five Basic Inquiry Services on the IB Services

Table 6.22 suggests that SBI has the highest rate and rank number one in terms of satisfaction on the five basic inquiries services on the IB services. ICICI, HDFC, PNB AND BOB are ranked at 2, 3, 4 and 5 respectively. The remaining banks that provide five basic inquiry services on the Internet are ranked 6, 7, and 8 which clearly shows that people are still not satisfied with their services.

NO	Basic Inquires on IB Services and Features	ICICI	SBI	HDFC	PNB	BOB	ABN Amro	ALLAHABAD	CANARA	UTI	STANDARD CHARTERED	GTB	CENTURION	CORPORATION
1	Inquiry about credit card and ATM card	3.8(*)	4	3.4	3	3	1	2	2	2	2	1.5	2	1.5
2	Inquiry about currency and exchange rate	3.5	4	3.4	4	3	2	1	2	2	1	2	1.6	2
3	Inquiry about bank interest rate	3.8	3.5	3.2	3	4	2	1	1.5	3	2	2	3	3
4	Inquiry about News and Business information	3.5	3.8	3.6	3	2	2	2	1.5	3.5	2.4	2	3	2
5	Inquiry about Economic Data and Information	3.7	4	3.6	3		1	1	2	4	2.6	2	1	1
Rating Score		3.6	3.8	3.4	3.2	3	1.6	1.4	1.8	2.9	2	1.9	2.1	1.9
Ranking Number		2	1	3	4	5	11	12	10	6	9	8	7	8

Table 6.22: Respondents ratings on IB Services and Features

In the above table (*) the value 3.8 is obtained by summation of the rating given by respondents divided by their number.

v) Performance Rating of IB Services Available in India

Referring to definition of performance in Part 2, performance is the operating quality of each IB service and feature offered by each bank. Example, if Internet service and feature that does not operate according to customer's reasons for using it on the Internet, then it is rated as poor, such as, inaccurate outstanding balance when you select "inquiry about outstanding balance". Table 6.23 presents result for performance rating of IB services available in India. The results suggest that only three banks provide information valid for the rating analysis of performance for each IB services and features available. ICICI bank

has been rated as number one for its performance on IB services. SBI and HDFC have been rated as number 2 and 3 respectively.

NO	IB Services and Features	ICICI	SBI	HDFC
1	Inquiry about outstanding balance	4	4.3	3.5
2	Fund transfer between accounts	3	4.3	3
3	Transfer payment for public utilities	4	4.3	3
4	Print account Statement	3	4.3	2
5	Web shopping on the internet	3	4.3	3.5
6	Change user id and password	4	4.3	3.5
7	e-phone banking on the internet	3	4	3.5
8	e-cash card on the internet	4	4.3	2.5
Average		3.5	4.26	3.06
Rank Number		2	1	3

Table 6.23: Performance Rating of IB Services Available in India

vi) Reliability Rating of IB Services Available in India

Reliability is the frequency of which each IB service and feature fail. Example, high frequency of failing service is rated as poor. No failing service is rated as excellent. Table 6.24 presents result for reliability rating of IB services available in India. The results suggest that only three banks provide information valid for the rating analysis of reliability for each IB services and features available. ICICI and SBI have been rated as number one for their reliability on IB services HDFC has been rated as number 2 respectively.

S No	IB Services and Features	ICICI	SBI	HDFC
1	Inquiry about outstanding balance	3.5	3.6	3
2	Fund transfer between accounts	4	3.6	3
3	Transfer payment for public utilities	3.5	3.6	4
4	Print account Statement	3.5	3.6	3
5	Web shopping on the internet	3.5	3.6	3
6	Change user id and password	3.5	3.6	4
7	e-phone banking on the internet	4	3.6	3
8	e-cash card on the internet	3.5	3.6	4
Total Average		3.625	3.6	3.37
Rank Number		1	1	2

Table 6.24: Reliability Rating of IB Services Available in India

vii) Serviceability Rating of IB Services in India

Table 6.25 presents result for serviceability rating of IB services available in India.

S No	IB Services and Features	ICICI	SBI	HDFC
1	Inquiry about outstanding balance	4	4.3	3
2	Fund transfer between accounts	3	4	3
3	Transfer payment for public utilities	4	3.6	3
4	Print account Statement	3	4.3	3
5	Web shopping on the internet	4	4	3
6	Change user id and password	3	4	3
7	e-phone banking on the internet	4	4.3	3
8	e-cash card on the internet	4	4	3
Total Average		3.625	4.06	3
Rank Number		2	1	3

Table 6.25: Rating serviceability of IB Services in India

Serviceability refers to speed, courtesy, and ability to correct or repair each Internet service and features. In the above table no ability to correct inaccurate inquiry about outstanding balance is rated as poor. Ability to quickly correct inaccurate inquiry outstanding balance feature within one day is rated as excellent. The results suggest that only three banks provide information valid for the rating analysis of serviceability for each IB services and features available. SBI has been rated as number one for its serviceability on IB services. ICICI and HDFC have been rated as number 2 and 3 respectively.

viii) Fees and Charges for Internet-based Transaction on IB Services Available

Table 6.26 presents results for fees and charges for Internet-based Transaction on IB Services. The results suggest that Internet-based transaction fee on IB services is not charged to customers by the banks. There are no fees for accessing account(s) through the Internet. However, fees, as described in the applicable product or account disclosure statement or Interest and Service Fees brochure, may apply to services ordered online and to transfers from a credit account.

S No	IB Services and Features	ICICI	SBI	HDFC
1	Inquiry about outstanding balance	I	I	I
2	Fund transfer between accounts	I	I	I
3	Transfer payment for public utilities	F	F	F
4	Print account Statement	F	F	F
5	Web shopping on the internet	I	I	I
6	Change user id and password	I	I	I
7	e-phone banking on the internet	I	I	I
8	e-cash card on the internet	I	I	I
Note: I = Internet Connection Fees and Charges to Internet Service Provider (ISP) F = Transaction Service Fees and Charges by the Bank				

Table 6.26: Fees and Charges for Internet-based transaction on IB services

Furthermore, respondents who were the IB adopters were asked to show their preferences if banks want to charge for IB services. Most of them expressed that they are unlikely to pay any charges for using IB. The data suggest that people prefer a fee based on connection time to a flat fee per month for using IB. However, a flat fee per month plus a fee per transaction was the option they liked least. Banks could take this for reference if they really want to impose service charges on their IB customers. If they want to impose a fee, their customers will probably switch to other banks that do not have any charges unless quality and range of the IB services are quite different among banks.

Fee Structure	No of Users
a flat fee per month	45
a flat fee per month plus a fee per transaction	26
a fee based on connection time	105
Total	176

Table 6.27: Preference of Fee structure

6.2.4 LIMITATION OF THIS STUDY

Due to the initiation stage of IB services available in India, many people are still not aware of and/or do not understand the nature of Internet-based banking services. Majority of them were not able to determine the level of overall quality of the Internet-based banking service available. However, the information collected from the customer via formal questionnaire and interview were used for data analysis and determine the level of awareness instead of overall quality of the service (dependent variable) in this study.

6.2.5 RESULTS AND RECOMMENDATIONS

A summary of major findings and recommendation for IB Services in India is presented in Table 6.28 as follows.

S No	Major Findings	Results	Recommendation
1	Awareness of IB Services in India	Awareness of IB service in India is very low. Many bank customers are not aware of IB services available by their banks in India.	All banks that provide IB services should increase promotion on IB services awareness and understanding programs to local customers in India.
2	Rating and Rank of Internet Banking Services In India	ICICI and SBI are ranked the no one IB service provider in India, followed by HDFC, PNB, BOB which are ranked 2,3 and 4 respectively	The remaining banks should expedite on their initiation and implementation on IB services to their customers.
3	IB Services and Features Available In India	All the banks are providing with adequate facilities and ICICI, SBI, HDFC are the mostly visited IB websites.	The remaining banks should come up new customized offerings of IB services to grab customer focus.
4	Rating Four Basic Inquiry Services on the IB Services	SBI has the highest rate and rank number one in terms of satisfaction on the five basic inquiries services on the IB services. ICICI, HDFC, PNB AND BOB are ranked at 2, 3, 4 and 5 respectively	The remaining banks that provide some of or part of five basic inquiry services on the Internet and are in their early stages of planning, developing and implementing IB services should speed up their efforts and resources to ensure up-

5	Performance Rating of Internet Banking Services Available in India	ICICI bank has been rated as number one for its performance on IB services. SBI and HDFC have been rated as number 2 and 3 respectively.	to-date IB services. All banks should provide 24 hours error free IB services with quality and security to ensure their high level of performance to their customers.
6	Reliability Rating of Internet Banking Services Available in India	ICICI and SBI have been rated as number one for their reliability on IB services. HDFC has been rated as number 2 respectively.	All banks should provide power backup and data recovery systems for their IB services in case of power failure, incomplete transaction. Also, a constantly monitoring system should be used to ensure accuracy of transaction processed and/or recovered.
7	Serviceability Rating of IB by each bank in India	SBI has been rated as number one for its serviceability on IB services. ICICI and HDFC have been rated as number 2 and 3 respectively.	All banks should provide 24 hour-Internet-based monitoring and assistance for IB services that have problems or need immediate assistance.
8	Fees and Charges for Internet-based Transaction on IB Services Available	IB service transaction in India is free of charge. However, customers pay for Internet connection and access time to their internet Service Providers (ISP).	IB service should remain free of charge by the banks in India. Also, ISPs in India should find a way to help IB customers reduce their Internet connection cost, such as, special rate or promotion.

CONCLUSION

7.1 MAJOR FINDINGS/ OBSERVATIONS

If we look back to the objectives behind the present study, the primary aim was to analyze the various e-Business models and evaluate the performance of Internet banks in India with a special emphasis on new generation private sector banks in the post liberalization era and through a study of the e-business investments and other technology initiative in the field of banking, suggest an ideal e-Banking model, which will find it competitive in the New Millennium. Internet banking in India has completed more than four years and it was an opportune time to test the efficacy of these initiatives by Indian banks. Looking at the objectives of the study the following hypotheses were framed.

1. The review of literature in E-Business provides business models with diverse components and parameters which are not sufficient to conduct effective and successful e-Business practices in the current business environment as there is no standardization of a business model definition and its components.
2. The Private, Public and some foreign banks in India started offering or are likely to offer various financial services to the customers through Internet banking because it is a cheaper and quicker mode.
3. The increased IT investment and e-initiatives in Indian banking system is not only enabling the banking system in the country to increase their productivity but also to gain competitive advantage and earn higher profits than they would have otherwise made.
4. Reengineering and migration from traditional form of business to Internet business is helping banks to save cost, time, human and other resources.
5. By and large customers (predominately from metro cities) are switching to Internet Banking but security, privacy etc still happens to be the major concern.
6. Internet Banking customer are showing a distinct preferences for performance, serviceability etc. while choosing Internet Banking service providers.

* | The comprehensive review of existing literature only provided some insight into e-Business models for different sectors but the practical applications were not thoroughly explored. So, there was a need to develop new modeling methods in the domain of business models for managing organization in the Internet era. Most of the researchers talked in detail about this term but still there is no standardization of how a business model is defined, how it is developed, what components comes under it, which are the principal business models, how to transform business models, etc. However, the existing literature on various e-Business models does provide a framework to design a new business model. We in our framework proposed four major factors, the value proposition, customer relations, Infrastructure management and revenue. The e-Business Model approach proposed in this research helps a firm to structure its organization in a way to become more efficient, more flexible and responsive to customer demand, to forecast possible future scenarios and therefore to stay competitive in the Internet era. The set of measures for each of the four components are identified and will help the banks to manage and control its activities and outcomes. They will also contribute to monitor the performance of the competition and finding new ways for keeping ahead.

Although the diverse literature available on Business models don't converge on a specific domain but at the same time they definitely provide a foundation for choosing the right mix of a successful Business model. Thus, our first hypothesis regarding the usefulness of Business model literature is true to a limited sense only.

✓ | Banks and financial institutions in India are also increasingly finding themselves facing rapid increases in turbulence and complexity, leading to greater uncertainty and increased competition. Customers are becoming more demanding. Apart from the traditional type of banking services, customers today require more personalized products and services, and access to such services at any time, and at any place. The tremendous advances in technology and the aggressive infusion of Information technology had brought in a paradigm shift in banking operations. To achieve a high level of customer service Indian banks are also forced to adapt the Internet banking service. The hypothesis tested in the current study was related to banking industry's integration with technology. Since the liberalization of banking sector has been a witness to sweeping changes on the

technology front. No longer are the banks just satisfied with getting their office operations computerized, they are going for advanced integration of technology by fully automating not only their back end operations but also using banking software's to offer a completely hassle free banking to the customer. It was the private sector banks that took the lead in this arena and very soon we saw most of the public sector banks jumping in the fray. The findings of our study clearly shows that when it comes to technology initiatives only private sector banks are showing positive sign of complacency. The arrival of foreign and private banks with their superior state-of-the-art technology-based services pushed Indian Banks also to follow suit by going in for the latest technologies so as to meet the threat of competition and retain their customer base. The new generation private sector banks have started with a bang putting in lot of money on the technology front and their counterparts in the public sector have also started showing interest in technology investments lately. The study also identified that the banks have started offering Internet banking as an alternate channel for customers although here also, some of the private sector banks took the lead mainly because of the cost factor. There is no doubt that the revolutionary developments in Information and Communications Technology will continue to transform the banking and financial industry. This research also provides a useful picture of the current market for Internet banking, the factors affecting the decision to adopt Internet banking as well as the scope of services offered, and information on banks' plans for the future. We believe this is an important initial step in analyzing the future impact of Internet banking on the banking industry.

Our study clearly suggests that most of the banks have started offering Internet banking as an alternate channel for customers although here also, the newer generation private sector banks took the lead mainly because of the cost factor but the impact on the bottom lines will be visible only after some time. Therefore, our second hypothesis is rather inconclusive.

To analyze the sweeping changes brought by e-initiative measures in the Indian banking sector, major private, public and foreign banks were chosen. An analysis of Internet banking in India with respect to profitability, cost efficiency, and other characteristics has been done using univariate statistical analysis. The study reveals the following results:

- Among the 82 banks (comprising 30 Private, 27 Public and 25 foreign banks) operating in India only 37 of them are offering IB services.
- As far as the public sector banks are concerned only 48 percent of them offered IB services. However 18.5 percent of them offered fully transactional IB. Among the private sector banks 47 percent of banks offered IB, however only 30 percent of banks are fully transactional banks. Similarly 40 percent of foreign banks offered IB and almost 36 percent are fully transactional banks.
- Foreign and Private Internet banks offered a broad range of services over the Internet. Public sector banks lag behind in offering wider range of IB services and products.
- Mostly I-banks were having higher premises and fixed assets expenditure. Thus banks with relatively high expenses in maintaining their branch networks may be expected to have the greatest incentive to adopt Internet banking. The private sector banks were having higher premises and fixed assets expenditure. However there is no statistical significance to show the relation between offering of IB and higher premises and fixed assets expenditure. A major reason of their less profitability may be the newness of the banks.
- There is no statistically significant difference between the Internet and non-I banks with respect to accounting efficiency. However, private sector Internet banks are more efficient than private non-I banks.
- Most of the growth in IB in India is due to private sector and foreign banks operating in India.
- Most of the market is still untapped in India. There is a lot of scope for banking institutions to expand their IB services to have a more sophisticated customer base.

To evaluate the productivity of e-Business investment in Indian banking sector the Cobb-Douglas production function is used to econometrically estimate the contribution of each input to total output in terms of the gross and net marginal product. The analysis suggests that the performance of the banking sector has improved considerably. The Cobb-Douglas function approach adopted to perform the analysis leads to the following major conclusions:

- In this analysis the coefficients of e-Business capital and e-Business labour are positive and statistically significant. That provides support for the H1 hypothesis, which states that e-Business investment makes positive contribution to output.
- The non-e-Business labour coefficient is also positive and statistically significant and the marginal product of e-Business labour is highest at 5.79 followed by that of e-Business-capital at 3.84. The marginal product of non e-Business labour is 1.85. This indicates that each one of these three variables is associated with increase in the output of the bank. In addition, both e-Business and non e-Business labour coefficients are statistically significant is perhaps reflective of the Indian banking industry where the emphasis on service delivery means that labour is considered to be a highly worthwhile investment.
- Non e-Business capital has the negative sign and the coefficient is statistically insignificant indicates the rejection of hypothesis H1 and conclude that non e-Business capital investment impacts negatively on bank productivity. The rejection of hypothesis H1 for non e-Business capital means that we can also reject the stronger hypothesis H2 for this variable.
- As both the e-Business and non e-Business labour are flow variables, every unit of e-Business and non- e-Business labour costs the same unit. With positive excess returns, the hypothesis H2 cannot be rejected for the labour variable.
- The marginal product of e-Business capital is positive while that of non e-Business capital is negative indicates that we cannot reject H2 for e-Business capital. Thus it can be concluded that investment in e-Business capital and e-Business labour have definitely led to an increase in productivity in the banking sector.
- More innovative are the results related to the disaggregation of IT investment into Hardware investment and Software and Communication investment. The results of our empirical analysis depicts that banks investing in hardware technologies would have a greater impact on revenues than in software and communication technologies. Therefore the main productive leverage is given by hardware

limiting the software and communication just to a marginal influence on productivity. According to this result banks considering the return of an investment in IT will prefer to allocate their budgets to hardware rather than to software and communication technologies.

- Further analysis of contribution of the Internet toward productivity was done by considering both usage of Internet for work related tasks and personal use. This empirical research shows that the Internet has a positive contribution to the productivity of the banks and this contribution decreases as long as the usage of the Internet at work increases resulting thus in decreasing marginal productivity. But perhaps the most amazing result is that non-Internet hours are more productive than Internet hours. Indeed, employees are more productive at work when they do not use the Internet than when they use it. This result is quite surprising, especially because in the estimation of Internet hours at work we have already corrected for those hours the employees used the Internet at work but for personal duties.

Estimation results using data from major banks shows that investments in IT-capital and labour and non-IT labour have a statistically significant impact on the level of productivity and profitability mainly in the private sector banks as compared to public and foreign banks. The results show strong evidence supporting the positive contribution of IT investment. Therefore the third hypothesis stands proved true.

The study also observes that the Information Technology has basically been used under two different avenues in Banking. One is Communication and Connectivity and the other is Business Process Reengineering. Most of the bankers in India believe that the Information technology enables sophisticated product development, better market infrastructure, and implementation of reliable techniques for control of risks and helps the financial intermediaries to reach geographically distant and diversified markets. The major drawback of the traditional banking operations was the cost, time and human resource escalation. This fact is evident in thesis from the statistics provided for the various reengineering processes and it proved a shift in the business doctrine as it alters

traditional business processes, relationships, and operational models. Therefore, banks will no longer be able to conduct business in the traditional way. One of the means of accomplishing these goals is BPR, which uses additional features included in simulation modeling methods and tools. The reengineering of traditional processes followed in the banks gives them a competitive advantage because it reduces the time and other assets invested, cost incurred for the processes undertaken. The resources thus saved can be put to use in other tasks to achieve optimum usage. In this study, various processes of the banks were developed and tested using the simulation modeling tool. The opportunity for "Car loan procurement model and EFT" development was simulated. Costs and benefits of future Internet Banking implementation were analyzed and different models were compared. The results of the research indicate that business process modeling and discrete event simulation are valuable mechanisms for realizing the actual business value of Business to Consumer (B2C). The business process model permitted the description of the loan procurement process, EFT and facilitated the evaluation of the process through simulation. Though only a "prototype" of the model was developed, it illustrated that the introduction of Internet banking would require organizational and technological changes. A change in technology mostly concerns new IT and Information systems (IS) implementation. Banks changes should help to remove or reduce non-value adding activities in the various processes, maintain or reduce time and cost, and increase productivity through improvements to various stages. Advances made in the loan and EFT process have greatly reduced time and costs involved in the loan procurement and money transfer life cycle. The improvements made in the different processes were evaluated. The model is accepted by all banks and were impressed enough to make simulation modeling an integral part of their business renovation plans.

There is no doubt about the fact that the various processes in banks in future will be very much different from what they appear now, doing a host of things which nobody could think of even five years ago and the banking business process models will go for a complete transformation. There is enough evidence in the study showing that the shift has already begun and banks have saved money, time, human and other resources through the migration. Our fourth hypothesis stands proved true.

The analysis of the impact of Internet banking on society shows that security concerns and lack of awareness stand out as the major reasons for non-adoption of innovation of Internet banking by Indian customers. The results provide strong evidence that Internet banking adoption behaviour is affected by individual characteristics like demographics, the exposure, information seeking behaviour and general banking behaviour. The demographic factors are less important than banking-specific behavior in adoption decision of a new banking technology. In establishing the social norm of Internet banking, the government should play a significant role by narrowing the socio-economic gaps. The analysis provides strong evidence on the possible consumer inertia and risk aversion when a new banking technology is introduced. If the security issue is one of the main concerns for both adopters and non-adopters of IB, appropriate public policy and regulation are required to mitigate the potential loss of welfare in case of financial accidents on the Internet as well as to optimize the speed of adoption. Bank managements could build awareness by emphasizing the benefits of Internet banking, telephone and brick and mortar banking and educate customers about security concerns on the lines suggested in this thesis. Further, the delivery of financial services over the Internet should be treated as a part of overall customer service and distribution strategy. The relationships developed could then be used as a gateway for delivery of product information. These measures could help in rapid migration of customers to Internet banking, resulting in considerable savings in operating costs for banks.

The study provides support for the fifth hypothesis that customers from metros are only switching to Internet Banking. Security and privacy are still their major concern for the adoption. The banks are making all the effort to woo their customers by changing their mindset in migrating from traditional form of banking to Internet banking. Only through sustained effort and commitment they can completely transfer to Internet banking.

Though, Internet banking services is a recent phenomenon in India still customers are determining the level of overall quality of the Internet-based banking services available to them. Majority of them are not aware of the advanced services offered by the banks. Very small percentage of customers predominately from urban cities knew about the various

services and these customers are having distinct preferences while choosing the IB services. In terms of serviceability, performance, reliability and satisfaction in India, ICICI and SBI are ranked as number one IB service providers, followed by HDFC, PNB, and BOB which are ranked 2, 3 and 4 respectively. All banks that provide Internet banking services should increase promotion on Internet banking services awareness and understanding programs to local customers in India. The remaining banks that provide some of basic inquiry services on the Internet are in their early stages of planning, developing and implementing Internet banking services. They should speed up their efforts and resources to ensure up-to-date IB services. Most of the IB service transaction in India is free of charge. However, customers pay for Internet connection and access time to their Internet Service Providers (ISP). IB service should remain free of charge by the banks and ISPs should find a way to help IB customers reduce their Internet connection cost, such as, special rate or promotion.

Our study also confers that serviceability, reliability and performance parameters are important quality factors for the customers to choose the IB service providers, which supports the sixth hypothesis.

7.2 LIMITATIONS OF THE STUDY

Concerning the research, limitations cannot be totally avoided. Firstly, although Internet Banking in India is a brand new innovation and it will take some time to grow and stabilize. The major limitations of this research could be primarily because of the time and size domain and is being done too early. For the study, the time period considered was primarily from 2000 to 2004, which could have a bearing on the research findings. The banks considered while comparing the public, private and foreign sector banks for the study were by and large the major public and new generation private sector banks and most of the survey was carried out in metro cities. While trying to see the technology integration again the focus was more on the banks situated in metro that have really surged ahead with their technological suaveness. However the same cannot be said for all the branches of the same banks. Again most of the people questioned were from the

upper middle class representing a portion of the customers banks are servicing and may not necessarily give a true picture. Lastly, the statistical techniques used for analyzing productivity of Internet banking like Regression Analysis and Cobb-Douglas have their own limitations.

During the collection of literature, the researcher found that there was a lack of relevant information. Second, the use of an online survey could have been a good tool for gathering responses to this study in terms of manpower, cost and time frame. However, after taking into consideration of the low response rate the researcher could have to give up this method. However, due to confidentiality and many other reasons, the researcher was refused a name list of Internet Banking users from the leading banks. Furthermore, since Internet Banking is relatively new in India, the pool of adopters may not be quite big during the period of this study. Very less number of respondents was users of Internet Banking. This means many of the respondents may not know what Internet Banking exactly is. Therefore, their comments may be rather arbitrary. The fourth limitation of this study is the generalizability of the findings. Since the stratified sampling was used, the researcher had no way of assessing the sampling error precisely. Also, the subjects of this study being also some university students, this sampling profile cover only a narrow range of different social classes. Therefore the representative of the sample population was reduced.

7.3 FUTURE SCOPE OF WORK

Most of the findings of the current research have largely pointed out to the fact that the Indian Internet banking is right now witnessing tremendous activity in almost all domains of bank working. However, most of these new developments have seen the light only recently and it remains to be tested in the next 4-5 years to actually assess the profitability of these huge investments being made by most of the banks right now.

The most critical issues of Internet adoption have been recognized, although there are still factors to be identified and analyzed. The study can be extended through the development of simulation models for all the processes involved in banks to establish a richer analysis

of B2C usage and evaluate the main critical success factors for Internet banking implementation.

The study on adoption intentions of Internet Banking services in India can be extended to corporate customers. Comparison can then be made between individual customers and corporate customers in terms of the factors influencing their adoption decisions, the criteria for selecting an online banking service, and the types of products and services perceived to be useful. A study with random sampling is suggested to offer a clearer picture of the consumer profile and to gather more representative information of the population. As Internet Banking services are still relatively new in India, this study has been unable to measure the actual usage behaviour of such services. Future studies should incorporate this formula to measure when the number of Internet Banking customers reached a critical mass. This way, a more comprehensive investigation of Internet Banking intention and usage behaviour can be conducted. This study was conducted to explore the factors influencing intentions to adopt Internet banking services. As such, there is still room for further investigation into the adoption of Internet banking services.

Following are some recommendations for future studies. First, future studies should be carried out on non-Internet users to investigate their adoption intentions of such services. Second, as Internet banking services are still relatively new in India, this study has been unable to measure the actual usage behavior of such services. Future studies should incorporate this measure once the number of Internet banking customers has reached a critical mass. In this way, a more comprehensive investigation of Internet banking intentions and usage behavior can be conducted. Third, the study on adoption intentions of Internet banking services in India can be extended to corporate customers.

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APPENDICES

APPENDIX A

QUESTIONNAIRE: To assess the IT impact on banks productivity

Please be candid while answering questions. If any answer cannot be disclosed, please mark N.D.

(i). Name:

(ii). Designation:

(iii).Name of the organization:

(iv). Does your bank provides the Internet Banking services?

Yes No

(v). If the answer to iv question is yes than the Year in which your organization went online (Please specify).

1. Indicate the different areas wherein Information Technology has been incorporated

2. Mention if there has been any vivid change in the way banking has been incorporated since the organization went online.

3. Mention (in percentage) the extent in which E-Banking has been involved in the present day working.

4. Mention any three tangible advantages due to E-Banking.
 - (i).
 - (ii).
 - (iii).

5. Mention any three intangible advantages due to E-Banking.
- (i).
 - (ii).
 - (iii).
6. Has there been any resistance amongst the employees when Information Technology has been introduced?
- Yes No
7. Has the customer satisfaction increased due to E-Banking? Yes No
8. If yes, Please specify the increase, in percentage, in the levels of satisfaction?
9. If no, Please specify the reason why the customer satisfaction dropped or there is not any significant change?
10. Do you think any changes have to be incorporated in the Information Technology that is presently used?
- Yes No
11. If the answer to the previous question is yes, Please mention some of the areas wherein the change could be incorporated?
12. What are the technologies that have been adopted by the organization?

13. Mention some of the products or services that are provided online? (Please put tick mark against the services listed here or for other use the space provided)

Service Code	Types of Service	
1	Balance Enquiry	
2	Fund Transfer	
3	Bills Payment	
4	Third Party Transfer	
5	Opening Accounts	
6	Receive Alerts	
7	Requests and Intimation	
8	Cash Management Online	
9	E-Shopping	
10	Credit Card Payments	
11	Standing Instructions	
12	Loan Applications	
13	Customer Correspondence	
14	Insurance	
15	Demat Holding	
16	Brokerage	
17	Investments	
18	Online Remittance of Fund	
19	Tax Advisory Services	
20	Financial Planning	
21	Linking A/ Cs Online	
22	Market News Online	
23	Trading Online	
24	Foreign Exchange Trading	
25	Foreign Exchange Rates Update	
26	Tds enquiry	
27	One View A/c	
28	Net Worth Statement	
29	Demonstration of I- Banking	
30	Privacy Statement	

14). Please provide the data:

Activity	%of time spent	Assigned cost	Activity quantity
Process Customer order			
Handle customer inquiries			
Perform Checking			

Note: The statistic required here is related to various processes in:

- The % of time spent is the time spent in processing one loan application.
- The assigned cost includes the workforce involved and their respective salary (total).
- Total number of loan application and the number of cases where loan has been disbursed.
- Perform checking includes the time spent in checking the credit worthiness or other related activities.

15) Kindly provide the details for 3 years before and 3 years after the bank went online.

YEAR	Profit / Loss percentage	Balance sheet	Capital invested In IT sector	Capital Invested in other sectors	Labor in IT sector	Labor in other fields

Thank you very much for your co-operation.

APPENDIX B

QUESTIONNAIRE: To study the impact of Internet banking adoption on customers.

Please tick mark in the box or use the space provided.

- (i). Name
- (ii). Age
- (iii). Sex M Male Female
- (iv). Marital status Married Unmarried
- (v). Area of residence (Please specify)
- (vi). Qualification
- (vii). Annual salary (If working)

1. At which bank/ banks do you hold Account?
2. Does your bank provide Internet Banking services?
 Yes No

2.1. Do you agree that the following factors drive you to go for Internet banking services? Rate according to the given scale.

Scale: 5=strongly agree; 4= Agree; 3= Neutral; 2= Disagree; 1= strongly disagree

IB is compatible to banking needs	
IB is easy to use	
IB is a cheaper way to conduct banking	
IB is self service	
IB makes conducting banking transactions easier	
IB is a convenient way to manage finances	
Other family members /colleagues are using IB	
IB is compatible to life style	

IB offers greater control over finance	
Using IB is a sign of modernity	
Bank offers additional benefits for IB users	
Bank encourages individual to use IB	

3. Do you currently use/ have ever used Internet Banking? Yes No

(If no please move to Question no. 18)

4. How long are you using the Internet banking?

Less than one year

1-2 Years

2-3 Years

3-4 Years

4-5 Years

More than 5 Years

5. For which of the following transaction you use Internet bank?

Money Transfer

Bill Payment

Balance Enquiry

Others (Please specify)

6. How frequently you use Internet Account?

Once a week

More than one in a week (Please specify)

Once a fortnight.

More than one (Please specify)

Once a month

More than one (Please specify)

7. Have you ever considered switching your Account to other bank?

Yes No

If yes please specify the reason

8. How satisfied you are from the service of your Bank?

Scale: Highly satisfied (1) satisfied (2) Neither Satisfied nor dissatisfied (3) Dissatisfied (4) Highly dissatisfied (5)

9. Do you think your banks website provides enough information that you need?

Yes No

Comments (Please specify)

10. Do you really feel?

Internet serves as a communication channel of banking? Yes No

Flexible in terms of time and location? Yes No

Do you feel secure while using your Internet account? Yes No

Is it convenient to use Internet banking? Yes No

(If the answer to the question no. 3 is yes please skip question no. 11)

11. How often do you visit bank branch?

Once a week

More than one in a week (Please specify)

Once a fortnight

More than one (Please specify)

Once a month

More than one (Please specify)

12. Do the following factors affect the adoption of IT on banking industry in India?

VARIABLE	INDIVIDUAL				
	Totally Disagree	Disagree	Neutral	Totally Agree	Agree
IT helps bank					
No effect of IT					
Faster enquiry					
Reduces product and service time to market					
Increases efficiency					
Expands customer base					
Attracts more profitable Customers					
Improves promptness					
Transaction time is reduced					
Easy handling of transactions					
Increases customer satisfaction					
Encourages people to patronize the bank					

13. Why banks generally go for adopting Internet mode for offering its services?

Statement	Totally Disagree	Disagree	Neutral	Totally Agree	Agree
To increase revenue					
To reduce operating cost					
To increase customer service					
To increase the efficiency in dealing with trading partners					

To increase information flow					
To enhance its brand and corporate image					
To increase customer loyalty and retention					

14. Please Specify:

(i). Reason not to use:

(ii). Do you have any plan to use Internet Banking? Yes No

(iii). If yes than what are the criteria you are looking for:

15. If you are not using Internet Banking presently, when will you start using it (i.e. Time Period?)

1	6 Months	
2	1 Years	
3	More Than 1 Years	
4	Never	

16. Please rank the following channels of banking as per the use?

Rank	Branch Counter	ATM	Phone Banking	Internet Banking
1				
2				
3				
4				

This is for IB users only

17. Please put a tick mark against the column, and do mention the reason for doing so

Fee Structure	No of Users
a flat fee per month	
a flat fee per month plus a fee per transaction	
a fee based on connection time	

18. What are the possible reasons for not using Internet Banking Services available in India? Are there any other reasons you want to mention

1	Difficulty in use	
2	Security Concern	
3	Resistance to Change	
4	No Internet Access	
5	Benefits of IB Not Clear	
6	Privacy concern	
7	Not offer incentives	

Thank you very much for your co-operation.

Questionnaire: To study the specific Quality factors of Internet banking service providers

Q1. Are you aware that these banks offer Internet banking services?

No.	NAME OF THE BANK	PROVIDE IB SERVICES	
		Yes	No
1	ICICI		
2	SBI		
3	HDFC		
4	PNB		
5	BOB		
6	ABN Amro Bank		
7	Allahabad Bank		
8	Canara Bank		
9	UTI Bank		
10	Standard Chartered Bank		
11	Global Trust Bank		
12	Centurion Bank		
13	Corporation Bank		

In case of your answer being yes please move on to the next question

Q2. Are you aware of the basic Internet services available by following banks for their customers? Tick the relevant boxes.

NO	INTERNET BANKING SERVICES AND FEATURES													
		1	2	3	4	5	6	7	8	9	10	11	12	13
		ICICI	SBI	HDFC	PNB	BOB	ABN Amro	ALLAHABAD	CANARA	UTI	STANDARD CHARTERED	GTB	CENTURION	CORPORATION
1	Inquiry about outstanding balance													
2	Fund transfer between accounts													
3	Transfer payment for public utilities													
4	Print account statement													
5	Inquiry about credit card and ATM card													
6	Inquiry about currency and exchange rate													
7	Inquiry about bank interest rate													
8	Inquiry about news and business information													
9	Inquiry about economic data information													
10	Web shopping on the internet													
11	Change user id and password													
12	e-phone on the internet													
13	e-cash card on the internet													

Q3. Are you satisfied with following features of Internet Banking Services available in India? Tick the relevant box.

NO	INTERNET BANKING SERVICES AND FEATURES																											
		1		2		3		4		5		6		7		8		9		10		11		12		13		
		ICICI		SBI		HDFC		PNB		BOB		ABN Amro		ALLAHABAD		CANARA		UTI		STANDARD CHARTERED		GTB		CENTURION		CORPORATION		
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	
1	Inquiry about outstanding balance																											
2	Fund transfer between accounts																											
3	Transfer payment for public utilities																											
4	Print account statement																											
5	Inquiry about credit card and ATM card																											
6	Inquiry about currency and exchange rate																											
7	Inquiry about bank interest rate																											
8	Inquiry about news and business information																											
9	Inquiry about economic data information																											
10	Web shopping on the internet																											
11	Change user id and password																											
12	e-phone on the internet																											
13	e-cash card on the internet																											

Q4. How do you rate banks in terms of the performance (operating quality and features of IB), on the basis of the services of Internet Banking in India?

(1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent)

NO	BASIC INQUIRES ON INTERNET SERVICES AND FEATURES	ICICI	SBI	HDFC	PNB	BOB	ABN Amro	ALLAHABAD	CANARA	UTI	STANDARD CHARTERED	GTB	CENTURION	CORPORATION
1	Inquiry about outstanding balance													
2	Fund transfer between accounts													
3	Transfer payment for public utilities													
4	Print account statement													
5	Inquiry about credit card and ATM card													
6	Inquiry about currency and exchange rate													
7	Inquiry about bank interest rate													
8	Inquiry about news and business information													
9	Inquiry about economic data information													
10	Web shopping on the internet													
11	Change user id and password													
12	e-phone on the internet													
13	e-cash card on the internet													

Q5. How do you rate banks in terms of the serviceability (speed, courtesy, and ability to correct or repair IB services), on the basis of the services of Internet Banking in India?

(1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent)

NO	BASIC INQUIRES ON INTERNET SERVICES AND FEATURES	ICICI	SBI	HDFC	PNB	BOB	ABN AMRO	ALLAHABAD	CANARA	UTI	STANDARD CHARTERED	GTB	CENTURION	CORPORATION
1	Inquiry about outstanding balance													
2	Fund transfer between accounts													
3	Transfer payment for public utilities													
4	Print account statement													
5	Inquiry about credit card and ATM card													
6	Inquiry about currency and exchange rate													
7	Inquiry about bank interest rate													
8	Inquiry about news and business information													
9	Inquiry about economic data information													
10	Web shopping on the internet													
11	Change user id and password													
12	e-phone on the internet													
13	e-cash card on the internet													

Q6.How do you rate banks in terms of the reliability (frequency of IB service and feature failure), on the basis of the services of Internet Banking in India?

(1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent)

NO	BASIC INQUIRES ON INTERNET SERVICES AND FEATURES	ICICI	SBI	HDFC	PNB	BOB	ABN Amro	ALLAHABAD	CANARA	UTI	STANDARD CHARTERED	GTB	CENTURION	CORPORATION
1	Inquiry about outstanding balance													
2	Fund transfer between accounts													
3	Transfer payment for public utilities													
4	Print account statement													
5	Inquiry about credit card and ATM card													
6	Inquiry about currency and exchange rate													
7	Inquiry about bank interest rate													
8	Inquiry about news and business information													
9	Inquiry about economic data information													
10	Web shopping on the internet													
11	Change user id and password													
12	e-phone on the internet													
13	e-cash card on the internet													

Q7. How do you rate the overall Internet Banking Services in India offered by banks?

(1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent)

NO	NAME OF THE BANK	RESPONDENT'S RATINGS
1	ICICI	
2	SBI	
3	HDFC	
4	PNB	
5	BOB	
6	ABN Amro Bank	
7	Allahabad Bank	
8	Canara Bank	
9	UTI Bank	
10	Standard Chartered Bank	
11	Global Trust Bank	
12	Centurion Bank	
13	Corporation Bank	

Q8. Do you think the new business model can help you in understanding the fundamental questions of e-Business? a) Yes b) No. If yes, rate them on Likert's scale. (1 equals to poor, 2 equals to below average, 3 equals to average, 4 equals to good and 5 equals to excellent)

Value proposition (Product innovation and services offered)	Customer relationship (ease of use and security)	IT infrastructure (technology used)

Thank you very much for your co-operation.

APPENDIX-C

PROFITABILITY

PUBLIC SECTOR BANKS

	Return on assets		Return on equity		Non-interest income to gross income		Staff expenses to operating expenses		Net profit margin		Net profit to deposits		Net profit to spread	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Allahabad Bank	0.63	1.48	15.43	34.04	16.94	21.93	55.92	58.28	5.36	13.56	0.65	1.47	18.25	42
Andhra Bank	1.77	1.79	40.31	36.10	21.57	23.34	65.94	62.18	14.40	15.95	1.91	2.02	53.52	50
Bank of Baroda	1.05	1.20	18.81	20.32	17.14	21.85	68.46	69.38	10.50	12.29	1.16	1.33	36.74	37
Bank of India	1.16	1.25	26.65	26.71	21.69	23.62	68.28	66.94	11.24	13.29	1.33	1.42	41.79	45
Bank of Maharashtra	0.96	1.07	26.46	25.21	14.76	17.43	68.66	66.24	9.09	11.41	1.00	1.15	32.83	39
Canara Bank	1.32	1.47	26.74	28.47	18.09	22.63	65.50	67.13	12.47	14.74	1.41	1.55	44.94	49
Central Bank	0.56	1.03	13.82	22.90	9.84	16.00	77.71	75.98	5.45	10.25	0.60	1.11	16.10	29
Cooperation Bank	1.67	1.82	18.84	19.62	20.19	19.01	54.29	49.58	15.79	13.55	1.91	2.17	52.52	52
Coop Bank	0.59	1.09	11.55	22.45	19.78	26.24	71.59	67.88	5.17	9.60	0.69	1.25	20.10	35
Indian Bank	0.56	1.09	4.05	7.61	17.17	21.89	76.29	81.24	6.15	11.68	0.70	1.33	23.02	36
Indian Overseas Bank	1.09	1.16	32.10	28.96	12.98	16.48	75.97	74.23	10.39	11.41	1.13	1.24	34.07	32
Oriental Bank of Commerce	1.36	1.83	24.51	28.67	13.85	17.94	59.65	56.85	11.91	17.06	1.53	1.92	37.63	47
Punjab & Sindh Bank	0.03	0.06	0.98	1.92	19.30	16.68	76.09	80.11	0.28	0.58	0.03	0.07	1.15	1
Punjab National Bank	1.06	1.18	23.24	24.52	14.31	19.35	71.77	69.77	9.64	11.49	1.11	1.25	26.96	30
SB of Bikaner & Jaipur	1.21	1.58	24.56	29.39	19.12	23.80	70.98	68.48	11.43	14.60	1.53	1.93	36.87	42
SB of Hyderabad	1.25	1.34	26.80	26.99	18.25	24.22	67.95	63.86	11.92	13.05	1.46	1.57	40.31	45
SB of Indore	1.89	1.85	40.21	32.94	23.44	25.64	65.97	62.92	15.55	15.08	2.17	2.17	54.56	49
SB of Mysore	1.07	1.41	29.63	34.83	22.08	24.36	75.75	71.68	8.71	13.62	1.29	1.59	29.96	36
SB of Patiala	1.67	1.79	25.22	27.39	16.60	25.03	66.41	62.64	15.27	17.09	1.60	1.91	41.05	52
SB of Saurashtra	0.89	1.46	15.51	25.47	19.20	24.66	62.09	59.88	8.27	13.66	1.02	1.56	28.97	43
SB of Travancore	0.96	1.14	25.66	29.68	15.93	21.27	73.20	70.01	9.08	11.07	1.07	1.24	32.71	35
State Bank of India	0.86	0.94	19.15	19.67	15.59	19.99	71.62	69.74	8.43	9.67	1.05	1.16	31.12	32
Syndicate Bank	1.04	1.06	23.02	24.92	14.69	20.11	78.25	75.70	10.21	11.24	1.12	1.02	28.45	30
UCO Bank	0.63	1.11	10.46	29.14	17.91	16.80	79.52	76.59	6.10	11.70	0.66	1.11	23.52	36
Union Bank of India	1.16	1.30	23.65	25.19	16.07	15.55	67.68	66.49	10.77	13.31	1.24	1.41	36.90	41
United Bank of India	1.36	1.30	28.54	22.80	16.81	19.60	81.34	76.57	11.98	12.22	1.45	1.35	42.41	40
Vijaya Bank	1.12	1.91	26.66	38.32	17.16	21.32	77.01	66.61	9.75	15.68	1.15	1.96	30.55	49

PRIVATE BANKS

	Return on assets		Return on equity		Non-interest income to gross income		Staff expenses to operating expenses		Net profit margin		Net profit to deposits		Net profit to spread	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Bank of Punjab	0.78	0.81	15.69	16.15	27.62	28.03	13.28	13.20	6.52	7.83	0.69	0.89	32.23	28
Bank of Rajasthan	1.25	0.95	26.37	22.46	21.10	26.04	65.43	64.02	11.42	10.15	1.29	0.93	37.64	36
Bharat Overseas Bank	1.25	1.33	21.66	22.45	16.93	13.75	45.64	45.99	13.46	15.24	1.33	1.42	47.11	41
Catholic Syrian Bank	1.23	1.38	36.89	33.83	26.51	24.96	75.62	72.10	9.56	11.67	1.29	1.46	50.49	46
Centurion Bank	NEG	NEG	NEG	NEG	17.40	15.87	15.65	17.30	NEG	NEG	NEG	NEG	NEG	NA
City Union Bank	1.38	1.96	21.74	31.03	18.74	19.41	59.90	55.53	11.61	15.65	1.44	2.00	50.26	59
Development Credit Bank	0.80	0.35	12.10	6.52	19.42	20.04	43.05	42.59	7.74	3.64	0.64	0.39	48.33	16
Ghanlakhimi Bank	0.75	0.77	14.63	13.74	27.05	23.34	65.70	63.31	5.79	7.01	0.62	0.81	28.19	25
Federal Bank	0.94	1.00	21.45	23.14	17.42	19.99	62.77	63.01	7.80	9.15	0.96	1.01	30.96	32
HDFC Bank	1.43	1.40	18.44	20.61	18.78	15.85	26.33	25.20	15.63	15.62	1.73	1.65	47.17	38
ICICI Bank	1.14	1.41	17.38	20.93	25.22	25.63	20.03	21.24	9.63	13.69	2.00	2.40	84.70	87
IDBI Bank	0.98	1.27	21.70	27.24	21.63	22.20	26.67	26.42	9.32	13.99	1.18	1.22	35.27	40
IndusInd Bank	0.90	2.10	15.49	37.37	25.76	25.91	23.97	23.20	9.01	19.69	1.05	2.34	48.88	82
ITC Vysya Bank	0.78	0.48	12.39	8.11	28.37	28.22	51.94	48.49	6.84	4.58	0.94	0.56	39.80	24
J&K Bank	2.14	2.14	31.00	28.66	16.75	16.55	60.98	57.44	19.70	22.29	2.30	2.18	64.16	65
Karnataka Bank	1.29	1.34	21.48	20.78	22.77	24.16	63.39	61.00	10.48	11.90	1.33	1.42	71.11	62
Karur Vysya Bank	2.22	2.43	25.28	25.35	20.44	10.29	57.73	50.27	19.28	22.31	2.44	2.72	73.92	54
Kotak Mahindra Bank	2.49	1.96	8.55	13.72	28.48	24.87	28.26	31.63	17.75	20.51	2.51	1.77	47.65	46
Lakshmi Vysya Bank	1.13	1.17	19.17	19.61	23.71	23.30	59.41	58.35	9.62	11.01	1.23	1.25	50.08	49
Lord Krishna Bank	1.29	1.18	20.24	20.39	30.23	29.03	42.72	38.70	10.34	11.24	1.39	1.14	87.53	77
Sangh Bank	1.29	0.64	29.23	14.56	18.54	16.41	76.23	74.46	6.89	7.34	0.70	0.65	29.56	23
South Indian Bank	1.02	1.00	24.29	23.56	21.54	25.69	66.53	67.59	8.63	9.21	1.05	1.02	40.66	42
Tamilnad Mercantile Bank	1.42	1.64	17.50	18.47	11.18	11.21	59.74	NA	12.01	13.32	1.56	1.83	37.69	37
United Western Bank	0.50	0.47	10.32	10.62	23.27	22.35	68.38	61.95	4.42	5.20	0.51	0.48	23.13	25
UTI Bank	1.13	1.27	25.06	27.06	21.89	25.40	26.40	28.92	10.25	13.09	1.13	1.33	59.61	49

PROFITABILITY

FOREIGN BANKS

	Return on assets		Return on equity		Non-interest income to gross income		Staff expenses to operating expenses		Net profit margin		Net profit to deposits		Net profit to spread	
	<i>(in per cent)</i>													
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
ABN Amro	1.74	1.95	17.15	18.66	25.42	33.26	28.43	27.61	14.67	17.08	2.91	3.33	39.88	43.37
Abu Dhabi Commercial	0.17	0.50	5.21	14.33	5.95	4.86	29.18	38.48	1.62	5.61	0.18	0.53	19.14	59.14
American Express Bank	NEG	NEG	NEG	NEG	38.43	41.86	37.09	37.83	NEG	NEG	NEG	NEG	NEG	NEG
Antareso Diamond Bank N.V.	0.72	1.58	1.54	4.99	6.60	14.42	35.60	37.62	7.30	24.84	2.41	13.31	10.70	39.35
Arab Bangladesh Bank	2.76	3.68	5.93	7.10	43.63	52.19	30.16	31.41	33.02	40.88	5.46	10.01	70.21	101.69
Bank Internasional Indonesia	2.11	NEG	2.41	NEG	17.05	3.37	8.58	18.58	38.89	NEG	20.10	NEG	61.52	NEG
Bank of America	1.72	1.28	13.69	9.60	18.82	22.51	37.77	42.20	20.21	17.75	3.31	4.04	69.16	54.64
Bank of Bahrain & Kuwait	1.06	0.12	8.17	0.90	21.46	26.65	42.52	40.16	10.24	1.54	1.54	0.19	61.47	11.42
Bank of Ceylon	0.26	0.36	0.95	1.38	13.45	32.68	25.40	21.51	3.46	4.68	0.38	0.71	8.95	17.60
Bank of Nova Scotia	0.69	0.66	7.64	6.86	14.98	25.61	31.73	36.77	6.83	9.43	1.25	1.05	27.37	-0.73
Bank of Tokyo	3.00	7.26	12.71	21.89	21.38	50.53	63.87	59.86	26.51	52.57	6.17	14.27	62.31	144.48
Barclays Bank	3.23	6.00	9.13	19.43	77.12	79.59	53.97	75.81	23.24	48.42	27.08	80.30	347.94	312.24
BNP Paribas	NEG	NEG	NEG	NEG	11.90	19.96	39.65	47.53	NEG	NEG	NEG	NEG	NEG	NEG
Cayon Bank	0.30	0.42	3.22	3.04	9.79	NEG	42.67	38.22	3.94	6.84	0.52	0.71	15.74	17.81
Chonung Bank	2.27	2.24	6.96	6.53	20.77	30.36	30.97	28.19	18.81	28.32	6.75	6.93	34.49	51.49
Citibank	1.58	1.08	20.27	23.70	27.63	28.01	22.55	24.97	14.31	15.05	2.21	2.79	41.22	42.16
Credit Lyonnais	0.61	0.69	4.61	4.08	24.19	23.46	43.92	50.08	5.34	7.02	0.86	1.04	46.45	42.80
CBS	1.55	NEG	8.44	NEG	11.21	8.73	46.43	50.44	16.85	NEG	5.44	NEG	36.72	NEG
Deutsche Bank	3.01	3.77	22.14	31.04	52.09	66.77	36.40	37.00	24.63	30.11	6.77	10.77	110.19	375.72
HSBC	0.75	1.70	8.52	16.58	24.56	33.26	38.12	37.08	7.66	16.58	1.17	2.42	24.97	56.93
ING Bank	NEG	NEG	NEG	NEG	27.23	63.52	57.99	14.49	NEG	NEG	NEG	NA	NEG	NEG
JP Morgan Chase Bank	3.34	2.47	9.88	7.62	47.82	35.64	57.24	53.38	33.82	27.71	10.27	4.11	67.68	56.85
Krung Thai Bank Public Co	NEG	1.39	NEG	2.00	5.85	4.63	21.26	24.09	NEG	22.67	NEG	4.74	NEG	26.00
Mashreq Bank	2.70	1.71	27.48	11.64	17.71	6.66	24.04	29.29	21.92	16.44	3.99	2.17	94.68	73.23
Mizuho Corporate Bank	0.28	2.33	1.28	6.04	12.60	13.26	41.81	44.23	3.17	30.56	0.67	13.79	11.47	53.29
Comen International	NEG	NEG	NEG	NEG	29.70	24.03	42.05	27.12	NEG	NEG	NEG	NEG	NA	NA
Societe Generale	NEG	2.32	NEG	10.34	22.24	40.48	47.29	43.79	NEG	30.17	NEG	3.64	NEG	108.81
Standard Chartered Bank	3.45	1.87	39.56	21.56	19.69	21.70	28.51	26.44	30.02	18.51	4.75	2.99	75.41	41.06
Sumitomo Mitsui Banking Corp	NEG	NEG	NEG	NEG	11.03	12.02	32.02	41.66	NEG	NEG	NEG	NEG	NEG	NEG
UFB Bank	0.32	1.75	0.76	2.70	11.56	18.64	29.49	32.10	4.44	29.03	0.96	9.75	9.09	41.26

FINANCIAL MANAGEMENT

PUBLIC SECTOR BANKS

	Average cost of deposits		Average yield on assets		Average yield on advances		Average yield on investments		Spread to total assets		Capital adequacy ratio		NPA to net advances	
	<i>(in per cent)</i>													
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Allahabad Bank	6.71	5.41	9.73	8.51	10.53	9.49	10.23	9.33	3.24	3.13	11.15	12.52	7.08	2.37
Anhra Bank	6.69	5.63	9.62	8.62	11.54	10.09	9.67	9.13	3.05	3.37	13.62	13.71	1.79	0.93
Bank of Baroda	5.69	4.83	8.28	7.61	8.89	7.90	10.01	8.60	2.75	3.02	12.65	13.91	3.72	2.99
Bank of India	5.52	4.57	8.12	7.19	8.80	7.48	8.70	8.03	2.67	2.59	12.02	13.01	5.37	4.50
Bank of Maharashtra	6.46	5.58	8.98	7.72	9.98	8.06	10.48	9.83	2.72	2.40	12.05	11.88	4.82	2.46
Canara Bank	6.21	5.20	8.68	7.72	9.76	8.67	10.01	9.04	2.76	2.69	12.50	12.65	3.59	2.89
Central Bank	6.15	5.20	9.25	8.41	10.26	9.71	10.77	9.25	3.32	3.35	10.51	12.43	6.74	5.57
Corporation Bank	6.25	5.30	8.43	7.94	8.86	7.64	10.29	10.24	3.02	3.31	15.30	20.11	1.65	1.60
Dena Bank	7.06	6.15	9.09	8.20	10.93	9.16	10.36	9.52	2.82	2.67	9.02	9.45	11.83	9.40
Indian Bank	6.51	5.24	7.71	7.16	9.80	8.88	9.96	9.23	2.32	2.85	10.85	12.82	6.15	2.71
Indian Overseas Bank	6.34	5.26	9.10	8.49	10.55	9.80	9.88	9.38	2.97	3.38	11.30	12.49	5.23	2.85
Oriental Bank of Commerce	6.97	5.46	9.98	8.80	10.29	9.00	11.33	10.35	3.57	3.55	14.04	14.47	1.40	Nil
Punjab & Sind Bank	6.66	5.63	9.09	8.67	10.57	10.01	10.30	9.75	2.67	3.29	10.43	11.06	10.89	9.62
Punjab National Bank	5.95	4.80	9.41	8.25	9.95	8.86	10.60	9.67	3.62	3.54	12.02	13.10	3.86	0.98
SB of Bikaner & Jaipur	6.95	5.80	8.59	8.23	10.32	8.99	10.24	10.23	3.07	3.54	13.08	12.93	4.13	1.24
SB of Hyderabad	6.74	5.90	8.57	7.80	10.05	8.93	9.94	8.86	2.86	2.75	14.51	14.29	3.25	0.65
SB of Indore	6.64	5.75	9.30	8.57	10.28	8.57	9.79	9.96	3.23	3.48	13.09	12.39	2.66	Nil
SB of Mysore	7.03	5.64	9.56	8.42	10.38	9.65	10.72	9.37	3.41	3.30	11.62	11.53	5.19	2.96
SB of Patiala	6.03	5.21	9.10	7.84	10.13	8.33	10.14	8.31	3.69	3.06	13.57	13.55	1.49	Nil
SB of Saurashtra	6.95	5.73	8.69	8.05	9.55	8.46	10.92	9.66	2.79	3.15	13.68	14.53	3.53	Nil
SB of Travancore	6.82	5.59	8.92	8.09	9.51	8.55	10.06	8.80	2.75	2.85	11.30	11.36	3.06	1.39
State Bank of India	7.12	5.90	8.59	7.77	8.69	7.62	9.61	8.78	2.65	2.74	13.50	13.53	4.50	3.48
Syndicate Bank	5.51	4.42	8.69	7.56	9.83	8.61	9.94	8.63	3.51	3.03	11.03	11.49	4.29	2.58
UCO Bank	6.32	5.18	8.43	7.87	9.71	8.84	9.98	8.52	2.53	2.73	10.04	11.86	4.36	3.65
Union Bank of India	6.37	5.52	9.03	8.26	10.01	8.79	10.43	9.27	2.93	2.98	12.41	12.32	4.91	2.87
United Bank of India	6.77	5.82	9.44	8.52	10.26	8.75	10.97	9.95	2.97	3.02	15.17	17.04	5.52	3.75
Vijaya Bank	6.25	5.53	9.49	8.99	10.74	10.28	10.64	9.44	3.37	3.48	12.66	14.11	2.61	0.91

FINANCIAL MANAGEMENT

PRIVATE BANKS

	Average cost of deposits		Average yield on assets		Average yield on advances		Average yield on investments		Spread to total assets		Capital adequacy ratio		NPA to net advances	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Bank of Punjab	6.74	4.98	8.65	7.45	10.35	8.66	11.33	9.62	2.30	2.65	13.59	12.64	7.17	4.69
Bank of Rajasthan	6.21	4.86	8.64	6.90	10.14	8.48	10.24	8.04	2.95	2.25	11.29	11.18	6.50	2.99
Enarat Overseas Bank	5.56	4.76	7.74	7.55	8.93	8.27	9.55	9.48	2.48	3.03	13.67	16.25	3.31	2.26
Catholic Syrian Bank	7.52	6.20	9.45	8.74	11.57	10.24	10.93	9.53	2.32	2.84	9.66	11.23	7.90	4.65
Centurion Bank	7.01	6.17	10.21	10.04	14.39	14.11	8.24	8.38	3.01	3.66	1.95	4.41	7.51	4.43
City Union Bank	7.76	6.94	9.62	9.50	11.64	11.47	9.95	9.65	2.53	3.02	13.95	13.35	8.21	6.37
Development Credit Bank	7.20	5.60	8.36	7.19	8.88	8.53	10.82	6.82	1.62	1.77	10.08	14.14	7.76	4.67
DhaniaKhmi Bank	7.40	5.84	9.48	8.40	10.81	10.32	11.21	9.03	2.53	2.84	10.45	13.55	9.25	6.68
Federal Bank	7.36	5.92	9.95	8.73	11.57	10.26	10.19	8.68	2.78	2.79	11.23	11.48	4.95	2.89
HDFC Bank	5.31	3.93	7.43	7.01	8.37	7.52	8.77	8.10	2.70	3.16	11.12	11.66	0.37	0.16
ICICI Bank	6.18	5.20	8.88	7.67	11.99	10.53	8.16	6.22	1.33	1.50	11.10	10.36	5.21	2.21
IDBI Bank	5.76	3.66	8.21	7.04	9.93	8.32	8.73	7.24	2.54	2.55	9.56	10.36	1.18	0.20
IndusInd Bank	6.01	5.05	7.39	7.89	8.55	10.59	9.72	8.00	1.86	2.10	12.13	12.75	4.25	2.72
ING Vysya Bank	7.36	5.69	8.16	7.50	9.77	8.83	9.37	7.01	1.89	1.85	9.61	11.05	3.55	2.60
J&K Bank	6.27	5.26	9.06	8.01	10.53	9.50	10.01	8.75	3.13	2.92	16.48	16.68	1.58	1.48
Karnataka Bank	8.43	7.03	9.53	8.55	10.93	9.73	9.87	8.70	1.67	2.02	13.44	13.03	7.36	4.98
Karur Vysya Bank	7.07	6.04	9.14	9.75	10.44	9.60	9.83	13.24	2.74	4.18	17.01	17.11	4.20	2.32
Kotak Mahindra Bank	9.79	2.27	10.03	7.24	15.12	12.62	2.09	4.02	4.38	2.93	25.97	15.25	0.11	0.17
Lakshmi Vilas Bank	7.43	6.34	8.96	8.15	10.58	9.50	9.20	8.51	2.13	2.18	11.35	13.79	7.15	5.40
Lord Krishna Bank	7.68	6.49	8.66	7.46	9.90	8.61	9.87	8.23	1.42	1.30	12.82	16.68	6.33	6.05
Sangli Bank	11.79	4.65	15.29	7.08	21.28	8.18	10.76	6.58	2.19	2.63	14.94	13.68	6.89	6.56
South Indian Bank	7.33	6.15	9.27	8.06	10.94	9.17	10.10	8.88	2.33	2.16	10.75	11.32	5.98	4.55
Tamilnad Mercantile Bank	7.62	NA	10.48	10.96	11.65	NA	12.34	NA	3.58	4.24	16.54	21.07	8.70	5.00
United Western Bank	6.84	5.43	8.59	7.06	9.83	7.86	9.74	8.26	1.99	1.71	10.17	10.13	9.50	8.95
UTI Bank	7.23	4.93	8.62	7.25	11.75	9.28	8.52	8.17	1.64	2.34	10.90	11.21	2.39	1.29

FOREIGN BANKS

ABN Amro	2.83	1.61	8.82	7.62	9.93	7.95	8.89	8.32	3.90	4.23	12.57	13.48	1.54	0.88
Abu Dhabi Commercial	9.49	8.06	9.83	8.45	13.15	10.50	10.32	9.75	0.87	0.83	10.14	14.22	9.68	27.39
American Express Bank	8.04	6.41	9.53	9.31	13.55	15.88	9.87	8.22	3.43	3.74	10.93	10.74	8.69	5.66
Antwerp Diamond Bank N.V.	0.47	0.71	9.22	5.43	7.32	5.82	2.75	7.51	3.37	2.99	92.69	53.22	NA	NA
Arab Bangladesh Bank	1.58	1.27	4.74	4.31	8.99	8.34	4.55	4.48	3.89	4.02	105.64	111.34	1.55	0.37
Bank Internasional Indonesia	6.19	4.28	4.50	3.95	9.38	10.80	14.77	13.64	3.41	2.88	103.98	133.94	15.20	72.15
Bank of America	4.76	4.12	6.90	5.60	7.40	5.15	8.09	7.53	2.52	2.30	21.08	22.92	0.05	Nil
Bank of Bahrain & Kuwait	7.10	5.69	8.12	5.75	10.36	6.32	8.54	6.36	1.72	1.06	17.19	21.05	11.26	17.73
Bank of Ceylon	7.69	6.66	7.06	5.44	10.12	10.93	12.08	6.36	3.07	2.03	32.29	45.25	25.98	21.85
Bank of Nova Scotia	5.32	5.44	8.60	5.17	9.51	4.86	8.80	7.16	2.84	1.41	13.38	13.78	8.64	9.07
Bank of Tokyo	5.66	2.72	8.90	6.83	9.34	8.19	9.71	6.05	5.25	4.82	30.40	32.78	0.07	0.10
Barclays Bank	7.72	1.39	3.18	2.53	3.69	5.03	5.86	5.65	0.83	1.67	45.68	37.16	Nil	Nil
BHP Panbas	7.59	4.25	7.72	6.22	9.63	6.74	8.21	8.45	2.85	2.61	10.74	21.70	3.77	2.70
Calyon Bank	1.61	0.78	6.85	6.95	11.10	8.08	10.68	10.91	2.30	2.87	20.04	24.51	0.51	1.01
Cho Hung Bank	6.10	1.34	9.57	5.52	13.52	6.64	8.93	7.54	7.15	3.73	37.17	54.43	0.48	0.80
Citibank	5.37	4.16	8.47	8.31	11.33	9.93	7.72	10.91	3.76	4.58	11.30	11.11	1.17	1.40
Credit Lyonnais	3.51	8.64	8.66	7.58	10.36	8.03	9.29	10.16	1.28	1.63	20.90	21.70	3.60	2.60
DBS	2.96	3.44	8.17	6.27	11.72	9.54	9.41	4.63	5.47	2.64	15.98	55.49	10.37	Nil
Deutsche Bank	2.39	1.48	5.85	4.17	8.52	5.01	7.38	6.14	2.65	0.84	17.35	14.42	Nil	Nil
HSBC	4.76	3.45	7.39	6.11	9.60	8.40	8.78	6.58	2.88	2.73	18.10	14.54	1.03	0.70
ING Bank	6.21	22.31	5.84	1.09	13.37	6.21	6.61	0.60	2.01	0.46	20.72	56.91	Nil	0.09
JP Morgan Chase Bank	3.31	2.29	5.93	5.74	3.85	NA	7.74	7.87	3.53	4.12	72.95	34.83	Nil	Nil
Krung Thai Bank Public Co	1.54	1.73	7.66	5.86	7.70	9.81	9.24	6.91	6.57	5.27	119.88	115.98	Nil	Nil
Mashreq Bank	9.04	9.05	10.12	9.72	18.07	21.79	9.73	11.05	3.43	2.41	39.38	54.71	Nil	Nil
Mizuho Corporate Bank	7.57	2.71	7.84	6.63	9.13	7.47	7.79	5.52	2.66	4.52	18.50	36.09	0.76	Nil
Oman International	7.92	6.63	3.82	3.84	7.14	6.09	8.32	7.31	-1.72	-0.36	14.62	16.48	42.15	61.37
Societe Generale	4.91	2.46	5.63	4.58	8.76	5.08	6.38	5.06	1.96	1.88	32.63	32.71	Nil	1.37
Standard Chartered Bank	6.13	3.77	9.23	7.93	13.23	10.47	8.80	8.80	3.87	4.23	10.56	10.87	0.31	0.52
Sumitomo Mitsui Banking Corpn	5.98	3.13	9.43	7.61	13.33	10.83	7.27	6.01	5.35	6.16	35.49	52.30	20.21	12.78
UFBank	5.33	2.22	6.32	4.90	7.20	6.91	7.59	4.74	3.37	4.54	67.68	121.69	8.58	Nil

PRODUCTIVITY

PUBLIC SECTOR BANKS

(In Rs lakh)	Total income per branch		Total income per employee		Operating profit per employee		(In Rs lakh)	Total income per branch		Total income per employee		Operating profit per employee	
	2003	2004	2003	2004	2003	2004		2003	2004	2003	2004	2003	2004
Allahabad Bank	160.93	176.67	15.86	17.73	2.64	4.54	SB of Bikaner & Jaipur	221.16	254.32	13.46	15.82	3.34	5.22
Andhra Bank	254.42	257.56	21.54	22.19	5.81	7.10	SB of Hyderabad	282.87	323.77	18.90	21.99	5.67	7.64
Bank of Baroda	271.05	292.20	18.26	19.77	4.26	6.25	SB of Indore	301.74	323.42	19.73	21.45	6.45	6.12
Bank of India	297.94	296.17	17.35	17.56	4.71	5.22	SB of Mysore	218.55	225.04	12.65	14.42	3.62	4.38
Bank of Maharashtra	195.23	209.14	17.39	18.83	3.71	4.77	SB of Patiala	284.64	338.99	16.08	21.60	6.34	6.51
Canara Bank	337.04	367.75	17.18	19.07	4.20	6.00	SB of Saurashtra	270.35	310.65	15.11	17.57	3.90	6.13
Central Bank	182.21	192.59	14.31	15.41	2.35	3.91	SB of Travancore	280.86	330.81	15.70	18.40	3.79	5.64
Corporation Bank	365.13	376.45	24.55	25.32	7.95	8.45	State Bank of India	407.70	421.21	17.53	18.39	3.70	4.61
Dena Bank	194.65	207.30	20.94	22.74	4.68	6.87	Syndicate Bank	193.58	218.64	13.24	15.34	2.43	4.19
Indian Bank	222.00	248.13	13.76	15.58	2.66	3.66	UCO Bank	199.65	217.25	13.52	14.82	2.49	3.78
Indian Overseas Bank	239.72	308.49	16.38	18.55	3.25	5.47	Union Bank of India	254.00	264.74	19.95	20.87	5.07	5.79
Orissa Bank of Commerce	337.83	337.05	23.40	29.57	8.61	11.27	United Bank of India	196.12	198.04	14.25	14.40	3.13	3.43
Punjab & Sind Bank	178.80	201.89	16.22	15.54	2.86	1.52	Vijaya Bank	239.24	284.73	17.20	21.21	3.69	7.45
Punjab National Bank	216.38	239.85	14.81	16.39	3.93	5.30							

PRIVATE BANKS

Bank of Punjab	456.29	384.03	42.16	32.29	9.38	7.04	ING Vysya Bank	333.20	345.15	23.67	25.95	4.53	5.28
Bank of Rajasthan	175.30	192.05	14.24	16.41	3.53	4.47	J&K Bank	377.66	383.78	24.11	26.92	7.79	9.28
Bharat Overseas Bank	268.14	287.65	20.59	22.36	4.79	5.52	Karnataka Bank	291.86	302.36	24.32	26.02	5.87	7.67
Catholic Syrian Bank	164.53	158.65	16.16	16.47	3.83	4.27	Karur Vysya Bank	302.83	323.71	22.83	25.24	6.97	7.53
Centurion Bank	749.25	650.44	47.57	35.68	2.30	1.09	Kotak Mahindra Bank	3,166.56	2,258.28	49.49	34.43	17.50	11.35
City Union Bank	231.75	267.72	20.41	24.55	5.71	8.44	Lakshmi Vilas Bank	165.22	165.44	17.91	19.15	4.04	4.68
Development Credit Bank	755.69	688.81	33.57	30.63	4.50	3.75	Lord Krishna Bank	232.18	221.22	22.84	20.11	5.26	4.14
Dhanalakshmi Bank	163.13	150.15	19.74	18.81	4.83	5.05	Sangli Bank	NA	NA	8.55	8.33	1.01	1.41
Federal Bank	NA	NA	21.65	23.42	5.65	6.86	South Indian Bank	214.25	223.28	23.60	25.90	6.10	6.85
HDFC Bank	1,073.23	970.82	51.75	53.39	14.82	17.77	Tamilnad Mercantile Bank	NA	NA	23.98	27.70	6.13	7.77
ICI Bank	3,432.02	2,895.63	114.24	87.68	23.45	17.43	United Western Bank	269.21	259.09	18.99	18.55	4.22	4.13
IDBI Bank	786.74	956.59	52.52	58.64	11.02	17.63	UTI Bank	1,339.49	1,131.31	80.21	51.70	17.54	19.91
Industrial Bank	1,855.11	2,182.09	105.45	76.11	34.17	25.42							

FOREIGN BANKS

ABN Amro	7,111.61	8,148.64	84.16	89.13	24.81	27.99	Citibank	13,675.34	15,832.87	169.46	156.52	53.76	61.11
Abu Dhabi Commercial	9,789.05	8,587.35	251.00	225.98	16.90	18.02	Credit Lyonnais	4,005.11	3,450.86	157.06	134.01	20.11	21.04
American Express Bank	10,351.70	10,523.42	37.86	37.29	7.81	7.11	DBS	4,001.89	3,245.83	166.75	111.93	62.17	41.03
Antwerp Diamond Bank N.V.	1,222.32	2,381.14	71.90	152.29	15.91	63.91	Deutsche Bank	13,857.96	18,112.04	175.66	216.65	83.00	120.89
Arab Bangladesh Bank	783.39	757.15	31.81	31.55	20.25	21.92	H&SBC	5,770.66	6,233.34	58.73	34.0*	14.06	12.39
Bank International Indonesia	462.04	386.73	30.60	25.78	-16.69	0.27	ING Bank	1,546.52	248.37	53.33	436.74	-19.23	68.69
Bank of America	8,428.94	7,230.35	162.10	135.91	51.10	44.95	JP Morgan Chase Bank	5,636.18	5,809.22	110.51	103.74	62.64	46.03
Bank of Bahrain & Kuwait	3,571.53	2,700.99	78.50	65.08	16.94	10.21	Krung Thai Bank Public Co	405.60	345.53	36.87	31.41	13.83	8.53
Bank of Ceylon	1,417.75	1,533.04	52.51	56.78	17.09	22.16	Mashreq Bank	2,702.62	1,844.37	300.29	307.39	81.22	52.74
Bank of Nova Scotia	5,307.53	3,753.34	142.68	105.54	39.99	33.81	Mizuho Corporate Bank	3,001.62	2,312.17	69.6*	52.55	8.69	19.72
Bank of Tokyo	4,480.60	5,236.14	60.01	92.40	15.51	56.19	Oman International	1,674.56	1,391.29	85.67	75.20	-13.72	-2.40
Barclays Bank	6,279.11	7,421.65	369.36	436.58	251.53	341.99	Societe Generale	2,018.42	2,486.35	62.11	84.25	4.56	32.49
BHP Ferbas	3,125.63	2,467.40	79.02	67.70	0.49	10.76	Standard Chartered Bank	4,380.75	4,957.77	83.77	72.24	32.61	30.87
Calyon Bank	4,525.19	2,586.53	177.46	126.17	23.90	-4.60	Sumitomo Mitsui Banking	7,436.62	5,086.72	69.50	49.39	26.14	23.80
Cho Hung Bank	2,004.11	1,458.05	400.82	104.15	227.36	62.21	UFI Bank	2,483.20	2,031.76	68.98	53.76	25.07	35.73

SOURCES OF FUNDS

PUBLIC SECTOR BANKS

(In Rs crore)	Capital		Reserves		Deposits		Borrowings		Other liabilities		Total	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Allahabad Bank	346.70	346.70	823.59	1,205.23	25,463.38	31,476.61	43.69	168.99	1,373.55	1,506.75	28,050.92	34,704.28
Andhra Bank	400.00	400.00	715.43	1,052.58	21,061.85	22,940.52	990.63	843.00	1,510.45	1,772.85	24,678.36	27,008.95
Bank of Baroda	294.34	294.53	4,092.63	4,836.40	66,441.40	72,967.32	625.33	875.11	4,970.88	6,135.31	76,424.58	85,108.66
Bank of India	428.14	486.14	3,052.64	3,521.52	64,098.45	71,003.12	4,026.93	4,520.78	4,628.05	5,326.43	76,294.21	84,859.99
Bank of Maharashtra	330.52	430.52	649.75	1,005.01	22,175.75	26,445.93	314.82	469.92	1,433.79	3,661.60	24,904.63	32,212.97
Central Bank	410.00	410.00	3,738.83	4,841.64	72,094.82	86,344.56	93.82	754.90	5,777.46	7,166.30	82,054.33	99,539.39
Central Bank	1,124.14	1,124.14	1,239.82	1,550.39	51,165.12	55,908.60	146.99	107.97	3,369.08	4,354.25	57,105.16	63,345.35
Cooperation Bank	143.44	143.44	2,226.76	2,625.21	21,724.57	23,190.93	803.34	934.13	1,373.96	2,259.93	26,071.38	29,153.69
Dena Bank	206.62	206.62	791.60	848.39	16,451.26	18,349.18	228.21	306.37	2,444.07	2,447.47	20,161.56	22,160.24
Indian Bank	4,573.96	4,573.96	558.18	963.67	27,015.93	30,444.40	449.21	296.92	2,779.94	2,672.92	35,375.22	39,154.07
Indian Overseas Bank	444.60	544.60	1,014.79	1,536.29	36,698.59	41,482.58	355.97	729.47	2,640.57	3,026.88	41,154.72	47,322.02
Oriental Bank of Commerce	192.54	192.54	1,916.80	2,484.26	29,809.09	35,673.50	766.02	700.50	1,314.42	1,955.76	33,996.66	41,006.56
Punjab & Sind Bank	243.06	243.06	214.38	223.54	13,223.62	13,642.03	24.76	10.07	785.08	892.70	14,450.91	15,011.39
Punjab National Bank	265.30	265.30	3,767.69	4,746.50	75,813.50	87,916.40	662.16	1,289.06	5,713.15	8,114.48	86,221.60	102,331.74
SB of Bikaner & Jaipur	50.00	50.00	853.45	1,098.57	13,279.71	15,642.31	310.54	615.88	3,495.00	2,849.66	17,968.70	20,256.42
SB of Hyderabad	17.25	17.25	1,233.69	1,556.52	20,596.94	24,257.85	416.42	825.41	3,665.24	3,565.07	25,131.54	30,646.10
SB of Madras	17.50	17.50	566.16	772.67	9,221.28	10,418.67	300.28	384.83	1,256.55	1,450.25	11,569.77	13,043.92
SB of Mysore	36.00	36.00	394.96	545.97	9,013.12	11,083.70	335.41	207.33	1,556.27	1,665.05	11,335.75	13,758.06
SB of Patiala	24.75	24.75	1,387.43	1,706.10	17,669.63	22,473.28	433.99	498.06	1,573.06	2,194.56	21,265.30	26,856.75
SB of Saurashtra	314.00	314.00	311.44	453.41	9,054.03	10,674.76	443.89	581.99	1,329.82	813.10	11,453.24	12,837.26
SB of Travancore	50.00	50.00	672.80	875.26	15,926.28	19,721.37	48.41	270.60	2,335.67	3,086.09	19,033.16	24,003.31
State Bank of India	526.30	526.30	16,677.08	19,704.98	296,123.28	318,618.67	9,303.62	13,431.33	53,246.21	55,534.00	375,676.50	407,815.28
Syndicate Bank	471.95	471.95	1,107.64	1,433.32	30,660.54	42,584.82	78.77	222.45	2,116.53	2,510.64	34,435.43	47,223.18
UCO Bank	599.36	799.36	606.29	983.70	31,343.39	39,244.26	407.21	386.37	1,957.82	2,384.13	34,914.08	43,797.82
Union Bank of India	460.12	460.12	2,106.71	2,627.02	44,748.62	50,558.93	442.07	934.24	3,302.97	3,736.37	51,060.49	58,316.68
United Bank of India	1,810.67	1,810.67	150.87	148.54	21,031.29	22,758.21	51.68	29.49	1,223.83	1,095.46	24,266.53	25,842.57
Vijaya Bank	333.52	433.52	477.75	302.02	17,019.81	21,015.05	320.82	336.65	920.33	1,363.78	19,072.28	24,071.02
Total	14,175.37	14,675.56	51,407.19	64,548.91	1,079,167.36	1,226,837.56	22,424.99	30,735.81	118,235.71	134,629.85	1,265,410.62	1,471,427.69

SOURCES OF FUNDS

PRIVATE BANKS

(In Rs crore)	Capital		Reserves		Deposits		Borrowings		Other liabilities		Total	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Bank of Punjab	105.00	105.00	109.58	138.73	3,569.60	4,136.88	142.28	61.96	340.26	396.89	4,256.73	4,839.46
Bank of Rajasthan	105.97	107.57	179.25	221.91	5,199.24	7,405.89	17.21	176.32	527.86	543.62	6,129.52	8,455.50
Barat Overseas Bank	15.75	15.75	124.55	156.43	2,149.10	2,471.52	55.65	15.98	95.24	157.18	2,440.29	2,816.85
Catholic Syrian Bank	10.58	10.54	129.44	183.37	3,566.20	3,880.45	1.52	21.07	214.88	211.77	3,681.62	4,307.31
Centurion Bank	152.47	56.75	23.35	136.20	2,634.71	3,028.79	60.48	43.97	314.44	283.18	3,365.47	3,545.87
City Union Bank	14.00	14.00	140.77	178.85	2,317.37	2,846.65	11.16	29.83	126.89	112.25	2,622.15	3,191.39
Development Credit Bank	28.75	39.36	218.20	247.00	3,657.09	4,474.18	299.92	238.58	203.82	353.51	4,407.19	5,392.62
Dharmalshin Bank	32.06	32.06	88.32	102.01	1,837.89	2,155.77	37.90	3.92	110.09	151.03	2,156.26	2,444.80
Federal Bank	21.72	21.72	507.75	627.03	10,947.42	13,476.68	84.68	126.72	640.07	562.03	12,201.93	15,114.27
HDFC Bank	282.05	284.77	1,969.69	2,408.54	22,376.07	30,405.86	2,084.65	2,307.84	3,711.42	4,656.98	30,404.55	42,306.99
ICI Bank	952.66	966.40	6,320.65	7,384.15	48,169.31	68,108.58	34,302.42	30,740.24	17,026.93	18,015.49	104,611.27	125,228.87
DBI Bank	140.06	214.24	214.21	404.03	6,032.30	10,048.16	1,041.49	1,484.53	509.44	651.25	7,528.72	13,002.20
Industrial Bank	219.27	290.42	382.99	510.00	8,597.67	11,200.26	236.79	2,310.35	464.14	775.43	9,501.56	15,085.46
ING Vysya Bank	22.62	22.65	684.37	724.67	9,186.62	10,475.07	933.85	964.34	631.34	1,008.59	11,456.82	13,183.32
ISB Bank	48.20	48.25	1,193.60	1,545.49	14,674.90	18,651.38	215.90	297.01	660.94	653.53	16,762.75	21,203.76
Karnataka Bank	40.43	40.43	542.98	657.72	8,291.72	9,406.94	165.34	183.28	224.34	288.25	9,264.33	10,576.65
Karur Vysya Bank	15.41	17.98	542.27	694.05	5,121.92	5,911.48	267.76	103.19	225.35	360.72	6,173.71	7,107.43
Kotak Mahindra Bank	59.21	59.53	482.25	546.78	256.81	4,459.34	1,140.36	511.63	213.98	239.57	2,152.61	3,815.95
Laxmi Vilas Bank	11.51	11.51	180.58	215.13	2,770.50	3,295.82	64.11	30.23	170.04	266.65	3,156.74	3,821.35
Lord Krishna Bank	56.69	56.69	62.59	82.55	1,863.29	2,311.22	1.93	0.63	73.17	153.47	1,937.67	2,604.56
Sangli Bank	20.41	22.25	60.00	63.97	1,677.78	1,859.36	6.88	0.35	52.22	46.52	1,677.29	1,992.45
South Indian Bank	35.77	35.78	285.22	359.11	6,861.27	8,280.03	94.88	79.45	351.52	499.68	7,628.66	9,254.05
Tamilnad Mercantile Bank	0.26	0.26	396.60	476.54	4,064.58	4,404.27	72.77	28.47	167.42	179.92	4,721.65	5,089.49
United Western Bank	29.69	29.89	249.07	274.08	5,391.09	6,430.19	51.74	60.03	249.85	345.15	5,971.53	7,139.34
UTI Bank	230.19	231.58	688.75	906.47	16,964.72	20,953.90	719.31	527.75	1,010.22	1,530.45	19,613.19	24,150.17
Total	2,671.35	2,745.56	15,777.22	19,254.88	198,259.37	260,094.68	42,110.98	40,347.45	28,339.34	35,249.32	287,156.27	357,691.89

FOREIGN BANKS

ABN Amro	169.02	169.02	767.36	982.66	5,022.30	5,856.44	2,890.50	2,924.93	532.08	676.72	9,381.25	10,609.77
Abu Dhabi Commercial	0.20	0.20	62.25	71.89	1,765.65	1,815.98	10.00	-	67.97	68.30	1,909.07	1,956.38
American Express Bank	47.77	62.40	205.20	181.63	2,387.93	2,788.52	300.00	132.01	229.97	238.91	3,170.86	3,403.46
Antwerp Diamond Bank N.V.	114.71	114.71	0.89	6.81	36.97	44.44	36.18	274.36	58.97	62.09	247.74	502.41
Arap Bangladesh Bank	36.58	36.98	5.97	7.25	46.19	30.93	2.00	-	1.25	0.58	92.39	75.74
Bank Internasional Indonesia	73.36	73.36	1.30	1.30	8.94	12.92	-	13.12	1.63	2.92	85.45	103.64
Bank of America	0.20	0.20	635.79	699.96	1,545.23	1,589.21	2,531.03	2,525.84	161.33	295.62	4,592.56	5,110.82
Bank of Bahrain & Kuwait	58.40	58.40	32.92	33.75	476.20	433.25	102.87	140.72	20.67	20.80	691.05	686.92
Bank of Ceylon	38.09	38.09	13.56	14.26	65.33	100.96	29.19	30.59	12.65	13.02	178.62	200.92
Bank of Nova Scotia	135.13	135.47	118.16	133.68	1,449.49	1,694.09	524.74	1,016.51	104.75	137.10	2,332.27	3,116.84
Bank of Tokyo	99.78	99.78	248.38	306.60	577.33	578.77	-	43.72	164.22	157.01	1,089.71	1,185.89
Barclays Bank	262.60	262.60	71.43	143.31	107.75	89.51	244.74	108.41	329.12	777.25	1,015.64	1,381.08
BNP Paribas	62.63	199.75	171.36	157.12	1,579.56	1,737.11	706.45	622.88	201.26	276.47	2,721.46	2,995.33
Calyon Bank	98.18	98.18	16.38	19.88	662.09	499.35	140.00	44.86	48.87	29.94	985.52	692.20
Cho Hung Bank	34.54	34.54	26.64	30.79	55.81	59.55	5.00	49.72	30.93	40.44	152.92	215.04
Citicorp	157.46	167.46	1,959.65	2,528.42	17,742.50	20,465.13	3,388.44	3,503.23	1,961.52	2,933.15	25,239.59	29,597.39
Credit Lyonnais	183.09	183.09	49.59	59.08	994.39	932.33	30.01	47.62	161.38	163.12	1,438.26	1,385.25
DBS	49.54	185.33	33.77	25.49	124.04	375.49	120.00	4.27	6.50	16.54	335.85	609.12
Deutsche Bank	392.66	292.68	445.67	625.49	1,945.07	2,532.51	2,727.69	4,700.85	336.77	445.20	5,649.88	8,596.75
HDFC	715.03	715.03	1,583.21	1,737.82	12,801.21	16,269.88	3,171.73	2,539.22	2,636.57	4,094.94	20,909.74	25,356.89
ING Bank	67.92	67.92	5.18	5.05	12.00	-	112.00	-	32.13	29.56	229.24	102.53
JP Morgan Chase Bank	167.62	167.62	35.33	51.43	165.68	391.78	210.04	28.60	16.25	46.32	615.13	687.95
Krung Thai Bank Public Co	35.84	35.84	2.95	3.73	16.02	16.51	-	0.50	0.53	0.59	55.35	57.18
Mashreq Bank	48.36	48.38	0.65	6.72	296.97	279.25	6.00	-	12.87	9.18	364.88	343.53
Mizuho Corporate Bank	70.86	144.34	5.80	12.87	142.86	51.25	87.49	74.22	5.22	10.40	312.22	293.07
Oman International	146.94	146.94	6.21	5.86	356.66	286.37	21.29	43.72	41.68	46.20	572.78	529.09
Societe Generale	133.59	144.37	1.60	8.22	127.92	412.47	270.07	144.08	23.35	24.11	558.92	734.15
Standard Chartered Bank	515.42	515.42	2,284.90	2,217.92	18,002.51	19,948.98	4,833.72	6,124.04	3,675.45	5,535.11	29,312.01	34,345.47
Sunamitsu Mizui Banking Corp	140.37	140.37	31.52	37.35	166.83	131.95	238.10	87.44	69.75	132.92	646.57	530.02
Wai Bank	186.60	186.60	28.32	34.22	115.27	60.52	26.00	30.23	3.10	2.80	359.49	314.57
Total	4,255.96	4,525.50	8,851.75	10,150.55	68,859.69	79,485.43	22,765.28	25,256.54	11,014.96	16,301.32	115,747.64	135,719.38

USES OF FUNDS

PUBLIC SECTOR BANKS

(in its crore)	Cash & balances with RBI		Balances with banks		Investments		Advances		Fixed assets		Other assets		Total	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
	Allahabad Bank	1,545.76	2,155.76	454.06	440.52	12,371.72	15,554.81	12,543.60	15,341.54	357.62	353.05	768.16	856.57	29,959.92
Anchra Bank	1,292.15	2,044.61	350.56	526.62	10,517.65	10,317.36	11,512.94	12,885.47	160.10	179.93	806.93	1,052.96	24,576.36	27,006.95
Bank of Baroda	3,465.62	3,059.76	3,351.28	4,210.03	30,179.38	38,016.81	35,348.08	35,600.88	697.32	815.27	3,362.70	3,456.65	74,454.58	65,105.66
Bank of India	3,349.73	4,230.94	3,646.16	4,327.01	24,434.84	27,162.69	42,633.18	45,851.90	736.70	798.59	1,491.53	2,484.67	75,294.21	84,659.99
Bank of Maharashtra	1,925.70	4,538.78	611.63	1,076.47	11,601.53	13,643.02	9,506.14	11,731.51	155.41	170.47	902.21	752.73	24,304.93	32,212.97
Canara Bank	5,507.51	4,590.94	2,059.64	5,136.08	30,453.24	35,792.95	40,471.60	47,639.63	659.62	663.26	2,765.32	3,426.57	60,254.93	66,539.35
Central Bank	3,597.02	3,408.55	1,722.65	1,653.51	26,045.35	31,425.13	22,251.75	22,604.11	752.31	778.55	2,642.06	3,277.40	57,105.14	63,345.35
Corporation Bank	1,283.64	1,694.57	1,145.70	1,141.63	10,662.90	10,635.04	12,029.17	13,869.72	232.95	249.47	910.61	1,492.33	24,271.58	26,156.69
Dena Bank	1,114.63	1,235.47	337.04	217.71	6,500.38	9,736.42	6,435.60	9,411.79	296.13	294.47	1,477.54	1,256.39	22,161.94	22,140.24
Indian Bank	1,203.62	2,845.75	944.64	300.65	14,633.01	16,626.21	12,274.99	14,128.08	423.86	434.34	4,289.40	4,752.64	35,375.22	59,154.67
Indian Overseas Bank	2,687.94	4,332.22	926.20	912.67	18,603.01	20,171.64	17,447.00	20,294.86	292.51	404.03	1,218.05	1,256.40	41,154.72	47,332.02
Oriental Bank of Commerce	1,895.90	2,633.52	626.31	966.85	14,780.54	16,794.12	15,677.24	19,680.76	145.28	161.78	871.59	769.54	33,396.86	41,006.56
Punjab & Sind Bank	993.69	1,057.17	623.54	459.33	6,237.46	6,776.59	5,692.09	6,030.01	68.42	63.28	765.40	615.01	14,490.91	15,011.39
Punjab National Bank	6,565.53	6,742.26	1,505.66	2,078.23	34,030.05	42,125.49	40,228.12	47,224.72	884.70	899.84	3,001.75	3,251.18	65,221.60	102,331.74
SB of Bihar & Jajpur	879.22	1,260.62	904.27	607.50	7,678.90	8,430.03	6,773.33	8,596.55	101.59	113.49	1,651.40	1,246.24	17,336.70	20,256.42
SB of Hyderabad	1,327.12	1,618.20	132.47	269.75	12,518.67	15,017.05	9,662.60	11,613.68	115.31	165.29	1,975.36	1,532.74	25,121.54	30,646.10
SB of Indore	522.62	552.11	85.33	264.40	5,137.03	5,425.02	5,162.95	6,408.06	46.73	60.56	289.04	33.77	11,353.77	13,043.92
SB of Mysore	465.24	710.94	430.62	654.45	4,760.57	5,486.65	5,260.67	6,306.72	38.29	75.49	320.36	512.35	11,335.75	13,756.06
SB of Patiala	1,175.65	1,026.61	235.70	289.67	6,122.06	11,110.21	10,746.40	13,085.34	119.39	123.96	359.39	1,226.50	21,255.50	26,636.75
SB of Saurashtra	574.62	734.21	133.43	234.18	4,730.41	5,846.38	4,648.50	5,240.48	43.19	59.14	1,272.60	722.67	11,433.24	12,637.26
SB of Travancore	826.65	957.92	413.36	446.83	8,038.73	10,778.07	9,170.66	11,132.43	72.27	106.43	509.48	579.63	19,633.16	24,003.31
State Bank of India	12,736.47	19,641.28	32,442.56	24,529.33	172,347.91	185,676.48	137,758.46	157,933.54	2,388.55	2,645.12	18,200.56	17,933.53	375,876.50	407,615.28
Syndicate Bank	1,849.93	4,597.19	859.03	2,070.31	13,623.25	17,916.60	16,305.35	20,646.92	343.18	363.69	1,444.65	1,716.48	34,435.43	47,223.18
UCO Bank	2,133.61	2,342.03	1,003.62	1,845.63	14,137.51	17,611.47	15,923.10	20,626.44	373.48	385.34	1,342.58	986.91	34,314.08	43,737.62
Union Bank of India	2,247.24	2,400.04	1,652.39	1,447.89	19,370.79	22,442.04	25,514.84	29,423.91	733.29	766.81	1,541.93	1,833.59	51,660.49	58,316.68
United Bank of India	1,700.33	1,261.67	391.07	1,056.45	12,632.37	13,516.14	7,351.69	7,963.34	187.38	169.75	1,996.65	1,652.22	24,206.53	25,642.57
Vijaya Bank	1,586.27	575.57	517.21	242.99	6,861.61	10,836.95	7,884.26	11,045.31	159.39	191.27	565.55	676.66	12,222.29	24,071.02
Total	65,166.62	84,241.79	57,731.95	57,448.67	545,635.90	625,677.67	546,436.62	632,739.69	10,592.98	11,527.54	57,846.55	59,732.33	1,265,516.61	1,471,427.69

PRIVATE BANKS

Bank of Punjab	405.65	322.72	123.65	176.63	1,454.91	1,571.64	1,767.13	2,353.46	190.89	187.61	284.20	227.00	4,266.73	4,639.46
Bank of Rajasthan	376.65	325.93	626.45	1,049.84	2,642.55	4,353.01	2,221.24	2,431.03	80.04	100.70	178.58	194.75	5,126.52	8,455.30
Bharat Overseas Bank	92.95	126.62	266.96	246.38	811.96	936.45	1,153.09	1,391.52	29.50	33.12	85.81	92.77	2,440.29	2,616.85
Catholic Syrian Bank	215.40	163.17	178.03	253.70	1,609.30	1,818.94	1,470.70	1,698.24	25.22	30.26	165.97	186.00	3,362.62	4,307.31
Centurion Bank	219.64	260.95	266.63	246.68	999.25	1,004.18	1,313.72	1,556.41	230.34	184.68	353.65	293.99	3,355.47	3,546.87
City Union Bank	153.65	203.05	24.02	36.42	1,059.20	1,279.00	1,212.05	1,546.98	16.67	24.06	116.56	121.88	2,522.13	3,191.39
Development Credit Bank	245.11	276.88	160.77	254.07	1,223.76	2,034.22	2,468.37	2,439.52	131.19	124.16	160.00	213.77	4,407.19	5,332.62
Dhanrajshahi Bank	126.02	145.46	97.14	126.20	675.06	894.65	1,060.49	1,138.59	27.97	30.37	97.56	111.30	2,196.25	2,444.60
Federal Bank	509.04	725.85	236.62	565.71	4,551.68	5,507.36	6,217.52	7,700.53	162.19	175.72	362.25	439.04	12,201.63	15,114.27
HDFC Bank	2,081.65	2,541.95	1,037.26	1,115.57	13,389.08	19,256.79	17,754.66	17,748.51	528.58	616.91	1,535.34	1,031.23	37,424.03	42,306.99
ICI Bank	4,386.14	5,428.00	1,602.66	3,062.64	35,462.30	42,742.86	53,279.41	62,095.52	4,060.73	4,056.41	7,520.52	7,852.24	105,811.27	125,228.27
IDBI Bank	600.62	763.56	101.58	375.76	2,410.88	3,914.02	4,325.19	7,398.92	164.51	151.72	325.74	336.23	7,926.72	13,002.20
Industrial Bank	574.76	1,334.64	575.96	916.97	2,535.07	3,971.69	5,347.85	7,812.23	110.10	288.39	757.31	750.53	9,901.06	15,036.46
ING Vysya Bank	511.19	625.64	715.95	379.00	3,640.54	4,089.24	5,611.61	7,046.51	344.79	334.43	634.74	727.31	11,438.82	13,198.32
J&K Bank	720.56	1,594.60	800.45	1,382.16	6,737.82	8,451.10	8,010.95	9,284.94	172.41	196.07	351.56	356.65	15,793.75	21,205.76
Karnataka Bank	437.27	388.76	196.51	360.53	4,432.61	4,878.91	3,859.70	4,667.92	79.12	93.17	217.62	197.23	2,264.63	10,576.03
Karur Vysya Bank	230.47	327.04	456.58	270.75	1,845.08	2,173.01	3,344.40	4,023.24	85.53	93.76	209.65	216.61	5,173.71	7,107.43
Kotak Mahindra Bank	56.74	126.65	17.67	551.57	706.96	2,892.77	1,240.56	2,097.02	79.79	85.26	49.17	73.48	2,152.61	5,616.95
Lalsonhi Vias Bank	166.05	230.33	66.92	46.73	1,036.58	1,338.17	1,763.70	2,038.70	29.90	31.31	133.55	133.04	3,196.74	3,621.55
Lok Kshema Bank	130.04	204.39	84.19	144.54	662.68	1,047.14	915.04	1,117.90	16.78	23.76	48.95	54.64	1,337.67	2,064.56
Sangli Bank	77.70	32.44	70.34	25.48	953.32	1,079.95	568.15	648.25	33.25	32.81	114.53	113.45	1,317.29	1,592.45
South Indian Bank	396.33	404.62	333.73	401.46	2,959.32	3,562.09	3,612.94	4,198.82	54.42	63.93	181.68	223.24	7,526.65	9,254.05
Tamilnad Mercantile Bank	270.63	223.76	113.68	160.80	2,142.11	2,353.71	1,959.96	2,113.99	49.40	53.64	185.61	183.55	4,731.65	5,086.46
United Western Bank	342.22	357.18	250.27	283.46	1,915.06	2,413.12	3,145.45	3,744.47	112.06	114.94	206.56	226.17	5,971.63	7,139.34
UTI Bank	1,600.03	3,776.94	1,569.68	1,886.27	7,841.02	7,792.76	7,179.92	9,362.95	305.51	435.16	717.02	896.10	19,613.16	24,150.17
Total	15,529.66	20,894.70	10,544.09	14,326.45	104,006.81	131,793.24	134,914.03	167,850.75	7,120.88	7,576.27	15,042.79	15,250.49	287,158.27	357,691.89

USES OF FUNDS

FOREIGN BANKS

(In Rs crore)	Cash & balances with RBI		Balances with banks		Investments		Advances		Fixed assets		Other assets		Total	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
ABN Amro	365.23	508.73	72.17	46.63	2,984.98	2,917.48	5,443.98	6,696.59	89.32	86.61	425.57	353.74	9,381.25	10,609.77
Abu Dhabi Commercial	44.22	82.28	110.60	216.73	1,327.34	1,353.85	273.70	167.57	8.12	7.67	145.10	128.09	1,939.07	1,956.36
American Express Bank	96.41	136.64	483.64	698.83	1,087.39	812.16	1,190.09	1,262.60	82.64	78.91	226.70	214.30	3,170.86	3,403.46
Antwerp Diamond Bank NV	4.00	13.16	14.31	68.38	47.39	95.83	175.96	297.75	3.61	2.93	2.47	4.36	247.74	502.41
Arab Bangladesh Bank	0.80	0.82	57.12	45.16	9.12	10.13	17.36	11.82	0.56	0.42	7.42	7.39	92.39	75.74
Bank Internasional Indonesia	0.52	1.24	1.83	36.77	16.65	12.47	18.31	3.45	8.04	7.56	40.11	21.41	65.45	103.64
Bank of America	105.15	231.32	44.19	156.26	1,300.49	1,381.44	3,298.14	3,059.30	29.21	31.67	116.42	246.02	4,933.53	5,110.62
Bank of Bahrain & Kuwait	17.21	21.40	41.20	15.15	254.63	317.06	352.76	303.74	9.85	8.57	15.01	21.00	611.05	686.92
Bank of Ceylon	6.91	19.66	46.33	59.56	23.27	44.64	84.56	62.84	0.25	0.16	17.21	14.08	176.82	200.92
Bank of Nova Scotia	64.53	103.23	37.37	116.10	652.72	772.45	1,459.77	2,019.20	7.06	6.24	110.22	59.55	2,332.27	3,116.84
Bank of Tokyo	37.02	31.95	222.72	205.45	205.10	323.00	438.86	427.50	14.69	11.01	171.32	186.98	1,069.71	1,165.69
Barclays Bank	2.52	6.33	10.99	20.79	483.69	446.87	2.30	2.56	3.43	8.04	512.51	694.49	1,015.64	1,381.06
BNP Paribas	116.43	96.33	35.92	367.50	917.86	1,001.42	1,422.71	1,314.90	95.36	90.00	133.19	125.18	2,721.46	2,995.33
Cajon Bank	25.66	25.80	247.29	163.59	362.25	331.29	232.07	46.81	32.16	37.25	86.08	87.46	915.52	692.20
Cho Hung Bank	3.47	5.04	11.60	92.32	30.37	39.77	75.25	44.66	0.53	0.41	31.70	32.83	152.92	215.04
Citicorp	1,233.20	3,497.18	2,569.62	1,710.72	7,035.93	6,669.61	12,628.69	15,259.12	525.54	513.56	1,226.61	1,927.20	25,233.53	29,597.39
Credit Lyonnais	32.54	36.56	30.44	217.03	628.05	526.24	658.02	511.27	3.66	2.64	65.35	89.23	1,435.26	1,385.25
DES	5.89	10.70	54.65	231.59	76.30	245.42	191.74	108.72	1.20	1.22	6.57	11.46	335.35	609.12
Deutsche Bank	159.70	334.90	1,031.43	2,906.06	2,458.74	2,277.18	1,607.64	2,098.06	93.21	93.05	499.10	667.49	5,543.38	8,596.73
HNBC	977.05	731.27	264.93	716.37	6,869.55	10,395.33	3,202.14	9,628.08	512.49	438.63	2,143.53	3,436.96	10,933.74	25,356.89
ING Bank	3.71	15.32	11.15	0.89	66.91	8.60	34.26	1.12	-	-	113.22	76.60	229.24	102.53
JP Morgan Chase Bank	7.86	221.25	25.75	86.39	529.39	295.37	-	-	0.80	0.84	51.33	84.10	615.13	687.95
Krung Thai Bank Public Co	0.64	0.82	31.31	29.16	7.67	8.45	11.67	15.50	0.29	0.36	3.77	2.89	55.35	57.18
Machree Bank	10.18	9.96	54.10	81.48	232.67	206.36	41.32	17.42	0.65	0.34	25.97	27.98	354.88	343.53
Mizuho Corporate Bank	2.61	5.13	28.03	41.32	64.98	32.57	187.63	181.80	1.90	2.04	27.02	30.21	312.22	293.07
Oman International	26.87	23.75	234.52	174.97	110.49	141.71	27.69	17.43	21.02	19.79	152.00	151.44	572.78	529.09
Societe Generale	11.51	22.13	110.36	4.22	276.16	459.33	86.61	170.83	38.23	36.02	35.85	41.66	536.92	734.15
Standard Chartered Bank	1,157.98	1,035.86	212.44	619.74	10,222.96	10,078.70	13,041.79	16,152.26	573.91	438.17	4,162.94	6,020.75	29,312.01	34,345.47
Sumitomo Mitsui Banking	59.98	19.55	37.44	118.63	203.63	174.82	311.64	174.29	4.68	3.99	29.00	38.44	646.57	530.02
UFI Bank	12.46	6.42	76.67	155.93	75.07	44.65	173.47	92.98	1.88	1.99	19.94	12.60	359.49	314.57
Total	4,534.45	7,260.44	6,230.33	9,625.74	40,562.36	41,444.32	51,690.53	60,150.18	2,164.48	1,930.92	10,565.50	15,307.77	115,747.64	135,719.38

INCOME & EXPENDITURE

PUBLIC SECTOR BANKS

(in Rs crore)	Interest received		Other income		Interest paid		Operating expn.		Prov. & contingencies		Net profit	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Allahabad Bank	2,570.33	2,668.67	524.36	749.81	1,660.56	1,582.92	918.31	959.30	349.84	412.87	165.99	463.38
Andhra Bank	2,195.02	2,227.26	603.64	678.05	1,442.05	1,316.68	601.78	658.46	351.84	466.67	402.99	463.50
Bank of Baroda	6,097.56	6,147.07	1,261.70	1,719.01	3,994.19	3,575.48	1,648.44	1,605.30	943.84	1,518.29	772.78	967.00
Bank of India	5,928.22	5,795.90	1,642.37	1,791.99	3,892.01	3,594.48	1,648.58	1,751.55	1,179.00	1,233.55	851.00	1,008.32
Bank of Maharashtra	2,061.68	2,203.40	360.47	465.22	1,405.37	1,431.67	516.20	560.46	298.56	371.94	222.02	304.55
Canara Bank	6,651.89	7,005.92	1,477.97	2,072.91	4,424.77	4,324.57	1,747.71	1,896.55	978.46	1,520.77	1,018.69	1,338.01
Central Bank	5,073.00	5,063.72	553.54	964.29	3,175.57	2,941.53	1,527.12	1,557.55	618.33	910.62	305.52	618.11
Corporation Bank	2,102.52	2,201.17	531.76	516.77	1,310.36	1,237.24	471.38	573.65	436.53	402.97	415.99	504.14
Dena Bank	1,772.30	1,735.48	437.00	617.41	1,204.19	1,143.21	511.28	499.09	379.64	480.09	114.19	230.50
Indian Bank	2,531.91	2,666.92	525.00	747.33	1,711.52	1,549.86	755.14	1,061.93	401.42	595.77	188.63	405.75
Indian Overseas Bank	3,485.91	3,754.10	519.90	740.66	2,264.44	2,154.69	947.23	1,014.87	378.03	812.44	416.10	512.76
Oriental Bank of Commerce	3,304.28	3,300.54	531.38	721.70	2,089.93	1,844.74	582.66	644.48	706.11	846.96	456.95	686.07
Punjab & Sind Bank	1,264.15	1,278.50	307.15	255.88	897.89	785.18	412.57	599.59	276.41	140.72	4.43	8.89
Punjab National Bank	7,465.01	7,779.70	1,250.31	1,866.88	4,361.29	4,154.99	2,056.73	2,370.72	1,475.09	2,012.17	842.20	1,108.69
SB of Bikaner & Jaipur	1,438.20	1,573.57	339.90	491.50	886.83	857.13	450.43	526.58	237.58	379.63	203.28	301.52
SB of Hyderabad	1,067.27	2,212.94	461.58	707.43	1,319.51	1,371.59	451.40	534.57	455.55	633.07	301.40	381.20
SB of Indore	956.47	1,045.20	301.96	360.69	619.29	592.79	248.14	281.86	220.66	305.96	200.32	226.26
SB of Mysore	1,037.13	1,057.05	293.86	340.42	650.52	602.65	327.72	369.90	236.63	248.54	115.92	176.38
SB of Patiala	1,759.13	1,658.25	350.03	630.45	974.61	1,066.05	395.00	448.90	417.52	573.39	322.02	430.36
SB of Saurashtra	904.35	978.03	214.89	320.49	584.63	574.25	245.77	271.51	195.66	275.37	92.55	177.39
SB of Travancore	1,584.44	1,739.65	300.16	469.95	1,061.59	1,056.52	368.01	452.45	283.95	456.24	171.04	244.60
State Bank of India	31,087.02	30,460.49	5,740.26	7,612.46	21,109.46	19,274.18	7,942.42	9,245.32	4,670.40	5,872.46	3,105.00	3,681.00
Syndicate Bank	2,675.17	3,084.85	495.08	776.40	1,665.45	1,655.63	1,086.02	1,151.37	274.66	620.12	344.13	434.13
UCO Bank	2,792.70	3,095.28	609.29	625.27	1,910.68	1,901.69	867.27	871.46	416.55	512.99	207.49	435.42
Union Bank of India	4,306.18	4,516.31	824.56	831.46	2,808.50	2,780.07	1,018.32	1,084.62	751.23	771.03	552.69	712.05
United Bank of India	2,119.41	2,072.96	428.20	505.44	1,399.73	1,292.44	591.86	672.66	250.63	298.22	305.19	315.08
Vijaya Bank	1,676.81	1,940.09	346.02	525.69	1,027.42	1,102.32	557.05	497.82	235.60	452.33	195.56	411.31
Total	107232.04	109496.24	21232.35	28105.58	69852.59	65764.54	28894.53	32362.58	17421.79	22928.34	12295.47	16546.36

INCOME & EXPENDITURE

PRIVATE BANKS

(In Rs crore)	Interest received		Other income		Interest paid		Operating expn		Prov. & contingencies		Net profit	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Bank of Punjab	353.39	339.94	134.84	132.42	254.61	211.62	124.98	157.61	76.60	65.93	31.84	37.00
Bank of Rajasthan	472.67	502.86	126.42	177.01	291.63	313.02	158.68	181.55	80.16	116.26	68.42	69.04
Bharat Overseas Bank	175.97	198.29	35.86	31.63	115.43	113.16	47.09	60.12	20.79	21.75	28.52	35.68
Catholic Syrian Bank	347.01	357.15	125.18	118.83	257.58	234.94	102.84	117.78	66.62	65.77	45.16	56.50
Centurion Bank	371.34	333.79	78.23	62.98	269.30	203.82	158.58	180.82	47.05	117.27	-25.36	-105.14
City Union Bank	233.51	276.16	53.85	66.50	167.11	179.94	39.93	44.95	46.66	50.76	33.37	57.04
Devi Cement Credit Bank	359.27	352.48	86.59	88.36	287.62	256.86	98.33	130.01	25.17	36.60	34.53	17.36
Dhanabai Bank	169.22	191.07	70.16	58.17	135.96	121.62	59.90	60.61	48.50	49.47	15.02	17.48
Federal Bank	1,111.45	1,192.06	234.43	297.86	772.26	770.29	222.12	282.89	246.46	300.44	105.01	156.31
HDFC Bank	2,013.61	2,542.93	465.55	480.03	1,191.96	1,211.05	577.05	810.00	322.55	498.41	387.60	509.50
ICICI Bank	9,365.06	8,894.04	3,158.83	3,064.92	7,944.00	7,015.25	2,011.69	2,571.23	1,365.01	735.36	1,204.16	1,637.11
IOB Bank	596.68	736.78	165.06	210.25	396.45	405.72	206.57	258.59	89.01	152.26	71.10	132.45
Indusind Bank	742.95	926.15	257.75	344.93	558.46	669.25	117.92	217.14	234.13	182.62	90.17	262.06
ING Vysya Bank	294.50	924.15	358.32	363.26	687.57	660.66	333.39	345.55	155.51	202.60	86.55	59.00
J&K Bank	1,427.35	1,521.25	287.20	301.70	900.95	901.36	259.88	293.17	215.97	222.69	337.75	406.33
Karnataka Bank	511.47	838.45	239.23	270.29	656.61	654.77	140.72	154.18	143.25	195.62	110.12	133.17
Karur Vysya Bank	515.61	647.62	132.45	74.25	346.55	350.42	104.10	156.90	72.45	53.51	102.97	161.05
Kotak Mahindra Bank	161.18	288.42	72.14	95.49	86.63	117.83	76.91	139.56	44.62	47.79	42.96	78.73
Lakshmi Vilas Bank	270.93	285.95	84.23	86.86	202.76	202.51	72.40	79.30	45.69	49.55	34.16	41.05
Lord Krishna Bank	155.52	166.42	67.37	68.07	129.16	132.52	42.35	53.68	28.31	21.95	23.05	26.35
Sargol Bank	136.96	134.84	31.63	30.43	99.20	82.44	51.21	54.80	8.43	15.90	11.75	12.13
South Indian Bank	657.31	680.29	180.42	235.14	479.42	480.05	141.84	193.40	144.14	157.65	72.33	84.33
Tamilnad Mercantile Bank	471.58	537.65	59.37	67.91	302.42	321.95	92.81	113.71	71.96	89.21	63.76	80.68
United Western Bank	477.14	462.74	144.74	133.17	358.26	340.69	125.57	122.21	110.56	101.64	27.50	30.96
UTI Bank	1,464.81	1,536.71	410.47	540.15	1,142.41	1,021.45	322.85	419.21	217.64	407.69	192.18	278.31
Total	23612.97	24994.40	7060.33	7400.61	18034.96	16973.05	5689.70	7196.99	3928.17	3971.11	3220.47	4253.86

FOREIGN BANKS

ABN Amro	742.53	761.37	253.10	379.44	376.26	312.24	325.81	470.31	147.47	163.46	146.07	194.80
Abu Dhabi Commercial	164.13	163.36	11.65	8.38	167.57	147.07	15.03	10.98	10.01	4.06	3.17	9.64
American Express Bank	316.68	305.90	198.91	220.27	210.04	178.54	200.75	247.31	135.23	123.90	-28.43	-23.57
Antwerp Diamond Bank N.V.	11.42	20.38	0.61	3.43	3.08	5.35	6.44	8.96	1.81	5.59	0.69	5.91
Arab Bangladesh Bank	4.30	3.62	3.33	3.95	0.71	0.58	2.06	1.74	2.34	2.16	2.52	3.10
Bank Internasional Indonesia	3.83	3.74	0.79	0.13	0.92	0.75	6.21	3.08	-3.30	0.27	1.80	-0.23
Bank of America	342.12	280.14	79.33	81.38	218.95	162.71	69.65	79.24	47.67	55.40	85.19	62.17
Bank of Bahrain & Kuwait	56.10	39.63	15.33	14.39	44.20	32.36	11.81	13.19	8.10	7.65	7.32	0.83
Bank of Ceylon	12.27	10.52	1.90	5.01	6.79	6.24	2.77	3.10	4.12	5.27	0.49	0.72
Bank of Nova Scotia	225.61	120.94	39.76	49.03	159.36	96.95	31.62	32.17	56.25	42.93	18.13	17.92
Bank of Tokyo	105.68	77.70	28.73	79.38	48.50	20.55	51.17	41.02	-0.88	12.94	35.63	82.58
Barclays Bank	26.73	30.30	96.85	118.14	20.34	7.28	19.72	24.88	56.34	44.40	29.18	71.88
BNP Paribas	247.85	177.75	33.48	44.32	170.33	99.43	109.26	87.34	16.09	48.37	-14.55	-13.07
Calyon Bank	61.64	58.28	8.86	-6.55	58.96	38.40	19.36	15.22	8.62	-5.43	3.57	3.54
Cho Hang Bank	15.84	10.15	4.16	4.43	4.95	2.13	3.73	3.74	7.60	4.58	3.77	4.13
Citicbank	1,279.23	2,279.51	755.64	687.06	1,029.63	925.74	837.40	1,009.54	476.55	651.67	391.49	571.62
Credit Lyonnaise	121.45	107.04	38.76	31.00	103.02	84.39	36.68	31.97	11.95	11.96	8.56	9.69
DES	15.53	29.62	4.49	2.84	17.16	13.56	7.93	7.00	8.18	19.90	6.74	-8.00
Deutsche Bank	331.97	300.91	360.93	604.69	177.12	228.34	169.05	171.94	176.10	232.66	170.63	272.65
HSBC	1,460.08	1,413.97	481.95	705.37	678.00	722.82	614.34	624.24	319.35	378.46	150.33	393.80
ING Bank	22.51	1.81	8.42	3.16	17.91	1.34	24.18	2.94	18.46	0.74	-29.61	-0.05
JP Morgan Chase Bank	29.41	37.39	26.95	20.70	7.67	9.07	16.75	23.24	12.88	9.68	19.06	16.10
Krung Thai Bank Public Co	3.82	3.30	0.24	0.16	0.19	0.28	2.35	2.23	1.92	0.16	-0.40	0.78
Mashreq Bank	44.48	34.43	9.57	2.46	31.97	26.15	7.47	4.41	2.77	0.27	11.85	6.06
Mizuho Corporate Bank	26.24	20.06	3.78	3.07	17.93	6.80	8.26	7.65	2.87	1.61	0.95	7.07
Oman International	23.55	21.14	9.95	6.69	33.36	23.04	7.80	5.68	2.76	1.09	-10.46	-2.08
Societe Generale	31.39	29.60	8.98	20.13	20.44	15.61	16.70	14.75	12.08	4.17	-8.85	15.00
Standard Chartered Bank	2,266.96	2,523.19	560.53	699.37	1,153.37	1,070.64	579.01	774.94	260.31	780.51	854.60	596.46
Sumitomo Mitsui Banking Corpn	66.16	44.75	8.20	6.11	31.60	12.10	14.80	14.26	73.54	97.16	-43.57	-72.67
Wah Bank	21.96	16.53	2.87	3.79	9.63	2.23	5.98	5.93	7.92	6.25	1.10	5.90
Total	8865.70	8946.80	3058.25	4001.72	5020.20	4250.89	3224.08	3740.98	1684.11	2722.08	1815.55	2234.65

BIOGRAPHICS

Biography of the Candidate

Ms. Neeru Maheshwari is a Post-Graduate in Management from Lucknow University and M.E. (Internet Technology & e-Business) from Birla Institute of Technology & Science, Pilani. She is presently working as a Lecturer in the Management Studies Group, BITS, Pilani. She has presented some papers in National, International Conferences and Seminars. Her research area includes e-Business, Management Information Systems etc.

Articles/Research Publications

"In Search of the Frame Work for the Internet Marketing: The Internet Marketing Mix", **International Journal of Communication**, Vol.14, Jan-Jun2004 Issue *

"Marketing communication on Web: A conceptual framework":**International Marketing Review**. **

"e-learning: As a lens to future of Indian Education System": **HRM,ICFAI Journal**.*

"A Conceived Framework for Consumer Durable Goods Retailing through Internet", **The Asian Economic Review** **

"An Analytical framework for evaluating e-business models for selected trade sectors in India": **The Journal of Internet Banking and Commerce**, September 2005, Vol. 10, No. 2*

"A framework for evaluating e-Business models and Productivity Analysis for Banking Industry in India": **Paradigm**, January-June'2005 Volume IX, No.1 *

Neeru Maheshwari, NVM Rao *"The Adoption of Internet Banking in India: An Empirical Study"*, **Asian Economic Review** Journal of Indian Institute of Economics, Hyderabad, September, 2005***

"Understanding of Specific Quality Factors of Internet Banking Services in India" **Prajnan**, **Journal of National Institute of Bank Management*****

"Communication technologies and its implications for Business Process Reengineering: A Case for Indian Companies", **Pragyan**, **Journal of Management and IT, IMS, Dehradun** ***

*Published, ** Accepted, *** Communicated

Conference Presentations/ Participations

- Presented a paper titled “ Analysis of e-business models and productivity Analysis of Internet Banking in India” at the XIII All India Input-Output Research Association (IORA) Conference held at BITS, Pilani on April 22nd - 24th 2005.
- Presented a paper titled “ A framework for analyzing e-business models for Internet Banking” at a Business Information Management Conference organized by Institute of Management Technology, Ghaziabad on March 8th - 9th 2005.
- Paper titled “*Communication technologies and its implications for Business Process Reengineering*” accepted for presentation in “**National Seminar on Emerging Communication Issues**” being organized by Languages Group, BITS, Pilani from 9th to 10th Sep 2004.
- Paper titled “*An Analytical framework for evaluating e-business models for selected trade sectors*”, presented at “Global Business & Economics Review-Anthology2004 Conference” being organized by **Business & Economics Society International on 19th July-22nd July’2004 in Islands of Rhodes, Greece.**
- Paper titled “*Using Regional Language as a strategic advantage in e-business*”: accepted in **2nd International Conference on Quality, Reliability and Information technology** organized by Dept. of Science & Technology, GOI in October, 2003.

Biography of the Supervisor

Dr. N.V. Muralidhar Rao is currently Associate Professor of Economics and Finance Group of Birla Institute of Technology & Science, Pilani, Rajasthan. He did his Ph.D. in the Econometrics from S.V. University, Tirupati in 1995. He was Group leader of Economics and Finance group from 1997 to December 2004. At present he is also working as Chief of Community Welfare Unit and Chief Warden, Student Welfare Division, BITS, Pilani. He has broad fields of research interests with specific areas of involvement in Econometric Methods, Applied Econometrics, Financial Economics, e-buisness, Software Engineering Economics and Microeconomics. He has published more than 25 research papers in National and International Journals of repute. Currently three doctoral students are working with him at BITS, Pilani on e-business business models, Resource Mobilization etc.