



MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)

DISTANCE EDUCATION

M.B.A.

Second Year

IV - Semester

Elective VII - Banking



**SMART BANKING
TECHNOLOGY AND MANAGEMENT**

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**SMART BANKING TECHNOLOGY
AND MANAGEMENT**

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MADURAI - 625 021.

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SYLLABUS

Unit 1 Branch Operation and core banking –introduction and evolution of bank management-technological impact in banking operations – total branch computerization – concept of opportunities- centralized banking - concept, opportunities, challenges and implementation.

Unit 2 Delivery channels – Overview of delivery channels – Automated Teller Machine (ATM) – Phone Banking – Call centers – internet Banking – Mobile Banking – Payment Gateways – Card technologies – MICR electronic clearing

Unit 3 - Back office operations- Bank back office management – Inter branch reconciliation – Treasury Management – Forex Operations – Risk Management- Data centre Management – Net work Management - Knowledge Management (MIS/DSS/EIS) - Customer Relationships Management (CRM)

Unit 4 – Inter bank Payment System – Interface with Payment system Network – Structured Financial Messaging system – Electronic Fund transfer – RTGSS – Negotiated Dealing Systems & Securities Settlement Systems – Electronic Money – E Cheques

Unit 5 – Contemporary Issues in Banking Techniques – Analysis of Rangarajan Committee Reports – E Banking – Budgeting – Banking Softwares – Case study Analysis of Recent Core Banking Software

Unit 6 – Smart Banking – Introduction – Characteristics of smart banking environment – components and Technologies of Smart Banking environments –Issues in Smart Banking

Unit 7 – Software Agents – Introduction – Fundamentals – Agents as tools of the Information Society – Fundamental Concepts of Intelligent Software Agents – Base Modules of Agent Systems – Development Methods and Tools – Applications – Application Areas for Intelligent Software Agents

Unit 8 – RFID – Introduction – RFID system. components – Operating frequency – Close coupling smart cards –Proximity – coupling smart cards, Working of slotted Aloha – OSI layers and RFID, vicinity coupling smart cards. RFID security considerations – RFID Applications – Short range RFID applications. Long range RFID applications.

Unit 9 – Context Aware Computing – Introduction – Structure and Elements of Context Aware Pervasive Systems – Context Aware Mobile Services – Context – Aware Artifacts – Context Aware Mobile Software Agents for Interaction with Web Services in Mobile Environment – Context Aware Addressing and Communication for People, Things and Software Agents – Context – Aware Sensor Networks – Context Aware Security

Unit 10 – Case Studies in Software Agents, RFID, Context Aware Computing

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UNIT 1

*Branch Operation
and Core Banking*

BRANCH OPERATION AND CORE BANKING

NOTES

1.1 INTRODUCTION AND EVOLUTION OF BANK MANAGEMENT

1.2 TECHNOLOGICAL IMPACT IN BANKING OPERATIONS

1.3 TOTAL BRANCH COMPUTERIZATION

1.4 CENTRALIZED BANKING

1.5 ANSWERS TO CHECK YOUR PROGRESS

1.6 REVIEW QUESTIONS

1.1 INTRODUCTION AND EVOLUTION OF BANK MANAGEMENT

Banks were in existence from time immemorial ever since mankind has evolved money as a medium of exchange. Unlike barter system, money enjoys storage value. People want to save their income and surplus in a safer and meaningful manner. Banks have started coming into existence as they are need based and serve the contemporary purpose of channelizing savings into productive investments.

Bank management is concerned with the gamut of the all aspects relating to

- a) Planning the purpose of bank, the facilities that a bank has to create to its stakeholders, its vision, mission and goals ,
- b) Provisioning of financial , human, technical ,marketing and intellectual resources to the proper conduct of the banking institution ,
- c) Review, feed back and corrective mechanism to raise the bank as a contemporary service provider according to the emerging information technological developments.

NOTES

**CHECK YOUR
PROGRESS**

1. There are ____
Private Sector
Banks in India

IN INDIA , WE MAY CLASSIFY BANKS INTO THE FOLLOWING CATEGORIES...

NATIONALISED BANKS

These banks are the banks whose equity shares are fully owned by the Central Government. Canara Bank, Indian Bank, State bank of India are the examples of nationalized banks. These are also known as public sector banks.

In India, we have 27 public sector banks or nationalized banks which have a number of branches through out the lengths and breadths of our country. There are also branches functioning abroad.

PRIVATE SECTOR BANKS

These are the banks whose equity shares are held not by Government but by private individuals. Karur Vysya bank Limited, Lakshmi Vilas bank Limited, Tamilnadu Mercantile Bank Limited are the examples for private sector banks.

In India we have 31 private sector banks.

DEVELOPMENT BANKS

These banks are owned and run by Central or State Governments for the purpose of Industrial and agricultural development. These Banks are brought into existence by a separate Act passed either in the Parliament of India or the State Legislature of a State Government or Union Territory. Industrial Development Bank of India, Industrial Credit and Investment Corporation Of India, Industrial Finance Corporation Of India, National Bank for Agriculture and Rural Development, Industrial Finance Corporation of India,

Tamilnadu Industrial Investment Corporation, Small Industries Development bank of India are the examples for development banks. About 150 development banks exist in India. These banks provide long term loans for establishment, modernization and expansion of industries in India in the various states and Union territories of India.

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SCHEDULED COMMERCIAL BANKS

These banks are enlisted by the Reserve Bank of India and provide commercial banking in India. Pandiyan Grama bank Limited is an example of scheduled commercial bank. These banks normally have joint equity participation of nationalized banks and other private individuals.

NOTES

CO OPERATIVE BANKS

These banks are formed by a specialist group of members to cater to their needs and are governed by the Co-Operative Societies Act.

**CHECK YOUR
PROGRESS**

2. Co-Operative
Banks are
governed by ____
Act.

Dimensions of Bank management

Statutory Compliance

Banks have to conduct their affairs according to the norms of Reserve Bank of India. The banks have to abide by the legal provisions of the respective Governmental laws, rules and regulations. The notifications coming out in the Official Gazette of India has also to be complied with. A number of forms have to be filed by the banks at regular intervals to the Reserve Bank of India which is a tedious process but yet compulsory as it is envisaged by law. Banks have to spare their valuable resources in terms of time and manpower towards this end. Banks have to maintain statutory liquidity ratio (SLR) adhere to RBI norms for classification of advances and investments.

Customer focus

Banks have to understand the emerging and contemporary needs of depositors, lenders, money market players, capital market players, tax collecting Government

*Branch Operation
and Core Banking*

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agencies and other stakeholders for the purpose of addressing their needs in a shorter span of time with more quality content to stay competitive and be ahead of competition. Towards this end ATMs, Phone Banking, Internet banking, virtual banking and other aspects are being carefully considered. Banks of to day are investing heavily in hard ware, soft ware and human ware to remain as quick and effective banking services.

Managerial excellence

Banks have to evolve vision, mission, goals, targets, objectives, philosophies, policies, procedures, practices, customs, traditions and modes to earn goodwill by way of adhering to the fundamental principles of management as spelt out by Henry Foyal and other management experts and should believe in professionalization as a means to achieve excellence instead of resorting to tactics alone which can help only in the short run.

A bank may establish a number of branches across the lengths and breadths of a geographical area spanning over a nation or over the world depending upon the size of the bank and its business. To cater customers at their proxim a bank may follow forward integration and open up new branches to facilitate customers to avail the emerging banking services which increases the quality of life measured on monetary parameters.

**CHECK YOUR
PROGRESS**

3. With regard to classification of advances and investments, banks have to maintain ___ ratio mandated by RBI.

OPERATIONS OF A BANK'S BRANCH AT A GLANCE

*Branch Operatic
and Core Bankin.*

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1. Accepting deposits of money from the public in the forms of savings bank deposits, fixed deposits or term deposits,
2. opening current accounts to help businessmen to enjoy safe and speed modes for receipts and payments involved in business,
3. **Extending long term financing facilities to establish, modernize and expand business establishments.**
4. **Providing short term credit facilities like cash credits, overdrafts , bills discounting , factoring , facilitating money at call and short notice arrangements, other working capital related arrangements like Letters of credit etc,**
5. Providing agency and general utility services like card payments, issuing drafts , money transfer, etc
- 6 Few specialist branches offer facilities of micro finance, loan syndication, dealing in capital market operations of big corporates, evaluation of business proposals, tax consultant , investment consultancy and do personal banking.

TECHNOLOGICAL IMPACT IN BANKING OPERATIONS

- 1) Technology has opened up new markets, new products, new services and efficient delivery channels for the banking industry. Online electronics banking, mobile banking and internet banking are just a few examples.
- 2) Information Technology has also provided banking industry with the wherewithal to deal with the challenges the new economy poses. Information technology has been the cornerstone of recent financial sector reforms aimed at increasing the speed and reliability of financial operations and of initiatives to strengthen the banking sector.

NOTES

- 3) The IT revolution has set the stage for unprecedented increase in financial activity across the globe. The progress of technology and the development of world wide networks have significantly reduced the cost of global funds transfer.
- 4) It is information technology which enables banks in meeting such high expectations of the customers who are more demanding and are also more techno-savvy compared to their counterparts of the yester years. They demand instant, anytime and anywhere banking facilities.
- 5) IT has been providing solutions to banks to take care of their accounting and back office requirements. This has, however, now given way to large scale usage in services aimed at the customer of the banks. IT also facilitates the introduction of new delivery channels--in the form of Automated Teller Machines, Net Banking, Mobile Banking and the like. Further, IT deployment has assumed such high levels that it is no longer possible for banks to manage their IT implementations on a stand alone basis with IT revolution, banks are increasingly interconnecting their computer systems not only across branches in a city but also to other geographic locations with high-speed network infrastructure, and setting up local area and wide area networks and connecting them to the Internet. As a result, information systems and networks are now exposed to a growing number.

1.3 TOTAL BRANCH COMPUTERISATION

*Branch Operation
and Core Banking*

Gone are the days where the operations of a branch have been performed manually. Banks are investing heavily in the appropriate hardware and software to handle branch transactions at the speed and accuracy to make customers feel delighted and to enjoy the banking services at any time ,at any place and in a manner convenient for them.

NOTES

The record keeping function of a branch is done through computer data input. The transactions of a branch such as receipts of deposits, payment to customers on account of withdrawals, giving loans ,interest calculation , Report generation ,reminders regarding overdues etc are done in a structured manner so that the position in the account of a depositor or borrower is capable of being known at the touch of a button instead of referring to manually maintained registers and ledgers. The up dation of subsequent registers are automated to facilitate report generation to the head office and other controlling authorities of the branch. The head office can enjoy direct access over the daily transactions of the branch without any interference to the routine functions of the branch. The branches which fully computerize their operations for the first time have to do a lot of homework in such a transformation process and should also undergo an audit in this regard.

Factors to be considered before total branch computerization.

1. Choice of appropriate hardware with a future perspective

Hardware peripherals such as computer systems, printers,power backup equipments, network stations, WAN facilities, LAN facilities , work station facilities have to be installed by hardware engineers who have prior experience in the computerization of bank's branches.

NOTES

**CHECK YOUR
PROGRESS**

4. How do we
train manpower
for a fully
computerised
environment?

2. Choice of appropriate software in line with the need The software should serve the bank's expectations in an efficient manner.
The software may be tailor made or ready made after considering the factors such as software vendors or software developers and the availability of brainware within bank's access. Banks such as ICICI bank have heavily invested in crores of Rupees in its hardware and software needs and hence it boasts of customer service according to international standards.
3. Deciding the functions which are planned to be computerized
It is always advisable to study the functions of the bank before computerization. Customization of functions leads to uniformity of dealing among various branches of the bank and hence homogeneity among computerization leads to efficacy in transfer of branch staff.
4. Training the manpower to understand the changed mode of operating
People of the branch need special knowledge to work in the computerized environment . Training varying from regular coaching of months to short term coaching of weeks ranging from clerical grade upto GM level or more should be made mandatory to reap the real benefits of branch computerization.
5. Arranging for consumables and re-supplies to facilitate continuance of operations in the computerized setting.
Computerization of a bank's branch though a one time affair, seeing that its facilities remain in the active working condition is really challenging. We can see ATM,s out of order, printers gathering unwork dust if consumables and spares are not timely procured and replaced
6. To review the system to trouble shoot ,to modify and to reposition for better productivity.
Periodic review at regular intervals in the form of utilization audit will go a long way to keep computerization in its effective mode.
7. To consistently repair, maintain , update and follow the principles of preventive maintenance instead of break down maintenance.

The branch management in consultation with the Head office or its controlling authorities should arrange for annual maintenance contract with experts in regard to both hardware and software functioning.

The banking activities with automation has dramatically changed the mind of people to use banks across the world which brought greater opportunities to the banking sector. A bank may establish a number of branches across the lengths and breadths of a geographical area spanning over a nation or over the world depending upon the size of the bank and its business. To cater customers at their proximity a bank may follow forward integration and open up new branches to facilitate customers to avail the emerging banking services which increases the quality of life measured on monetary parameters.

1.4 CENTRALISED BANKING

MEANING

The term centralized banking is also known as "CORE BANKING SOLUTIONS"(CBS). Core means "Basic". Hence, the basic services provided by the internet worked branches of bank is called the "Core Banking". Core Banking is normally defined as the business conducted by a banking institution with its retail and small business customers. Many banks treat the retail customers as their core banking customers, and have a separate line of business to manage small businesses. Larger businesses are managed via the Corporate Banking division of the institution. Core banking basically is depositing and lending of money.

Now a days, most banks use core banking applications to support their operations where CORE stands for "*Centralized Online Real-time Exchange*". This basically means

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**CHECK YOUR
PROGRESS**

5. What is CORE?

that all the bank's branches access applications from centralized datacenters. This means that the deposits made are reflected immediately on the bank's servers and the customer can withdraw the deposited money from any of the bank's branches throughout the world. These applications now have capability to address need of corporate customers also , hence comprehensive solution for bank Few decades ago it used to take at least a day for the amount to reflect in the account because each branch had their local servers and the data from server in branch to server in the datacenter happened only at the end of the day.

Normal core banking functions will include deposit accounts, loans, mortgages and payments. Banks make these services available across multiple channels like ATMs, Internet banking, and branches.

Almost a decade ago, automation was introduced into the Indian Banks. During this time, personal computers and servers have been installed and are being continuously installed along with banking software packages at various branches. This has automatized many of the bank branches' activities. But this has still to be met as per the banks expectations and help deliver better customer service. We have to enter into new markets and introduce new products quickly to get the best out of this development. But the point to be seen is, whether all these products are friendly with the customers and profitable to the banks. Is this network enough to move both information and money efficiently. Is the top management of the banks getting the right information on time to enable them take better and faster decisions. Whether the technology which is used today is open enough to integrate with emerging technologies. Such type of questions are arising increasingly in the present liberalized and highly competitive environment. Many nationalized banks are not ready to accept the same. All the issues associated with the

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above automation stem from two main things. Firstly, the drawbacks of the existing branch banking software and secondly the lack of networking infrastructure are the main constraints. Both combine to create islands of information which do not help effective decision making.

Existing branch banking applications do not afford some very important facilities such as the bank cannot deploy new retail products and new delivery methods quickly and economically. And then the bank branch cannot have an enterprise – wide view of its assets, liabilities and profitability. Further the banks cannot integrate corporate and treasury operations to gain synergies. Only a centralized banking solution can enable the provision of facilities which are critical to the efficient and effective functioning of a bank. A centralized banking solution does not mean a main frame. In fact, the latest advanced solutions run on powerful saleable, secure and cost effective systems. With such centralized solutions, the bank can retain or simply upgrade its existing software and hardware. These solutions give the bank the flexibility to start computerization at a lower scale with few branches and scale upwards afterwards and connect hundreds of branches in a multi – tier manner.

In the present Indian scenario, there is a preponderance of brick and mortar branches and any solution which does not provide for a minimum data base at a branch for operations purposes will not work when the number of branches multiply to higher numbers. Actually, the banks buy only when they need to expand services or add new facilities. Contrary to this, solutions available on proprietary mainframe technology do not enable the banks to start small and also have very high incremental costs. These solutions were designed in an older era and are hence rigid when it comes to customizing

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especially for Indian conditions. The proprietary mainframe based solutions do not provide for a smaller backup database at the branch level. The risk of having all customer data residing only at the head – office is well known.

A more realistic approach is provided by the open UNIX and Windows NT based solutions. In addition to the central database the head office, there are lean branch databases which allow customers to avail of banking services even during communication link failures which is not at all an uncommon phenomenon in India. And because of the cost effectiveness of the open technology, this combination of the central server and small branch servers along with their databases is far more economical than the expensive proprietary mainframe and proprietary database and cost – effective to maintain and upgrade in the longer run.

MERITS OF CENTRALISED BANKING

The merits of centralized banking can be listed as follows:

1. Centralized banking reduces the cost of banking operations in a substantial manner.
2. Newer and more useful products can be introduced.
3. As this banking system is targeted towards customers, it gives very faster customer service and increased level of satisfaction and customer retention.
4. There is an improved risk management in centralized banking.
5. Operational risks are mitigated.
6. Real time transaction processing.
7. Operations can be scaled upwards.

8. Availability of e-trade options to bank customers.
9. Efficient and easy transactions round the clock.

SHORTCOMINGS OF CENTRALISED BANKING

Centralized banking has its own limitations which can be listed as follows:

1. Centralized banking is excessively relied on its technology , which reduces the credibility of the banking operations.
2. Owing to the interdependence of computer systems, failure of one will pull the whole network down.
3. If Data is not protected properly and if proper care is not taken , hackers can gain access to the sensitive data.
4. The bank has to update its softwares with technological growth, which if not properly done will affect the organization in large scale.

DEVELOPMENT OF CENTRALISED BANKING IN INDIA

It is imperative that Indian banks start to seriously consider migrating to a centralized banking approach which is flexible and based on open technology. It is the most cost – effective way to increase back office efficiency which would enhance front – office effectiveness. With this centralized banking customers get more varied and faster services. The customer will have access to “anywhere banking” wherein anybody can transact against his account from any of the bank’s designated retail outlets/branches. The customer can have banking as per his convenient timings. Customers will be able to have comprehensive account sweep and on-line funds transfer facility which will enable better funds management for large corporate customers. This will remove time consuming inter

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branch reconciliation and transactions between branches is sorted and stored at the head office system and resolved before being posted. A relationship banking practice is possible with centralized information of the customers. The customers are treated in a more holistic manner rather than as a set of accounts.

1.4 ANSWER TO CHECK YOUR PROGRESS

1. Thirty One
2. Co-Operative Societies Act
3. SLR
4. People of the branch need special knowledge to work in the computerized environment . Training varying from regular coaching of months to short term coaching of weeks ranging from clerical grade upto GM level or more should be made mandatory to reap the real benefits of branch computerization.
5. - Centralized Online Real-time Exchange

1.5 REVIEW QUESTIONS

1. Explain the concept of TOTAL BRANCH COMPUTERISATION .Also explain the factors governing computerization of banks.
2. Explain the concept of CORE BANKING SYSTEM. Bring out its features, merits and shortcomings.

UNIT 2

Delivery Channels

DELIVERY CHANNELS

- 2.1 OVERVIEW OF DELIVERY CHANNELS
- 2.2 AUTOMATED TELLER MACHINE (ATM)
- 2.3 PHONE BANKING
- 2.4 CALL CENTERS
- 2.5 INTERNET BANKING
- 2.6 MOBILE BANKING
- 2.7 PAYMENT GATEWAYS
- 2.8 CARD TECHNOLOGIES
- 2.9 MICR ELECTRONIC CLEARING
- 2.10 ANSWERS TO CHECK YOUR PROGRESS
- 2.11 REVIEW QUESTIONS

NOTES

2.1 OVERVIEW OF DELIVERY CHANNELS

A delivery channel may be defined as the method through which a bank's service products are enabled to reach the customer so that the customer can receive and utilize the ever-growing financial products emerging from the bank. A delivery channel decides the ability of a bank to reach its customers in a smarter way and eventually it is the design of its retail function.

Here the customer is able to recognize the banking product that he enjoys, the price that he pays for it and he knows as to how this product saves his time and energy from traditional and old methods of consuming a banking service. A delivery channel should also help a bank to seek a commercial gain apart from soothing a customer's banking experience.

The delivery channels commonly used in banking industry are ...

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**CHECK YOUR
PROGRESS**

1. First ATM was introduced in the year ____

1. BRANCHES
2. ATMS
3. PHONE BANKING
4. KIOSKS
5. PC BANKING THROUGH PERSONAL FINANCIAL SOFTWARE
6. PC BANKING THROUGH PROPRIETARY SOFTWARE
7. INTERNET BANKING
8. COMMERCIAL ONLINE SERVICE BANKING
9. INTERACTIVE TV
10. SMART CARDS / E-CASH

BRANCHES: A branch of a bank acts as a physical outlet for supplying the various financial products of a bank. Branches act as link between customer and bank. Customers approach A branch to satisfy their deposit and borrowing needs . Spealist branches offer unique services like investment consulting ,tax planning etc.

2.2 ATMS

ATMs have evolved as the primary delivery channel for cash withdrawals. They are continuously improving with foreign language, touch-screen, advanced transaction, video conferencing, and related capabilities. This channel is likely to continue to be an important one for most banks.

History

ATMs first came into use in December 1972 in the UK; the IBM 2984 was designed at the request of Lloyds Bank. The 2984 CIT (*Cash Issuing Terminal*) was the first true Cash point, similar in function to today's machines.

Location

ATMs are placed not only near or inside the premises of banks, but also in locations such as shopping centers/malls, airports, grocery stores, petrol/gas stations, restaurants, or any place large numbers of people may gather.

Two types of ATM installations:

On and off premise.

On premise ATMs are typically more advanced, multi-function machines that complement an actual bank branch's capabilities and thus more expensive. Off premise machines are deployed by financial institutions and also ISOs (or Independent Sales Organizations) where there is usually just a straight need for cash, so they typically are the cheaper mono-function devices.

Many ATMs have a sign above them indicating the name of the bank or organization owning the ATM, and possibly including the list of ATM networks to which that machine is connected. This type of sign is called a *topper*.

Financial networks

Most ATMs are connected to interbank networks, enabling people to withdraw and deposit money from machines not belonging to the bank where they have their account or in the country where their accounts are held (enabling cash withdrawals in local currency).

An ATM is typically made up of the following devices:

- CPU (to control the user interface and transaction devices)
- Magnetic and/or Chip card reader (to identify the customer)
- PIN Pad (similar in layout to a Touch tone or Calculator keypad), often manufactured as part of a secure enclosure.
- Secure cryptoprocessor, generally within a secure enclosure.
- Display (used by the customer for performing the transaction)
- Function key buttons (usually close to the display) or a Touchscreen (used to select the various aspects of the transaction)
- Record Printer (to provide the customer with a record of their transaction)
- Vault (to store the parts of the machinery requiring restricted access)

Delivery Channels

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- Housing (for aesthetics and to attach signage to)

Today the vast majority of ATMs worldwide use a Microsoft OS, primarily Windows XP Professional or Windows XP Embedded. A small number of deployments may still be running older versions such as Windows NT, Windows CE or Windows 2000. Notably, Vista was not widely adopted in ATMs.

Linux is also finding some reception in the ATM marketplace. An example of this is Banrisul, the largest bank in the south of Brazil, which has replaced the MS-DOS operating systems in its ATMs with Linux. Banco do Brasil is also migrating ATMs to Linux.

Security

Encryption of personal information, required by law in many jurisdictions, is used to prevent fraud. Sensitive data in ATM transactions are usually encrypted with DES, but transaction processors now usually require the use of Triple DES. Remote Key Loading techniques may be used to ensure the secrecy of the initialization of the encryption keys in the ATM. Message Authentication Code (MAC) or Partial MAC may also be used to ensure messages have not been tampered with while in transit between the ATM and the financial network.

Manufacturers have demonstrated and have deployed several different technologies on ATMs that have not yet reached worldwide acceptance, such as:

- Biometrics, where authorization of transactions is based on the scanning of a customer's fingerprint, iris, face, etc. Biometrics on ATMs can be found in Asia.

**CHECK YOUR
PROGRESS**

2. Contact centre
is a part of a
Bank's ____

- Cheque/Cash Acceptance, where the ATM accepts and recognise cheques and/or currency without using envelopes Expected to grow in importance in the US legislation.
- Bar code scanning
- On-demand printing of "items of value" (such as movie tickets, traveler's cheques, etc.)
- Dispensing additional media (such as phone cards)
- Co-ordination of ATMs with mobile phones
- Customer-specific advertising
- Integration with non-banking equipment

NOTES

**CHECK YOUR
PROGRESS**

5. What are phone banks?

Related devices

A Talking ATM is a type of ATM that provides audible instructions so that persons who cannot read an ATM screen can independently use the machine. All audible information is delivered privately through a standard headphone jack on the face of the machine. Alternatively, some banks such as the Nordea and Swedbank use a built-in external speaker which may be invoked by pressing the talk button on the keypad. Information is delivered to the customer either through pre-recorded sound files or via text-to-speech speech synthesis.

2.3 PHONE BANKING

With low set-up costs for banks, phone banking is another delivery channel that's taken hold recently. Telecommunication companies and call centers now offer

sophisticated voice response and video telephone services which increase functionality for bankers who prefer to contact their banks from home.

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Telephone banking is a service provided by a financial institution, which allows its customers to perform transactions over the telephone.

To guarantee security, the customer must first authenticate through a numeric or verbal password or through security questions asked by a live representative. With the obvious exception of cash withdrawals and deposits, it offers virtually all the features of an automated teller machine: account balance information and list of latest transactions, electronic bill payments, funds transfers between a customer's accounts, etc.

In addition to the self-service transactions, telephone banking representatives are usually trained to do what was traditionally available only at the branch: loan applications, investment purchases and redemptions, chequebook orders, debit card replacements, change of address, etc.

Banks which operate mostly or exclusively by telephone are known as phone banks.

2.4 CALL CENTRE

A call centre is a centralized office used for the purpose of receiving and transmitting a large volume of requests by telephone. A call centre is operated by a company to administer incoming product support or information inquiries from consumers. Outgoing calls for telemarketing, clientele, product services, and debt

collection are also made. In addition to a call centre, collective handling of letters, faxes, live chat, and e-mails at one location is known as a contact centre.

Contact centre

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A contact centre, also known as customer interaction center is a central point of any organization from which all customer contacts are managed. Through contact centers, valuable information about company are routed to appropriate people, contacts to be tracked and data to be gathered. It is generally a part of company's customer relationship management (CRM).

2.5 INTERNET BANKING

Today, talking about Internet banking seems to be the rage. Analysts predict it will grow by roughly 150% annually over the next four years. However, fewer than 75 banks currently offer true Internet banking. Most analysts agree that Internet banking will surpass PC banking within the next year or two—and that by 2000, there will be twice as many Internet bankers as people using dial-up programs.

2.6 MOBILE BANKING

Mobile banking (also known as M-Banking, mbanking, SMS Banking etc.) is a term used for performing balance checks, account transactions, payments etc. via a mobile device such as a mobile phone. Mobile banking today is most often performed via SMS or the Mobile Internet but can also use special prog

Trends in mobile banking

Over the last few years, the mobile and wireless market has been one of the fastest growing markets in the world and it is still growing at a rapid pace. According to the GSM Association and Ovum, the number of mobile subscribers exceeded 2 billion in September 2005, and now^[when?] exceeds 2.5 billion (of which more than 2 billion are GSM). With mobile technology, banks can offer services to their customers such as doing

funds transfer while travelling, receiving online updates of stock price or even performing stock trading while being stuck in traffic. Smartphones and 3G connectivity provide some capabilities that older

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Mobile Banking Services

Mobile banking can offer services such as the following:

Account Information

1. Mini-statements and checking of account history
2. Alerts on account activity or passing of set thresholds
3. Monitoring of term deposits
4. Access to loan statements
5. Access to card statements
6. Mutual funds / equity statements
7. Insurance policy management
8. Pension plan management
9. Status on cheque, stop payment on cheque
10. Ordering check books
11. Balance checking in the account
12. Recent transactions
13. Due date of payment (functionality for stop, change and deleting of payments)
14. PIN provision, Change of PIN and reminder over the Internet
15. Blocking of (lost, stolen) cards

Payments, Deposits, Withdrawals, and Transfers

Delivery Channels

1. Domestic and international fund transfers
2. Micro-payment handling
3. Mobile recharging
4. Commercial payment processing
5. Bill payment processing
6. Peer to Peer payments
7. Withdrawal at banking agent

NOTES

KIOSKS:

Video kiosks give customers a direct connection to the most appropriate service agents. Although currently most don't link directly to a customer's records, this functionality is expected in the near future. At that time, banking kiosks will become enhanced ATMs.

A postal interactive kiosk may also share many of the same components as an ATM (including a vault), but only dispenses items relating to postage.

A scrip cash dispenser may share many of the same components as an ATM, but lacks the ability to dispense physical cash and consequently requires no vault. Instead, the customer requests a withdrawal transaction from the machine, which prints a receipt. The customer then takes this receipt to a nearby sales clerk, who then exchanges it for cash from the till.

PC BANKING THROUGH PERSONAL FINANCIAL SOFTWARE

NOTES

Quicken, Microsoft Money, Managing Your Money, and related programs are a familiar delivery channel to many customers. These personal financial software companies offer direct links to many large banks. Some banks reject this delivery channel because they believe customers will transfer their loyalty to the software company, not the bank.

PC BANKING THROUGH PROPRIETARY SOFTWARE

PC, or dial-up banking, is sometimes offered through a bank's proprietary software system. Such systems are generally considered more secure than "open" systems. Their primary drawback is that they require the bank and/or its technology provider to issue and maintain the software program and its upgrades.

COMMERCIAL ONLINE SERVICE BANKING:

Online services such as America Online are becoming an increasingly important delivery channel for some banks. Some computer users prefer commercial online services because they find them easier to use and because they think they're more secure than direct Internet connections.

Online banking (or Internet banking) allows customers to conduct financial transactions on a secure website operated by their retail or virtual bank, credit union or building society

The common features fall broadly into several categories

- Transactional (e.g., performing a financial transaction such as an account to account transfer, paying a bill, wire transfer... and applications... apply for a loan, new account, etc.)

- Electronic bill presentment and payment - EBPP
- Funds transfer between a customer's own checking and savings accounts, or to another customer's account
- Investment purchase or sale
- Loan applications and transactions, such as repayments of enrollments
- Non-transactional (e.g., online statements, check links, cobrowsing, chat)
 - Bank statements
- Financial Institution Administration -
- Support of multiple users having varying levels of authority
- Transaction approval process
- Wire transfer

Features commonly unique to Internet banking include

- Personal financial management support, such as importing data into personal accounting software. Some online banking platforms support account aggregation to allow the customers to monitor all of their accounts in one place whether they are with their main bank or with other institutions.

2.7 PAYMENT GATEWAY

A payment gateway is an e-commerce application service provider service that authorizes payments for e-businesses, online retailers, bricks and clicks, or traditional brick and mortar. It is the equivalent of a physical point of sale terminal located in most retail outlets. Payment gateway protects credit cards details encrypting sensitive

NOTES

**CHECK YOUR
PROGRESS**

3. What are the three major Card Technologies?

information, such as credit card numbers, to ensure that information passes securely between the customer and the merchant and also between merchant and payment processor.

Many payment gateways also provide tools to automatically screen orders for fraud and calculate tax in real time prior to the authorization request being sent to the processor. Tools to detect fraud include geolocation, velocity pattern analysis, delivery address verification, computer finger printing technology, identity morphing detection, and basic AVS checks.

2.8 CARD TECHNOLOGIES

When we use the term "card technologies" or "smart cards," what do we mean? The easy answer is - any technology that can be placed on a card. Typically we think of our credit or bank card but there are other sizes and materials used for different applications. The card can be made of plastic (polyester, pvc, or some other material) or paper, or even some amalgamation of materials. The common point is that the card is used to provide "access" to something and it includes some form of automatic identification and data capture technology.

There are currently three main technologies we think of when we mention card technologies:

- Magnetic stripe,
- Smart cards, and
- Optical cards.

Smart card looks like a credit or debit card but with a difference - it contains a built-in integrated circuit chip used for identification and authentication purposes.

2.9 MICR

Magnetic Ink Character Recognition, or MICR, is a character recognition technology used primarily by the banking industry to facilitate the processing of cheques. The technology allows putters to read information (such as account numbers) off of printed documents. Unlike barcodes or similar technologies, however, MICR codes can be easily read by humans.

MICR characters are printed in special typefaces with a magnetic ink or toner, usually containing iron oxide. As a machine decodes the MICR text, it first magnetizes the characters in the plane of the paper. Then the characters are passed over a MICR read head, a device similar to the playback head of a tape recorder. As each character passes over the head it produces a unique waveform that can be easily identified by the system.

SMART CARDS / E-CASH

Although they won't offer all the functionality of the delivery channels outlined above, experts believe smart cards and e-cash will replace cash for certain purchases. Business Communications Co. predicts that the number of smart cards in use will grow from nearly 5 million today to more than 103 million in 2001. If this happens, banks will want to be positioned to deliver money through these innovative channels.

2.10 ANSWERS TO CHECK YOUR PROGRESS

1. 1972
2. CRM
3. MAGNETIC STRIPE, SMART CARDS, OPTICAL CARDS
4. INTERNET BANKING
5. BANKS WHICH OPERATE MOSTLY OR EXCLUSIVELY BY TELEPHONE ARE KNOWN AS PHONE BANKS.

2.11 REVIEW QUESTIONS

1. What is the meaning of delivery channel in banking? Explain its types.
2. What is ATM? Explain the uses of ATM.
3. Explain MICR code.
4. What is phone banking?
5. How payment gateways work?
6. What is Data center? Explain the uses of data centre.

NOTES

CHECK YOUR PROGRESS

4. Online banking is commonly known as _____

UNIT 3

BACK OFFICE OPERATIONS

NOTES

3.1 BANK BACK OFFICE MANAGEMENT

3.2 INTER BRANCH RECONCILIATION

3.3 TREASURY MANAGEMENT

3.4 FOREX OPERATIONS

3.5 RISK MANAGEMENT

3.6 DATA CENTER

3.7 NET WORK MANAGEMENT

3.8 KNOWLEDGE MANAGEMENT

3.9 CUSTOMER RELATIONSHIPS MANAGEMENT (CRM)

3.10 ANSWERS TO CHECK YOUR PROGRESS

3.11 REVIEW QUESTIONS

3.1 BACK OFFICE MANAGEMENT

A back office is a part of most corporations where tasks dedicated to running the company itself take place. The term comes from the building layout of early companies where the front office would contain the sales and other customer-facing staff and the back office would be those manufacturing or developing the products or involved in administration but without being seen by customers. Although the operations of a back office are usually not given a lot of consideration, they are a major contributor to a business.

Examples of back-office tasks include IT departments that keep the phones and computers running (operations architecture), accounting, and human resources. These tasks are often supported by back-office systems: secure e-commerce software that processes company information (e.g. a database). A back-office system will keep a record of the company's sales and purchase transactions, and update the inventory as needed. Invoices, receipts, and reports can also be produced by the back-office system.

In banking, the back office includes a heavyweight IT processing system that handles position keeping, clearance, and settlement. In investment firms, the back office includes the administrative functions that support the trading of securities, including record keeping, trade confirmation, trade settlement, and regulatory compliance. If used in sales, the back office would include functions that fulfill customers' orders and would usually include the duties involved in customer-support call centers.

Back offices may be somewhere other than the headquarters of a company. Much of the time they are in areas and countries with cheaper rent and lower labor costs. Back office functions can be outsourced to consultants and contractors in any country.

3.2 INTER-BRANCH RECONCILIATION

NOTES

Inter-Branch Reconciliation is an important back-office function for Banks and its significance cannot be more emphasized in today's expanding world of banking. As commercial activities and money involved grow in magnitude, co-ordination between activities of all branches becomes a daunting task. With this in perspective, it becomes important for banks to protect their assets. In case of frauds or errors in transactions due to negligence. A good Bank Reconciliation system helps detect them. Once identified, the errors can be rectified or at the very least, short-circuit the progression of losses. Therefore, it becomes imperative to have an efficient and robust IBR (Inter Bank Reconciliation), which can handle high volume of data with accuracy and also with an inbuilt flexibility to handle exceptions.

**CHECK YOUR
PROGRESS**

1. What is the purpose of IBR?

3.3 TREASURY MANAGEMENT

Treasury as "a place where stores of treasures are kept, the place of deposit, care, and disbursement of collected funds." Moreover, if you consider the treasury function in your own organization, this definition would most likely broadly describe it. This article will expand on this definition and describe the scope of responsibilities in a typical treasury function.

Treasury and its responsibilities fall under the scope of the Chief Financial Officer. In many organizations, the Treasurer will be responsible for the treasury function and also holds the position of Chief Financial Officer. The CFO's responsibilities usually

include capital management, risk management, strategic planning, investor relations and financial reporting. In larger organizations, these responsibilities are usually separated between accounting and treasury, with the controller and the treasurer each leading a functional area. Generally accepted accounting principles and generally accepted auditing standards recommend the division of responsibilities in areas of cash control and processing. Accounting will create the entries for treasury to process payments, treasury will advise accounting of receipts of cash, so accounting can make the proper entries, and reconciliation of bank accounts under the control of treasury will be completed by accounting. The working relationship between the managers of these two financial functions must be very close and ethical.

High-level treasury responsibilities will normally include capital management, risk management and relationship management. Treasury is a staff service function that supports many different areas of the organization. As an internal consultant to the teams in the different functional areas, treasury provides advice in the areas of cost of capital, risk analysis and mitigation, and the effects of the teams' actions on vendors, customers or investors.

The specific tasks of a typical treasury function include cash management, risk management, hedging and insurance management, accounts receivable management, accounts payable management, bank relations and investor relations. Following is a description of each of these tasks:

Cash Management includes the control and care of the cash assets and liabilities of the organization. This will include the selection of banks and bank accounts, investment

NOTES

vehicles, investment brokers, methods of borrowing, cash management information systems, and the development and compliance with cash and investment policy and processes. Bank selection can be based on geographical location, services provided (controlled disbursements, positive pay, lockbox processing, sweep account investing, trade finance, etc.), technology provided to customers, financial strength, covenants in the credit agreement and customer service provided by the bank. Investment vehicles can include commercial paper, bonds, mutual funds, certificates of deposit and savings accounts. Of course, investment broker selection will depend on the investment vehicles they can provide, their bonding, technology provided to their customers and their service abilities. Borrowing will include the selection of lenders and borrowing vehicles that best serve the business and the lenders. These vehicles can include prearranged revolving and term credit agreements, commercial paper, debentures and private loans. Just as credit agreements will control the methods of borrowing, treasury must also develop an investment policy that discusses the level of risk taken through investments of excess cash. Information systems provided by the banks, investment brokers and other cash management providers must be integrated. All of these pieces of the cash management puzzle need to be coordinated and documented in a procedural manual in order to control the risk associated with cash.

Risk Management includes customer credit management, vendor/contractor financial analysis, liability claims management, business disaster recovery, and employee benefits program risk. Customer credit management includes financial analysis, credit limit establishment and order control. Vendor/contractor financial analysis involves the

advising of purchasing management of the viability and risk associated with those contractors and vendors that supply our organizations.

*Back Office
Operations*

3.4 FOREX OPERATIONS (Foreign Exchange Operations)

NOTES

In today's expanding international trade, the importers, exporters, foreign traveler's etc need to receive, pay and deal not merely in a single country's currencies but in multiple currencies. Knowing this need of customers, branches of banks situated in places like Tirupur, Mumbai, Chennai, Kolkatta, Delhi and other pockets of our country where importers, exporters, foreign travelers etc live in large numbers, open FOREX division which is a specialist function in the era of banking. Be it opening a LETTER OF CREDIT for an importer or PURCHASING A BILL OF EXCHANGE drawn in foreign currency or simply issuing a FOREIGN DD, a branch should possess the requisite trained manpower, appropriate RBI sanction and much more.

Foreign exchange means the currencies of various countries. Foreign exchange is a sensitive commodity which is subjective to wide fluctuations in price. A bank will always prefer to keep the balance as low as possible. The bank would prefer to trade (buy and sell) in foreign exchange without attracting the problem of exchange risk fluctuations. A bank has to carefully plan, purchase and sale of foreign currencies.

Sources of acquisitions of foreign currencies by a bank may be one or more of the following:

1. Forward purchase contracts

2. Purchase of bills of exchange involving foreign currencies
3. making payments against demand drafts, travelers Cheque expressed in foreign currencies etc.

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Avenues for outflow of foreign currencies may be one or more of the following:

1. Issuing DD etc in foreign currencies
2. Forward sale contracts etc

Meaning of exchange position of a bank:

It means the net balance of the aggregate purchases and sales made by a bank in the currency of a particular country. A bank has to carefully plan its exchange position in each currency that it deals prominently.

Meaning of cash position of a bank with reference to forex:

It means the balance outstanding in the bank's Nostro account abroad

Nostro account:

Nostro account means an account maintained by a bank in India with another bank in a foreign country. A bank in India carries out its foreign exchange transactions through *nostro* accounts

Mirror account or Shadow account:

Mirror account or Shadow account means the account of foreign bank as is maintained in the books of accounts of a bank in India. Periodically *nostro* account and mirror account should be reconciled.

Reserve bank of India has provided guidelines for internal control over foreign exchange business of the banks.

**CHECK YOUR
PROGRESS**

2. What is
exchange position
of a Bank?

A bank should follow the following principles in its forex dealings:

- Well trained personnel should handle forex operations
- Dealing function, back office function, accounting function and reconciliation function with respect to forex should be separated from each other in a bank
- The dealer selection by a bank should be carefully done after studying the character, capacity and conduct of the dealer applicant. This is because a dealer plays a vital role in the supply chain management.
- The data processing system of forex dealings must be adequately protected against unauthorized access and should facilitate the generation of necessary reports to be submitted to RBI etc.
- The dealing procedure should be properly planned and executed.
- Voice recording should be done at the foreign exchange dealing rules
- At adequate intervals (five to seven years), the bank should rotate its foreign exchange dealers
- The dealer in foreign currency should be asked to comply with the code of conduct prescribed by FEDAI
- The foreign exchange dealing operations of a bank may be subjected to periodical internal auditing and systems auditing to ensure early detection of errors and frauds.
- The bank management should follow the principles of risk management when it deals in forex operations.
- Appropriate accounting system should be installed and maintained for the foreign exchange dealings

*Back Office
Operations*

NOTES

**CHECK YOUR
PROGRESS**

3. What is Nostro
Account?

3.5 RISK MANAGEMENT IN BANK

Risk management underscores the fact that the survival of an organization depends heavily on its capabilities to anticipate and prepare for the change rather than just waiting for the change and react to it. The objective of risk management is not to prohibit or prevent risk taking activity, but to ensure that the risks are consciously taken with full knowledge, clear purpose and understanding so that it can be measured and mitigated. It also prevents an institution from suffering unacceptable loss causing an institution to fail or materially damage its competitive position. Functions of risk management should actually be bank specific dictated by the size and quality of balance sheet, complexity of functions, technical/ professional manpower and the status of MIS in place in that bank. There may not be one-size-fits-all risk management module for all the banks to be made applicable uniformly. Balancing risk and return is not an easy task as risk is subjective and not quantifiable where as return is objective and measurable. If there exist a way of converting the subjectivity of the risk into a number then the balancing exercise would be meaningful and much easier.

Banking is nothing but financial inter-mediation between the financial savers on the one hand and the funds seeking business entrepreneurs on the other hand.

As such, in the process of providing financial services, commercial banks assume various kinds of risks both financial and non-financial. Therefore, banking practices, which continue to be deep rooted in the philosophy of securities based lending and investment policies, need to change the approach and mindset, rather radically, to manage and mitigate the perceived risks, so as to ultimately improve the quality of the asset portfolio. As in the international practice, a committee approach may be adopted to manage various risks. Risk Management Committee, Credit Policy Committee, Asset

Liability Committee, etc are such committees that handle the risk management aspects. While a centralized department may be made responsible for monitoring risk, risk control should actually take place at the functional departments as it is generally fragmented across Credit, Funds, Investment and Operational areas. Integration of systems that includes both transactions processing as well as risk systems is critical for implementation.

In a scenario where majority of profits are derived from trade in the market, one can no longer afford to avoid measuring risk and managing its implications thereof. Crossing the chasm will involve systematic changes coupled with the characteristic uncertainty and also the pain it brings and it may be worth the effort. The engine of the change is obviously the evolution of the market economy abetted by unimaginable advances in technology, communication, transmission of related uncontrollable flow of information, capital and commerce through out the world. Like a powerful river, the market economy is widening and breaking down barriers.

Government's role is not to block that flow, but to accommodate it and yet keep it sufficiently under control so that it does not overflow its banks and drown us with the associated risks and undesirable side effects. To the extent the bank can take risk more consciously, anticipates adverse changes and hedges accordingly, it becomes a source of competitive advantage, as it can offer its products at a better price than its competitors. What can be measured can mitigation is more important than capital allocation against inadequate risk management system. Basel proposal provides proper starting point for forward-looking banks to start building process and systems attuned to risk management practice. Given the data-intensive nature of risk management process, Indian Banks have

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CHECK YOUR PROGRESS

5. Give few examples of committees which manage risk in a Bank.

NOTES

a long way to go before they comprehend and implement Basel II norms, in to. The effectiveness of risk measurement in banks depends on efficient Management Information System, computerization and net working of the branch activities. The data warehousing solution should effectively interface with the transaction systems like core banking solution and risk systems to collate data. An objective and reliable data base has to be built up for which bank has to analyze its own past performance data relating to loan defaults, trading losses, operational losses etc., and come out with bench marks so as to prepare themselves for the future risk management activities. Any risk management model is as good as the data input. With the onslaught of globalization and liberalization from the last decade of the 20th Century in the Indian financial sectors in general and banking in particular, managing Transformation would be the biggest challenge, as transformation and change are the only certainties of the future.

3.6 DATA CENTER

A data center is a centralized repository for the storage, management and dissemination of data and information. Data centers can be defined as highly secure, fault-resistant facilities, hosting customer equipment that connects to telecommunications networks. A data center provides certain facilities, like housing websites, providing data serving and other services for companies. The primary 'goal' of a data center is to deploy the requisite state-of-the-art redundant infrastructure and systems so as to maximize availability and prevent or mitigate any potential downtime for customers.

A data center or datacenter (or data centre) is a facility used to house computer systems and associated components, such as telecommunications and storage systems. It generally includes redundant or backup power supplies, redundant data communications

connections, environmental controls (e.g., air conditioning, fire suppression) and security devices.

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Operations*

The boom of data centers came during the dot-com bubble. Companies needed fast Internet connectivity and nonstop operation to deploy systems and establish a presence on the Internet. Installing such equipment was not viable for many smaller companies. Many companies started building very large facilities, called Internet data centers (IDCs), which provide businesses with a range of solutions for systems deployment and operation. New technologies and practices were designed to handle the scale and the operational requirements of such large-scale operations. These practices eventually migrated toward the private data centers, and were adopted largely because of their practical results. The main purpose of a data center is running the applications that handle the core business and operational data of the organization. Such systems may be proprietary and developed internally by the organization, or bought from enterprise software vendors. Such common applications are ERP and CRM systems.

NOTES

**CHECK YOUR
PROGRESS**

4. What are the common applications used in Data Center?

A data center may be concerned with just operations architecture or it may provide other services as well.

Often these applications will be composed of multiple hosts, each running a single component. Common components of such applications are databases, file servers, application servers, middleware, and various others.

Data centers are also used for off site backups. Companies may subscribe to backup services provided by a data center. This is often used in conjunction with backup tapes.

Backups can be taken of servers locally on to tapes., however tapes stored on site pose a security threat and are also susceptible to fire and flooding. Larger companies may also send their backups off site for added security. This can be done by backing up to a data center. Encrypted backups can be sent over the Internet to another data center where they can be stored securely.

For disaster recovery, several large hardware vendors have developed mobile solutions that can be installed and made operational in very short time.

3.7 NETWORK MANAGEMENT

Network management of a bank means the way in which the whole bank through its branches, across its delivery channels and other back office operations is cross linked and integrated in a structured and a computerized manner. It involves installation of appropriate work stations, local area networking peripherals, wide area networking peripherals, satellite licenses and other communication devices for record, transmission, communication among the member branches and of course with other banks also to enable interactive transaction processing, data access etc.

Networking management in a large bank helps quicker decision making, maximum customer focus, automatic branch performance reporting and analysis. Branch networking creates the room for creating virtual banking. The choice of appropriate hardware and software technologies, reformatting the report structure are the critical areas of network management.

3.8 KNOWLEDGE MANAGEMENT

Knowledge management in a bank is a subject matter of human resources management. Imparting adequate knowledge, skills etc. into the minds of the man power of the bank, updating the knowledge and skills vastly determines the success or failure of a bank. It should be ensured continuously that a bank employs up-to-date technologies and modern methods of banking instead of resorting to old and obsolete modes of functioning. The hardware and software will be rendered useless if there is no appropriate brainware called humanware.

NOTES

3.9 CRM-CUSTOMER RELATIONSHIP MANAGEMENT

Nowadays, many businesses such as banks, insurance companies, and other service providers realize the importance of Customer Relationship Management (CRM) and its potential to help them acquire new customers retain existing ones and maximize their lifetime value. At this point, close relationship with customers will require a strong coordination between IT and marketing departments to provide a long-term retention of selected customers. Customer Relationship Management includes the methodologies, technology and capabilities that help an enterprise manage customer relationships. The general purpose of CRM is to enable organizations to manage their customers in a better way through the introduction of reliable systems, processes and procedures.

CRM is a corporate level strategy which focuses on creating and maintaining lasting relationships with its customers. Although there are several commercial CRM software packages on the market which support CRM strategy, it is not a technology itself. Rather, a holistic change in an organization's philosophy which places emphasis on the customer.

NOTES

A good CRM program needs to:

- * Identify customer success factors
- * Create a customer-based culture
- * Adopt customer-based measures
- * Develop an end-to-end process to serve customers
- * Recommend what questions to ask to help a customer solve a problem
- * Recommend what to tell a customer with a complaint about a purchase
- * Track all aspects of selling to customers and prospects as well as customer support

A company must consider keeping more extensive information on their primary customers and keeping less extensive details on the low-margin clients.

3.10 ANSWERS TO CHECK YOUR PROGRESS

1. IBR can handle high volume of data with accuracy and also with an inbuilt flexibility to handle exceptions.
2. It means the net balance of the aggregate purchases and sales made by a bank in the currency of a particular country.
3. Nostro account means an account maintained by a bank in India with another bank in a foreign country.
4. ERP and CRM
5. Risk Management Committee, Credit Policy Committee, Asset Liability Committee.

3.11 REVIEW QUESTIONS

1. What is the meaning of back office operations ?
2. What is Inter branch reconciliation ?
3. What is Treasury management ?
4. Explain Forex operations ?
5. What is Customer Relationships Management ?

INTER BANK PAYMENT SYSTEM

NOTES

4.1 INTERFACE WITH PAYMENT SYSTEM NETWORK

4.2 STRUCTURED FINANCIAL MESSAGING SYSTEM

4.3 ELECTRONIC FUND TRANSFER

4.4 RTGSS

4.5 NEGOTIATED DEALING SYSTEMS & SECURITIES SETTLEMENT SYSTEMS

4.6 ELECTRONIC MONEY

4.7 E CHEQUES

4.8 ANSWERS TO CHECK YOUR PROGRESS

4.9 REVIEW QUESTIONS

4.1 INTERFACE WITH PAYMENT SYSTEM NETWORK

Inter bank payment system means the way in which funds are transferred from one bank to another bank or from one branch to another branch of the same bank. Money is paid at a bank closer to customer by the customer. He may request the bank to transfer the money to another person who keeps his bank account with another bank or with another branch. The banks have developed sophisticated ways and means to transfer the funds instantly at the touch of a computer system well protected with passwords and other fire walls.

Inter bank dealings refer to acquisitions and disposal of both domestic and foreign currencies between the banks. In other words it refers to the currency dealings of a bank in the currency market. A bank should ensure that it possesses sufficient currency to honor the payment commitments of its customers. The bank will collect service charges from the customers on whose behalf the money was transferred.

NOTES

The banks will have mutual arrangements among their member banks with the aid of computer networking for the purpose of having a scientific interface to facilitate transfer of currencies among themselves periodically. Centralized clearing system and periodical reconciliation among the member banks with the aid of the appropriate hardware and software makes funds transfer an enjoyable banking experience for the customers. Instant credit from one country to another country is also possible. E-Payment of bills, income tax, customs duty, excise duty and other business payments are done by e-payment. Such payment facility avoids lot of paper work and it is safer also as physical handling of cash is dispensed with.

The smart banking technologies of today will help the economy to get rid off fake currency notes. Very soon physical cash handling will disappear barring petty payments. Electronic cash is going to rule the world tomorrow.

**CHECK YOUR
PROGRESS**

1. What is EFT?

4.2 STRUCTURED FINANCIAL MESSAGING SYSTEM:

It is a system developed by banks for the purpose of meaning full transmission of the balances standing in the accounts of the account holders, the transfers made from their account to the accounts of other persons, the transfers made into their account from other accounts and other deposits and with-drawls in the account of the customer to the related parties. Appropriate hardware and software enable knowing the account position instantly the periodical reports are also generated. This brings transparency in the accounts among customers and among dealing banks. Such system also dispenses the need for reconciliation.

4.3 ELECTRONIC FUNDS TRANSFER

Electronic funds transfer or EFT refers to the computer-based systems used to perform financial transactions electronically.

The term is used for a number of different concepts:

- Cardholder-initiated transactions, where a cardholder makes use of a payment card
- Direct deposit payroll payments for a business to its employees, possibly via a payroll services company

- Wire transfer via an international banking network (generally carries a higher fee)
- Electronic Benefit Transfer

Inter Bank Payment System

NOTES

In 1978 U.S. Congress passed the Electronic Funds Transfer Act to establish the rights and liabilities of consumers as well as the responsibilities of all participants in EFT activities in the United States.

OPERATION OF RBI EFT system

Step-1: The remitter fills in the EFT Application form giving the particulars of the beneficiary (city, bank, branch, beneficiary's name, account type and account number) and authorises the branch to remit a specified amount to the beneficiary by raising a debit to the remitter's account.

Step-2: The remitting branch prepares a schedule and sends the duplicate of the EFT application form to its Service branch for EFT data preparation. If the branch is equipped with a computer system, data preparation can be done at the branch level in the specified format.

Step-3: The Service branch prepares the EFT data file by using a software package supplied by RBI and transmits the same to the local RBI (National Clearing Cell) to be included for the settlement.

Step-4: The RBI at the remitting centre consolidates the files received from all banks, sorts the transactions city-wise and prepares vouchers for debiting the remitting banks on Day-1 itself. City-wise files are transmitted to the RBI offices at the respective destination centres.

Step-5: RBI at the destination centre receives the files from the originating centres, consolidates them and sorts them bank-wise. Thereafter, bank-wise remittance data files are transmitted to banks on Day 1 itself. Bank-wise vouchers are prepared for crediting the receiving banks' accounts the same day or next day.

Step-6: On Day 1/2 morning the receiving banks at the destination centres process the remittance files transmitted by RBI and forward credit reports to the destination branches for crediting the beneficiaries' accounts.

NOTES

Step-5: RBI at the destination centre receives the files from the originating centres, consolidates them and sorts them bank-wise. Thereafter, bank-wise remittance data files are transmitted to banks on Day 1 itself. Bank-wise vouchers are prepared for crediting the receiving banks' accounts the same day or next day.

Step-6: On Day 1/2 morning the receiving banks at the destination centres process the remittance files transmitted by RBI and forward credit reports to the destination branches for crediting the beneficiaries' accounts.

4.4 RTGS SYSTEM

The acronym "RTGS" stands for Real Time Gross Settlement. RTGS system is a funds transfer mechanism where transfer of money takes place from one bank to another on a "real time" and on "gross" basis. This is the fastest possible money transfer system through the banking channel.

Settlement in "real time" means payment transaction is not subjected to any waiting period. The transactions are settled as soon as they are processed. "Gross settlement" means the transaction is settled on one to one basis without bunching with any other transaction. Considering that money transfer takes place in the books of the Reserve Bank of India, the payment is taken as final and irrevocable.

EFT and NEFT are electronic fund transfer modes that operate on a deferred net settlement (DNS) basis which settles transactions in batches. In DNS, the settlement takes place at a particular point of time. All transactions are held up till that time. For example, NEFT settlement takes place 6 times a day during the week days (9.30 am,

10.30 am, 12.00 noon, 1.00 pm, 3.00 pm and 4.00 pm) and 3 times during Saturdays (9.30 am, 10.30 am and 12.00 noon). Any transaction initiated after a designated settlement time would have to wait till the next designated settlement time. Contrary to this, in RTGS, transactions are processed continuously throughout the RTGS business hours

The RTGS system is primarily for large value transactions. The minimum amount to be remitted through RTGS is Rs.1 lakh. There is no upper ceiling for RTGS

**CHECK YOUR
PROGRESS**

2. NEFT
settlement takes
place ___ times a
day.

transactions. No minimum or maximum stipulation has been fixed for EFT and NEFT transactions.

Under normal circumstances the beneficiary branches are expected to receive the funds in real time as soon as funds are transferred by the remitting bank. The beneficiary bank has to credit the beneficiary's account within two hours of receiving the funds transfer message.

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The remitting bank receives a message from the Reserve Bank that money has been credited to the receiving bank. Based on this the remitting bank can advise the remitting customer that money has been delivered to the receiving bank.

It is expected that the receiving bank will credit the account of the beneficiary instantly. If the money cannot be credited for any reason, the receiving bank would have to return the money to the remitting bank within 2 hours. Once the money is received back by the remitting bank, the original debit entry in the customer's account is reversed.

The remitting customer has to furnish the following information to a bank for effecting a RTGS remittance:

1. Amount to be remitted
2. His account number which is to be debited
3. Name of the beneficiary bank
4. Name of the beneficiary customer
5. Account number of the beneficiary customer
6. Sender to receiver information, if any
7. The IFSC code of the receiving branch

On a typical day, RTGS handles about 14000 transactions a day for an approximate value of Rs.1,50,000 crores.

NOTES

**CHECK YOUR
PROGRESS**

3. What are the
other names of
Electronic Money?

4.5 NEGOTIATED DEALING SYSTEM & SECURITIES SETTLEMENT SYSTEM:

A Security with reference to capital market may mean an equity share or preference share or debenture or bond issued by a corporate entity. The securities are bought and sold through the medium of stock exchange. Now a days the securities are held not in physical form but in de materialized form. Settlement may mean a sale or purchase in a security transaction. Sometimes there may be call options and put options. Banks have electronic funds transfer facility for the purpose of aiding the smooth conduct of the commercial dealings among stock brokers and other capital market intermediaries. The amounts earned by them in their operations are instantly credited to their account and banks have elaborate arrangements to facilitate transfer of funds among the buyers and sellers.

In respect of foreign currency payment obligations of the customers banks entertain forward contracts enabling the customer to free himself from the foreign exchange risk arising out of exchange rate fluctuations. Such a forward contract negotiations are also possible to enable a customer to realize his foreign currencies into Indian currency at a pre determined date. So that the customer can hedge himself against the risk of exchange rate fluctuations.

4.6 ELECTRONIC MONEY

Electronic money (also known as e-currency, e-money, electronic cash, electronic currency, digital money, digital cash or digital currency) refers to money or scrip which is exchanged only electronically. Typically, this involves the use of computer networks, the internet and digital stored value systems. Electronic Funds Transfer (EFT) and direct deposit are all examples of electronic money. Also, it is a collective term for financial cryptography and technologies enabling it.

Future progression in electronic money

The main focuses of digital cash development are

- 1) bein₃ able to use it through a wider range of hardware such as secured credit cards

- 2) linked bank accounts that would generally be used over an internet means, for exchange with a secure micro payment system such as in large corporations (Pay Pal).

4.7 E CHEQUES

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Electronic cheques are another form of Electronic tokens. They are designed to accommodate the many individuals and entities that might prefer to pay on credit or through some mechanism other than cash. Once registered, a buyer can then contact sellers of goods and services. To complete a transaction, the buyer sends a check to the seller for a certain amount of money. These checks may be sent using Email or other Transport methods. When deposited, the cheque authorises the transfer of account balances from the account against which the cheque was drawn to the account to which the cheque was deposited.

The electronic cheques are modeled on paper checks, except that they are initiated electronically. They use digital signatures for signing and endorsing and require the use of digital certificates to authenticate the payer, the payer's bank and bank account. They are delivered either by direct transmission using telephone lines or by public networks such as the Internet.

With amendments in the Sections 6 and 1(4), coupled with the introduction of 81 A to the Negotiable Instruments Act, 1881, ECT is now legalized. An electronic Cheque is a Cheque that never expires and never bounces whether because of insufficient balance in the account or a faulty signature. The creditor doesn't have to present physically at his bank. It enables outstanding payments to be credited to the payee's account within 2-3 days flat. It transfers money at half the cost of a demand draft can.

Banking sector is considered the heart of an economy; integration of the banking and the information technology industry has benefited the consumers in many aspects with respect to time, cost and operational efficiency. Cheque is the most widely accepted Negotiable Instrument to settle transactions in the world. Paper cheques provide consumers and businesses critical alternative payments mechanism. Today billions of cheques are written and processed each year, and consumers and businesses remain confident and satisfied with writing cheques. However, cheque processing is

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experiencing a radical change as financial institutions and their customers now have new, more efficient ways to process and clear cheques. Financial institutions need to develop and implement a cheque image clearing strategy to remain competitive in the future.

Negotiable Instruments consist of three types of instruments namely, the Promissory Note, The Bill of Exchange and the Cheques. RBI's jurisdiction is mainly limited to the "Cheques" since it is an instrument drawn payable on a Bank by a Customer.

According to Sec 6 of NI (AMENDMENT ACT) 1881 defines, "Cheque" as a "cheque" is a bill of exchange drawn on a specified banker and not expressed to be payable otherwise than on demand and it includes the electronic image of a truncated cheque and a cheque in the electronic form.

The other aspects of the above definition are that the drawee should be a Banker and the sum payable and the person to whom it is payable should be Certain and the Order to pay should be unconditional.

Important features of the Cheque are:

1. Transferability
2. System of Crossing and its implications
3. Creation of a Holder in Due Course

1. Transferability:

A Cheque as any other Negotiable Instrument is transferable by Delivery in case it is drawn payable to a Bearer and by Endorsement and Delivery when made payable to order. The word Bearer has been used in the NI Act as a person who is in the physical possession of the written instrument. This aspect of Delivery cannot be constructive or implied in case of Negotiable instruments. Hence it can be fulfilled only in respect of Written Negotiable Instruments. If the Virtual instruments are to be acceptable, perhaps these concepts of Delivery and Bearer as applicable to them have to be redefined.

2. System of crossing:

The idea of crossing of cheques has always been recognized through the method of physically writing on the paper cheques. But after the introduction of electronic cheques, the method of physically crossing the cheques has not been suitable amended so that if a particular cheque has to be crossed or is required to be sent to a particular account, there are no complications. Nowhere has it been mentioned after the amendment that the system of crossing shall also be electronically completed. Crossing by definition is an act of Writing. Unless this is redefined, it cannot be applied by extension.

3. Holder in Due Course:

This aspect of negotiable instruments actually rests totally upon the fact that there has to be a physical existence of the cheque. Unless and until such existence is not there, it shall not be possible to have a Holder in Due Course for a cheque or any other negotiable instrument. There has not been an amendment which could give a full proof recognition to a holder in due course of an electronic cheque. The very essence of a Negotiable Instrument is its ability to create a Holder in Due Course. Whatever attempt has been made to redefine the law and introduce Virtual Negotiable Instruments it will have to accommodate this feature. Without this, the Virtual Cheques can only be another type of a Quasi Negotiable Instrument

4: Rights and Liabilities of Bankers:

The extent of liability of the Collecting and the Paying Banker has been very clearly laid down under the Banking law. It cannot be extended to the electronic cheques, simply by introducing the concept of e-cheques without providing for a suitable amendment, which would clarify as to rights and liabilities of the banks. It should be made clear as to when will the liability of the paying banker arise in case of a fraud with respect to electronic cheques, and what remedy does it have against the customer. It should also be mentioned regarding the Collecting Banker

Advantages of Electronic cheques:

1. Similar to traditional cheques. This eliminates the need for customer education

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**CHECK YOUR
PROGRESS**

4. What are the drawbacks of traditional payment system?

2. Since Electronic cheques use conventional encryption than Public and private keys as in e-Cash, Electronic cheques are much faster.

The risk is taken care of by the accounting server, which will guarantee that the cheque would be honoured.

Disadvantages and Legal Issues of E-Cash

1. E-Cash cannot be broken into smaller denominations.
2. The concept of maintaining a database of spent notes is very expensive.
3. Accessing Database of spent notes is also very time consuming.
4. Transaction based taxes account for a significant portion of state and local government revenue. If e-Cash becomes successful, then people will use it to buy things like cars and houses, which would not have been possible with actual cash. (One can't physically carry so much of real cash)
5. Currency fluctuation is another issue related to e-Cash.

Problems with the traditional payment systems:

1. **Lack of Convenience:** Traditional payment systems require the consumer to either send paper cheques by snail-mail or require him/her to physically come over and sign papers before performing a transaction. This may lead to annoying circumstances sometimes.
2. **Lack of Security:** This is because the consumer has to send all confidential data on a paper, which is not encrypted, that too by post where it may be read by anyone.
3. **Lack of Coverage:** When we talk in terms of current businesses, they span many countries or states. These business houses need faster transactions everywhere. This is not possible without the bank having branch near all of the companies' offices. This statement is self-explanatory.
4. **Lack of Eligibility:** Not all potential buyers may have a bank account.

Indian Scenario:

In the five decades since independence, banking in India has evolved through four distinct phases. The Indian banking industry is in the midst of an IT revolution. Combinations of regulatory and competitive reasons have led to the automation of the Banking Industry. The Reserve Bank of India has made several reforms for a safe and efficient electronic mode of payment, along with improved efficiency in the paper based mode of payments. In order to foster faster cheque processing the Central bank has implemented Cheque Truncation system in India on a test basis in the National Capital Region, in February 2008. Amendments to the Negotiable Instruments Act and the Informational Technology Act have been made to facilitate the smooth functioning of the new technology. The introduction of the new technology does not change the method of writing the cheques. Government Departments may have to re-engineer their Codes and Manuals governing settlement of their cheques through legally valid electronic images instead of physical cheques. India is doing something very unique because it has a very large cheque volume. It processes about 1.2 billion instruments annually. The National Capital Region alone processes 6, 00,000 cheques in a day.

Conclusion:

Thus the domain of Negotiable Instruments is too vast to be easily covered by the Bridging provisions of the ITA-2000. If any attempt is made in a halfhearted manner to bring virtual instruments under the ambit of RBI, we may end up with more confusion. The amendment of 2002, which provides due recognition to recognition to the concept of e-cheque, has not appealed to the characteristics, which are inherent to a cheque. The aspects of transferability, endorsements, holder-in-due-course of a cheque have totally been overlooked by the legislature. Therefore, there is a need of another amendment which gives due recognition to these.

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**CHECK YOUR
PROGRESS**

5. What is the legal issue relating to E-cash?

The Indian law also appears to be strong on the other legal aspects of defining the presentation of truncated cheques and the protection for the collecting and paying bankers. It may one day be possible for payees to accept cheques just as credit cards and debit cards are accepted today. Even point-of-sale terminals – now being used for other applications - may possibly be image-enabled, so that truncated cheques may be viewed.

Another drawback of this concept is that due regard has not been given to those customers who are not conversant with the online transactions of the cheques. The provision has been introduced to bring convenience to the customers and faster working of the banking system. But, what about these customers, don't they need this convenience and speed in their transactions? It is therefore suggested that, some kind of training program should also be conducted so that every kind of customer is able to take maximum advantage of any such development so that it appeals to the masses as a whole.

4.8 ANSWERS TO CHECK YOUR PROGRESS

1. Electronic Funds Transfer
2. Six
3. E-currency, E-money, electronic cash, electronic currency, digital money, digital cash or digital currency.
4. Lack of Convenience, Lack of Security, Lack of Coverage, Lack of Eligibility
5. Transaction based taxes account for a significant portion of state and local government revenue. If e-Cash becomes successful, then people will use it to buy things like cars and houses, which would not have been possible with actual cash. (One can't physically carry so much of real cash)

4.9 REVIEW QUESTIONS

1. Explain the concept of Electronic Funds Transfer?.
2. Explain RTGS
3. Explain Electronic money
4. Explain E-Cheques

UNIT 5

CONTEMPORARY ISSUES IN BANKING TECHNIQUES

*Contemporary
issues in banking
Technologies*

5.1 CONTEMPORARY ISSUES IN BANKING TECHNIQUES

NOTES

5.2 ANALYSIS OF RANGARAJAN COMMITTEE REPORTS

5.3 E BANKING

5.4 BUDGETING

5.5 BANKING SOFTWARES

5.6 ANSWERS TO CHECK YOUR PROGRESS

5.7 REVIEW QUESTIONS

5.1 CONTEMPORARY ISSUES IN BANKING TECHNOLOGIES

Banking scenario has changed rapidly since 1990s. The decade of 90s has witnessed a sea change in the way banking is done in India. Technology has made tremendous impact in banking. 'Anywhere banking' and 'Anytime banking' have become a reality.

The financial sector now operates in a more competitive environment than before and intermediates relatively large volume of international financial flows. In the wake of greater financial deregulation and global financial integration, the biggest challenge before the regulators is of avoiding instability in the financial system.

Economic outlook and banking sector's performance

Keeping in mind the impact of real sector shocks on financial stability, any assessment of the banking sector needs to be done in the backdrop of national as well as international economic outlook. During the last couple of years, global growth has been above the forecast in almost every region stimulated by strong monetary and fiscal measures. The domestic economic outlook is also bright with the real GDP growth rate surpassing 8% last year and estimated to be around 7% in the current year. Industrial performance also improved considerably with a strong manufacturing growth for the

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trading component of profits is no longer going to shore up banks' profitability. On the contrary, most banks have been required to provide for the decline in the market value of their investments portfolio. Thankfully, one offsetting factor has been the strong pick up in the credit off-take due to buoyant demand in the economy and revival of industrial activity, which have resulted in substantial increase in banks' core interest income.

High capital inflows: an opportunity as well as a challenge As you all know, liquidity position in the financial sector has been quite comfortable in the recent times. The buoyant capital market coupled with an appreciating rupee vis- \diamond -vis US dollar has been attracting large foreign institutional inflows during the last two years.

While we have an all time high foreign exchange reserves of more than \$130 billion, high capital inflows pose a big challenge to monetary and exchange rate management. In this context, operationalisation of Market Stabilisation Scheme (MSS) has given an additional instrument for liquidity and monetary management.

To sum up the challenge, I would like to quote a statement of Dr. Y.V. Reddy, Governor, Reserve Bank of India, which he made at the annual meeting of Bank for International Settlement (BIS) on June 28, 2004. And I quote, "...Special defences need to be put in place for ensuring financial stability in the case of countries like India that are faced with the prospect of volatile capital flows. The issues relating to cross-border supervision of financial intermediaries in the context of greater capital flows are just emerging and need to be addressed."

Technology is the key

As I mentioned in the beginning of my speech, technology has thrown new challenges in the banking sector and new issues have started cropping up which is going to pose certain problems in the near future. The new entrants in the banking are with computer background. However, over a period of time they would acquire banking experience. Whereas the middle and senior level people have rich banking experience but their computer literacy is at a low level.

Therefore, they feel the handicap in this regard since technology has become an indispensable tool in banking. Foreign banks and the new private sector banks have

to pose certain problems in the near future. The new entrants in the banking are with computer background. However, over a period of time they would acquire banking experience. Whereas the middle and senior level people have rich banking experience but their computer literacy is at a low level.

Therefore, they feel the handicap in this regard since technology has become an indispensable tool in banking. Foreign banks and the new private sector banks have embraced technology right from the inception of their operations and therefore, they have adapted themselves to the changes in the technology easily. Whereas the Public Sector Banks (PSBs) and the old private sector banks (barring a very few of them) have not been able to keep pace with these developments.

In this regard, one can cite historical, political and other factors like work culture and working relations (which are mainly governed by bipartite settlements between the managements and the staff members) as the main constraints. Added to these woes, the PSBs were also saddled with some non-viable and loss-making branches, thanks to the social banking concept thrust upon them by the regulatory authorities in 1960s.

Globalization of financial services

Growing integration of economies and the markets around the world is making global banking a reality. The surge in globalization of finance has also gained momentum with the technological advancements, which have effectively overcome the national borders in the financial services business. Widespread use of Internet banking has widened frontiers of global banking, and it is now possible to market financial products and services on a global basis. In the coming years globalization would spread further on account of the likely opening up of financial services under WTO. India, as you know, is one of the 104 signatories of Financial Services Agreement (FSA) of 1997. This gives India's financial sector including banks an opportunity to expand their business on a quid pro quo basis.

Indian Banks at the global stage:

A Reality check As per Indian Banks' Association report 'Banking Industry Vision 2010', there would be greater presence of international players in Indian financial system and some of the Indian banks would become global players in the coming years.

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CHECK YOUR PROGRESS

1. Is India signatory of FSA of 1997?

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**CHECK YOUR
PROGRESS**

2. How many countries have signed the FSA of 1997?

So, the new mantra for Indian banks is to go global in search of new markets, customers and profits. Let us not forget that the competition is not only on foreign turf but also in the domestic field as well from foreign banks operating in India.

The scope of disclosure and transparency has also been raised in accordance with international practices. India has complied with almost all the Core Principles of Effective Banking Supervision of the Basel Committee. Some of the Indian banks are also presenting their accounts as per the U.S. GAAP.

The roadmap for adoption of Basel II is also under formulation. The VRS scheme in the recent past in some of the banks was aimed not only at downsizing the manpower but also at cutting down the staff costs and increasing the performance levels of the staff in the long run. Some of these banks are able to run the show to certain extent by low cost funds that are available thanks to the branch network spread over the length and breadth of the country.

Consolidated accounting and supervisory techniques would have to evolve and appropriate firewalls built to address the risks underlying such large organizations and banking conglomerates.

Will the stable conditions continue for the banks?

The big question we have to ponder is whether these stable conditions marked by all round improvement in banks' performance can continue into 2005 onward in the light of potentially dramatic changes that include, among others, a sliding dollar, rising interest rates, introduction of Basel II accord and international accounting standards, and the possible flattening of consumer lending boom.

Hopefully, the banking industry in tandem with the regulatory authorities will rise to the occasion, and collectively face the challenges and opportunities that lie ahead.

Formation of Rangarajan Committee

The high-level committee on estimation of savings and investment, headed by Dr C Rangarajan, the then chairman of the Economic Advisory Council to the Prime Minister was set up on 12 December 2007 to critically review the existing methodologies used to

estimate saving and investment aggregates for the Indian economy and suggest measures for improvement.

The committee had the following members: Dr. C. Rangarajan, Member of Parliament and former chairman of the Economic Advisory Council to the Prime Minister (Chairman); Dr Kirit Parikh, member-in-charge of perspective planning division, Planning Commission, Prof Ravindra Dholakia, Indian Institute of Management, Ahmedabad, Dr S L Shetty, EPW Research Foundation, Dr Saumitra Chaudhuri, member of the Economic Advisory Council to the Prime Minister, Ramesh Kolli, additional director general, National Accounts Division, Central Statistical Organisation, Government of India and Dr RB Barman, former executive director, Reserve Bank of India.

KUB Rao, adviser, department of economic analysis and policy, Reserve Bank of India (RBI) was the member-secretary to the committee, located in the RBI offices.

The terms of reference of the committee were as follows:

Undertake a critical review of the available estimates of domestic and national saving and investment in the economy, both in the aggregate and its components with respect to data base, methods of estimation, reliability and interpretational significance;

To examine if rapid financial deepening in the economy is getting duly reflected in the estimates of financial saving and suggest improvements, if needed;

To examine the feasibility of directly estimating household saving through integrated income and expenditure surveys;

To examine the feasibility of arriving at separate estimates for pure households, household enterprises and unincorporated bodies through a suitable method;

To examine saving in the farm sector in relation to investments;

To examine if corporate saving estimation should be done on marked-to-market basis or the present book value method;

To suggest improvements in the methods and procedures used in the estimation of corporate investment and saving;

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**CHECK YOUR
PROGRESS**

3. On what date was the Rangarajan Committee formed?

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To recommend methods of strengthening public sector saving and investment estimates by taking account of municipalities, city corporations, gram panchayats and other local Governments on the one hand and increased private participation in public investments on the other;

To examine the empirical methods and procedures used in the estimates based on commodity-flow-method and flow-of-funds method and suggest improvements therein;

To suggest new data bases, if any, to be devised/built-up for improving the reliability or checking validity of the estimates; and

To review the existing methodology and suggest improvements in the estimation of capital formation at the regional level.

**CHECK YOUR
PROGRESS**

4. What are the two funds constituted with NABARD?

5.2 OVERVIEW OF RECOMMENDATIONS OF RANGARAJAN COMMITTEE

- The Committee feels that the task of financial inclusion must be taken up in a mission mode at the national level. The mission should be responsible for suggesting the overall policy changes required for achieving financial inclusion and for supporting a wide range of stakeholders.
- Launching of a National Rural Financial Inclusion Plan (NRFIP) in mission mode with a clear target to provide access to comprehensive financial services, including credit, to at least 50 per cent (say 55.77 million) of the financially excluded rural households by 2012 through rural/semi-urban branches of commercial banks and RRBs. The remaining households have to be covered by 2015. For the purpose, a National Mission on Financial Inclusion (NaMFI) is proposed to be constituted comprising representatives from all stakeholders to aim at achieving universal financial inclusion within a specific time frame.
- Constitution of two funds with NABARD –
 - the Financial Inclusion Promotion & Development Fund (FIPF)and
 - the Financial Inclusion Technology Fund(FITF)

with an initial corpus of Rs 50 billion each to be contributed by the Government / RBI/ NABARD. The FIPF will focus on interventions like Farmers' Service Centers, Promoting Rural Entrepreneurship, Self-Help Groups and their Federations, Developing Human Resources of Banks, Promotion of Resource Centers and Capacity Building of Business Facilitators and Correspondents. Similarly, the FITF will focus on funding of low-cost technology solutions.

- Deepening outreach of microfinance programme through financing of Self-help Groups (SHGs) and Joint Liability Groups (JLGs) and setting up of a risk mitigation mechanism for lending to small marginal farmers /share croppers /tenant farmers through JLGs
- Use of PACSs as Business Facilitators and Correspondents
- Micro finance—Non-Banking Finance Companies (MF-NBFCs) could be permitted to provide thrift, credit, micro-insurance, remittances and other services up to a specified amount to the poor in rural, semi-urban and urban areas. Such MF-NBFCs may be recognized as Business Correspondents for providing savings and remittance services and also acting as micro-insurance agents.

5.3 E-BANKING

E-banking is a generic term for delivery of banking services and products through electronic channels, such as the telephone, the internet, the cell phone, etc. The concept and scope of E-banking is still evolving. It facilitates an effective payment and accounting system thereby enhancing the speed of delivery of banking services considerably. While E-banking has improved efficiency and convenience, it has also posed several challenges to the regulators and supervisors. Several initiatives taken by the government of India, as well as the Reserve Bank of India (RBI), have facilitated the development of E-banking in India. The government of India enacted the IT Act, 2000, which provides legal recognition to electronic transactions and other means of electronic commerce. The RBI has been preparing to upgrade itself as a regulator and supervisor of the technologically dominated financial system. It issued guidelines on risks and control in computer and telecommunication system to all banks, advising them to evaluate the

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risks inherent in the systems and put in place adequate control mechanisms to address these risks. The existing regulatory framework over banks has also been extended to E-banking. It covers various issues that fall within the framework of technology, security standards, and legal and regulatory issues.

E banking is changing the banking industry and is having the major effects on banking relationships. Banking is now no longer confined to the branches where one has to approach the branch in person, to withdraw cash or deposit a cheque or request a statement of accounts. In true Internet banking, any inquiry or transaction is processed online without any reference to the branch (anywhere banking) at any time. Providing Internet banking is increasingly becoming a "need to have" than a "nice to have" service. The E-banking, thus, now is more of a norm rather than an exception in many developed countries due to the fact that it is the cheapest way of providing banking services.

Traditional banks offer many services to their customers, including accepting customer money deposits, providing various banking services to customers, and making loans to individuals and companies. Compared with traditional channels of offering banking services through physical branches, e-banking uses the Internet to deliver traditional banking services to their customers, such as opening accounts, transferring funds, and electronic bill payment.

E-banking can be offered in two main ways. First, an existing bank with physical offices can also establish an online site and offer e-banking services to its customers in addition to the regular channel. For example, Citibank is a leader in e-banking, offering walk-in, face-to-face banking at its branches throughout many parts of the world as well as e-banking services through the World Wide Web. Citibank customers can access their bank accounts through the Internet, and in addition to the core e-banking services such as account balance inquiry, funds transfer, and electronic bill payment, Citibank also provides premium services including financial calculators, online stock quotes, brokerage services, and insurance.

E-banking from banks like Citibank complements those banks' physical presence. Generally, e-banking is provided without extra cost to customers. Customers are attracted by the convenience of e-banking through the Internet, and in turn, banks can operate

more efficiently when customers perform transactions by themselves rather than going to a branch and dealing with a branch representative.

In addition to traditional banks that have both a physical and online presence, there are several e-banks that exist only on the Internet, allowing users to work with a "virtual" bank. NetBank is such an Internet-only bank. Without physical branches, NetBank can cut operating costs and can potentially offer higher deposit rates to its customers and waive many fees normally charged by a bank with a large network of physical branches. The challenge for Internet-only banks is to provide quality customer services without physical offices. One way in which NetBank is dealing with this issue is via an agreement with the MAC ATM Network (automated teller machine network), thus providing its customers access to nearly 18,000 ATMs across the United States. NetBank customers can deposit and withdraw funds from their NetBank accounts through these ATMs, and in addition, customers can also deposit and receive funds through wire transfer.

Softwares and languages used in E-banking

E-banking services are delivered to customers through the Internet and the web using Hypertext Markup Language (HTML) . In order to use e-banking services, customers need Internet access and web browser software. Multimedia information in HTML format from online banks can be displayed in web browsers. The heart of the e-banking application is the computer system, which includes web servers, database management systems, and web application programs that can generate dynamic HTML pages.

Bank customers' account and transaction information is stored in a database, a specialized software that can store and process large amounts of data in high speed. The function of the web server is to interact with online customers and deliver information to users through the Internet. When the web server receives a request such as an account inquiry from an online customer, it requires an external web application program to process the request. C, Visual Basic, VBScript, and Java are some of the languages that can be used to develop web application programs to process customer requests, interact with the database, and generate dynamic responses. Then, the web server will forward the response HTML files to e-banking customers. Several banks, such as NationsBank, also

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**CHECK YOUR
PROGRESS**

5. What are the methods used by banks to ensure Data Security?

use state-of-the-art imaging systems, allowing customers to view images of checks and invoices over the Internet.

Security

One of the main concerns of e-banking is security. Without great confidence in security, customers are unwilling to use a public network, such as the Internet, to view their financial information online and conduct financial transactions. Some of the security threats include invasion of individuals' privacy and theft of confidential information. Banks with e-banking service offer several methods to ensure a high level of security: (1) identification and authentication, (2) encryption, and (3) firewalls. First, the identification of an online bank takes the form of a known Uniform Resource Locator (URL) or Internet address, while a customer is generally identified by his or her login ID and password to ensure only authenticated customers can access their accounts. Second, messages between customers and online banks are all encrypted so that a hacker cannot view the message even if the message is intercepted over the Internet. The particular encryption standard adopted by most browsers is called Secure Socket Layer (SSL). It is built in the web browser program and users do not have to take any extra steps to set up the program. Third, banks have built firewalls, which are software or hardware barriers between the corporate network and the external Internet, to protect the servers and bank databases from outside intruders. For example, Wells Fargo Bank connected to the Internet only after it had installed a firewall and made sure the firewall was sufficiently impenetrable.

Services of E-banking

The range of e-banking services is likely to increase in the future. Some banks plan to introduce electronic money and electronic checks. Electronic money can be stored in computers or smart cards and consumers can use the electronic money to purchase small value items over the Internet. Electronic checks will look similar to paper checks, but they can be sent from buyers to sellers over the Internet, electronically endorsed by the seller, and forwarded to the seller's bank for electronic collection from the buyer's bank. Further, banks seek to offer their customers more products and services such as insurance, mortgage, financial planning, and brokerage. This will not only deliver more value to the customers but also help banks to grow business and revenues.

5.4 BUDGETING

A budget is a powerful tool that which takes care of controlling the money.

A budget helps to decide what is needed and how to plan for its achievement.

Budget means planning the resources for future action. By way of budgeting generally standards are being fixed. In the course of action the standards & actuals are being compared and then the necessary actions are been taken.

In the sense of E banking the budgets have been set for the finance resource and human resource. According to the size and transactions of the bank the budget is drawn for e banking expenses. Expenses may be:

- cost of software and hardware

- Maintenance cost for the software and hardware
- Implementation cost
- Transformation cost
- Training cost of the employees
- Upgradation cost of the system

Some times unexpected cost like technological change may occur which also has to be taken care by the banking authorities.

5.5 BANKING SOFTWARE

Computerized banks were transacting the transactions of their own branch accounts and with the help of net they are doing transactions for some of the others branches

With the help of core banking any bank (branch) can do the transactions for any other bank (branch) even located far away.

To do this effectively special softwares are needed. With these software alone the core banking are done in a more effective manner.

Nowadays these softwares have been typically built for tackling the complex needs of the banks. The software vendors are designing such kinds of softwares that are used to solve the most common needs of the banks

5.6 ANSWERS TO CHECK YOUR PROGRESS

1. Yes
2. 104
3. 12th December, 2007
4. FIPF, FITF
5. Identification and authentication, Encryption and Firewalls .

5.7 REVIEW QUESTIONS

1. Explain the recommendations as given in the report of the expert SHRI RANGARAJAN Committee
2. What is E banking?

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6.1 INTRODUCTION**6.2 CHARACTERISTICS OF SMART BANKING ENVIRONMENT****6.3 COMPONENTS AND TECHNOLOGIES OF SMART BANKING ENVIRONMENTS****6.4 ISSUES IN SMART BANKING****6.5 ANSWERS TO CHECK YOUR PROGRESS****6.6 REVIEW QUESTIONS****CHECK YOUR PROGRESS**

1. What is the work age group in India?

6.1 INTRODUCTION

With changing times, the banking sector in India too observed a steady change. From people frequenting banks just to deposit money to the age of building relationships rather than just customers has become the new norm. This has also opened new avenues of growth for the banking industry. From branch banking to internet banking and now to mobile banking, the industry has surely come of age.

The reason for this can be widely attributed to the socio-economic changes happening widely in India due to economic liberalization. According to the *Technical Group on Population Projections* constituted by the *National Commission on Population*, May 2006, in India the proportion of population in the working age group of 15-64 years will increase to 68.4 per cent in 2026. This clearly shows a mass of bankable customer and as they grow up in the career ladder, the need to manage their finances will increase.

Looking at this growing set of customers, all major banks have taken the route of next-generation banking. To build a steady relationship, they are now offering life-cycle wise products. Saving plans are available from the moment a child is born. Then there are loan and insurance schemes to fulfill their educational, health or other such needs for a

secure future. Banks are also providing guidance on wealth management and customized products to suit individual needs.

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6.2 CHARACTERISTICS OF SMART BANKING SYSTEM

A major breakthrough in banking services has come in the form of internet banking and mobile banking. Banks have realized that the customers today need a convenient and secure way to manage their finances. Internet banking has provided the freedom of 24x7 banking to the customers. Now from getting your phone recharged to booking tickets for movie or a journey to taking loans, all is possible with a click of a button. With no additional cost and easy accessibility, the medium is fast taking over the traditional mode of banking. "In this busy age nobody has the time to stand in lines to pay bills or check account balance. Internet banking has come as a boon for this generation that wants everything at a moment's notice. I have just bought a car and the loan formalities were fulfilled sitting in my office through net only. Not only did it save time, I didn't have to take leave from my office as well," shared Namrata Oberoi, a management consultant. With strict security procedures and password-protected identity-checking service, online transactions have become quite safe and secure

CHECK YOUR PROGRESS

2. What is the base stone of Smart Banking Systems?

The usage of credit and debit cards has also seen a major increase among the younger segment of customers. According to a recent study, the average age of credit card holders has come down to 27 years from 45 in a span of just two to three years. Though this sounds like a good news for the banks, they are making sure that it doesn't cause a problem in the future. To ensure proper return of their debt, banks have come out with customer-friendly education material which helps the customer take sound financial decisions.

CHECK YOUR PROGRESS

3. What are the components essential for an efficient Smart banking System?

6.3 COMPONENTS AND TECHNOLOGIES OF SMART BANKING ENVIRONMENTS

Smart Banking can be done with the following components

Software, Hardware, Security services, cards(credit card, debit card, etc), phone banking, e-banking, core banking, ATM's, etc.

In all these situations information technologies which plays the primary role satisfy all the above components. With the help of information technology as a primary technology the other technologies like telephone either private or government lines which enables the connection in a prominent way. The electricity which is also very important to enable these things to work in the proper way.

6.4 ISSUES OF SMART BANKING

Lack of knowledge

Although all the functionalities are user friendly and menu driven it will not be easy for all the users to transact through this system. And uneducated and illiterate users are not showing proper interest towards smart banking system.

Security concern

Through the physical transaction there will be documentary evidence for the customers for each and every transaction that has been taken place, but through this smart banking system there will no be adequate physical evidence and this makes the users to feel unsafe about whether the transaction has been taken place for the correct amount and on the correct account

Power constraint

This smart banking system requires to be active through out the day and this requires a large amount of power supply. Hence with these constraints it will be difficult to maintain the smart banking methodology

Costly

This smart banking system is costlier to install and maintain than the corporate banking system

6.5 ANSWERS TO CHECK YOUR PROGRESS

1. 15-64
2. Providing the freedom of 24x7 banking to the customers.
3. Software, Hardware, Security services, cards(credit card, debit card, etc), phone banking, e-banking, core banking, ATM's, etc.
4. Population is on the increase; hence, there is an increase in the number of customers or users of banking services. Smart Banking Systems are necessary for crowd management and to compete in a globalised environment.
5. Insurance, Investment, Mutual Funds, E-tax, etc.

6.6 REVIEW QUESTIONS

1. Explain the concept of smart banking in detail.
2. Explain the limitations of smart banking system.

**CHECK YOUR
PROGRESS**

4. What is the need for Smart Banking Systems?

**CHECK YOUR
PROGRESS**

5. What are the non banking services provided by Banks?

SOFTWARE AGENTS

NOTES

7.1 INTRODUCTION

7.2 FUNDAMENTALS

7.3 AGENTS AS TOOLS OF THE INFORMATION SOCIETY

7.4 FUNDAMENTAL CONCEPTS OF INTELLIGENT SOFTWARE AGENTS

7.5 BASE MODULES OF AGENT SYSTEMS

7.6 APPLICATION AREAS FOR INTELLIGENT SOFTWARE AGENTS

7.7 ANSWERS TO CHECK YOUR PROGRESS

7.8 REVIEW QUESTIONS

CHECK YOUR PROGRESS

1. Software Agent is also known as

7.1 INTRODUCTION

In computer science, a software agent is a piece of software that acts for a user or other program in a relationship of agency. Such "action on behalf of" implies the authority to decide which (and if) action is appropriate. The idea is that agents are not strictly invoked for a task, but activate themselves.

7.2 FUNDAMENTALS

A Software Agent (or Autonomous Agent or Intelligent Agent) is a computer program which works toward goals (as opposed to discrete tasks) in a dynamic environment (where change is the norm) on behalf of another entity (human or computational), possibly over an extended period of time, without continuous direct supervision or control, and exhibits a significant degree of flexibility and even creativity in how it seeks to transform goals into action tasks.

7.3 AGENTS AS THE TOOLS OF INFORMATION SOCIETY

NOTES

A simpler, more structured definition is to say that a software agent is a computer program that exhibits the characteristics of agency or software agency.

A software agent is autonomous or at least semi-autonomous, meaning it can perform tasks in pursuit of a goal with minimum of no direct supervision or direct control, but can interact with another entity to obtain guidance or output results. It may or may not have a user interface.

A software agent could in fact be interactive or conversational, acting on behalf of another entity that is not directly apparent to the "user" interacting with the agent. This would be a direct analog to how real-world agents work.

A software agent may need to have a high level of "intelligence" in order to deal with a dynamic environment in which the unexpected is the norm. But it is also possible to have a "dumb" software agent which works autonomously to accomplish well-defined tasks and requests supervision only when it detects unexpected conditions.

A software agent may be "mobile" and move or be moved around the network, but a software agent may also be "static" and do all its work on one host computer on the network, including accessing resources which are on hosts other than the host on which the agent is executing.

An interactive or conversational agent may in fact merely be an "assistant", under direct control and on behalf of the same user. This would be a less autonomous mode of operation, but the interactive agent could possibly be directed to go off and achieve some goal and work in an autonomous mode while doing so. The question of "agency" is mostly the extent to which there is NOT a one-to-one relationship between the conversation between the user and agent and the actual set of tasks performed by the alleged agent. An assistant does exactly as told. An agent is given a goal and has flexibility as to how to achieve that goal.

An agent may be a *single agent* (one agent doing a range of tasks to accomplish a goal), *part of an agent ensemble* (a relatively small team with specialization among the team members), *or a very small part of an agent armada* (large numbers of agents with a significant amount of parallelism for even specific tasks). Even a single agent may

**CHECK YOUR
PROGRESS**

2. Define Software Agent.

interact with other agents which are responsible to some other entity. What distinguishes an agent ensemble and an agent armada is that they are responsible to a single entity.

Characteristics that are frequently mentioned as appropriate for software agents include: reactive, deliberative, goal-driven, adaptive, autonomous, learning, communicative, competitive, and collaborative behaviors.

Software agents (and software agent systems) should be designed using a modular architecture.

Software agents offer opportunities for parallelism and inter-program collaboration, and on a large scale, and to do it easily and in a robust, reliable, flexible, and secure manner.

Intelligent software agents

Intelligent agents are often described schematically as an abstract functional system similar to a computer program. For this reason, intelligent agents are sometimes called abstract intelligent agents (AIA) to distinguish them from their real world implementations as computer systems, biological systems, or organizations.

Some definitions of intelligent agents emphasize their autonomy, and so prefer the term autonomous intelligent agents. Still others (notably Russell & Norvig (2003)) considered goal-directed behavior as the essence of intelligence and so prefer a term borrowed from economics, "rational agent".

Intelligent agents in artificial intelligence are closely related to agents in economics, and versions of the intelligent agent paradigm are studied in cognitive science, ethics, the philosophy of practical reason, as well as in many interdisciplinary socio-cognitive modeling and computer social simulations.

Intelligent agents are also closely related to software agents (an autonomous software program that carries out tasks on behalf of users). In computer science, the term *intelligent agent* may be used to refer to a software agent that has some intelligence, regardless if it is not a rational agent by Russell and Norvig's definition. For example,

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autonomous programs used for operator assistance or data mining (sometimes referred to as *bots*) are also called "intelligent agents".

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7.4 FUNDAMENTAL CONCEPTS OF INTELLIGENT SOFTWARE AGENT (ISA):

A software agent that uses Artificial Intelligence (AI) in the pursuit of the goals of its clients.

- *Artificial Intelligence* is the imitation of human intelligence by mechanical means. Clients, then, can reduce human workload by delegating to ISAs tasks that normally would require human-like intelligence.
- Many researchers that formerly referred to their work as AI are now actively engaged in "agent technology". Thus the word "agent" by itself generally connotes ISAs in the terms of the present-day research community.
- *Delegacy* for ISAs is far more absolute. ISAs have the capability to generate and implement novel rules of behavior which human beings may never have the opportunity or desire to review. As ISAs can engage in extensive logical planning and inferencing, the relationship of trust between the client and the agent is or must be far greater, especially when the consumption of client resources is committed for reasons unexplained or multiple complex operations are actuated before human observers can react.
- *Competency* as practiced by ISAs adds higher order functionality to the mix of capabilities. In addition to communicating with their environment to collect data and actuate changes, ISAs can often analyze the information to find non-obvious or hidden patterns, extracting knowledge from raw data. Environmental modes of interaction are richer, incorporating the media of humans such as natural language text, speech, and vision.
- *Amenability* in ISAs can include self-monitoring of achievement toward client goals combined with continuous, online learning to improve performance. Adaptive mechanisms in ISAs mean that they are far less brittle to changes in environment and may actually improve. In addition, client

responsiveness may go so far as to infer what a client wants when the client himself does not know or cannot adequately express the desired goals in definitive terms.

7.5 BASE MODULES OF AGENT SYSTEM

NOTES

Agent-based modeling is a powerful simulation modeling technique that has seen a number of applications in the last few years, including applications to real-world business problems. After the basic principles of agent-based simulation are briefly introduced, its four areas of application are discussed by using real-world applications: flow simulation, organizational simulation, market simulation, and diffusion simulation. For each category, one or several business applications are described and analyzed.

In agent-based modeling (ABM), a system is modeled as a collection of autonomous decision-making entities called agents. Each agent individually assesses its situation and makes decisions on the basis of a set of rules. Agents may execute various behaviors appropriate for the system they represent—for example, producing, consuming, or selling.

Repetitive competitive interactions between agents are a feature of agent-based modeling, which relies on the power of computers to explore dynamics out of the reach of pure mathematical methods.

At the simplest level, an agent-based model consists of a system of agents and the relationships between them. Even a simple agent-based model can exhibit complex behavior patterns and provide valuable information about the dynamics of the real-world system that it emulates.

In addition, agents may be capable of evolving, allowing unanticipated behaviors to emerge. Sophisticated ABM sometimes incorporates neural networks, evolutionary algorithms, or other learning techniques to allow realistic learning and adaptation.

ABM is a mindset more than a technology. The ABM mindset consists of describing a system from the perspective of its constituent units. A number of researchers think that the alternative to ABM is traditional differential equation modeling; this is

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wrong, as a set of differential equations, each describing the dynamics of one of the system's constituent units, is an agent-based model.

A synonym of ABM would be microscopic modeling, and an alternative would be macroscopic modeling. As the ABM mindset is starting to enjoy significant popularity, it is a good time to redefine why it is useful and when ABM should be used.

One of the reasons underlying ABM's popularity is its ease of implementation: indeed, once one has heard about ABM, it is easy to program an agent-based model. Because the technique is easy to use, one may wrongly think the concepts are easy to master. But although ABM is technically simple, it is also conceptually deep. This unusual combination often leads to improper use of ABM.

Agent-based modeling is a powerful simulation modeling technique that has seen a number of applications in the last few years, including applications to real-world business problems. After the basic principles of agent-based simulation are briefly introduced, its four areas of application are discussed by using real-world applications:

- Flow simulation,
- Organizational simulation,
- Market simulation, and
- Diffusion simulation.

For each category, one or several business applications are described and analyzed.

Benefits of Agent-Based Modeling.

The benefits of ABM over other modeling techniques can be captured in three statements:

- (i) ABM captures emergent phenomena;
- (ii) ABM provides a natural description of a system; and
- (iii) ABM is flexible.

It is clear, however, that the ability of ABM to deal with emergent phenomena is what drives the other benefits.

**CHECK YOUR
PROGRESS**

4. What are the benefits of ABM over other modeling technologies?

7.6 AREAS OF APPLICATION.

Examples of emergent phenomena abound in the social, political, and economic sciences. It has become progressively accepted that some phenomena can be difficult to predict and even counterintuitive. In a business context, situations of interest where emergent phenomena may arise can be classified into four areas:

1. Flows: evacuation, traffic, and customer flow management.
2. Markets: stock market, shopbots and software agents, and strategic simulation.
3. Organizations: operational risk and organizational design.
4. Diffusion: diffusion of innovation and adoption dynamics.

The rest of the article is organized around these areas of application.

7.7 ANSWERS TO CHECK YOUR PROGRESS

1. Autonomous Agent or Intelligent Agent
2. A Software Agent is a piece of software that acts for a user or other program in a relationship of agency.
3. Artificial Intelligence is the imitation of human intelligence by mechanical means.
4. ABM captures emergent phenomena; ABM provides a natural description of a system; and ABM is flexible.
5. Yes

7.8 REVIEW QUESTIONS

1. Explain the term “software agent”.
2. Explain the characteristics of software agents?
3. Explain the types of software agents?

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CHECK YOUR PROGRESS

5. Is software agent system a useful tool for real world business problem?

RADIO FREQUENCY IDENTIFICATION (RFID)

NOTES

**CHECK YOUR
PROGRESS**

1. Expand RFID

8.1 INTRODUCTION

8.2 RFID SYSTEM

8.3 RFID SYSTEM COMPONENTS

8.4 OPERATING FREQUENCY

8.5 CLOSE COUPLING SMART CARDS

8.6 PROXIMITY COUPLING SMART CARDS

8.7 SLOTTED ALOHA

8.8 OSI LAYERS

8.9 VICINITY COUPLING SMART CARDS

8.10 RFID SECURITY CONSIDERATIONS

8.11 RFID APPLICATIONS

8.12 SHORT RANGE RFID APPLICATIONS, LONG RANGE RFID APPLICATIONS

8.13 ANSWERS TO CHECK YOUR PROGRESS

8.14 REVIEW QUESTIONS

8.1 INTRODUCTION

Radio-frequency identification (RFID) is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

Why RFID?

In an increasingly fragmented, regulated, and uncertain world, Texas Instruments' (TI) RFID technology gives businesses, governments, and consumers a safe, private, and unobtrusive way to keep track of it all.

*Radio Frequency
Identification
(RFID)*

Consumers benefit from shorter lines at checkout counters, in hospitals, libraries, and gas stations because RFID fast-tracks them to the front of the queue. They can also benefit from lower prices because of the efficiencies RFID brings to the supply chain.

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Business and institutions are turning to RFID technology as they comply with government product-tracking regulations, seeking to limit theft, reduce out-of-stock losses, strengthen brand loyalty, and make interaction with customers a more positive experience.

RFID is a mature, thoroughly tested technology. In most RFID applications, the period of trials, testing, and economic feasibility studies is over. Large-scale RFID system rollouts are underway.

**CHECK YOUR
PROGRESS**

2. RFID technology does not require contact or line of sight for communication; true or false?

8.2 RFID SYSTEM

Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category of automatic identification technologies.

Unlike ubiquitous UPC bar-code technology, RFID technology does not require contact or line of sight for communication. RFID data can be read through the human body, clothing and non-metallic materials

8.3 RFID SYSTEM COMPONENTS

A basic RFID system consists of three components:

- An antenna or coil
- A transceiver (with decoder)
- A transponder (RF tag) electronically programmed with unique information

8.4 OPERATING FREQUENCY

NOTES

**CHECK YOUR
PROGRESS**

3. Why RFID has
gained quick fame?

- The antenna emits radio signals to activate the tag and to read and write data to it.
- The reader emits radio waves in ranges of anywhere from one inch to 100 feet or more, depending upon its power output and the radio frequency used. When an RFID tag passes through the electromagnetic zone, it detects the reader's activation signal.
- The reader decodes the data encoded in the tag's integrated circuit (silicon chip) and the data is passed to the host computer for processing.

The purpose of an RFID system is to enable data to be transmitted by a portable device, called a tag, which is read by an RFID reader and processed according to the needs of a particular application. The data transmitted by the tag may provide identification or location information, or specifics about the product tagged, such as price, color, date of purchase, etc. RFID technology has been used by thousands of companies for a decade or more. . RFID quickly gained attention because of its ability to track moving objects. As the technology is refined, more pervasive - and invasive - uses for RFID tags are in the works.

A typical RFID tag consists of a microchip attached to a radio antenna mounted on a substrate. The chip can store as much as 2 kilobytes of data.

To retrieve the data stored on an RFID tag, you need a reader. A typical reader is a device that has one or more antennas that emit radio waves and receive signals back from the tag. The reader then passes the information in digital form to a computer system

8.5 CLOSE COUPLING SMART CARD

A smart card, chip card, or integrated circuit card (ICC), is any pocket-sized card with embedded integrated circuits. There are two broad categories of ICCs. Memory cards contain only non-volatile memory storage components, and perhaps dedicated security logic. Microprocessor cards contain volatile memory and microprocessor components. The card is made of plastic, generally polyvinyl chloride, but sometimes acrylonitrile butadiene styrene or polycarbonate. The card may embed a hologram to

prevent counterfeiting. Smart cards may also provide strong security authentication for single sign-on within large organizations.

The term 'smart card' is subject to a variety of interpretations, but is most usefully understood as a conventional plastic card with a silicon chip added to it.

Some chips merely provide storage, and are roughly comparable to a high-capacity magnetic-stripe. The more interesting chips also contain a micro-processor, enabling the card to become an active component within large-scale systems.

The major boom in smart card use came in the 1990s, with the introduction of smart-card-based SIMs used in GSM mobile phone equipment in Europe. With the ubiquity of mobile phones in Europe, smart cards have become very common.

8.6 PROXIMITY- COUPLING SMART CARDS

ISO 14443 has two variants, Type A and Type B. ISO 14443A was accepted by the ISO committee in 1997. It is the first ISO standard for 13.56 MHz frequency contactless card which was developed by Mikron Austria and acquired by Phillips in 1996. Currently, ISO 14443A is the most widely used contactless standard in the world, mainly in transport applications. ISO 14443B was approved by the ISO committee in 1998.

Smart cards serve as credit or ATM cards, fuel cards, mobile phone SIMs, authorization cards for pay television, household utility pre-payment cards, high-security identification and access-control cards, and public transport and public phone payment cards.

Security

Smart cards have been advertised as suitable for personal identification tasks, because they are engineered to be tamper resistant. The chip usually implements some cryptographic algorithm. There are, however, several methods for recovering some of the algorithm's internal state.

Problems

The plastic card in which the chip is embedded is fairly flexible, and the larger the chip, the higher the probability the normal use could damage it. Cards are often carried in wallets or pockets—a harsh environment for a chip. However, for large banking systems,

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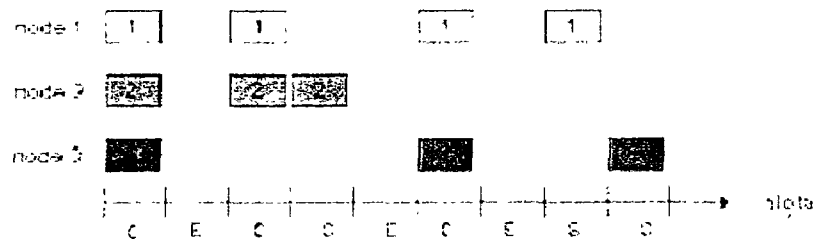
failure-management costs can be more than offset by fraud reduction. The language should be able to incorporate rich context information

8.7 SLOTTED ALOHA

- Synchronous system: time divided into slots
- Slot size equals fixed packet transmission time
- When Packet ready for transmission, *wait* until start of *next* slot
- Packets overlap completely or not at all

Slotted Aloha

- time is divided into equal size slots (= pkt trans. time)
- node with new pkt: transmit at beginning of next slot
- if collision: retransmit pkt in future slots with probability p , until successful.



Success (S), Collision (C) Empty (E) slots

5. DataLink Layer Sa-21

**CHECK YOUR
PROGRESS**

4. How does RFID help Supply Chain Management?

8.8 OSI MODEL LAYERS

- Application
- Presentation
- Session
- Transport
- Network
- Data Link
- Physical

Multimedia Presentation Layer Standards

- JPEG - Picture standard from the Joint Photographic Experts Group.
- MIDI - Musical Instrument Digital Interface is used to digitize music.
- MPEG - Motion Picture Expert's Group standard for encoding video.
- PICT - Picture format for QuickDraw graphics used by Macintosh programs.
- TIFF - Tagged Image File Format for bitmapped high resolution images.

Session Layer

Offers three communications modes

- Simplex - Only one device transmits.
- Half-duplex - Each side takes turns transmitting from one side at a time.
- Full-duplex - Devices on both sides of the communications channel can talk at the same time.

Connection split into the following three phases:

1. Connection establishment
2. Data transfer
3. Connection termination

Session Layer Protocols

- NFS - Network File System
- SQL - Structured Query Language
- RPC - Remote Procedure Call
- X Window
- ASP - AppleTalk Session Protocol used for Apple client to server communications.
- DNA SCP - Digital Network Architecture Session control Protocol. A Digital DECnet protocol.

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CHECK YOUR
PROGRESS

5. Short Range
RFID constitutes
multiple
technologies;
elucidate.

Transport Layer

Maintains flow control which prevents buffer overflow and data loss. Reliable data transmission provides for:

- Acknowledgement of received segments.
- Retransmission of segments not acknowledged.
- Proper re-sequencing of segments.
- Flow control to manage the data so no data is lost.

In reliable communications, data is transmitted and received in the same order. If the data is received out of order, the communication fails. Rather than transmitting a packet and having an acknowledgement sent for each packet a window is established. A window specifies the number of packets the transmitting device can send before an acknowledgement is received. Then the acknowledgement is sent the number of the next packet that has not yet been received is sent. If no acknowledgement is received by the sender in a given period of time, the packet or packets are re-transmitted. Two main protocols:

- TCP - Reliable with establishment of virtual circuit and numbering and acknowledgement of packets. Also establishes the connection before sending data.
- UDP - Unreliable with no virtual circuit and numbering without acknowledgement of packets.

Network Layer

Responsible for controlling the path of the data.

Data Link Layer

The data packets are encapsulated into frames. A header with a hardware (MAC) destination and source address are added. Parts of a data frame include:

- Start indicator (preamble) - Bit pattern indicating the start of a frame.
- Destination address
- Source address

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- Type field in ethernet II frames
- Length field in 802.3 frames
- Data
- Frame Sequence Check (FSC) field which includes the Cyclic Redundancy Checksum (CRC)
-

Data Link Layer WAN protocols:

- HDLC - High Level Data Link Control - Implemented by the International Standards Organization (ISO).
- SDLC - Synchronous Data Link Control uses a master slave relationship between primary and secondary devices. The master always initiates communication. This protocol was started by IBM to communicate between offices with mainframe computers.
- LAPD - Link Access Procedure Balanced - Can detect missing or out of sequence frames and is used with X.25.
- X.25 - Defines specification between a DTE and a DCE and is a packet switching network.
- SLIP - Used to support TCP/IP communications over a slow serial interface.
- PPP - Used to support several protocols over a slow serial interface with several enhancements over SLIP.
- ISDN - Integrated Services Digital Network - Digital phone lines for voice and data transmission.
- Frame Relay - Higher speed than X.25 packet switching network.

DOD Model

These are the names of the layers according to Microsoft documentation with corresponding OSI layers:

- Application - Application, Presentation, and Session.

- Host-to-Host - Transport
- Internet - Network
- Network Access - Data Link and Physical

NOTES

RFID technology has been expected to replace barcode or other identification schemes. But it is not used widely yet. RFID technology is easy to use and has merits of AIDC - Automatic Identification and Data Capture, but also serious problems of security. Main target of RFID is supply chain management, which may contain important information of customers and companies. Security threat, however, becomes the obstacle against spread of RFID technology. In this paper, security problems of RFID technology are explained first. The method for RFID security and necessary tag memory structure is explained

8.9 VICINITY COUPLING SMART CARDS

In 1998, Philips and Texas Instruments presented ISO 15693 for vicinity applications. The aim of this standard is to increase the reading distance. Its predecessor, ISO 14443, only has a communication of 10cm, ISO 15693 expands the communication range for vicinity operations to around 1.5m in gate configuration. However, its drawback is its limited communication speed which is offset by the communication range.

8.10 RFID SECURITY CONSIDERATIONS

RFID has long been used as an electronic key to control who has access to office buildings or areas within office buildings. The first access control systems used low-frequency RFID tags. Recently, vendors have introduced 13.56 MHz systems that offer longer read range. The advantage of RFID is it is convenient (an employee can hold up a badge to unlock a door, rather than looking for a key or swiping a magnetic stripe card) and because there is no contact between the card and reader, there is less wear and tear, and therefore less maintenance. As RFID technology evolves and becomes less expensive and more robust, it's likely that companies and RFID vendors will develop many new applications to solve common and unique business problems.

Another problem is the lack of standards for functionality and security. To address this problem, The Berlin Group launched the ERIDANE Project to propose "a new functional and security framework for smart-card based Point of Interaction (POI) equipment".

8.11 RFID APPLICATION

There are almost as many RFID applications as there are business types. TI has established a leadership position in these basic categories:

- Automotive - Auto-makers have added security and convenience into an automobile by using RFID technology for anti-theft immobilizers and passive-entry systems.
- Animal Tracking - Ranchers and livestock producers use RFID technology to meet export regulations and optimize livestock value. Wild animals are tracked in ecological studies, and many pets who are tagged are returned to their owners.
- Asset Tracking¹ - Hospitals and pharmacies meet tough product accountability legislation with RFID; libraries limit theft and keep books in circulation more efficiently; and sports and entertainment entrepreneurs find that "smart tickets" are their ticket to a better bottom line and happier customers.
- Contactless Payments - Blue-chip companies such as American Express, ExxonMobil, and MasterCard use innovative form factors enabled by TI RFID technology to strengthen brand loyalty and boost revenue per customer.
- Supply Chain - WalMart, Target, BestBuy, and other retailers have discovered that RFID technology can keep inventories at the optimal level, reduce out-of-stock losses, limit shoplifting, and speed customers through check-out lines.

8.12 SHORT-RANGE RFID TECHNOLOGY AS DESIGN MATERIAL

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Knowledge of technology has always been important in conceptual design both as inspiration and as means of realizing ideas. Emerging technology plays an important part by offering designers new potential and functionalities that may enable the development of innovative solutions. As a result, novel conceptual designs are often seen in tandem with new materials. Short-range RFID is an emerging technology that might bring such opportunities to design by allowing devices to read and write to short-range radio transmitters called RFID tags. Such technology has been used in public transport, where commuters encounter ticketing systems that allow them to swipe their RFID-enabled cards past ticket readers that register them for travel. Thus far, much short-range RFID technology has been steered towards such systems, along with payment and security related applications. However, the growing number of RFID enabled mobile phones is changing the scope of short-range RFID technology usage. These phones allow users to access information embedded in RFID tags (or systems) by using their mobiles as terminals (Figure 1). As a consequence, the technology is now more widely available to a large base of developers and designers making consumer oriented mobile applications. It is likely that the increasing base of designers and developers with access to this technology, will make short-range RFID more common in design processes geared towards the development of innovative services.

Short-range RFID technology refers to multiple technologies covering a large set of possible hardware types and software implementations. Short-range RFID can be understood as a collection of materials that can be combined in various constellations to make up short-range RFID systems. From a design material perspective, it is useful to frame the technologies providing form-making qualities that separate short-range RFID from other materials. I suggest that short-range RFID can be addressed as a material that consists of near-fields and computational technology. I label this Near-Field material. This is based on the analysis of design experiments that showed that the near fields themselves are the unit that provide form variations specific for short-range RFID. The near-fields showed a surprising versatility in application and combination with additional materials, making these fields very useful as a conceptual material in support of designing.

This approach to short-range RFID as the near-field material departs from the normal conception of such systems in that it is device independent and does not consider how the fields are realized. This means that, conceptually, tags or reader devices are additional materials that need to be combined with the near-fields to create working systems. This is counter-intuitive, but allows a designer to see the opportunities of near-field interaction in an abstract way, outside the conceptual restrictions of implementation.

In order to be perceivable by users, the near field material needs to be mediated through additional output oriented materials, like screens or speakers. Without them, the near-field material does not exist in user experience because the fields do not have any physical expression. Still, the near-field material can be considered a separate material since, from a design standpoint, it does have physical and temporal form with specific qualities that can be shaped in designing. As a result, despite having no inherent output channel, the near-field material allows expression by affording users possible input.

The framing of the near-field material is inspired by Vallgård and Redström's (2007) definition of computational composites. These composites consist of both physical material and computation. This corresponds well with the near-field material comprising the fields and computing. In the case of short-range RFID technology, I propose that the computational technology could be expressed through the near-fields. Consequently, the near-fields and the computational technology are interdependent and together they make up an interaction design material that can be addressed as a computational composite.

In the final sections of the article, I move on to analyze short-range RFID technology in search of form-making qualities. In the following sections, I present the design and research methods employed in this study.

8.13 ANSWERS TO CHECK YOUR PROGRESS

1. Radio Frequency Identification

2. True

3. RFID quickly gained attention because of its ability to track moving objects. As the technology is refined, more pervasive - and invasive - uses for RFID tags are in the works.

4. Business and institutions are turning to RFID technology as they comply with government product-tracking regulations, seeking to limit theft, reduce out-of-stock losses, strengthen brand loyalty, and make interaction with customers a more positive experience.

5. Short-range RFID technology refers to multiple technologies covering a large set of possible hardware types and software implementations. Short-range RFID can be understood as a collection of materials that can be combined in various constellations to make up short-range RFID systems.

8.14 REVIEW QUESTIONS

1. What are smart cards?

2. What is RFID?

3. What are the security considerations of RFID?

CONTEXT AWARE COMPUTING

NOTES

9.1 INTRODUCTION

9.2 STRUCTURE AND ELEMENTS OF CONTEXT AWARE PERVASIVE SYSTEMS

9.3 CONTEXT AWARE MOBILE SERVICES

9.4 CONTEXT AWARE ARTIFACTS

9.5 CONTEXT AWARE SENSOR NETWORKS

9.6 CONTEXT AWARE SECURITY

9.7 ANSWERS TO CHECK YOUR PROGRESS

9.8 REVIEW QUESTIONS

CHECK YOUR
PROGRESS

1. What does
Authentication
mean?

9.1 INTRODUCTION

Context awareness originated as a term from ubiquitous computing or as so-called pervasive computing which sought to deal with linking changes in the environment with computer systems, which are otherwise static. Although it originated as a computer science term, it has also been applied to business theory in relation to business process management issues.

9.2 STRUCTURE AND ELEMENTS OF CONTEXT AWARE PERVASIVE SYSTEM

Context defines some rules of inter-relationship of features in processing any entities as a binding clause.

Some common understanding is the segregation of four categories:

- Location
- Identity
- Activity

Time

Context Aware
Computing

Some classical understanding in business processes is derived from the definition of AAA applications with the following three categories:

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- Authentication, which means i.e. confirmation of stated identity
- Authorization, which means i.e. allowance to accrual or access to location, function, data
- Accounting, which means i.e. the relation to order context and to accounts for applied labour, granted license, and delivered goods,

9.3 CONTEXT AWARE-MOBILE SERVICES

With the recent advances in mobile computer technology and the penetration of wireless networks, the nature of the services proposed to the users is moving towards mobile and context-aware mobile services.

With the aim to propose methods and technologies for the development of such services and the infrastructure to support them, SINTEF Telecom

and Informatics has started LAMA, a strategic research programme on technologies forenabling mobility [LAMA].

The particularity of this programme is that experts from different technological fields are working together in order to enable the development of integrated solutions. Radio experts are working with reliable high-capacity transmission on new wireless mobile radio network infrastructures.

Software engineers focus on architectures that support the adaptivity of applications to changes in the means of communication, the available processing power and the user environment. User interface experts work on the adaptation of user interfaces to the changing context of the mobile user.

As the participants in LAMA have different scientific background and are working in distinct technological areas, we believe that it is important to develop a common conceptual framework or reference model for enabling the unified understanding and

**CHECK YOUR
PROGRESS**

2. Expand BSN.

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formulation of mobility-related issues, and describing problems and solutions. Such a model provides a unified way of integrating results.

The use of context is becoming important in interactive computing, but still context is a poorly utilized source of information . Context information can be used to facilitate the communication in human-computer interaction. However the concept of context is not yet well understood or defined, and there exists no commonly accepted architecture that supports the management of context information.

Context information often changes for the mobile user. One challenge of mobile services is to cope with the frequent context changes of the mobile users and exploit them.

9.4 CONTEXT AWARE ARTIFACTS

The idea of context-aware artifacts is that computational artifacts are able to recognize the context in which they are being used so that these artifacts are able to adapt their functionality to the respective context. Most work in developing context-aware artifacts appears to be technology-driven by which we mean that often the relation of the artifacts to the underlying concepts of context remain unclear.. Acknowledging the difference suggests that developers of context-aware artifacts should pay considerable attention to the fact that the context determined by artifacts may differ from what the persons involved in the situation have negotiated. Furthermore, it suggests to critically review operationalisations of context in context-aware artifacts and their impact on how context is conceptualized.

9.5 CONTEXT AWARE SENSOR NETWORKS

With recent advances in wireless sensor networks and embedded computing technologies, miniaturized pervasive health monitoring devices have become practically feasible. In addition to providing continuous monitoring and analysis of physiological parameters, the recently proposed Body Sensor Networks (BSN) incorporates context aware sensing for increased sensitivity and specificity. To facilitate research and development in BSN and multi-sensor data fusion, a BSN hardware development

**CHECK YOUR
PROGRESS**

3. Why traditional security mechanisms are context insensitive?

**CHECK YOUR
PROGRESS**

4. What do AAA denote?

platform is presented. With its low power, flexible and compact design, the BSN nodes provide a versatile environment for wireless sensing research and development.

The availability of various sensors that can be networked using the wireless technology allows for large-scale sensing of physical spaces. These sensing applications are in various domains. For example, environment and habitat monitoring, tracking, travel and transportation, inventory management and supply chain, monitoring of building structure, creating a highly efficient temperature-controlled environment by monitoring the readings of temperature/humidity/pollen sensors in buildings, etc. With the deployment of such sensor networks it is not only possible to obtain a fine grain real-time information about the physical world but also to act upon that information.

The accuracy and the timeliness of this sensed information are extremely important in all these applications; since detrimental actions are usually taken based upon these sensed values. In general, the quality and the reliability of this data are important issues that have received attention recently.

9.6 CONTEXT AWARE SECURITY

Ubiquitous computing advocates the construction of massively distributed computing environments that feature thousands of transparent devices and sensors. These gadgets enable the seamless integration of computing resources and physical spaces, and surround users with a convenient, information-rich atmosphere that we refer to as *a smart space*. Smart spaces should sense and react to situational information. They should tailor themselves to meet users' expectations and preferences, as long as the system's security policies are not violated. Context awareness is an important mechanism to achieve the "disappearing computer" vision. However, ubiquitous computing raises security and privacy issues. Smart spaces extend computing to physical spaces, thus, information and physical security become interdependent. Furthermore, the dynamism and mobility that smart spaces advocate can give additional leverage for cyber-criminals, techno villains, and hackers by increasing opportunities to exploit vulnerabilities in the system without being observed. Home and workplace smart spaces require proper and adequate security measures to be laid out to prevent unauthorized access and enforce security policies.

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CHECK YOUR PROGRESS

5. Ubiquitous computing is also known as pervasive computing; true or false?

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Traditional authentication and access control methods require much user interaction in the form of manual logins, logouts, and file permissions. These manual interactions violate the vision of non-intrusive ubiquitous computing. In addition, we believe that the security requirements of a smart space may vary according to the context of the space. Some situations (like during a confidential meeting or homeland security alerts) require greater security to be in place; while other situations may not require a very high level of security. Traditional security mechanisms are context-insensitive, i.e. they do not adapt their security policies to a changing context.

9.7 ANSWERS TO CHECK YOUR PROGRESS

1. Authentication means confirmation of stated identity
2. Body Sensor Network
3. Traditional security mechanisms are context-insensitive because they do not adapt their security policies to a changing context.
4. Authentication, Authorisation and Accounting.
5. True.

9.8 REVIEW QUESTIONS

1. Explain the structure and elements of context aware pervasive system?
2. Explain context aware mobile services.
3. How sensor networks got linked with context aware technology?
4. Explain the context aware security system.

CASE STUDIES

CASE STUDY ON CORE BANKING**NOTES**

A major investment bank adopted the Connotate solution and achieved substantial results within one year. The financial services firm used the power of intelligent Agents to harvest data that could be interpreted in new ways, to generate alerts, and uncover leading indicators from a sea of information.

THE PROBLEM

Investment management firms must deliver proprietary trading insights ahead of their competitors and anticipate market trends. In the fiercely competitive world of investment management, uncovering and delivering innovative research is vital to an investment bank's success. One of the world's largest diversified financial services companies approached Connotate looking for a better solution to the problem common to many modern businesses: a mind-boggling sea of data.

This firm manages more than \$600 billion in assets and maintains offices in more than 30 countries. Traditionally, such investment banks encouraged investment activity by offering insightful research. Producing unique research has grown more challenging with the explosion of data on the Web. There are now more than 700 billion web pages on the Internet. At financial services firms or hedge funds, people report spending a quarter or half their time just gathering information—surfing the web, cutting, pasting and reformatting. Some members of the staff, such as junior analysts, spend the majority of their time doing this grunt work although they were hired for their analytical abilities.

Consider an analyst tasked with monitoring the number of homes for sale on a particular home builder's web site. The analyst would have to visit the site every day and check inventory and sales activity. Even if the analyst just focused on one homebuilder rather than a comprehensive view across a set of home builders, the manual effort would be overwhelming. Soon meetings and other duties would make it almost impossible to

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PRODUCT NAME:

AGENT COMMUNITY GEN2

VENDOR NAME: CONNOTATE

VENDOR WEB SITE:

www.connotate.com

COMPANY SUMMARY:

Connotate is changing the way businesses leverage information from the Web and Enterprise.

Connotate

100 Albany Street

New Brunswick, NJ 08901

Maintain this mundane routine and throw the analyst off schedule. Even the best minds in the business can't perform to their potential if they spend a disproportionate amount of time sifting through information.

Clearly, a better solution was needed.

The client identified two main objectives:

- Automate web data gathering efforts, which were being performed by analysts on an occasional, haphazard basis.
- Innovate ways to generate new ideas and gather web data in order to cultivate alpha boosting ideas.

THE SOLUTION

The firm selected Connotate to automate its data harvesting. Deploying Connotate Agents freed analysts to expand their research efforts and spend more of their time making the sorts of decisions and judgments that only humans can.

Intelligent Agents go out at the same time every day and gather thousands of data points from disparate web sites and compile it in whatever format the client desires. These Agents allowed the client to automate complicated tasks such as monitoring online consumer marketplaces in several countries – a task that would have been extremely difficult to perform manually.

JOB POSTINGS: Connotate's intelligent Agents can reveal leading indicators that give the client an advantage over competitors who haven't figured out a way to see through the blinding snowstorm of data on the Web. Agent Community GEN2 allows analysts to slice data in new ways and develop new, innovative sources of information. For example, job postings have long been public, but until recently they have not been fully exploited as valuable sources of information. A cluster of postings for a certain type of qualifications might suggest that a company is undertaking some kind of new initiative. Connotate can provide a time-series analysis and reveal trend lines that illustrate how many software developers a company is hiring, or how much the company is expanding in Asia or Europe. Similarly, an increase in job postings might indicate that management is confident that future prospects are good. On the other hand, it also could foretell bad news before it becomes public: the sudden removal of job postings may be an early warning that a company expects poor quarterly earnings. Armed with such insight, a trader might take a very profitable position.

Of course, even the best information does little good unless it reaches the right person. Fortunately intelligent Agents can be directed to automatically monitor conditions around the clock and send alerts via email, to a mobile device, or in whatever format the client chooses.

CURRENCY MARKETS: Another example of alerts comes from currency markets – an area of obvious interest for financial institutions. Agents can pick up news that normally wouldn't make it into the mainstream newswires. Connotate Agents were able to pick up warnings of a coup in Fiji from local newspapers before the news circulated the mainstream newswires. Again, the investment bank was able to take advantage of this information.

TRAVEL PRICING: Imagine going to an airline web site every hour to check on ticket price and availability for hundreds of flights. A human could do that for only a short time before he or she became distracted by other duties, bored, and increasingly prone to error. The Connotate solution automates these repetitive tasks on a scale unachievable by humans. Thus a travel analyst can employ Connotate

Agents to monitor airline ticket prices, cruise line packages, and other travel indicators around the clock.

By checking travel pricing for several hundred trip scenarios several times each week, price fluctuations can be monitored, providing a window into consumer trends, the travel industry, and many other interesting points for analysis.

BENEFITS

Connotate's solution helped the firm automate -- check web sites as frequently as desired for new or updated information -- and innovate -- use the information in new and interesting ways to reveal patterns that provide a new angle on the direction that a given publicly traded company is taking.

This firm achieved substantial results within one year. Financial institutions are characteristically unwilling to quantify their results, but perhaps other metrics can be examined. The firm expanded its use of Connotate from North America to Europe and Asia. The managers who oversaw the project were promoted. And one manager said, "We cannot operate without it."

ABOUT CONNOTATE

Connotate's premium solution goes far beyond search allowing users to quickly create and share on demand applications that discern high value information, automate repetitive tasks, and provide analysis and alerts from information found on the Web and across the Enterprise. Its machine-intelligent Agents can do anything a human can do to monitor, mine, analyze mash up and deliver high value content. Agents operate on a fully-automated, 24 x 7 basis. Connotate Agent Community GEN2 is a robust, flexible and scalable platform. Agents are created using an intuitive GUI that supports fast and easy configuration by end-users without programming experience. Content is delivered

over any number of media including XML, RSS, email, text messaging, file systems, direct feeds to SQL databases and Excel. Connotate's clients include large hedge funds and financial services firms; many of the largest global publishers and online media companies; pharmaceutical, energy and Internet companies; and federal and state government agencies. Connotate was the recipient of the 2007 KM Promise Award and has been named one of the "100 Companies That Matter in Knowledge Management" by KMWorld for four consecutive years. Connotate's investors include Goldman Sachs; a relationship that includes a joint marketing agreement in which Goldman Sachs' Hudson Street Services offers Connotate's solution to its investor client base.

NOTES**PRODUCT OVERVIEW****Agent Community GEN2**

Connotate's Agent Community GEN2 is a powerful business intelligence solution that places information access, analysis, and automation right at your fingertips. Based on Enterprise 2.0 principles, GEN2 provides the Enterprise with a complete information access ecosystem. The platform offers a number of features that empower your workforce with tools for idea generation, personalized monitoring, precision harvesting, data mashup, and rapid integration. Without the need for programming, Agent Community

GEN2 increases productivity by a factor from 10 to 100 by eliminating more than 40% of the time spent hunting, gathering, and manually integrating data from disparate internal and external sources.

Connotate empowers the business user with the ability to reach and unleash dynamic content buried deep within the Web and the Enterprise through a virtual workforce of machine-intelligent software agents. With patented machine intelligence and simple point-and-click technology, Agents can be trained in minutes and can perform almost any human interaction with data. Non-technical users can deploy Agents to quickly create and share on-demand applications that discern high-value information, automate repetitive tasks, provide analysis and alerts, and deliver results to a variety of end media. Agent Community GEN2 also helps technical staff or information services by generating awareness of information available through enterprise applications as well as by promoting adoption of those applications.

Use Agent Community GEN2 to:

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- Automate access to and collection and integration of dynamic content from unlimited structured and unstructured sources.
- Penetrate the 700 billion "deep Web" pages not indexed by Google or Yahoo.
- Monitor and extract text, data and pictures from sources in any language that can be shared throughout the organization.
- Provide timely, precise monitoring, surveillance and extraction of time-sensitive, essential information (e.g., earnings, business intelligence, competitive intelligence, SEC filings, international developments, etc.).
- Remove knowledge acquisition bottlenecks within your organization.
- Access a user-created library of best BI/KM sources and practices.
- Uncover business intelligence through access to a number of content-rich internal and external sites.
- Utilize "data feeds" for other knowledge management applications such as text mining, categorization, RSS, enterprise information systems and portals.
- Support better, faster decision-making by sharing information throughout the organization.
- Transform static information stores into automated, real-time data feeds.

Connotate's Agent Community GEN2 is a three pillar approach to information access comprised of the following components:

AGENT STUDIO: A visual, point-and-click Agent creation interface empowering non-technical users to build powerful Agents.

AGENT LIBRARY: A browser-based hub for collaborative business intelligence that provides users with a platform to share and personalize Connotate Intelligent Agents.

AGENT PORTAL: An internal community platform for Accessing, Sharing and Delivering actionable intelligence.

The environment is powered by the Agent Server – A proven highly scalable, Enterprise-level engine for running the Agents. Working together, these components

represent a robust infrastructure enabling the configuration of "on-demand" applications. They enhance organizational agility and knowledge, while reducing time-to-market cycles.

Case Study: Centralized Core Processing Implementation

The implementation of the Tata Consultancy Services (TCS) BaNCS Core Banking at the State Bank of India (SBI) and its affiliate banks represent the largest centralized core system implementations ever undertaken. The overall effort included the conversion of approximately 140 million accounts held at 14,600 domestic branches of SBI and its affiliate banks. This Tower Group

Research Note is a case study that overviews the history of the State Bank of India and details the effort to modernize the bank's core processing systems. It also identifies the drivers to modernization, the critical success factors, and the conversion methodology. For a broader overview of the Indian core systems market, see TowerGroup Research

Background

The State Bank of India is the oldest and largest bank in India, with more than \$250 billion (USD) in assets. It is the second-largest bank in the world in number of branches; it opened its 10,000th branch in 2008. The bank has 84 international branches located in 32 countries and approximately 8,500 ATMs. Additionally, SBI has controlling or complete interest in a number of affiliate banks, resulting in the availability of banking services at more than 14,600 branches and nearly 10,000 ATMs.

SBI traces its heritage to the 1806 formation of the Bank of Calcutta. The bank was renamed the Bank of Bengal in 1809 and operated as one of the three premier "presidency" banks (the presidency banks had the exclusive rights to manage and circulate currency and were provided capital to establish branch networks). In 1921, the government consolidated the three presidency banks into the Imperial Bank of India. The Imperial Bank of India continued until 1955, when India's

- The State Bank of India (SBI), the largest and oldest bank in India, had computerized its branches in the 1990s, but it was losing market share to

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private-sector banks that had implemented more modern centralized core processing systems.

- To remain competitive with its private-sector counterparts, in 2002, SBI began the largest implementation of a centralized core system ever undertaken in the banking industry.
- The State Bank of India selected Tata Consultancy Services to customize the software, implement the new core system, and provide ongoing operational support for its centralized information technology.
- Although SBI initially planned to convert only 3,300 of its branches, it was so successful that it expanded the project to include all of the more than 14,600 SBI and affiliate bank branches.
- The State Bank of India has achieved its goal of offering its full range of products and services to all its branches and customers, spreading economic growth to rural areas and providing financial inclusion for all of India's citizens. Central bank, the Reserve Bank of India, acquired the majority interest in the bank and changed its name to the State Bank of India (SBI). In 1959, the Indian government passed the State Bank of India Act, resulting in the acquisition (majority shareholding) of eight state-affiliated banks and the creation of the State Bank of India

Group (SBI Group). The SBI itself is now majority owned by the Indian government, which purchased the shares held by the Reserve Bank of India. The State Bank of India and its affiliate banks are profiled in Exhibit 1.

Exhibit 1

Profile of the State Bank of India and Associate Banks (May 2008)

Source: State Bank of India Group Unlike private-sector banks, SBI has a dual role of earning a profit and expanding banking services to the population throughout India. Therefore, the bank built an extensive branch network in India that included many branches in low-income rural areas that were unprofitable to the bank.

Nonetheless, the branches in these rural areas bought banking services to tens of millions of Indians who otherwise would have lacked access to financial services. This tradition of "banking inclusion" recently led India's Finance Minister P. Chidambaram to comment, "The State Bank of India is owned by the people of India."

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A lack of reliable communications and power (particularly in rural areas) hindered the implementation of computerization at Indian banks throughout the 1970s and 1980s. During this period, account information was typically maintained at the local branches with either semi-automated or manual ledger card processing. During the 1990s, the Indian economy began a period of rapid growth as the country's low labor costs, intellectual capital, and improving telecommunications technology allowed India to offer its commercial services on a global basis.

This growth was also aided by the government's decision to allow the creation of private-sector banks (they had been nationalized in the 1960s). The private-sector banks, such as ICICI Bank and HDFC Bank, altered the banking landscape in India. They implemented modern centralized core banking systems and electronic delivery channels that allowed them to introduce new products and provide greater convenience to customers. As a result, the private-sector banks attracted middle and upper-class customers at the expense of the public-sector banks. Additionally, foreign banks such as Standard Chartered Bank and Citigroup used their advanced automation capabilities to gain market share in the corporate and high-net-worth markets.

State Bank of India Core Systems Modernization**Drivers for a New Core System**

SBI had undertaken a massive computerization effort in the 1990s to automate all of its branches, implementing a highly customized version of Kinle Banking Systems' Bankmaster core banking system (now owned by Misys). However, because of the bank's historic use of local processing and the lack of reliable telecommunications in some areas, it deployed a distributed system with operations located at each branch. Although the computerization improved the efficiency and accuracy of the branches, the local implementation restricted customers' use to their local branches and inhibited the introduction of new banking products and centralization of operations functions.

The local implementation prevented the bank from easily gaining a single view of corporate accounts, and management lacked readily available information needed for decision making and strategic planning.

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The advantages in products and efficiency of the private-sector banks became increasing evident in the late 1990s as SBI (and India's other public-sector banks) lost existing customers and could not attract the rapidly growing middle market in India. In fact, this technology-savvy market segment viewed the public-sector banks as technology laggards that could not meet their banking needs. As a result, the Indian government sought to have the public-sector banks modernize their core banking systems. In response to the competitive threats and entreaties from the government, SBI engaged KPMG Peat Marwick (KPMG) in 2000 to develop a technology strategy and a modernization road map for the bank.

In 2002, bank management approved the KPMG-recommended strategy for a new IT environment that included the implementation of a new centralized core banking system. This effort would encompass the largest 3,300 branches of the bank that were located in city and suburban areas.

The State Bank of India's objectives for its project to modernize core systems included:

- The delivery of new product capabilities to all customers, including those in rural areas
- The unification of processes across the bank to realize operational efficiencies and improve customer service
- Provision of a single customer view of all accounts
- The ability to merge the affiliate banks into SBI
- Support for all SBI existing products
- Reduced customer wait times in branches
- Reversal of the customer attrition trend

Challenges for the Bank

The bank faced several extraordinary challenges in implementing a centralized core processing system. These challenges included finding a new core system that could process approximately 75 million accounts daily — a number greater than any bank in the world was processing on a centralized basis. Moreover, the bank lacked experience in implementing centralized systems, and its large employee base took great pride in executing complex transactions on local in-branch systems. This practice led some people to doubt that the employees would effectively use the new system.

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Another challenge was meeting SBI's unique product requirements that would require the bank to make extensive modifications to a new core banking system. The products include gold deposits savings accounts with overdraft privileges, and an extraordinary number of passbook savings accounts.

