Chapter 4

Computerisation and Computer-Audit in Banks in India
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4.1 Introduction and Historical Developments

As the Indian banking and financial systems develop and get integrated with the international similar markets, the computerisation and networking has become inevitable. The banks in India are gearing up to adopt IT-based systems on the lines of what has been done by the banks in other parts of the world. The Reserve Bank of India had appointed a Committee on Computerisation under the Chairmanship of Dr. C Rangarajan, the then Governor, RBI, in 1983 to look into the modalities of drawing up phased plan of computerisation for the banking industry covering the period 1985 to 1989. The Committee submitted its report in 1984, recommended introduction of computerisation at branch and controlling offices of banks. The RBI in 1988 constituted the Second Rangarajan committee to draw up a perspective plan for computerisation in banks and to suggest modalities for implementing on-line computerisation, specially at branch-level, to indicate application-areas like funds transfer, electronic mail, BANKNET, SWIFT, ATMs etc. The Committee was expected to assess requirements of trained personnel as well as training needs, to indicate for introduction of bilingualisation. The Committee submitted its report in 1989, and recommended that the thrust of bank-computerisation for the next five years should be to computerise around 2000 to 2500 large branches located at high activity centres, computerisation of RO/ZO/IO (Regional Office/Zonal Office/Head Office), use of BANKNET for several intra-bank and inter-bank applications like funds transfer, credit and authentication, and also installation of small network of cash-dispensers and ATMs at strategic locations such as airports/railway-stations etc. on shared basis by banks. The Committee also recommended the ‘Single Window Concept’, ‘all bank credit cards’, credit-clearing/GIRO system, office-automation, etc.

The computerisation settlement of October 1993 was signed between the IBA and bank employees’ unions to reduce the resistance from labor-unions for computerisation as suggested by the Rangarajan Committee viz to computerise 2500 to 3000 branches in urban and metropolitan centres. The settlement also provided scope for ‘Single Window Concept’ at branches, networking within and among branches, terminals at customers locations, enquiry-terminals for valued customers, ATMs bank-wise and on pool basis, note-counting and signature
verification equipment and use of latest communication facilities available under BANKNET/RBINET, I-NET, SWIFT etc.

The RBI had appointed a Committee (in 1994) on Technology Issues related to payment systems, under the Chairmanship of W S Saraf, the then ED, RBI. The objective of the committee was to suggest ways and means to improve payment systems with the help of technology. The Committee had suggested far reaching changes relating to payment systems, cheque clearing, securities settlement, technology and training in technology for the banking industry. A Delivery versus Payment (DvP) system, for Subsidiary General Ledger (SGL) transactions in Government Securities, had also been suggested by the committee. It had also recommended that the use of electronic communications network based reporting of currency chest transactions.

To examine various issues pertaining to technology upgradation in the banking and financial sector, and to suggest steps for a time-bound implementation of schedule of the Narasimham Committee’s recommendations, the RBI had setup a Committee in the Department of IT under the chairmanship of Dr. A Vasudevan (ED, RBI). One of the terms of reference (which was related to computer-security and audit) was, to suggest necessary security systems and standards for various network-based banking applications. The committee submitted its report in July 1999, and re-emphasised the recommendations made by earlier committees. Some of the important recommendations related to computer-security and computer-audit are:

- There should be an appropriate institutional arrangement for key-management and authentication, by way of a certification agency.
- Banks should adopt widely used standard of cryptography procedures to prevent data-tamper during transmission. These standards would require to be periodically reviewed *.
- Each bank needs to devise a manual on computer-audit and develop appropriate methodologies / systems for conducting computer-audit.
- All new applications should be subject to pre-installation and post-installation audit in addition to periodical audits.
- The capabilities of the CPPD / IT department for selection of applications for outsourcing, choice of vendors, negotiation, managing the contract and post-installation of the software, managing future computer-based solutions etc., have to be reviewed on an on going basis or at least once in three years.

The total number of branches of Indian public sector banks identified for full branch computerisation up to March 2000 is around 7827. However, by March 1999, the number of fully computerised branches was increased to the level of 4620. Banks are also concentrating on inter-connecting branches with one another using Leased-lines or VSATs (Very Small Aperture Terminals), which give banks control over their operations from a central place. The foreign banks operating in India, Urban Co-operative banks, newly established private banks and other private sector banks have also undertaken computerisation and networking of their branches.

The administrative offices of banks viz. Head/Zonal/Regional offices are doing a lot of data processing work to help the concerned authorities to analyse the available information, to monitor business activities and to make decisions. In India, computers are being used for selective activities in administrative offices of banks viz. Processing of statutory returns under RBI Act, monthly/quarterly performance reports from branches, credit information, statistical returns, inter-branch transactions, personnel inventory, provident fund accounting, profit & loss accounts, cash and investment management, stationery stock accounting, and branch house-keeping. Most banks have operationalised software packages for these purposes.

4.2 Electronic Data Interchange (EDI)
As recommended by the Rangarajan Committee and also Saraf Committee, the IBA has constituted a Message Development Group – Finance (MDG-F) to develop message-formats and standards for financial applications of EDI. The GOI (Government Of India) has created a national set-up for promotion and propagation of EDI. The Ministry of Commerce (MoC) is the nodal agency for the EDI work in the country. On the advice of the MoC, the IBA is working on the development of messages for EDI applications in banks. EDI is computer to computer transfer of commercial or administrative transactions using an agreed standard to structure data pertaining to those transactions. EDI standards have been developed in respect of specific messages for transmission of business transactions in electronic form. This scheme is at pilot study stage.

4.3 Electronic Funds Transfer (EFT) System
The system was started in 1996 between Mumbai and Chennai to facilitate transferring of funds between these two cities, across branches and banks. Although the system is inter-bank in orientation, intra-bank transfer would also be possible. In this system, banks can accept request
from their customers irrespective of whether the beneficiary happens to be an account holder or another bank. Customers of around 2500 branches of nationalised banks are getting benefited. This scheme works on the principle of NEXT DAY AVAILABILITY OF FUNDS. The beneficiary gets funds on the next day. Transaction has to be up to Rs. 5,00,000. Those banks which are not computerised can also be linked with the scheme with the help of their service branches. RBINET is being used for transmitting EFT-messages. RBI acts as a service-provider as well as regulator.

4.4 Electronic Clearing Service (ECS)
Reserve Bank of India (RBI) which has taken the initiative of introducing computerisation in middle of 80's has introduced in middle 90's a special variant of EFT in the form of an Electronic Clearing System (ECS) - a clearing system meant for effecting bulk payment transactions without using paper instruments thus paving way for quick and improved customer service to banks/companies, corporations etc. ECS consists of two parts: credit clearing and debit clearing.

The ECS-debit system is used for transactions which involve movement of money from a large number of accounts to a single account. These transactions can be income tax payments by taxpayers, payment of bills by customers of various public utilities etc. In this system, the debit information/instructions is brought to the clearing center by the sponsor bank on magnetic media for subsequent processing.

ECS-credit system can be used for transactions which involve multiple credits. These transactions can be payment of interest, salary, pension, dividend, refund etc. which involved movement of money from a single source to a large number of customers. Instructions/information about the credit of a customer to destination account is brought to the clearing center by the user bank on magnetic media for onward processing.

4.5 SWDHAN : Shared Payment Network System (SPNS)
The Shared Payment Network system (SPNS) in Mumbai has been setup to provide round the clock banking services like cash withdrawals/balance enquiry, at any ATM belonging to one of the banks in the network. This scheme has been implemented by the IBA on behalf of its member-banks, which went live in Mumbai on Feb. 1, 1997. As on 16/8/1999, 29 banks with 109 ATMs plus 4 cash dispensers have become operational. Now the IBA is trying to facilitate use of
SPNS by foreign nationals with the help of international credit cards like MasterCard and Visa international. It will be helpful to foreign travelers in making use of their ATM-cards in India. The SPNS creates benefits in the form of convenience to cardholders and it also helps to reduce cash-holding at home. SPNS network helps card-holders in cash-withdrawal, balance-enquiry, depositing cash or cheques, request for transfer of funds, request for cheque-book, giving standing-instructions, getting a statement of accounts etc. This SPNS will be extended to other cities also. The Network may have more than 500 ATMs in the next five years. In addition to that, it will also be connected to international payment systems through international credit-cards like VISA, MASTERCARDS, AMEX CARDS, etc.

### 4.6 Status of computerisation in Indian Public Sector Banks

As on 30th September 1998, out of total 45439 branches (i.e. whether computerised or not), only 8998 branches have been computerised, either partially or completely, in accordance with the criteria stipulated in Unions/Banks agreement. Out of this, 3668 branches have been fully computerised, and the number of branches (excluding service branches) identified for Total Branch Computerisation (TBC) up to 31st March 2000, is 7022. By now, in most of the controlling and Head office departments, some computerisation is done. The systems there are either Unix or Novell-LAN-based multi-user systems, or PC- (MS-DOS or MS-Windows) -based systems. There are 803 Unix-based mini-computer systems, 2745 Novell-LAN-based systems, and 64066 PCs (either stand-alone or as nodes) installed. Most of the banks have now started planning their inter-branch network and branch-to-corporate/controlling offices' connectivity by setting their own corporate-networks, and many of them have now e-mail and internet facilities at their head-office. A few progressive banks are also thinking of starting internet-based banking services and products in the near future.

### 4.7 Development of Computer-Audit in Banks in India

In view of the rapid adoption of computer-technology in banks in India, and therefore growing importance of Computer-Audit, the IBA made beginning way back in 1990 by bringing out a set of guidelines on EDP-audit. Subsequently, in 1995, the RBI constituted a Committee under the chairmanship of Shri. R Jilani, the then Chairman, PNB, to examine the internal inspection and audit system in banks and to suggest ways to make it more effective. The committee rightly devoted one chapter in this report discussing the problems of ‘Computer Audit’ in general and has made a number of suggestions, a gist of the same is reproduced below.
4.7.1 Recommendations of the Jilani Committee

- There is a need for formal declaration of systems development methodology, programming and documentation standards by the banks, and the EDP Auditors should verify the compliance thereof.

- The entire domain of EDP activities (policy to implementation) should be brought under scrutiny of inspection and audit department.

- Efforts should be made to develop a competent and motivated team of EDP Auditors. There is also a need for the creation of EDP Audit cell within the Inspection and Audit Department. This cell should be manned by personnel drawn from both EDP and Audit Departments.

- More emphasis should be given to total systems development rather than ad-hoc implementation, for effective working and control over computerized operations.

- In the present target-oriented time bound scenario for computerization of branches, there is an urgent need for specifying the role and linkage of EDP Department with outside vendors. There is, thus, a need to formulate a policy and lay standards for development, updation/amendments and audit of such software (S/W) developed by OCA (Outside Computer Agencies). Such S/Ws are required to be approved by senior management before these are implemented. Inspection and Audit department should also verify changes from the point of view of control for maintaining uniformity.

- There is also a need to augment knowledge of EDP auditors on an on-going basis by deputing them to seminars/conferences and through technical publications.

- System of contingency plan should be introduced and subjected to testing by inspecting staff at periodical intervals.

- Due to increase in the use of on-line application, EDP auditors should place greater emphasis on security and controls. Moreover, different security and control features for different systems should be defined and implemented.
- EDP audit function should include critical areas like access control and its levels authorized to make changes in S/W and privileges, etc.

- System of automatically generating inspection reports should be developed for MIS purposes which would evaluate services management for ordering rectification/ratification. Exercise of such reports should be a checking point for EDP auditors.

4.7.2 Training Initiative at NIBM

In this connection, as a proactive step and with a view to preparing an in-house cadre of EDP audit personnel, NIBM took the much needed step of exploring the possibility of providing training support. In fact, it identified the need for IT-audit in 1985, and it was formally expressed in the Conference of Chiefs of Internal Audit & Inspection departments of the banks, held at NIBM. During the period of 1990-95, the same institute conducted a series of training programmes on IT-audit, of 4 to 5 weeks duration each, which included one week assignment of auditing computerised system in banks at branch and controlling offices level. Then in 1996, Mr Javier F Kuong, an expert in the area of EDP audit in USA, was invited to conduct a two week intensive EDP audit course during March 4-15, 1996. The researcher was actively involved in this as well as all subsequent courses conducted by NIBM. In addition, it conducted a series of one-week programmes on computer-audit and trained about 1000 officers for computer-audit of various banks.

4.7.3 Difficulties in EDP Audit

During these courses, the following problems/difficulties in EDP audit area were identified:

- There is a need for greater appreciation of the problems and challenges of EDP audit by the Top Management of respective banks.
- In majority of the banks, computer audit policy has not yet been defined nor has there been supportive writing of EDP audit procedures, formats for a partially/fully computerized environment, SWIFT, ATMs, etc.
- There is a general dearth of EDP audit expertise.
- The EDP Audit Cell, as part of the Inspection and Audit Department, has been created in most of the banks. However, career-path of specialist officers is not defined or explained.
- There are insufficient avenues to train/update knowledge of EDP staff in general and EDP audit personnel in particular.
- **Hardware** (H/W) acquisition policy, software (S/W) procurement, upgradation and maintenance standards have not been formulated in most of the banks.

- There is no system of S/W audit/authorization approval before implementing the same at branches in general. This observation also holds good in respect of procurement of application software.

- There is unlimited dependence on vendors for S/W maintenance. Therefore, there have to be proper procedures for control of changes made to the software.

- There is, in general, a lack of awareness about the custody of source code.

- There is no appropriate system for drawing up a plan for disaster/contingency in business resumption in majority of the cases.

### 4.7.4 Suggestions

These shortcomings can be broadly classified under the following heads:

- Management / policy related
- Personnel related and
- H/W, S/W policy related.

To overcome these deficiencies, the following suggestions are given *(based on the article "EDP Audit in Banks in India : A Resume", Dr. V S Kaveri, Vinimaya, Vol. XVII, No. 1, 1996-97.)*:

- In the wake of time bound switch over to computers by branches in general, the top management of banks may appreciate the need to develop an in-house team of EDP auditors, spelling out, in clear terms, the bank EDP audit policy and documenting EDP audit procedures and formats.

- The career path of trained EDP audit staff in particular, needs a re-look. Acquiring EDP auditing qualification like Certified Information System Auditor (CISA) by an officer may be encouraged by the banks. Further, banks may consider it desirable to pick up the talent and train them frequently in specially tailored programmes at NIBM/BTC (Bankers’ Training College)/ STC(Staff Training Colleges). Overseas training may also be thought of. A
suggestion of accelerated career path for them should be considered to retain expertise in the organization.

- There is also a need for the top management in banks to spell out the management control policy for EDP audit and set of hardware specifications and software development standards. Incidental to this, it is necessary to shortlist and empanel suitable H/W, S/W vendors. Till such time that this is materialized, an in-house team should develop the requisite expertise to write software. The application software packages need to be tested for controls and endorsed by EDP auditors (in-house/external). The user/data processing departments may design internal controls while submitting user specifications for software development to either in-house team/outside vendors.

- It is perhaps a matter of concern that policy for acquisition of hardware, short-listing of vendors, specification standards, bench marking, etc., have not been spelt out in most of the organizations. A system needs to be finalized and hardware standards be laid down for which expert advice can be sought from reputed organizations like NIBM, C-DAC (Centre for Development of Advanced Computing), NCST (National Centre for Software Technology), etc. Software area in particular has several problems and a lack of uniformity is one of them.

- In the case of PC-based software-packages, a policy is yet to emerge. User banks need to remember the perils of using copied packaged software, utilities and the like. Banks are exhibiting a high dependence on vendors. The concept of custody of source code is being ignored and vendors have a 'free for all situation' where they have access to software.

- The Audit Department in banks is not being involved at the development and design stage of the System Development Life Cycle (SDLC), as a result of which much needed audit checks, automatic generation of audible reports, inspection reports, etc., are not provided for. This is partly attributable due to lack of appreciation of audit checks at the S/W development stage. At S/W testing stage, the audit staff does not join the developers for verifying audit test modules, embedded in the system or otherwise. A belated demand for implanting audit routines in the S/W solutions after S/W is installed, would be both costly and time consuming.
- There is need to make one aware of spelling out audit procedures and documenting them in
  the form of manuals and formats.

- A system of carrying out 'Implementation Audit' by suitable officials within a period of 4-6
  months of switch over from manual to partly/fully computerized scenario should perhaps be
  made mandatory.

- There is also a need to educate all in the perils of computer frauds with particular reference to
danger signals and consequences of disregard or compromise of physical and logical security
checks.

- A conscious decision may have to be taken by the management to permit access to the EDP
auditor as a user (for audit purposes) for an effective audit. Access to the operating system
may also be necessary. Test data, based on as near to a live situation as possible may be
developed by an in-house team which will take care of limitations of 'off the shelf' audit
packages.

- The role of the concurrent auditor, working in a fully computerized scenario also needs to be
fine-tuned so that he could use his audit techniques in the working environment most
effectively.

It is also suggested that, in the wake of fast computerization, the RBI may spell out the EDP audit
policy in clear terms and make it mandatory for banks.

4.8 Conclusion

Even today, i.e. after about five years from the submission of the report, and despite creating a lot
of awareness about the importance of computer-security and computer-audit through a large
number of training-programmes (about 20, which were attended by in all about 1000 executives
from the IT-Department and the Audit department of various banks in India and abroad), the
computer-audit activities in the banks in India are still in the beginning stage. The Committee set-
up under the chairmanship of Shri. M Narasimham, on Banking Sector Reforms (known as
Naramsham Committee II), also re-emphasised the importance of computer-audit related
activities. It states, one of the most important areas requiring close scrutiny in the coming years
would be "Computer Audit", in view of the large usage and reliance on IT. It also says: a lesson
to be learnt from the experience of some advanced countries where IT has been put to great use in
the last two-to-three decades is with regard to the security-standards and features that would be
required to be adopted to maintain secrecy and integrity of data also against penetration of frauds
in this area. Necessary computer-audit measures relating to this area have, therefore, to be put in
place. The Committee also suggested to make an early review of the progress made in regard to
the implementation of the Jilani Committee’s recommendations.

All this shows that, the area of computer-security and audit is still in the evolving stage, and
requires urgent attention. In fact, as of today, there is no any person / group of people within the
banks (apart from computer-audit cell) to look after security aspects of the electronic banking,
unlike in the advanced countries. On an average, there is only computer-auditor (the officer-
grade) in the computer-audit cell in most of the banks. A few banks, which are having a good
team of two or more IS-auditors (e.g. BOI, Vysya Bank etc.), have started preparing computer-
audit manual especially for conducting computer-audit at fully computerised branches and also
for conducting the software-audit. Some banks which do not have adequate computer-audit
expertise available with them, have out-sourced the computer-audit of computerised-branches as
well as software audit part of it. For example, Dena Bank has used this strategy. They also got
done the software-audit of their vendor-supplied software-systems from a third party.
Accordingly, the software vendors who have supplied branch-automation packages to this bank,
was told by the bank to get the software-audit done, and it was carried out by two of the
international computer-audit firms. Along with this, the bank also underwent environmental
computer-audits of its computerised branches by these agencies, on a regular basis. Adoption of
this strategy gave very good results to the bank. However, there are not many banks in India, who
have exercised computer-audit activities in an effective way. In many other banks, there is hardly
any presence of computer-audit related activities. Thus, the banks in India have a very long way
to go. Especially in the context of accelerated pace of computerisation and networking, there is an
urgent need to develop this area.

In order to emphasise the importance of computer-audit, several cases on computer-
security break-downs and computer-frauds are examined under the study. Also, it is
attempted to assess the computer-fraud risks at the bank-level, sector-level and at the
Indian banking industry-level. All these things are discussed in the next chapter.

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