

बैंकों में कम्प्यूटरीकरण  
समिति की रिपोर्ट

REPORT OF THE COMMITTEE  
ON  
COMPUTERISATION IN BANKS



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भारतीय रिज़र्व बैंक  
बम्बई - 400 023.

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RESERVE BANK OF INDIA  
BOMBAY-400 023.

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1989

# **REPORT OF THE COMMITTEE ON COMPUTERISATION IN BANKS**



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BOMBAY - 400 023.**

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# Chapter 1

## Background

1. The profile of Indian banking has undergone a metamorphosis in the post-nationalisation era. The change is characterised by radical transformation in the role, scope and extent of business operations of banks. The industry has grown dramatically in size as well as complexity of business. Banks have emerged as effective catalytic agents of socio-economic change.
2. This massive expansion and diversification of the banking system was not without its attendant stresses and strains. Housekeeping and control functions got somewhat neglected owing to business pressures. Customer service tended to deteriorate and attracted public attention. Bottlenecks developed in the flow of information compromising control and monitoring on the one hand and responsive policy formulation and review on the other. Recovery of advances slipped, thereby suboptimising recycling of funds and profitability of banks.
3. Banks showed exemplary zeal in meeting their social obligations in tune with the national policies. Banks in India have perhaps registered the highest growth in terms of branch network within a span of two decades. The growth in network of branches and volume of business was achieved mostly by enlarging the manpower resources. However, higher and sophisticated technology was not widely used. Banking industry has now entered a phase with accent on consolidation, productivity and qualitative improvement in its operations. Inevitably this has prompted a closer look at the technology in use.
4. The first blue print for computerisation and mechanisation in banking industry was drawn up in 1983-84. A Committee was set up in 1983, under the chairmanship of Dr. C. Rangarajan, Deputy Governor, Reserve Bank of India to look into the modalities

of drawing up a phased plan of mechanisation for the banking industry, covering the period 1985-89. The Committee submitted its report in 1984 and recommended introduction of computerisation/mechanisation at Branch, Regional Office/Zonal Office and Head Office levels of banks. The recommendations of the Committee are being implemented by banks and progress monitored on an ongoing basis by Reserve Bank of India and the Government.

5. Against the background of the experience gained in the eighties and the tasks ahead of the banking system, Reserve Bank of India set up in September 1988, another Committee under the chairmanship of Dr. C. Rangarajan, Deputy Governor to draw up a perspective plan of computerisation for banking industry for the five year period 1990-94, and consider other allied issues.

6. The terms of reference of the Committee are as under:-

(i) To draw up a perspective plan for computerisation of banks at the Branch, Regional Office/Zonal Office and Head Office levels for the five years from 1990 to 1994 and to recommend the strategy for its implementation.

(ii) To suggest modalities for implementing on-line banking, specially at the branch level.

(iii) To indicate the application areas (like Electronic Funds Transfer, Electronic Mail, Message Switching) relating to the use of BANKNET and SWIFT.

(iv) To suggest guidelines for installation of ATMs and other self-service machines by banks.

(v) To assess the requirements of trained personnel and the need for training on computerisation and to recommend suitable arrangements therefor.

(vi) To suggest modalities for phased introduction of bilingualisation in computers used in banks.

(vii) To make any other recommendations which are incidental or related to the above terms of reference.

7. The composition of the Committee is as under:-

(i) Dr. C. Rangarajan                      Chairman

Deputy Governor

Reserve Bank of India

Bombay

(ii) Shri K. P. P. Nambiar                      Member

Secretary

Government of India

Department of Electronics

New Delhi

(iii) Shri V. P. Sawhney                      Member

Additional Secretary

Government of India

Ministry of Finance

(Banking Division)

New Delhi

(iv) Dr. P. P. Gupta                      Member

Chairman

CMC Ltd.

New Delhi

(v) Shri S. R. Vijayakar                      Member

Chairman

MELTRON Ltd.

Bombay

: 4 :

- (vi) Shri R. Srinivasan                      Member  
Chairman  
Indian Banks' Association  
Bombay
- (vii) Shri J. S. Varshneya                      Member  
Chairman & Managing Director  
Punjab National Bank  
New Delhi
- (viii) Shri P. S. Gopalakrishnan                      Member  
Chairman & Managing Director  
Indian Overseas Bank  
Madras
- (ix) Shri N. Vaghul                              Member  
Chairman  
Industrial Credit &  
Investment Corporation  
of India Ltd.  
Bombay
- (x) Shri V. Atal                                      Member  
Managing Director  
State Bank of India  
Bombay
- (xi) Shri B. K. Ghose                              Member  
Director  
National Institute of Bank Management  
Pune

(xii) Dr. S. Ramani Member

Director

National Centre for

Software Technology

Bombay

(xiii) Prof. A. Kalro Member

Indian Institute of Management

Ahmedabad

(xiv) Shri S. P. Gothoskar Member

Principal Adviser

Department of Statistical

Analysis & Computer Services

Reserve Bank of India

Bombay

(xv) Shri T. K. K. Bhagavat Member

Chief Officer

Department of Banking

Operations & Development

Reserve Bank of India

Central Office

Bombay

(xvi) Shri B. J. Mandhyan Member -Secretary

Adviser

Management Services Department

Reserve Bank of India

Central Office

Bombay

Upon the retirement of Shri K. P. P. Nambiar, Secretary, Department of Electronics, Shri R. Rajamani, his successor represented Department of Electronics on the Com-



mittee. Shri S. P. Gothoskar, Principal Adviser, Department of Statistical Analysis & Computer Services, Reserve Bank of India tragically expired during the tenure of the Committee; the Committee places on record its heartfelt condolences and appreciates his valuable contribution.

8. The Committee on computerisation in banking industry had its first meeting at Reserve Bank of India, Bombay on 28th and 29th October 1988. Members of the Committee were taken round to visit the computerised branches and regional office of banks situated in Bombay, to obtain a first hand feel of computerisation efforts. During the meeting, among other issues, it was proposed that a Technical Group may be constituted to assist the Committee in the task and suggest modalities for on-line computerisation in banking industry. The members of the Technical Group so constituted and its terms of reference are as follows:

(i) Dr. S. Ramani Chairman

Director

National Centre for

Software Technology

Bombay

(ii) Shri B. J. Mandhyan Convenor

Adviser

Management Services Department

Reserve Bank of India

Bombay

(iii) Dr. K. K. Bajaj Member

Additional Director

Department of Electronics

Government of India

New Delhi

- (iv) Shri Rakesh Babu                      Member  
Deputy General Manager  
(Computers)  
Mahanagar Telephone Nigam Ltd.  
Bombay
- (v) Shri A. K. Sud                              Member  
Deputy General Manager  
Bank of India  
Bombay
- (vi) Smt. L. S. Hoskote                      Member  
Deputy General Manager  
Union Bank of India  
Bombay
- (vii) Smt. Harsha Palav                      Member  
Assistant General Manager  
Central Bank of India  
Bombay
- (viii) Shri Narendra Kale                      Member  
Managing Director  
Kale Consultants Pvt. Ltd.  
Bombay
- (ix) Prof. S. M. Padwal                      Member  
National Institute of  
Bank Management  
Pune
- (x) Dr. Nirmal Jain                              Member  
Tata Consultancy Services  
Bombay

(xi) Prof. T. P. Rama Rao                      Member

Computer Group

Indian Institute of Management,

Ahmedabad

9. The Technical Group was requested to examine the need, scope and technical and operational feasibility of on-line banking at the Branch, Regional Office/Zonal Office and Head Office levels and also examine the implications of the proposed measures including modalities for their implementation. Infrastructural and secretarial assistance to the Group was provided by the Management Services Department of Reserve Bank of India.

10. The first meeting of the Technical Group was held on 5th December 1988 and was addressed by Dr. C. Rangarajan. The Technical Group subsequently held several meetings and submitted its report to Dr. Rangarajan in January 1989. The report was circulated for comments to all the members of the Committee. Simultaneously, as desired by the Committee, Management Services Department framed a detailed questionnaire on all relevant issues and sent it to banks, Government departments, some prominent user bodies, Indian Institutes of Management and other concerned bodies. The questionnaire was addressed to 50 organisations and individuals and responses were received from 35. These responses were broadly summarised into three sections (progress, issues and plans) and sent to all members as a background paper along with Technical Group's report.

11. The Committee met thereafter on 15th March and 3rd May 1989 and the members deliberated on all the terms of reference. Draft report of the Committee was prepared and discussed on 15th June and 17th July 1989. The report was finally signed by members on 9th November 1989.

The recommendations of the Committee are given in the following chapters.

12. All the members of the Committee are grateful to the Governor, Reserve Bank of India, for giving them the opportunity to work on this Committee. The Committee also places on record its grateful thanks to the Technical Group members who did a quick and competent job of examining various issues referred to them for examination. In particular, the Committee is thankful to the many respondents from banks and other agencies who took pains to give valuable comments and suggestions in response to the questionnaire sent to them. The Committee would like to thank Shri R. Janakiraman, Executive Director, Reserve Bank of India for his active participation during the deliberations of the Committee. The Committee desires to record its special appreciation of the services rendered by Shri B. J. Mandhyan, Member-Secretary. His involvement in the work of the Committee was total. He diligently and meticulously organised the required data and background material. He also set forth the possible alternatives relating to several issues and this immensely helped the Committee to take the various decisions. The Committee also places on record their appreciation of the efficient and competent secretarial help provided by the members of staff of Management Services Department (MSD), Reserve Bank of India, specially Sarvashri R. S. Bakkannavar, S. T. Gerela, Rakesh Mathur, R. M. Udyavar, B. L. Bomma and V. S. Hameed Kutty. Thanks are also due to the typists and stenographers of MSD who sincerely and diligently applied themselves to the task of typing the report at various stages.

## Chapter 2

### Progress and Review

In 1983, Reserve Bank of India constituted a Committee under the Chairmanship of Dr. C. Rangarajan, Deputy Governor, Reserve Bank of India. The Committee had as its members, Chairmen of major banks, officials from Government, Reserve Bank of India, Indian Institute of Management, Department of Electronics etc.

2. The tasks before the Committee were broadly to:

- (i) Identify the areas/functions where mechanisation will be essential;
- (ii) Recommend appropriate types of equipments suitable for various types of processing;
- (iii) Recommend infrastructure needed to ensure smooth data flow;
- (iv) Suggest phased programme of implementation;
- (v) Suggest appropriate steps so that exchange of information through suitable computer media between different banks and Reserve Bank of India is possible;
- (vi) Suggest standardised procedures in various areas of work and examine the feasibility of having common processing arrangements for all banks at selected focal points.

3. The Committee analysed the then prevailing banking scenario and observed that though the banking industry with its 45,000 branches at that time, was spread in 25,000

centres, nearly 60% to 70% of the business was concentrated in about 10,000 branches located in about 100 centres.

It also observed that with the phenomenal increase in the activities of banks and wider geographical coverage, a degree of mechanisation had become essential if customer service, house-keeping functions and generation of data required for control and monitoring purposes were to be performed efficiently. While making its recommendations, it took into account the extent and level of technology available in the country in early 1980s and the agreement entered into by Indian Banks' Association with employees' unions in 1983, which imposed limitations on the extent and degree of computerisation in terms of type of machines to be used, application areas, number of machines to be used, capacity of the computers etc.

The Committee submitted its report in 1984.

4. The Committee made the following major recommendations:

(i) Mechanisation should encompass Branch, Regional/Zonal Office and Head Office levels with the emphasis varying from one level to another;

(ii) At the branch level, the mechanisation should be implemented under either Model I or Model II of mechanisation. In Model I, stand alone electronic ledger posting machines with attached memory module will be installed to perform dedicated functions at different counters. The machine would also generate statement of accounts and periodically work out products and interest accruing on accounts. In Model II, a single micro-processor-based system will be installed in a branch. Vouchers will be posted manually in primary ledgers and thereafter information will be entered into microprocessor system to generate supplementaries, day book, general ledger and other statistical returns;

(iii) The data from branches will be received by Regional/Zonal Offices and processed through micro-processor based computer systems for generating appropriate outputs to facilitate their control functions. The data will then be transmitted to the Head Office for being stored in the mainframe system to generate macro level information for the bank as a whole;

(iv) Input/Output formats should be standardised;

(v) The mechanisation programme should be implemented in two stages. During the three-year period from 1985 to 1987, Regional/Zonal Offices and Head Offices would be equipped with suitable systems. About 2,500 branches were to be equipped with 10,000 Model I or Model II machines. In stage II, (1988-89), additional 6,000 branches should be mechanised with 20,000 machines;

(vi) Telecommunications need to be made more effective; and

(vii) Clearing House operations should be computerised on priority basis.

5. The Indian Banks' Association had entered into an agreement on mechanisation/computerisation with All India Bank Employees' Association in September 1983 under which Electronic Ledger Posting/Accounting Machines, Micro Processors/Mini-computers and Mainframe Computer systems were to be installed to support specified functional areas in Branches, Regional/Zonal and Head Offices of banks. The settlement specified that accounting machines, electric/electronic, with memory other than computers may be utilised in banks for the following purposes:

- (a) Current Accounts
- (b) Savings Bank Accounts
- (c) Other Deposit Accounts
- (d) General Ledger Accounts
- (e) Cash Credit and Loan Accounts
- (f) Salary and Pay rolls

The Agreement, further laid down that no accounting machine will be used at rural branches and no electronic machines with memory will be installed at semi-urban centres except as provided for below:

- (i) At rural and semi-urban branches, machines may be used for the limited purposes of Management Information System including General Ledger Accounts;
- (ii) At rural and semi-urban branches where the clerical strength exceeds 15, machines may be used for the purposes listed above.

Further, computers including mini-computers were allowed for clearing operations, reconciliation, remittances, foreign exchange transactions, investment management, personnel inventory, payroll, pension and provident funds, merchant banking operations and management information systems on credit, budgetary data and annual closing returns. In so far as large computers other than mini-computers are concerned, not more than one could be installed at one centre in each bank and the capacity of such large computer was limited to what is being used in RBI from time to time. No retrenchment of staff as a result of the introduction of machines/computers was permitted. If there is any displacement of staff as a result of introduction of such machines/computers, it was to be kept to the minimum. The staff so displaced were to be absorbed in the same city or town.

6. This agreement was valid for three years but it was open to individual banks to extend the scope of computerisation during this period by reaching an agreement with their own recognised unions.

7. Installation of Advanced Ledger Posting Machines (ALPMs) at branches was delayed owing to inadequate infrastructure facilities and controversy over the interpretation of some of the provisions of the agreement. Later on, another agreement was signed on 29th March 1987 between Indian Banks' Association (IBA) and Employees' Unions.



The main provisions of the revised agreement are as under:-

(a) Electronic Accounting Machines with memory, other than computers, also described as ALPMs and Advanced Electronic Accounting Machines (AEAMs) may be installed with configuration as under:

- i) not exceeding 256 kilo bytes
- ii) not exceeding 16 bits
- iii) floppies/winchester disk

(b)The Machines shall be stand-alone, each dedicated to only one of the following functions:

- i) Current Accounts including overdraft accounts
- ii) Savings Bank Accounts
- iii) Other Deposit Accounts
- iv) General Ledger Accounts
- v) Cash Credit and Loan Accounts
- vi) Salary and Payroll

(c)Average number of vouchers per machine of Current Accounts including Overdraft Accounts or Other Deposit Accounts or Cash Credit and Loan Accounts shall be about 400 per day.

(d)The number of accounts on the machines for Savings Bank shall be 2,200.

(e)The machines shall not be installed at the rural or semi-urban branches of any bank.

(f) The machines shall be installed at branches eligible on the following basis:

i) in banks with aggregate deposits of Rs.1,500 crores or more as on 31st December 1985 at their branches with an average of 1000 or more vouchers per day.

ii) in banks with aggregate deposits of less than Rs.1,500 crores as on 31st December 1985 at their branches with an average of 750 or more vouchers per day.

(g) The number of machines to be installed by banks including 28 public sector banks shall be upto 3,500 for the period ending 7th September 1987 and upto 5,700 during the next 2 years to be shared amongst the banks on a pro-rata basis of the aggregate deposits as on 31st December 1985.

(h) Special allowance of Rs.350/- per month to the machine operators and Rs.245/- per month to Encoder Operators will be payable. ALPM operators will be selected on the basis of an aptitude test.

(i) It is open to individual banks even during currency of this settlement to continue with any existing understanding/settlement or to enter into any fresh understanding/agreement/settlement with their representative/recognised union for further enlargement of the scope of computerisation/mechanisation.

8. Quarterly Action Plans were drawn up for computerisation at all the 3 levels and in regard to clearing houses. Performance of banks was monitored through periodical returns and meetings.

9. To start with, most of the banks did not have either a suitable organisational set up or technically qualified staff in adequate number to effectively implement the plan of computerisation. Therefore, the first task was to create a distinct and fully

accountable organisational unit called 'Computer Policy & Planning Department' in each public sector bank under the charge of a senior executive. A concerted effort was organised to provide training for the personnel of banks at various levels.

Resultantly, all the public sector banks have now a fullfledged department at corporate level with an officer in Scale IV, V or VI in charge. Further, about 2,300 officers have been trained in Programming/System Analysis, over 12,000 staff in terminal operations and about 20,000 officers have attended computer appreciation programmes.

#### ***10. Mechanisation at branch level***

There were several teething problems relating to infrastructure such as :

- (i) paucity of space in already congested metropolitan branches,
- (ii) non-availability of reliable uninterrupted power supply equipment,
- (iii) application software to suit requirements of individual banks,
- (iv) chronic shortage of power in some cities,
- (v) inadequacy of the computer industry to allocate its manpower resources to meet the special operational requirements, specially relating to security and safety in banks.

11. While in mid 80's there were hardly half a dozen vendors catering to banks, over a period of next three years, it has been possible to have a panel of over two dozen vendors who are fairly well aware of specific requirements of banks. During this period, operating system of the machines had to be modified to suit security needs of banks

and considerable efforts devoted to develop suitable application software. Some of the security features provided are :

(i) atleast two hardware locks, one each for operator and Manager/Supervisor,

(ii) floppy drive shutter and lock to bar access to data floppies during operations,

(iii) function oriented two or three level passwords,

iv) compulsory print out of all transactions put through the machine with the operator's identity and numbering every page of the print out,

(v) certain set of privileged operations e.g. opening of new account, begin/end activity, authorisation of some exceptional transactions etc. not to be possible without Manager/Supervisor' authorisation,

(vi) special utilities to compute a control number at day-end, based on the daily transactions, and, re-checking and matching it at the time of begin- day operation,

(vii) encryption of data,

(viii) periodical back-up of data files.

12. The process of customisation of software to suit the individual requirements of the banks resulted in some delays in the operationalisation of the machines. Indian Banks' Association was, therefore, requested to attempt standardisation of software specs for front office applications.

The IBA Group submitted reports on Savings Bank, Current Accounts, Cash Credit and Overdraft, Term Deposits and General Ledger. The reports provided standards for software specs, functional features, screen formats, codes for operations and systems

and procedures to be followed by branches. Copies of the specifications were circulated to banks and all empanelled vendors.

13. In conformity with the policy of bilingualisation enunciated by the Department of Official language (DOL), series of meetings were held with bankers, vendors and officials of DOL, DOE and CMC Ltd. to explore avenues of developing bilingual capabilities in ALPMs. Accordingly, the hardware specifications were revised in late 1987 to provide hardware capability for bilingual operations on ALPMs. The revised specifications were as under :

- (i) IBM PC-XT/AT compatible machines with 256 KB of RAM ( Random Access Memory )
- (ii) 16 bit Word length
- (iii) Colour graphics/Hecules Card
- (iv) IBM Compatible printer

14. While initially the pace of mechanisation at branch level was slow, it picked up during the last two years. The progress made by the banks in computerisation at branch level as on 30th September, 1989 is as under :

Number of ALPMs installed	4776
Number of operational machines	4489
- of which on live run	3409

### **15. Computerisation in Regional/Zonal Offices**

The objectives of computerisation in the regional/zonal offices of banks were identified by the Committee (1984) as follows :

- (i) to capture data on computer media such as floppy discs/tapes;
- (ii) to edit and transmit these data for direct input to the mainframe computer systems in head offices of banks; and
- (iii) to undertake limited processing to generate information for operational controls.

The Committee added that ROs/ZOs should have microprocessor systems with adequate number of off-line data entry machines for achieving these objectives. Data would be received from branches and after their scrutiny, transcribed on to floppy discs for being processed on the microprocessor systems installed in these offices. Besides editing and analysing data for control purposes, the regional/zonal systems would mainly support data entry operations and exchange of information on computer tapes/floppy discs.

16. The various common application areas contemplated for computerisation at RO/ZO level are :

- (i) Processing statutory returns under Section 42(2) of RBI Act;
- (ii) Monthly/Quarterly performance report from branches ;
- (iii) Credit information system;
- (iv) Processing of BSRs;
- (v) Inter-branch transactions with partial processing;

- (vi) Personnel inventory system;
- (vii) Provident fund accounting;
- (viii) Profit & Loss, Balance sheet;
- (ix) Cash management;
- (x) Stationery & Dead stock accounting and control.

Besides the above, other items suitable at RO/ZO level envisaged were monitoring of branch housekeeping and necessary follow up, profile of large/critical borrowers, MIS etc.

Initially, standardised hardware and systems software specifications were prescribed for RO/ZO systems. These were finalised with the help of CMC Ltd. Thus, VME bus, MC 68000 family chip, Unix O/S, Unify Database, Microfocus Cobol etc. were prescribed and vendors empanelled on that basis. These specs have recently been relaxed. To ensure compatibility of application software across the machines of different vendors, now the only standardisation insisted upon is on Unix as O/S, Microfocus Cobol and X.25 Protocol support.

17. CMC Ltd. was also requested to develop standard software packages for the applications listed in the Committee's report and offer them to banks on licence basis at reasonable fees. Banks were also given an option of developing requisite software either in-house or to procure it from any other agency. CMC Ltd. came out with 3 packages on Credit information system (CRISP), Personnel inventory system (PINS) and Weekly returns to RBI (WIRES) in October 1986. Subsequently, they also marketed 4 more packages, viz., Performance budgeting, Cash management, Provident fund accounting and Payroll in August 1987. These packages, however, did not find ready acceptance with banks on account of their varying internal MIS requirements.

Most of the banks have operationalised the 7 software packages mentioned above. Quite a few banks have developed inhouse several packages, such as, Investment management, outstanding entries in Suspense account, Compilation of annual accounts, agricultural advances monitoring, Share applications, Small-scale industries' advances etc.

A proposal to share packages, developed internally, with one another was also mooted in 1988 to optimise the development costs by avoiding duplication of efforts. A list of packages available with various banks was circulated to all banks with a request to work out sharing arrangements to mutual satisfaction.

As on September 1989, 233 systems were installed.

### ***18. Computerisation at the Head Office level***

The main objectives of computerisation of head office are orderly storage of data and their retrieval and analysis to exercise control, generation of reports for management to aid policy formulation and evaluation of performance, and, maintenance of external data base on domestic and international economies. Bulk of these data was estimated to need batch processing on receipt from ROs/ZOs.

To determine the specifications of the mainframe computers to be installed by banks at their Head Offices, a Committee comprising members from RBI, Indian Banks' Association and a few banks was set up in 1985.

The report of the Committee was circulated in October, 1985 amongst the public sector banks, CMC Ltd. and Department of Electronics for their reactions to the recommendations. While the recommendations generally found acceptance, divergent views emerged on certain specific issues such as networking facility, single/multiple vendor approach, standardisation of hardware, compatibility with RO/ZO systems and branch level machines, configuration and utilities etc.



Another group was constituted in December 1986 with members from RBI, IBA, DOE, experts of CMC Ltd. and a few commercial banks to give a comprehensive look at all the related issues. The Group in its report submitted in 1987 outlined various applications at Head Office level and the required hardware and software specifications. The report covered essential details pertaining to site preparation, selection and training of personnel and organisational set-up as well as the need to develop standardised applications software. This report was also circulated amongst the banks.

19. The Group considered it desirable for banks to instal a mainframe in place of several minis as better security features, higher speeds, data transmission and message switching facilities etc. are available on the mainframes.

Broad configuration as recommended by the Group is as under (subject to specific needs of each bank) :

	Category I (more than 1000 branches)	Category II (less than 1000 branches)
CPU	32 MB	32 MB
Disk - Capacity	6 - 12 GB	4 - 8 GB
- Spindles	10 - 15	6 - 10
Tape drives	4	4
Printers : line	2	2
	(1000 lpm)	(1000 lpm)
: Dot- ) Matrix )	1 or more with software support for printing in Devanagari	
Terminals	40	20

20. Subsequently, a benchmarking committee of RBI, banks, CMC and DOE was constituted and they empanelled 3 indigenous vendors for supply of mainframe computers to banks.

21. One bank had already installed an imported mainframe system prior to the completion of the benchmarking exercises. Another bank installed a mainframe from amongst the empanelled vendors in June 1989. Another 3 or 4 banks are expected to instal mainframes by end of 1989.

22. An effort has also been made to pool in the resources of the banks for in-house development of application software. A group was constituted for developing software specifications for two applications, viz., Lead Bank Scheme monitoring and Government Accounts Co-ordination from amongst volunteering banks. The Group has submitted specifications and input-output formats for adoption by banks.

### **23. Other areas**

In addition to the various systems installed for identified purposes within the guidelines of the Committee's report (1984), banks have also installed several other computers for activities such as Foreign Exchange dealings, Inter-Branch Reconciliation, Word Processing, Training, generation of various MIS reports, Software Development, Consolidation of Annual Accounts etc. The number of such system which include Personal Computers, minis and other machines, as reported by the banks on 30th September, 1988, was about 600.

### **24. Computerisation in Clearing Houses**

The work involved in cheque clearing operations is voluminous, repetitive and routine in nature. To speed up the process, it was felt that the clearing operations may be computerised. In the first phase, operations at the clearing houses managed by RBI at 9 major centres, viz., Ahmedabad, Bangalore, Bombay, Calcutta, Hyderabad, Kanpur, Madras, New Delhi and Nagpur have been computerised.

25. The systems installed in the clearing houses are also utilised for balancing of Reserve Bank's inward and outward clearing cheques and preparation of scrolls covering receipts and payments transactions on account of Government departments. The computerisation of settlement operations at the remaining 5 centres managed by RBI (Bhubaneswar, Guwahati, Jaipur, Patna and Trivandrum) has been taken up and preparatory work is in progress.

26. Further, to facilitate cheque sorting and to cut delays, high speed reader sorter systems driven by powerful IBM 4381 systems have been installed at Bombay, Delhi, Madras and Calcutta. The 4 systems together are now processing about one million instruments per day with Bombay clearing house touching peak figure of over 6 to 7 lakhs on some days. It has thus been possible to ensure orderly and timely balancing of clearing houses notwithstanding the big load on the systems.

MICR technology requires standardisation of cheques etc. in terms of quality of paper and printing of relevant particulars of cheques such as serial number, city/bank/branch on which drawn, account number, nature of transaction and amount at bottom of the cheque (called MICR band) in magnetic ink. While some particulars are pre-printed other particulars such as account number and amount are encoded by banks with the help of the encoders. 7 manufacturers of MICR grade paper and 51 security printers have been empanelled and size of instruments standardised.

27. A special clearing for high value cheques of more than Rs.1 lakh has been introduced in Bombay, Calcutta and Madras. Credit is afforded to parties within a day and withdrawal allowed the next day.

28. National Clearing of inter-city cheques has been operationalised between Bombay, New Delhi, Calcutta and Madras. Outstation cheques drawn on Bombay, Madras, New Delhi and Calcutta are now cleared within about a week as against the previous time lag of upto 4 weeks. Similar facility one way, i.e., for collection of cheques drawn on the above centres received in Ahmedabad, Bangalore, Nagpur and Hyderabad has

also been introduced. Clearing House rules have also been standardised for better working.

### **29. BANKNET**

It is proposed to operationalise by early 1990, a telecommunication network of banks and financial institutions called 'Banknet'. This will facilitate funds transfer, message switching, access to common data base, electronic mail, MIS etc. BANKNET will be based on X.25 packet switching data network. CMC has been appointed as consultant. Clearance has already been received for import of the required equipments and Department of Telecommunications have also approved the establishment of this network. Efforts are afoot for development of needed software and creation of suitable infrastructure. A users group of RBI, banks and other experts has been constituted to review and monitor implementation under a time bound schedule.

### **30. SWIFT**

Reserve Bank of India and 28 Indian banks as well as 8 foreign banks in India have become members/sub-members of the Society for Worldwide Interbank Financial Telecommunications (SWIFT). SWIFT would provide rapid, reliable, secure and cost effective means of transmitting international financial messages. The process of implementation has started in the RBI & banks. SWIFT communication network is expected to be operational in India from March-June 1991 onwards. A user group has been set up, headed by Chairman IBA, to facilitate SWIFT implementation.

### **31. Training**

The Committee (1984) had estimated macro level requirements of trained resources for the three tiers, viz., Branch, Regional/Zonal Offices and Head Office levels at which computerisation had been contemplated during 1985 to 1989 as under :

i) Data Entry Operators	40,000 - 45,000
ii) Systems Analysts & Programmers	1,000

The Committee had indicated that these requirements are to be met largely from the existing staff, by arranging for their training to develop necessary skills. Further, managerial skills for proper co-ordination between data suppliers, data users and EDP departments also need to be developed. These estimates were based on the assumption that 30,000 ledger posting machines, 300 microprocessors in Regional/Zonal Offices and about 25 mainframes at Head Offices would be installed during the plan period. However, the branch target for installation of ALPMs has subsequently been scaled down to 5,700 up to September 1989.

32. Banks are quite conscious of the role of training in successful implementation of computerisation plan. The progress achieved as on September 1989 is as follows :

Number of Officers who have undergone	
Programmers/Systems Analysts courses:	2,372
Number of employees trained as Data	
Entry Terminal Operators	1 2,761
Number of Officers who have attended	
brief Appreciation Programmes	20,655

Recognising the need to train groups of officers from within banks in the specialised task of Computer Audit, IBA had recently organised long term programme in Computer Audit, through Tata Consultancy Services and CMC Ltd. The programme was of 6 months' duration and has been well received. NIBM has also conducted one Audit Programme and agreed to schedule on a regular basis, similar short duration programmes on the subject. Another important contribution has come in the form of an audio-visual training kit for training at the branch level, developed by a consultant,

or an assignment from the IBA. The kit consists of reading material, transparencies as well as a computer aided self-learning programme.

33. A questionnaire soliciting comments & suggestions on bank computerisation was sent to 28 public sector banks as well as 22 other organisations. The questionnaire had seven sections such as Statistical information, Computerisation at Branch, Regional Office/Zonal Office and Head Office levels, Banknet/SWIFT, ATMs, Bilingualisation, Manpower requirements and General observations. Replies were received from all the public sector banks and 7 other organisations, viz., Indian Banks' Association, All India Bank Depositors' Association, Associated Chambers of Commerce and Industry of India, Jamanalal Bajaj Institute of Management Studies (Bombay), IIM (Bangalore), Banking Service Recruitment Board (Southern Region) and Manufacturers' Association for Information Technology. Gist of the views expressed by the respondents, is given in Annexure I.

34. Responses generally point to initial problems encountered by banks & the constraints under which they operate. However, the industry is geared for a major thrust during the coming years. Evidently, the technology is now being accepted and adapted to the needs of Indian banking.

## Chapter 3

### Purposes of Computerisation

#### ***1. Banking industry - growth and projections***

The challenge facing the banking industry can be met only by taking a long term view towards technology. Bank deposits and credit have grown at an average rate of 17% per annum in the past five years. It is quite likely that the volume of business transacted by banks will grow more or less at this rate in future as well and in this context staff productivity will have to be significantly enhanced. Indian industry and exports are greatly dependant on the banking sector which, in turn, has to achieve the highest international standards. The options available to the banking industry for meeting these challenges inexorably point to the need for adoption of higher technology in its day to day operations.

2. One of the interesting features of the banking scene today is its multifaceted character. The class of customers and their expectations differ widely from one population segment to another - rural, semi-urban, urban, metropolitan. Similarly, the number of transactions and staff also vary widely - from a smallest branch having a couple of officials to extra large branch accounting for business of over hundreds of crores of Rupees. Banking is spread in almost all the districts and thousands of centres. Therefore, it is difficult to generalise on the pattern of services to be provided by banks at their various branches. This would therefore call for differential approach to computerisation at different centres and branches.

### ***3. Purpose of Computerisation***

The purpose of computerisation for banking operations is fourfold, viz.,

- i) improving customer service,
- ii) improving housekeeping,
- iii) improving decision making, and
- iv) improving productivity and profitability of banks.

4. Customer interface at the branch level is dominant. At the branch, the customer would expect warm and courteous behaviour from the staff which can be cultivated through attitudinal changes prompted by training programmes and demonstrable examples. Insofar as use of computer and communication technology is concerned, it should lead to reduction in waiting time, accuracy in reporting, provision of additional/innovative services and expeditious transfer of funds as also availability of larger span of time for doing banking business.

5. Housekeeping in banks can be improved by facilitating quick balancing of books, devising systems that reduce paper work, avoiding multiple entries in books of accounts, generating adequate and accurate information for the use of management and submission of statutory and other returns to Head Office, RBI, Government etc. Most of the items would be attended to at Regional/Zonal and Head Office by improving MIS and providing data base for decision making.

6. Decision making can be improved by computerising the management information system so that there is timely and accurate flow of data in an analytical and meaningful form to various levels of hierarchy, be they at the Branch, RO/ZO or Head Office. By ensuring availability and easy retrieval of information from common data bases, computers can aid faster and more efficient decision making.



7. Productivity/profitability of banks can be improved by optimum use of resources, viz., funds, equipment and manpower. Computers and Communication technologies can help to achieve such optimisation. By speeding up processing of vast volumes of data and delivery of messages, especially those relating to funds transfers, banks can deploy their funds in a most profitable manner. Provision of connectivity to international networks would also lend a competitive edge to banks in India in their international operations.

8. If the above objectives are to be adequately met, banks have to move away from the present level of computerisation which is confined to operation of dedicated machines at the counters and mini-computer systems at RO/ZOs used mainly for batch processing connected with MIS needs. A time has come now to move to on-line real time transaction processing environment in relation to branch banking so as to enable the customer to have better service and reduce work at back-office. Obviously branches that come under such a dispensation must have enough workload to justify such a change. Connectivity between various branches and administrative offices would speed up flow of information and improve management effectiveness. At the RO/ZO and Head Office levels, the computer culture has to be deepened and widened amongst supervisory and managerial cadres so that various applications aid and improve decision making and do not merely remain confined to accounting, balancing and reconciling of transactions.

Details of the nature and extent of computerisation envisaged for the next 5 years are discussed in the subsequent chapters.

## Chapter 4

### Branch Computerisation

Having identified the purpose of computerisation, the next step is to identify its coverage as well as scope. The primary unit of banking is the branch, which has the maximum interface with customers. Also, all preliminary data required for MIS and decision making at various levels gets generated at branch level. Therefore, it would be appropriate to first establish a base of computerised operations at the branch level and then build the structure upwards.

2. As on 30th June 1989, the top 100 centres of business activity in the country accounted for 59% of the total bank deposits and 65% of total bank credit. Computerisation of branches in all these 100 centres, may result in thinly spreading the effort and resources. Computerisation of all branches at each of the 100 centres in the country may throw enormous burden on banks. Moreover, some of these 100 centres may have considerable snags and constraints in regard to infrastructure, e.g., power supply, maintenance of computers, telecommunication links etc. It would, therefore, be better to focus attention on a smaller number of centres and make a concerted attempt at these select centres of high business activity to achieve demonstrable gains and make a favourable impact by providing significant improvement in customer service.

#### *3. Types of branches to be covered*

Branches could be selected for computerisation either on the basis of business volume or on the basis of voucher load. Incidentally, although some branches may have a large business volume, the daily voucher load can be disproportionately small.

Taking note of this, it is felt that the degree of computerisation at the branches should be related to the number of transactions, (as reflected in terms of the voucher load).

To make an assessment of the workload at branch level, information about the voucher load as on 31st December 1987 at different branches was called for from the public sector banks. The information received from 27 public sector banks was telescoped to cover the total of about 37,000 branches as on that date. It is estimated that about 6% to 7% of the total branches of the public sector banks have a daily voucher load of over 750 vouchers. We can assume that about 2000 to 2500 branches may be having daily voucher load of more than 750; although, majority of these would be located in the 30 top metropolitan/urban centres, branches with a workload of 750 vouchers and above, wherever they are located, must be taken up for computerisation. These are the branches which merit computerisation of the type indicated later.

#### ***4. Customer Service Scenario***

While contemplating various technical options in regard to computerisation, especially at the branch level, it is envisaged that a customer coming to the branch should get attended to promptly. Unlike the present system, where counters are dedicated to a particular service and even group of accounts, a customer should be able to go to any free counter convenient to him. Duties of machine operators and tellers may have to be combined to give prompt and complete service at any counter. This would call for networking of all machines/terminals placed at the counters; to drive these, the branch will have to instal either a Local Area Network (LAN) or a mini computer/mainframe system depending upon the volume of transactions and strategy chosen for computerisation. The system will have to be on-line real time transaction processing and an effective software system will have to be developed, suited to Indian environment and security needs. Such on-line systems should not only update customer balances but also simultaneously generate all the subsidiary books, clean cash book, general ledger accounts and MIS reports so as to avoid duplication at back office.

Further, to provide for instantaneous transfer of funds and effective monitoring and control, it may be advisable to establish connectivity between branches. Also, the customer should be able to have his standing instructions relating to payments to various agencies executed by banks, by transfer of credits without recourse to drawing of cheques, somewhat akin to Credit Clearing/Giro system.

All this would call for a scheme of computerisation at the branch level which will encompass all activities done at a branch and a networking of all machines and terminals.

Taking the above requirements into account and the fact that in the years to come, the banking industry must take full advantage of the synergic impact of advances in computer technology and telecommunications, it would be desirable to establish telecom links amongst the systems installed at 2000 to 2500 branches of banks. Further, consistent with the contemporary operational needs of banking, we would have to plan on the basis of each branch being a separate accounting/processing unit. This would take care of majority of the customers normally calling on their designated branch. Simultaneously, adequate backup has to be provided at a central location as also for datacom lines.

### ***5. Application areas***

For rendering better customer service and reducing delay in dealing with customers calling at the branches, it is proposed that branches, with daily load of over 750 vouchers, may be fully computerised i.e. Current Account/Cash Credit/Overdraft/Savings Bank, Clearing, Demand Drafts, Bills, Foreign Exchange operations, Back-office operations etc.

## **6. Alternatives**

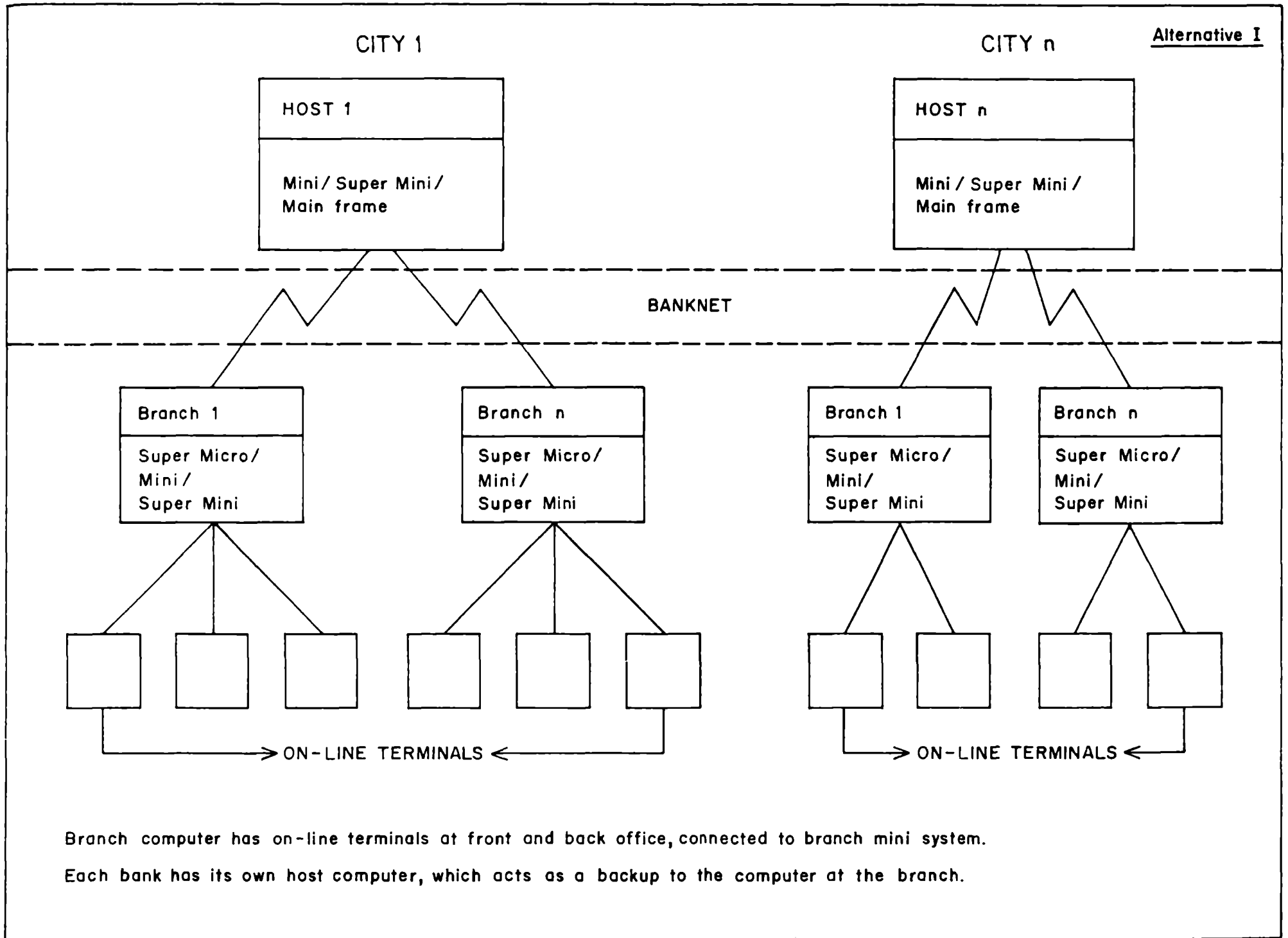
Taking the above facts into account, the following three alternatives to the present system of dedicated ALPMs can be considered:

i) A super micro or mini or a super-mini computer system along with the required number of online terminals can be installed at the counters and back-office of the identified branches. The computer system of these branches would be linked over data communication lines with a bigger computer, say its own host mini/super-mini/main-frame, depending upon the requirements, at each centre. Each bank would have a separate host, which would also serve as a backup. The connectivity would be provided eventually through Banknet and/or through Public Data Network. This option would require about 2000-2500 mini systems at branches and 840 (28 x 30) larger systems at the 30 centres acting as concentrators or hosts.

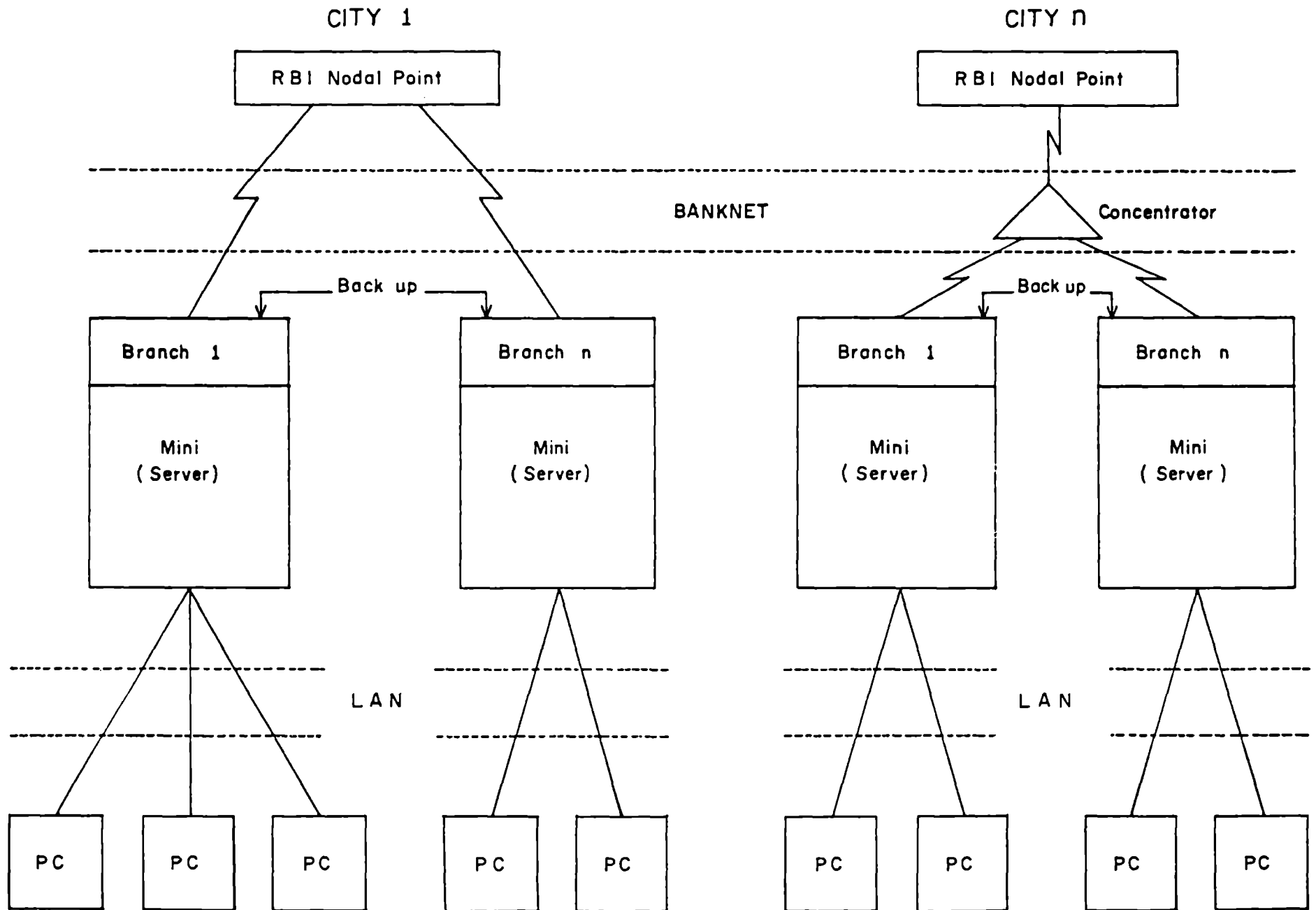
ii) Each branch will have PCs at its various counters (and another larger system functioning as the file server) connected through a Local Area Network. Branches will also be connected through Banknet with each other and to a Reserve Bank of India Banknet node, directly or through concentrators. The computer system of one branch can serve as the back-up for another branch in close proximity. For this purpose, the computer capacity of each such system would have to be suitably augmented. Under this approach, in the event of the system failing at one branch, customers can get attended to at the proximate backup branch.

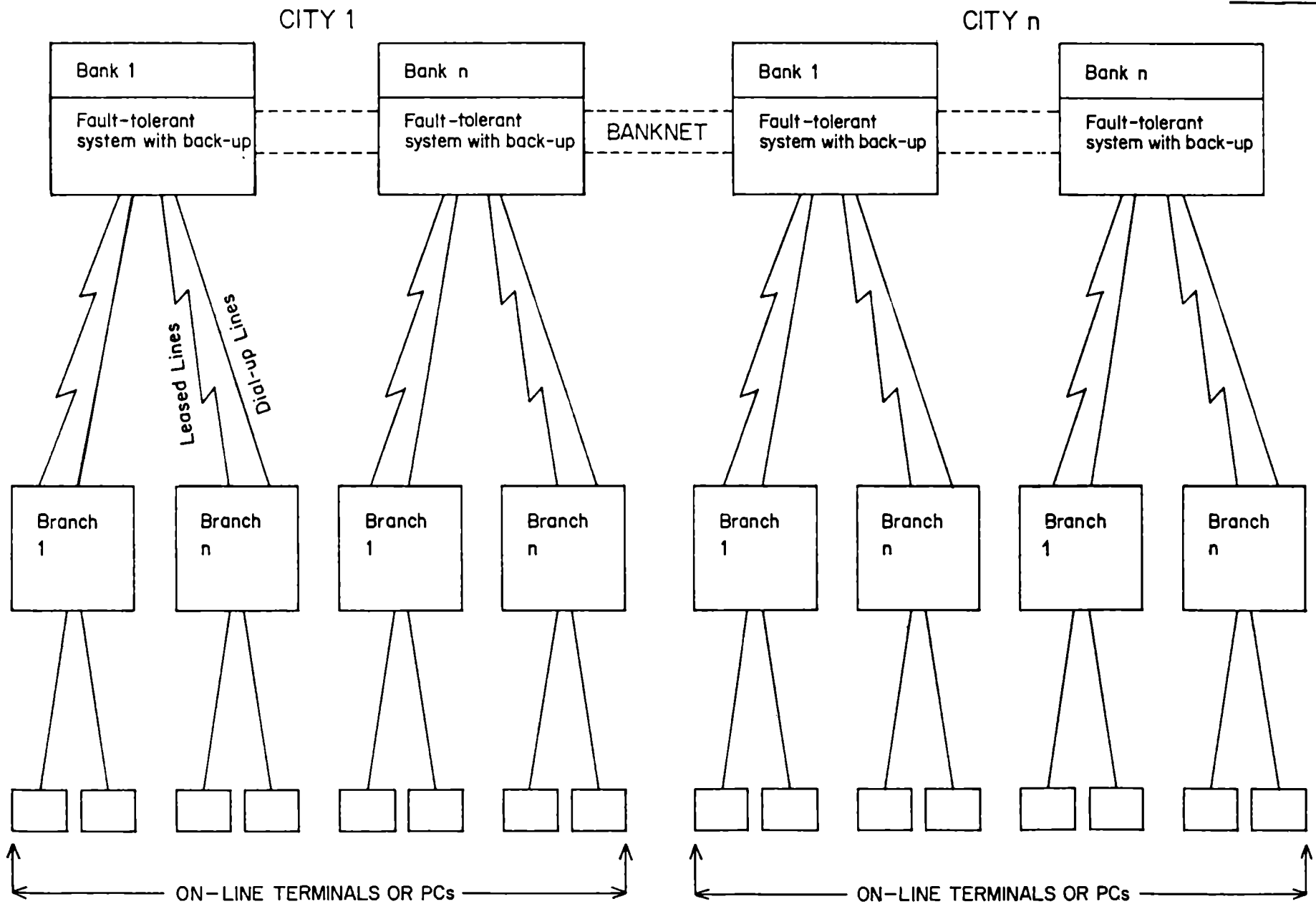
iii) The third alternative depends heavily on reliable telecom lines within the city and between the 30 cities. Under this dispensation, on-line terminals or PCs at the counters and back-office at each of the branches could be hooked on to one central system for that bank; suitable backup and redundancy for this central system will have to be provided (fully fault tolerant, dual processor etc.). The leased lines would also need to be backed up so as to prevent a complete shut out position.

Pictorial presentation of the 3 alternatives is given in the succeeding pages.



Alternative II





On-line terminals at the branch are directly connected to a central fault-tolerant computer



### ***7. Need for connectivity***

All the alternatives require development of reliable telecom lines. These are now available at major centres. Moreover, under the project BANKNET, the banking industry is planning to have 100 centres connected within 5 years. It would be necessary to synchronise the pace of development of Banknet and computerisation and also initiate steps well in advance to obtain intra-city leased lines promptly from the DOT/MTNL. Dial up lines on the network both as a back up and/or independent mode of communication may also be obtained if permitted on private network.

Connectivity between branches of the bank, within a city may be established as it would improve communications, provide flexibility to the customers to go to any branch of the bank rather than only to the branch where they maintain their accounts, provide multiple standby arrangements to branches, reduce load of inter-branch reconciliation etc. Also, connectivity between branches is considered essential for making a demonstrable impact on customer service. Even in cases where banks initially choose to go ahead without providing for immediate connectivity, it may be ensured that the software developed is eventually capable of establishing connectivity.

### ***8. Comparative Analysis of Alternatives***

The local area network approach, as suggested in alternative 2 above, is comparatively of recent origin and needs further experimentation before venturing on the scale contemplated. Besides, Personal Computers do not as yet offer adequate security features, which would be required by the banking industry in the proposed on-line environment, though progress in this can be expected in the future.

9. The other two options, viz., minicomputer at branch with centralised backup, and central system directly connected through online terminals at all computerised branches, deserve further examination from the implementation point of view. Under both the alternatives, hardware would be maintained by the vendor, as per the prevalent practice. Under the first approach, larger number of peripherals, which are

generally prone to more frequent breakdowns, would require maintenance at widely dispersed locations. On the other hand, maintenance of leased and cable lines will be more critical under central computer system approach. As regards maintenance of software, it would in any case be desirable to handle it centrally, rather than at the installations spread over various locations. Thus, software maintenance would not make any difference under either alternatives.

While the technology for the central computer based system is generally accepted and proven, Alternative I, i.e. branch system supported by a central system appears more attractive, particularly because Distributed Data Processing technology has made rapid strides in the recent past. This option would also provide better response time and also more security in case of line failures, since majority of the transactions, which are local in nature, can still be handled through the branch level computer. The central computer could be updated later, as and when the link is re-established. The branch computer system supported by a central system is therefore recommended as a preferred solution. However, the other models are available and in case any bank finds it desirable to proceed with LAN or alternative 3, it may bear in mind the needs for providing inter-branch and inter-bank connectivity, and eventually the standardised software across the industry.

#### ***10. Single window concept of service***

All branch level activities at the computerised branches can be classified into 3 categories. Some services could be rendered at any of the counters due to establishment of connectivity within the branch; some would require dedicated windows or visits to two counters; and yet some other services could be provided only by visit to officials at the back-office. Such categorisation is based on the type of service needed. An illustrative list is given in Annexure II.

#### ***11. Non-computerised branches***

There are around 39,000 branches of the public sector banks as at June 1989. It is suggested that besides about 2000 to 2500 branches brought under computerisation as

discussed above, remaining branches can also be brought under the scope of computerisation through the computers installed at the nearest regional Office/Zonal Office. Some of the housekeeping functions of such branches, such as preparation of periodical reports to management, periodical statutory returns for RBI/GOI, interest calculations etc, (i.e., activities other than daily balancing of cash) can be performed on the Regional Office/Zonal Office computers under whose jurisdiction such branches fall.

Depending upon the volume and distance, suitable approach can be adopted by the banks for processing the data received from the branches. It must, however, be ensured that under no circumstance the concerned branches' primary responsibility for maintaining branch accounts gets diluted or disturbed.

### ***12. Implementation Schedule***

It is suggested that public sector banks take up about 2000 to 2500 branches, with daily voucher load of 750 and above, for total computerisation at 30 centres during the next 5 years. The total computerisation of branch activities would necessitate taking of series of preparatory steps like identifying the branches, site preparation, finalisation of input/output and screen formats, development of software, selection of hardware and its installation, testing and commissioning of the system. All this will take time and advance planning.

Therefore, it may be desirable to proceed in the manner indicated below:-

- i) In the first two to three years, banks may take up about 500 large branches with daily voucher load of 1500 and above for total computerisation. Installation of software and hardware for these branches will have to be determined on the basis of achieving total computerisation within a specified time frame. In case some of these branches have already installed ALPMs, the same may be suitably redeployed with necessary modifications either within the branches themselves or elsewhere such as training establishments or used as PCs in other areas.

ii) The remaining about 1500 to 2000 branches, with daily voucher load between 750 to 1500 vouchers could be taken up in the second phase. It would however be necessary to start even now with computerisation of all back office operations in these branches and later extend the scope of computerisation to front office activities in a modular fashion. However, it will have to be ensured that the software developed and the hardware selected is capable of taking such modular additions in a phased manner. It should also be ensured that it is possible to establish connectivity between the branches at later stages.

iii) After the branches are fully computerised, banks may gradually connect them within a centre and between centres as may be dictated by operational needs and availability of reliable DOT lines.

## Chapter 5

### **Regional/Zonal Office and Head Office Computerisation**

The previous Committee on Mechanisation had recommended computerisation of operations at Regional/Zonal Office level with following objectives:-

- (i) to capture data on computer media such as discs/tapes;
- (ii) to edit and transmit these for direct input to the mainframe computer systems in Head Offices of banks; and
- (iii) to undertake limited processing to generate information for operational controls.

The Committee had recommended that Regional/Zonal Offices should have microprocessor systems with adequate number of off-line data entry machines for achieving these objectives. Data would be received from branches and after their scrutiny transcribed on to floppy discs for being processed on the microprocessor systems installed in these offices. Besides editing and analysing data for control purposes, the Regional/Zonal systems would mainly support data entry operations and exchange of information on computer tapes/floppy discs. The various developments in this area of computerisation have been dealt with in Chapter 2.

2. According to the action plan for the years 1988 and 1989, banks are expected to instal 311 mini-computer systems by end of December 1989. This action plan is being monitored through quarterly targets. As at the end of September, 1989, banks have ordered 259 systems and installed 233 systems of which 224 are operational. The feedback so far indicates that most of the systems are being utilised well for initial processing and MIS needs and banks have been able to develop some expertise on in-house

programme development and operations and management of EDP centres. Banks must make an effort to fully utilise the systems that have been installed.

3. As regards future, it is recommended that all the Regional/Zonal Offices (and Local Head Offices of State Bank of India) numbering about 900, be taken up for computerisation during the plan period. After allowing for the progress expected in computerisation of ROs/ZOs up to 1989 (viz., 300 offices), about 600 Regional/Zonal/Divisional Offices of banks, mostly Regional or Divisional Offices, would require to be computerised upto 1994. Apart from receiving and processing various administrative and statutory returns, these Regional Offices could also be used as data centres for the non-computerised 37,000 branches coming under their respective jurisdiction, as already indicated in paragraph 11, Chapter 4.

4. The sizing of the configuration of the system at RO/ZO may be done on the basis of Regional Office's own volume of work as well as additional workload that would devolve on it, on account of acting as data centre for the non-computerised branches coming under its jurisdiction. The modalities for transmission of input data and retransmission to branches could be decided on the basis of data volume and distance of branch from the processing centre. Incidentally, RBI had recently relaxed the specifications relating to hardware and as such the banks will be free to choose any machine from empanelled vendors. It would however be ensured that the empanelled vendors consistently conform to the conditions prescribed by RBI for empanelment.

5. Thus, computerisation of ROs/ZOs, besides improving control and generating valuable information for management use, would also facilitate the bringing of additional branches under the scope of partial computerisation.

#### ***6. Head Office Computerisation***

Consequent to the proposed on-line banking at the branch level, responsibilities of the Head Office would increase inasmuch as it would have also to act as the focal point of branch network, besides having to meet the future requirements of the bank

on account of BANKNET, SWIFT, Credit Clearing and other innovations proposed. Head Office would also have to provide adequate capacity to process high volume jobs in-house.

7. The burgeoning growth in business volume as well as the number of outlets, would put great pressures on the control mechanism to be exercised by the Head Office. As only a small number of branches of the banks is proposed to be brought under the ambit of on-line banking, the Head Offices would continue to receive increasing volume of data in respect of the remaining branches. The application areas already identified for the Head Offices provide a strong case for installing powerful mainframes at the Head Offices. Moreover, under the IBA agreement, banks cannot contract out processing/data entry jobs beyond September, 1989.

8. A few banks are expected to instal mainframe computers prior to the commencement of the perspective plan for 1990-94. The remaining banks should make concerted attempts to acquire and operationalise the mainframes at the earliest.

## Chapter 6

### Communication Network for Banks

Today, the key technology is information gathering, processing and distribution. Computerisation takes care of only the processing end whereas information gathering and distribution are greatly facilitated by electronic modes of communication. But, banks in India mostly use telephone, mail, telegraph and telex for communication between their branches and controlling offices. A few banks have established Store and Forward Telegraph (SFT) system and dedicated network of telephone services. However, use of telecommunications for data transmission and networking of computers is confined to only some of the foreign banks. In the absence of quick communication facilities, information regarding movement of funds reaches the destination late and results in inefficient use of funds. Further, the delay in receipt of advices makes inter-branch reconciliation of accounts difficult. Data transmission through paper results in delay and high cost due to handling at several stages.

#### *2. The Need*

A common communications network called "BANKNET", operated by banks and financial institutions on a co-operative basis within the country, is being set-up. This would serve the purpose of domestic inter-bank funds and message transfers and also provide a convenient interface with proposed SWIFT Regional Processor at Bombay. A common network for banks will also help to check the growth in the volume of cheques. The clearance for import of required equipments and approval from Department of Telecommunications for the establishment of this domestic network have already been received. The common network can be put to several uses depending on the number of branches and centres connected to the network and availability of the software.



Some of the illustrative uses are:

***A. Transfer of Funds***

1. Customers can draw cash against their deposits at any branch of the bank as envisaged under on-line banking and can also deposit cash at any branch for credit to an account at some other branch.
2. Advance can be allowed at one branch against deposit at some other branch.
3. Immediate remittance of funds to any branch connected to the network.
4. Immediate transfer of funds between the branches on customers' account.
5. Deployment of banks' funds can be kept at the most economical level in view of availability of facilities for immediate transfer of funds.
6. Credit card authentication can be facilitated.

***B. Statistics***

7. Statistical data can be passed on to the Regional Office/Central Office expeditiously.
8. Following types of jobs can be easily undertaken, especially at RO/ZO level:
  - i) Identification and provision for bad and doubtful debts,
  - ii) Transmission, analysis and projection of data for business plan,
  - iii) Lodging claims under Credit Guarantee Scheme,
  - iv) Follow up on recoveries of advances,
  - v) Personnel inventory system,
  - vi) Credit information system,

vii) Scrutiny of priority sector advances data, and

viii) Consolidation of data for returns to be submitted to Reserve Bank of India, etc.

### ***C. Foreign Exchange Business***

9. The transfer of data and dissemination of rates between the controlling and dealing branches will be immediate, resulting in quoting finer rates, better customer service and efficient funds transfers. The number of such branches can also be increased due to improvements in communications.

### ***D. General***

10. The expenditure incurred on stationery can be reduced to a great extent resulting in better utilisation of resources and increased profitability.

11. Pension payments and other Government transactions at branch level become easy and claims on Government can be settled expeditiously through link branches.

12. A link between branches and administrative offices would improve control aspects such as follow-up of advances, inspection of bank accounts, monitoring growth vis-a-vis targets, etc.

13. Preparation of a number of returns can be done at the level of the administrative office if common data base can be maintained.

### ***E. Inter-bank applications***

1. Quick settlement of inter-bank fund transfers and currency chest transactions leading to efficient use of funds.

2. Improvements in payments system by facilitating automated clearing services (similar to Bankers Automated Clearing System in the U.K.) or GIRO, providing faster credit to various utilities in response to standing instructions of customers.

3. Maintenance of data bases of common interest from which information can be retrieved by banks, e.g.,

- industry/business profiles
- profiles of geographical areas useful for lead banks
- country profiles useful for foreign exchange business.

#### ***F. Others***

1. Data transmission between RBI and Zonal/Regional/ Head Offices of banks.
2. Exchange of credit reports on big borrowal accounts between banks and RBI.
3. Exchange of information between banks and other financial institutions such as IDBI, NABARD, Exim bank, etc. on area profile about deposit and borrowal accounts.
4. Access to SWIFT international network from different centres in the country.
5. Electronic Mail System

The development of applications will be an on-going process, which has been undertaken by the users. An interesting possible use of the network can be to substitute cheque clearing with data communication, a brief note on which is given at Annexure III. The communication media options available and their costs are briefly discussed in the Annexure IV.

#### ***3. Network Requirements***

The requirements for banks' data communication during 1990-94 will involve:

- a) Connecting in phases 2000 to 2500 branches selected for full computerisation
- b) Connecting all Regional/Zonal Offices as well as Head Offices of banks located in state capitals and district headquarters.

4. The communication load is estimated at an average of 0.96 million bits per second, as given in Annexure V. The estimates of data communication loads worked out above assume that signature verification is not done on-line. It also assumes that ATMs, if used, will exploit the same datacom volume as provided for transactions, and may not significantly alter the volume estimates made above.

5. Suitable legislation may also have to be enacted, to cover Electronic Funds Transfer, and to provide for the responsibilities of the banker and protections available to him thereunder, on the lines of the Negotiable Instruments Act. It would also be advantageous to develop standard ciphers procedures and provide other security features, e.g., regulated access, coding, automatic message numbering and checking, checksum files etc., to ensure safe transfer of funds electronically.

6. RBI, in association with the banks, is already engaged in the task of establishing the industry-wide network by 1990 at 7 major cities and a Core Group of users is applying itself to work on the necessary details for implementation. It is suggested that banks may address themselves to the several possible uses indicated above and use the network optimally. Over the next 5 years, the network would be further extended to other centres, especially the 30 centres recommended for total computerisation at branch level. Over the same period, it is expected that public data network/s will cover several cities and remote areas. It is desirable that BANKNET interface with these networks to the extent practicable so as to optimise on resources, without detriment to operational and security needs of banks.

## ***5. Recommendation***

To meet the needs of customers to draw cash when they need as also to derive maximum benefits from technology, a small network of ATMs installed at strategic locations like airports, railway stations, hospitals and outside important branches, may be tried out at major cities. A proposal for a shared network at Bombay has been made by IBA. The Scheme is based on the participation of 28 public sector banks, sharing a network of 3 ATMs and 21 cash dispensers, serving the needs of an estimated 1,26,000 cardholders over a five year period ,in Bombay. About 52 transactions per cardholder per year have been projected. It is expected by IBA that the additional costs under such a Scheme can be offset over a period after taking into account the revenues generated from the one time card issuance fees and transaction fees. A shared network will be more economical than individual banks acquiring ATMs on their own. In setting up such a network, there are several issues which arise such as the formation of a separate company, the legal implications and the security needs. These need to be worked out in detail before such a network can be launched. The Committee recommends the setting up of such a network in Bombay, to start with, which could cover banks which are willing to join it, which in course of time can be replicated in the other major cities. However, before replicating the project at other centres, it is assumed that sufficient care will be taken to assess its efficacy and effectiveness vis-a-vis the investment and expenditure involved.

## **Chapter 7**

### **Automated Teller Machines (ATMs)**

#### ***1. Introduction***

ATM is an electronic self-operated machine, which can be used by the customer to make deposits, withdrawals, balance enquiries, lodging requests for new cheque books, transfer of funds, statement of accounts etc. during as well as outside the banking hours. The customers are provided ATM cards on agreed terms and conditions (such as minimum balance to be maintained, maximum withdrawals per transaction or per day etc.). Each cardholder is provided with a secret personal identification number (PIN) which in conjunction with the card acts as proper authentication for the transaction.

#### ***2. ATMs in the West***

ATMs made their entry in the West when it graduated from Cash economy to Cheque Economy and then to Plastic Card Economy. It is reported that now there are over 2 lakh ATMs and about 850 networks. In the highly cheque-oriented economy of the West, recourse to cash was rare, so people had no need to carry cash with them. In case of need, cash could be obtained through ATMs at all hours and convenient locations.

#### ***3. Advantages and Disadvantages***

The advantages and disadvantages of ATMs as normally perceived are as follows:-

##### ***Advantages***

(i) Banking transactions can be put through round the clock as minimum or no employee interface is required. There is ease and privacy of operations through self-service.

(ii) ATMs provide customers, not having credit card facilities, an alternative for obtaining cash when required.

(iii) It eliminates the need for the customer to travel to the branch at which his accounts are maintained, if the machines are conveniently located and networked.

(iv) Automatic and instantaneous accounting and updating is possible.

(v) Where labour costs are high, the technology provides cost-effective solution.

(vi) Customers can deposit cash/instruments and leave instructions for their requirements of a statement of account, transfers etc.

(vii) As the transactions are controlled through software and often without handling cash/instruments, scope for frauds, robberies and misappropriation is reduced.

### ***Disadvantages***

(i) The cost of each ATM is around Rs.15 to Rs.20 lakhs including freight, insurance, customs duty, etc. In the Indian context, it acts as a disincentive.

(ii) The machines are mostly paid for in foreign exchange. Large scale import will result in pressure on limited foreign exchange resources.

(iii) At present ATMs are installed only at branches and operated only as stand-alone machines. This reduces the convenience of the customer as he has still to travel to the concerned branch only.

(iv) The banks providing ATMs facility insist on minimum balances to be maintained by the customers and daily withdrawal is also limited; this restricts the facility to a miniscule percentage of bank customers.

(v) Cash dispensation is currently limited to a few denominations only. The quality of the notes deposited in the dispenser has also to be good, as the machine may not be able to count soiled notes. This further reduces its utility.

(vi) The system demands a higher degree of sophistication and literacy on the part of customers.

(vii) Deposits of cash/cheques is not acknowledged immediately - final credit is given only after manual intervention/verification by officers.

#### ***4. Relevance to Indian conditions***

The relevance of ATMs will have to be considered under Indian conditions where the need to keep cash is greater. Moreover, the banking industry in India cannot allow itself to be left far behind the level and sophistication of service provided by banks abroad and foreign banks operating in India. ATMs provide improved facilities to the customers for drawing cash in emergencies and also extend banking services nearer his home/office. Some such improvements can be brought about by tapping existing options under bank computerisation. It is felt that the proposed plan of branch computerisation with connectivity in the 30 high business activity centres and increased usage of credit cards could offer more flexibility and convenience compared to installation of dedicated ATMs at select branch or two. In this context, it would also become possible upon computerisation of front and back-offices, to cut down the time span normally used, after banking hours, for book-keeping and balancing under the manual system. It may then become possible to consider the feasibility of extending the business hours for public transactions. This in itself would provide tangible relief to the customers. The full potential of ATMs can be exploited when they are networked, so that account balance updating can be done instantaneously and at several locations. This is, however, dependent on reliability of datacom lines.



### ***5. Recommendation***

To meet the needs of customers to draw cash when they need as also to derive maximum benefits from technology, a small network of ATMs installed at strategic locations like airports, railway stations, hospitals and outside important branches, may be tried out at major cities. A proposal for a shared network at Bombay has been made by IBA. The Scheme is based on the participation of 28 public sector banks, sharing a network of 3 ATMs and 21 cash dispensers, serving the needs of an estimated 1,26,000 cardholders over a five year period ,in Bombay. About 52 transactions per cardholder per year have been projected. It is expected by IBA that the additional costs under such a Scheme can be offset over a period after taking into account the revenues generated from the one time card issuance fees and transaction fees. A shared network will be more economical than individual banks acquiring ATMs on their own. In setting up such a network, there are several issues which arise such as the formation of a separate company, the legal implications and the security needs. These need to be worked out in detail before such a network can be launched. The Committee recommends the setting up of such a network in Bombay, to start with, which could cover banks which are willing to join it, which in course of time can be replicated in the other major cities. However, before replicating the project at other centres, it is assumed that sufficient care will be taken to assess its efficacy and effectiveness vis-a-vis the investment and expenditure involved.

## **Chapter 8**

### **Other areas for computerisation & rationalisation**

Besides the scheme of computerisation recommended in the preceding chapters, banking industry would also need to take additional steps to harness the benefits of the higher technology. Some of these steps work in tandem with the computerisation scheme, while others assist in improving office productivity.

#### ***2. Teller system***

To further improve customer service at the mechanised branches and to derive optimum benefits of computerisation, it is desirable if the counter staff at the branches operating the terminals are also vested with powers, up to a specified limit, for passing cheques and making payments of cheques tendered at the counter. They could also be given limited powers for receiving cash deposits. The limits could preferably be fixed by each bank after studying the pattern and proportion of deposits/withdrawals up to the contemplated limits. This would facilitate single-window service to the customer, which may be preceded by combination/upgradation of the job of Terminal operator and Teller.

#### ***3. Signature storage/Retrieval system***

Signature verification for cheques can be made easier, and speeded up through computerised signature storage and retrieval system. These can be gradually introduced, where appropriate, taking into account costs and benefits, at the 2000 to 2500 branches in 30 centres. While larger branches can have their own scanner, smaller branches can share a common scanner.

#### ***4. On-line terminals to large corporate customers***

Modern banking is moving towards the concept of carrying banking services to the doorstep of the customer. In western countries, most of the large bankers provide

on-line access, with suitable security & safeguards, to their corporate customers enabling the latter to get updates on their accounts and pass on suitable instructions to the bank. In India, a beginning has been made by some foreign banks and State Bank of India. This service needs to be supported. Now that communication network would be extended within a city and over 30 cities, it should be possible to provide this facility, may be at a cost, to valued large customers. This would enable Indian banks not only to keep pace with the demands of modern business, but also effectively meet competitive challenge from foreign banks.

#### ***5. Customer authentication***

The plan of computerisation envisages the possibilities of the customer carrying on banking business at a branch other than the one where he maintains the account, initially within the same city and thereafter in other cities also. This exciting possibility presupposes connectivity and also that the branch where the account is maintained, as well as the branch where transactions are proposed to be put through, are computerised as suggested. Customer authentication can be carried out by using specimen signatures stored on the computer, which can be retrieved on a screen anywhere through data communication facilities. However, sending bit maps of signatures through communication lines can be a risky proposition.

Another way of accomplishing customer authentication is by issuing machine readable cards to all the customers, which can also serve as credit cards. The face of the card would carry the specimen signature of the customer and would be laminated to make it tamper proof. Every customer can also have a secret password or personal identification number, which could be resident in encrypted form on the magnetic strip. The customer can be asked to type in his password on a keypad in the branch where he wishes to transact his business. The specimen signature on the card, coupled with computer matched password, should serve as adequate identification.

## **6. Credit Cards**

Credit Cards with machine readable magnetic strips embedded on the reverse, containing essential customer information, should also be introduced and encouraged for wider use. Such a scheme would act as a conduit for channeling the flow of funds through the organised banking sector. Load on local clearing centres will also be reduced. It is suggested that a single 'All Bank' credit card can be designed with one common name to enhance its visibility and credibility and to make it acceptable at all outlets.

7. Such cards may be numbered according to a coding scheme whereby the issuing bank can be identified so that proper accounting can be facilitated. But, for the credit cardholders or to the merchant allowing facilities on cards, it would look as a single Bank Card. The facility could be extended much more widely to almost all customers who seek it. If need be, banks could work out an arrangement under which cards with differential encashment limits can be supplied to comparable class of customers. Further, if necessary, commission charged to the establishment could be reduced and/or they be provided with free or subsidised equipment for card reading so as to greatly popularise its use over a large number of outlets. All this should reduce recourse to cash and cheque transactions and also indirectly contribute to greater customer service.

8. Accordingly, to start with, banks may work out a scheme for issue of All Bank Card under the aegis of IBA. IBA may consider ways and means of popularising the issue and acceptance of cards. While in the short run, the Credit Card System may function on the traditional lines, over a period, it may become necessary to introduce greater sophistication in the issuance, verification and settlement procedures for speeding these up and widening the acceptability of cards. At a later stage, banks can consider providing more sophisticated card reading equipment, dial up facility to a central location in each city, telephonic confirmation facility, or even on-line access to computer of the bank co-ordinating such operations at a specified centre.

### ***9. Credit Clearing/GIRO System***

Arrangements should also be initiated to instal a system of credit clearing under which each bank may bring to the clearing house the magnetic tapes indicating the credits to be given to the payee banks on account of salaries, electricity and telephone bills, insurance premia, fees to educational institutions, clubs, associations, payments to Government, etc. GIRO system as prevalent in some of the European countries may also be considered for implementation in the country in the longer run. All this should reduce the workload on clearing houses and lead to better customer service, inasmuch as there would not be need to draw cheques on each occasion.

### ***10. Office Productivity Aids***

Apart from the on-line banking system proposed in the preceding paragraphs, banks need to use a variety of other ancillary equipment on an increasing scale to improve office efficiency. These are word-processors, copying machines, sophisticated duplicators, calculators of various types, electronic bilingual typewriters, overhead and slide projectors, projectors for connecting PCs with larger screen, other audio-visual aids for facilitating interaction at conferences and meetings, FAX machines, electronic telex-cum-teleprinters, etc. Apart from all these, there is urgent need for most of the banks to instal microfilming/document processing equipment so as to take care of paper explosion taking place in the context of scarce office space. Heavy printer outputs from computers and the plethora of copies generated through photocopying machines would add to the problems of records management of the banks. Therefore, microfilming of records and review of preservation periods of various books and records is called for. These office aids and equipment are used by banks sparingly and in some cases they are resisted by Unions/Management. Banks may take a more liberal view about the use of these tools, especially microfilming, and attempt to improve efficiency, environment and general quality of work life.

## Chapter 9

### Bilingualisation of computers

Banks, under instructions from the Department of Official Language (DOL), are required to ensure that all types of computer systems including word-processors, data entry equipment, electronic tele-printers, ALPMs, minicomputer systems etc., installed by them should be capable of working bilingually, i.e., in English and Hindi.

2. In this connection, the configuration of the ALPMs initially installed by the banks at the branches was not standardised and several vendors had supplied 8 bit machines. After consulting ALPM vendors and Department of Electronics, RBI informed DOL that it would not be technically possible to make these machines bilingual.

3. Keeping in view the difficulties being faced by the banks in this regard, DOL has agreed that the banks can purchase and instal ALPMs at the branches till 30th September 1988, though the machines may not have the ability to work in Hindi at present, subject to the following conditions:

a) The technical specifications of ALPMs should be such that there is no impediment to create bilingual capability in them later; and

b) Suitable software will be ported on these machines installed in Regions 'A' and 'B' by 30th September 1988 and work in Hindi will commence between 1st October 1988 and 31st December 1988. This software will be made available to branches situated in Region 'C' also, when required.

As regards the ALPMs installed by the banks at their branches after September 1988, these should be capable of working in Hindi; regarding the ALPMs purchased before

1st January 1988, DOL have informally agreed to waive their conversion to bilingual form in view of the technical and operational problems associated therewith.

4. With a view to have uniformity in the application software and minimise customisation later, RBI requested IBA to appoint a Group to standardise the software specs in Hindi. Accordingly, a Group was constituted and the report submitted by the Group was discussed with the vendors. It was felt that it would be possible to develop software for bilingual work on ALPMs, as per the specs drawn up by the Group, and in consonance with the Devanagari keyboard standard code released by DOE.

5. The mini-computer systems installed at the Regional/Zonal Offices of the public sector banks have line printers attached thereto. It is presently not possible to obtain Devanagiri print-outs on these printers as Devanagari print bands are not made in the country. Also, none of the empanelled vendors seem to have so far developed or tested any suitable software for the purpose. RBI had represented these problems to DOL, who have permitted banks to instal 200 mini- computers, including those already installed, subject to the following conditions:-

(i) Their technical specifications should be such that there is no problem in making them bilingual later; and

(ii) The branches of banks situated in Regions 'A' and 'B' will not be asked to submit information etc., in English to their Regional/Zonal Offices just because facility to work in Hindi is not available in the mini-computers installed thereat.

However, RBI/CMC/DOE may explore various alternatives for creating bilingual capability in these 200 systems and subsequent purchases.

6. The mainframe systems to be installed at the Head Offices of banks should also have bilingual capability. The empanelled vendors have given assurance that they

would be able to provide bilingual capability in the mainframe systems to be supplied by them to the banks for installation at the Head Office.

7. The term of reference of the Committee in this regard is to recommend the methodology for phased implementation of Hindi on the computer systems installed in the banks. Considering the difficulties in developing and making available suitable bilingual systems as well as necessary application software, additional cost involved, and the need to provide fast and efficient customer service in all regions, it is felt that the mandatory requirements of bilingual capability in computers may conceivably result in slowing down the pace of computerisation in banks. Bilingualisation of the envisaged computer systems, with inter-branch and intra-branch connectivity, is going to add to the complexities of operations and may impede the progress of implementation of the programme of computerisation in banking industry. While it may be technically feasible to work out bilingual solutions for on-line banking in the long run, it cannot be gainsaid that inexpensive and practical solutions need to be developed by the computer industry. Bilingualisation of computers and communication systems in banks simultaneously with the introduction of advanced computer technology may be difficult owing to lack of progress in the software and training infrastructure as well as absorptive capacity of the employees. However, it would be ensured that the systems are capable of implementing bilingualisation, as and when cost-effective hardware and software solutions are available.

8. While implementing the bilingualisation programme, the banks may give priority to such of the branches and offices, where the work is even otherwise being done in Hindi. At other branches and offices, the banks may introduce use of Hindi on computers consistent with the availability of reliable technical support at a reasonable additional cost. However, basic requirements relating to the bilingually preprinted forms and outputs etc., should be strictly complied with. Banks also need to gear up training on use of Hindi in computers. DOL, DOE, software houses, vendors etc., could perhaps help the banks in finding effective solutions early. Until that time, RBI and Finance



Ministry may request DOL to view sympathetically the shortfall in fulfilling the requirements of Official Language policy in regard to computers, owing to the aforesaid difficulties.

## Chapter 10

### Training

1. Success of computerisation will largely depend on availability of skilled and trained staff. In fact, it would not be wrong to assert that without a band of skilled, dedicated and professional personnel, it would not be prudent for the banking industry to venture into electronic banking of the 90s. Today, computers and communications together have brought about metamorphosis in the structure, form and contents of information required in the banking industry. Management have to meet the challenge of change in the organisation with the introduction of higher technology in banking operations.

2. Banks are quite conscious of this desideratum for successful implementation of computerisation plan and have already trained significant number of personnel in different computer courses. However, there is still inadequacy of fully trained and professionalised personnel at the operations and managerial levels. While it is true that a computer specialist in the bank should be a banker first and then a specialist, it is also equally true to emphasise that a high level of technical knowledge, background and experience is required to man specialist posts at supervisory and managerial levels. Since there are problems associated with not only securing personnel from outside but also with relation to their getting accepted in the banking mainstream and charting their career development, it is necessary to resort to judicious selection and training of personnel from within the banks. Thus, while the primary source for providing professionals will be the work force and officers of the banks, this could be supplemented, wherever necessary, by recourse to outside recruitment especially at levels of Systems Analysts, EDP Managers and CPPD Chiefs.

3. The investment in hardware and software needs equal reinforcement of 'peopleware' so as to make a success of the envisaged programme. The staff would need training at various levels and in varying degree to reorient them skillwise and attitudinally towards computerised environments. Also, there is urgent need for creation of general awareness about computerisation among the banking staff.

4. Keeping the above objective in view, the training needs have been identified for the following categories of trained staff -

<u>Category/type</u>	<u>Duration of training</u>	<u>Number</u>	<u>Remarks</u>
i) <u>Computer Operators (clerical staff)</u> On-job	1 week	About 56,250	20 employees at 500 branches and 10 each at 2000 branches. 10 each at remaining 600 ROs/ZOs & 50 each at 30 head offices, with reserves @ 0.5 for every employee.
ii) <u>Supervisory Staff (Officers)</u> Classroom/on the job	2 weeks	About 5,625	In the ratio of 1:10 with operators
iii) <u>EDP Managers</u> Classroom + on-the-job project work using computers	6 months	8,100	30 professionals at 30 centres + 5 each at 600 ROs/ZOs and 5 at each HO with reserves @ 1:1.
iv) <u>Specialists (Computer Audit, Telecommunications etc.)</u> Universities/Institutions	Long term	2,000	Majority of EDP
v) <u>Trainers</u> Classroom + project work	4 weeks	400	Two each at about 200 training establishments.
vi) <u>Managerial staff</u> Appreciation - Classroom	2 to 4 days	1 lakh	About 50% of supervisory staff.

EDP personnel would need to be provided with training inputs on subjects such as Systems Analysis, Data Base Management System, UNIX, basic hardware maintenance, networking, computer languages such as COBOL and C, as per needs.

The supervisory staff in the operational areas (Category ii, iii and iv) will have to be retrained at regular intervals to keep them up-to-date with the latest technological developments in the computer field. Some of the staff in these categories may also be given additional specialised training as per requirements in the areas of computer security, computer audit, telecommunications etc.

5. The staff requirements for computerisation will be largely met from among the existing staff of the banks. The staff should be selected after aptitude test, if necessary, to ensure that officials with right kind of background, attitude and aptitude get the opportunity to work on computers and that they have enough scope to pay off the investment made in their training. If it is necessary at some levels (e.g. Systems Analysts, Chief of CPPD and/or EDP Manager) to recruit staff from outside, then it should be ensured that this staff is provided with sufficient scope for career advancement. This could be in the specialist or generalist cadres as the banks may consider fit.

6. It is felt that all induction programmes for employees must have the component of training related to information technology. Also, for creating general computer awareness among all categories of staff, training colleges should include components on information technology in all training programmes. In addition, training establishments of the banks will have to be geared to handle functional programmes such as Computer Appreciation, Computer Audit, Telecommunication, O & M etc.

Officers from the operational banking inducted into Computer Section could effectively contribute to system - development in a computerised set-up, by precisely defining the operational requirements of practical banking. While inducting such officers in the Computer Section, it may be ensured that they remain there for sufficiently long period, say 5 to 7 years. Later, they can go back to the mainstream.

7. Today in the banking industry there are several national level institutes (such as, National Institute of Bank Management, Bankers' Training College, College of Agricultural Banking, North-Eastern Institute of Bank Management, Northern India Bank Staff Training College and Southern India Bank Staff Training College, Bankers' Institute for Rural Development), about 30 staff colleges and 150 training centres. All these train almost three lakh employees every year through various programmes run on various aspects of operational banking. Impressive though it may sound, the fact is that in-depth programmes on the omnibus discipline concerning computers and communications are limited. Further, there is absence of courses on computer security and audit, attitude reorientation accompanying technological changes, and training of faculty. Accordingly, the training institutes of the banks will have to gear up their infrastructural facilities by opening additional channels devoted exclusively to Information Technology to meet the future needs. It may be necessary for banks to set up a separate institute for Information Technology catering to the specific needs in this discipline. For example, SBI is setting up the Institute of Information and Communication Management at Hyderabad as a step towards fostering wider use of Information Technology. It may also be necessary to increasingly involve NIBM in this effort. To this end, NIBM may have to strengthen and augment its faculty on computers and communication. NIBM, colleges and training centres will also have to instal the needed number of mini systems and PCs to effectively provide the training.

To further augment the supply of trained manpower, the existing system of encouraging employees to take up part-time computer related programmes on voluntary basis should continue. However, the scheme for sponsorship should be integrated with the overall training strategy, so that there is no mismatch between the demand for specific skills and its supply - whether through bank organised programmes or through voluntary programmes.

## Chapter 11

### Standardisation

The previous Committee on Mechanisation in banking industry had suggested standardisation of input-output formats, preparation of glossary of terms/items in various books of account and their standardisation with uniform code designs and examination of all the coding systems in different returns with a view to standardising them. It also felt that there is a necessity to bring about uniformity in systems, procedures and practices followed by different banks. It had also suggested development of common software packages for all banks.

While implementing the recommendations of the Committee, during the last five years or so, attempts have been made at standardisation, pooling of resources and sharing of experiences among the banks to save on resources, both men and material.

2. As per the scheme of computerisation, banks were to instal ALPMs at the eligible branches, which were standalone, each dedicated to single function like Savings Bank Accounts, Current Accounts, Other Deposit Accounts and General Ledger etc. To save on effort and cost in development of suitable software for these applications, RBI set up an IBA group to develop standard software specifications for front and back-office applications. The specs drawn by the IBA group were circulated to banks and vendors empanelled for supply of ALPMs to banks. Subsequently the banks were required to implement Hindi on ALPMs in terms of directions from Department of Official Language. IBA had set up another group to draw up a set of specifications to facilitate bilingualisation of ALPMs. These specs were also circulated to banks and empanelled vendors. The packages have, however, not been uniformly implemented by banks. In order to save on resources for development of suitable software packages for RO/ZO systems, CMC Ltd. had come out with seven packages, viz., Credit Information System (CRISP), Personnel Inventory System (PINS), Weekly Returns under section 42

(WIRES), Performance Budgeting, Cash Monitoring, Payroll and Provident Fund accounting, which, however, did not find much favour with the banks. Thus, the efforts made so far for developing standardised common software packages have not yielded commensurate results, mainly due to customisation insisted upon by the banks, so as to meet their internal MIS requirements.

3. Similarly, an effort has also been made to pool the skills of the bankers for developing software specifications for two head office applications, viz., Lead Bank Scheme monitoring and Government Accounts coordination. The Group constituted for the purpose by RBI has recently submitted its report and it remains to be seen how far the banks would be willing to implement these.

4. Recently, eight public sector banks have undertaken pilot projects of total computerisation of one branch each. The implementation of these projects is taking time. Each bank is proceeding independently; the projects are being implemented separately by vendors/consultants, who are a mix of hardware vendors, software houses and miscellaneous companies. The hardware and software solutions selected by banks while implementing these projects are also different and it is feared, these may pose difficulty subsequently when the banks go in for intra-branch and inter-branch connectivity in the next phase of computerisation as is being suggested by the Committee.

5. The developments narrated above point inexorably towards pursuing the course of standardisation with renewed vigour notwithstanding the none-too-encouraging response in the past; and this is partially on account of the fact that efforts to bring about standardisation were mainly suggestive or voluntary. There is, therefore, a need to go in for standardisation in a more regulated and sustained manner especially when the level of computerisation being suggested by the Committee makes the development and whole-hearted acceptance of standards all the more necessary.

6. The efforts at standardisation and development of uniform, modular specifications for various branch level applications are necessary and could be facilitated by

drawing from the experience of the pilot projects on total branch computerisation. Banks could add or omit some of the modules depending upon their immediate requirements. It would also be desirable to standardise input, output and screen formats on an industry-wide basis, to gain optimum results. The changed scenario obtaining due to introduction of connectivity, would necessitate some revamping of the applications at the ROs/ZOs. Some common applications can be developed by the banks, either through inhouse efforts or through an outside agency.

7. Hardware specifications would also have to be drawn up, for the two solutions suggested for branch computerisation both in terms of configuration as well as network requirements, particularly keeping in mind the security and operational aspects. A frequent problem in purchasing computer equipment is that the buyer gets locked into proprietary hardware and software. Another major problem is that one vendor's computer does not interwork properly with that of another vendor. It is, therefore, desirable that multi-vendor standards such as OSI (Open Systems Interconnection Standards, for networking) and CCITT standards, such as X.25 and X.400 etc., for data communication, are be adopted. The specifications can be fine tuned to individual requirements based on broad uniform specifications. Concerted efforts in this regard have to be made after the acceptance of this Report.

8. It is, therefore, recommended that planning for introduction of the computerisation plan as suggested, may be taken up by the banks in right earnest. At industry level, groups may be constituted to develop standards and uniform specifications so that delay in operationalising the computerisation are minimised.



## **Chapter 12**

### **Conclusion**

A wide network of branches as well as extensive diversification of banking functions in India underscore the need for the use of sophisticated technology. Besides, banks in India as elsewhere in the world are facing severe competition from non-banking financial intermediaries and the distinction between banks and non-banks is getting blurred. Bank customers have become increasingly more demanding and expect a higher level of satisfaction from banks. The broad objectives of computerisation are, therefore, to improve customer service, house-keeping, decision making and productivity and profitability of banks. The programme of computerisation envisaged during the next five years will include full computerisation of branches with daily voucher load of 750 and above with an emphasis in the first two to three years on 500 large branches with daily voucher load of 1500 and above, installation of mini-computers at all regional offices/zonal offices and installation of mainframes in the head offices of all banks.

Installation of computers and associated equipments plus the investment involved in the preparation of the sites and other infrastructural facilities would necessarily involve substantial expenditure. The programme of computerisation suggested is modest and any scheme of modernisation will necessarily entail additional expenditure. However, the expenditure to be incurred by banks will be phased over a period of five years. Gains made by way of productivity and business growth over a period of time should more than compensate the banks for the initial investment cost.

With the rapid growth of the Indian computer industry in recent years, the programme of computerisation envisaged in this report should not result in any big demand for imports. Banks must be able to rely by and large on Indian sources for hardware and software.

The objective of mechanisation in India is not to replace man with machines. Rather the objective is to make work life more meaningful. The programme of computerisation envisaged will not result in any reduction of labour. Of course, there has to be some reallocation of work. In fact, this will only reduce the drudgery involved in routine work. The rapid expansion which lies ahead of the banking industry, which computerisation will itself help to usher in, will provide increased employment opportunities. Banking is a service industry and improved efficiency will lead to a faster rate of growth in output and help to expand employment all around. The work force in the banking industry must, therefore, look upon computerisation as a means to improve customer service and must welcome it in that spirit. In identifying the areas for computerisation, the approach has always been selective. It has also been decided to follow a phased programme so that the changes may be introduced in a manner in which they can be absorbed easily. Needless to say, absorption and effective utilisation of new technologies will involve changes in structure, organisation, systems as well as attitudes of people working in the banking industry.

## Summary

### *Background*

The Committee was constituted by Reserve Bank of India in September 1988 to draw up a perspective plan for computerisation in banks, during 1990-94, and to consider other allied issues. The Committee was headed by Dr.C.Rangarajan, Deputy Governor, Reserve Bank of India and had members drawn from Government and banks as well as financial, software/hardware and training institutions.

2. The Committee appointed a Technical Group to assist it in its deliberations. The Group was headed by Dr.S.Ramani, Director, NCST, with members from RBI, DOE, MTNL, NIBM, IIM, Consultants and banks.

### *Progress*

3. The progress achieved in the area of computerisation in the banking industry as on 30-9-1989 is as follows:

ALPMs installed at branch level	4776
Mini-computers installed at Regional/Zonal Office level	233
Head Office systems installed	2
MICR clearing	4 centres
Computerised clearing settlement	9 centres
Programmers, Systems Analysts trained	2372
DETOs trained	: 12761
Computer awareness programme participants	20655

4. A survey of opinion conducted amongst banks and other institutions revealed that computerisation has considerably helped banks in house-keeping, provided slightly better service to customers and had been seen to be useful by bank employees.

### ***Purposes***

5. The purposes of computerisation have been identified as improvement in customer service, house-keeping, decision making and productivity/profitability. To meet these objectives, banks have to move away from the use of dedicated, stand-alone machines as at present. A time has now come to move towards an on-line, real time, transaction processing environment in relation to branch banking, to provide better customer service and reduce work pressure on the back office. Branches that come under such a dispensation must have enough workload to justify such a change.

### ***Branch Computerisation***

6. The top 100 banking centres accounted for 59% of total bank deposits and 65% of total bank credit as on 30-6-89. However, computerisation of all the branches at each of the 100 centres would result in dissipation of energy and thinly spreading the resources available. Moreover, many of these centres may not have adequate infrastructural facilities. Attention of the banking industry must, therefore, be focussed on the top 30 business centres, which account for about 51% of the total banking business. Around 2000 to 2500 branches are estimated to be having a workload of 750 vouchers per day or more. Majority of such large branches are likely to be situated mostly in the 30 high activity centres. Considering the need to show demonstrable impact on customer service and also taking into account the infrastructural constraints relating to power supply, computer support and maintenance and the state of telecom links, it is recommended that the thrust of bank computerisation for next 5 years should be to fully computerise the 2000 to 2500 large branches.

7. At the branch level, the attempt should be to provide prompt customer service by giving a choice to the customer to go to any free counter convenient to him unlike the present system of dedicated counters/machines. Further, connectivity between branches would also need to be established to effect instantaneous transfer of funds and facilitate effective monitoring and control. Also, it should be possible that the customer's standing instructions relating to payment to various agencies be executed

by magnetic tapes/floppies prepared by the transferring banks thereby avoiding recourse to drawing individual cheques.

8. This would necessitate that all items of work at the front office and back-office should be fully computerised. The selected branches should also be gradually connected. Consistent with the contemporary banking trends, branch will continue to be the processing and accounting centre for all transactions pertaining to the accounts maintained by it.

9. Computerisation at Branch Level can be through one of the following 3 alternatives:

(i) Each of the selected branches can have a super-micro, mini or super-mini, with required number of on-line terminals at the counters and back-office. The system at the branch would be linked over BANKNET's datacom lines to its own central computer (mini/super-mini/mainframe), in the same centre, which would serve as a back-up. Connectivity would be provided through BANKNET and/or through Public Data Network.

(ii) Each of the selected branches may have PCs operating under LAN, with a mini-computer as server. Branches will be connected with each other and the nodal point of Reserve Bank of India, through BANKNET, directly or through concentrators. The computer system of a proximate branch would serve as back-up to another branch. It would then be possible to avoid separate host systems for each bank.

(iii) On-line terminals or PCs at the counter and back-office at each branch, could be hooked on to one central system for that bank, which may have suitable safeguards against failure (fully fault tolerant system). Leased lines can be used, backed up by dial-up lines. This alternative subsumes availability of reliable telecom lines.

10. Alternative (i) is recommended as a preferred solution, since it is more reliable and also offers more security. Banks can also proceed with the other alternatives but must bear in mind the needs for providing inter-branch connectivity, and eventually the

standardised software across the industry. All the alternatives require that the pace of development of BANKNET should be synchronised and synthesised with the computerisation plans.

### *Non-computerised branches*

11. The remaining about 37,000 branches spread over thousands of other centres can be brought within the ambit of computerisation. It is suggested that some of the housekeeping functions such as periodical reports to management, statutory returns, interest calculations etc., could be done using the computers installed at the nearest Regional/Zonal Offices. Suitable method for processing the data received from the branches may be adopted depending upon the volume of transactions and distance.

### *Phased implementation*

12. (i) In the first two to three years, banks may take up about 500 large branches with daily voucher load of 1500 and above for total computerisation. Installation of software and hardware for these branches will have to be determined on the basis of achieving total computerisation within a specified time frame. In case some of these branches have already installed ALPMs, the same may be suitably redeployed with necessary modifications either within the branches themselves or elsewhere such as training establishments or used as PCs in other areas.

(ii) The remaining about 1500 to 2000 branches, with daily voucher load between 750 to 1500 vouchers could be taken up in the second phase. It would however be necessary to start even now with computerisation of all back-office operations in these branches and later extend the scope of computerisation to front office activities in a modular fashion. However, it will have to be ensured that the software developed and the hardware selected is capable of taking such modular additions in a phased manner. It should also be ensured that it is possible to establish connectivity between the branches at later stages.

(iii) After the branches are fully computerised, banks may gradually connect them within a centre and between centres as may be dictated by operational needs and availability of reliable DOT lines.

### ***RO/ZO/HO Computerisation***

13. All the ROs/ZOs (and Local Head Offices of SBI) numbering about 920 and non-computerised Head Offices should be taken up for computerisation during the plan period. After allowing for the progress expected till 1989, about 600 ROs/ZOs/Divisional Offices may have to be computerised. The sizing of the configuration of the system at the RO/ZO may be done on the basis of present and additional volume of work devolving on the Regional/Zonal Office. The responsibilities of the Head Office would increase, besides having to meet the future requirements on account of BANKNET, SWIFT, etc. Banks may make concerted efforts to acquire and operationalise the mainframes at the earliest.

### ***Network - Usage and workload estimates***

14. BANKNET can be used for several intra-bank and inter-bank applications such as customers drawing/depositing cash at any branch, transfer of funds, credit cards authentication, economical deployment of banks' funds, statistics, foreign exchange business, inter-bank funds transfers and settlements, exchange of credit reports, access to SWIFT etc.

The average communication load on the network is estimated at about 0.96 million bits per second. Reserve Bank of India, in association with the banks, is already engaged in the task of establishing the industry-wide network by 1990. It is desirable that BANKNET should interface with public data network/s, which are expected to cover several cities and remote areas during the next 5 years.

### ***ATMs***

15. Taking into account the Indian experience and the typical Indian conditions, it is felt that this kind of service may be provided by the banks. Improvements in banking

services can also be brought about by tapping the feasible and socially acceptable alternative solutions and wider use and acceptability of credit cards. As proposed by IBA, a small network of ATMs may be tried out, to begin with in Bombay, by installing Cash Dispensers and ATMs at strategic locations such as airports, railway stations etc. on a shared basis by banks. In course of time, the network can be replicated in other major cities, depending upon its efficacy and cost-effectiveness.

### ***Teller System***

16. To further improve customer service at the mechanised branches, the counter staff operating the terminals/ALPMs, should be vested with powers for passing cheques, making payments and accepting deposits upto specified limits. This would facilitate the single-window service approach.

### ***Signature Storage/Retrieval System***

17. Signature verification may be made easier by selectively introducing signature storage and retrieval systems. Larger branches can have their own scanning equipment, while smaller branches can share a common scanner.

### ***On-line terminals at corporate customer sites***

18. When communication network is extended within a city and across 30 cities, it should be possible to provide facilities for on-line enquiry and transmitting instructions to the bank, through terminals provided to valued corporate customers, if necessary, at additional cost to the customer.

### ***Customer authentication***

19. The computerisation scenario envisages the possibilities of the customer doing banking business at any branch of his bank, other than where he maintains the account, to begin with in the same city and later in other cities also. Customer authentication can be facilitated through laminated, tamper-proof machine readable cards issued to the customers, which can also serve as credit cards. Specimen signature carried on the face



of the card, coupled with a secret personal identification number keyed in by the customer should serve as adequate identification.

### ***Credit Cards***

20. Single, "All Bank Credit Cards", with machine readable magnetic strips embedded at the reverse, containing essential customer information, need to be introduced and encouraged for wider use. Such cards will act as conduits for channelising the flow of funds into the banking sector, besides greatly reducing the pressure on the cheque clearing system. Subsidised or free card reading equipment can be provided to merchant establishments.

### ***Credit clearing/GIRO System***

21. Credit clearing system on the lines of the GIRO system prevalent in some European countries may be considered for implementation in the country in the long run.

### ***Office automation***

22. In addition to the computerisation efforts, banks should also increasingly use ancillary equipments, such as word-processors, copying machines, facsimile machines, sophisticated duplicators, audio-visual aids for conferences and especially microfilming/document processing equipment, to improve office efficiency, environment and general quality of worklife.

### ***Bilingualisation of Computers***

23. It is felt that the mandatory requirements of providing bilingual capability in computers may conceivably slow down the pace of computerisation, particularly keeping in view the complexities of the operations envisaged under on-line transaction processing under branch connectivity envisaged. The Committee suggests that Department of Official Language may be requested by RBI and Finance Ministry to view the shortfall in Devanagaran of computers in banks more sympathetically, and grant suitable exemptions till indigenous technology is sufficiently advanced to make available cost-effective hardware and software solutions. While implementing the bilingualisation

programme, the banks may give priority to such branches and offices where the work is even otherwise being done in Hindi.

### ***Training***

24. The banks would have to resort to judicious selection and training of personnel mainly from within the banks. Recruitment from outside, may be done to supplement the trained workforce, especially at levels of Systems Analysts, EDP Managers and CPPD Chiefs. It is estimated that during the period, about 56,250 Data Entry Terminal Operators (DETOs), 5625 supervisory staff, 8100 EDP Managers, 2000 specialists and 400 trainers would need to be trained. Apart from this, general appreciation programmes for about 1,00,000 officer staff may have to be conducted. All induction programmes should also contain a component of training related to information technology. The trained officers should remain in computer section for 5 to 7 years to derive optimum results, after which they can go back to the main-stream. Training institutes of the banks as well as NIBM would need to augment and strengthen their faculty and infrastructural facilities. The scheme of sponsorships for training in computers may be integrated with overall training strategy, so that there is no mismatch between demand and supply of skills. Banks could also consider setting up separate institution for training in Computers and Communications.

### ***Conclusion***

25. The wide network of branches as well as extensive diversification of banking functions in India, underscore the need for the use of sophisticated technology. Substantial expenditure is involved in installation of computers and associated equipments, preparation of sites and other infrastructural facilities. This expenditure would be spread over the next five years and the growth of business as well as possible productivity gains should more than compensate the initial investment.

The objective of mechanisation in India is not to replace man with machines. Rather the objective is to make work life more meaningful. The programme of computerisation

envisaged will not result in any reduction of labour. Of course, there has to be some reallocation of work. In fact, this will only reduce the drudgery involved in routine work. The rapid expansion which lies ahead of the banking industry, which computerisation will itself help to usher in, will provide increased employment opportunities. Banking is a service industry and improved efficiency will lead to a faster rate of growth in output and help to expand employment all round. The work force in the banking industry must, therefore, look upon computerisation as a means to improve customer service and must welcome it in that spirit. In identifying the areas for computerisation, the approach has always been selective. It has also been decided to follow a phased programme so that the changes may be introduced in a manner in which they can be absorbed easily. Needless to say, absorption and effective utilisation of new technologies will involve changes in structure, organisation, systems as well as attitudes of people working in the banking industry.

( i )

***Annexure I***

**Feedback from banks and other sources**

The replies received in response to the questionnaire issued by RBI, are summarised below:-

***Issues***

(i) Major difficulties experienced by the banks in operationalising the systems at branch and RO/ZO levels have been mentioned as :

- a) software bugs
- b) inadequate vendor support
- c) lack of software standardisation
- d) inadequately trained staff
- e) inadequate space
- f) erratic power supply
- g) creating users' awareness and gaining acceptance
- h) malfunctioning of UPS Systems
- i) non-availability of DETOs
- j) resistance from Unions.

(ii) It would be observed that generally, the major concerns of the banks are vendor support, inadequacy of trained staff, power and space and unions' resistance.

( i i )

iii) Benefits of computerisation have generally been mentioned as:

***(a) To the bank***

- Better housekeeping and control
- Prompt and improved Customer Service
- Optimum utilisation of staff and increase in productivity
- Interest calculations made easy
- Speedy compilation of statements
- Better information system

***(b) To the staff***

- Relief from drudgery
- Exposure to new technology
- Job satisfaction
- Better work environment
- Upgradation of skills

***(c) To the Customers***

- Prompt, neat and correct statements of accounts
- Faster customer service
- Accurate and timely payment of interest
- Prompt reply to customers' queries etc.

***(iv) Complaints from customers***

Of the 28 reporting banks, 11 banks have mentioned that they have not received any complaints. Others have generally, listed the following types of complaints from the customers:-

- (a) Delay in getting the updated statement for the whole year,
- (b) Slow response of some Advanced Ledger Posting Machines (ALPMs)
- (c) Reluctance of Savings Bank Account holders to accept statements of accounts instead of pass-books,
- (d) Disruption of work due to machine breakdown,
- (e) Funds transfer and collection of instruments have not improved significantly.

***Bilingualisation***

(i) The general opinion expressed was that while bilingualisation may be feasible at branches, it may not be feasible or cost effective at RO/ZO and HO levels. Printing of voluminous reports in bilingual form at RO/ZO and HO without the use of line printers, would be a problem.

(ii) The difficulties generally encountered in bilingualisation have been mentioned as training of operational staff, delays in data entry and printing, requirement of additional stationery, inadequate memory to maintain data in both languages, software problems, limited number of display lines in Devanagari on the screen, slow speed of Devanagari printing.

(iii) It was felt that insistence on bilingualisation is likely to affect the pace of computerisation. the additional cost estimates made by banks were high with a few stating that cost implications are not yet known and needed to be worked out carefully.

(iv) Bilingualisation is likely to lead to delays in computerisation and customer service. Suggestions made to overcome the delays are educating customer groups, using pre-printed bilingual stationery, selective/phased implementation, bilingual software to be implemented after thorough testing, bilingualisation of only new ALPMs, bilingualisation only in Region 'A', etc.

***Manpower requirements***

(i) Most of the banks did not indicate either for themselves or for the banking industry, the specific staff requirements at each level in the next five years in the context of computerisation plans for 1990 to 1994.

(ii) As regards skill requirements, a few banks have indicated that the skill requirements should be according to responsibilities and should include awareness. A specific suggestion made was that officers in Scale IV and above should get skills on:

(a) planning, coordinating and communications at the corporate level

(b) identification of areas for computerisation

(c) leadership

(d) capability of logical analysis

(e) knowledge of different programming languages and communications.

(iii) Very few respondents felt that the staff requirements for computerisation can be met from within. Majority of the banks are in favour of recruiting a few professionals from outside, particularly for technical aspects of computerisation. The levels and skills of such professionals have, however, not been specified.

(v) Banks have pleaded for sanction of additional staff for computerisation so as to speedily implement the programme.

***Training requirements***

(i) The training requirements for future should include general computer appreciation for non- EDP staff, specialised training programme in languages for EDP personnel, and specialised training for inspecting officers/auditors. The specialised training for EDP personnel should include DBMS, Systems Analysis and Design, COBOL, Basic, Unix, 'C', Lotus and dBase, Word Processing, hardware maintenance/communication and networking. It has also been suggested that adequate number of staff be trained for working on mini-computers, mainframe computers and in communication areas. The training should be targetted towards both the users and the managerial staff.

(ii) majority of the banks were of the view that the existing infrastructure in their banks and industry is not sufficient to meet the future training requirements of computerisation. Banks have indicated that there is a need to set up an exclusive, specialised Information Technology College for banks. It has also been suggested that a few Regional Information and Technology Colleges may be set up. The College can take care of standardisation of system specifications and software to certain extent. It can also take responsibility for developing software for ATMs and Banknet.

(iii) It has been suggested that a separate Department for Communications under the Chief EDP, may be created. General embargo on transfer of EDP staff till 1994 may be considered. It has also been suggested that a Bilingual dictionary should be developed by N.C.S.T. or through a central pool. Further, special incentives could be given to EDP personnel to motivate them.

***Some other relevant observations***

(i) Systems and procedures across the banks should be standardised and there should be separate organisation to handle ATMs, credit cards and inter-bank network.



(ii) On-line banking at maximum number of branches, networking, developing a comprehensive inter-bank settlement system and integrating it with payment system of the rest of the economy and use of specialised machines have been suggested.

(iii) Computerisation plan requires support at apex level and active cooperation of staff and bank managements. Actual course of progress to be adopted should be left to individual banks within the overall scope.

(iv) Computer audit should be carried out along with RBI inspection. Non-performance in computerisation should be taken as seriously as non-performance in business.

(v) There should be more emphasis on RO/ZO and HO computerisation as also other activities like accounts and clearing etc.

(vi) Qualitative targets may be given priority over quantitative targets.

#### ***Computerisation at Branch, RO/ZO and HO levels***

(i) The most commonly suggested objectives of computerisation are improvement in customer service, housekeeping and employee productivity. Other objectives suggested are decentralisation of data processing, improving MIS/reporting systems, improving working conditions and enriching job content, even distribution of workload, efficient funds deployment, bring down costs, eliminate scope for frauds and keeping pace with technological changes.

(ii) Targets for coverage have been generally suggested on the basis of top business centres and volume of business in the branches. The range of coverage suggested varies from a few metropolitan centres to all metropolitan, urban district headquarters and semi-urban branches. Many respondents suggested that the criteria of selection of branches should be flexible with options left open to the banks.

(iii) As regards areas to be computerised the views are divided on whether to computerise all activities at branch level. Generally, it has been suggested that the front

office or transaction-oriented applications having customer interaction should have priority.

(iv) The general criteria suggested for selection of branches for computerisation is business volume. Other factors for consideration while selecting the branches have been suggested such as sufficient space/power, vendor support, number of transactions, number of accounts, number of employees, nature of branches (e.g. focal branches for collection of excise, customs duty), potential of business growth, variety of transactions and union agreements.

(v) Minis and PCs/PC-ATs have been suggested for branch level computerisation. Some banks have suggested multi-terminal, multi-user system in the form of LAN or on-line terminals. Other ancillary facilities such as signature storage and retrieval, pass book printers, magnetic cards readers etc., have also been suggested for installation.

(vi) As regards standardisation, banks are generally of the opinion that standardisation of software is desirable, but would have to be preceded by standardising systems and procedures.

A suggestion has also been made that an Indian Banking Software Group may be formed with participation from each bank for attempting industry-wide standardisation and to act as an exchange house for sharing the software packages developed by banks.

(vii) Most of the banks advocate single window service facility for customers, using multi terminals through a Mini System or LAN. This would also help to evenly distribute the workload at different counters. However, a few respondents caution that such facility may be introduced only at selected branches, and will also call for massive retraining.

(viii) Banks generally aver that on-line terminals at customer sites can be provided. However, necessary controls such as passwords, audit trails, legal implications would

need to be worked out. Such services are subsumed on efficient communication facilities with fully automated branches. A suggestion has also been made that data transfer on magnetic media may first be attempted. The cost of providing the services should be met by the customer. It has also been suggested that an expert committee may look into the matter in detail.

(ix) The most commonly identified application areas for Head Office computerisation are Pay Roll, P. F., Personnel Inventory, IBR, Credit Information, MIS, Statutory Returns, Performance Budgeting etc. Other areas suggested are analysis of loss making branches, costing of services, submission of claims, 'expert systems' on credit appraisal, foreign exchange transactions etc.

(x) At the Regional Offices/Zonal Offices, the most common areas suggested are credit information system, personnel inventory, performance budgeting, payroll, statistical returns, branch profiles etc. Some other areas suggested are inventory of big customer accounts, inter/intra-zone branch reconciliation, merchant banking, training data, lead bank returns, branch level business planning and monitoring, keeping track of irregular and overdue accounts etc.

### ***BANKNET/SWIFT***

(i) The most commonly suggested application areas for BANKNET are : Electronic funds transfer, Message switching, Inter-bank settlements etc.

(ii) Other suggested areas are : investments, multiple currency transactions, foreign exchange operations, ATMs , credit cards accounting, credit clearing, MIS, home banking, point of sale service, reporting currency chest transactions, FAX transmissions etc.

(iii) Majority of the banks have not given any concrete suggestions for organisational arrangements for BANKNET. Some of them have suggested that the BANKNET could be managed either by Reserve Bank of India, State Bank of India, Indian Banks' Associa-

tion, separate independent network authority or a subsidiary organisation on the lines of SWIFT/Clearing House. As regards sharing of initial expenditure on BANKNET, majority of the banks indicated that it should be shared either on the basis of business of individual banks or prorata on the basis of usage. Another suggestion made was that initial expenses may be borne by RBI or Government of India. However, as regards recurring expenditure, majority of the banks indicated that it may be shared by banks on the basis of usage.

(iv) Usual precautions while dealing in funds transfers, viz., regulated access, password, encryption, use of coded messages, ciphers, automatic messages numbering and checking, authentication of messages, standard formats, built- in logging, checksum files etc. have been suggested. It has also been suggested that steps may be taken for enacting suitable legislation on the lines of Western countries, or the Negotiable Instruments Act may be suitably amended to provide protection for inter-bank transfers. Creating a national organisation for ciphering has also been suggested.

#### ***Automated Teller Machines (ATMs)***

(i) Most of the banks advocate a restricted/selective approach by installing ATMs in metros, large branches etc. Another view is that these may be installed only at convenient/strategic locations like airports, railway stations, big departmental stores etc. and not at branches of banks.

(ii) Installation of ATMs off-the-premises is favoured. However, security measures have been suggested such as appointing armed guards, restricted access, passwords, proper check signals, good lighting, burglar alarms and other preventive measures.

(iii) Banks are in favour of sharing ATMs, expenses may be shared on the basis of usage, per constituent charges etc. But some also feel that such a facility may create confusion and leakage of information.

(iv) It is suggested that networking of ATMs may be done gradually. Setting up of a separate organisation, owned either by RBI/SBI/IBA/GOI, or as a consortium of participating banks, has also been mooted.

(v) Various methods suggested for disseminating information about the ATMs to the customer are newspaper, advertisements, video publicity, on-site personnel, T.V. coverage, pamphlets, promotional and educational literature etc. A deeper examination by a separate committee has also been suggested. Another view is that since ATMs are already in use or will be used by the well-to-do customers, no additional efforts will be necessary.

(vi) The opinion generally expressed is that point of sales terminals facility may be allowed. It is also suggested by a few banks that it may be done on selective or experimental basis, after Banknet/computerisation stabilise.

(vii) Other comments received regarding ATMs are:

(a) Adequate training needs to be provided to staff.

(b) Changes to be made in Shop and Establishment Act and Bankers' Book of Evidence Act and existing savings bank rules.

(c) Suitable insurance covers to be taken.

(d) Legal aspects of computerised accounting systems and EFT to be studied.

***Annexure II***

**Illustrative list of activities at computerised branches**

***(a) Single-window service (at any counter)***

- (i) Cash receipts and withdrawals
- (ii) Cheques deposit for clearing
- (iii) Balance enquiry & statement of accounts
- (iv) Payment of DDs, Traveller Cheques, Fixed Deposit Receipts
- (v) Issue and encashment of MTs/TTs
- (vi) Loan repayment receipts

***(b) Dedicated counters/visit to two counters***

- (i) Issue of cheque books
- (ii) Issue of Demand drafts, banker's cheques
- (iii) Fixed Deposits renewal
- (iv) Issue of foreign and rupee travellers cheques, gift cheques
- (v) Bills for collection
- (vi) Sale/purchase of foreign exchange

Such services would require making payment or leaving instructions at one counter, followed by a visit to another specified window for receiving the signed security paper instrument, which would be printed near the back-office upon instructions conveyed through the on-line terminal at the counter.

***(c) Services at back-office***

These are the services which would require greater scrutiny or interaction with the customer, or they are purely of housekeeping nature such as:

- (i) Opening/negotiating letters of credit
- (ii) Issue of bank guarantees
- (iii) Opening/closing/transfer of accounts
- (iv) Bills for discount/purchase
- (v) Lockers, safe custody of articles
- (vi) Credit appraisal
- (vii) Compilation of statutory and other MIS returns
- (viii) General ledger and other books of accounts and house keeping .

*Annexure III*

**Substituting cheque clearing by funds transfer**

Relatively small cheques can be handled by the branch in which they are being deposited, as follows:-

- (i) The bank receiving the deposit sets up on-line communication with the bank which is going to pay.
- (ii) The cheque number, the account number of the person issuing the cheque, validity of the cheque number for the account concerned, and balance are checked immediately.
- (iii) The bank which has been contacted for this purpose immediately debits the amount in the account of the person who has issued the cheque.

It is difficult to visualise signatures being checked through data communication. For one thing, sending bit maps of signatures would increase communication volumes. But, more important, it might also increase the possibility of forgery. An option that could be considered is to honour clearing cheques within specific limits without prior signature verification. However, large value cheques would have to be sent for actual signature verification before payment. Further, if an environment can be successfully created in which funds transfer can occur within minutes, most business activities will start using the funds transfer mechanism and avoid sending large cheques for inter-city payments.



*Annexure IV*

**Nature of communication media available, and costs**

***(a) The Terrestrial Option***

One possibility is to use leased data channels (for use over long distances) and telephone cable pairs (for use within a city, or from a town to a nearby rural branch). The current tariff is as follows:

- Channels : About Rs.500 per kilometer per year.
- Cable pairs : About Rs.1,900 per kilometer per year, for a single cable pair, and approximately Rs.3,800 per kilometer per year for a twin cable pair.

Cost of leasing communication media under terrestrial option:

2500 branches, 900 ROs/ZOs and 30 Head Offices to be connected by local cable pairs  
length on the average = 12 kms.

Total length of local cable pairs =  $3430 \times 12 = 41,200$  kms.

approximately.

24 active non-metropolitan locations to be connected by channels,

Distance to the nearest metropolis,

on the average : 200 kms.

6 metropolitan centres to be inter-connected

average distance : 1500 kms.

( xv )

Total channel distance =  $200 \times 24 + 6 \times 1500 = \text{say, } 15,000 \text{ kms.}$

Total estimated annual leasing cost                         =  $41,200 \times 4,000$   
  
  +  $15,000 \times 500$   
  
  = Rs.17.23 crores approximately

Considering the investment in equipment that is proposed to be made, this price for data communication is not disproportionately high. Datacom makes a real difference to the bank client, speeding up the flow of information and funds, avoiding delays and speeding up business and other economic activity.

***(b) The Satellite Option***

The other option to be considered is satellite data communication, using the so called 'micro-earth stations' to reach even individual branches directly via satellite. This will avoid the 'last mile problem' and enable creation of networks as fast as equipment can be acquired and installed. A single satellite transponder, leasing at about Rs.1.5 crores per year can carry the entire estimated traffic load and can also provide a healthy margin for extension of the network to other branches as well. The choice is not of the DOT option versus the Satellite option. Both options will require DOT's commitment and co-operation. Satellite equipment can be ideally acquired from an ITI subsidiary specially set up by DOT for this purpose. DOT, or one of its units, could function as the implementing agency for the satellite option. It is also worth noting the flexibility of the satellite option. The equipment required, even for the thirty high volume centres, will be quite small in size and low in weight. In due course, perhaps the banking industry could switch over to satellite communication network.

*Annexure V***Estimate of traffic load on the network*****A) Estimate of daily voucher load***

The workload handled at the 2500 branches would be to the order of 3 million vouchers, estimated as follows :

Number of branches	Daily voucher load	Total vouchers
500	2000	10,00,000
2000	1000	20,00,000
		-----
		30,00,000
		-----

It is estimated that roughly 40 % of the above will involve inter-branch and inter-bank communications, i.e. 1.2 million transactions. Reports, etc. being submitted by the branches, may generate additional volume of communication load equivalent to say, half a million transactions. The total branch level communication load is therefore estimated at the equivalent of about 1.7 million transactions per day.

Allowing for acknowledgements, overheads and safety factors, each transaction can be considered to comprise of 1 kilobyte of data. The load generated for transmission from RO/ZOs to Head Office levels can be assumed to be the equivalent of 1000 transactions per day per office.

***b) Estimate of Communication load***

The daily communication load over the network would be:

***I. Branch level***

2500 branches generate in	= 1.7 million transactions
6 hours working daily	= 1.7 million x 1kbytes

$$\begin{aligned}
 \text{Bytes per second} &= \frac{1.7 \text{ million} \times 1000}{6 \text{ hrs} \times 60 \text{ mts} \times 60 \text{ sec}} \\
 &= 0.08 \text{ million bytes/second} \\
 \text{(A)} &= 0.64 \text{ million bits/second.}
 \end{aligned}$$

## *II. RO/ZO level*

Daily load per day at

$$\begin{aligned}
 920 \text{ ROs/ZOs (in bytes)} &= 920 \text{ million bytes} \\
 \text{Bytes per second} &= \frac{920 \text{ million bytes}}{6 \times 60 \times 60} \\
 &= 0.04 \text{ million bytes/second} \\
 \text{(B)} &= 0.32 \text{ million bits per second.}
 \end{aligned}$$

$$\text{Total load (A) + (B)} = 0.96 \text{ million bits per second.}$$

The estimates of data communication loads worked out assume that signature verification is not done on-line.

**Price : Rs. 40/-**

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