



AUTOMATED TELLER MACHINES (ATMs) TRENDS, PROBLEMS AND PROSPECTS

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Abstract: Over the past decade, India has emerged as one of the fastest-growing economies on the globe. The rest of the world has been impressed to see that the reforms initiated in the early 1990s are bearing fruit. To sustain any country's growth, of course, a strong and dynamic financial sector is essential. In recent years, financial markets have undergone some of the most rapid and extensive changes perhaps foremost among recent changes in world financial markets have been their accelerating integration and globalization. This development, which has been fostered by the liberalization of markets, rapid technological progress and major advances in telecommunications, has created new investment awareness and financing opportunities for business and people around the world. The banking system is, by far, the most dominant segment of the financial sector. The present paper is an attempt to analyze the impact of recent global financial crisis on Indian economy. The paper has discussed the features of recent global financial meltdown also deals with the impact of this crisis on Indian banking sector and discusses how India came back to high growth.

Keywords: Indian Economy, Financial Turmoil, Credit Flows, Sub-prime Mortgage.

Introduction

Banking all around the world has acquired new dimensions with the introduction of technology. Automated Teller Machines (ATMs) form an integral part of the total computerization plan of a bank. The paper looks into different aspects of ATMs with special reference to Indian Banking. The advantages and disadvantages with special emphasis on economic aspects such as cost and revenue are discussed. Drawing inferences from experiences of other countries, the paper suggests some important policy aspects for ATMs in our country. It is suggested that ATMs be adopted to suit the requirements of our country.

Banking has come a long way in the last 200 years. The role of banks has undergone a radical

change. The primary role of banks, which was essentially service oriented, has changed and they are trying to come out of the protected shell built by the Central Banks. Banks all over the world are facing market competition with the entry of technologically well placed non-banking financial institutions.

Automated Teller Machines (ATMs) form an integral part of the total computerization plan of banks. ATMs are based on computer technology which can perform a variety of functions, the primary one being cash dispensing. A large portion of total expenditure of a bank on computerization is spent on ATMs. Most bankers feel that ATMs are instrumental in providing '*high technology front end*' services

to the customers. They are assumed to be the tools for attaining better competitive edge.

It is in this context that a detailed study of ATMs is essential. The aim of this paper, therefore, is to study the different aspects of ATMs with special reference to Indian Banks. Section I deals with the evolution of ATMs. Physical structure and organization of ATMs are discussed in the Section II. The areas where ATM services are used are explained in Section III. Various advantages of ATMs are discussed in Section IV. Section V. Deals with major problems associated with ATM services. Experiences of other developed countries are discussed in Section VI. Important policy suggestions for Indian ATM network are made in Section VII. Finally conclusions are drawn in Section VIII. The special focus of the Paper is to present an economic justification of the use of ATMs.

History and Developments

Let us understand the historical development of ATMs abroad and in India. The ATMs were first introduced abroad around 1970. The only role these machines initially played was in replacing a human teller with a machine teller i.e., they were used as a cash dispenser only. Michael Violano & Shimon-Craig Van Collie (1992), in their book Retail Banking Technology, explain the evaluation of ATMs as follows:

“The Birthing Phase (1970-1976) marked the pioneering use of ATMs by the early adopting banks. Rapid sales to big banks created a short-lived competitive advantage. There was a scant understanding of customer need or expectations and only vague strategizing as to the role of ATMs in banks’ overall retail delivery system”.

“In the Acceptance Phase (1977 – 1984) nearly every bank had to have some (ATMs) to keep up with the banks down the street. Bankers expected the customers to expect the convenience of anytime and anyplace account access. However, bankers started to notice that ATMs were a drag on profits and only a third of all customers actually used the machines”.

“During the Maturity (and Decline?) Phase (1984 – the early 1990s) most bankers (grudgingly) accepted ATMs as a necessary cost of being in the retail banking business.”

Indian Banking Industry remained untouched by technological developments for quite some time. The use of computers in the Indian Banking Industry initially was very minimal. This was mainly due to opposition from workers’ unions. The Bipartite Settlements in 1983, 1989 and 1993, signed between banks and major unions, removed the main hurdle. The process of computerization acquired greater speed with the beginning of liberalization era. The availability of user friendly computer applications, coupled with the easy availability of relevant manpower, helped in the process of computerization. With changing times and increasing competition banks are forced to adopt new technology. According to some projections the total number of branches that would be computerized by the end of 1996 would be around 5000, out of which around 750 will have total computerization. Following are some of the figures on 31st March 1996 in relation to computerization and communication in Indian Public Sector banks.

1.	Expenditure on computerization	Rs.57222.49 lakhs
2.	Expenditure on communication	Rs.4080.68 lakhs
3.	Number of officers trained on communication	Rs.3465
4.	Number of other staff members trained in communication	2322
5.	Number of officers trained in computer applications	49942
6.	Number of other staff members trained in computer applications	40660
7.	The number of stand-alone PCs	5628

(Source: Information sheet, Reserve Bank of India, 1996, Unpublished)

Let us have a look at the present status of computerization and ATM installations in banks in India.

Table – 1 Branches and ATMs of Scheduled Commercial Banks (Continued)
(As at end-March 2011)

S. No.	Name of the Bank	Branches					ATMs			Percent off – site to total ATMs	Percent of ATMs to Branches
		Rural	Semi Urban	Urban	Metro-politan	Total	On -site	Off- site	Total		
1.	2	3	4	5	6	7	8	9	10	11	12
	Scheduled Commercial Banks	21,705	19,800	16,945	15,680	74,130	40,729	33,77	74,505	45.3	100.5
	Public Sector Banks	20,387	15,978	13,569	12,277	62,211	29,795	9,692	49,487	39.8	79.5
	Nationalized Banks	14,185	10,561	10,154	9,398	44,298	15,691	9,145	24,836	36.8	56.1
1.	Allahabad Bank	968	455	506	444	2373	142	72	214	3.6	9.0
2	Andhra Bank	407	422	455	319	1603	452	529	981	53.9	61.2
3	Bank of Baroda	1171	833	625	723	3352	998	563	1561	36.1	46.6
4	Bank of India	1299	769	613	622	3303	755	670	1425	47.0	43.1
5	Bank of Maharashtra	534	290	298	383	1505	323	94	417	22.5	27.7
6	Canara Bank	803	912	765	772	3252	1415	758	2173	34.9	66.8
7	Central Bank of India	1386	948	724	679	3737	374	632	1006	62.8	26.9
8	Corporation Bank	216	338	362	352	1268	677	505	1182	42.7	93.2
9	Dena Bank	362	258	264	307	1191	391	105	496	21.2	41.6
10	Indian Bank	496	502	473	358	1829	806	322	1128	28.5	61.7
11	Indian Overseas Bank	573	547	543	504	2167	719	324	1043	31.1	48.1
12	Oriental Bank of Commerce	333	396	495	416	1640	878	314	1192	26.3	72.7
13	Punjab and Sindu Bank	299	150	238	254	941	81	2	83	2.4	8.8
14	Punjab National Bank	1972	1091	993	799	4855	3044	2006	5050	39.7	104.0
15	Syndicate Bank	768	605	591	527	2491	1018	202	1220	16.6	49.0
16.	UCO Bank	802	466	479	445	2192	411	197	608	32.4	27.7
17	Union Bank of India	828	846	730	647	3051	1830	104	2634	30.5	86.3
18	United Bank of India	627	286	349	294	1556	262	246	508	48.4	32.6

19	Vijaya Bank	260	260	358	308	1186	447	98	545	18.0	46.0
20	IDBI Bank Ltd.	81	187	293	245	806	668	702	1370	51.2	170.0
	State Bank Group	6202	5417	3415	2879	17913	14104	10547	24651	42.8	137.6
21	State Bank of India	4972	3865	2382	2065	13284	10826	9258	20084	46.1	151.2
22	State Bank of Bikaner and Jaipur	317	256	164	172	909	586	391	977	40.0	107.5
23	State Bank of Hyderabad	311	387	292	220	1210	997	273	1270	21.5	105.0
24	State Bank of Mysore	213	141	152	194	700	532	203	735	27.6	105.0
25	State Bank of Patiala	334	280	249	150	1013	574	178	752	23.7	74.2
26	State Bank of Travancore	55	488	176	78	797	589	244	833	29.3	104.5

Note: Nationalised Banks include IDBI Bank Ltd.,

Source: Master Office file (latest updated version) on commercial Banks.

Table:1 Branches and ATMs of Scheduled Commercial Banks
(Continued) (As at end-March 2011)

Sr. No	Name of the Bank	Branches					ATMs			Off-site total	ATMs Branch
		Rural	Semi-urban	Urban	Metro polita	Total	On-	Off-	Total		
1	2	3	4	5	6	7	8	9	10	11	12
	Private Sector Banks	1,311	3,814	3,315	3,162	11,60	10,64	13,00	23,65	55.0	203.9
	Old Private Sector	764	1,738	1,349	966	4,817	2,641	1,485	4,126	36.0	85.7
1.	Catholic. Syrian Bank	18	194	99	49	360	105	54	159	34.0	44.2
2.	City Union Bank Ltd.	34	82	83	49	248	185	47	232	20.3	93.5
3.	Dhanalakshmi Bank Ltd.	24	107	83	59	273	167	292	459	63.6	168.1
4.	Federal Bank Ltd.	49	402	178	112	741	462	342	804	42.5	108.5
5.	ING Vysya Bank	83	84	162	175	504	206	194	400	45.5	79.4
6.	Jarmuu and Kashmir	231	84	124	64	503	262	100	362	27.6	72.0
7.	Karnataka Bank Ltd.	90	101	148	144	483	192	75	267	28.1	55.3
8.	Karur Vysya Bank Ltd.	33	128	1.27	81	369	371	117	488	24.0	132.2
9.	Lakshmi Vilas Bank Ltd.	38	97	86	48	269	145	1.05	250	42.0	92.9
10.	Nainital Bank Ltd.	25	29	25	22	101				-	
11.	Ratnakar Bank Ltd.	25	30	20	25	100	32		32	-	32.0
12.	SBI Commercial and International Bank Ltd.				2	2	2	-	2		100.0
13.	South Indian Bank Ltd.	65	304	160	103	632	398	91	489	18.6	77.4
14.	Tamilnad Mercantile Bank Ltd.	49	96	54	33	232	114	68	182	37.4	78.4
	New Private Sector Banks	547	2,076	1,966	2,196	6,785	8,007	11,518	19,52	59.0	287.8
15.	Axis Bank Ltd.	94	449	452	382	1,377	1,743	4,527	6,270	72.2	455.3
16.	Development Credit.	4	14	12	52	82	78	56	134	41.8	163.4
17.	HDFC Bank Ltd.	123	619	548	073	1,963	2,749	2,722	5,471	49.8	278.7
18.	ICICI Bank Ltd. ..	260	803	693	767	2,523	2,727	3,377	6,104	55.3	211.9
19.	IndusInd Bank Ltd.	22	78	110	93	303	254	340	594	57.2	196.0
20.	Kotak Mahindra Ltd.	21	57	82	162	322	307	403	710	56.8	220.5
21	Yes Bank Ltd.	23	56	69	67	2.15	149	93	242	38.4	112.6

Nil/Negligible.

Source: Master office file (latest, updated version) on commercial Banks.

Table -2: Branches and ATMs of Scheduled Commercial Banks
(Concluded)(As at end – March 2011)

Sr. No	Name of the Bank	Branches					On-	Off-	Total	Per Off-site total	Per cent ATMs Branch
		Rural	Semi-urban	Urban	Metro polita	total					
1	2	3	4	5	6	7	8	9	10	11	12
	Foreign Banks	7	8	61	241	317	286	1,081	1,367	79.1	431.2
1.	AB Bank Ltd.	-	-	-	1	1	-	-	-	-	-
2.	Abu Dhabi Commercial	-	-	-	2	2	-	-	-	-	-
3.	American Express	-	-	-	1	1	-	-	-	-	-
4.	Antwerp Diamond Bank	-	-	-	1	1	-	-	-	-	-
5.	BNP Paribas	-	-	-	9	9	-	-	-	-	-
6.	Bank International	-	-	-	1	1	-	-	-	-	-
7.	Bank of America National Association	-	-	-	5	5	-	-	-	-	-
8.	Bank of Bahrain &	-	-	-	2	2	-	-	-	-	-
9.	Bank of Ceylon	-	-	-	1	1	-	-	-	-	-
10.	Bank of Nova Scotia	-	-	1	4	5	-	-	-	-	-
11.	Barclays Bank PLC	-	1	4	4	9	7	28	35	80.0	388.9
12.	Chinatrust Commercial	-	-	-	1	1	-	-	-	-	-
13.	Citibank N.A.	-	2	12	29	43	58	593	651	91.1	1,514.0
14.	Commonwealth Bank of	-	-	-	1	1	-	-	-	-	-
15.	Credit Agricole Corporate Investment	-	-	-	6	6	-	-	-	-	-
16.	Credit Suisse AG	-	-	-	1	1	-	-	-	-	-
17.	DBS Bank Ltd.	3	3	-	6	12	4	26	30	-	250.0
18.	Deutsche Bank (Asia)	1	-	6	8	15	14	46	60	76.7	400.0
19.	First Rand Bank	-	-	-	1	1	-	-	-	-	-
20.	HSBC Ltd.	1	1	10	38	50	72	79	151	52.3	302.0
21.	JPMorgan Chase Bank Association	-	-	-	1	1	-	-	-	-	-
22.	JSC VTB Bank	-	-	-	1	1	-	-	-	-	-
23.	Krung Thai Bank Public	-	-	-	1	1	-	-	-	-	-
24.	Maslircqbank PSC	-	-	-	2	2	-	-	-	-	-
25.	Mizuho Corporate Bank	-	-	-	2	2	-	-	-	-	-
26.	Oman International Bank	-	-	1	1	2	1	-	1	-	-
27.	Sber Bank	-	-	-	1	1	-	-	-	-	-
28.	Shinhan Bank	-	1	-	2	3	-	-	-	-	-
29.	Societe Generale	-	-	-	2	2	-	-	-	-	-
30.	Sonali Bank	-	-	1	1	2	-	-	-	-	-
31.	Standard Chartered Bank	-	-	16	78	94	95	224	319	70.2	339.4
32.	State Bank of Mauritius	-	-	-	3	3	-	-	-	-	-
33.	The Bank of Tokyo-UFJ, Ltd.	-	-	-	3	3	-	-	-	-	-
34.	The Royal Bank of	2	-	10	19	31	35	85	120	70.8	387.1
35.	UBS AG	-	-	-	1	1	-	-	-	-	-
36.	United Overseas Bank	-	-	-	1	1	-	-	-	-	-

Nil/ Negligible.

Source: Master office (latest updated version) on commercial Banks.

A large variety of technology has been introduced in the past few years to suit the requirements of banking industry in India. The information technology industry has grown more sensitive to the needs of banking sector as it has

become a major market for it. Phase by phase, various computer related applications are being introduced targeting the banking industry. Some of them include.

- Automated Ledger Posting Machines,

- Magnetic Ink Character Recognition (MICR) Cheques,
- Society for Worldwide Inter-Bank Financial Telecommunication (SWIFT),
- Computer terminals for direct access to customers,
- ATMs, etc.

These applications were introduced from time to time in different areas of banking operations. The area most affected by computerization plans of banks is their delivery system. Banks are trying to find new technologies, which are cost effective and which will help in reducing the paper work.

Banking Industry in India, especially in metro cities, is planning interconnectivity of banks, and simultaneously. It is also thinking in terms of providing interconnectivity to all its branches, with the help of networking. This will allow a customer to operate his account from anywhere, irrespective of his account with a particular branch of a particular bank. Indian Banks are on the threshold of entering into ATM network. They are setting up a network of ATMs in Mumbai. Let us have a look into the ATM network plan of Indian Banks.

Indian Banks Association (IBA) has planned an extensive network of ATMs, Point Of Sale (POS) terminals, Cash Dispenser spread all over Mumbai. Large number of Public sector, co-operative and foreign banks are participating in this network. The objective is to provide twenty-four-hour non-stop banking service to customers. This has been titled as 'Shared Payment Network System' (SPNS). The SPNS will offer following main services to the customers.

- i) Cash Transactions and Cheque Deposits.
- ii) Extended Hours Facility
- iii) Across the Bank Payments
- iv) Utility Payments
- v) Balance Enquiry

- vi) Printing of Statement of Account
- vii) Request for Cheque Book and Standing Instructions.
- viii) Point of Sale Facility etc.

The Central Switch is placed at Dadar. There will be hubs located at Andheri, Chembur and Fort. ATMs will be connected to the nearest hub via leased line of 2.4 Kbps. Banks will have the freedom of selecting the location of their ATMs. ATMs will be owned by individual banks. Each IBA member, who is participating in ATM network, would install at least one ATM, if it has fewer than five branches in Mumbai, or a minimum of two ATMs if there are more branches. Around 146 ATMs pooled by 38 banks are being connected to the SPNS in the first year. The network is expected to start working by beginning of 1997. Following are some of the charges associated with the ATM network for the Banks.

a) A one time ATM link-up fees of Rs.1,40,000/- for each ATM that would be connected to SPNS.

b) An annual ATM fees of Rs.23,950/- per ATM payable on all ATMs every year.

c) A transaction fees of Rs.1/- per transaction, payable to the network provider by the acquirer of the transaction for switching the transaction, if the ATMs are directly connected to the switch. If the ATMs are connected to the host and the host in turn is connected to the Switch, then the transaction fees would be Rs.2/- per transaction.

d) Host certification/testing /connectivity charges, in case of host/ interchange banks.

e) An acquirer fees of Rs.20/- paid by the Issuer of Acquirer.

Organization of ATMs

1. Physical Structure of ATM: ATMs are available in three models, i.e., Lobby Models, Through The Wall (TTW) Models and Drive in Models. Lobby models are the cheapest of all, whereas Drive In Models are the costliest. The

ATMs situated in the bank premises are easier to build and maintain. The stand-alone-ATMs are difficult to maintain and require more security cover. Banks have to incur more expenditure on networking of stand-alone ATMs. ATM has a specific number of bins for holding currency notes of single or multiple denominations.

Strip Card and Smart Card are the two types of cards used to operate ATMs. Most of the ATMs accept strip cards. Strip cards have a magnetically encoded strip which holds information such as customers PIN (Personal Identification Number), expiry date of the card, etc. The strip card is used only as an activator. Most of the strip cards follow standard specifications about size, track, etc. This allows a card issued by one bank to be used in ATM of another bank. Smart card has a small micro processor embedded in it. The micro processor is capable of storing substantial amount of information and data. The information is updated every time when the card is used. Smart cards provide enhanced services, speed up the processing of transaction and are safer. The main problem associated with the smart cards is that they do not have a common standard specification. Recently some of the major companies have reached an agreement on common standards for smart cards. As far as the cost goes, strip cards are a far cheaper option.

Most of the ATMs around the world use a basic software platform. They have built-in-fault tolerance. The machines generally have a DOUBLE of everything, such as Central Processing Unit, Power Supply, hard Disk, etc. The systems in ATMs are linear and modular. There are always two processes simultaneously running in the machine. In case of failure of one of them, the DUPLICATE takes up the process.

ATMs have strong safe quality steel housing. All the information stored in machine is backed up by independent memory. Some of the machines come with a safety cover on the keyboard which is removed automatically only after the customer inserts the card in the slot.

2. Working of ATMs: The working of ATM is not completely standardized. It depends firstly, on the bank using it, secondly, on the company supplying it, and thirdly, on the software which is being used by the machine.

An ATM has a monitor (Cathode Ray Tube) or a screen (Liquid Crystal Display) used for displaying various options such as withdrawals, deposit, balance information, issue of cheque book, etc. A customer is given a special card, which carries an encoded PIN. The customer has to insert the card in the slot provided for it. He has to then punch in the PIN along with the account number. The ATM verifies the PIN and account number from its memory. If both are found to be correct the customer is asked to select the required option. Withdrawals are restricted to specific amounts, which are multiples of numbers such as 50, 100 or 500. Generally an upper limit is set for withdrawals. The machine delivers the cash in the form of crisp currency notes.

If the PIN is incorrect, the machine warns the user. Most of the machines are designed in a manner whereby it gives a maximum of three attempts for PIN, after which it 'eats away' (holds back) the card inside and raises an alarm. It also keeps a record of such cards. The arrangement helps in reducing the chances of fraud.

Generally all the ATMs are connected to a host computer situated at a central place with the help of networking. ATMs transfer data to the host

computer, where the respective account is updated.

Applications of ATMs

Abroad ATMs have been in use since early 1970s. Following are some of the important services which can be provided with the help of ATMs.

1. Cash Withdrawals: The basic purpose of ATMs is to provide a twenty-four-hour unmanned teller, to meet round the clock money needed by customers. May be due to this service, ATMs are popularly known as 'Any Time Money' (ATM). The withdrawals can be any time, at any place and from any machine.

2. Cash and cheque deposits: Customers can deposit cash and cheque through an ATM any time.

3. Information about balance: Customers can have an access to a wide range of information about their accounts such as balance, cheques credited and debited, bank charges for various items, etc.

4. Ordering cheque book: Customers can order a cheque book any time from an ATM. **5.**

Ordering bank statements: Periodic bank statements can be ordered by customers through an ATM.

6. Direct transfers: Transfers can be of two types. It can be between different types of accounts belonging to one account holder only and it can be between two different accounts of different holders.

7. Arrangements for regular payments: Payments of telephone bill, insurance premium, electricity bill, periodical membership payments, etc. can be easily handled through an ATM.

8. Issue of travelers cheques: ATMs can be used to issue travelers cheques of various denominations.

9. Handling of loan applications: Although complete processing of a loan application is not possible on an ATM, certain basic formalities can be completed with its help.

10. Point of Sale transactions: ATMs can be used for POS transactions. Customers, making purchases, can pay through ATMs, which will directly debit their account and immediately credit will be given to the retailer's account.

11. Miscellaneous: Banks offer a number of other services to their customers on ATMs. ATMs can accept share applications, and can also be used to buy and sell shares and other securities. Some of the ATMs in America sell postal stamps, coupons for retailers, tickets for cultural programmes and sports events, etc.

Advantages of ATMs

1. Economic Benefits of ATMs: How much the ATMs will add to the profits of the bank is always a very debatable issue. While calculating monetary benefits of ATMs, banks should take into account various limitations associated with them such as obsolescence, maintenance, supervision, and so on. Opportunity cost should also be considered while calculating the extra revenue generated from ATM service. Some of the main monetary benefits are as follows.

a. Reduction in the salary bill: ATMs can be an instrument in improving overall productivity and profitability. Use of ATMs in a proper manner will lead to improved services. Efficiency can be increased with the use of latest technology. Use of ATMs, to a certain extent, at least in the long run, will reduce the salary bill of the banks. ATMs cannot be successful in replacing branches. But they will definitely help in reducing the need of human tellers. Till 1985, Bank of America has eliminated about 1400

teller positions by introducing ATMs. Considering an average monthly payment of Rs.10,000/- to a human teller and adding costs like fringe benefits, training, other benefits to the tune of around 20% of salary, an annual expenditure of nearly Rs.1,44,000/- per human teller can be saved. Adding it up for an average three tellers per branch, it comes to Rs.4,32,000/- Thus a considerable saving in the salary bill can be made in the long run by using ATMs. This savings will be far greater if we consider 24 working hours of human teller, same as that of ATMs. Considering a working of 6 hours by a human teller, the annual saving per branch rises to Rs.17,28,000/-.

b. Generation of More business: Banks can use ATMs for generation of more business by introducing innovative services on ATMs, besides offering a general advantages of 24 hours, unrestricted, quick withdrawals. Extra business can be generated from introducing new services and attracting new customers. It should be noted that the increase in the business will be noticed not only at micro level. i.e. at the level of a branch, but also at macro level, i.e. at the industry level. ATMs can help in attracting new clients as well as in retaining old ones. This can bring additional business for the bank.

c. Fees from transactions: Banks may charge customers for providing ATM service. The charges can be based on number of transactions done using ATMs, or can be a one time fees, or can be a regular monthly charge. This will be a direct income to the banks. How much the banks can charge will depend on the charges of the competitors, degree of freedom a bank enjoys in such pricing, government regulation, and other factors. Recently banks have started charging customers for some of the basic services such as

issuing a cheque book. A reasonable service charge should not be a deterrent in the introduction and expansion of ATM service.

d. Sharing ATMs with retailers: Another source of income from ATMs can be through the extension services to retail outlets. Some of the ATMs can be located in busy shopping centers, whereby a customer will be allowed to, directly make the payments through his bank to the retailers banks. Banks can charge small fees per transaction to the retailers also.

e. Availability of cheap Funds: Due to easy access to ATMs, customers will stop making one time withdrawals, which they generally make to avoid going to banks and again. They can withdraw money any time, hence they would like to keep money with the bank for a longer duration. This will make available cheap funds for the banks in the form of deposits in savings bank account and demand deposits.

f. Commission from utility agencies: Banks can collect commission from agencies and companies providing utility services like, telephone, electricity, etc. In cities like Mumbai, MTNL, BSES, and MSEB pay commission to their collection centers or spend certain amount in operating them. The ATM network can tie up with them and, for a small commission, collect the bills for them.

2. Competitive edge: Public sector banks now face a stiff competition with the foreign banks, co-operative banks, private sector banks, and non-banking financial institutions. The competition is more severe especially where technology is concerned. Foreign banks are already using latest technology since a long time. Private banks have begun their operations with a high note of technology. Cooperative

banks, with their limited branch network find it easy to introduce new technology. Public sector banks with their huge manpower and vast network of branches find it difficult to suddenly adopt new technology. With the customers having an option of variety of financial institutions, banks have no other way but to accept latest technology. Installing ATMs is one of the methods which can help public sector banks stay in competition. It should however be noted that using new technology is a necessary and not sufficient condition for staying ahead in competition. Banks now need innovative methods of marketing their services along with a complete marketing approach.

3. Improved house keeping and public relations: Clerks who will be relatively free due to shifting of some of the work to ATM, can devote their time for improving house keeping and public relations. Staff can also devote time for introducing new services to customers.

4. Benefits to customers: Customers are supposed to be the ultimate beneficiaries of ATMs. Most of the features of ATMs are designed keeping in mind the end user. Any transaction via ATM can be directly recorded into the memory of a computer which will help in updating the account of customer instantly. A customer will always have latest information of his account. The basic utility of ATMs is withdrawals of cash any time (especially during non-banking hours). This service is slowly becoming popular as the requirements for cash have changed drastically over last few years. Customers have a unique advantage of withdrawing cash whenever needed, especially during emergencies. They need not stand in long queues in banks for withdrawing cash. They can plan their withdrawal any time during the day.

They can even withdraw money from ATMs located far away from the branch having their accounts. Stand-alone ATMs provide the facility of cash withdrawals from places like airports, shopping centers, petrol pumps, etc. In an advanced system, ATMs which are connected via network lines, enable customers to withdraw required amount from any ATM belonging to a particular network. ATM users can have an instant update of their account without any delay. Customers can deposit cash and cheques through an ATM. The cash is kept in an envelope, which is opened during the working hours of banks by an authorized employee. Some companies have introduced ATMs which count the notes at the time of deposit itself. They also check whether the currency is counterfeit and give an immediate credit to the customer account. Customers can have an access to a wide range of information about their accounts. Balance, cheques credited and debited, bank charges for various items, etc. are some of the information which customers can get from ATMs. Disabled customers can use Drive-In models of machine, and do the banking operations easily. Customers will also have the benefit of earning extra interest, as there will be no need to withdraw all the cash at one time.

5. Benefits to Government: By promoting the use of ATMs, the government can, to a certain extent, curb the use of black money. When people have almost hundred percent liquidity of bank money, they will rely less on cash. Besides all the transaction from an ATM can be directly fed into a computer which keeps them in the memory, hence government can use them in future to trace down irregular payments.

6. Benefits to Retailers and Vendors: Big retailers like departmental stores and

supermarkets can increase their sales due to installation of ATMs in their premises. A customer need not carry cash or credit card for making payments. He can make payments directly by using his ATM card. The amount can directly be credited to the account of the retailer.

Problems related to ATMs

Technological advantages and disadvantages are based on time, place, and circumstances. A technology which is advantageous at one place may not be so at other. The constraint of time, place and situation should be remembered while discussing pros and cons of any technology. As in the case of all other technologies, ATMs also have some major drawbacks. Certain distinctive features of Indian financial markets include heterogeneous customers, highly widespread use of black money, desire to hold wealth in cash, use of traditional modes for settlement of business dues, etc. The financial markets in India consist of different types of financial institutions. Although a major share of business is with the public sector banks, there are co-operative banks, private banks, foreign banks, non-banking financial institutions, small money dealers, and private individual money lenders also. Indian financial markets have a large variety of customers. Some are literate and some are illiterate, some are computer-educated and some of them fear the sight of computers. Some are traditional, doing business in old system, whereas some are modern, some of them are rich whereas some are middle class and poor. The investment decisions are only marginally affected by the official bank interest rates, mostly they are guided by privately floating interest rates. Let us discuss, keeping in mind these heterogeneous characters of Indian Financial markets and customers, some of the

main disadvantages associated with the use of ATMs.

1. Various Costs: The cost of ATMs is a major drawback. While considering the total cost, the following costs should be taken into account.

a. Cost of machine: The total cost of the machine including the import duty for imported machines should be considered. The prices of some of the main ATM models available in Indian market are as follows:

Model	Approximate Price
Lobby Model	12,00,000/- to 18,00,000/-
TTW Model	15,00,000/- to 23,00,000/-
Drive In Model	25,00,000/- to 30,00,000/-

b. Transport charges: The transport cost should be added to the cost of the machine itself. The transportation charges are going to be high if the machine is imported. Even if the machine is bought from local market, the transportation to the site will cost heavily.

c. Installation expenditure: Installation expenditure should be added to the cost of the machine. All the relevant costs like creating a security cover at the site should also be included in the cost of installation. Installation charges are going to be high in case of a stand-alone ATM.

d. Activator card expenses: The company supplying an ATM will also supply the Activator Device (Card). The cost of the card should be ascertained from the supplier.

e. Floor space expenditure: Bank should take into account the cost of the premises which it will be using to install an ATM. The total floor space required should be fixed. An appropriation should be made for the floor space utilized.

f. Depreciation: A depreciation schedule should be prepared. The life of machine should

estimated and assuming a scarp value, the rate of depreciation should be decided based on an appropriate method of depreciation.

g. Servicing and maintenance expenditure:
Banks should take into account the costs which will be involved in servicing and maintenance of

ATMs. The cost will gradually increase over period of years.

When all these items are added together, the total cost of installing and operating an ATM would typically be as given below:

S.No.	Item	Cost
A.	Capital Expenditure (One Time)	Rs.
1.	Cost of themachine	30,00,000.00
2.	Transport and installation expenditure	50,000.00
3.	Expenditure for getting connection	1,40,000.00
4.	Other expenditure (Air conditioning, Security lighting etc.)	1,00,000.00
	Total Capital Expenditure	33,15,000.00
B.	Recurring Expenditure (Annual Basis)	
1.	Depreciation @15% (assuming a life span of 7 years for an ATM)	4,89,750.00
2.	Card expenditure @Rs.30 per card for an estimated 5,000 cards per year	1,50,000.00
3.	Electricity @Rs.4.00 per unit assuming a consumption of 50 units per day totaling to 18,250 units a year	63,000.00
4.	Annual fees for connection	23,950.00
5.	Servicing and maintenance @ 5% of capital cost	1,63,250.00
6.	Interest on capital cost @ 18% per annum	5,87,700.00
7.	Miscellaneous (down time etc.)	50,000.00
	Totaling Recurring Expenditure	15,27,650.00

If other costs such as provision for misappropriation, frauds, litigation expenditure etc. are also taken into account, the recurring cost per annum may go up to Rs.17,00,000.00 per annum.

The basic question which arises from the above cost analysis is the financial feasibility of the ATM project. Can ATMs generate reasonable profits on such a huge investment? Will it be financially viable to install a machine which involve such a huge investment with uncertain future earnings? How should be bank appropriate this capital expenditure? Will it be

proper to show this as a deferred revenue expenditure?

The answer to some of these questions may be found if we look into the experience of other countries. It can be understood from the ongoing discussion about the cost and earnings of ATMs that in developed countries also, there is no general agreement about the financial soundness of the ATMs. A large number of authors have claimed that ATMs have become a necessity. Hence the cost should not be a factor of discussion. How much the customers should be charged is a very important item of discussion. Certain analysts abroad have felt that there are

fees for opening and closing account for ATM transactions, for using ATM cards too much, and using them to little. These charges have absolutely no relation to the costs to the banks. It appears that banks are padding their profits by soaking depositors.

1. To generate a reasonable profit on the capital cost, the bank will have to collect a gross revenue of minimum Rs.25,00,000.00 per ATM. Considering the usage scenario now, the banks may not be able to generate such huge collections.

2. Manhandling: ATMs are highly sophisticated machines. They can lead to huge losses if they are not handled properly. Manhandling of machine may lead to breakage and other complications, some of which can be beyond repair. Anti-social elements pose a great threat to such machines because ATMs are generally placed at strategic locations which have an easy access to customers. During riots and social commotion, banks face a great danger of ATMs being damaged.

3. Malfunctioning: The malfunctioning of machines can sometimes be more serious when they start giving wrong results or storing erroneous data.

4. Eligible customers: The facility of ATM is offered subject to a lot of restrictions. Banks have a lot of conditionalities for allowing ATM service. Only a selected few are given the ATM service. Conditions like minimum balance requirement act as a barrier in spreading ATM services. The illiterate, computer-ignorant, poor and rural customers are not suitable for ATMs. If we omit these categories of customers, the remaining ones form a very small percentage of total customers. Thus huge investment for such a small section of the total population of customers

may not be justifiable. The aspect which reduces the number of eligible customers is the minimum balance required by banks. This is a major deterrent in the expansion of the ATM service. Banks should either reduce the minimum balance or provide a decent rate of interest on the minimum balance. The bank can cast the net of ATM services wider by treating the minimum balance as term deposits.

5. Black-white money concept: In India, we have two economies running parallel to each other, i.e. Black and White economy. Most of the customers do not want to enter into the net of taxation; hence they deal in cash, which is generally not accounted for. Customers using ATMs are aware that whatever transactions they carry through ATMs will be recorded and will be accountable. This sometimes acts against the use of ATMs. The business , community generally shies away from ATMs due to the fear of taxation.

6. Behavioral problems: The cash spending habits of Indian customers can be another problem related to the growth of ATM business in India. Indian customer is more happy to keep "Cash" instead of "Card" in the pocket. The general unhappiness about the new technology is another negative factor. A large section of the population is still "unfit" to use sophisticated machines.

7. Expensive premises: Banks cannot justify easily the use of prime and expensive premises for setting up an ATM. Prime locations cannot be used simply for dispensing cash. The revenue generated through ATM should be reasonable enough to justify such a step.

8. Sharing ATMs: The sharing of ATMs by banks is likely to be a difficult problem to solve. The division of the cost and revenue, standardisation of

software and hardware and security are some of the problems associated with it. Security of data cannot be guaranteed in shared ATM environment as banks will be sharing the security responsibility. In the USA there has been a lot of debate about the validity of shared ATMs, as it seems to violate the rules related to monopoly and restrictive trade practices. The sharing of ATMs or forming a network of ATMs creates natural monopolies. How can it be guaranteed that the banks will not increase the fees too much in the shared network environment?

9. Suitable area: Selecting an ideal location for ATM may not be as easy as it appears, While selecting location factors like safety, accessibility, geographical coverage, density of population, etc. will have to be considered. An improper location for ATM may simply act as an additional liability.

10. Legal issues: The liabilities in case of frauds, misappropriations, break down, mistakes, etc. are not very clear. The suitable laws to deal with such issues do not exist. Who is supposed to bear the final responsibility for losses arising out of such cases? There is a need to amend important Acts, such as Negotiable Instrument Act, Contract Act, Bankers Evidence Act, etc. in the light of new forms of payment instruments and new methods of settling payments for transactions. Banks will otherwise find themselves in legal deadlocks.

11. Risks: The use of ATMs involves different types of risks as discussed below:

a. Physical: The location of ATM affects the physical security. Banks generally need a full time security personnel posted at the site. The physical penetration risk is far more greater in case of ATMs which are located on highways, high crime areas and petrol pumps which are situated in thinly populated areas. There is also a risk

associated with the verification of correctness of customer information. Basically there are two methods of verification of PIN, on-line and off-line. In on-line method, the information supplied by customer is immediately passed on to the main computer to which the ATM is connected. Such a method requires a continuous on-line connection to main computer. This can be slightly difficult in case of stand-alone ATMs, situated at supermarkets, petrol pumps, hospitals, etc. The off-line verification involves the verification of PIN immediately with the help of the information stored in the memory of the card itself.

b. Marketing: The success of any new product or service depends on strategically marketing. ATM service is a totally new kind of service for Indian markets. Banks face a major challenge in the marketing of ATM services. As discussed earlier, eligible customers for ATM service are very limited. Hence banks have to be more careful in marketing their services. With the heterogeneous customers of Indian market, banks are in greater difficulty in finding a suitable marketing mix so as to suit the needs. Various advertising methods will have to be used by banks to attract more and more customers. The use of ATMs can be successful only when the bank is able to use it to its optimum level. Banks will be required to enroll maximum customers on a single machine. All this will become more and more difficult with more and more banks joining the fray. Marketing a service like ATM will require services of marketing experts, which is bound to lead to additional cost.

Suggestions for ATM Policy for India

The above discussion leads us to raise some serious questions about the ATMs. Although the fact which emerges is that there is no escape from technological advancement, at the same time, answers should be found to questions like how

much of new technology should; used? In what areas of banking operations should it be used? When should it be introduced? How much the banks should charge for the new services?

ATM should be introduced on a very small scale, to certain areas, in only metro cities. In the initial phase only necessary services should be put on ATM agenda and the system should run on trial for some period. Following are some of the areas where precautions a required.

1. Security: The most important area of trouble related to ATMs will be security. Bank will have to design ways and means of fighting frauds, misappropriations, physical attack c customers using ATMs, etc. The areas where ATMs are installed should be well lit. The ingress and egress for ATM should also have sufficient lighting. There should be adequate space f< movement of the customer. Alarm system components should include shock or seismic sensor door contacts, and heat detectors. The daily routine which includes loading the machine retrieving the seized cards, running totals, balancing the account, and bringing the machine on-line again, should be done in presence of a very responsible officer. Some of the high co; security options include an on-line security camera along with the posting of a 24 hours guard. Marjolijn (1900) has suggested the following ways to fight ATM frauds.

A. Fraud Policies

1. Develop written policies for ATM fraud prevention, investigation, and clear settlement.
2. Review fraud policies and audit controls of all outside vendors.
3. Include ATM activity on suspicious activity reports.

4. Exchange fraud information with other financial Institutions in your market.

B. Card Issuance

5. Audit blank card stock on a routine basis.
6. If card processing is done in-house, limit employee access to blank card stock and encoding machines.
7. Do not mail ATM cards to a post-office box or known mail drops.
8. Undelivered or returned ATM cards should be handled by a special section in the organisation.

C. PINs

9. Strictly limit employee access to PINs and PIN algorithms, and require dual control procedures.
10. Limit the number of PIN access attempts by the consumer. The majority of banks allows no more than three tries before capturing the card.
11. Ensure that your system does not permit transaction when PINs cannot be verified.

ATM Withdrawals

12. If appropriate, limit withdrawals when operating in an on-line mode.

ATM Deposits

13. Consider limiting an immediate credit for deposits.
14. Require dual control for deposit verification.

15. Report ATM deposits in your kiting reports.

System Requirements

16. Encrypt both hardware and software to prevent fraudulent entry.
17. Upgrade system for full PIN encryption.
18. Select an impartial third party to analyse systems and procedures on an annual basis.
19. Ensure that your system cans Hot Card immediately after receiving a report of a lost or stolen card.

G. Claim Processing

20. Require customers claiming unauthorised use to sign an affidavit.
21. Remind customers who claim fraud of the penalties for a false claim.
22. Refer false customer claims for criminal prosecution.

H. Employee Education

23. Inform employees of the organisation's fraud policies and claim processing procedures.
24. Refer any employees who are misappropriating funds to criminal prosecution.

I. Customer Education

Remind customers of PIN safety and how to report a lost or stolen card on a routine basis.

Marketing: On the marketing front banks will have to spend heavily on creating a general

awareness about the benefits of using ATMs. They will also have to take up the task of building up confidence of customers in using ATMs. Customers will have to be educated about the uses of ATMs. They will have to be taught the proper use of ATMs. Banks will also need to tie-up with government departments such as telephone and electricity, and market the ATM service to them also. An aggressive marketing campaign will have to be designed in the initial phase of the introduction of ATMs, so that the subsequent years will yield better profits. Banks should follow a two stage policy, first they should promote ATMs among non-users by offering them incentives and second they should devise policies for retaining old users. It appears that banks would have to target older customers as they constitute a major part of customer population. It will be slightly more difficult to introduce technology based services to older customers due to their general resistance to it and preference for personalised services.

Purchases: Before making purchases of ATMs and related products, banks should take a very clear undertaking about reliability, service and maintenance of ATMs from the vendors. The ATMs should be suitable for Indian weather conditions. There should be provision for the use of regional languages in the software.

Maintenance: The work of maintenance should be given to professional agencies. They should be completely reliable as it involves the question of security. In America there have been cases of embezzlement by service engineers.

Area Selection: ATMs can be installed in areas where there are no branches. Locations having higher density of population can be selected for installing ATMs. Highways, Shopping centres, Hospitals, Petrol Pumps, and other similar

locations which have more cash flow, and which have more customers, can be ideal locations for ATMs provided security is ensured. The Bank of America has installed ATMs in some university campuses. While selecting location, the crime rate in particular area should also be checked.

Conclusions

It is clear from the above discussion that the banks have no other way but to adopt new technology, but it should be time, place, person, and environment specific. It should be done with great caution. Circumspection is required before adopting new technology. The idea of "Appropriate Technology" in the case of banking sector also should be developed. A blind following of models of ATM network of developed countries may not work in the Indian environment. A careful study should be undertaken about customer preferences and needs concerning technology. ATMs should be introduced only after proper study of Indian financial markets. Major behavioral changes are required before we think about a "cashless society". The concept of a large network of ATMs is inappropriate under the present and expected behavioural patterns. A legal committee should be set up to look into the complications arising out of a change in the method, speed, way, and instruments of payment. Such a committee should also suggest necessary changes which will be required to handle the legal issues arising out of problems associated with the new technology. It is rightly said that:

"Technology can and should be used to enhance service in all customer groups; it should not be used as an indiscriminate substitute for human interaction. Replacing bank buildings and personnel with more efficient and less costly

machines is not the ultimate benefit of technology in the banking industry. During a time of rapid change and technological transformation, failure to consider customers' needs/preferences may result in banks with every conceivable technological feature and few customers to use them." (Bednar and others, 1995).

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