TECHNOLOGICAL INNOVATION IN INDIAN BANKING SECTOR – USE OF IT PRODUCTS

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ABSTRACT
Transformation is taking in Indian banks from all verticals, and subtle and not so subtle makeovers in banking products are dynamically altering the face of banking. The research paper focuses on the way transformation is affecting the banking sector and the way use of IT products have changed the face of banking in India. It reveals current environment of the banking industry; the factors that have brought changes in the industry; and the way these changes have contributed to the development of banking. This paper concludes that financial market has turned into a buyer’s market. Banks have now bloomed into one-stop Supermarkets. Their focus is shifting from mass Banking to Class banking with introduction of value added and customized products. Technology now allows banks to create what looks like a branch in a business building’s lobby without having to hire manpower for manual operations. These branches are working on the concept of 24 X 7 working made possible due to Tele banking, ATMs, Internet Banking, Mobile Banking and E-banking. This technology driven delivery channels are used to reach maximum customers at lower cost and in most efficient manner. The beauty of these banking innovations is that it puts both banker and customer in a win-win situation. The need of an hour is to design a system to promote marginal efficiency of investment in technology and widen the gap between marginal benefits and marginal cost involved in Banking transformation with special reference to technological upgradation.

Keywords: CRM, ECS, Skimming, Spoofing, ATMs

INTRODUCTION
The study presents a broad overview of the current state of the banking industry in India. It then goes on to identify some important forces for change and some important forces resisting change. Attention is paid finally to growth path of banking sector with technological advancement. It is depicted that banking is going to be intensely competitive and complex. The best idea would be for the domestic banks to enhance mutual co-operation in order to create a healthier market order and raise the overall competitiveness of the industry as a whole. Incorporation of advanced technology and
utilization of modern management techniques are other crucial aspects at which domestic banks should pay keen interest.

**Indian Banking Transformation – The Starting Point**

Since independence Indian banks have undergone through four major shifts which can categorized as pre reform (before 1991) and post reform period (after 1991):

**Pre-Reform period:**

- A period of consolidation of banks up to 1966
- A period of historic expansion in both geographical and functional terms from 1966 to mid-1980s
- A period of consolidation of branches from mid-1980s to 1991

These changes were policy induced but not driven by market forces.

**Post-Reform period**

Entry of technology in the Indian banking sector can be traced back to the Rangarajan Committee report, way back in the 1980s but during nineties, the banking sector witnessed various liberalization measures.

New private sector and foreign banks emerged - equipped with the latest technology. These banks opted for a different model of having a single centralized database through a network infrastructure, instead of having multiple databases for all their branches. These changes were market driven, having the influence especially of globalization. The crux is Indian banks have no control over developments abroad but are subjected to their effects. Hence these changes were not the outcome of internal changes but of external changes.

Deregulation has opened up new opportunities for banks to increase revenues by diversifying into investment banking, insurance, credit cards, mortgage financing, depository services, securitization, etc.

Now all the banks have started with the concept of multi-channels, like ATMs, credit cards, debit cards, telephone/mobile banking, internet banking, call centers, etc.

The role of banking is redefined from a mere financial intermediary to service provider of various financial services under one roof acting like a financial supermarket.
Forces for change in Indian Banking:

Underlying forces for change

- Developments in communication systems, coupled with blurring of differences between banks and non-banks and globalization have aggravated the competitive environment.

- Technology became a key differentiator for the new private sector banks. The technological superiority helped these private sector banks to have upper edge over public sector banks. The traditional source of income (Net Interest margin = Interest Earned – Interest Expended) was compressed due to the pressure of competition. As a result commercial banks had to face the challenge of finding out new sources of income and curtailing overhead expenses.

- The operating conditions are different for private sector and public sector banks in India (wage bill, legacy of non-performing assets and extensive network of Public sector banks) which results in imperfect competition in the market.

- With increasing competition among banks, customers are also becoming more discerning and demanding. To meet customer expectations, banks will have to offer a broad range of deposit, investment and credit products through diverse distribution channels including upgraded branches, ATMs, telephone and Internet. The mantra to attract and retain customers lies in efficient customer service including customized and value added products to meet various needs of individual customers as also to meet the need of diverse types of customers.

Manifestation of underlying forces:

Concern Issues:

- Use of technology to be increased substantially in banks to cope with rising volumes and reduce transaction costs and processing time. In Public Sector Banks, legacy systems and interoperability is a major hurdle in the integration of all delivery channels. A major problem of banks in India is the availability of excessive data, the relevance and quality of which are both suspect. The inculcation of a proper attitude towards technology adaptation and proper security systems is an urgent need of the hour.
Very low level of computer literacy and the existing mind set of some senior bankers are road blocks in the IT implementation in banks to 100% level.

It related security issues in Indian banks are also a matter of concern.

Suggestions & Recommendations:

- Better and cheaper access to basic infrastructure requirements such as power and telecommunications.
- Creation of customer awareness and education for technology adoption are imperative.
- The IT Act 2000 needs to implement in totality to handle legal issues.
- Set up an Electronic Banking Group to provide guiding principles for prudent risk management of e-banking activities.
- E-security to be tackled efficiently so as to mitigate all the attendant risks.
- Convert branches into boutiques catering to the requirements of clients and re-engineer the functions of branch banking using technology and delivery channels.

BANKING INNOVATIONS

Today we have electronic payment system along with currency notes. India’s financial sector is moving towards a scenario, where it can have new instruments along with liquidity and safety.

Important events in the evolution of new age payment systems in India

- Arrival of card-based payments- debit card, credit card- late 1980’s and early 1990’s.
- Introduction of Electronic Clearing Service (ECS) in late 1990’s
- Introduction of Electronic Funds Transfer/ Special EFT (EFT/SEFT) in the early 2000’s
- Real Time Gross Settlement (RTGS) was introduced in March 2004
• Introduction of NEFT (National Electronic Funds Transfer) as a replacement for EFT/SEFT in 2005/06

• Plan for implementation of cheque truncation system as a pilot program in New Delhi in 2007.

• Migration from cash and cheque based payment system, it has become a necessity to electronic fund transfer system on account of the following reasons:

1. Large volumes of transaction,

2. High cost of physical handling and storage of paper instruments.

3. Delay in realization is a common feature.

4. Finality of payment takes time because the physical movement of instruments in large volumes from branches to and from clearing house, and sorting them according to each bank branch at the center creates problems.

RBI has taken two major steps to tackle this problem:

• Use Of Magnetic Ink Character Recognition (MICR) technology was resorted to facilitate and expedite physical sorting of instruments using high-speed MICR sorters. There are about 40 MICR centers in India today.

• Introduction of Electronic Clearing Service.

The ECS was the first version of ‘Electronic Payments’ in India. It is a mode of electronic funds transfer from one bank account to another bank account using the mechanism of clearing house. It is very useful in case of bulk transfers from one account to many accounts or vice- versa.

There are two types of ECS (Electronic Clearing Service)

1. ECS – credit

2. ECS- debit.
ECS facility is available at more than 60 centers in India. The beneficiary has to maintain an account with one of the banks at ECS center in order to avail benefits of ECS.

**ECS- CREDIT**

Advantages of ECS to ultimate beneficiary are:

- No need to make frequent visits to bank for depositing physical paper instruments.
- No possibility of loss of instrument and fraudulent encashment
- No chance of delay or return in realization of proceeds as in the case of paper instruments.

Benefits to Corporate bodies of ECS

- Save on administrative machinery for printing, dispatch and reconciliation
- Avoid the chance of loss of instruments in postal transit
- Avoid the chance of frauds due to fraudulent access to the paper instruments and encashment
- It can be ensured that the beneficiary’s accounts get credited on a designated date.

**ECS DEBIT**

It is a scheme under which an account holder with a bank can authorize an ECS user to recover an amount at a prescribed frequency by raising a debit in his account. Utility service providers such as telephone companies, electricity boards, credit card collections, collection of loan installments by bank and financial institutions, and investment schemes such as mutual funds are eligible to participate in the ECS debit scheme.

Advantages of ECS debit scheme

A. To the ultimate beneficiary is:

- Eliminates the need of physical visit and the trouble of standing in long queues for making payment
- There is no need to track down payments by last dates.
B. To the corporate bodies and Institutions are:

- Saves on administrative machinery for collecting the cheques, monitoring their realization and reconciliation
- Better cash management
- Avoids chances of fraud
- Receives payments on a single date

These schemes were introduced when Indian banking was in infant stage of its computerization hence cost benefits could not be maximized.

**EFT Electronic Fund transfer**

EFT scheme targeted one to one payments as an alternative to the use of cheques and drafts for remitting funds between bank accounts located at different centers. EFT encountered the problem of low level of computerization and connectivity in the Indian banking industry.

**Core Banking Solution**

CBS is a centralized platform, which creates environment where the entire bank’s operations can be controlled, and run from a centralized hub. This creates a centralized customer database, which makes anytime, anywhere, anyway banking possible.

Immediate advantages of CBS are:

- Faster and efficient customer service.
- Offering multiple delivery channels, like ATMs, Cards, mobile/Telephone Banking, internet Banking, Call centers, etc.
- Reducing the operational costs, through manpower saving and space saving.
- Centralizing the back end processes and reporting.
• Creating a customer profile database, it is a powerful tool for gaining competitive advantage through cross selling opportunities.

• Adoption of Risk management, by taking care of risk-monitoring and risk-reporting requirements.

ATMs

ATMs are an issue of survival for the banks and are becoming just another part of everyday life. Falling costs of machines and connectivity is a key factor contributing to the growth of ATM network. Banks have also been cutting costs and gaining synergies through ATM sharing agreements amongst themselves, for example:

- Cash Tree (Bank of India, Union Bank of India, Indian Bank, Dena Bank and Syndicate Bank)
- SBI, HDFC Bank, UTI Bank, Indian Bank and Andhra Bank
- ICICI Bank, Andhra Bank and Federal Bank

Banks are now using ATMs for product promotion as banks market broader financial services to their captive audience of ATM users. But these facilities come with added problems when huge amount of money is withdrawn by large number of consumers in a market period (very short period of time).

CRM

Customer Relationship Management Solution is the set of methodologies and tools that help an enterprise manage customer relationships in an organized way - finding, getting, and retaining customers. It helps to provide better customer service, increase customer revenues, discover new customers and sell products more effectively.

CORPORATE INTERNET BANKING

The Internet has initiated an electronic revolution in the global banking sector. Its dynamic and flexible nature as well as its ubiquitous reach has helped in leveraging a variety of banking activities. The Internet has emerged as one of the major distribution channels of banking products and services for banks in the U.S and in European countries. Consumers
are embracing the many benefits of Internet banking like improved customer access which facilitates the offering of more services, attract new customers and reduce customer attrition.

Advantages of Internet Banking:

A) Advantages to customers

- Banking from your desk: with e-banking services, one can actually carry out a number of transactions sitting on one’s seat with just a few clicks. Net banking customers view their account balance and also open fixed deposits, transfer funds, pay electricity, telephone or mobile phone bills and much more.

- Instant information: The accounts of the customers are updated as soon as the transaction takes place i.e., the accounts show the information updated to the last second. This means if a cheque issued by you has been debited from your account in the morning, your account status will reflect this when you log in to your accounts in the afternoon as against the earlier updating at the end of the day.

B) Advantages to the banks

- Lesser personnel required: online banking has encouraged a chunk of people, though a smaller one to carry out most of their transactions from a distance. This has resulted in lesser pressure on the employees in terms of entertaining customers. Easy publicity: banks can easily pass on the information about their new avenues/schemes without any wastage of time. Customers interested in the schemes would revert back and can be attended to later.

PAYMENT SYSTEMS BY RBI:

- Inter-bank Clearing System
- High Value Clearing System
- MICR Clearing System
- Government Securities Clearing System and
- Real Time Gross Settlement System
Banks not only deal with corporate and individual but also they need to make payments to each other to settle the accounts arising of the transactions carried out for their customers, and also for borrowing or repayment, investments, sale and purchase of various assets. These payments have to be effected through their accounts maintained with the Reserve Bank of India.

**Real Time Gross Settlement System**

The inter Bank Payments handle large amounts of money. The RTGS system is one in which payment instructions between banks are processed and settled individually and continuously throughout the day. In India currently it covers more than 28,000 branches of banks. The attraction of RTGS is that the payee banks and their customers receive funds with certainty and finality during the same day enabling them to use the funds immediately without exposing themselves to risk. RTGS system, do not create credit risk for the receiving participant because they settle the each payment individually, as soon as it is accepted, liquidity risks remains, as well as the possibility of the risks being shifted outside the system. The security has to ensure that hacking is not possible at the site.

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**RISK FACTORS**

The latest fraud which is considered as the safest method of crime without making physical injury is the Computer Frauds in Banks.

Computerization of banks had started since 1994 in India. Reserve Bank of India has evolved working pattern for Local area Network and wide area Network by instituting different microwave stations so that money transactions could be carried out quickly and safely. The main banking tasks which computers perform are maintaining debit-credit records of accounts, operating automated teller machines, and carry out electronic fund transfer, print out statements of accounts create periodic balance sheets etc.

Internet facilities of computer have revolutionized international banking for fund transfer and for exchanging data of interest relating to banking and to carry out other banking functions and provides certain security to the customers by assigning different pin numbers and passwords.

Computer depredations have by some been classified as:
1. Computer frauds; and
2. Computer crimes

Computer frauds are those involve embezzlement or defalcations achieved by tampering with computer data record or programme, etc. whereas computer crimes are those committed with a computer that is where a computer acts as a medium. The difference is however academic only.

The three most common are:

1. Cheque Frauds

The resolute growth of paper cheques coupled with the ready availability of latest printing technology has resulted in an alarming rise in cheque frauds in Indian banks. Cheques are widely used instruments across the globe. It is interesting to note that cheques as a payment mechanism are still having a dominant position, both in developed and developing countries.

Banks have been working very hard to wean customers from paper cheques. Cheques are expensive to print, mail and process. Other problems associated with cheques are inherent manual – handling process, high costs for banks, and high transportation costs between parties.

Concept and Magnitude of Cheque Frauds

There are a variety of ways to categorize cheque frauds. One broad distinction is “internal” and “external”. Internal cheque fraud refers to schemes devised by insiders – employees responsible for creating, authorizing, or processing cheques. External cheque fraud refers to schemes created by independent operators or by organized gangs. The most common forms of external fraud involves:

a. Alteration of cheque details
b. Creation of counterfeit cheques
c. Forgery of cheques

Physical Security Controls used are watermarks, high resolution micro printing, reflective holograms, and security inks etc.
2. ATM Frauds

Automated teller machines, or ATMs are electronic machines linked to the accounts and records of a banking institution. It enables customers to carry out banking transactions without visiting bank premises. ATMs are virtual banks which allow the user to withdraw cash, pay bills, balance inquiries, cash deposits etc. The machine is operated with the help of an access device, which is a card, code (Personal Identification Number), or through other means of access to a customer’s account, or any combination thereof. **Fraud Related to ATMs**

Frauds may be committed by both outsiders and insiders. It is understandable that as the number of transactions rise, the number of fraud occurrences will rise as well. Frauds can occur due to the negligence on part of the cardholder or on the part of bank. If the cardholder does not follow the precautionary measures, he is exposed to risk.

- A cheat may go through discarded receipts or carbons to illegally find out the card number.
- A dishonest clerk makes an extra imprint from credit card or charge card for his or her personal use.

In addition, E-mail and Internet-related fraud schemes are being perpetrated with increasing frequency, creativity, and intensity. With the help of latest technology, fraudsters dupe innocent customers through ATM and Internet.

A few of the methods adopted by fraudsters are:

1. **PHISHING**

   It is in the center stage of Internet Scams. It is the practice of sending emails at random, purporting to come from a genuine company operating on the Internet. In an attempt to trick the customers ‘fraudsters’ request disclosing information at a bogus website operated by them. Any information entered on the bogus website is captured by the criminals for their own fraudulent purposes.

2. **SKIMMING**

   Fraudsters make counterfeit ATM cards using a skimmer, which is a card – swipe device that reads the information on a consumer’s ATM card. Scammers insert onto an ATM, ready to swipe information from unsuspecting customers. They take a blank card and encode all the information from an ATM card when they swipe. The skimmer catches the PIN through a small camera mounted on the ATM.
3. SPOOFING

The attacker creates a misleading context to trick you into making an inappropriate security – relevant decision. For example, bogus ATM machines have been set up. Once they have the PIN number they have enough information to steal from the account.

3. Credit Card Frauds

Credit card fraud is widespread as a means of stealing from banks, merchants and clients. A credit card is made of three plastic sheet of polyvinyl chloride. The central sheet of the card is known as the core stock. These cards are of a particular size and many data are embossed over it. But credit cards fraud manifest in a number of ways.

They are:

- Genuine cards are manipulated
- Genuine cards are altered
- Counterfeit cards are created
- Fraudulent telemarketing is done with credit cards.
- Genuine cards are obtained on fraudulent applications in the names/addresses of other persons and used.

It is feared that with the expansion of E-Commerce, M-Commerce and Internet facilities being available on massive scale the fraudulent fund freaking via credit cards will increase tremendously.

OBJECTIVE OF THE STUDY

The objective is two fold:

- To evaluate the usage pattern of various banking tools
- To evaluate preventive measures the respondents take against frauds.
METHODOLOGY

Data has been collected from 50 respondents, users of a variety of banking IT tools / services. An objective questionnaire has been used – consequently to which the responses have been tabulated.

ANALYSIS AND DISCUSSIONS

50 respondent questionnaires were filled. The data was collected through a tested and structured questionnaire. The respondents were selected at random, ensuring that they are savvy customers using most modern banking products.

The findings were as follows:

<table>
<thead>
<tr>
<th>TABLE 1: AWARENESS ABOUT THE TECHNOLOGY THREATS</th>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>PHISHING</td>
</tr>
<tr>
<td>SPOOFING</td>
</tr>
<tr>
<td>SPAMMING</td>
</tr>
</tbody>
</table>

% OF AWARENESS

- PHISHING: 32%
- SPOOFING: 24%
- SPAMMING: 64%
‘Spamming’ clearly seems to be the most familiar of the three, though all three of them are definitely dangerous. What is unclear though is whether they actually are able to appreciate the threat it poses or maybe they just think of it as a nuisance.

Phishing websites are very common and it would be safe to say that all the respondents at some point or other would definitely have gone to a phishing site. It is a dangerous sign thus that they are not familiar with the huge threat it poses. Similar threats are existent with spoofing.

<table>
<thead>
<tr>
<th>TABLE 2: PREVENTIVE MEASURES TAKEN</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handed over your credit card to a petrol pump attendant without watching</td>
<td>(35)</td>
<td>(15)</td>
</tr>
<tr>
<td>Given credit card information on a non-verifyable phone call</td>
<td>(31)</td>
<td>(19)</td>
</tr>
<tr>
<td>Responded to ‘phishing’ mails</td>
<td>(21)</td>
<td>(29)</td>
</tr>
<tr>
<td>Used unsecured website</td>
<td>(27)</td>
<td>(23)</td>
</tr>
<tr>
<td>Written your PIN number on your credit card</td>
<td>(11)</td>
<td>(39)</td>
</tr>
<tr>
<td>Written your Credit Card number in a public place</td>
<td>(19)</td>
<td>(31)</td>
</tr>
<tr>
<td>Carry only the cards you need</td>
<td>(15)</td>
<td>(35)</td>
</tr>
<tr>
<td>Change your ATM PIN once every 2 months</td>
<td>(08)</td>
<td>(42)</td>
</tr>
<tr>
<td>Use your birth date, phone number, house number etc. as the PIN</td>
<td>(24)</td>
<td>(26)</td>
</tr>
<tr>
<td>Ensure that card is swiped in your presence</td>
<td>(27)</td>
<td>(23)</td>
</tr>
<tr>
<td>Tear up Carbons and save your receipts</td>
<td>(26)</td>
<td>(24)</td>
</tr>
</tbody>
</table>
The above table lists the preventive measures taken by customers. It makes for some interesting readings; and is evident that consumers are making basic mistakes with their transactions and dealings, and the way they handle their operations and financial products.

<table>
<thead>
<tr>
<th>E – Channels</th>
<th>Most Reasonable</th>
<th>Reasonable</th>
<th>Undecided</th>
<th>Unreasonable</th>
<th>Most Unreasonable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Banking</td>
<td>(20)</td>
<td>(17)</td>
<td>(01)</td>
<td>(12)</td>
<td>(00)</td>
</tr>
<tr>
<td>Mobile Banking</td>
<td>(03)</td>
<td>(06)</td>
<td>(13)</td>
<td>(09)</td>
<td>(19)</td>
</tr>
<tr>
<td>ATM</td>
<td>(18)</td>
<td>(26)</td>
<td>(03)</td>
<td>(03)</td>
<td>(00)</td>
</tr>
<tr>
<td>Credit Card</td>
<td>(16)</td>
<td>(15)</td>
<td>(15)</td>
<td>(04)</td>
<td>(00)</td>
</tr>
<tr>
<td>Debit Card</td>
<td>(14)</td>
<td>(11)</td>
<td>(13)</td>
<td>(08)</td>
<td>(04)</td>
</tr>
<tr>
<td>Smart Card</td>
<td>(12)</td>
<td>(03)</td>
<td>(05)</td>
<td>(13)</td>
<td>(17)</td>
</tr>
<tr>
<td>Tele – Banking</td>
<td>(11)</td>
<td>(04)</td>
<td>(02)</td>
<td>(02)</td>
<td>(31)</td>
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</table>

ATMs are clearly the winners here, followed by Internet Banking and Credit Cards. It is good to see that Internet Banking seems to be catching on – as it is a cheap, efficient and paperless way of dealing.

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

Suggestions regarding ATM Frauds

1. Remember not to leave your card at the ATM.
2. Protect the secrecy of the PIN number as you protect hard cash.
3. Do not keep Bank ATM card and PIN together.
4. Neither lend your ATM card to anyone nor reveal PIN to another person.
5. Do memorize the PIN.
Suggestions regarding Credit Cards:

1. Keep an eye on the card when you use it.
2. Never give your credit card information when you receive a phone call.
3. Never respond to ‘phishing’ mails.
4. Never use a website that is not secure.
5. Sign your credit card as soon as you receive it.

In the dawn of the new technological era of the domain of specific technology in the Banks, technology is one which has undergone and is all poised to spin-off radical changes within the Banking Industry as a whole. In today’s business the environment is characterized by the powerful forces of change – far reaching and continuing developments in technology, a flurry of new products and services in the services in Banks, the banks are facing intense competition amidst themselves. We implicit from the Paper:

<table>
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<th>Dimensions of IT Innovation</th>
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<th>Potential for electronic-only retail commercial banking</th>
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| Innovation in Service Offering | • Each new technological innovation accounts for (proportionally) smaller reductions in price differentials.  
• Bank customers remain unwilling to pay for interfaces for the new technology, while merchants expect to share the revenue of new payment media through lower commission charges.  
• Defection rates remain low thanks to the inertia of bank customers, which has been historically high. | • Greater price transparency.  
• Greater convenience to customers (including congenial resolution of customer complains through electronic media).  
• Each customer segment interacts with the bank through the most cost effective distribution channel.  
• Innovations (such as smart cards and digital cash) that circumvent banks’ proprietary networks with alternative distribution or payment systems |
(i) That it is a time that we launched ourselves in the next orbit and touch new heights of excellence in the performance and efficiency of the Banks.

(ii) R&D, Trainings, Consultancy and IT specific up gradation tools be implemented in Banking Industry

(iii) Precautions in terms of firewalls, data encryption, digital certification are some of the precautionary security measure which should be well embedded in the software used by the bank

(iv) ERP (Enterprise resource planning) auto reconciliation for one to one fund transfer, bulk fund transfers, statements be generated at a nominal cost

(v) Continuous quest for up gradation of skills, vision, mission and commitment to perform efficiently for profitability and productivity are some areas needing urgent attention.

<table>
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<td>• Enhanced financial performance due to reductions in overhead expenses (i.e. no retail branch network) which are not offset by reductions in revenue or increases in other expenses.</td>
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