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The Modern Banking Technology in and around India: Benefits and Challenges

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ABSTRACT

Online banking, a little known concept so far has soon taken centre stage. So, it's imperative for us to understand that online banking is all about doing banking transactions over the NET. E- Banking is a concept which will enable anyone to conduct business with a bank from the comforts of the home or office. Indian Banks are still in the process of exploring the potentials of the internet as a medium for the banking as the technology heading towards more business, there are potential prospects of internet banking. Now a days, people are managing multiple online / digital accounts and to manage password is becoming challenging job. Banking industry is looking for acceptable biometric authentications for internet as well as mobile banking. Although, banking industry is making lots of changes, still people are reluctant to adopt digital technology. In this paper, innovative banking technology all around the were discussed as well as what are the issues related with these technology were discussed.

Keywords: *Online banking; Technology; Biometric mobile banking.*

1.0 Objectives of the Research Paper

- To appreciate the various innovative banking products/services being offered by the banks across the globe.
- To examine the various technologies that can help banks in offering various innovative banking products/services in the future
- To find out the leaders in banking innovations among public sector banks and private sector banks in India
- To understand what are the challenges of implementing digital banking

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2.0 Research Methodology

The research is mainly based on secondary data. Data has been collected from various sources like scholarly articles, annual reports of selected banks, newsletters, and various web sites.

3.0 Literature Review

As per the "Consumers and Mobile Financial Services 2016" survey report, mobile banking users would increase day by day. As per the surveye, out of 100 mobile owners with bank account, 43 had used mobile banking, which was increased to the previous year data.

From the 100 mobile users , 42 percent think that people's personal information is "very unsafe" or "somewhat unsafe" when they use mobile banking, and an around 15 % said that "don't know" how safe these activities are.

One of the main factors for not using mobile banking and payments was a preference for using other methods for banking or making payments over mobile banking and also safety concerns.

A Paper published in "The Wall Street Journal" by Paul Lee, partner and head of global technology, media, and telecommunications (TMT) research, Deloitte Touche Tohmatsu Limited, said that by 2020, smart-phone users across the world would have 200 online accounts and would be very difficult to remember strong & complex password. In his paper Paul Lee quoted that Deloitte Global expects fingerprint readers would be very common in smart-phones and to be a common part of other devices as well, ranging from remote control device to desktops or laptops and will replace password readers in nearby future. Lee (2016)

Peters and Panayi (2016) in their research paper "Understanding Modern Banking Ledgers through Blockchain Technologies: Future of Transaction Processing and Smart Contracts on the Internet of Money", the blockchain technology likely to change the banking industry through supporting global money payment, smart contracts, digital online ledgers and digital assets. They said that several features that are vital from a financial application perspective, including secure authentication, proper permission, information integrity and data security as well as significant regulatory needs relating to account provisioning for financial asset reporting, blockchain can help elp adhere to these security related aspects.

A white paper published by Banking Expert survey, 2017 concluded few findings:

- Large banks of developed countries like USA, UK, Germany, and Switzerland, digital transformation strategy was already implemented or in development.
- Main driver for the strategy is to meet customer expectations followed by financial aspects in terms of revenue increases and reduction of operational costs
- Main challenges of implementation lack of experts , connection to legacy systems and retaining their data

Gupta (2017) in her research article talked about digital innovation in India like Electronic Fund Transfer, Net Electronic Funds Transfer, Real-time Gross Settlement, Immediate Payment Interface, Unstructured Supplementary Service Data, Mobile Banking, Mobile Wallets, etc. She argued in her research paper that it is critical opportunity for the banking sector to compete with emerging banks by implementing innovative technology.

Sreelatha and Sekhar (2012) observed in their study that the banks were quickly responded to the changes in the industry; especially the new generation banks. The innovation has changed banking industry's entire look and banks started offering more customised services. As technology makes banking convenient, customers can access banking services and do banking transactions any time and from any ware.

Breitenstein and McGee (2015) in their study argues that Information Technology (IT) has revolutionized the entire banking business spectrum and banking is no exception.IT can be suitably used in brick/mortal as well as virtual set up. IT has, in short, become the lifeline of banking.

4.0 Advantages of Modern Banking Technology

The recent liberalization trend and globalization has brought many changes in business practices and economic systems in the world. Consequently, the banking sector and other financial institutions are also affected by new realities following globalization. This is the age of internet banking. Indian banks have already started offering web-based banking services to the account holders. Online banking has proved successful in the international banking sector in other countries and has revolutionized the E-commerce industry Innovative Banking Technology Across the globe:

4.1 Advantage of modern banking technology

There are many opportunities for the banking industry as well as customer

4.1.1 To the bankers

- Bankers can provide customer friendly services to the customer almost 24x7

- Banks are going bigger; they can increase their scale as physical presence may not be important.
- Deposits can done online, money can be withdrawn from ATMs without physicalinteraction with Banking staff. Since they don't have to maintain physical branches or hire as many employees, technology can help reduce operational cost lower as compare to branch banking. Sontakke and Gajbhiye (2013).
- Innovation may change the banking structure, may banks go bigger in terms of providing various other financial services like M&A activity. Deloitte. (n.d.).
- Geographical expansion of banking industry

4.1.2 To the customers

- Customer can pay bills, manage investments, position ATMs, check their account balance, review their recent transactions, also can transfer funds from one account to another account, etc.
- Mobile banking can prove a boon to rural people as it is available round the clock 24*7 365 days and also it is easy and convenient.
- Time-saving: Instead of walking to the bank, one can check account balances, schedule and receive payments, transfer money and organize your accounts from anywhere. Chauhan and Choudhary (2015)

5.0 Emerging Banking Technology across the Globe

5.1 Biometrics technology

In one of the white paper by Deloitte, researchers predicted that in the coming years people may have more than 200 accounts handled digitally and password managing would be difficult for users.

Biometric technology is the means through that the person can be exclusively identified by various biological traits. Biometric authentication includes fingerprints; DNA, face, hand, retina and ear features. It may even include a heartbeat as well. Market Wired (2015) Biometrics systems could end the need fora password and PIN code. Voth (2003) According to the BBC, Hongkong and Shanghai Banking Corporation (HSBC) is launching voice and touch recognition security services in the UK. British banking firm Barclays also adopted innovative way which offered finger vein scanning for authentication of huge dealings. HSBC bank has adapted facial recognition technology.

Biometric authentication systems are not 100% accurate. There are two types of errors in a typical biometric system. A false reject (FR) error is the rejection of an

authorized person trying to access the system. A false accept (FA) error is the acceptance of a person who is in reality a different one. Chatterjee and Nath. (2015). These two types of errors graphs go in reverse and in common can be controlled by a confidence threshold. To decrease the security of the system, the threshold can be decreased, which increases FA errors and decreases FR errors.

5.1.1 Advantages of biometric systems

- Improved security
- Improved customer experience
- Cannot be forgotten or lost
- Reduced operational costs

5.1.2 Disadvantages of biometric systems

- Environment and usage may make variations in measurements
- Systems are not 100% accurate
- Require integration and/or additional hardware
- Cannot be reset once compromised

Few banks in India have also started implementing biometrics devises for their customers:

- DCB Bank's ATMs require customers' fingerprints to draw money. Such ATMs are linked with Aadhaar card hence customer's fingerprint data with his Aadhaar biometric details. Such systems, however are available for only DCB Bank customers.
- HDFC Bank has launched a hand-held device or a micro ATM with along biometric verification to reach to remote places specifically rural areas which don't have ATMs. They have taken help from Gramin Banking Officers (GBO) to provide this facility in Punjab.
- SBI also uses similar facilities also to verify bank employee credentials before they access sits core banking system.

5.2 Wearable technology

Another innovative technology is wearable technology having all the features of smartphones. There are various forms of wearable - from smart-watches to augmented-reality glasses to clothing. They constantly keep on informed and provide intelligence to a user constant about the world around them. They also help businesses engage with

customers ever before. (Deloitteeditor, 2017). It can, perhaps better than ever before. Alvarez (2014).

In a survey of McKinsey, Wearable technology can create an economic impact of up to US$6.2 trillion annually by 2025. Regular uses of wearable technologies are the military, for mobile industrial inspection, etc. Consumer uses include display peripherals, smart fabrics and computer-ready clothing and banking industry is leveraging this. SESTEK Blog. (2019) and Thierer (2015).

5.2.1 Google glass technology

A Spanish Bank - Banco Sabadell created history while creating a Google App that allowed to check account balances, to locate the nearest ATM and also use video conferencing for technical upport. Another app also developed by Spanish financial firm, Caixa Bank provides information such distance and phone number of the nearest branch, all of which are accessed through the voice recognition system.

5.2.2 Augmented reality (AR) apps

Augmented Reality (AR) is a method of enhancing and improving your view of the real world using different technologies. Shroff (2007)It is the integration of digital information with the user's environment in real-time. Westpac - an Australian Bank had launched an augmented reality app for mobile devices. Commonwealth Bank of Australia and St George Bank Australia also adopted this technology.

5.2.3 Scenario of wearable technology in India

- HDFC bank has launched 'watchbanking' with its Apple watch. The bank will provide all its banking services through all wearable devices across platforms like iOS and Android. Some of them being View Account Information, Bill Payments, Recharges, hot listing facilities, locate the nearest branch, ATM, offer, request statement and chequebook among other," said the bank in a statement.
- ICICI Bank had launched iWear in year 2015, an application for smartwatches. This is available for Android watch users. Bank had presented voice recognition for its customers to deal smoothly via call centre. Customers won’t require to use their PIN and card number as their voice will act as the password now. The voice recognition technology authenticates based on speed, accent and pronunciation, which are unique to every individual. Business Standard(2017)

5.3 Branchless banking

According to BCG report, the number of internet users is set to increase from an estimated 350 million now to 500 million by 2018. Moreover, 60 percent of internet

users are moving to vernacular language in small towns/villages using their mobiles to transact. Rao (2012) Nowadays, for customers of the banks, banking is important – not physical banking. Kulkarni (2018). The proliferation of banking touchpoints driven by technology as a part of outreach has been gaining traction. Federal Deposit Insurance Corporation(2015)

The benefits of this strategic change in banking about the physical presence of banks with a view to

- Extend smart digital outreach -24/7
- Reduce operational costs more particularly when net interest margins are coming down
- Redeploy these spared off staff to a more profitable location
- Fear up to serve next-generation customers in the way they need to be served
- Align branch network policy with global development

5.4 In-car apps

Once again Caixa Bank - a Spanish financial institution had made the mobile banking app that can be accessed simultaneously while driving which understands the voice instructions/commands. Drivers can make balance inquiries and transfers, as well as locate nearby branches and ATMs, by providing voice instructions/commands into the device. Many car manufacturers like General Motors, Jaguar, Honda, Shell, etc have made started research on in-car applications as part of IoT (BoT).Raynor and Cotteleer (2015).

5.5 Beacon technology

Another innovative teachlogy called - beacon technology uses a devices. This devise transmits data in the form of signals to the nearby Bluetooth enabled smart devices like Android phones , iPhone, iPad, tablets, etc . For example, a retail shop has installed broadcaster (beacon device). Now when a user arriving into a store or with a beacon app installed on his/her smart-phone, it would detects the small packet of data transferred from the broadcaster. Triggered information can be of anything like offers, details about the product, deals and coupons and more. Shroff (2007)

Bluetooth Beacons installed at banks to integrate physical and mobile channels, to create a new type of interaction and effective commercial communication and to deliver to the customers a positive and personal experience. Barclays is one of the first bank to use this technology. Other banks which were interested in Beacon Technolgy were Citi Bank, US Bank, St. Geroge Bank (Australia), DenizBank (Istanbul), etc.

Bluetooth Beacon hardware, mobile middleware for iOS and Android and a very powerful cloud platform, is able to monitor and manage the content and the interactions, to gather analytics and measure results, and to efficiently administrate the hardware infrastructure.

Beacon Technology can provide services like mobile payments, presence detection, customer ID recognition, satisfaction surveys, and contextual advertising, alerting account managers, customised offers, up-selling and education, cross-selling and new income, branch analytics, etc.

5.6 Artificial intelligence (AI)

Artificial intelligence basically creates the intelligent machines that work and acts like humans. Computers can perform activities like speech recognition, Learning, Planning and Problem solving with AI. Tiwari and Kumar (2012).

As per the prediction of Accenture, banks would communicate and transact with their customers through primarily through AI.

The use of intelligent digital assistants is now common in some of the more developed banking markets like US, Japan and Hongkong. The self - learning capabilities of these programs help them get better with every subsequent interaction.

5.6.1 Scenario of AI in the banking sector in India

- Several Indian banks have started exploring the implementation of machine learning (ML) and artificial intelligence (AI) in their day to day processes. Like, SBI, ICICI, HDFC, Yes Bank has started using AI.
- Banking operations are highly process-oriented and data-intensive. Hence, AI can help to carry out the process for bankers and analyze huge volumes of information about a client's behaviour to offer them detailed, personalised in format.For example, YES BANK is betting on AI-powered BOTS, Technology to usher 'Digital Transformation of Retail loans'.

5.7 Oculus rift

Oculus Rift is once again another advanced display technology combined with its precise; and tracking system permits the sensation of presence. The US bank has been testing the use of Oculus Rift which may allow customers to virtually enter a branch and speak to a teller's face to face.

5.8 Blockchain technology

"A Blockchain is a digital, immutable, distributed ledger that chronologically records transactions in near real-time. The prerequisite for each subsequent transaction to be added to the ledger is the respective consensus of the network participants (called nodes), thereby creating a continuous mechanism of control regarding manipulation, errors, and data quality.

5.8.1 Key characteristics of the Blockchain

- All the information on Blockchain is digitized, eliminating the need for manual documentation.
- It stores varoius transactions in the one block which becomes kind of repository. This block is links to the previous block in the same transaction and these connected blocks make a chain which is chronologically ordered provides the trail of underlying transactions.
- Blocks created are cryptographically sealed in the chain. That means that it becomes impossible to copy ,edit or delete the already created blocks and put it on network
- Because of its decentralized storage, it becomes very failure-resistant. Even in the case of the failure of a large number of network participants, the the Blockchain remains available, eliminating the single point of failure. Data stored in a Blockchain is immutable.
- A transaction on Blockchain can be effected when all the nodes on the network unanimously approve it. However, consensus-based rules can be altered to suit various circumstances.
- In distinguishable copies of all information are shared on the Blockchain. Participants independently validate information without a centralized authority.
- Even if one node fails, the remaining nodes continue to operate, ensuring no disruption

5.8.2 Blockchain in Banking

The banking firms in India today is faced with issues such as growing costs of operations, aggregating vulnerability to fraudulent attacks on centralized servers, and challenges in ensuring transparency. All this happening primarily because most of the banking transactions – from opening customer accounts to making global payments – may require intensive manual processing and documentation, involve costly intermediaries and is time-consuming as these transactions need

5.8.3 What are banks looking for?

Banks are continuously exploring novel ways to perform transactions quicker for enhanced customer service while ensuring cost efficiency in its operations and assuring transparency to customers and regulators.

For this, Blockchain potentially provides a solution for banks as it inherently helps eliminate intermediaries, maintain an immutable log of transactions and also facilitates real-time execution of transactions. This could potentially reduce the TAT for banking transactions, reducing costs of manual work, and leading to enhanced customer service and satisfaction. Like any other industry, choosing the right 'use case' is the key for Banks to leverage full value of Block-chain. Peters and Panayi(2016).

5.8.4 Circumstances or types of transaction where BCT can be used Shah and Jani (2018)

- Too much manual paperwork is involved
- Transaction should be performed on real-time basis
- Intermediaries are charging heavily
- Multiple parties are involved in the transaction
- Data are being stored in multiple locations and data consistency issues are there

5.8.5 In banking various transaction having all the features Shah and Jani (2018)

- Vendor Financing
- Customer Loyalty Program
- Syndicated Loans

6.0 Issues in Implementation of Modern Banking Technology

Banking sector is facing major competition from non-bank players in P2P payments, real-time payments, and other growing sectors. Consumers expect all businesses to adapt to their changing needs with the same speed and agility as they have come to expect from the tech industry, leaving banks to play a complicated game of catch-up with more nimble technology pioneers. Hence, the banking sector is facing tremendous pressure in recent time. InformationWeek. (2018).

6.1 The payment challenge

One of the key challenges facing banks is the impact of disruptive new technologies on their retail payments business – the so-called "rise of the FinTech". Such competition from non-banks in retail payments services is of course not new.

Western Union and Moneygram, for example, are well-established non-bank providers. International banker (2014). There are various factors simultaneously responsible to fundamentally change the landscape of the retail payments market that might change the banks' dominant market position.

6.2 The replacement of legacy

Replacing legacy systems, however, is a costly and risky undertaking that involves a lot of cooperation across multiple divisions, departments, and sometimes even countries. One strategy being explored by some to address large infrastructure issues is to implement small-scale solutions to improve data sharing and communication between existing systems. While such solutions may work in certain situations, they commonly create an environment of even greater technological complications, especially when targeted solutions are designed and implemented by disparate third-party providers. ThrottleNet IT Blog. (2018)

6.3 Security issues

The continuous growth of data breaches remains a major threat to the banking firms as the aggressiveness of the cyber-attack have increased from malware to ransomware and banking Trojan. Sasi (2016).

The wake-up call, though, has been the attempted heist in the Bangladeshi central bank. In February 2016, cyber thieves had issued instructions to transfer $951 million out of Bangladesh Bank's account at the New York Federal Reserve. While most were declined, an amount of $81 million was transferred to a bank in the Philippines, never to be traced again. The theft sent shock waves through the global banking community, both for the amount of money that was swindled and how the heist leveraged the Society for Worldwide Interbank Financial Telecommunication (Swift) system, the backbone of international finance.

There are many threats related to payment services, from malware to social engineering-related threats. Few threats and mitigating controls has been listed.

6.3.1 Denial of service

Denial-of-Service (DoS) attack is an attempt to make a system / application or network resource unavailable to its users for their intended purposes, such as to interrupt or suspend services of a host connected to the Internet. It basically done by thousands or millions of systems / persons simultaneously which stop an Internet site or service from functioning normally. Studies show that the Internet of Things (IoT) devices are not

adequately secured and can well be infested by criminal organisations in order to "participate" in a Distributed DoS attack.

6.3.2 Social engineering

Social engineering is a primarily non-technical method of intrusion used by attackers to target users to provide access and information rather than the attacker directly attacking the system.

Social engineering attacks range from mass email attempts that can be relatively easy to identify as an attempt to defraud a customer, through to attacks that target one or two individuals in an organisation and impersonate senior employees within that organisation, an attack known as CEO Fraud or Business Email Compromise (BEC).

6.3.3 Malware

There are various types of malwares such as worms, virus, remote access tools , Trojans , spyware , etc. The new type of malware is ransomware, also known as cryptoware. Malware exploits software susceptibilities in third party software , browsers and operating systems to take control to the device and its information and resources.

6.3.4 Mobile device related attacks

The use of mobile devices for both online banking and the purchase of goods and services (both online and in person) is still increasing. With this increase in usage there is a corresponding increase in the threats affecting these payments.

Main threats include:

- Malicious apps purporting to be banking apps;
- SIM swap based attacks;
- To exploit novel contactless payment means in which a traditional payment mechanism, e.g. a credit card, is stored on a mobile device for contactless transactions
- Phishing attacks specifically targeting the mobile device;
- Malware infecting the mobile device, compromising the legitimate use of the device and stealing credentials etc.;

Many other threats weaken the security of the banking payment system. Indian Baing industry should take stringent steps to stops these threats .Banks should form

security control framework. Framework would identify major threats; the risk related to the particular threat and also should mention about mitigating control of that threat.

Banks should also increase awareness among the customers related to the threats and should give them guidelines on how to safeguard their mobile devices, IoT devices , online banking transactions, etc.

6.4 Lack of technology experts

For an industry that depends on security more than any other industry in the world, financial services companies are lacking when it comes to understanding technology in banking. A recent document put out by Accenture.com states that among 109 of the largest banks in the world, 43% don't have any board members with professional technology backgrounds and only 3% of their CEO's have a background in technology. There are concerns related with security, implementing truly impactful strategies and adapt to the constantly changing technology in banking.

Financial Services IT consulting services are definitely needed in the banking industry to help key decision makers improve digital processes and understand their risks.

7.0 Conclusion

Indian banks have adopted innovative & modern banking technology at fast pace. Both public sector and private sector banks have already implemented the e-banking facilities. These technology driven services are going to make jobs easy for bonkers as well as customers. But adoption of this technology by customer is still questionable. This hesitance in adoption of new technology may due to trust factors, security and privacy risk and also because of less awareness among customers. Banking sector along with Government is making an effort to make e-banking more safe, secure and reliable. This paper only presents the overview of Modern Banking Technology in Indian Context.

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