

**A REPORT ON**

**DIGITALIZATION & AUTOMATION IN**

**BANKING SERVICES TO REDUCE TAT**

**BY**

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Chinmay Nema	2017A3PS0337P
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**AT**

**BANK OF MAHARASHTRA, PUNE**

**A Practice School-I station of**

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI**

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# ABSTRACT

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE**

**PILANI (RAJASTHAN)**

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Abstract: The report analyzes the improvements that can be done in banking services like reducing TAT( turnaround time ) with the help of digitization and automation. It discusses the importance of data and what can be done to improve efficiency in its verification. Further it discusses about chat bots and how they can improve the overall banking experience. The latter part contains some conclusions based on the report.

# **1. INTRODUCTION**

In recent times banking services have been heavily becoming digitalized. TAT is the turnaround time i.e. the time taken by the bank to process an application and sanction/approve the service to the customer.

The report sheds light on some of the various methods and implications banks can use to improve their TAT for various banking services like credit or loan processing. The report also talks about customer data integration and its importance.

Further, the report talks about digitizing of business processes in public sector banks. Further, the report sheds light on the verification process and how it can be improved significantly with the use of algorithms. The later part of the report consists of some suggestions and conclusions based on the report.

## **2. TAT**

Turn Around Time in the context of banking services is the time taken by the bank to process an application and sanction/approve the service to the customer. Now different banks and financial institutions have varying TAT and this report aims to find, analyse and then make suggestions on the factors that come into play to decide TAT.

Some of the primary questions raised when considering the time required to process an application from a customer are proper documentation, eligibility, and authenticity. The three are relevant to varying degrees depending on the service. For instance, retail loans will have require perfect scores on all three parameters while financial advice might be offered to a wider customer base. In addition the way different banks handle tackle the three parameters also varies. The process of verifying the authenticity of a customer as well his eligibility is dealt with in different ways by banks.

In the modern digital age, there is an increased demand for being able to handle the three parameters digitally so as to provide banking services with minimum hassle to an e-customer base. This in turn requires that banks are able to verify the identity of customers digitally and provide services in a secure manner. A multitude of options are now being developed and implemented to provide faster and more secure banking services that have been discussed in this report.

### **3. The Objective: DATA INTEGRATION**

Banks cannot afford to leave their customer data in silos now that clients are raising expectations and interacting with them through various disparate touch points. Banks need to make use of data integration to gain meaningful and valuable information from customer data.

Along with this comes the responsibility to ensure this data is well verified and correct. As we raise standards, security issues increase too. Hence it is very necessary to create a balance so that both the banks and customers can coexist happily.

Data integration gives the financial institution an edge over others as it saves time and effort making all processes quite efficient. Here in our project we are concerned about the TAT of loans. Often incorrect or insufficient documents cause queries to be raised and hence TAT increases which is very undesirable. It is a loss-loss situation for both banks and customers. A system is required to convey all the information to customers about all necessary documents. This would decrease the load of banks. But data integration can let you get all the information about certain customer provided you have some basic information about a person.

Till now the idea we have thought is to have a platform that contains all information and documents of a customer and it can only be accessed with the permission of the client.

In India, digilocker is a step towards data integration which is linked to both your aadhar card and cell phone and stores all documents. It eliminated the use of physical documents saving on



time, money and paper. All documents can be attested and verified. Banks could directly access data from here to verify it's client before sanctioning of loans. Obviously there will be a threat of cyber security that would be a challenge that we could find a solution to.

#### **4. Digitalization of business processes in public sector banks**

Digitalization connotes the use of electronic means and ways to conduct banking. It encompasses products and services that bank customers can typically access using their mobile devices or computers. Today's demand of banking requires robust, innovative and ready to meet expectations of empowered and tech-savvy customers.

To meet client desires, banks must quicken the digitization of their financial procedures. But they should go beyond simply automating the existing process. They must reinvent the entire banking process, including reducing the number of steps required, developing automated decision making, reducing the number of documents, and dealing with fraud and regulatory issues. Data models should be adjusted and rebuilt to enable a better performance tracking, decision making and customer insights.

##### Methods and strategies which could be adopted

- Digitalization as a part of banks' mission and vision:

Convention bound banks usually state customer centricity and experience as their motto. Since digitalization will be all encompassing in the days to come, banks ought to consider incorporating it in their mission and vision as this will impact their budget as well as their outlook.

- Becoming a data driven organization:

In the digital age, cost, speed, ease and seamlessness of operations matter the most to banks and their clients. Banks will need to leverage analytics technologies to gather insights as they offer multiple products and services. Hence it is fundamental for banks to invest in training their employees to become a data driven organization and must offer accentuation to big data analysis.

- Adopting Automation:

Digital services present opportunities for banks to automate operations in a number of ways. Although there is a caveat that human touch should not be lost, the very nature of digital technologies lends themselves to automation for example, the e-wallet.

- Blockchain Technology:

Another case in point is the blockchain technology which is set to revolutionize digital transactions as banks will have to look at the entire chain of operations and identify repetitive tasks. It's a technology that uses distributed databases and cryptography to record transactions. A blockchain functions as an open, decentralized ledger that keeps track of transactions between two parties effectively in a permanent and verifiable way. Financial and banking institutions could benefit a lot from blockchain such as fraud reduction, clearings and settlements. This technology also helps banks to sanction loans faster as it reduces the time for Know Your Customer (KYC) and customer due diligence regulations thus reducing the turnaround time (TAT).

- Implementation of cloud technology:

The adoption of cloud technology has been accelerating drastically. The financial services industry is also realizing the benefits that this technology brings. These benefits are not confined to cost efficiencies such as faster processing and reduced risk. Adoption of cloud technology also brings about an increase in revenue with higher number of loan applications, improved conversion rates, and better pricing. Cloud computing creates a multi-channel relationship with the clients at every aspect of the service such as storing, backup, updating and recovering huge data for the organization thus reducing the banks' turnaround time.

## **5. Verification of users by bank employee and vice versa**

Whenever a conversation needs to be done between bank and a user/customer it needs to be as secure as possible. Even if the messages are encrypted it needs to be verified whether the bank is talking to the correct person or not.

The following scenarios depict some illegal cases:

1. Suppose I took a loan from a bank and all conversation I did was online, but now I am unable to pay the loan, so I can say that I never had such conversations, I never took loan it was someone else who masqueraded my identity and escaped.
2. Suppose someone actually interfered between the conversation.

To tackle such scenario we will use a concept from public key cryptography, the Diffie hellman key exchange.

DH is usually utilized when you encrypt data on the Web utilizing either SSL (Secure Socket Layer) or TLS (Transport Layer Security). The Secure Shell (SSH) protocol also uses DH.

Obviously, in light of the fact that DH is a piece of the key exchange mechanism for IPSec, any VPN based on that technology uses DH too.

The algorithm explained:

Suppose Alice and Bank are the two people having the conversation so they first verify themselves in the following way:

This algorithm requires public key components and private key components(for a particular session) :

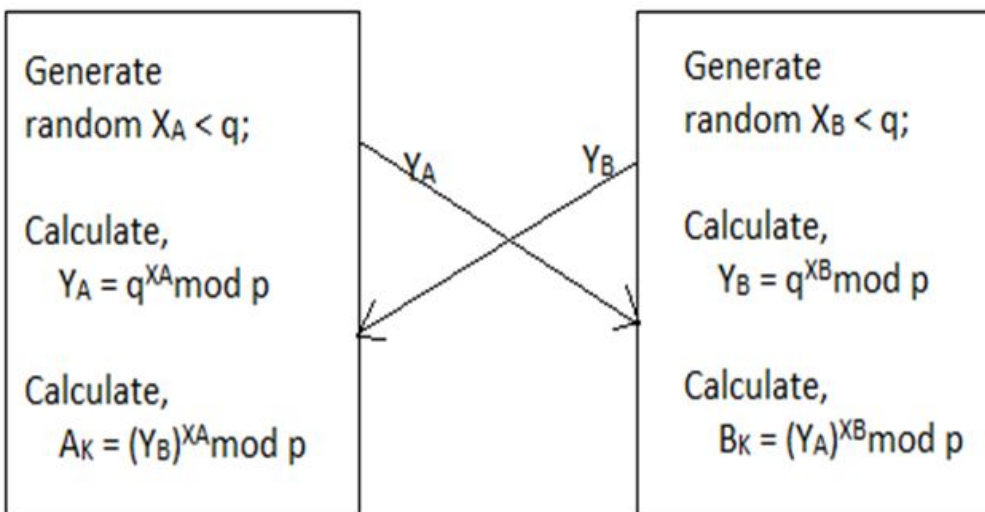
Public key components(to be announced by bank):

Q & P :

Such that P is very very very very very very large prime and G is generator, i.e. when  $G^a \bmod P$  is not equal to  $G^b \bmod P$  for all  $a \neq b$

Private Key components :

Chosen by both bank and user, require a random  $X_A$  chosen by alice and a random  $X_B$  chosen by bank.



### 3. Issues and Security:

Biggest issue is the man in the middle attack.

Suppose I impersonate both as bank to the user and as user to the bank, now there and do the whole process again but with different random variables for bank and user, now in the actual research paper of Diffie Hellman key exchange it was mentioned that man in the middle attack is impossible to tackle but in our scenario since we have some information about the user we can use to exploit this shortcoming.

4. Verifying that the user only has sent messages and it has not been altered in the network :This we can do by using the concept of digital signatureAlgorithm :

❖ We can have shared global public key values (p,q,g):

❖ choose a large prime p with  $2^{L-1} < p < 2^L$

❖ where L= 512 to 1024 bits and is a multiple of 64

❖ choose q with  $2^{159} < q < 2^{160}$

❖ such that q is a 160 bit prime divisor of (p-1)

❖ choose  $g = h^{(p-1)/q}$

❖ where  $1 < h < p-1$  and  $h^{(p-1)/q} \bmod p > 1$

❖ users choose private & compute public key:

❖ choose  $x < q$

❖ compute  $y = g^x \bmod p$

- ❖ to **sign** a message  $M$  the sender:
  - ❖ generates a random signature key  $k$ ,  $k < q$
  - ❖ nb.  $k$  must be random, be destroyed after use, and never be reused
- ❖ then computes signature pair:
  - ❖  $r = (g^k \bmod p) \bmod q$
  - ❖  $s = [k^{-1} (H(M) + xr)] \bmod q$
- ❖ sends signature  $(r, s)$  with message  $M$
  
- ❖ having received  $M$  & signature  $(r, s)$
- ❖ to **verify** a signature, recipient computes:
  - ❖  $w = s^{-1} \bmod q$
  - ❖  $u1 = [H(M)w] \bmod q$
  - ❖  $u2 = (rw) \bmod q$
  - ❖  $v = [(g^{u1} y^{u2}) \bmod p] \bmod q$
- ❖ if  $v=r$  then signature is verified

## 6. Digitizing Customer Care using Chatbots

Banking is a labor-intensive job with ever increasing customers and traffic. The existing systems can only take it so far and they are bound to become inefficient and error-prone.

HSBC, American Express, American bank, HDFC almost all major banks today are investing in AI-based bots for more efficient customer services.

Chatbots are efficient, convenient and more reliable than helpdesks, FAQs or call center services.

The steeply increasing demand for banking services has made it clear that customer care can no longer be carried out in the traditional way and technology needs to intervene.

Major advantages using of chatbots:

1. Bypassing verbal communication can help in overcoming communication gap due to differences in languages and accents.

2. Complete knowledge:

The personal incompetency of customer service representatives is often a problem. They can misguide a customer or deliver incomplete information. Since the flow of information is verbal, often they cannot be held accountable.

On the other hand, well-programmed chatbots deliver correct and much more detailed information and hence reduce the chance any misguidance.

3. Time constraints

It's no news that customer service representatives are hard to reach and deal with. The hotlines are invariably busy or out of service. Also due to time constraints and a large number of people to handle the representatives aren't able to listen to the customers very patiently. Hence people often avoid using them.

But a chatbot provides a very personalized experience. It can be used for as long and as many times as a customer wants, that too 24\*7

#### 4. Other functions:

Bots can do much more than just laying out info. They can be used to take appointments, register complaints, provide step by step troubleshooting, issue new documents, cancel requests and much more. They can easily replace choppy and hard to navigate websites and faq pages.

#### 5. Most importantly they can be trained:

Machine learning can make Chatbots smart. The more they are used, the smarter they become. Hence there is no need to hard code them and generally, they do not become obsolete.

Following are some of the most well-developed bots which are being used by banks:

##### 1. Erica-Bank of America

As a market leader in both mobile banking use and AI implementations in the U.S., Bank of America introduced its AI-based virtual assistant [Erica](#) to send notifications to customers, provide account information, gives suggestions to save money, give credit report updates, pay bills and help customers with simple transactions. Since the introduction, the capabilities of Erica have expanded as an advanced virtual assistant to help clients make smarter decisions.



Erica integrated with Bank of America mobile banking app. Customers can get help via voice or text regarding their banking problems. It offers personalized recommendations, after analyzing the customer's data. It can also send educational videos on finance.

## 2. Capital One

Eno is Capital One's text-based chatbot that helps customers to manage their finances using phones.

Eno can adapt itself to customer behavior and modify itself according to their requirements.

Clients can get their account balances, transaction summary and other info in the form of text messages. They can also pay bills using the bot. The chatbot can also process emojis and thumb signs.

Capital One has another AI based bot based on Amazon Alexa which takes voice input. This bot enables Capital One clients to know about upcoming payments, check account balances, and pay their credit card bill using their voice.

## 3. JPMorgan Chase

JPMorgan is using bots to streamline its back end operations. The bank launched [COIN](#) to analyze complex contracts quicker and more proficiently than human lawyers. According to JPMorgan Chase, the organization has saved more than 360,000 hours of labor.

The chatbot additionally utilizes the innovation to parse messages for representatives, enable access to programming frameworks, and handle fundamental IT solicitations like resetting passwords. Going ahead, the bank has demonstrated the expectation to continue utilizing bots to discover wellsprings of salary, approaches to diminish costs and better approaches to lessen the chance.

#### 4. Ally Bank

Ally Bank was one of the main banks to execute a chatbot, with the dispatch of Ally Assist in 2015. Partner Assist is a remote helper inside the Ally Mobile Banking application. Ally Assist can be gotten to by means of voice or content to perform capacities, for example, making installments, moves, P2P exchanges and stores.

A client can likewise demand a record outline or exchange history just as screen sparing and spending designs. Through AI, Ally Assist can anticipate client needs by dissecting records and exchanges to give significant assistance subjects and messages. The collaborator likewise utilizes characteristic language to address basic client administration questions.

## **7. Conclusions**

- TAT in processing loans can be significantly improved with the help of modern technology, digitalization and automation.
- Data integration gives a bank edge over other banks by saving time and efforts, also services like digilocker aid the same.
- Blockchain and cloud technology can assist the bank and save lots of human resources and get work done more efficiently and quickly.
- Digitizing verification gives an added measure of security and helps reduce TAT.
- Chat bots in banks can help to provide better overall customer experience.

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