Suitability of Big Data Analytics in Indian Banking Sector to Increase Revenue and Profitability

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Abstract—Banking Sector over the last few decade has undergone drastic changes, when it comes to the way they operate and provide efficient services. Increasing population worldwide overburden the existing banking infrastructure. This will in turn increases the number of customers, online transactions and also create huge amount of data when dealing with large segment of customers. Banks in United State and other countries are now using Big Data Analytics (BDA) to handle this situation in every day. It find various patterns within their databases and for gaining the profits for their organizations. It is very surprising, yet true that most of the banks in India have actually not utilizing the information they have stored in their own databases due to several issues like connectivity, fetching time etc. Data experts expect an enormous increase in the volume of data, before 2020, i.e., the size of the data is in Petabyte's and Exabyte's. This will be the actual amount in which the data is being stored in our banks in past a decade. To address the above mentioned issues, this paper provide a detailed review on suitability of BDA in Indian banking sector. BDA is a huge step towards the development of banking sector. So, applying BDA in banking sector in India would help banks in generating actionable insights to improve strategic and operational decisions, and to stay on top of business and competition, every bank must be highly rich with technology and Analytics. Big Data is definitely going to make things easier for the banking industry.

Keywords–Big Data Analytics, Banking Sector, Customer segmentation, Fraud detection and prevention, India Economy.

I. INTRODUCTION

Handling of data will play major role in success of digital banking by way of delivering competitive advantage and determining future winners. More importantly, a bank's data and analytical capabilities will be central to staving off multiple challenges – such as data silos and lack of integration, both of which limit insight – facing traditional banking structures and models. Banks trying to overcome their four biggest challenges, linked to customers, competition, fraud and compliance, will find many solutions in advanced data and analytics technologies. The term Big Data (BD) which is "bigger" in size. By referring to "bigger", we mean datasets which are so large and complex that traditional tools and techniques are not sufficient to process these datasets [2]. BD is said to be so strong and powerful for business decision making than it is possible with traditional business intelligence.

We live in the digital world, where data is being stored and processed every instance of time [3]. According to Peter BaeBrandtzaeg of SINTEF ICT, "90% of the world's data is collected in last two years only." Everything we do online, be it posting twitter feeds, facebook statuses and comments, video, audio and image transactions all over the internet, collects a huge amount of data within seconds. Not only the social activities, but from every business point of view, data is being stored so rapidly and in large volumes, that we need better and advanced technological tools for processing this data. And here comes the concept of BDA.

BD is being generated at every bank in India as well. Banks throughout India generate and collect a huge amount of data, by every service provided in banks. Following are the few sources that generate huge datasets in banks:

- Customer Information
- Loan Information
- Financial Transaction Data
- Credit/Debit Card details of every customer

By the use of BDA, as shown in Figure 1, Indian banks will improvise their service delivery to their customers also it would be helpful for them to understand the customers' behavior, their money spending habits etc. Banks can monitor their customers' activities, in their money transactions, credit card limits faster and can process them effectively and efficiently. Figure 1(a) show the task wise percentage of banking data 1(b) show the year-wise deposits of customers in various schemes.

A. Research Contributions of the paper

The possible outcomes that can be achieved using this analysis are given as follows:

- We have provided an analysis for the application of BDA in the Indian Banking Sector.
- We have highlighted advantages of BD in banking sector for the betterment of the services that are being provided by the banks.
- Finally, we have also provided challenges that are to be faced in applying the BDA in banking sector.

B. Organization

The rest of this paper is organized as follows: In second section, we have covered past work done by various researcher in this domain. Third section covers detailed analysis. Section IV gives the use of BDA in banks. Section V highlight the opportunities and challenges faced by applying

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the BDA in Indian banking sector. Finally, section VI conclude the article.

II. Related Work

This section provides the brief discussion on some of the existing work of applying BDA in banking sector. Chandani A. *et al.*[1] done comparison between the traditional tools and BD tools over a period of five years and gave the values of the most popular and widely used tools in the world of finance to enable managers in decision making. According to her BD is the most popular amongst all the data handling tools and techniques. Utkarsh Srivastava *et al.* [4] discussed one of the ways in which customer sentiments were captured and used to assessed the functionality of the banks. "BD implementation will be crucial to address these opportunities and threats arise in new evolving environment,"[5]. This is the right time to invest in BDA for better satisfaction with our customers at various touch points. In order to successfully identify and implement BD solutions and benefit values from BD, Banks need to be upgraded in terms of resources that need extra time and resources.

A. V. Nikam*et al.*, [6] discussed five ways to leverage BD and concluded that it can be proved very useful for business organizations particularly in banking sector. It has been seen that banking sectors in India has already undergone many technological advancements. Over the past few years the development of banking sector is enormous. The banking sector is also very important part for any country to accelerate the country economy, and it will be topic of interest for researches of different domains like management science, marketing, finance and information technology. So it is very necessary for the Banks to shift from using the Data Analysis and must migrate their services on BD Technology [7]. Even though most of the banks in the world adopted that BDA which can provide a competitive advantage. According to survey conducted by Capegemini, only 37% of the banks are being working on BD and utilizing its benefits, while the rest of the banks are still not trying to migrate their services on BDA and large group of customers think that their bank have a deep knowledge of their needs and preferences.

Financial sector raise all their funding from the banking sector in India. Effective and faster credit risk analysis is very important segment of BDA. So all the probable solutions against already discussed issues will probably benefit the banking sector, if BD techniques are applied.

A. Reasons for Banks to adopt Big Data

According to survey conducted by Qlik among only 21 % of respondents say they have implemented BD technologies, 42% said they plan to invest in BD technologies in the next 12 months. Three reasons why Indian companies adopt BD technologies are:

- To improve productivity within their organizations
- To improve customers satisfaction, their daily needs, and their spending patterns
- Finally, to increase the overall revenues and profitability

Despite the relatively low implementation of BD technologies in India today – a trend that is mirrored across most other markets in Asia Pacific, we have found that more and more companies plan to invest in BD in the near future. India, being a high growth economy, is in a strategic position to leapfrog over other countries in helping companies to adopt technologies that turn raw data into insights. From literature we have notices that there is an urgent need of BD in banking sector as shown in Figure 2.

III. Advantages of Big Data in Banking Sector

BD offers a number of advantages to both banks and their customers. Advantages of BD in terms of functional and business area are given in table I. Some of the world wide accepted advantages of applying BD for banking in India are as follows:

- Fraud Detection and Prevention: It is one of the major problems faced by the financial sectors and BD can ensure banks that no unauthorized transactions and access

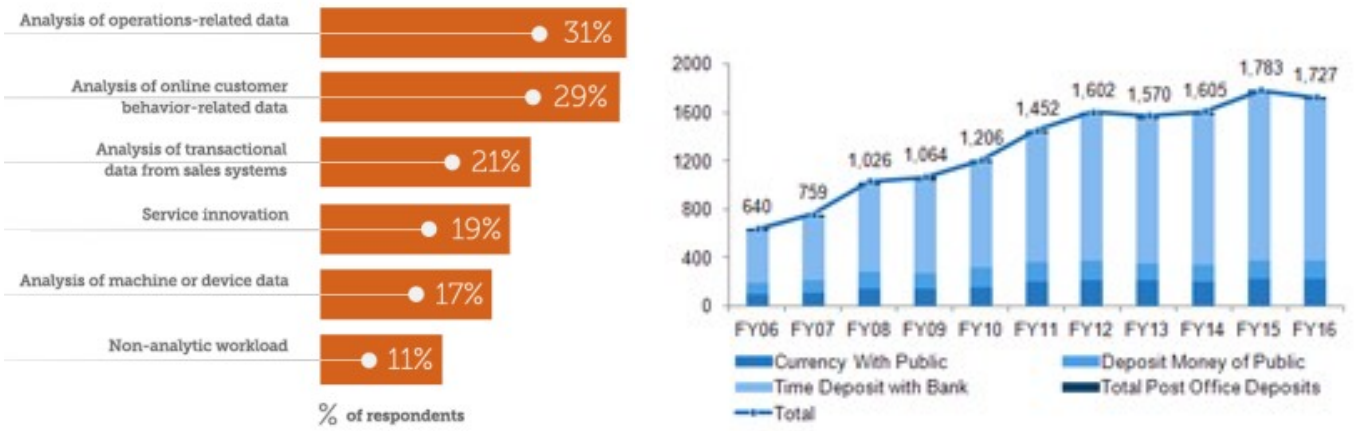

Fig. 1: (a) Task wise percentage of banking data, (b) Year-wise deposits of customers in various schemes

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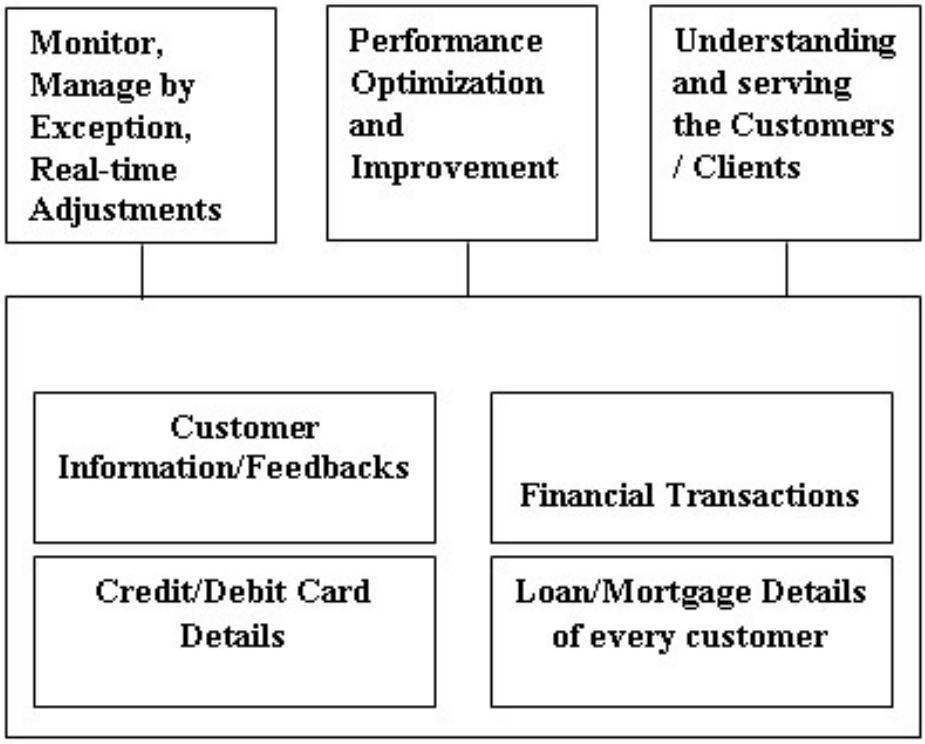

Fig. 2: Need of Big Data Analytics in Banking Sector

will be made from their systems, providing a level of safety and security that will raise the security standard of the entire financial industry.

- Customer Segmentation: It will be the need to divide customer base into groups of individuals that are similar in particular ways relevant to marketing and business, such as their age, gender, financial conditions, interests and spending habits. This segmentation allows banks to provide or deliver to customers with exactly what they're looking for.
- Risk Management: The early detection of fraud is a large and major part of risk management and BD can do as much for risk management, as it does for fraud identification. It locates and presents BD on a single large scale that makes it easier to reduce the number of risks to a manageable number. This would further reduces the chances of losing data or ignoring frauds within transaction in banks.
- Study of Indian Economy: Similar to what financial organizations and banks are doing in other countries such as U.S.A., the techniques can be applied in India for studying the Indian economy more efficiently, and can help in improvising it to a better level.
- Customer Profitability: BD also gives up to date information about their customers, that will help banks in identifying the most important and valuable customer with less hurdle. Banks can use this information to provide the right products to them and help them to decide in which product to invest for profitable returns.
- Past Data Analysis and Future Predictions: Banks can also look at the past data, they have already stored, and can plan for the future. BD helps them in spotting patterns in different domains of their services provided to their customers and can use these data patterns to predict their businesses future e.g. where and how to invest their labor, money and time for profitable returns.

IV. Study of Indian Economy using Big Data

According to J.P. Morgan Chase and Co.'s [8] spending remains volatile for the broad middle class and not just the poor. Researchers tracked the spending and income patterns of 100,000 randomly selected individuals from a sample of 2.5 million accounts at the bank over a 27-month period ended in December, 2014. From this finding, two in five individuals saw their income vary by at-least 30% from one month to another, three out of five individuals saw their spending vary by at-least 30%. After this report, BD was found to be very effective and useful enough for studying the Indian Economy. Other findings from institutes first run through its data lab: Monday is the top spending day of the week and sunday is the lowest, Americans spend three times as much on Monday as they do on Sunday. But in Indian context sunday is more profitable from business perspective.

V. Big Data Analytics in India

HDFC Bank was the first bank in India which started using BD in the most effective way in the early 2000. They installed a data warehouse and started their investment in technology that would help it make sense of massively stored unstructured data by its IT systems. Later on, ICICI Bank had also adopted BD in the similar way as HDFC Bank. These banks are looking at BDA as a tool to get profits by generating more revenue, as they get valuable intuition for customers and

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TABLE I: Functional and Business Area of Big Data and their opportunities

Functional Area	Functional Area	Business Area Opportunity
Fraud Detection and Prevention	Detect Fraudulent transactions with greater accuracy.	To assure no unauthorized transaction is being done providing a level of safety and security to raise the security standards of the industry.
Customer Segmentation	To maintain their customer relationship.	It will allow the Banking Sector in finding out their customers' interests and the best services they need the most as per their interests.
Risk Management	Reduce exposure and optimize asset utilization.	To ensure the early detection of fraud and reduce the chances of losing data and ignoring frauds.
Study of Economy	Generating reports of the Indian economy and to utilizing it in business interests.	For studying the economy of the country and then it will help in improvising it to a better level.
Customer Profitability	Detection of the most valuable customer.	Banks can use their customers' data in finding out suitable products and services for them to invest for profitable returns.
Past Data Analysis and Future Prediction	Finding out patterns and loopholes from stored data for their better good in future.	It will help customers in finding out where and how to invest their money and time for positive returns.

markets.

For Banks like HDFC and ICICI, data is generated through multiple channels like voice call logs, emails, websites, net banking, social media and real time market feeds. Using analytics these banks were also able to keep records of credit histories of customers and can handle loans accordingly. In coming time more and more banks are willing to adopt BD and they should start investing their time and money into analytics for profitable business and providing a better service to their customers.

VI. Open Issues and Challenges for Indian banks to adopt Big Data

The biggest BD challenge that banks face is how to access and analyze this large volumes of data to come up with new insights, followed by managing the evolving variety of data. Banks are still in the 'explore and experiment' mode to apply BD and Analytics in daily services offered by them. Through use of this latest technology, it can be concluded that this adoption in series of incremental progressions will definitely pay back to banks. Challenge for banks is how to take full advantage of this demanding opportunities as well as overcoming current and future challenges. Some Challenges for Indian banks to adopt BD are as follows:

- The Banks in India will have to make a gradual shift towards "Data Culture" which may not be easy as it sounds.
- The Banks will have to identify the existing employees present skill set and find out the gaps required for the implementation of BDA and cater for the same.
- The cost for adopting BDA might be high, but it is a one time investment, once adopted, will only return profitable outcomes.
- The proper use of tools like Hadoop, R, NoSQL would be a little bit hard for the employees but, as soon as they will get their hands on, it would be easier for them to do daily work easily.

VII. Conclusion

BDA is currently being adopted by the financial and banking sector of various countries. The power of BD must be utilized by Indian banking sector too in order to improvise the services they provide and the operations they perform. In order to take advantage of BDA banks need to upgrade their traditional technological approach and start implementing new technologies and processes. This paper analyzed some of the most important advantages of BD that can be seen while using the techniques of BDA. There can be challenges also while using it, that we will get to know when Indian Banks will adopt BD and start the analytics.

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