

Big Data In Banking: Opportunities And Challenges Post Demonetisation in India

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Abstract: India's Demonetisation followed by digitization of its economy is substantially adding to the high volumes of data being generated by global social media and the growing number of smart phones. Big data refers to datasets that are not only big, but also high in variety and velocity. Big data deals with the information management strategy with many new types of data and data management along with traditional data. Studies suggest that 90% of the world's data was generated in the last few years. Big data is a key trend for many industries, including financial services in general and banking in particular. Demonetisation-to-digitization is playing significant role in revolutionizing the banking sector resulting into more avenues for Big Data industry in India. This paper addresses the prospects for big data industry in India particularly in banking sector; its risk and solutions.

Keywords: Demonetisation, banking, e-payments, online frauds, Big Data, security, Privacy, employment opportunities in India.

I. Introduction

Digital data has snowballed, with the proliferation of the internet, smart phones and other devices. Companies and governments alike recognize the massive potential in using this information - also known as Big Data - to drive real value for customers, and improve efficiency. Big Data could transform businesses and economies, but the real game changer is data science.[1] Among the main sources that generate Big Data are Archives, Docs, Media, Data Storage, Business Apps, Public Web, Social Media, Machine Log Data and Sensor Data.[2] The pace of generation of Big Data is amazing in 2010; total data generated by the world was recorded over 1ZB. Studies estimate that this figure would reach upto 7ZB by the end of year 2014. [3] A few years ago, [IDC] made headlines by predicting that the total amount of digital data created worldwide would mushroom from 4.4 Zettabytes in 2013 to 44 Zettabytes by 2020. Now, IDC believes that by 2025 the total will hit 180 Zettabytes. The astounding growth comes from both the number of devices generating data as well as the number of sensors in each device... approximately 11 billion devices connect to the Internet now. The figure is expected to nearly triple to 30 billion by 2020 and then nearly triple again to 80 billion five years later.[4]

The Demonetization unfolded a new era accelerating rapid growth in e-Banking and e-Commerce in India. After Demonetization the government of India started promoting digitization for a cashless society paving way for increased e-Banking and e-Commerce transactions. Thus, large-scale campaign run by the government is underway to educate and motivate general public to use e-Payment options. Presently, very few Mobile payment apps which, are still in its infancy like; MobiKwik, PayTM, Freecharge, Momoe, Google Wallet, PayUMoney, State Bank Buddy, ICICI Pockets, HDFC Chillr, Citi MasterPass, Oxigen Wallet, Vodafone M-pesa, etc.[5] The potential of the business can be clearly estimated by looking at PayTM's growth - an e-Commerce website started in 2010, offering only mobile recharging succeeded in attracting personal investment from industrialist Ratan Tata by March 2015.

The same month, the company received a \$575 million investment from Alibaba Group of China. As of November 2016, PayTM became India's largest mobile payment service platform with over 150 million wallets & 75 million android based app downloads.[6]. "With this policy change, we expect a 10x impact; we expect to easily hit \$10 billion in payments volume by 2017. Indian users do a trillion US dollars' worth of payments annually, of which more than 90% are in cash. We were earlier trending to process \$1 billion payments by 2017," said MobiKwik co-founder Upasana Taku.[7] This surely is adding to generation of large volumes of digital data.

II. What is Big Data?

Big data means really a big data; it is a collection of large datasets that cannot be processed using traditional computing techniques. Big data is not merely a data; rather it has become a complete subject, which involves various tools, techniques and frameworks.[10]

Figure 1: Data Generation Sources to Analytics

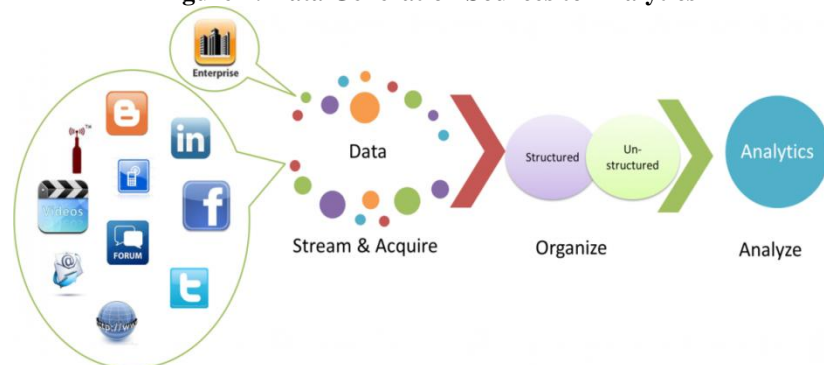


Fig. 1 clearly explains that, The presence on so many channels will generate so much more data of so many types such as transaction details, preferences, tweets, uploaded images, comments, emails, page views, recommendations apart from the usual sales and purchase data. Now this huge amount of data from a number of sources has storage and analysis requirements of an altogether different nature. For large organizations this data may go into zillions of bytes.[8] It is estimated that Walmart collects more than 2.5 petabytes of data every hour from its customer transactions. A petabyte is one quadrillion bytes, or the equivalent of about 20 million filing cabinets' worth of text. [9]

III. Indian Banking sector: unleashing the power of Big Data

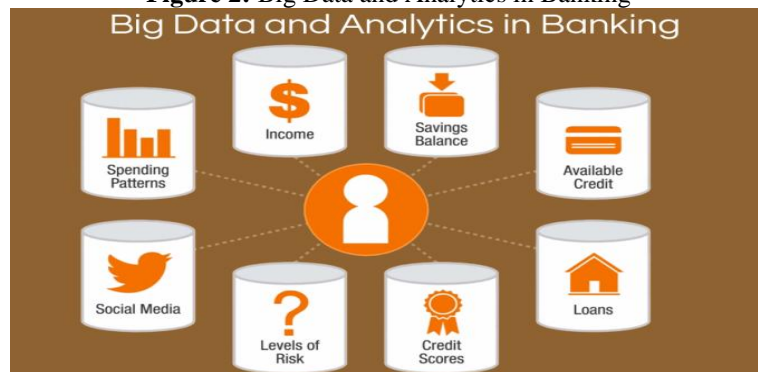
In an era when banking is highly digitized - the mining of Big Data provides a massive opportunity to stand out from the competition. Every banking transaction is a nugget of data, so the industry sits on vast stores of information. By using data science to collect and analyze Big Data, banks can improve, or reinvent, nearly every aspect of banking. Data science can enable hyper-targeted marketing, optimized transaction processing, personalized wealth management advice and more - the potential is endless.

Banks can model their clients' financial performance on multiple data sources and scenarios. Data science can also help strengthen risk management in areas such as cards fraud detection, financial crime compliance, credit scoring, stress-testing and cyber analytics. The government's policy to digitize the entire banking sector and its subsidiaries greatly propels Big Data generation opening up vast opportunity for Indian market.

Over 1.7 billion people with mobile phones are currently excluded from the formal financial system. This makes them invisible to credit bureaus, but they are increasingly becoming discoverable through their mobile footprint.

While banks have historically been good at running analytics at a product level, such as credit cards, or mortgages, very few have done so holistically, looking across inter-connected customer relationships that could offer a business opportunity - say when an individual customer works for, supplies or purchases from a company that is also a client of the bank. The evolving field of data science facilitates this seamless view.

Figure 2: Big Data and Analytics in Banking



Research indicates that less than half of the banks analyse customers' external data, such as social media activities and online behavior.[11] Simultaneously the use of the following increased:

•**Automated Teller Machine**

The conveniences with which ATMs dispense money and collect deposits have become the biggest source of banking transactions. Growing competition amongst banks is resulting into increase in installations of ATMs trying to close knit vast geographical areas. Government's 'Demonetisation-to-Digitization' drive is playing crucial role in widening the sphere of ATM network focusing on rural India.

•**Debit Card**

Banks are now providing Debit Cards to their customers having saving or current account in the banks. The customers can use this card for purchasing goods and services at different places in lieu of cash. The amount paid through debit card is automatically debited (deducted) from the customers' account.

•**Credit Card**

Credit cards is one of the product which banks are selling aggressively, its handy enhanced buying power is one of the main reasons that customers are being attracted towards its use.

•**Net Banking**

Number of customers availing net banking facilities and mobile apps are growing day-by-day. Major attraction for the customers are the ease of paying utility bills online, money transfer, making fixed deposit, buying insurance policies are attracting customers.

•**Phone Banking**

As more and more people are now using mobile phones, phone banking is possible through mobile phones. In mobile phone a customer can receive and send messages (SMS) from and to the bank in addition to all the functions possible through phone banking.[12]

IV. Applications of Big Data in Banks

Big data, either acquired from some source or internally generated data is to be used in the manner that it is in synchronization with the organizational vision and mission. Banks should be able to use this data so as to meet the predetermined objectives which can be either to reduce cost, minimize the time taken in the processing, launch a new product to name a few. All these and others factors and variable should ultimately lead to better decision making in the organization. Advantages of Big data for banks using big data and technology, may be able to reap some of the following benefits:

- Find out the root cause of issue and failures
- Determine the most efficient channel for a particular customers
- Identify the most important and valuable customer
- Prevent the fraudulent behavior
- Analyze the risk and the risk profiling
- Customized products and customized marketing Communication
- Optimize human resources
- Customer retention [13]

V. Challenges in Big Data Analytics for Banking Industry

Following are the key challenges for banks:

1. Legal Challenges
2. Regulatory Challenges
3. Privacy Challenges
4. Security Challenges
5. Data Quality
6. Organizational Mindset
7. Data Visualization
8. Data Integrity
9. Offer management & Relationship pricing
10. Inefficient Data Management
11. Lack of capability of the Back end systems
12. Compliance

13. Regulatory reporting
14. General Ledger transformations
15. Dynamic Relationship based pricing [14]

VI. Issues Needed To Be Resolved To Provide Effective And Secure Banking Transactions

1. Security

Security of the transactions is the primary concern of the internet-based industries. The lack of security may result in serious damages such as Posta Pay frauds. This section will be discussed in the next section.

2. Anonymity (Privacy)

By strengthening the privacy technology, this will ensure the secrecy of sender's personal information and further enhance the security of the transactions. The examples of the private information relating to the banking industry are: the amount of the transaction, the date and time of the transaction, and the name of the merchant where the transaction is taking place. This section will be discussed in the next section.

3. Authentication

Encryption may help make the transactions more secure, but there is also a need to guarantee that no one alters the data at either end of the transaction. There are two possible ways to verify the integrity of the message. One form of verification is the secure Hash algorithm which is "a check that protects data against most modification". (Pfleeger et al. 1997). The sender transmits the Hash algorithm generated data. The recipient performs the same calculation and compares the two to make sure everything arrived correctly. If the two results are different, a change has occurred in the message. The other form of verification is through a third party called Certification Authority (CA) with the trust of both the sender and receiver to verify that the electronic currency or the digital signature that they received is real.

4. Divisibility

Electronic money may be divisible into different units of currency, similar to real money. For example, electronic money needs to account for pennies and nickels. [15]

VII. Effect Of Demonetisation /Cashless Economy

1. Consumer behavior and demonetisation: "Consumer behavior complexity has become much bigger. The concept of big data is nice, but applying that data to specific business problem is still something we have not yet codified" Kantar's chief operating officer Richard Ingleton. Kantar Insights South Asia CEO Preeti Reddy" Big data is today's absolute buzzword.[16]

2. Currency ban and GST:"Demonetisation could aid a smooth transition to the GST. Demonetization and GST acting in tandem may deliver a new higher normal for the tax-GDP ratio by pushing it from the current level of 16-17 per cent of GDP to 20 percent in the medium term by formalizing the informal sector. This would considerably enhance the financial capacity of the government of to deliver basic services to the people. [17]

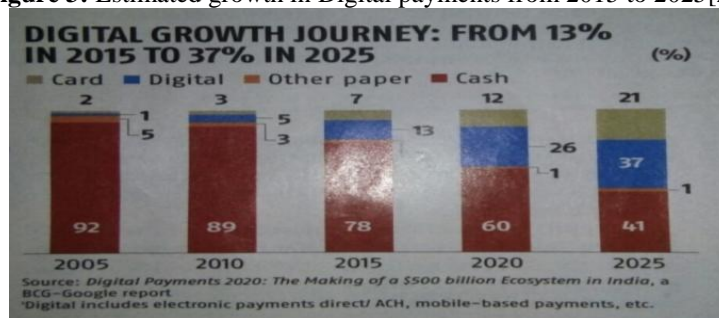
3. "Internet users and Demonetisation: Indian" Internet user base is expected to double in the next three years."Vinay Singhla.[18]

4." Demonetisation will help the Indian economy in the longer run" Richard Chapman, Chairman, Norwegian Business Association-India. .[19]

5. Kunal Bahl co-founder and CEO, Snapdeal, which also owns online recharge and wallet player Freecharge said," The quantum of India's economy moving through the digital pipes will witness massive growth [20]

6. Country head-digital banking, HDFC Bank Nitin Chugh says, "The availability of public infrastructure in terms of bandwidth, connectivity and the penetration and performance of smart phones is a prerequisite".[21]

Figure 3: Estimated growth in Digital payments from 2015 to 2025[21]



VIII. Online Transaction Fraud

Figure 4: Sector-wise Estimated Online Frauds till the year 2020



According to Juniper Research, e Retail, banking and airline ticketing are the three hottest areas for online fraud. A study from the United Kingdom-based Juniper Research found fraudulent online transactions will reach \$25.6 billion by 2020, up from \$10.7 billion last year. That means for every \$1,000 spent, \$4 will be fraudulent. The study, “Online Payment Fraud: Key Vertical Strategies & Management 2016-2020,” identified three hot areas for online fraud: e Retail (65% of fraudulent transactions, or \$16.6 billion), banking (27%, \$6.9 billion) and airline ticketing (6%, \$1.5 billion). Meanwhile, the research claimed that although banks can counter online banking fraud by deploying new technologies such as 3D-Secure, which requires an additional step during the authentication process, and device fingerprinting, these measures often only provide only temporary relief as fraudsters rapidly discover new schemes.[22]

IX. Some Predictions That Big Data Will Be Armed With To Change The Future Of Technology

1) Accommodating the ever growing bundles of data:

As we already know and have discussed the need for a system that will store the data that is increasing every day. Yes, the growing popularity of these hand held devices including Smartphone and Android devices and the devices that favor internet connectivity are increasing every other day which makes it possible to produce more and more data per day. So, Big Data needs to be introduced to give space for all the data that is being produced daily.

2) Privacy:

We know that huge volumes of data are being produced and to store this we need an advanced technology system like the Big Data. But, the privacy of the data that is being stored in collaboration with the big data schema is to be ensured and it is one of the challenges that we are going to face in near future.

3) Improved data analysis techniques:

Data is going to be produced in huge bulks. It is essential to have a great data analytics techniques or tools to analyze the data that is being produced. SQL still remains the standard tool but Spark is one of the emerging tools that will boost the current data analysis structure.

4) Real-time data streaming:

Users will be provided with insights into real time data streaming. This will help them to take better decisions relating to anything and everything.

5) The need for chief data officers:

As more and more data evolves, big data will be altered and modified and more companies will see the need for appointing a chief data officer. But, in future as the big data evolves into a machine controlled technique, the need for a CDO will slowly decrease.

6) Demand for big data experts:

As time evolves, we will need more number of people who are experienced at working on big data. The year 2017 will witness the need for big data analyst scientists, researchers and other experts.

7) **The need for adopting the change:**

All companies will need to adopt the change that is going to revolutionize the world soon. And, you need to be a part of it. So, if you are company still does not use big data it is high time you started implementing it. Also, a small note for those companies that focus only on web development it is better if you could spin around the wheel and rope in big data analysis services because your clients are not going to be too happy if you refuse to offer them big data services and solutions. So, it is time to arm ourselves for the big data revolution that is all set to change the world of web.

X. Job Prospects In Big Data

Data scientists, who possess mathematical, analytical, technical, and industry knowledge and experience along with the business judgment power that gives them an insight into the future scope combined with soft skills will be in greater demand in Big Data industry. Skills that data analysts must possess are enlisted below:

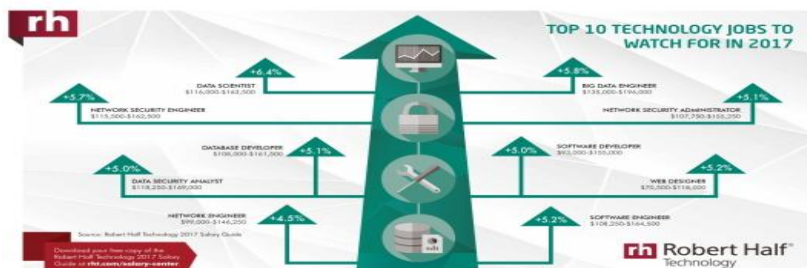
Data analyst must be capable of:

- Analyzing the resulting data with effectiveness
 - Ask the right kind of business questions
 - Realizing what kind of statistical approach will fit in to tie up together volumes of amorphous data.
 - Applying the right kind of skills while working on extraction and data analysis and these includes presentation skills, analysis skills, database skills and other coding abilities that they possess.[23]
- The Big Data Salary Report 2016 claims that the job market across India is seeing a 32.2% demand.[24]. Another report that seems to have overlooked the ‘Demonetisation-to-Digitization’ effect claims that the Indian job market size is of 60,000 and will grow at 30% Y-O-Y.[25]

Somewhere during the year 2012-13, Open Source analyst firm ‘Wikibon’ predicted that, Big data market will grow at an amazing CAGR of 58% in these five years and by the year 2017 it is expected to touch \$50 billion mark.[26] Thus, the effects can be seen on pay packages and corresponding increments. The ‘2017 Technology and IT Salary Guide’ published by ‘Robert Half’ (Robert Half North American recruiting and staffing professionals make thousands of placements each year) predicts attractive growth in salary levels as shown below:

- Data Scientist salaries are predicted to range from \$116,000 to \$163,500 in 2017, increasing 6.4% over 2016 salary levels.
- Big Data Engineer salaries are predicted to range from \$135,000 to \$196,000 in 2017, increasing 5.8% over 2016 salary levels.
- Network Security Engineer salaries are predicted to range from \$115,000 to \$162,000 in 2017, increasing 5.7% over 2016 salary levels.
- Security, Web Development and Software Development will see the highest salary growth in 2017.[27]

Figure 5: Estimated Job opportunities in Top 10 Technology sectors in the year 2017



XI. Conclusion

Present day life is tech-savvy generating huge volumes of big data. This paper focused particularly on banking sector which, post-demonetisation emerged as one of the major sources of big data. Most of the challenges that the banking sector will face in ‘Demonetisation-to-Digitization’ era are reviewed in this study. This study reveals that the government’s decision; its efforts to promote cashless transactions and e-Commerce will surely propel big data generation with greater speed resulting in growth of Big Data market in India. The second positive effect India will witness is increased employment opportunities offering lucrative pay packages. Growth prospects also pose few serious challenges before the Indian government, education and the IT sector. Where the Indian government can encash this opportunity to reduce its unemployment it doesn’t seem to be

prepared. Education sector and particularly colleges governed by the All India Council for Technical Education (AICTE) offering computer and information technology courses which have been set up after investing millions of rupees are on the verge of closure due to sharp drop in admissions. Such a situation raises question whether Indian education sector is prepared to cater to the needs of Indian Big Data market? The researcher leaves a link for further study.

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