



## DATA ANALYTICS IN BANKING

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**Abstract:** Data Analytics has proved to be hugely significant in various domains of the industry. In this paper, we will explore the use and its importance in the banking sector. The implementation of this technology will create a win-win situation for the company as well as the end user, re-defining the experience as a whole. The paper answers questions like why and how is DA a necessity in the banking industry today. It also highlights the different areas of banking; DA can be useful. Special emphasis is given on fraud detection, which is one of the major problems faced by the industry. With enough proof for the increase in the usage of this technology, millions of dollars are regularly being invested in the Research and Development. While exploring the cons of the process, this paper will explain the usage of the new technology, and its fruitage with the help of three case studies of our country. With an obvious idea of its advantages, the disadvantages of this venture also need to be analyzed.

## 1. INTRODUCTION

In the world where new technologies are being invented from day to day basis. New users and websites are generated every second. There is one entity that is constantly increasing, data. By the time the word "data" is said, people around the world make 1,800+ Skype calls, around 10,000 tweets, upload around 5.5 hours of YouTube video and exchange more than 2.4 million emails. It is assumed that around 2.5 exabytes of data are produced every day. [1] □

Interactive Data Corporation has predicted that the world will generate 40 zettabytes of data by 2020. This raw data although extremely useful can only be used when it is orderly examined to conclude. Data processing is simply the conversion of this raw data to meaningful information that can help achieve wanted conclusions. As easy as the definition and goal sounds, the present technology is not just insufficient to store but also accurately process the complete available data. With the word "business intelligence" (BI) being coined since long, a new term "data analytics" has recently emerged.

Data analytics can help business improve operational efficiency, increase revenues, smooth customer service, optimize marketing strategies, respond rapidly to emerging marketing trends and gain a competitive edge over rest. All with a primary goal of boosting business performance. This can be achieved so, with the help of historical records or new information that has been processed for real-time analytics uses, extracted from internal as well as external sources. [2] □

Data analytics has contributed to various fields like Healthcare, Education, Industrial and Natural Resources, Transportation and Public Sector. But the one sector that it has contributed the most and has an important role to play in future is Banking and Fraud Detection. Banking leads most industries when it comes to Big Data analytics. Banks use it to contain costs, compete globally and boost profits. □

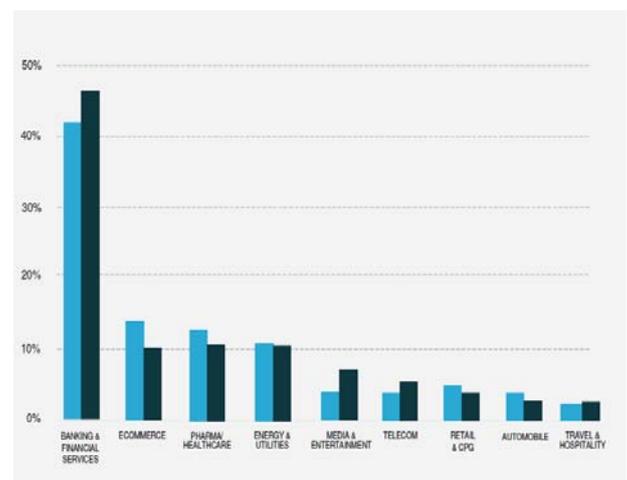


Fig. 1. Percentage of Analytics Jobs by Industry

With banks understanding and acknowledging the current need of Data analytics, more and more banks are investing funds in research and implementation of this technology. Goldman Sachs a 'Tech' Company drew consternation from many in the banking community. It was doing so because the bank has 9,000 more engineers and programmers than Facebook, Twitter or LinkedIn. With the number of benefits increasing with the advancement in the technology, banks have already successfully implemented Data Analytics in,

- Risk Management
- Marketing and sales automation
- Customer profitability
- Performance analytics, budgeting, and product innovation □
- Historical analysis
- Executive dashboards
- Regulatory compliance

Are a few areas in which data analytics help banks. [1]

With the above-stated areas already managed by Data analytics. There is one more field where Data analytics has to strengthen its grip. Big data is hugely used in the fraud

detection. In banking sectors, as the big data analytics is implemented, it finds out all the mischief tasks done. It detects the unauthorized use of credit cards and debit cards, archival of inspection tracks, venture credit hazard treatment, increases business clarity, checks customer statistics alteration. [3] □

## 2. WHY WAS DATA ANALYTICS IN BANKING NEEDED?

Traditional retail banking providers are now weighed down by monolithic legacy systems and ponderous regulations. The newly available technologies have upended the industry, enticing both small tech startups and large financial firms to apply disruptive technologies. To remain relevant while becoming agiler, traditional retail banking providers find themselves exploring their technological options with focused intensity. To narrow down, they're looking for insights into customer behaviors to achieve better understanding and enhance the experience. □

Innovations in data analytics empower financial institutions with smart, self-learning technologies that refine their algorithms and improve results over time. [4] Data Analytics, in particular, provides an enormous advantage in the banking industry as the prime challenges faced by the banks can be overcome with the help of Data Analytics. One of the main challenges faced by the banks, which is, Fraud Detection & Prevention, can be vanquished by Big Data. It helps in providing the bank with the level of safety and security that is needed to make sure that no unauthorized transaction takes place which in turn will increase the security standard of the entire industry. Another important utilization of Data Analytics is in enhancing the compliance report in which banks cater millions or even billions of customer needs, in a meaningful way. This will lead to an expansion of banking industry in a way that will allow them to earn more revenue through cost reduction by cutting down the unnecessary costs and providing the customers with the exact information they are looking for. □

Big Data will not only help in customer segmentation, which will give banks profound insights of the client's spending habits and patterns, but also helps in personalized product offerings which uses the segmentation for further maneuver to create and deliver new schemes and plan out of it which is aimed directly at the betterment of the customers[6]. □

The prime challenges faced by banks that can be overcome using AI are:

- Scattered Data
- Fraud Identification
- No Single View of the Customer
- Targeting/ Customer Analytics
- Governance

71% of banking and financial firms believe that Analytics creates competitive advantage due to which there is an increase in the expenditure by 26% in BIG data but out of 71%, only 41% of the banks use the Big Data Tools for actionable insights.[5] With this ever-growing rate in which Data Analytics is used and invented. Forbes' research indicated that, by 2035, AI with the help of Data Analytics could double economic growth rates in 20 countries, and boost labor productivity by up to 40 percent. AI provides speed and accuracy – the entire reporting and disclosure

process, for example, can be undertaken in real (or nearly real) time. Rather than waiting until the end of the quarter, the finance team empowered with this technology can identify issues and make adjustments much sooner than is possible today, increasing accuracy and eliminating period end efforts. [9]

## 3. RECENT INCREASE IN RESEARCH IN DATA ANALYTICS FOR BANKING

With the potential shown by Data Analytics, many major banks are also investing on AI to act like a digital personal assistant to customers, contributing to automate and quicken money-making decisions. As CEO of Spain's BBVA, Carlos Torres Vila said, "What we can do is leverage data and AI to provide people with peace of mind, really having an almost magical experience that thing in their financial life turn out the way they want it. It's almost like a self-driving bank experience." Such goals can only be facilitated with the help of Data Analytics. [10]

With the ongoing trend, the banking security is increasingly investing in Data Analytics.

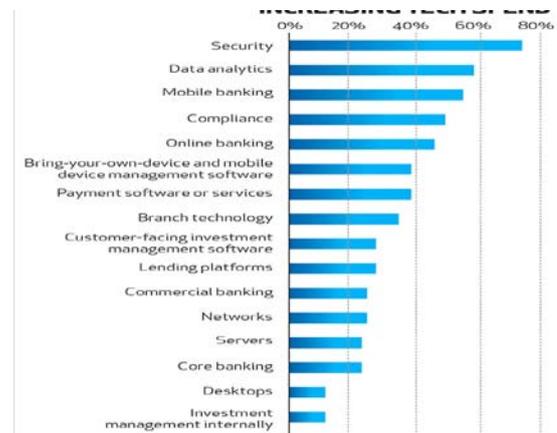


Fig. 2. Where Banks Are Increasing Tech Spend

Financial services businesses, including the investment banks, generate and store more data than any other business in any other sector – broadly because it is such a transaction-heavy industry, often driven by models and algorithms. To support the previous statement, IDC predicts that worldwide revenues for big data and business analytics (BDA) will grow from US\$130.1 billion in 2016 to more than US\$203 billion in 2020.

While Data Analytics being second to only Security, which also can be strengthened using Data Analytics, it is very clear that Banks find DA to be of prime importance in the next generation. With the numerous problems being solved and new features being added, the investment in DA has increased substantially each year. □

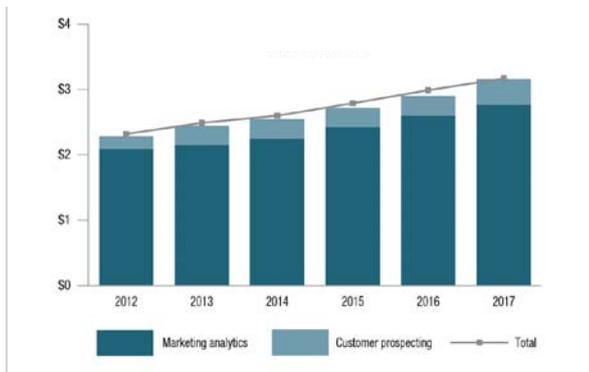


Fig. 3. Financial Institution Spending on Marketing Analytics and Customer Data.

#### 4. THE NEW POSSIBILITIES WITH THE HELP OF DATA ANALYTICS

We have already seen that Data Analytics is playing an effective role in a wide variety of sectors today, a major one being banking. Due to the benefits that it is offering, it is gaining more attention, and many of the banks are willing to invest for incorporating DA into their daily operations. □

This section aims at closely looking at the new possibilities that Banks can obtain and create with the help of Data Analytics. Following are the ways in which Data Analytics can increase profits and revenues for the banks in the long run. □

Consumers or Customers are the most important part of any banks’ revenue. By knowing what the customers want, and keeping them happy, the banks can retain existing customers and also acquire new ones because of having a positive image. Information for this can be gathered from analyzing the daily transactions made by customers thoroughly and designing a strategy which provides benefits to the bank as well as its customers. For Instance, A bank once analyzed transactional data of credit card transactions made by its customers online and decided to provide incentives to customers whenever they made a transaction from any of the bank’s merchants. This strategy provided benefits to the bank, its customers, and its merchants. [5]

Data Analytics can also be used to improve the efficacy of machines being used in the daily operations of banks. This makes machines faster and decreases the response time to customer's queries, in turn, increasing customer satisfaction. Speeding up machines is vital, as not only customers, but even banking officials have a direct dependency on machines. This process can be implemented in many ways, for example, figuring out the daily requirement of an ATM by analyzing daily data and supplying it with that many notes. Another way in which machines can be made faster is by optimizing the code of the banking application running on it. [5]

Banks can also secure their revenue and reduce their losses by enhancing their risk control strategies. Risk control strategies are those that are implemented by banks in order to reduce their risk factor to a considerable level. The use of DA here can predict the most vulnerable and risky situations faced by banks so that precautions can be taken accordingly ensuring the minimum loss. □

Data Analytics can also propose new business models for banks which act as secondary sources of income. To employ data analytics in their system, they have to invest in machinery, software and employees (Which serve as

analysts). As an example, even this can act as a secondary source of income for banks if they tie up with other companies to provide them with a set of ‘analytics solutions.’ These companies will ideally be those who do not want to invest in their solution for analytics.

#### 5. ANALYTICS IN INDIAN BANKING SECTOR

As the technology has evolved, banks worldwide are adapting to data analytics. Many private banks in India have also implemented it successfully and have flourished since then. □

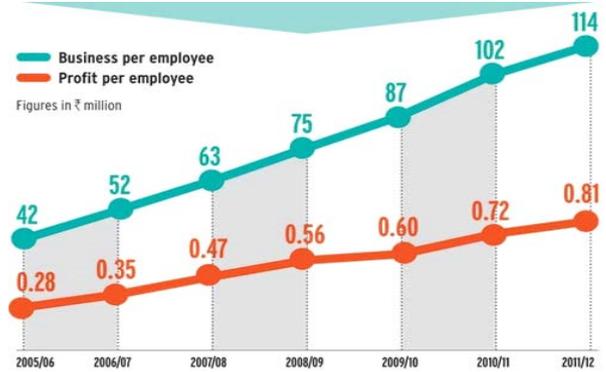


Fig. 4. Profit and Business Per Bank Employee

##### 1. HDFC Bank

One of the first banks to implement Data Analytics was HDFC bank. HDFC started off with building an analytics solution back in 2004. They lay the foundation for this whole process by building a warehouse.

Once the solution was built entirely, it was actively used to analyses transaction data, customer profile data, etc. to provide active customers with more facilities and incentives. This led to increasing in the utility - customer satisfaction and gradually resulted in a high-rise in revenues which served as a Return on Investment that was made to implement the analytics solution. This solution was integrated with every function of the bank. For Example, all transactions of customers were analyzed to bifurcate which accounts were active and which were not active. Customers who had active accounts were provided with more facilities for their convenience such as net banking so that they do not have to visit the bank for every other inquiry. [6, 7]

Soon after, even other private banks like ICICI Bank and Ratnakar Bank started working on Analytics. □

##### 2. ICICI Bank

ICICI Bank started off with its analytics solution in 2007. Just like HDFC Bank, even ICICI bank chose to create an in-house solution rather than taking services from a third party. ICICI bank has employed various software such as SAS, Sybase, TRIAD, Posidex, Data Clean, and Blaze Advisor to build its business intelligence solution. They have been using analytics widely in their debt recognition process for carrying out sub-processes such as evaluation of customer profile, efficiency of banking officials, prioritizing among debts, etc. [7]

During the debt collection process, customers were reminded periodically to pay their debts in various ways such as SMS, E-Mail, Visits, And Phone calls, etc. The BI solution would prioritize debts into low-risk and high-risk debts. For High-risk debts, SMS and phone calls would not be effective, and this meant that banking officials would

have to meet these customers personally and request them to return their respective amount to the bank as soon as possible. Whereas for low-risk debts, the call center can continue to remind the customers via SMS, E-Mails or phone calls. The BI solution analyzed all available data such as customer amount, the time duration of debt, reminders sent, responses recorded, etc. to prioritize and de-prioritize debts.

The use of BI here gave very effective results as customer satisfaction played a very important role for retention of customers, and using BI the bank could perceive more information and respond accordingly to them

### 3. ING Vyasa Bank (Now acquired by Kotak Mahindra Bank)

Before the evolution of automation and data analytics, all tasks performed on a daily basis were done manually. Since these tasks were being performed by human beings, the process was carried out very slowly, and there was a large probability of inaccuracy due to human errors. One major problem faced by ING Vyasa bank was the generation of inaccurate reports. [8] Different users produced inconsistent and inaccurate reports for the same query. This inaccuracy was the result of performing complex queries using SQL, where each business query had to be broken down into multiple basic queries.

The bank started with the implementation of their in-house analytics solution around the April of 2010 [8]. Their whole solution has been created using SAP BO [8]. After integrating this solution with the report generation module, they could successfully deliver reports that were consistent, accurate and faster-to-produce. □

One more sector where this bank is actively using analytics is to monitor money laundering and consumer fraud. For example, the system continuously tracks patterns of transactions made by each customer. If the customer makes transactions under 50000 frequently, there is a possibility that he or she is doing so to save tax.

Therefore, we can say that data analytics has proven to benefit the Indian Banking System extensively and has played a very important role in making the banking system robust.

## 6. THE CURSE OF DATA ANALYTICS IN BANKING

With the innovation of any human substitute, comes a curse of decline in human employment. Usually referred as Technological unemployment, it is the loss of job due to technological changes. Banking sector already in the midst of a technology revolution and this technology revolution has brought a complete paradigm shift in the functioning of each department in banks. Gone are the days when every banking transaction required a visit to the bank branch. With India, especially, not yet fully recovered from the steep incline in job cuts. A new wave of unemployment is something the sector is not ready for. After the complete development of AI, data analytics with AI will result in more technological unemployment. The fruits of technology implementation will certainly taste a lot sweeter when the result can be measured in absolute terms, but we have to

look at the other side of the coin as well so that this revolution will not eat millions of job all over the world.

## 7. CONCLUSION

It is now needless to prove that DA has now a crucial part of banking. With the ever-growing need of banking in the booming economical and financial sector, DA will play a vital role its development. With the example of case studies mentioned above, it is important for all banking industries to trust and soon implement the new technology. With keeping in mind the cons of DA, banking needs to find new employment alternatives, which wouldn't be very difficult keeping in mind the present growth and need of employment in banking. Therefore, it is easy to draw the significance of Data Analytics coupled with inventions like Artificial Intelligence in the Banking Industry.

## 8. FUTURE SCOPE

In the mid-90s, Bill Gates said, "Banking is necessary, banks are not." The statement that then looked like an unreal goal is now changing into reality. The applications for data and analytics in banking, as stated above, are endless. They can use data for greater personalization, enabling them to offer products and services tailored to individual consumers in real time. Although not fully developed, it will be safe to say that Data Analytics will be a prime pillar of any financial institution, solving many current and future problems, within a time frame of 5 years. With the massive investment currently done in developing the technology, small banks are still behind in the race.

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