"A STUDY ON THE OPPORTUNITIES AND BUSINESS CHALLENGES IN BANKING INDUSTRY TO DEVELOP WITH THE HELP OF BIG DATA & ANALYTICS"

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Abstract:- One of the key values of the banking industry has been its 'Customer-Focused' mindset, but in the new era, the trend is moving to being 'Customer-Centric'. This is because advances in technology and communication, combined with an explosive growth in data and information, have given rise to an even more empowered and aware global consumer. With this change in consumer dynamics; the banking industry has an opportunity to develop an improved customer engagement strategy. More than 70% of the banking executives worldwide say customer centricity is important to them, but do they really understand what that means? Being customer centric means; providing customer satisfaction in five core areas of the Customer-Bank relationship. The banks need to analyze their service and answer the following questions:

Key Words- Industry, Big-Data, Customer-Centric, technology and communication

1.   Introduction:-

Historically banks collected huge amounts of data but were unable to derive meaningful insights in a timely manner, which prohibited them to predict and respond to the changing consumer needs and led to missed opportunities. Today the Banking Industry truly believes that big data analytics offer a significant competitive advantage, and even then, only 37% of the banks actually have any hands-on experience with any live big data processes or policies. Banks are no longer questioning the benefits of big data, but some are still holding back. Apparently, 63% of the banks and financial institutions are just exploring and experimenting with it. As per another study by Dell, only 1 in 5 companies use advanced analytics report or utilize high volume or high velocity data commonly associated with big data and majority of firms seem to have their hands full with their own internal, "small" data [1]. One of the major reasons behind a slower adoption of big data in the banking industry is the organization structure and silos. According to, Deutsche Bank: Big data plans held back by legacy systems, February 2013, Big Data plans at Duetsche bank were held back due to legacy infrastructure, which resulted in 90% overlap of data since petabytes of data was stored across 46 data warehouses and

The bank constantly kept collecting data from the front end (trading data), the middle (operations data) and the back-end (finance data). In spite of having huge amount of data, the bank was unable to utilize it and get valuable customer insights since there was no efficient

way to extract data, streamline it, and build traceability and linkages from the already existing traditional system [2]. Traditional relational databases have limits on field lengths leading to data loss and it resists complex images, numbers, designs and multimedia. Since they are isolated in nature, information cannot be shared easily from one large system to another for e.g., database at hospital billing department is unable to "talk" to the database at hospital HR department. Another reason that acts as a challenge in big data adoption is skills and talent gap. It is estimated that by 2018, United States alone would face a talent gap of about 200,000 professionals with deep analytical skills, and 1.5 million more to interpret and use findings effectively for decision making. According to Ryerson's University paper "Closing Canada's Big Data Talent Gap," Canada's Big Data Talent Gap is estimated to be about 20,000 professionals with deep data and analytical skills (roles of Chief Data Officer, Data Scientist, and Data Solutions Architect).

The gap for professionals with solid data and analytical literacy to make better decisions is estimated at a further 150,000 professionals (Business Manager and Business Analyst). By improving labor market clarity, building the right type of talent and having the government act as a key enabler, can successfully overcome the talent gap. As per another study by Oracle, 60% of companies report that lack of data scientists hinders the success of their projects, 65% organizations are hampered by too little business intelligence and too few analytic applications developers and only 10% of employees are satisfied with the big data technology resources available to them to support analysis and decision-making. Data privacy, governance and compliance form the third biggest challenge when it comes to adopting big data. Big data have this

2.   Significance of the study:-

1.   Do they really 'Know' their customers?

2.   Is the 'Product-Channel' fit for their customers?

3.   Are they providing a 'Multi-Channel' experience?

4.   Are they making a genuine effort for 'Relationship Building'?

5.   Do their customers have enough 'Confidence and 'Trust' in them?

6.   How can the banks get an answer to these above questions? Well the answer is through "Big Data".

The banks have a vast variety and amount of customer data due to an increasing number of transactions through various devices, but they are only using a very tiny proportion to generate insights and enhance the customer experience. Data science goes beyond traditional statistics to extract actionable insights from information. It extracts not just the sort of

information you might find in a spreadsheet, but everything from emails, phone calls, text, images, video, social media data streaming, internet searches, GPS locations and computer logs.

3. Scope of the study:-

According to BigData-Startups.com, With Proof of Concepts Rabobank Learned Valuable Big Data Lessons, 2013, Rabobank a leading Dutch multinational banking and financial services company, named big data as one of the 10 most important trends and started developing a strategy around it [4]. They created a list of 67 possible big data use cases, divided them into four categories – 'Fix organizational bottlenecks', 'Improve efficiency in business processes', 'Create new business opportunities' and 'Develop new business models'. For each of these categories they measured IT impact, time required for implementation, and business value proposition [5]. It started with using only internal data but later extended the scope of its big data program to include web data, click behavior, social network data, public data from government sources and macro-trend data etc.

4. Methodology-

These were some of the many advantages of using Big-Data tools and techniques. The main attributes of big data are- Data (structured to completely unstructured), Technology (such as Hadoop Ecosystem) and Size (huge volume, variety, velocity, veracity and Value) which makes it a powerful tool for business decision making, revealing insight and behaviours with much more speed and accuracy. Below are some common examples that focus on customer metrics and can help us in understanding some ways by "How" Big Data Technology helps.

5. Analysis of the Data & Interpretation and Findings of the study-

Challenges faced by banks and how big data helps in tackling them: asking the following questions:

1. Is collection and analysis of data a crucial aspect of their business strategy?

2. Is big data analytics a key component of their day to day decision making?

3. Does Business and IT teams work in synergy?

4. Do they have a centralized analytics team?

5. Is their data structured to a level where data from different sources can be combined to create an integrated dataset?

6. Are they well equipped to meet the needs of the continuously growing data volume?

7.   Do they have a robust data management framework and technology to do both predictive and prescriptive analytics on customer data?

The bank built small clusters using open-source technology to test and analyse unstructured data sets, which kept costs low and offered the scalability to expand. A dedicated multidisciplinary team was setup to implement big data use cases that experimented with small and short implementation cycles. One of the use cases at Rabobank involved analysing criminal activities at ATMs. Rabobank found that the proximity of highways and weather conditions increased the risk of criminal activities. The bank also used big data tools to analyse.

Business profitability

The key business challenge for Banks is increasing its revenue and margin. Big data help in identifying the services that customers want, price points for new services and helping customize services to drive new customer demands. Big data help in driving offers that matter to individual customers rather than generic approaches with non-optimal returns. Successful on-boarding can be followed with precise cross-selling, up-selling, next best offers and product bundling.

Big data help the banks use techniques like 'Product Propensity Score' which is the key to unlocking insights from customer behavior data as it allows simultaneous combination, integration and analysis of data. Big data can help banks increase customer acquisition, increase revenue per customer, decrease costs to acquire and retain, reduce customer attrition and enhance their products.

Big data are helping organizations get their arms around huge volume of data and make the prospects of gaining insights faster in a cost effective way. This can be proven by quoting a leading organization- Amazon, the pioneer in 'next best offer' [8]. The company employs collaborative filtering to predict a customer's product propensity. From this, Amazon generates its "you might also want" and "customers also bought" campaigns for each product purchased and viewed by the customer. This has led to a significant increase in Amazon's cross sales and revenue. Another great example is Money-Supermarket who measures offline and online user interactions across a range of channels looking for its interest in holiday, car hire and hotels to target customers for travel insurance. By combining data across all channels to build a customer profile has enabled Money-Supermarket to grow their revenue by 33%.

Customer attrition

What if the customers start leaving a bank for a competitor and the bank cannot predict that happening? It would be a disaster. A study reveals that if banks know a customer is going to leave, there is 50% better chance of retaining that customer. So how can big data help? Big

data can predict customer churn or attrition by helping banks understand customer activities that might indicate that the client is considering moving their funds elsewhere and by correlating this data and determining the statistical relevance of each activity. Some of the indicators pointing to attrition could be cancellation of pre-authorized payments, customer complaints, social media sentiment, and major withdrawals. One of the organizations that successfully understand their customer potential churn is T-Mobile who uses billing analysis, where the product usage is calculated. If the frequency of calls to contacts that are using a new provider is increasing, this could imply that friends or family are switching providers, and the customer might possibly do so as well. By identifying these customers and targeting them, T-Mobile USA achieved its target to decrease churn rate by 50% in just one quarter.

Customer acquisition costs

A McKinsey Global Institute Report found that marketing and sales consume about 15 percent of costs for banks. But how can big data help reduce these costs? Banks can use customer data insights to build effective and targeted promotions by correlating customer purchase history, customer profile data, and customer behavior on public social media sites that indicate areas of interest. These customers can then be offered special promotions specific to them. For example, if a person made a number of transactions at Whole Foods and liked the Food Network, the company could send a credit card with a special promotion for Whole Foods or the Food Network. The strategy for saving cost is identifying the right customer, targeting that customer because there is a better chance to acquire that

Customer. The sentiment analysis tool helps identify the influential customer and help engage the right people and the ones who are critical to a successful acquisition strategy. This big data methodology is successfully used by HDFC bank in India, where the customer lifecycle is used to boost credit card activations. HDFC bank targets promotions with personalized messages to each lifecycle segment for an increased adoption. By using this strategy, the bank has been able to significantly increase their credit card acquisitions and reduce the cost per acquisition for each customer. Another example is OCBC bank in Singapore leveraged a similar big data methodology and achieved a 20% increase in its customer satisfaction index by responding to customer needs after understanding their personal lifetime events and demographic profiles.

Marketing

Business leaders can no longer rely on their intuition to make decisions. Adding objectivity to those decisions with the help of data and analytics is unavoidable in today's era. Big data help in generating a consistent and complete customer view across products, channels and systems. It views the past, present and future to better understand and engage customers. Using big data analytics, banks can understand where and how a particular customer fits in the product lifecycle. Having this insight can have an incredible impact on marketing communication. A customer at the acquisition stage is probably more open to marketing

messages than an existing customer. A customer who is planning on leaving the bank will be a better candidate for retention offers rather than a loyal customer. Jeanswest, a retail company uses this methodology to understand their customer engagement. They target frequent shoppers with "thank you" offers, new customers with "welcome offers" and irregular shoppers with offers encouraging them to shop.

Risk Management

Big data offer significant opportunities in wide variety of risk domains, by utilizing insights of volume, velocity, variety and veracity. Big data technology is known to improve predictive power of the risk models, improve risk monitoring by providing real-time risk intelligence, enable evidence based decision making, resulting in significant cost savings. Banks can switch from their traditional architecture and use open technologies like Hadoop ecosystem, which enables them to add significant value to existing traditional systems, databases and data marts by mapping sourced data and aggregating results. For example, by using such big data methodology a bank can segment customers in risk profiles by using information on credit report, spending habits, social media profile, credit card repayments etc. Banks can then use these risk profiles for various activities like pricing customers on their credit products, offering pre-approved offers etc.

Fraud Detection

With growth in the digital realm, the banks have to face a huge challenge of fraud and scams. Staying vigilant to this digital distress is the only possible way to have peace of mind and combat losses. Machine learning uses algorithms to detect changes in digital networks. A designated team can review this and strengthen security measures. Some of the most common ways by which machine learning helps in fraud detection is by identifying strange spending habits, combining supervised and unsupervised techniques to automate tasks, finding customer anomalies and verifying changes etc. Big data can help the banks prevent cyber-attacks, improve regulatory compliance, detect criminal behavior, and detect credit card fraud by understanding customer behavior.

Anti-money laundering

A report by Thomson-Reuters titled The Rising Costs of Non-Compliance, states that Standard Chartered was fined $340 million for anti-money laundering failings. The report also notes that a parallel enforcement action against Deloitte (citing the inadequacy of its consulting work on the bank's AML issues) led to a $10 million fine and a one-year ban on all consulting work at NYDFS-regulated firms. One solution to this problem lies in big data analytics and harnessing the power of Hadoop and moving from a static pool of data stored in a warehouse to a situation where data is fluid and actionable in real time. This enables a much more efficient ingestion, enrichment, analysis, and visualization of large, diverse and constantly changing data sets so they can be harnessed in the fight against Anti-Money Laundering.

Reputational risk

Banks can no longer solely rely on their experience to save their brand. Big data technology can understand consumer behavior to predict future market trends. For example, big data insights can be used to monitor the web to understand customer sentiment towards a bank's products, employees, board members etc. Amazon is a great example of how a company can use big data insight to build its brand. Amazon saw that internet penetration exacerbated by the growth of mobile phones and a new behavior where the customer preferred shopping online rather than in a physical store. Amazon immediately jumped on the opportunity and heavily invested in analytical systems that enabled it to collect a lot of data about website

Customer Metrics	Benefits to Banks	Sources of Data	Methodology	How?
Customer	Enhance products, services and marketing strategies	Social network, blogs, customer survey, call-logs, websites etc	Text Analytics Algorithm	Naïve Bayes can analyze documents and categorize them into positive and negative sentiments which can be scored as -1 and +1. This gives an overall total sentiment without having to read the entire text. Keywords can also be extracted for insights.
Opinions, Feelings and Attitudes			Link Analysis and Graph Theory	This methodology helps identify the most influential customers by providing them a leadership score. Decision trees are created to evaluate the interaction of that customer (considered as a node) with other customers. The high scoring customers are then targeted with offered and given special attention.
	Understand customer pro	Customer transactions	KYC, Neural Networks	Neural Networks can help predict the general financial

Custom er and Relationsh ip	Pr ofi le , lifecycle , attrition	ne pot enti al	file, , social media feeds etc.		condition and health of the bank. This methodology generates a two-dimensional map to identify problematic entities.
				Classificatio n Algorithm	KNN clustering partitions the data points into small number of clusters, where K points are placed in space representing objects being clustered. These data points are initial centroids. Then each object is placed closest to that centroid which is most associated with. For example: customers with investments more than $500,000 are considered profitable and targeted with better credit offers at a better rate.
				Survival Analysis	This technique helps to predict if a customer is about to leave the bank or not. It divides customers into segments and compares them across time series.
Custom er and Objectives	Go als Acquire customers, Deepen existing relationships , Encourage product bundling	ne w	Transaction history, Profile data, Historical purchases	Market Basket Analysis	Link analysis technique is applied to find connection between products so that they can be bundled appropriately. For example: a customer who has recently opened a student account may also need a small student credit card for daily purchases and a student loan to fund their education.
				Linear Regression	Linear regression and decision trees can be used to understand a customer's propensity to a certain product by studying different attributes like income, demographics etc.

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Table 1: Customer metrics.

6. Conclusion

It takes 1 second to say the word "data" and in that one second people around the world generate about 10,000 tweets, make 2,000 skype calls, upload 5 hours of YouTube videos and send more than 3 million emails. Globally, we produce 2.5 Billion gigabytes of data in a day, and International Data Corporation (IDC) predicts number of transactions between firms and those between firms and consumers will reach 450 billion per day by 2020. In addition to these numbers, leading consulting firm PWC states that big data market has grown by $48 billion in the last 5 years. This is HUGE!!!!! So how do we collect this data, manage it, store it and most importantly use it? The answer is by using 'Big Data and Analytics' tools and technology. Banks need to prepare themselves for the future and analyze the continuously growing data, respond to the changing requirements in real time, adapt rapidly to changing data forms and types, learn patterns and predict outcomes, provide security and confidentiality to their customers, keep growing the bank profitability by providing targeted customer advice and most importantly protect their brand.

As a result of adopting big data analytics, the banks can answer questions like:

1. What's really happening across the customer journey?

2. Which campaign combinations accelerate revenue?

3. Which offers drive customer loyalty?

4. What credit card behavior signals potential fraud?

5. How can we assess customer risk before extending credit?

6. How can we create more targeted campaigns?

7. How can we acquire new customer with a reduced cost strategy?

8. How can we know in advance is a customer is about to leave us and be proactive to reduce customer attrition?

9. What can we do to make our customers happy?

7. Suggestions:-

The banks have always collected data from its customers. One step ahead would be coupling the traditional information with big data (interactional data) for a better customer engagement leading to a greater customer lifetime value. Being able to identify root causes of any failures in real time, fully understanding the importance of data driven campaigns, generating customer offers based on their preferences, revaluating risk portfolios, increasing customer engagement and loyalty and personalizing the customer experience are some of the very basic benefits. Big Data have to offer. It is evident that data driven decision are better decisions and there is clearly an opportunity for the banking industry to incorporate big data and analytics to improve business results, create a better products and experiences for their customers and enhance their brand value.

References

1. Bedeley R (2014) Big data opportunities and challenges: the case of banking industry. Association for information systems electronic library.

2. https://www.americanbanker.com/news/

3. Armah NA (2013) Big data analysis: the next frontier. Bank of Canada review.

4. Chevalier M (2013) TD Bank Answers Customer Needs Through Data And Analytics. Bank systems and Technology.

5. Martin (2015) How big data changes the bank industry. Cleverism.

6. Toller C (2016) How TD's innovation lab is reimagining its banking experience. Canadian Business.

7. Castaldo J (2016) CIBC CEO victor dodig on banking's tech revolution. Canadian Business.

8. Arellano N (2015) Scotiabank banking on data analytics. Computer dealer news.

9. Cameron N (2015) Jeanswest details how it's building personalised digital engagement. CMO.

10. http://www.csc.com/big_data/success_stories

11. MacDonald D (2016) How OCBC sold its big data vision. O'Reilly and Cloudera.

12. Jones M (2016) 12 Amazing Big Data Success Stories for 2016, Success stories. Datafloq.

13. Van Rijmenam M (2011) T-Mobile USA Cuts Downs Churn Rate By 50% With Big Data. Datafloq.

14. https://www.forbes.com/sites/ciocentral/2016/11/08/another-side-of-big-data-big- data-for-social-good-2/#756a2dc06628

15. https://www.forbes.com/sites/howardbaldwin/2015/06/08/whos-ready-for-some- big-data-success-stories/#69ec42e47801

16. Savitz E (2012) The big cost of big data. Forbes.

17. https://www.sas.com/en_in/customers/hdfc.html

18. Culp S (2017) Artificial Intelligence Is Becoming A Major Disruptive Force In Banks' Finance Departments. Forbes.

19. Fujitsu SR, Verizon WG, eBay NS, Sqrrl AF, Securosis AL (2012) Top ten big data security and privacy challenges. Cloud security alliance.

20. Jessica D (2016) How TD Bank Is Transforming Its Data Infrastructure. Enterprise Challenge.

21. https://en.wikipedia.org/wiki/Canadian_Imperial_Bank_of_Commerce

22. https://en.wikipedia.org/wiki/Royal_Bank_of_Canada

23. https://en.wikipedia.org/wiki/Toronto-Dominion_Bank

24. https://en.wikipedia.org/wiki/Bank_of_Montreal

25. https://en.wikipedia.org/wiki/Scotiabank

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