

How Analytics Can Facilitate Innovative Financial Services for Consumers in Developed Countries

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Abstract- Of late, the financial services industry is quickly moving far from the conventional paradigm on the complicated digital means of offering and the client. Both the facets of the fiscal service sector, The financial service providers and the customers, are going through a digital evolution. Particularly, the banking industry has evolved from a journal of financial assets and ledger entry paradigm to information and analytics driven banking operations, which subsumes online and traditional client behavior. This particular paper covers different scenarios in development, finance services, and insurance, where big data analytics is turning out to be of paramount importance and a catalyst for change. The article additionally highlights the possible benefits of new technologies, like Internet of Things, Blockchain, Robotics and Chatbots.

Keywords: Big Data Analytics, Hadoop, Financial Services, Digital Banking.

1. Introduction

Financial transactions evolved over a period from the old barter system to the present day state-of-the-art e-commerce feature [1]. Together with the fast development of human civilization, and the connected exceptional technical achievements, the financial services sector has flourished substantially. Earlier in the digital era, all transactions, and the business intelligence thereof, had extreme human involvement [2]. The digital world, while doing the transactions sharply and transparently, generated a great amount of digital data. These digital footprints have grown to be amenable for rigorous analysis, aided by the new area called analytics to make right and clear business choices [9]. Over a period, with the ever growing small clients, their increasing requirements & globalization and desires, financial services industries created humongous quantities of types of information at a breakneck speed, resulting in an innovative development of the data analytics paradigm known as Big Data Analytics [8].

1.1 Introduction to Big Data

Data-driven technologies and decision making are usually termed quarter paradigms of science, the

theoretical, computational and experimental paradigms getting the additional 3. In the last 2 years, lots of engineering and science disciplines, medication, business, economics, created huge quantities of information in different types because of the proliferation of advanced instruments, inexpensive novel and hardware business procedures [8]. This particular pattern is exacerbated by the rampant use of social networking by Web 2.0 [4]. To analyze this big information and give a much better customer practical experience with more effective data management has led to the genesis of Big Data Analytics. These financial transactions in banking, finance, services and insurance sectors produce enormous amounts of information in less time from many digital units concerning various kinds of information platforms [1].

1.2 Introduction to Apache Hadoop

As the information produced by the Banking, Finance sectors and Insurance is of large scale, with various details formats, which are impossible to deal with the conventional relational database. Below comes the open-source Apache Hadoop framework, which can keep a lot of information by using distributed storage space file system and procedure, or even assess them

in a distributed fashion by using parallel MapReduce computational structure [10]. The starting Apache Hadoop framework comprises the following modules: Hadoop Common, Hadoop Distributed File System, Hadoop Yarn, and Hadoop MapReduce [5]. The Hadoop standard module contains libraries utilities necessary for other Hadoop modules. Sazu & Jahan (2022) stated that the HDFS is definitely the distributed file system, which stores the information sent out over a few commodity devices contained in the bunch. YARN will be the platform that permits the management of computational energy pre sent in the bunch and booking the users' program. MapReduce provides the computational framework for distributed processing for large scale data [21].

1.3 Introduction to Apache Spark

Apache Spark is a fast, distributed computing technology. It employs horizontal clustering for quick and effective computation. Apache Spark offers the computational framework of its own, along with Hadoop MapReduce version, and engages MR type for a prolonged computational framework, which includes active collection queries and internet processing via streaming. Probably the most striking feature of Spark is memory computation, which cuts down on the read/write latency of intermediate details during processing [21].

The present situation of the financial world mirrors the utility of information plus analytics completed on them for all the insights [9]. The analytics, and in an official way the important data analytics, has paved a route to show another dimension to the company. The fundamental data analytics are implemented to deal with various issues the financial industries face during their operation [6].

2. Literature Review

2.1 Digital Banking

The digital world makes a revolution in the banking business. At first, beginning with primary banking, the banking industry moved to the multichannel banking industry with various types of units. Generally, a bank has internal and external areas [7]. The outside facet represents the consumers of the bank, the regulator, along with other fighting partners and banks. The inner facet contains HR department, back office operations, and treasury. Looking at these 2 elements, a digital bank has 8 main dimensions, which create the entire umbrella for a digital banking program [2]. The

external part assumes regulatory and operational factors of banking. In turn, the operational part subsumes the dimension of services and customer/sales. These are the initial two circles in Fig. one.



Fig. 1. Proportions of a digital Bank

Customer/Sales/Services. It's the main pillar of any digital banking framework. For giving the buyer financial services and product sales, a digital bank is thought to execute alternative CRM. Customer-centric business models are determined based on extensive information of the buyer. Such a model involves tactical preparation on:

- Establishing an omnichannel incorporated wedge - to facilitate a consistent and seamless user experience across all stations, internet, i.e., banking app more than mobile phone and social media services [10].
- Developing the competence to obtain, include and evaluate many energy sources of external and internal details - to understand the buyer for a personalized fix [11].

Regulatory/Other Banks: It comprises a seamless interaction at many company quantities, and fraud related reports on the regulatory board, e.g., RBI. Additionally, it requires seamless interaction between different industrial banks to possess smooth banking operations.

Physical: It comprises uses for analytics with management and measurement of various forms of risks a bank can encounter during its daily operation. These consists of credit risk, industry risk, operational

danger in the highest level, and numerous additional risks in a lower level.

Engineering: This particular issue involves core banking, service-oriented architecture and Data Lake, Omni-channel data warehouse, m-wallets, e-wallets, mobile banking and internet.

Data: The information dimension relates to the quality of the information which occurs within the bank. This deals with information governance and data quality control.

Protection Analytics: It includes vulnerability analysis, innovative chronic risk prediction, intrusion detection, information infiltration detection, DDoS detection, malware detection, spam detection, phishing detection, anomaly detection, SQL injection attack detection etc. The Fig. five succinctly captures the multidisciplinary dynamics of cyber security, whereby a multi pronged program is suggested to be adopted to foresee and stop cyber security incidents. Of the 6 different, albeit somewhat overlapping dimensions, data analytics play a major role, as they often rely solely on the different data types created and discovered around security incidents.

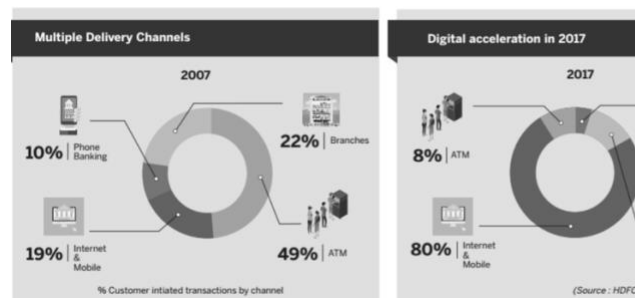


Fig 2: Distribution of channels

3. Futures of Digital Banking

The sophisticated, cutting-edge computer solutions, top computational power allowed digital products, along with the state-of-the-art uses, are proving their influence and presence in the modus operandi of the banking industry and impacting the banking ecosystem. Probably the most predominant leading-edge solutions include Big Data Analytics, Cloud Computing, Artificial Intelligence and Machine Learning, Robotic Process Automation, Blockchain and the Internet of Things.

Start using Cases of IoT in Banking The banking industry has begun to enjoy the skills of IoT. A survey was done on a worldwide situation, and it was discovered that 64.5 % of banking executives tracked their customers from the mobile apps used on various digital products, such as smartphones, tablets, and other digital devices in which the apps can run. Moreover, 31.6 % of banking institutions used the IoT to look at retail locations, bank branches. Similarly, 21.1 % used receptors to gather merchandise general performance info, and 15.8 % executives employed IoT sensor embedded wearables to follow consumer merchandise utilization.

Financial businesses have begun to prioritize buyer and item monitoring due to the increasing incidents of on the internet and offline frauds. Identity verification has turned into a hectic undertaking, as identity theft also plays a significant part in the fright and global fraud of computer systems, and network breaches. Customers' economic transactions are monitored, and information is collected thereof through the use of the IoT products. Sensor information is also used to check the evaluation and assets of collateral while issuing loans. The banking business additionally uses IoT lodged in a wearable, i.e., smartwatch or maybe exercise band, for fundamental banking. Various analysis functions have been performed in the BFSI market employing IOT products. Krishna et al (2016) have suggested a framework for investment management using IOT [12].

3.1 Blockchain, AI and the role of its in the Banking Industry

We all know that the Blockchain has arisen as the coming generation of fee channels without the participation of any controlling third party [18]. A Blockchain is a public ledger of all cryptocurrency transactions performed. A Block is a product of the Blockchain, which contains some or most of the latest transactions. It's the present part of any Blockchain, which previously completed enters into the Blockchain as the permanent storage of its [25]. The finished blocks are appended to the Blockchain in a linear, chronological order. The blocks are linked by keeping the hash of the prior block. Each node in the Bitcoin system authenticates and broadcasts the transactions to additional nodes contained in the system [19]. The node gets a replica of the Blockchain, which is downloaded instantly upon connecting to the Bitcoin community. The Blockchain has detailed info like the addresses, and their balances, beginning with

the inception block to the most recently appended block. Anytime a block gets finished, a new block is generated [26].

3.2 Chatbots

A chatbot is a program or maybe tool you can speak with via text messages. The chatbot knows what you're attempting to state, and replies with a coherent message that is relevant or even specifically completes the preferred undertaking for you personally.

The services Chatbot can deliver are varied. Vital life saving health communications, to look at the weather prediction or even to buy a new pair of shoes, etc., are a few instance jobs they can do.

The chatbot can speak with you through several channels: Facebook Messenger, Slack, SMS, Telegram, WeChat, Siri, many others and Skype.

The chatbots may be employed in various fronts of the company. They will come in handy and lower time, labor costs, and efficiency, leading to enterprise benefit enhancement. In financial services industries, we can use a chatbot as HR assistant, Market intelligence assistant, Workflow assistant, Social media channel assistant, Financial analyst assistant, Scheduling assistant, and in general, when the ambassador for the business. These are the various dimensions of a company where a chatbot can provide a paradigm shift.

Based on a research study, eighty % of worldwide financial institutions regard chatbots as a golden chance to enhance business efficiency. Basically sixteen % view chatbots as both a risk and chance, while only two % think that chatbots might be a risk to the company, a loophole for breaching important company information.

3.2.1 The Future of Chatbots

The AI enabled chatbots to interact in real time and help with personalized and contextual answers to consumer queries. It can inform the balance in the present account, transfer cash to the next account, spend an electricity bill, and article recent spending pursuits [19].

It will ultimately built with the data about the buyer in fulfilling his/her requirement, and should also watch out for a few much better choices and incentives for him/her, according to the insights gathered from greater learning about him. Lastly, the bot will influence with an Omni channel existence by combining virtual private assistants such as Facebook Messenger, Amazon's Echo, etcetera.

3.3 Robotics in Finance and Banking industry

Robotics, empowered with AI, is the best tool that could make functional advantages to the entire financial services industry. Robots come with special benefits - they're time and cost effective, enhance productivity, provide superior results, and may work with no rest more than repetitive jobs [24]. When enabled with cognitive computing, AI features, robots could be taught to work autonomously. They could also learn how to improve accuracy and performance with very little human input. Additionally, multilingual language processing and voice recognition capabilities enable robots to interact and conduct apparently intelligent, meaningful and coherent discussions with buyers [20].

For instance, Bank of Tokyo Mitsubishi UFJ launched Nao, a 58 centimeter tall, 5.4 kg robot created by Aldebaran Robotics - a France based subsidiary of Japanese internet and telecom giant SoftBank. It's built with a digital camera and microphone, and contains visual recognition and remote control capabilities. It can acknowledge nineteen spoken languages, interact and speak with people in limbs, and respond to queries.

3.4 Insurance Analytics

Insurance, another sub domain of financial services, creates a large quantity of information that could be examined by using prescriptive, predictive, and descriptive analytics to gain company insights for improving the company while rendering much better service to their clients.

4.2 Predictive Analytics and Insurance

By using predictive analytics, insurance companies can predict trends in different activities. For example, predicting feasible fraudulent claims, different healthcare frauds, insurance needs based on client information, etc. Consequently, predictive analytics generates revenue for the business.

4.3 Prescriptive Analytics and Insurance

Prescriptive analysis indicates some optimized answers to an issue based on other analytical results. Prescriptive analytics is definitely evolving and of essential importance to the company's values [18]. Instance of prescriptive analytics are as follows: Casualty insurance providers can work with historic climatic information for prediction and catastrophe modeling, suggesting the proper cost for the insurance. It can present policy situations and enhance portfolios to keep an inspection on the rise of danger. Sazu &

Jahan (2022) recommended optimum priced plans, setting policy circumstances, and optimizing portfolios to keep the accumulation of danger in check. Prescriptive analytics empowered by information can shape the world of the insurance business [20].

A society is a team created based on attachment to your own product to sell or even brand. This represents highly useful marketing, CRM tools, and innovation management. The emblem towns bring the emblem and community together to one platform. The interpersonal interaction of all community members influences the customer connection, in addition to point of view towards the item. Thus, social network analytics will increase the company's worth for the fiscal service industries. Akter et al presented how towns are embedded in social networking sites and how to leverage them [3].

4. Discussion

The important data analytics is changing the face of the financial services market. In the banking business, a great quantity of customer-generated and system-generated details propels the company's development. The following are the various ways in which big data analytics can bring forth a new face to the banking industry. Different kinds of analytics discussed in the papers indeed may benefit hugely from the fundamental information offered in the respective business/operational issues, like the new technologies IoT, Robotics, Blockchain, Chatbots, and Information Lake.

- The customer analytics present a 360 degree view of a person to create a good decision for personalized advertising.
- The danger analytics can help establish the credit rating of a person to take choices on giving a loan [22].
- The public analytics offers the insights for cross selling, and helps prevent frauds.
- The analysis of client interaction over several channels can help the bank provide personalized offers [15].
- The sensor information from IoT products could be examined for a clear understanding of the buyer behavior pattern.
- The internet footprints on the bank's site and invest design analysis will give the insight for cross selling [16].
- The banks can also evaluate the traditional interaction of the buyer with the bank with the ATM

information, credit or maybe debit card transaction information [14].

- The information from offline and online interaction with the bank may be examined for churn prediction, market basket analysis, raising the consumer life phase.

- The security analytics helps you create a fraud free environment, which helps build the company community [16].

Regardless of the quintessential advantages of information analytics/big data analytics in the financial services industry, many issues still impede its full scale implementation: Lack of • good details quality may be the main obstacle in implementing BDA [13].

- analytical-savviness in a company is an equally essential roadblock [12].
- qualified and well trained manpower is yet another stumbling block [17].
- participation of the company or maybe operator departments stymies the implementation of BDA.
- Executive assistance in the creation of the BDA implementation is a non starter [23].
- phased procedure in implementation • change control preparation in terminology of mindset change throughout business These may be seen as a critical success factor for any BDA implementation.

5. Conclusions

The article gives the present digital trends in the financial services market due to a focus on the banking business, in which a few business issues resolved by big data analytics are highlighted. Additionally, it discussed several state-of-the-art technologies, which combined with big data analytics brought a considerable change in the quality and efficiency of the banking business. The stock market and insurance disciplines were also explored, wherever prescriptive and predictive analytics play a paramount role. This particular paper concludes with the right difficulties, and that impede full scale implementation of big data analytics in the financial services sector to improve the company's worth.

Further research can be conducted to understand implication not only across developed nations but also in developing nations like China, Pakistan, Vietnam etc.

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