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How companies are effectively using Big Data!

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Abstract*: Nowadays organizations have more data than ever at their disposal which we generally called Big Data and which is composed of Structured, Semi-structured and Unstructured nature of the data. Today, deriving meaningful insights from that Big data and converting knowledge into action is much easier said than done.The Big data analytics involves examining large amounts of data. To uncover the hidden patterns, correlations and valuable insights so as to make proper business decisions is important for every business organization whether it is small, medium or large. Basically, organizations have realized the need for evolving from a knowing organization to a learning organization. Essentially, businesses want to be more objective and data-driven, and so they are embracing the power of big data and analytics technology.The big data concept has been around us for many years. Businesses are applying analytics on the data they collected so as to gain insights and uncover trends. This involved capturing numbers on a spread sheet and manually examining the numbers.On the other hand Big data analytics is done using advanced software systems and analytics techniques. This allows businesses to reduce the analytics time for faster decision making. Basically, the modern data analytics systems allows for fast and efficient analytical processes. This ability to work faster and achieve agility offers a competitive advantage to businesses. In the meantime, businesses enjoy lower cost using big data analytics techniques.Organizations have invested in big data analytics and they are looking forward to Big Data Analystics in many such cases. This paper highlights how companies are effectively using Big Data in enhancing business value through big data analytics.*

Keywords: *Big Data, Business Intelligence, Big Data Analytics, Data Science, Use Cases*

I. INTRODUCTION

This paper documents the basic concepts relating to Big data, Business Intelligence (BI) and Big data analytics.Big data is a much discussed and hyped topic in IT, Businesses and Enterprieses nowadays, but its true meaning is not always that clear and easy to define. If we would ask people around us to describe "Big Data", it is most likely that we will get a lot of different answers, some people might think of their collections of pictures, documents, music, etc., small and middle sized enterprises are in the need of systems for storing huge amounts of quotations and invoices, data warehouses sometimes are catalogued as big data, techies think of technologies like Hadoop and MapReduce. But big data actually is more than what we just read. Big data isn't only about massive amounts of data or the way how we consume it, but also about the structure of that data with the purpose of delivering added value to the organization.

Increasingly present in our lives, big data is changing our everyday life. Both in our personal as in our business environment we create, whether we like it or not, a non-stop continuous stream of GPS data, phone records, text messages and other information that is captured and ready to analyze. Social media platforms, such as Twitter and Facebook, but also professional networking platforms, such as Linkedin, are processing millions of records per second. Intelligent devices, like smart energy meters, smartphones, GPS trackers, heart rate monitors in hospitals, etc., communicate with each other and store useful

information. The presence of RFID tags and sensors on products present a clear picture of specific situations. A couple of years ago, online retailers changed the way they looked at customers. Trying to understand a customer, it was not only important to know what they actually bought but also what products they looked at, how long they visited a specific webpage, how customers were influenced by promotion emails, how they navigated through the website.

Because of the digital evolution it is now even possible to add peoples' opinions and other information in the process of understanding customers. Imagine, for example, receiving a text message while walking by a big sports equipment reseller stating the bike you last week liked on Facebook now will be sold half the price it was. This could become possible by embracing the power of big data effectively in the companies.

There is a big pile of big data created every second awaiting to be processed and analyzed but for data to be more meaningful it must integrate sales, finance, marketing, product data with social data, sentiment data, demographic data, competitors data and so on in Business Intelligence systems before decision-making to be taken placed.

This paper is organized as follows. First we have introduced the significance of the big data in the industry. Second we have defined Big Data, Business Intelligence and Big Data Analytics. Third, we put some light on Challenges organizations are facing in adopting Big Data Analytics, Fourth, we have given some use cases of Big Data and Analytics in the industry. Overall this paper threw light on how companies are effectively using Big Data in enhancing business value through business intelligence and big data analytics.

II. DEFINING: BIG DATA, BUSINESS INTELLIGENCE AND ANALYTICS

The term big data is a buzzword in the industry and it occurs more frequently now than ever before. Almost every field, ranging from everyday life to traditional research fields (i.e., geography and transportation, biology and chemistry, medicine and rehabilitation, IT, operations, retail, health, etc), involve big data problems. [1] The commonly accepted definition of big data comes from Gartner who define it as high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight, decision making, and process optimization. These are known as the ―three Vs.

The [2] summaries the key factors by which Big data differs from traditional analytics as follows:

- volume, the storage space required,
- velocity, the speed of data creation coupled with the advantage, gained from analyzing the data in real time
- variety, the fact that data takes many different forms. It is often unstructured or its structure is specific to the data source, and
- veracity, uncertainty especially with regard to data quality.

On the other hand, Business Intelligence (BI) is defined as "a set of methodologies, processes, architectures and technologies that transform raw data into meaningful and useful information used to enable more effective strategic tactical, and operational insights and decision-making" [3]. The explosion of computing power and data acquisition techniques have led to big data within organizations. Big data analytics is receiving a lot of attention than ever and organizations are investing heavily in acquiring the

necessary infrastructure and skilled workers to leverage the vast amount of operational and external data to gain competitive advantage. This has led to high demand for professionals with skills in data management, statistics, and business analytics. BI technologies such as data warehousing, online analytical processing, data mining, and data semantics have matured and become main stream in generating valuable controls and providing decision support.

The process of analyzing the large amount of data-sets i.e. big data containing different variety of data types in order to reveal unseen patterns, unknown relations, customer interests, new marketing strategies and other important information about business is called Big data analytics [4]. This big data analytics plays an important role in making business more effective, helping to achieve for more customer satisfaction, enhancing outputs and other business profits. Actually the key objective of big data analytics is to help data scientists, analysts and other business professionals to make effective and accurate business decisions by analyzing the ample amount of transactional data and other forms of data which was not possible with conventional BI. Business organizations are taking the advantage of analytical tools and techniques to gain the profit from the data available, also they are employing data scientists who are adept in managing big data and bringing useful insights to big data. Big data is going to change the way we think, make decisions and do our business. Managing big data usefully, has the potential to help companies to take faster and more intelligent decisions. The trend of Big data and analytics provides great resources and powerful methodology to support the data-driven decision-making process, which is the core of "BI." [5]

III. CHALLENGES ORGANIZATIONS ARE FACING IN ADOPTING BIG DATA ANALYTICS

Meeting the challenges presented by big data will be difficult. [6] Most industries today are resorting to data and analytics for accomplishing tasks that were earlier thought impossible given the volume, variety and velocity. It has become a crucial part of the overall working of most the organizations. While the adoption of analytics have been increased, it comes with its own set of challenges and opportunities. Following are some of the points on how the companies need to use big data and solve the challenges that come with analytics adoption whether it is finding the right talent or solving primary challenges revolving around getting the raw material organised, hidden security vulnerabilities and more. We have listed down few of the such challenges that the organinizations or companies are facing in order to data analytics implementation despite the spectacular growth that has been witnessed with its adoption over the years.

- **Required Skill Set for Data Analyst:**

This tops the list of challenges as most companies are facing required skillset shortage in the industry. Many CIOs, CTOs and Analysts heads believe that the actual challenge that Indian analytics industry faces is the dearth of skills set. A significant percentage of Indian professionals are not equipped with the required skill-set catering to evolving business requirement. There is a need for people who can understand and execute complex analytics projects, posing the right balance of analytics skills and business domain knowledge. There is a lack of talent in the market which has the right mix of business, statistical and programming knowledge.

- **Finding The Right Data**

It is important to have 'right data' which can play a crucial role in building the right model. With the large volume and velocity of data, one of the biggest challenges is to be able to make sense of it all to drive profitable business decisions. Too much data can take the focus away from actionability and mislead to data analytics project. It is important to capture data and correct the noise to make a robust analytical model. Data cleaning is necessary for accuracy of the models. Organisations need to ask

themselves if they are really equipped to make sense of such large volumes of data and more importantly and whether all the data points are going to be utilised. It is important to realized what is critical and what needs to be measured in order to help with organisational decision making. A lot of time, effort and money are spent on collecting, storing and integrating data sources without first determining how the data will eventually be consumed and by whom.

- **Consolidation of Information**

All the organizations have overflowing data that is mostly scattered. In such scenarios, consolidation of information remains one of the biggest challenges as most organisations cope with leveraging internal data systems. The organizations are struggling with collecting data into a single purview to reap maximum benefits from it. It is important to have a unified view of data while enriching the information with analytics-infused data elements.

- **Creation of Data Science Models**

This mostly goes for the data science team that is interested in building the data science models but they might not be necessarily solving business problems from organizations point of view. The entire process of adoption of data science solutions to execution can be quite intimidating and it is important to build the models that can solve the challenges in real-time. It requires skilled experts with a strong problem-solving capability to make this happen and again directs back to the point of recruiting the right talent.

- **Identifying Appropriate Analytics Use Cases**

As the Big Data Analytics is still evolving, many analytics leaders believe that there are not a lot of use cases that actually exist out there. It is a challenge to identify correct data for the appropriate analytics use cases. If the right set of data is not identified for a specific use case, there are chances that insights may be incorrect.

- **Agility**

Usually, the Big Data Analytics functions are structured in a way that allows little or limited interaction with the end business user. Professionals believe that for analytics to be generating more meaningful ways to support a business, it needs to be more agile and in sync with business during the decision-making process.

- **Data Security**

Analytics is all about handling a huge volume of data and ensuring the security of data that companies are dealing with remains a big challenge. Organizations need to work on ensuring privacy and making data as safe as possible from any unauthorised use.

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IV. BIG DATA AND ANALYSTS USE CASES

Following are some of the use cases of how big data and analytics posed potential source of opportunities to the organizations. Big data analytics can improve efficiency and effectiveness across the broad range of responsibilities, by improving existing processes and operations and enabling completely new ones.

There is great potential to do more across the board, but with big data technologies coupled with abilities to mine and analyze different types of data, text, pictures and videos, sensor data will contribute to the new generation of analytical applications that will hopefully make the world even slightly more predictable and a safer place. [7]

Big data has the potential to add value across all industry segments. [8] Companies likely to get the most out of big data analytics includes the following use cases.

Fraud detection, maximizing successful trades, etc. through Financial services which generate large quantities of stock market and banking transaction data.

Supply chain, logistics, and manufacturing with RFID sensors, handheld scanners, and on-board GPS vehicle and shipment tracking, logistics and manufacturing operations produce vast quantities of information to aid in route optimization, cost savings, and operational efficiency.

Online services and web analytics firms can greatly benefit from increasing their customer intelligence and using it for effective cross-selling.

For preventive means to avoid disastrous failures, Energy and utilities and electronic sensors attached to machinery, oil pipelines and equipment generate streams of incoming data can be used.

Streaming media, smartphones, tablets, browsing behavior and text messages aid in analyzing the user interests and behavior and improve customer retention and avoid churn.

Analyzing electronic medical records systems in aiding optimum patient treatment options and analyzing data for clinical studies can heavily influence both individual patients‘ care and public health management and policy.

Retailers can analyze vast quantities of sales transaction data and understand the buying behaviors, as well as make effective individual-focused customized campaigns by analyzing social networking data

V. CONCLUSION

The availability of Big data, low-cost commodity hardware, and new information management and analytic tools and techniques have produced a unique opportunities for Big Data and Analytics at the organizations of all size. Because of convergence of these trends we have the capabilities required to analyze big data sets quickly and cost-effectively for the first time in the history. It represents clear opportunity to realize enormous gains in terms of efficiency, productivity, revenue, and profitability.The Age of Big data is here, and these are truly revolutionary times if both business and technology professionals continue to work together and deliver on the promise.Success is better decision making. Earlier with low volumes of data, intuitive decision making would work. As the data size has grown to incredible proportions, human ability has been reduced to make intuitive decisions. The result of this,

data-driven decision making become more prevalent to ensure a reasonable path for success. This situation makes sense as it is easy to see that data are not diminishing but rather increasing. This paper highlighted Big data, Business Intelligence and Big data analytics trends and challenges. It has also covered some of the use cases of the Big Data and Analytics in the industry. It has helped to understand the how companies are using Big Data in enhancing business value through Big Data Analytics in the industry.

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