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Big Data in Retail Management

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***Abstract*- Retailers are progressively more looking to find actionable perceptions into their data. Retailers generate large amount of data across their supply chain and at the same time digital customer and social media occurrence is feeding massive volume of data. The analysis of this huge volume of Big Data provides a great prospect for retailers. Using Big Data they can maximize the potential of these disorderly trends and succeed in the competitive marketplace.**

This paper explores how Big Data is becoming the key retailer can adopt to capitalize on their revenue.

***Index Terms*— Big data, Hadoop, RDBMS, OSS, BSS.**

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I. INTRODUCTION

Today, Customers purchase products across multiple channels such as web and mobile, use real time information through social media customer forums and blogs and make purchase decisions through ratings, reviews, and price comparison and product recommendations. Across all these transactions, customers leave some information about their inclinations and activities that retailers can follow to adopt customer-centric strategies that help them involve customers.

Big data is a collection of all these structured and unstructured data sets and it becomes very difficult to practice this large and complex data using on-hand database management tools or traditional data processing applications.

Problem lies in the use of these traditional systems to store massive data. Though these systems were a success a few years ago, with increasing amount and complexity of data, these are soon becoming outdated.

II. TECHNOLOGY USED

The traditional RDBMS can not handle big data therefore non relational database Hadoop is being used. Microsoft SQL has now been replaced by Map Reduce which is the distributed querying and data processing engine used to extract data from big datasets hosted on clusters in Hadoop implementation.

Hadoop is an open source software framework that supports data-intensive distributed applications Hadoop has been developed, based on a paper originally written by Google on Map Reduce system and applies concepts of functional programming. Hadoop is written in the Java programming language and is the highest-level Apache project being constructed and used by a global community of contributors. Big data can improve decision making and increase companies efficiency and Effectiveness, but only if company employ a variety of analytical tools and methods to make sense of the data. For example, descriptive analytics produce standard reports, ad hoc reports, and alerts; predictive analytics is concerned with forecasting and statistical modeling; and prescriptive analytics focuses on optimization and randomized testing.

Hadoop is a platform for distributing computing problems across a number of servers. First developed and released as open source by Yahoo, it implements the Map Reduce approach pioneered by Google in compiling its search indexes. Hadoop's Map Reduce involves distributing a dataset among multiple servers and operating on the data: the "map" stage. The partial results are then recombined: the "reduce" stage.

To store data, Hadoop utilizes its own distributed file system, HDFS, which makes data available to multiple computing nodes. A typical Hadoop usage pattern involves three stages:

- Loading data into HDFS,
- Map Reduce operations, and
- Retrieving results from HDFS.

This process is by nature a batch operation, suited for analytical or non-interactive computing tasks. Because of this, Hadoop is not itself a data ware house solution but can act as analytical adjuncts to one.

III. BIG DATA REQUIRES HIGH-PRFORMANCE ANALYTICS

Example of big data might be petabytes (1,024 terabytes) or Exabyte (1,024 petabytes) of data consisting of billions to trillions of records of millions of people—all from different sources (e.g. Web, sales, customer contact center, social media, mobile data and so on). The data is typically loosely structured data that is often incomplete and inaccessible.

When dealing with larger datasets, organizations face difficulties in being able to create, manipulate, and manage big data. Big data is particularly a problem in business analytics because standard tools and procedures are not designed to search and analyze massive datasets.

For most organizations, big data analysis is a challenge. Consider the utter volume of data and the many different formats of the data (both structured and unstructured data) collected across the entire organization and the many different ways different

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varieties of data can be combined, contrasted and analyzed to find patterns and other valuable information.
The first challenge is in breaking down data silos to access all data an organization stores in different spaces and often in different systems. A second big data challenge is in creating platforms that can pull in unstructured data as easily as structured data. This massive bulk of data is typically so large that it's difficult to process using traditional database and software methods.

IV. ENABLING PERCEPTIONS AND DRIVING SALES

Big Data analytics allows retailers to take on new techniques to absorb customer with their brands. They provide most promotional offers through mail, vouchers and coupons. Big Data allows retailers to make recommendations and advertisements to the customers, thereby enlightening sales and allied services. Big Data promotes real-time transparency, enable predictive alerts within the supply chain, and exposes supply demand trends. This optimizes inventory and helps evading stock out incidents. Big Data solutions permit retailers to identify and assess patterns that affect product demand, thereby boosting supply chain. Big Data solutions capitalize on campaign effectiveness by providing customer view and analyzing customer actions.

V. TRANSFORMING BUSINESS WITH BIG DATA

To analyze such a large size of data, big data analytics is typically implemented using specialized software tools and applications for predictive analytics, data mining, text mining, and forecasting and data optimization. Collectively these processes are distinct but highly incorporated functions of high-performance analytics. Using big data tools and software enables an organization to process extremely large dimensions of data that a business has collected to decide which data is relevant and can be analyzed to drive better business decisions in the future.
Overproduction refers to the “instability of distribution of production from time to time and inequality of delivery of productive activity from place to place. This overproduction, escorted by sustained under consumption of a physical good, would normally result in a crisis situation, categorized by decreased pricing and a deflation of the product. However, big data presents a variance to this economic rationale. In this case, because of the lower level of consumptions, more unconsumed
data accrues. As more data is produced, instead of the data losing value, there’s increased value in the potential insight that can be gathered from analyzing such data. By transforming big data into beneficial knowledge and measureable metrics through appropriate analysis, this potential profit from the overproduction of data can be accessed and the rates of data production and consumption carried to more similar rates. Even though the consumption of big data might carry on to lag behind the rate of production, the value can continue to upsurge because of opportunities for analysis, and will affect how the information is technically processed and organizationally accomplished.
Service providers can make use of this big data to drive a wide range of important pronouncements and activities, such as: designing more competitive offers, prices and packages; recommending the most attractive offers to subscribers during the shopping and ordering process; communicating with users about their usage, spending and purchase options.
For the Service Providers, big data not only means a vital shift in the way data is stored and managed – it also requires deploying powerful real-time analytics and visualization tools, collaboration platforms, and the ability to automatically create links with existing applications vital to the CSP’s business,
Such as operations and business support systems (OSS/BSS) and customer relationship management (CRM).
There are several use cases for big data analytics in retail, such as:

- predicting customer purchases
- customer micro-segmentation
- cross selling & up selling
- location-based marketing
- supply chain & logistics optimization
- retail fraud

Controlling retail fraud is a big goal for any retailer, since deceit has a negative effect on net returns. Analyzing customer behavior data can help spot fraud timely, and stem the loss.
Cross-selling by using aggregate customer behavior analysis to propose further products to customers that match their needs and budget, is also proving to be a productive use of big data in retail. The Use of big data is to optimize the company inventory based on regional and seasonal preferences of customers in each geographic area they serve. Furthermore, the use of big data is to implement an in-store, mobile navigation system that signals customers to sales based on their preferences and location in store.

VI. BIG DATA PLAN IN RETAIL INDUSTRY

Keeping up with today’s demanding customers and analytics competitor means putting data at the core of the retail business. There are some steps plans:

1. Determine the maturity level of company’s approach to big data, and then implement the proof of concept to escort ongoing investment.
2. Big data can drive the greatest enhancement and create meticulous use cases to investigate pricing, segmentation and marketing effectiveness.
3. Size up data management and analytical capabilities, identifying gaps.
4. Data strategy incorporates customer data management, policy and process rules, and data collection usage and sharing.

VII. CONCLUSION

With the right big data analytics platforms in place, an enterprise can boost sales, increase efficiency, and progress operations, customer service and risk management.

Many big data projects invent from the need to answer specific business questions such as what customers really think about our brand, and how can we increase our sales aptitude and close more agreements. Big Data solutions are the new cutting edge for retailers seeking to drive business transformative values and enlarge higher margins and profits from their marketing strategies and supply chain planning.

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