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A SURVEY PAPER ON BIG DATA ANALYTICS IN SALES AND MARKETING

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Abstract: With fast-growing advancements in E-commerce and product-centric organizations, data science and analytics are the backbones of firms. Predicting sales, analyzing customer sentiment and improving lead generation is one of the numerous cases data analytics is applied to improve strategies and provide effective operational tactics. This study aims to understand the impact of data analytics in the sales and marketing sectors. By providing valuable insights via visualizations, presentations and advanced analyses, data analytics has made it possible to understand the holistic approach to business efforts and study the impact of marketing campaigns, and take better data-driven decisions in the future.

Keywords **– Data Analytics, Business Intelligence, Big Data, Sales, Marketing, Customer Lifetime Value**

I. INTRODUCTION

There has been a sudden increase in commerce, and e-service innovations due to profound technological advancements and greater customer demand [3]. Firms can apply new information technologies (NITs), using both quantitative and qualitative approaches to develop an understanding of customer sentiments, predict market patterns and drive revenue generation. Specific ways catering to different organization types – whether they are small businesses, large enterprises or specialized agencies, can increase profitability and drive market success.

To adapt to constantly changing markets, companies are forced to adapt quickly to new and unknown situations. Companies are now increasingly relying on data-driven technologies such as Business Intelligence (BI) to accommodate fast-paced decision-making processes. Business Intelligence can be captured as the process of accumulating, organizing, analyzing, presenting and monitoring information supporting management decisions [5]. The collection of unbiased data present in the market, performing analysis and presenting strategies to increase business efficiency is the primary objective of data analysis. It allows us to gain a significant competitive analysis facilitating future decisions [6]. Market research and analysis is the process of identifying the market you want to either enter or break with better reach with customers while competitive analysis is understanding the competition prevalent in the market.

Advantages of Data Analysis for Sales and Marketing:

1. Data-driven marketing strategy: Product release, marketing approaches- both modern and traditional, distribution channels and promotion of sales are all marketing strategies that can be understood holistically using data analysis and business intelligence tools.
2. Defining target customers: Visualizing the target audience and profiling customers based on age, gender, location, income, job titles and family status.
3. Customer Sentiment Analysis: to extract insights from websites, blogs, review sites or social media to extract real-time actionable insights, automated sentiment analysis use text mining algorithms.
4. Better cross-selling and Up-selling: identifying important sales parameters like popular products, high demand products, key value categories and key value items.
5. Lead generation: Leveraging vast resources of data using big data to identify audience and automate presales processes.

II. BIG DATA ANALYTICS

2.1 Big Data

The larger the datasets, the more difficult they become to manage. Big Data can be coined as a term for datasets that become so huge that they become difficult to manage with traditional database management systems [8]. These data sets enter a size which is beyond the handling capacity for common functional technologies used for capture, storage, analysis, management, visualization and presentations. Generally, data warehouses have been used to manage large datasets. Big data analytics can be broadly coined as the use of advanced analytic techniques against very diverse, large data sets. These data sets may be unstructured, semi-structured and structured data from different sources, in sizes ranging from terabytes (TB) to zettabytes.

2.2 Characteristics of Big Data

In recent years, big data has accumulated in the fields of sales, marketing and E-commerce, collecting data from various sources such as websites, social media, blogs, review sites, consumer webpages and digital surveys using text mining algorithms, social computing, internet search indexing and Optical Character Recognition (OCR) technology.

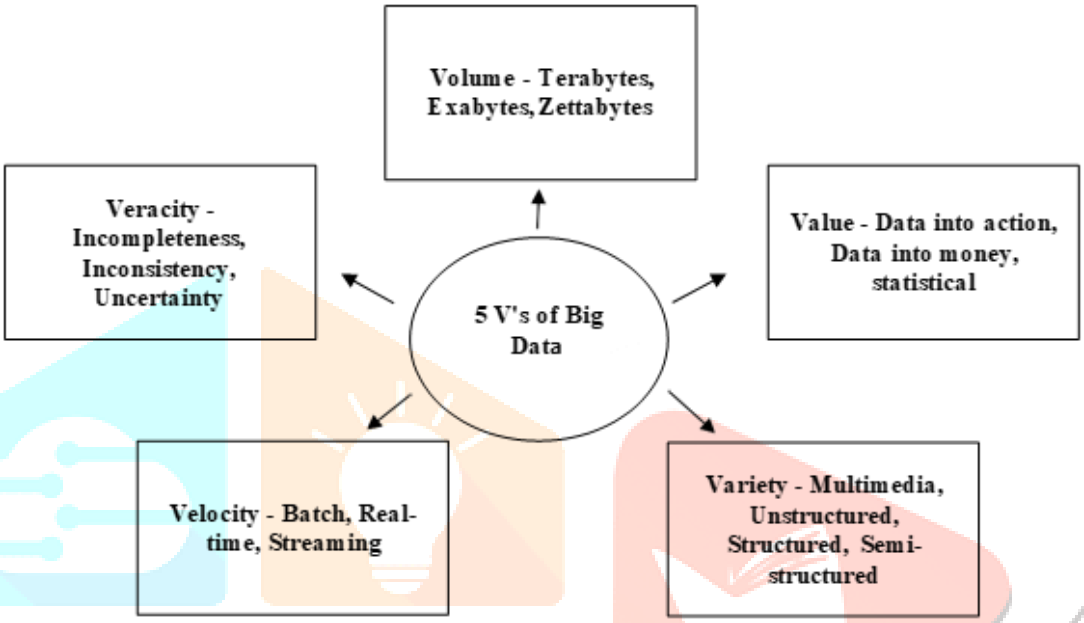

Fig 2.2.1: Common Characteristics of Big Data

Volume: Volume refers to the amount of data that gets processed. It speaks about the scale and size of the data that gets processed. Using huge amounts of data pose problems while performing analysis constructively if the data hasn't been preprocessed properly. Currently data between Exabyte (EB) and Zettabyte (ZB) are considered as big data [12]. For example, Amazon Web Store fields about 1.1 million requests a second [13]. Alongside purchasing information, Amazon also collects data in three other forms – firstly data collected while using their services, secondly the data it collects automatically while using digital devices, current location and ads, thirdly the data it collects from third parties such as credit cards and purchase history. Such huge amounts of data can be used to boost profits and optimize organizational efficiency.

Veracity: Veracity represents the quality of data. Data can be incomplete, inconsistent, uncertain and these data sets can then further be categorized as good, bad and wanted, unwanted, defined, or undefined. Accuracy and trust play a huge factor in determining the usability of data. Healthy data sets are collected from trustworthy sources. If analysis is performed on data sets which aren't accurate, the business decisions made on the analysis may turn out to be inefficient and may cost the business. Data collected from "cookie trackers" is one of the ways Amazon can modify and target ads to audience to improve leads to products and increase sales. These data sets are collected directly from the user on their device using the webpages they access, and thus prove to be a trusted way to collect data from the target audience themselves.

Velocity: Data velocity is defined as the speed at which data is being processed. This emphasizes the need for data to be processed at a considerable speed when compared to the speed at which the data is being produced. This can be further represented in terms of real time, streaming, near real-time and batch. Data is being continually produced while any consumer performs actions related to products. Purchasing information, credit card updates, website clicks, product views are all examples of actionable data that get produced every second worldwide. Relevant analysis needs to be performed for businesses to increase sales and target audience better. If the data is outdated, the analysis would result in inconsistency with current consumer practices and thus, data velocity is an important characteristic while data analysis is performed.

Variety: Veracity determines the type of data which can be categorized as multimedia, structured, semi-structured and unstructured. There is uncertainty while converting one form of data to another which may result in changes in the underlying structure. Traditional analytics data algorithms face challenges while dealing with unstructured, noisy or incomplete data. Most data obtained would be from heterogenous sources. Businesses obtain data from digital sources, surveys and multiple third-party connections and thus data cleaning techniques are employed to address data quality problems.

Value: Value represents the usefulness and context of the data for decision-making. Amazon can garner large number of audiences to its platforms by leveraging valuable big data via analytics with their products. This leads to increased user participation and sales. The step after collecting large amounts of data, is to retrieve useful data to perform analysis.

2.3 Benefits of Big Data Analysis

1. Operational efficiency and cost reduction: Storage tools can help organizations save costs on management and storage of sizeable amounts of data. Flexible data processing can help analyse large amounts of data providing insights and discovering patterns that can help business make better decisions and operate efficiently.
2. Faster, better decision-making: Businesses can start with any amount of data and move to scale larger amounts of data both historical and real-time. The access to a large volume of data provides better insights to for finer decision-making,
3. Improved data-driven market traction: Analysing data from social media, videos, devices, logs, transactional applications and web allows businesses to be more data-driven. Big data analysis allows organizations to gauge customer needs, potential risks and market reach, while creating new products and services.

III. SALES AND MARKETING

3.1 Sales

The overriding goal of a market-driven firm is to create a performance- driven culture focused on satisfying customers [15]. This leads to a shift in mindset from just selling a product or service to selling costumer productivity or satisfaction. This change in perspective leads to a customer-centric market. Sales is becoming a strategic activity as stated in Harvard's Business Review's special issue on sales [17]. The intention is to build and maintain long-term relationships with consumers. There is an extremely high impact of sales strategies on business efficiency and revenue generation.

3.2 Marketing

Marketing can be coined as the practice of promoting and selling a product or service and constitutes of all the underlying strategies, market research and advertising. This includes the processes of creating, communicating, delivering and exchanging offerings that have a high impact on customers, partners, clients or firms at large.

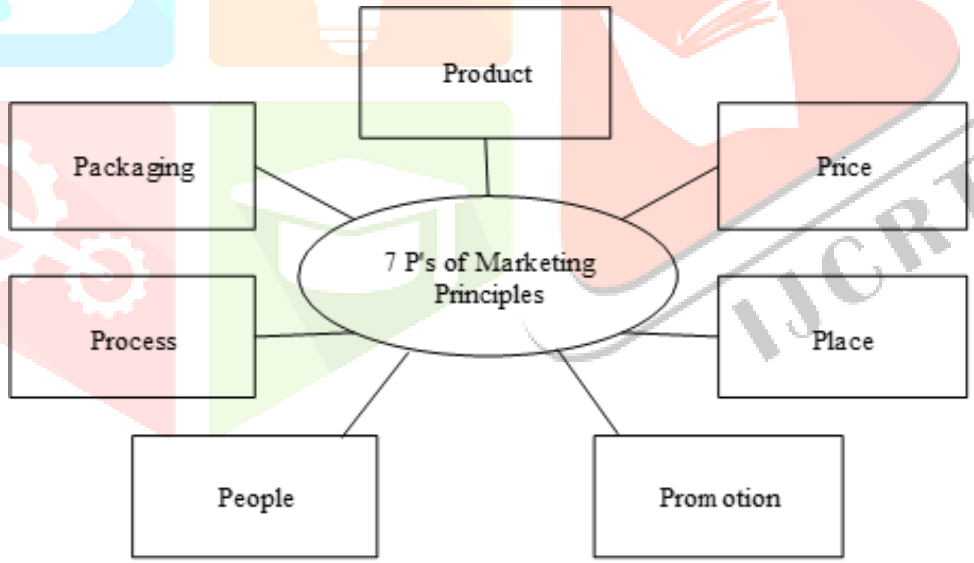

Fig 3.2.1: Marketing Principles

3.3 Sales and Marketing Integration Model

The integration of both interfaces aims to provide efficient strategies to produce long-term relationships with consumers. The major objective of integrating both features together is to leverage the strengths of sales and marketing and create a methodology for the calculation of customer lifetime value (CLV).

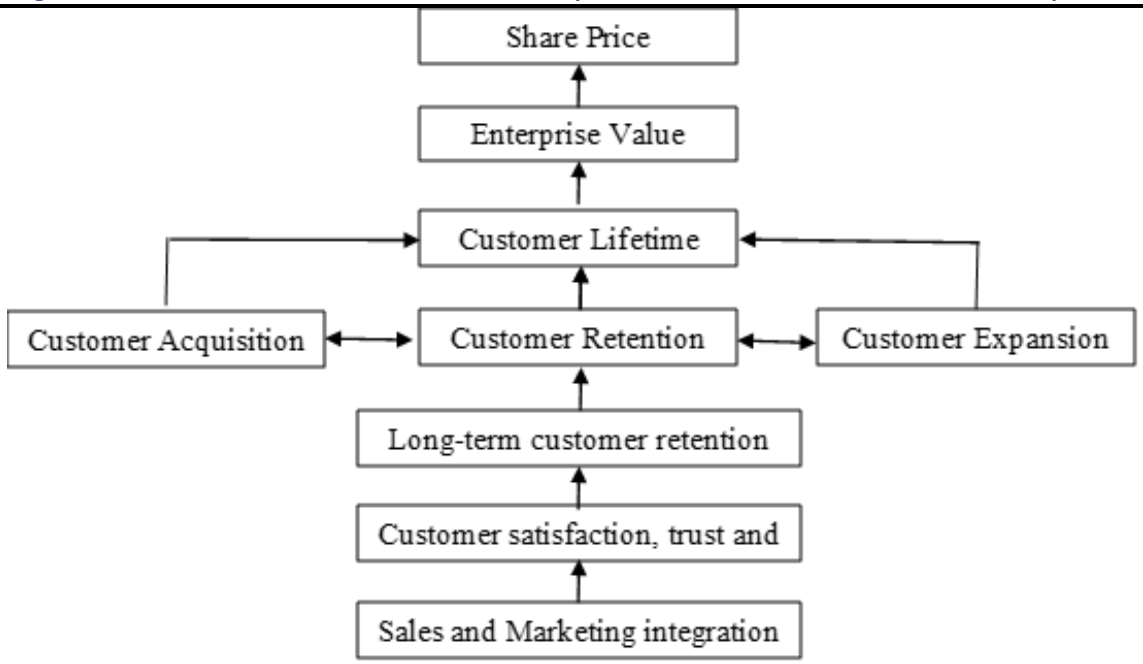

Fig 3.3.1: Sales and Marketing Integration Model to Enhance CLV

IV. STEPS TO IMPLEMENT BIG DATA ANALYTICS

4.1 Strategy Formulation

The definition of the problem structure and determining the constituent parts of a problem are done in this step. This includes the business goals of a particular organization and the future projections they have in mind regarding a particular product or service. Marketing strategy formulation is the procedure to describe objectives of the firm. Building the right approach enables businesses to target audience better and gain competitive advantage.

4.2 Data Extraction

Collection of data begins once the correct source has been identified. This step is crucial as the nature of data collected will determine how in-depth the analysis is. Post identification of internal and external sources, the data is collected in both structured, unstructured and semi- structured form.

4.3 Data Storage and Transformation

Big data storage is a compute-and-storage architecture. It enables businesses to store massive amounts of data and perform analyses on historical and real-time data. The key considerations organizations take while storing big data are to first define requirements – understanding and providing insights on what type of data is to be stored, categorizing it, and its accessibility. Secondly, data tiering allows the data to be moved to lower-cost data tiers to improve cost efficiency. Finally, disaster recovery which sets policies to safeguard the data and ensures back-up and restoration.

4.4 Data Analysis

The process of systemically statistical and/or logical techniques to describe, illustrate, condense and evaluate data is done in this step. Businesses can evaluate their previous sales and marketing strategies and draw comparisons of patterns or “gold nuggets” found in the analysis. Inspecting and discovery of useful information have a profound impact on future decisions which are data-driven.

4.5 Report/Visualization

Data visualization is one of the steps of data analytics which entails representing information graphically using statistical and visual elements like graphs, maps, models and other tools. It provides a better way to understand complex information, identify patterns and correlations in the dataset that may have gone undetected in text-based forms. Also, the role of ML and ESPs [24-86] are becoming important in recent applications, recognition and control.

Fig 4.5.1: Model Visualization for Customer Segmentation

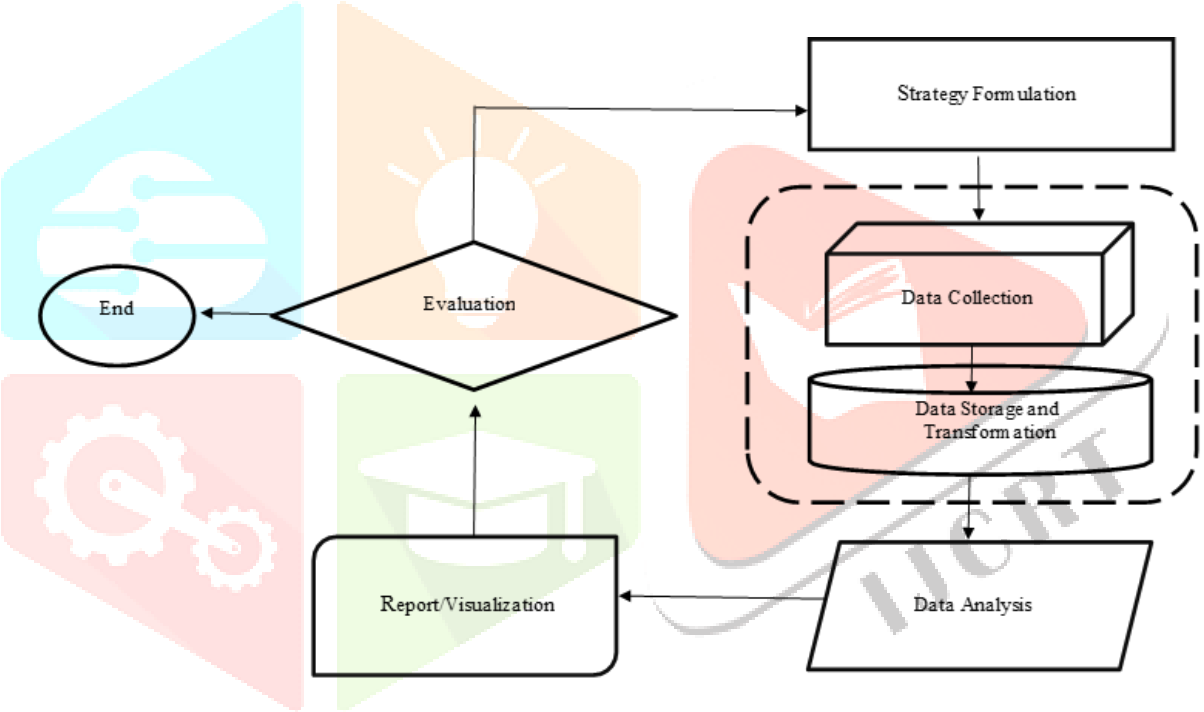

Fig 4.5.2: Workflow of Big Data Analytics

V. CONCLUSION

In this paper, we discussed the sales and marketing integration interface and the impact of big data analytics. We saw the various characteristics of big data and their correlation to different sales data accumulated by organizations. We further discussed the advantages of using big data analytics on sales and marketing strategies to increase business strategy returns, boost revenue generation and operate efficiently. We then discussed sales, marketing and their integration model to increase customer lifetime value. These various aspects all contributed to fragments of the big data analysis to improve sales and marketing strategies. The procedure of the same showcased the workflow post which evaluating the data leads to positive impact on business decisions.

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