INFLUENCE OF BIG DATA ON MARKETING

Abstract

Big Data has gained popularity in IT fields within a decade. The amount of experiments that can be conducted to create efficiently working models using this data is tremendous. It's a fact that all the industries are co-dependent, therefore, big data has found its application even in the business and marketing sectors. The marketers have improved their ways of finding solutions that are faster and more profitable than the traditional techniques using different analytical skills. The advancement in marketing was seen when this data was being analyzed. Every corporation have their own way of dealing with data yet the basics remain same for all. Further, due to uncertainty in the present world the rapid change in the data lead to new methodologies of dealing with data.

Keywords: Big Data, Data-Driven Marketing, Analytics, Big data analytics, Behavioral data, Precision- Marketing.

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I. INTRODUCTION

1. **Big data:** John Mashey introduced the term big data in the 1990s. It may have been divulged a couple of decades ago, but it exists ever since people started storing data. Big data became a tech trend in 2005. Despite so much popularity and use, no one can define what big data is. The word itself suggests big data is massive. Let's take an example of social media during the 2016: Instagram users post around 46,740 photos, 456,000 tweets are sent on Twitter, 4,169,000 videos are watched on YouTube, Facebook has 7 billion active users every single minute, besides this, business transactions, podcasts, GPS trails, web pages were used and the list goes on. [1] Every single action creates data that is recorded in systems containing big data. With approximately 1.145 trillion of data being produced per day [2], the real question that arises is: what is the limit for data to be big data? This depends on the organizations handling it. When data becomes too difficult to handle by a company or organization, it becomes big data. So, the definition of big data is rather perspective than descriptive. Though it's imprecise, we can define big data as a collection of hard to manage an enormous volume of structured and unstructured data.

2. **Significance of big data:** Although having a hard time describing what big data is, it becomes completely useless if not analyzed. The significance of big data rose when people started analyzing it, before that it was just huge digital trash. Digging into the data systems and discovering patterns also called Data Mining is what made big data important. Around 2010, big companies learned the changes they can bring in their strategies using big data. Being able to handle big data became a new challenge for the giant companies in the race. While 80% of these companies understood how critical big data was, only 60% could dig into it and only 3% could manage it. [3] In today's world data corresponds to intelligence therefore the implementation of data is important for businesses existing in the present generation. While big data was influencing every part of a business, marketing was the earliest field to be effected by the gradual rise of need of big data which led to data driven marketing to be requisite for the marketers around the globe whether they were dealing with a small company or larger ones.

II. MARKETER AND DATA

A marketer is the one responsible to connect customers to the product or the service provided by the company. Marketers play an active role in developing and executing strategies to promote brands, products and services, maximizing profits for the company. [4]The prime responsibilities of a marketer are: Gathering and analyzing market trends (information), Marketing Planning, Product Designing and Development, Standardization and grading, Packing and labelling, Branding, Customer Support Services, Pricing of Product, and Promotion. [5]

To perform the above tasks, data is needed that is stored in different locations and is retrieved from various sources. These data include:

- **Customer data:** This type of data is collected when the customer interacts with the business through website, social media, campaigns, online and offline survey and many other methods.

- **Financial data:** This contains information about the organization's sales, marketing statistics, costs and margins.
- **Operational data:** This type of data is volatile. It does not contain any historical record, and it deals with real time reporting. [6]

Figure 1: Types of data used by marketer with examples.

Every data is equally important for the marketer but the customer data is vast and one that can be experimented on the most. Collaborating these two, a new type of marketing was introduced called Data Driven Marketing.

1. **Data-driven marketing:** Data driven marketing is the process of colleting customer data and exacting insights from the previous interactions to make marketing decisions, bring in new users and engage the old ones. The main objective of analyzing data for data driven marketing is to predict customer behavior. A customer is an essential part of the company so improving customer experience can help the company get better revenues, a step ahead in the competition, brand loyalty and trust. Analyzing the big data to know their target audience is the foremost goal and media plays a vital role in it. [7]

   The media used for advertising in the traditional marketing was newspaper, television and magazines. These traditional media reached out large number of audience but it was difficult to get a clear picture of what audience, place or time to approach. [8] DDM overcame these difficulties by using social media or websites. Here the advertisements reach the audience who may be interested in the product. Let's take an example of a café owner who wants to open a new branch: the first task would be to know what kind of customers would visit the place by analyzing the data from the previous café and a conclusion is drawn that the targeted audience would be people of the age group 16-35. The next step is to select where the café should be located. Now the data collected would contain various colleges and companies situated in the area which will help the owner to recognize the most convenient location for the customer to reach the café. The last step would be to promote the café. Selecting a correct platform to advertise the shop is equally necessary and here a social media app or website is more preferable than newspaper or magazines. Hence, the data collected from the previous café helped the owner to set up a better business. As café is a small business, the data needed was simpler and the target audience was small, but when it comes to larger companies the data needed is also large and it becomes difficult to analyze it. Therefore, these companies invest in analysts and marketers who can utilize the data for a better marketing strategy.

2. **Precision marketing:** Due to rapid change of customer behavior marketers are not able to trust the historical data. Therefore, to make their results more precise they are reverting back to mass communication and promotions. [19]These techniques may seem similar to the traditional ways but are a lot more than that. Here, the companies collect real time data. This kind of data is delivered as soon as collected. This is usually also termed as behavioral data. This kind of data helps the marketer know about how their customers behave on change. [20]On analysis they can find the reasons for their behavior and provide better services for their customers. The study of behavioral data is so complex and wide that it can lead to a new kind of marketing too.

III. ANALYTICS

Marketing analytics is a practice of managing and analyzing marketing performance to use it for the effective marketing strategies and optimizing return on investment. It is an assessment of a market both in volume and value. The three important parts of analysis are reporting on past, analyzing the present and predicting the future. The important step in the market analysis would be to assess the size of the market.

1. **Size of the market:** Estimating the size of the markets would include these simple steps:

   - **Defining target customer:** This is also termed as Segmentation. An effective segmentation is a need for allocating resources. A small group of customers could help an analyst find potential growth in their business. For example, a company supplying smart home appliances were examining the customer data and found that many of their products helped customers who were visually impaired, therefore to provide better services the company started improving their projects that would be convenient for these customers. This leads to more people being interested in the company, making loyal customers and gives them a step ahead of their competitors. Finding target audience could be with respect to age, income, gender, location, occupation, etc. [10]

   - **Market needs:** Target audience may help you cut down the amount of advertising and resources but to bring in investors for the business plan one should know the market trends. For instance you were to launch a new product if the possibility of it to be replaced in a couple of years are high, the investors would be least interested to invest into such business. Therefore, analyzing and predicting the future stability of your product or service is an essential criteria to get investments and that can be done by knowing the market needs.

   - **Competition:** After knowing your audience and getting investors and setting up a business, the next issue the company would face is the competition. With various businesses setting up out there, providing better services or products than the others becomes vital. Analyzing the previous data and the competitor's data can help the company to come up with a better plan. [13]

     These are the main goals of a person analyzing data but dealing with behavioral data is still tricky and is yet not adapted by many organizations.

2. **Types:** While solving a problem statement it becomes necessary for the analyst or marketer to ask the right questions. Asking for right questions leads to finding the data in need and with the right data finding pattern and then solutions becomes easier. According to what type of questions are being answered the analytics can be divided into:

    - **Descriptive analytics:** This answers 'What happened?' This was the most basic form or approach to analytics is works with the past and present data to tell what exactly happened and what is happening. For example if a bookstore had to test the sale from past 3 years if would check the past data and current data and analyses the trends of when the sales went low and when they were high. They find that the sales have decreased drastically in the past few months.

    - **Diagnostic analytics:** This answers 'Why did it happen?' Once the company knows when its sales have went down its next move would be to find the reason for the loss. In the above example, the owner tries to find the reason via feedback or any other source for sudden disinterest of customers in their bookstore. They find that many books promoted on social media were getting popularity and the bookstore didn't have enough trendy books.

    - **Predictive analytics:** This answers 'What will happen? Now the reason of failure is known the owner starts predicting the future. Here he comes to a conclusion that if he doesn't go with the trend his business will shut down.

    - **Prescriptive analytics:** This answers the 'What should be done?' To avoid the loss the owner now tries to research about what book is popular on the trend and keep extra stock of that particular genre or book. Also he tries to promote his store on social media to gain new customers. [23]

IV. DATA ANALYTICS

Data is the magical element in the world of analytics, with time as the amount of data and its complexity is increasing there is a need for effective and efficient processes to harness the value of this data. Data analytics is the process of analyzing raw datasets to derive conclusions regarding the information they hold. It helps one discover patterns in the raw data and draw valuable information from them.

Data Analysis and data analytics are terms that are often used interchangeably yet it is important for the reader to know the key difference between the two. Data analysis is the process of cleaning, inspecting, transforming, and modeling data so that it can be transformed into meaningful and useful information while data analytics is a far broader field that targets data to uncover solutions and generate growth opportunities for businesses. We can say that data analytics is one important part of the data analytics process. [30]

1. **Key phases in big data analysis:** An Analyst breaks down the work into number of steps or tasks to make their job easier. Depending on the organization these steps may vary, in spite of these differences the meaning or the goal of the processes remain the same. For example one organization can term the phase as prepare and process while other can expand these processes as gather, prepare and clean. A big data analytics life cycle can be given as follows:

2. **Business case evaluation**: This is the ask stage in analytics. The analyst asks questions as a data is only as good as the question asked. Based on the company's strategy, goals, budget and many other aspect the set of questions to be asked is framed, like:

   What are we looking for?
   Where is the data coming from?
   What is the data quality?
   What are the scales used to measure this data? [24]

   There is one more conclusion to be made during this phase i.e. whether the data being looked at is big data or not. To be identified as big data we have to understand the 3Vs- Velocity Variety and volume.

   Velocity is the speed of data processing.
   Variety is the number of types of data.
   Volume refers to the amount of data.

   Many people have misunderstood big data to be something that's growing in volume alone i.e. the amount of data being handled. But this is not the truth the data is considered big data if it's growing with respect to 3Vs.

3. **Data identification:** A bigger data set may lead to various hidden patterns and correlation, but the quantity of the data is not the only thing that matters. Identifying the right data for your task becomes equally important. For example, let's take OOT platforms for an instance: they collect data of individual subscriber and personalize their recommendation based on their previous views, location, age group, browsing history, social media searches, languages, genres, many more. The data they are working on is huge but it is still personalized and targeting every person individually. While on the other hand if a clothing brand were to analyze their data it would be more baised on location, season, size, culture, temperature, trends, etc. Although the goal of both the platforms is to personalize the customers experience the data they may be looking at is different. Here, the fact that the average height of men of India is 177cm is a vital information for the clothing brand it may be completely irrelavent to the OOT platform. So, it's very important to identify the right data for your analysis to save time and find patterns that are of real help.[25]

   - **Data extraction:** It is the process of retrieving data for further data processing. Companies use Business intelligence tools, migrate the data to a repository or replicate data as a backup. Data sources may be digital like webpages, databases, reports or physical sources like books, newspaper, surveys and many more. Data extraction can be divided into: Logical and Physical extraction.

     Logical extraction can be further divided into: Full extraction (Complete data is extracted at once.) and Incremented extraction (Applying logic to source systems and keeping track of changes/updates)

Physical extraction can be further divided into: Online extraction (extraction tools are linked directly to the source so that data is directly extracted from source to the data warehouse). [27]

- **Data acquisition:** The data should now be stored into data warehouse or other storage solutions. Before storing the data it had to be gathered, filtered and cleaned, as the data being analyzed is a collection of structured and instructed data it becomes absolutely necessary to filter the data out. Let's take a simple example, a person is working on the last month sales of his store but the few transactions are not recorded or if the maximum amount products available for sale is less than the amount that is recorded as sold, this data will lead to wrong conclusions, therefore it is a need to filter the data. In the example the person is working on a small amount of data and the problem seems easy to approach but when it comes to larger datasets its better to clean data before transferring it into the storage. The data is first differentiated into structured, semi- structured and unstructured data. Filtering a structured data is easier than unstructured as they can be ordered or scaled. Each company have different protocols to deal with their data, but reorganizing the data, converting from one form to another and grouping based on behavior form the basis of their approach. [30]

- **Data validation and cleaning:** Now that we have filtered data we have to validate data. Having a clean data or gathering a lot of data isn't the main goal of analyst, it's to get results for the problem they are trying to solve. Therefore, they need data that is validate, accurate and clear. This is the final stage of colleting or deleting the data in use. After this step if one has still wrong data or irrelevant data, the analysis may lead to wrong results. One can validate data by either writing a script or using software that perform data validation.[28]

- **Data aggregation and representation:** In this process a summary is made of the data collected. Now that the data we have is clean, it is easier to find similarities between them and summarize the data. [22] For example, If we take an example of a perfume brand. They collected information about which perfume is the most frequently bought along with their age. With this they may summarize that Type1 and Type2 scents are very popular among age around of 18-25. Another summary is made using the date of purchase and age group, and it is found that most of the purchases were made in late summer. This will be a summary of data collected.

- **Data analysis:** After summarizing the data in different ways now the task of the analyst is to find patterns in the behavior of data. Is there a link between the data collected? They try to find solutions to the problem they were given. For instance in the above example, if the perfume brand has decided to give discounts on few products to increase their customers, the job of the analyst is to find the right time and audience to be targeted. From the summarized data it can be concluded that Type1 and Type2 scents are very popular among 18-25 age group and these are usually bought during late summer.

- **Data visualization:** Now that the analyst has the solution to the problem, the task may seem to end here but that's not the case. In a corporation there exist different types of people. The terms used by the analyst may not be familiar to the client or

manager, who has to be convinced about the solution. So representation of the result in the most convincing way to all types of audience becomes a need. Data visualization is the process of representing the data using graphs, diagrams and charts. [21] There are visualization tools that can help find patterns in the data, even the ones that must have been neglected by the analyst manually.

- **Utilization of analysis result:** Data utilization refers to the continuous use of data in corporate activities to improve operational efficiency and productivity for the benefit of the business. [29] Now that we have a conclusion from data we have to put this into business use this is done at the data utilization process. In the above example, the data collected should be compared with facts and a business plan should be created. It was found that most of the universities open during late summer and students buy perfumes as one of their back to school products. A plan is made that the brand can give special student discounts for Type1 and Type2 scents, especially during late summers (college reopening). They can also promote their brand more near college areas.

V. CONCLUSION

1. **Challenges:** Analyzing data is like entering a whole new perspective of world. It provides numerous opportunities for the marketer but it isn't easy to handle. The challenge starts from asking the right questions, if there's no clear picture of the problem statement, finding solutions becomes pointless. Now if the problem statement is comprehensible the next problem arises with collecting data. The data available to the analyzer is huge in quantity but its quality is what matters. Here quality would refer to secure or accurate data that will help the analyzer validate the results with sorted findings and no wasteful resources. Breaking down the data, cleaning and harmonizing it would be next. Let's consider that the data that's collected is effectual, now the bigger problem is how to interpret it. At the end bringing everything together that is integrating the data is an issue. While these are just the challenges of the historical data, behavioral data is the upcoming challenge for analytics and a solution to many of the company's problem too. [17]

2. **Future scope:** During the recent pandemic most of the models failed to produce a proper solution to the rapid change. Most employees of the business organization had to work remotely which lead to decrease in response time by the company causing their downfall. The market is in need of new models that could analyze the data in such circumstances. Creating new models but with the same old data is purposeless. [19] The models should be capable of analyzing behavioral data. Behavioral Data Science is the emerging discipline that can help the companies deal with most of their issues. [18]

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