Fall Semester 2021-2022
Review-lll
Fundamentals of Data Analytics

Our Team Members

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Topic
Big Data In Marketing

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Abstract:

Big data is a new force behind societal and economic development in the world. The world's data collecting is at a turning point that could lead to significant technological advancements that could lead to new approaches to decision-making, city planning, finance, and educational administration.

The capacity to find the "value" in the data using Big Data Analytics technologies will have the biggest impact, even while data complexity is growing, including data's amount, diversity, velocity, and veracity.

The construction of highly scalable algorithms and systems to integrate the data and unearth significant hidden values from diverse, complicated, and enormous datasets presents a significant problem in big data analytics.

Potential breakthroughs in Big Data Analytics include innovative algorithms, techniques, systems, and applications that find useful and hidden knowledge from the Big Data efficiently and effectively.

Aim:

We are going see about big data in marketing and what are the uses of big data in marketing.

Introduction:

Digital marketing is the marketing of products and services over the digital media. The advantage of internet created new opportunities for marketing. With the rise of digital technologies, customers expect from the companies to create more relationship with them, by fulfilling their requirements. They also want companies to understand their needs and wants. (Kotler et al. 2012).

Big data is used for capturing, storing, managing, analyzing and processing the hugh amount of data which is too complex to be processed by any traditional

database management system. Therefore, enterprises require big data platform to keep much more about the customers and segment them more wisely. Customer segmentation is dividing customers into groups who similar preferences, needs and wants. By using big data, companies can segment their customers more accurately and wisely and perform their digital marketing activities more efficiently.

The topic of this study is to analyze the big data usage in digital marketing, including from B2B and B2B markets and also a startup firm points of view. This study purposes to be a reference and inspiration for the companies, who want to perform digital marketing more wisely by using big data.

Marketing information system:

Marketing information system (MKIS), which is a management information system (MIS), is used to get marketing decisions easily. In 2007, Jobber defined MKIS as a system, which collects, holds, analyses, reports the marketing data and provides outputs for the managers to help with their decisions.

Philipp Kotler identified the four components of the MKIS which are internal reporting system, marketing research system, marketing intelligence system and marketing decisions system. Figure 2.1 shows the components of MKIS. Internal reporting system includes all data available in the organization such as customer relations management (CRM) data, sales data, ordering, inventory, payables, costs, historical data of the marketing research activities, old reports. (Yourarticallibrary.com 2015). Marketing intelligence system provides information to the managers such as the external environment. Marketing research system collects primary and secondary data and provides the reports as output. Marketing decision support system finds out the possible scenarios by using the collected data. It predicts the outcomes of the scenarios.

Marketing Information system :
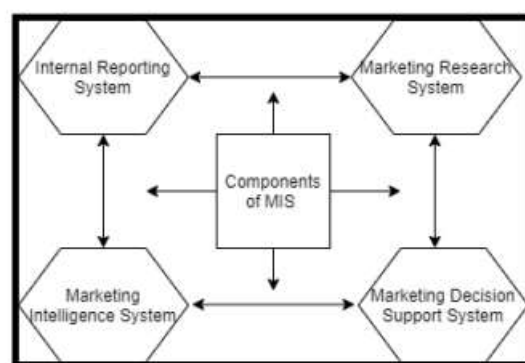
B2C and B2B Marketing:

B2B stands for business to business, whereas B2C is business to customer. The main focus of B2B sector is the product and its features. Customers are enterprise and also investigate alternative solutions. At the same time, B2C marketing is dealing with end users. Saha et al. (2014) explained the differences between B2B and B2C markets as in below image.

Reklatis et al. (2019) define the differences between B2B and B2B as evident and indicated that the organizations should plan and realize the marketing communications according to these differences. From marketing point of view, the most important difference is emotional relationships is used in B2C marketing with the consumers.

The Differences Between B2B And B2C Markets:

	B2C	B2B
Focused Customers	Consumers / End users	Enterprises
The size of the market	Big	Small
Sales	Low	High

Risk	Low	High
Time to Purchase	In a short period	Long period
The type of payment	Cash or with credit cards/bank cards	Longer and complexer procedure
Buyer decision	Emotional relationship	Rational relationship

Digital Marketing Research

Digitalization As A Concept:

The American Marketing Association (AMA) Board defined the marketing as an activity which includes the processes to create, communicate, provide the offers which have high value on the customers. (Ama.org 2017) Marketing creates customer satisfaction while gaining profit.

Digital marketing is the marketing of the product and services over the digital channels by using digital technologies to aquire, retain, satisfy customers, to increase brand awareness, customer loyalty and sales. (Simões et al. 2019)

Digital marketing uses not only internet marketing but also all other communication channels which do not require and internet connectivity, such as short message service (SMS), multimedia message service (MMS), electonic and interactive billboards.

Types Of Digital Marketing:

Some types of digital marketing are social media marketing (SMM), content marketing, E-mail, search engine optimization (SEO) and search engine marketing (SEM), mobile marketing, short messaging service (SMS), multimedia messaging service (MMS), display advertising, digital video marketing, pay-per-click (PPC), blogs, influentia l marketing, affiliate marketing.

Social Media Marketing:

Social media marketing is used to communicate or promote products and services and also to enhance customer relations by using social media platforms such as Facebook, Twitter, Instagram, Pinterest, Snapchat, LinkedIn and Youtube. It might be a post, an advertisement on social media and also even a tweet. For instance, by writing a website's URL in a tweet will increase the inbound traffic of the corresponding web site.

Content Marketing:

Content marketing provides a relevant and valuable content for the customers. As an example, blog posts, videos, white papers, articles, ebooks can be given.

E-Mail Marketing:

E-Mail marketing is mostly used as a digital marketing channel for reaching the customers directly via electronic mail. It is fast, cheap and easy for the marketers to reach to their customers. Additionally, companies send out newsletters, which are relevant for the customer. Email newsletters are a cost effective way of reaching the customers. Email personalization is a way for sending targeted message to the customer and by this means creating more engaging email experiences to the customers. An example would be Amazon.com. The company sends personalized emails suggesting products similar to your last search items. This email is a strong example of how to use a contact's search behaviour to re-engage them with the company.

Search Engine Optimization Marketing:

Ledford (2007) defined that SEO is used to increase the search engine ranking by customizing elements such as keywords in the web site. This process increases the visibility of a web site in the results of search engine, including Google, Yandex, Yahoo, Bing etc., as free of charge. The keywords and phrases, which are included in the content of the web sites, are used to increase the visibility and they should be selected wisely to implement a successful SEO. The page which is ranked higher than the others, would have more chance to be visited.

Search Engine Marketing:

Search Engine Marketing (SEM) is used to increase the visibility of the web sites on the Search Engine Result Pages (SERPs) through SEO. SEM includes both paid search results and organic search results, which is SEO.

Mobile Marketing:

Mobile marketing reachs customers through their mobile devices including mobile phones, tablets, applications. The increase in the usage of mobile devices encourage the companies to use mobile marketing. Mobile marketing categories are SMS and MMS marketing, mobile applications based marketing, in-game mobile marketing, location based services, quick response (QR), push notifications.

Display Advertising:

Display advertising, or banner advertising, is displaying the advertisements on web sites, mobile applications, social media by using banners, texts, images, logos, videos, audios, or gifs.

Affiliate Marketing:

Affiliate marketing is a referral marketing model, which is a cost effective solution and decreases online marketing costs. Basically, web sites pay commissions to the other web pages, which sends traffic to them.

Digital Marketing Tools:

Digital marketing tools are categorized into analytics, SEO, PPC, social media tools, email marketing, push notification, digital surveys tools, content marketing, affiliate marketing, A/B testing, e-commerce, marketing cloud, cookies, webinars, online PR, inbound marketing, blogs, e-newsletters, SMS,

MMS, online videos etc. Examples of some of them are provided in Table given below.

Digital Marketing Tools:

Category	Example of the tool
Analytics & Trackings	Google Analytics
SEO	Moz, Google Analytics
Pay-Per-Click	Google Adwords
Social Media Tools	Sprout Social
E-Mail Marketing Tools	GetResponse, iContact, Mailchimp, Constant Contact, Infusionsoft, Aweber, Emma
Push Notification	Urban Airship, etc.
Digital Survey Tools	Surveys
Content Marketing	Blog posts, videos, white papers, articles, e-books
Affiliate Marketing	Commision based advertisement
A/B Testing	Comparable promotions on web sites
E-Commerce Marketing	Shopify
Marketing Cloud	Salesforce, Pega, Adobe
Cookies	Web cookies

Advantages And Disadvantages Of Big Data:

Ciklum (2019) explains the advantages of big data which are; easy and quickly identification of the root causes of the failures, fraud detection, catching errors quickly and responding to the upcoming failures, supporting innovation, increasing revenue, defining the pain points, learning the customer needs, creating customer value, increasing customer satisfaction and loyalty, tracking the movements of the customers, knowing better about the customers, predicting the customer trends, increasing operational effectiveness like customer services. (Ciklum 2019).

Unstructured data is captured from IoT, human and online machines which provide rich, varied data which can be used to understand user requirements. The examples of unstructured data are social media, keyword searches, clickstreams, YouTube videos and this kind of real-time data provides to the companies to create real-time advertisements.

Besides the advantages, the disadvantages are cost of deploying and managing of big data platform, complexity and requiring proper training and to hire experienced employees, difficult to decide the correct platform, possibility of misusage of the collected data by sharing private data between the organisations. Regulations tries to protect the customers from misusage but organisations must be more careful on this topic.

Big Data Tools:

Big data can be integrated and implemented by using different tools such as Hadoop, Spark, MapReduce, Pig, Hiv, Cassandra and Kafka (Towards Data Science 2019). Based on the special requirements of companies, the most effective tool is chosen by the companies after evaluating advantages and disadvantages of them. In Figure given below, Towards Data Science presents big data tools.

Hadoop is mostly used and very popular in big data implementation and has the capability to handle with hugh data including both structured and unstructured data formats (Gavali et al 2018).

Apache Spark is a computung engine and processes data on computer clusters with parallel processing. (Databriks n.d.)

Apache Cassandra is a database with the capabilities such scalability and high availability and is a good choice for web and mobile applications. (Apache n.d.)

Kafka is another successsful tool with low-latency and real-time processing functionalities. (Yadranjiaghdam et al. 2016)

Apache Storm is free-of-charge and open source real-time processor and has complex event processing capabilities.

The Implementation of Big Data in Digital Marketing:

The most popular approaches of big data processing are batch processing and real-time processing.

Batch Processing:

Batch processing can be used in the solutions, which requires data in a specific time window. Mostly it is being used with Hadoop and MapReduce, which are used for keeping and analyzing structured and unstructured data to identify historical patterns and trends. MapReduce programming model, which is presented in Figure given below, creates big data sets on a cluster which filters, sorts and reduces. As this solution is applicable for creating historical data decision, it is not suitable for real-time solutions.

## Batch Data Processing For Historical Data:
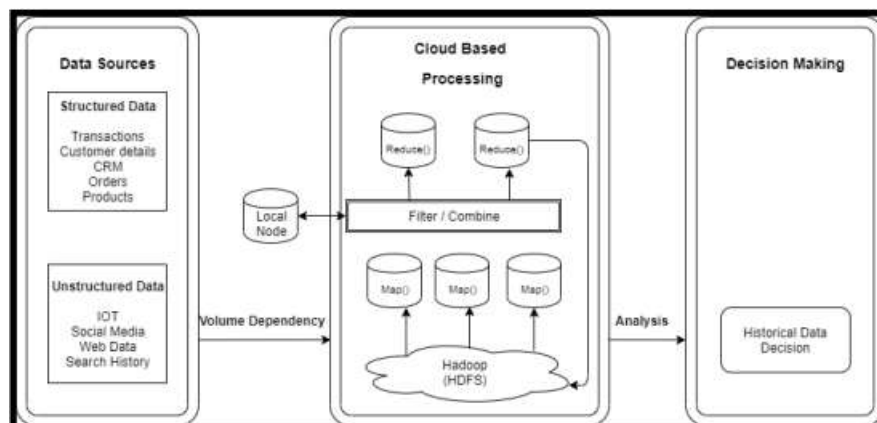
Real-Time Processing:

Input data arrives to the system as continuous streaming and can be processed in realtime. With the help of real-time processing, organizations can react very fast to the changes in consumer behaviors or any change in the market. Consequently it has continuously updated data sets for the decision making. Figure given below provides an example of real-time data processing with Apache Storm which is cloud based system:

Real-Time Data Processing:
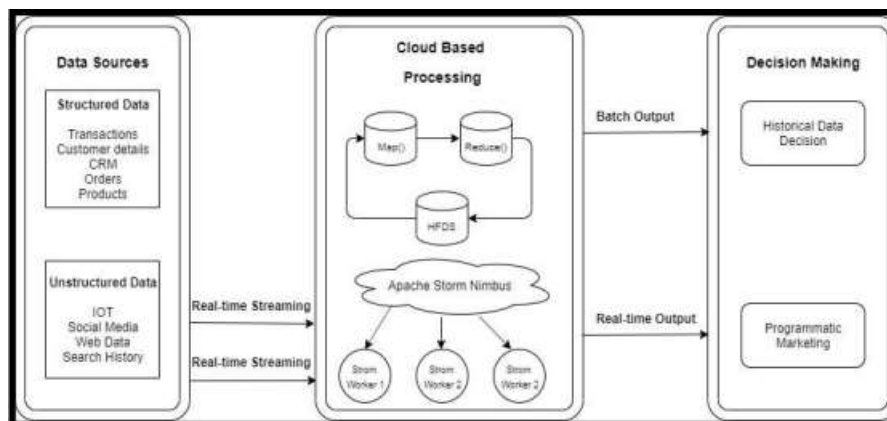
The Role of Big Data in Digital Marketing:

Digital marketing collects and processes big data coming from different sources. Through proper data processing, customers are reached out more accurately with low costs. Datadriven marketing is becoming a significant part of digital marketing, while big data in the marketing context is termed data management platform (DMP). Customer's data from various online and offline sources are aggregated from web analytics tools, mobile web, mobile apps, e-commerce portals, behavioural and demographic data, CRM data, POS data, social networks, online video, Smart TV data etc. (Jacuński 2018)

Basically, the main advantage of big data is to learn much more about the customers. In addition to the standard demographic information, companies are able to track customers' digital behavior. With the help of big data, customers's lifecycle and behavior are understood. "Customers voluntarily generate a huge amount of data daily by detailing their interest and preference about products or services to the public through various channels."(Anshari et al 2018) For the business, to profile customers is very important and they are trying to offer personalized and customized product and services to the customers through their CRM platforms (Lies 2019)

Product Development is a use case that big data is involved in predicting for new products and services after analyzing past and current situation by defining the relationship.

Customer Experiences is another important use case in big data. It provides personalized, consistent, omni-channel customer experiences and better capability to offer next-best-actions in real-time.

Real-time data provides to the companies to create real-time advertisements. Consequently, the organizations can react the changes in the market fastly and keeps the data continously up-to-date.

Fraud and compliance is another use case in big data to identify fraud issues quickly to save money and reputation.

The term "Machine Learning" is defined automated data processing system and decision-making algorithms and it can work with big data efficiently. Machine Learning algorithms 23 provide effective automated tools for data collection, analysis, and integration. Some of the common applications are web search, recommender systems, ad placer.

Conclusion:

Big data is used for capturing, storing, managing, analyzing and processing large amount of data which cannot be processed by any traditional database management system. Therefore, enterprises require big data platform to keep much more data of customers, process and segment them more wisely. Customer segmentation divides customers into groups who have similar preferences. With the help of big data and segmentation, companies perform their digital marketing activities more efficiently.

A study was perfromed by Tykheev in 2018 on the same topic by analyzing two clothing retail companies. However in that study, big data implementation in digital marketing is compared between online and traditional marketing which is different topic.

To gain different experiences and views, especially from B2C and B2B Market point of view, in-depth personal interviews were conducted with the companies, Siemens, INUOVO and MIOPS, from different sectors. Interview questions were prepared about the strategy of big data usage in digital marketing. Companies are from the industries; building technology, shoe manufacturer and photography, which are the examples of B2B and B2C marketing including a startup firm. Interviews were conducted with the marketing managers to understand their digitilisation strategy, big data usage, their marketing research activities, digital marketing process, product development and segmentation strategies including big data usage, marketing communication and adaptation of future trends in digital marketing.

Recommendation for future studies would be the usage of continuous customer segmentation with AI which is trending and provides higher level of segmentation. Traditional segmentation methods does not take into account of

the changing world. Traditional segmentation uses the data of a spefic time, but the needs and behaviours of the customers are changing. By using this technology, new segments may be exposed, the segments may be obsolated and changed so that the marketers can adapt to the changing word quickly.

In addition to above recommendations, B2C companies can segment the customers in real-time by using their emotional situations, which can be found from their social media or any external sources in order to increase the sales. As an example, womens prefer to shop when they don't feel good and the emotional analysis could be done by using external data.

Another recommendation would be that, the B2C companies can use more location based digital marketing including augmented reality, gamification, which entertains the users more.

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