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Big Data Applications in Digital Marketing

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Abstract: Every year, a set of new trends arise that change the course of the digital marketing process and make it easier for marketers to do their work and save time continuously. One of the most critical new trends that have greatly influenced digital marketing and are expected to sustain its impact in the future is Big Data. This article aimed to outline the role of big data in digital marketing by discussing its various applications in digital marketing operations. This article was based on the systematic review methodology by reviewing the previous literature in the study area. The results obtained from the literature showed various applications of big data analytics in digital marketing, including (improving customer experience, measuring and analyzing competitors, innovation and product development....etc.). The article also discovered that companies regularly employ big data to improve the accuracy of different marketing decisions, such as enhancing customer knowledge, providing highly customized promotional content, increasing sales, and measuring the effectiveness of digital marketing campaigns. This article will provide a theoretical base for future researchers to conduct a field study on Turkish companies to examine to what extent they are using big data analytics in digital marketing.

Keywords: Big Data, Big Data Applications, Big Data Analytics, Digital Marketing, Social Media
JEL Classification: C55, M31

1. Introduction

The volume of data produced in the world was estimated at 44 zettabytes (ZB) at the dawn of 2020, and by 2025, the amount of data produced each day is expected to reach 163 ZB globally (Vuleta, 2021). Due to this evolution, Big Data has been accepted as “Digital Oil” because of the great value, and has also been named as the New Raw Material of the 21st century (Lua & Lin, 2018). However, what matters is not the data itself, but the insights, decisions and actions taken from Big Data that make all the difference.

Marketing is a dynamic and ever-changing business function. The key to modern marketing is customization (personalization). However, in today's digital marketing era, companies need to better understand the impact of digital technology on their marketing

strategy. Digital marketing is the result of using information technology in traditional marketing methods (Sudianto, 2019).

Since the begin of the 21st century, the use of big data in digital marketing has increased significantly. According to an online survey of 253 corporate marketing decision makers, 91% believe that successful brands use customer data to drive marketing decisions (Rogers & Sexton, 2012). In addition, according to the results of the New Freeman survey with more than 650 lead marketing executives from most of the world's largest companies, 89% of them were used big data to make strategic decisions, 98% of them were employed big data to maintaining budgets, and more than 70% of them were utilize big data to influence broader marketing and business goals (Freeman, 2018).

The availability of big data creates huge opportunities for the industry in terms of developing marketing strategies; It helps marketers better understand the market, improve their marketing strategy, and streamline decision making. According to (Järvinen, Tollinen, Karjaluoto, & Jayawardhena, 2012), the availability of digital data from a marketing perspective creates two significant opportunities for the industry. First, firms have access to a wide variety of digital tools that can be used for marketing purposes, and second, digital media has made marketing more measurable by improving the ability of marketers to evaluate, collect, process and report data about their marketing activities. In this matter, to survive or stay competitive in today's digital marketplace, organizations need to deliver a new data-driven approach that helps transform data into knowledge and science to attract new potential and loyal customers.

The main purpose of this work is to attempt to define the role of big data in digital marketing by reviewing several practical cases from different companies and researching the main methods and applications of big data that they follow and apply in their digital marketing strategies.

2. Data-Driven Digital Marketing

Due to the rapid development of the Internet of Things, where objects interact with other objects, it has provided significant opportunities to generate large amounts of data (Big Data). According to Kotler, consumers now have a greater ability to search for information about a company and its products/services (Kotler, 2016). Consumers can also know the rating of their product/service, the social responsibility of the company, and even get references from other consumers, using only digital devices that connect to the internet (Kotler, 2016). Because of these developments, it has become important for managers and marketers to know how to get their consumers' reactions and to

quickly understand consumer behavior. In this regard, Big Data is the main resource that supports them to make better decisions by collecting and analyzing data.

Big Data plays a key role in Digital Marketing strategy. According to a recent survey by Forbes, 88% of marketers stated that they use third parties to extract Big Data for marketing purposes. This survey also concluded that companies implementing data-driven marketing are six times more likely to remain profitable over the course of the year. According to the statistics above, this gives marketers a clear competitive advantage while also giving them the opportunity to increase profitability. As a result, more and more marketers are turning to data to decide how they should engage with their target audience (Reddy, 2021).

Understanding this evolution, companies have gradually changed their marketing processes while reconsidering priorities and allocating funding for digital marketing, as well as transforming workflows and developing core skills (Edelman, 2010). That's why many companies have begun recruiting developers and data scientists to learn from their target customer in order to increase the relevance of their offerings (Li, 2016).

3. Big Data Applications in Digital Marketing

The knowledge gained from the use of big data provides added value to businesses through new productivity, growth, innovation and consumer surplus, and thus Big Data becomes an important determinant of competitiveness. For this, businesses need data analytics capacity to harness the full potential of data (Vassakis, Petrakis, & Kopanakis, 2018).

3.1. Innovation and Product Development

One of the most common uses of Big Data is to get product insights. Companies can easily conduct qualitative and quantitative market research online at a much lower cost than they were two decades ago (Luenendonk, 2019).

In terms of product, marketers have strengthened their ability to respond to competition by innovating products without wasting time. Taking an example from the motor market, ConnectedDrive, as the integrity system developed by BMW to increase the safety and comfort of drivers, is able to optimize design and capabilities by utilizing Big Data and Predictive analytics, while also predicting consumer trends and demands (Schotman & Mitwalli, 2013). Besides, to overcome fierce competition from rivals Hyundai, Skoda and Tata, Ford Motor has used Big Data to revolutionize product innovation and design. Ford collects consumer data from its vehicles on the road via sensor and remote application management software (Lua & Lin, 2018). Satell said Ford is facilitating product

innovation using Big Data instead of waiting for insights from traditional marketing research (Satell, 2014).

Another example of success in leveraging Big Data in this field is the Rolls-Royce company. Roll-Royce is a British brand that manufactures massive engines used by airlines and more than 150 armed forces. Rolls-Royce uses Big Data processes in three main areas of its operations: design, production and after-sales support. Thus, Big Data Analytics helps Rolls-Royce improve the design process, shorten product development time, and improve the quality and performance of its products. Although exact figures are not available, the company says that adopting a Big Data-driven approach to diagnosing, fixing and preventing errors has "significantly" reduced costs. It is also said that they facilitate production processes by allowing the elimination of defects in future products during the design process (Marr, 2016).

As the leading furniture manufacturer, the IKEA brand also uses big data in innovation and product design. In 2013, IKEA launched a feature for image recognition and augmented reality in its apps. Customers scan their favorite products with their phones, directly from an IKEA catalog or store. These advanced analytics allow customers to virtually place their favorite furniture in their home and see how it looks, as well as change colors, sizes and models. With such a personalization feature, IKEA provides high-quality Customer Experience and increased satisfaction not only in the store but also in the web store and phone app (Stoycheva, 2018).

3.2. Personalized (Customized) Marketing and Targeted Ads

Besides the ability to interact with customers at scale, Big Data can also be used to create personalized campaigns that target individuals. By communicating with each customer individually, marketers are able to recognize key customer behavior patterns that will help engage consumers. Personalized marketing is the creation and delivery of messages to individuals or target audience groups, with the help of consumer data such as geographic location, browsing history, click behavior and purchase history through data analysis (Nazarov, 2019).

Targeted Ads (known as One-to-One Marketing) help companies improve customer experience, increase brand loyalty and drive sales. 71% of customers prefer ads tailored to them, and twice as many people click on a website banner even if they are promoted with a brand they don't know (Carstensen, 2019).

Netflix is a good example of the big brand that uses Big Data Analytics for targeted advertising. To create personalized accounts for each consumer, Netflix collects data

such as when subscribers watch the show, whether they watch it excessively or take a while to finish, whether they pause the show and resume it after a break. Because Netflix's goal is ultimate customization (Tudor, 2020). Netflix also makes excellent use of email marketing to entice new users to join their platform and then offers personalized recommendations based on their preferences (Rangaiah, 2021).

YouTube is another shining example in this regard. YouTube's “Recommended” section is based on neural networks. This section analyzes customer liked information, video materials and presents new video clips based on Big Data Analysis. "Digital Trail" or "Digital Footprint" is another method companies use in the "Recommended" section or related ads. Social media users such as Facebook, Instagram and Twitter leave this digital trace when they press the 'like' button. Another example of the principle of “Digital Trail” is the voicemail of “Vkontakte”. For example, if a user wants to order pizza while chatting, he/she will definitely see the relevant ad on social media after a while (Nazarov, 2019). On top of that, the Peloton Fitness industry (Darling Peloton) is another brand to watch when it comes to Big Data. The company uses data to personalize emails for its members and provides workouts and activity summaries only to them. This strategy resulted in an average 48% open rate for fitness brand intro emails and high rates for subsequent emails (Velasco, 2020). Similarly, retail company "Kroger" has used Big Data in a rather unconventional way to customize direct mail coupons to existing customers. To do this, it used data from robust, well-ranked customer loyalty programs to sending the right coupons to the right customers at the right time. The industry average coupon rate of return is 3.7%, but Kroger's data-driven approach has earned them an incredible 70% coupon rate of return (Velasco, 2020).

One example of the successful use of Big Data in Digital Marketing is found in the business of US trade chain "Target". Target's Audience Statistics Analysts have found a way to identify female consumers' pregnancies early in the second quarter to send them personalized marketing ads and coupons about the upcoming baby's birth and give them special offers on pregnant women's clothing, toys, diapers and similar products (Ćurko, Varga, MerkaŠ, & SiloviĆ, 2017).

Amazon's personalized recommendation system is one of the reasons that made the company so successful. Amazon.com uses data-driven suggestions as a targeted marketing tool on its website. Clicking "Your recommendations" will take the link to a page where your recommendations are modified based on variables such as product types, subject area, and ratings of previous products, and it can also be seen why a particular product is recommended. That's how Amazon earns 35% of its annual sales (Valcheva, 2020).

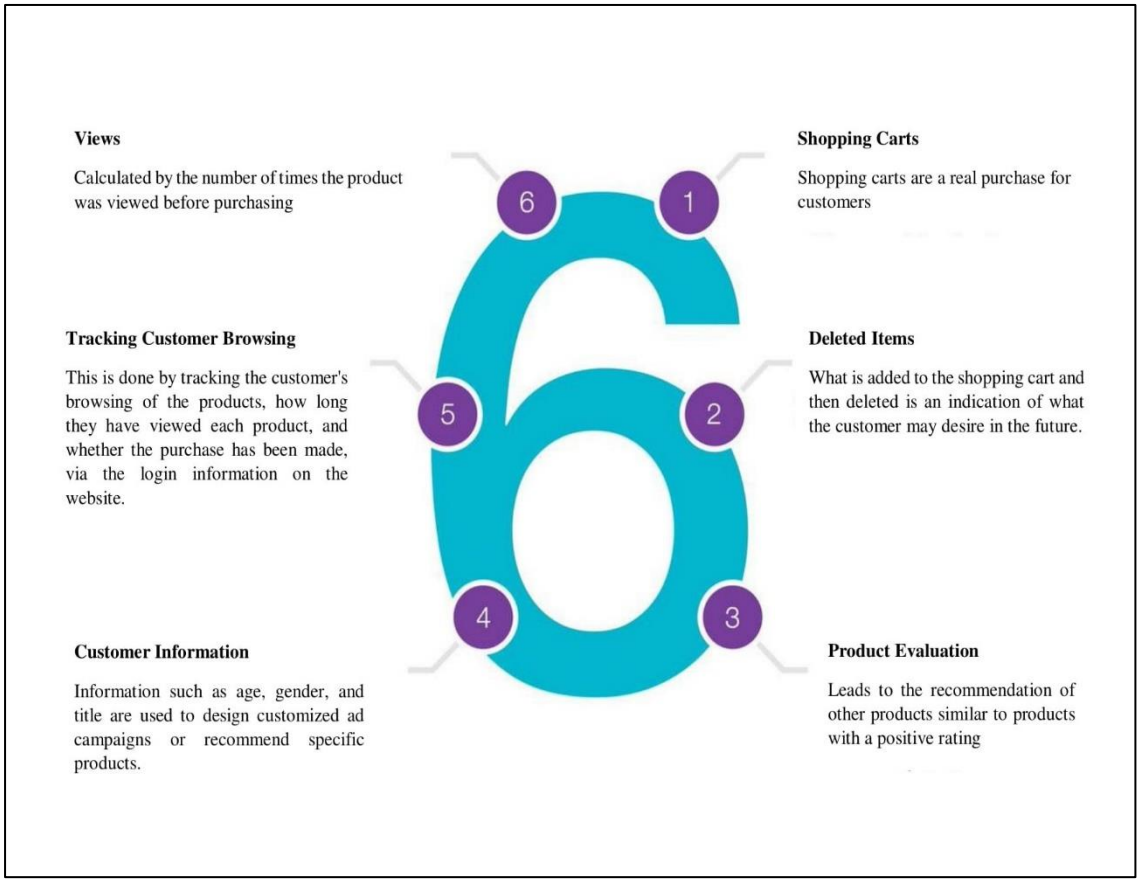

Figure 1. The Amazon Recommendations System (Arsenault, 2016)

"Starbucks" is also using Big Data to create a better customer experience. Starbucks collects data by providing customers with Starbucks rewards programs and mobile apps that help them learn more about each of their customers' purchasing habits, and then uses that data to recommend products to loyal customers, create better marketing campaigns, and new menus, plus send personalized emails with offers or discounts to customers who haven't visited the store for a while so they can re-engage with them. Additionally, "EasyJet Airlines" kicked off its 20th anniversary with a data-driven campaign. The brand has created individual stories using the travel history of each of its customers. At the heart of the campaign, emails are customized using customer data, such as when they first traveled with airlines and other data. As a result, open rates for this campaign were 100% higher than typical newsletters, with 25% higher CTR (Click-through Rate) (Aroscop, 2019).

3.3. Price Optimization and Sales Boost

Big data gives companies the opportunity to forecast selling probabilities and the most likely scenarios, and then fully develop their own demand forecasts. Demand forecasting can both reduce the risk of being out of stock and enable companies to control their production costs. Price Optimization can maximize sales and revenue. Price Optimization is the practice of using data from customers and the market to find the most effective price point for the product or service. Generally, SMEs set prices according to various criteria such as competitors' cost, production cost and the expected value of the product from the customer's demand. However, using big data analytics, companies can determine the best price for products by considering different factors such as data from completed deals, coupons used when purchasing, discounts and performance data. Big Data helps businesses make price decisions easily because every purchase is different.

As everyone knows, airlines use Dynamic pricing tactic when selling airline tickets. If a customer checks the same ticket over and over, it probably means that she/he really wants the ticket and is ready to pay more. The same logic applies to Amazon's website, their prices are changed up to 2.5 million per day. The factors affecting these price changes are user activity, order history, prices offered by competitors, product availability, etc. (Tudor, 2020). Consumers' reactions to this pricing plan strategy will have a significant impact on their satisfaction with their purchase and their subsequent behavioral intentions. For example, Amazon normally changes the price of products sold on its website by 5%, 10% or 15% on a daily, weekly or monthly basis (Le & Liaw, 2017). Amazon uses this method to provide discounts on popular products and profit on less popular products (Board Infinity, 2019).

Also, as discussed above, companies can change pricing according to the consumer's characteristics. Using an example from the hotel industry, examining data can reveal that owners of a certain type of smartphone or using a particular type of browser are more likely to make hotel reservations regardless of price, then, the hotel can increase the prices for those who access their site with the respective smartphone or browser (Luenendonk, 2019). Many hotels and hotel chains (like Starwood Hotels) use dynamic pricing to optimize revenue. Room rates vary based on various factors such as local and global economic situation, weather, availability, booking behavior, cancellations, and more. Starwood Hotels using dynamic pricing technique resulted in 5% revenue growth per room (Tudor, 2020).

3.4. Place (Distribution) and Storage

Companies also benefit from big data in developing place (distribution) strategies. As a good example, Amazon company analyzes data such as order history, product search history, and shopping cart activities to predict when the customer purchases a particular product, and starts shipping the product to the nearest customer's warehouse before the customer places their order. Amazon uses insights from Big Data to reinvent its delivery and distribution strategy (Lua & Lin, 2018). In addition, it uses a predictive shipping model that uses Big Data to predict the products most likely to be purchased by its customers (Board Infinity, 2019; Saahilk, 2020). On the other hand, according to research by Forbes, "Starbucks" has seen a nearly 26% increase in revenues in just three years (2016-2019) (Stoycheva, 2018). Starbucks uses big data to determine the potential success of each new branch, taking into account information about location, route, area demographics, and customer behavior. Conducting this type of evaluation before opening a new branch means that Starbucks can make a fairly accurate estimate of what the success rate will be and select locations based on revenue growth trend. In this way, the brand manages to reduce the risk of opening a branch in an unprofitable location and ultimately prevent any branch bankruptcy (O'Neill, 2016).

Similarly, the "Nordstrom" brand has found another application of Big Data in creating a cross-channel inventory system that allows customers to see what products are or will be available in a given location. Thus, Nordstrom combines online and offline capabilities to deliver an enhanced customer experience (Tykheev, 2018).

3.5. Improve Customer Experience

Big Data allows marketers to compile, explore and analyze various aspects of behavioral metrics – how people use their products and services – as well as social and demographic factors.

In Digital Marketing, Segmentation based on Touchpoint Interaction, Segmentation based on Purchasing Patterns and Micro Segmentation are the three most commonly used types of segmentation. Micro Segmentation application seems to be more developed and a rising trend in marketing. Micro Segmentation helps to more accurately categorize people, especially regarding behavioral intentions (ActiveWizards, 2019). "Best Buye" company creates a bottom-up segmentation of its customer base to identify key characteristics and behaviors that suggest someone is a 'Good' or 'Bad' customer. By applying data-driven segmentation, "Best Buye" concluded that 7% of customers manage 43% of sales volume (Harker & Riccio, 2011).

Big Data also works when the company builds a relationship with a customer. The more interactions a company has with customers, the more information it can gather and better understand, which influences customer decisions (Tykheev, 2018). One of the ways in which big data is changing the customer service industry is through chatbots. It has become a popular tool for businesses because it provides customers with quick and easy customer service. It also reduces the problems and costs caused by human error in customer service (Analytics Insight, 2021). For example, the brand “KIA” has a chatbot on Facebook Messenger (named Kian) to help car buyers get valuable information. Kian is able to get 3x more engagement than the corporate site by helping car buyers find answers to various questions. Kian exchanged 600,000 messages with customers and generated 50x more engagement via Messenger. Kian's service can be personalized at scale and can answer critical questions for any car model (Valcheva, 2020).

One of the important ways to improve the customer experience is customer satisfaction. As customers' satisfaction goes up, so does their experience. The world's largest telecommunications company “AT&T” coordinates customer management communications centrally across the enterprise. This improves consistency and relevance for customers and reduces the cost of customer interactions. Additionally, AT&T uses network analytics to predict and resolve mobile customer service issues (usually before the customer realizes the issue) and uses post-sales follow-up calls to ensure customer satisfaction (Harker & Riccio, 2011).

Successful companies are not only improving the customer experience to achieve their goals, they are increasingly discovering new techniques to retain them and reduce their loss. "Coca-Cola" is an example of company that uses big data analytics to retain customers. In 2015, Coca-Cola successfully strengthened its data strategy by creating a digital loyalty program Coca-Cola's Director of Data Strategy interviewed by ADMA's Executive Editor, and the interview shows that Big Data Analytics stands firmly behind Coca-Cola's customer retention (Kopanakis, 2018).

3.6. Budget Optimization

Budget Optimization is a crucial part of any marketing strategy and one of the biggest challenges for digital marketers. In today's era of accountability, especially as the number of ways to reach customers and potential customers continues to increase; it has become crucial for marketing leaders to set their budgets wisely. To optimize a company's marketing budget, it must evaluate its performance from the previous budget cycle and make predictions about what bottom line impact future activities will have. In other words, companies have to find out exactly what they are spending their budgets on by focusing on the cost of advertising and the revenue generated.

Today, businesses have many channels to reach consumers and the entire marketing budget is allocated to each channel separately. Decision-makers face significant challenges when determining the optimal budget allocation. For example, it is not easy to blame a particular channel for growth, and at the same time, decision makers cannot reduce it to only a few channels or allocate resources randomly. According to Anurag, Big Data offers a solution to this problem by using the Market Mix Modeling Technique (MMM). Market Mix Modeling provides insights into the current environment of marketing activities and the potential future impact of marketing campaigns on ROI, profits and sales. Thus, it provides predictive insights into the profitability of campaigns even before implementation. This helps companies pinpoint the channels that have the potential to increase their profits and invest accordingly (Anurag, 2017).

As an example of two real-life successes in this field, the American banking and finance company “Capital One” analyzes its customers' demographics and spending habits to determine the best times to present various offers to customers. Thus, it can increase conversion rates from its communications and improve budget allocation (O’Neill, 2016). Similarly, as a retail company, “Sears” has optimized its budget by applying a data-driven approach. By combining data on customers, products, sales, and campaigns, the Sears company has reduced the time it takes to launch major marketing campaigns from eight weeks to one week (Petersen, 2016).

3.7. Competitors Analysis

In today's age of intense competition, identifying and analyzing competitors has become very important for companies to stay one step ahead. Most business decisions are based on analysis of competitor products extracted from the market. Competitor Analysis is about analyzing competitors' products, strategies and performance to understand how a company will improve its own products and services and expand its customer base. In this context, big data provides companies with the opportunity to learn about their competitors (Big Data Analytics News, 2020).

Fashion and apparel e-commerce platform “Leasara”, for example, during its years of success, CEO Roman Kirsch said that, relying on data, they were able to provide customers with exactly the trends they were looking for and want to buy, with more personalized fashion than any traditional retailer. He explained that they could offer a shopping experience and an advantage of his company over their competitors in this way (Tykheev, 2018). As another example, healthcare digital marketing service "DMD Marketing Corporation" outperformed competitors 3 times due to big data. DMD Marketing offers the only verified database available that can access, report on, and respond to the dynamic digital behavior of over six million US healthcare professionals.

DMD has run over 300 million emails and 30,000 email marketing campaigns to date. Given that marketing emails to healthcare professionals is a very competitive commodity business, Big Data offers DMD a way to differentiate. Using cloud-based Big Data integration tools, DMD refreshes email data every day instead of every three days, helping the company outperform the competition with 95% email deliverability (Talend, 2020).

4. Conclusion

Literature has demonstrated many applications of Big Data in Digital Marketing; most importantly, successful Big Data can help improve customer experience, measure and analyze competitors, and Big Data can offer promising opportunities for innovation and product development.

The study found that companies generally use Big Data to improve the accuracy of different types of decisions. Effective use of Big Data in marketing leads to enhanced customer knowledge. Another important advantage brought by Big Data is that it can predict trends and therefore increase sales. In addition, the results show that effective use of Big Data in marketing provides ways to more accurately measure the effectiveness of Digital Marketing campaigns as well as optimize the marketing budget.

Big Data has endless applications in Digital Marketing Strategies. Marketers need to uncover hidden patterns, links and gain insights from unstructured Big Data to make sound marketing decisions. From product development to measuring results and satisfying customers, companies can apply Big Data Analytics in different ways to improve their marketing operations. Therefore, businesses need to make sure they have the right infrastructure to manage Big Data.

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