İSTANBUL BİLGİ UNIVERSITY

INSTITUTE OF GRADUATE PROGRAMS

MEDIA AND COMMUNICATION SYSTEMS

MASTER'S DEGREE PROGRAM

THE USE OF BIG DATA AND ALGORITHMS ON DIGITAL ADVERTISING

GÜLŞAH ZAMORANO DE SAN MARTİN

117680016

Doc. Dr. ERKAN SAKA

İstanbul 2021

İSTANBUL BİLGİ UNIVERSITY

INSTITUTE OF GRADUATE PROGRAMS

MEDIA AND COMMUNICATION SYSTEMS

MASTER'S DEGREE PROGRAM

THE USE OF BIG DATA AND ALGORITHMS ON DIGITAL ADVERTISING

GÜLŞAH ZAMORANO DE SAN MARTİN

117680016

Doc. Dr. ERKAN SAKA

İstanbul 2021

Tez Danışmanı : (İmza) .....

…..... Üniversitesi

Jüri Üyeleri (İmza) .....

..... Üniversitesi

Juri Üyesi:

…..... Üniversitesi (İmza) .....

Tezin Onaylandığı Tarih : .....

Toplam Sayfa Sayısı: .....

Anahtar Kelimeler (Türkçe)

1)

2)

3)

4)

5)

Anahtar Kelimeler (İngilizce)

1)

2)

3)

4)

5)

ACKNOWLEDGMENT

I would like to express my deepest respect and gratitude to my very valuable teacher and thesis advisor, Doc. Dr. Erkan Saka for his valuable knowledge, contributions and never ending support at every stage of this piece of work which I have written as a postgraduate's thesis.

I would also like to thank my family for supporting me through this period.

Yours respectfully.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

With the impact of digital transformation, big data and algorithms have had a significant impact on digital advertising. Rather than the visual or content richness of advertisements, this transition means organizations refining their business strategy, getting to know their clients better, and delivering relevant goods and services. In digital advertising, Turkey's advertising corporations gain from big data and algorithms. The role of big data and algorithms in digital advertising was attempted to be established in this qualitative research study, which involved 23 (16 male, 7 female) persons from relevant firms. The participants were provided with the semi-structured interview form prepared in this regard, and their thoughts on the usage of big data and algorithms were gathered.

The themes were revealed when the data obtained for the study was examined using the content analysis approach in the Nvivo 12 program. Big data and algorithms are of great importance in digital advertising in this context; advertising companies should benefit from big data, based on the fact that almost everyone in the world provides data to big data, and the usefulness of big data and algorithms in ensuring correct product pricing are the situations stated by the participants. Participants explained their reasons for using big data and algorithms, the increase and change in customer demands (86.96 %), to be a pioneer in the competitive environment (78.26 %), evaluation of new market opportunities (73.91 %), development of new They are listed as goods and services (65.22%), current event and changes in the world (56.52%), and increase in stakeholder value (30.43%). Participants pointed out that personalization and accurate targeting (47.8%) for the advantages of big data and algorithms, direct access of advertisements to the targeted customer and contributing to the reduction of advertising expenditures (43.5%) are priority. Furthermore, the participants stated that the potential of big data and algorithms to access all consumer information violates ethical limits, which they believe is a negative. As a result, big data and algorithms are becoming increasingly important

in the evolution of digital advertising in Turkey, and businesses are increasingly relying on them to stay competitive.

Keywords: Big data, algorithm, digital advertising, qualitative research

ÖZET

Dijital reklamcılık, dijital dönüşümün etkisiyle büyük veri ve algoritmalardan oldukça etkilenmiş durumda. Bu dönüşüm, sunulan reklamların görsel ya da içerik zenginliğinden öte, firmaların iş stratejilerini geliştirme, müşterilerini daha yakından tanıma ve buna uygun mal ve hizmet sunma anlamına gelmektedir. Türkiye'de reklam firmaları dijital reklamcılıkta büyük veri ve algoritmalardan faydalanmaktadır. Nitel araştırma yöntemiyle yürütülen bu çalışmada, ilgili firmalardan 23 (16 erkek, 7 kadın) kişiyle mülakat yapılmış ve dijital reklamcılıkta, büyük veri ve algoritmaların yeri saptanmaya çalışılmıştır. Bu kapsamda hazırlanan yapılandırılmış görüşme formu katılımcılara sunulmuş ve büyük veri ve algoritma kullanımına dair görüşleri öğrenilmiştir.

Araştırma kapsamında toplanan veriler Nvivo 12 programında içerik analizi yöntemiyle analiz edilmiş ve temalar açığa çıkarılmıştır. Bu kapsamda büyük veri ve algoritmaların dijital reklamcılıkta büyük öneme sahip olduğu, dünyadaki neredeyse herkesin büyük veriye veri sağlamasına bağlı olarak, reklamcılık şirketlerinin büyük veriden faydalanmaları gerektiği, ürün fiyatlandırmalarının doğru olabilmesi için büyük veri ve algoritmaların kullanışlılığı, katılımcılar tarafından belirtilen durumlardır. Katılımcılar büyük veri ve algoritma kullanma nedenlerini; the increase and change in customer demands (86,96 %), to be a pioneer in the competitive environment (78,26 %), evaluation of new market opportunities (73.91 %), development of new goods and services (65,22 %), current event and changes in the world (56,52 %), and increase in stakeholder value (30,43 %) şeklinde sıralanmışlardır.

Katılımcılar büyük veri ve algoritmaların avantajları için kişiselleştirme ve doğru hedefleme (%47,8), reklamların hedeflenen müşteriye doğrudan ulaşması ve reklam harcamalarının azalmasına (% 43,5) katkıda bulunmasını, öncelikli olarak işaret etmişlerdir. Buna ek olarak katılımcılar, büyük veri ve algoritmanın,

müşterilerin tüm bilgilerine erişebilme yeteneğinin, etik çizgileri aştığını ve bunun bir dezavantaj olduğunu düşündüklerini vurgulamışlardır.

Sonuç olarak Türkiye'de dijital reklamcılığın dönüşümünde büyük veri ve algoritma büyük bir öneme sahiptir ve firmalar pazarda etkin olabilmek ve rekabet ortamında kaybolmamak için bu sistemden oldukça sık ve etkili bir şekilde faydalanmaktadırlar.

Anahtar kelimeler: Büyük veri, algoritma, dijital reklamcılık, nitel araştırma.

INTRODUCTION

Beginning from the end of the 20th century up until now, significant developments have been observed in all areas of technology, particularly in information technologies. Consequently, we've seen the evolution of digital technology, which now plays a critical role in both social life and the economy. Because of the widespread use of the Internet, digital technologies are of concern not only to society and businesses but also to individuals. Consumers can now actively engage in almost all processes and have an impact on them all at the same time.

The Fourth Industrial Revolution, the most dynamic wave of transformation in human history, is currently underway. The Fourth Industrial Revolution, according to researchers, will arise as a result of the convergence of digital and various physical technologies such as artificial intelligence, augmented reality, virtual reality, machine learning, and cloud computing (Schwab, 2016). Hence, the combination of these technologies has revealed transformations that can be called New Industrial Revolution or digital transformation. What is more, the digital revolution is characterized as an attempt to maintain competitiveness by using digital technologies to keep up with the change in market landscape (Cho & Lee, 2018). Therewith, historically only available processes in analog form (such as music, film, and photography) are now converted into digital manifestations or transforms (sensory experiences, shopping and books). The distribution of digital technologies has significantly influenced the media sector.
The blurring of borders and gaps between different advertising media has been caused by the fast transitions in the media field brought on by the digital revolution (Lee & Cho, 2019).

In this context, the phrase "digital transformation" (or "transition from analog to digital media") refers to the implementation of a comprehensive corporate plan as well as new methods of thinking and acting to improve organizations' strategic

views; hence, it goes deeper than the development of media that enhances picture quality or improvements in technological advancement (Cho & Lee, 2018). Digital advertisement is definitely one of these new ways of thinking.

Digital advertising offers marketing professionals several groundbreaking innovations. Businesses can now target particular groups with tailored commercial messages in different formats delivered at specific times and places. When compared to traditional advertising, digital ads offer benefits, including improved targeting and relevance, as well as personalized ad content. With real-time programmatic sales and different online and offline response behaviors, it is also possible to quantify individual customer ad experiences in an integrative way. These mentioned features completely changed the way marketing professionals spend their budgets. Revenue from digital ads rose by 117 percent from 2014 to $ 108 billion in 2018 (eMarketer, 2019; Interactive Advertising Bureau [IAB], 2019). It is assumed that the updated number of this statistic is much greater and presumed to rise.

Marketers can choose from a variety of search and display advertising solutions provided by digital advertising firms. Despite the fact that digital advertising has been around since 1995, market dynamics are changing at a rapid pace, especially in recent years. For instance, the number of marketing tech companies grew from 150 to 7,040 between 2011 and 2019 (Brinker, 2019).

Companies have now adopted various advertisement formats based on what piques consumers' attention and their media usage patterns. Although this observation process was initially carried out through desktop viewing and monitoring searches, recent development has shifted to social networking, video, audio, and mobile advertising. Of course, the extraordinary impact of big data must be mentioned at this stage. Because of the introduction of new algorithms and the contributions of big data to this area, digital advertising has experienced profound changes in recent years.

It is thought that data can be generated in almost every sector where humans work, and those novel methods of understanding our world depend on it as well. The collected data from humans showed that big data would be beneficial in terms of optimum usage of resources when it comes to deciding based on information (Alam & Dhunny, 2019). Artificial Intelligence (AI), Machine Learning and Internet of Things (IoT), make a great contribution to this process. All of these arguments are generated within the paradigm of algorithm reasoning.

According to De Mauro, Grimaldi and Greco (2016), big data gathered by special algorithms can be converted to value through volume, speed, and diversity that necessitate analytical techniques. As a result, 4V technology allows for the differentiation between data and big data. Nowadays, several sectors use this technology. Notwithstanding, due to the competitive perspective of businesses that want to participate in the global market, big data and algorithms have become more useful for advertising companies.

1.1. The Purpose of the Research

Nowadays, as big data and algorithms influence almost every aspect of our lives, research on the topic continues apace. This study aims to demonstrate that there are numerous opportunities to enhance marketing practices by using big data and algorithms in the digital era. Furthermore, big data seems to be the only way to understand consumer needs at the appropriate time and in the appropriate manner. As a result, the research participant group will serve as a reference for businesses seeking to enter the global market.

1.2. The Significance of the Research

This research will act as a reference and provide a qualitative contribution to the field by demonstrating how big data and algorithms are applied and used in digital marketing.

1.3. Research Method, Data Collection Technique and Analysis

One of the *Qualitative Research Methods* was used to conduct this study, namely, the *Phenomenology* method. Also, in this research, the data was obtained via the Interview technique by administering a Structured Interview Form. They were then subjected to *Content Analysis* and the resulting data analyzed with the *Thematic Analysis* method.

1.4. Limitations of the Research

This research is

1. limited to only 23 individuals from 23 companies who participated in the study.
2. The study is limited to the 5 qualitative questions in the structured interview form created after comprehensive literature review.

1.5. Assumptions of the Research

It is believed that the people who took part in this study answered the questions truthfully.

1.6. Research Questions

The questions of this research are as follows.

1. What function do big data and algorithms play in the evolution of digital advertising?
2. How do digital advertising companies utilize big data and algorithms?
3. What are the advantages and disadvantages of big data and algorithm-based ads for companies?
4. Why do companies use big data and algorithms?

2. CONCEPTUAL FRAMEWORK

2.1. Digital advertising

Beyond time and space, the digital media world provides opportunities for businesses and customers. While traditional media is consumed over a timeframe, new media can be accessed via mobile devices, as consumers bring their smartphones with them almost everywhere these days. Consumers can now consume all types of content that are produced and delivered by the media whenever and wherever they want. Embracing digital media in our lives fundamentally coincides with the accelerated usage of the Internet and cell phones (Truong, McColl, & Kitchen, 2010). Having access to mobile-based communication provides marketers with additional opportunities to promote, engage with customers, and receive immediate feedback (Andrews et al., 2016). The mechanism of delivery of advertising messages has shifted to mobile platforms, allowing messages to reach people immediately and prompt responses without having to go through traditional channels can be given as an example.

The terms “digital advertisement” and “online advertising” or “internet advertising” are also used interchangeably. Digital advertising, according to IBIS World (2016), is promotional messages offered to the consumer via online media channels. Similarly, online advertising supplied through channels meant for broad consumption is also known as digital advertising. Based on such research, it is feasible to conclude that digital advertising utilizes interactive media to enable marketers to deliver a better brand experience (Cho & Lee, 2018).

Digital advertising, which includes both online and mobile advertising, is a major source of revenue on the Internet. While Internet advertising has been altering the rules of the industry since the 1980s, a new sort of in-app mobile advertising is gaining traction in the smartphone market. These platforms collaborated to boost

ad sales to new heights at all times. Digital advertising has been a huge driving force behind web and mobile technologies due to its tremendous sales potential. HTML5 rich media adverts that show straight on consumers' smartphones are now available.

2.1.1. History of Digital Advertising

There is no single universally recognized fact about when digital ads began. Some people claim that the first spam email was sent on May 3, 1978, and this was the start of digital ads. Gary Turek, marketing manager of Digital Equipment Corporation, sent this email to 400 to promote some of the firm's goods. This elicited a negative response at first. But, things had to change once this situation was experienced, and since then, digital advertising has become an indispensable aspect of both business and consumer preferences (Sen, 2018).

Several people believe that digital ads began in the 1990s, particularly in 1994. This particular date is based on the banner ad sales of HotWired web magazine for AT&T on their site. After that, banner advertising started to be used by several other businesses (Kaye & Medoff, 2001).

The expense of selling the ad was computed based on the number of individuals who saw it at the time. To put it another way, the value of online ads was determined by the number of individuals who had seen them. This approach was in use until the mid-1990s, when Procter & Gamble and Yahoo introduced the ‘cost per click’ model, which is still used today (Kaye & Medoff, 2001). The internet advertising market has been steadily growing since the late 1990s, with similar profit models. Ads were paid based on how many times they were viewed between 1998 and 1999. That being said, on a quantitative basis, this model did not assist companies in determining the efficacy and attractiveness of ads on websites. On the other hand, Overture Services has pioneered a novel approach by enabling companies to pay based on how high they rank in user search results. Advertisers were able to more

easily identify their target audience, allowing them to display their advertisements to more relevant people, thanks to this model (Sen, 2018).

In 2000, Google launched its AdWords service with the participation of only 350 advertising companies. Millions of advertising agencies currently use this ad service, and it is assumed that approximately 33% of global advertising revenue relies on it (Sen, 2018). Along with Facebook and Alibaba, Google is currently leading the online advertisement competition.

The very first efforts to promote goods and services online have been influenced by traditional ads. However, until the online advertising business matured, it gradually gained new features, improved its methods, and after fulfilling its potential, its remarkable success also brought autonomy too. In 2005, online advertising outperformed radio channels in terms of investments and profits, while TV was the only remaining competitor (Taylor, 2009).

2.1.2. Types of Digital Advertising

Digital advertising is divided into several types based on the ad medium, content format (text, photo, image, gif, audio or video) and the specific characteristics related to the areas in which they are displayed.

2.1.2.1.Banner (Display) ads

Banner is a corporate communication element prepared for advertisement and promotional purposes and designed in sizes that will align with the headings or bottom parts of websites and newspapers or as a poster (Wikipedia, 2021). Banner advertising accounts for roughly 47% of online advertising spending, particularly with the growing rise of social media display ads (ZenithOptimedia, 2016).

Increased ad engagement has been shown to have a positive impact on banner advertising effectiveness, as calculated by click-through rates (Sherman and Deighton 2001). Nevertheless, previous research has shown that when surfing the Internet, a large proportion of consumers pay little attention to banner ads (Drèze & Hussherr 2003). Later on, click-through rates were discovered to be indicators of advertising effectiveness that are strictly correlated to the consumer's interest in the service or product advertised. The attractiveness of banner ads proven to be directly influenced by personalization that is achieved through behavioral targeting (Bleier & Eisenbeiss 2015), animation and color are two design elements (Cho, Lee & Tharp 2001; Tsang & Tse 2005), and size (Robinson, Wysocka & Hand 2007). Below are examples of banner ads:

Table 2. 1 Volvo The First Banner Name (Number of Visitors is 2 million)

Table 2. 2 The History of Web Banners 1990

Table 2. 3 The History of Web Banners 1994

2.1.2.2. Pop –up ads

Pop-ups are small windows that open above web pages in the internet browser. Advertisers utilize them to pique users' attention. But even so, since the first day of such commercials, consumers of digital media have had a negative reaction to the case (Le & Vo, 2017). According to Courbet et al. (2014), internet users viewed pop-up ads as the most disruptive ad type while web browsing, out of all ad formats. Furthermore, of all the various types of online Internet ads (banner; pop-up; skyscraper; Wallpaper; floating; interstitial), pop-up advertising is the one that causes the most rage and annoyance (Harms, Bijmolt & Hoekstra 2019). Similarly, Liu, Liang, and Liu 2019 revealed that among six different online internet ad types, consumers have the most negative attitude toward pop-up ads.

When internet users become exposed to internet ads, they show a tendency to avoid looking or noticing them, and most of the time, they close the pop-up window not to expose them to ads. These behaviors are called ad avoidance (Duff & Faber, 2011). There are two types of ad avoidance. The first is to avoid cognitive advertising, which corresponds to browsers' subconscious attempts and trying to avoid focusing their eyes on the ad's visual range. The second is to avoid physical advertising, which refers to avoidance from browsers that purposefully use an action or mechanical system to expose ads (Söllner & Dost, 2019). Since they block web content originally shown by web browsers, pop-up ads are often regarded as the type of ad that triggers the most ad avoidance behavior (Chatterjee, 2008). The following is an example of the visual pop-up ad that makes entire web content out of sight.

Figure 2. 1 Pop-up Banner

Figure 2. 2 Pop-up Banner

2.1.2.3. In-line Display Ads

All other advertisements that appear alongside or within the main content of a web page are classified as in-line display ads. The in-line advertising concept includes different forms, such as skyscraper and rectangular advertising, which differ in terms of shapes and sizes (Burns & Lutz, 2006). Since they do not disturb or obscure the key content, in-line ads are less disruptive than pop-up ads (McCoy et al., 2007). They are, though, more puzzling than conventional banner ads because they divert web users' attention away from the content. Similar to banner ads, in-line ads can be shown in different types. These types can be listed as; texts, hyperlinks, graphics, animation or rich media content.

2.1.3. Search Engine Marketing and Optimization

Thanks to the keywords typed in the search engine, and users list the content suitable for their research. Ranking of these listed contents is achieved through certain optimizations.

2.1.3.1. SEO: Search Engine Optimization

SEO means search engine optimization. In simpler terms, it's the method of optimizing a website to make it more visible for related searches. As a page's position in search results increases, it is more likely to spark people's attention and drive existing and potential customers to the company.

Bots are used by search engines such as Google and Bing to scan the web, navigate to different sites, collect information about these pages, and index them. Following that, the algorithms examine the pages in the index, taking into account hundreds of ranking factors or signals in the search results for a specific query. The interest and intent of the user play a dominant role in ranking factors. Content quality and keyword research are key factors of content optimization. Working on these factors when optimizing the site and its content enables the pages to rank higher in the search results (Zhang & Cabage, 2016).

2.1.3.2. SEA: Search Engine Advertising

Search Engine Advertising is a significant source of revenue for major search engines (Jafarzadeh et al., 2015), including Google, Bing, Baidu, and Yandex. SEA, also known as search engine marketing, keyword ads, and pay-per-click, has influenced the web's essence and is a vital marketing element for some businesses (Laffey, 2007; Quinton & Khan 2009).

Search engine advertising is a low-cost marketing strategy that positions brands and goods at the top of SERPs (Search Engine Result Pages), increases visibility, and strengthens companies and brands. Search engine advertising is sometimes used in tandem with a marketing or branding strategy. One of the main goals of SEA is to increase the click-through rate. Because ad space can easily increase the number of clicks on a website.

2.1.3.3. SEM: Search Engine Marketing

SEM is a marketing approach in which a company's sponsored adverts are shown on search engine result pages. Advertisers bid on keywords that customers search for on Bing and Google when looking for specific items or services. This allows the advertiser to display their adverts alongside the ’s search results. These advertisements, frequently known as pay-per-click ads, come in a range of formats. The most significant strength of search engine marketing is based upon its ability to position motivated customers in front of advertisers who are assumed to buy their advertisements (Terrance, Shrivastava & Kumari, 2018).

2.1.4. Social Media Ads

When we take into account the rapid changes in digital processes, various advertising and media terminology are used interchangeably in the literature and are not clearly distinguished. Despite the fact that “social media” is a widely used term by many advertising professionals, it is totally inadequate as a self-contained notion for advertisement research (Voorveld et al., 2018). Furthermore, the blurry lines distinguishing offline, online, social, mobile, and interactive media demonstrate how broad the field of digital advertising is. (Lee & Cho, 2020).

Digital advertising is described by Rodgers and Thorson (2018) as different kinds of branded content in the digital context, such as branded content displayed in social media contexts, blogs, tweets, and Facebook posts, as well as company messages. Social platforms such as Facebook, Twitter and Instagram allow consumers to share ads or comment on them. The shares of digital ads lead those to have greater effect size thanks to reaching new audiences on platforms, yet, this spread also causes further confusion (Tellis et al., 2019). Ad posts on social networks can be interpreted as an unwanted and annoying disruption to the stream of online activities when users view social media as their semi-private social domain (Goncalves et al., 2016). In a social setting, commercial advertising may also be

perceived and interpreted differently. Therefore, it is more likely to be ignored (Bang & Wojdynski, 2016).

2.1.4.1. Instagram

Instagram has become a vital advertising platform where businesses can showcase their promotions to reach their target clients, and it is extensively used throughout the world. According to Vahl (2011), Instagram is a platform that uses image analysis to determine a customer's age and interests. Instagram, like this, allows people to express their ideas and experiences about a business or product. In this way, big data provides important data when gathering client inputs. Instagram publicizing is an effective way to contact customers (Das & Nayyar, 2019). The evolution of Instagram-based ads is a testament to the platform's transformation into a tool for advertising products and organizations, with advertisers seeing Instagram ads as a beneficial tool for drawing customers.

Instagram, a photo and video-sharing app for mobile devices, is one of the most popular social media sites for influencer marketing. Influencers on Instagram grow their followers by using hashtags and sharing amazing photos that attract the app's users. As a result, the word "Instafamous" has gained popularity, referring to a self-made micro-celebrity famous for their work on Instagram (Dewey 2014). Brands who want to collaborate with Instagram influencers to advertise their goods can select people who are appropriate for their target market. Influencers, on the other hand, help facilitate a mutually beneficial relationship between brands and their customers by posting about the brand to their vast number of followers. (MediaKix 2016). In addition, accounts that gain trust by using hashtags on Instagram, celebrities' pages, taking the follow-to-follow approach, buying fake followers, and increasing the number of followers can sell products.

2.1.4.2. Facebook

Facebook advertisement allows users or consumers to interact with advertisements on their pages by “liking” and “sharing” them, as well as seeing who else liked or shared the same ad. Facebook provides broad platforms for online advice that goes viral (Smock, Ellison, Lampe, & Wohn, 2011). This feature of the platform encourages advertisers to allocate a fair portion of their budgets to user analysis in order to find potential customers and target them with Facebook advertising (Falls, 2009). Advertisers enhance the impact of WOM (Word of Mouth) Facebook advertising has been positioned as a significant instrument for strengthening the brand identity of a range of products and services through Facebook (Kaplan & Haenlein, 2010).

After becoming a Facebook member, many users post information about themselves and their lives on this platform. By following the brands on their pages, users actually present data about their areas of interest with their own consent. As a result, Facebook can conveniently meet the target audience during the marketing activities of businesses.

2.1.4.3. Twitter

Microblogging services, such as Twitter, are particularly receptive to the digital economy's quick access to information. The quick transmission of information on Twitter demonstrates that little units, rather than large amounts of data, attract attention (Lambrecht, Tucker & Wiertz, 2018). New subjects surface momentarily and then vanish after a time on Twitter, providing quick and short-lived information flows. Twitter, which is best known as a social media advertising platform, includes two key aspects. For starters, this technology enables advertisers to detect current hot subjects (Du & Kamakura, 2012). Popular topics are found using sophisticated algorithms that consider the timeliness and frequency of concurrent mentions or interactions. Secondly, advertisers can target advertisements to people who spread

such trending subjects (Vaynerchuck, 2013). As a consequence, businesses include messages about their products that coincide with emerging trends into Twitter conversations. Companies can simply reach out to people who take part in these conversations, retweet them, and end up creating adverts. Furthermore, when a trending hashtag is utilized, an advertiser is more likely to interact with individuals who have no or few followers (Vaynerchuck, 2013). As a result, the majority of unidentified individuals who are interested in the subject are approached and an advertisement message is delivered.

2.1.4.4. TikTok

TikTok is a social platform for short videos. This platform, which was released in September 2016, is a community platform that focuses on short music videos created by young people. This software allows users to choose songs, film short music videos, and create their own works. The number of active users reached 500 million in December 2018, and this number continues to grow (Tang, 2019).

Tik Tok ads are based on the app itself since it is open to market ads. Such ads have gradually spread to Sina Weibo and Red platforms, thanks to Tik Tok's social network. For advertisers, the most effective part of TikTok is that short videos offer a more standardized marketing opportunity besides the platform's expansion policy. One of the most desirable advantages for marketers is to use the associative function of short videos and combine entertainment with aesthetics (Jenny, 2021).

2.1.4.5. Snapchat

Snapchat is one of the most popular messaging platforms in the world, with 186 million daily active users, according to Snap Inc. data from the fourth quarter of 2018 (Snap Inc., 2018a). The app is especially common among the younger generation, which is a key demographic for the advertising industry. According to digital marketing company eMarketer (Baysinger, 2017), Snapchat's market share

in the US digital ad market is less than 1%, with ad revenue of $ 824 million in 2017 (Snap Inc, 2018b). Although Facebook, Instagram, and YouTube all have ad buying options for those looking to do digital media marketing, Snapchat has an additional purchase option for this. Advertisers are apprehensive for numerous reasons, per Castillo (2017), the first of which is that the platform gives minimal data on its consumers. Another issue is that some advertisers, especially those who aren't Millennials, are still unfamiliar with Snapchat's communication rationale (Castillo, 2017). Notwithstanding, Snapchat offers a number of advertising options, including traditional video advertisements, influencer marketing, sponsorship, and ad filters, such as effects that may be applied to photos and videos.

2.1.4.6. YouTube

As people's interest with online material and social networks has expanded, YouTube, which incorporates both the streaming and social sides of media consumption, has surged in popularity. YouTube currently has more than 2 billion users worldwide (YouTube, 2021). Marketers are increasingly appealing to this platform to spread their brand message given the broad audience reach. YouTube influencers usually manage the delivery of marketing or advertising messages. Researchers describe social media influencer marketing as when an individual uses a viral marketing strategy delivered through blogs, tweets, posts, or other forms of social media communication to influence consumer attitudes (Freberg et al., 2011). Influencer marketing on YouTube falls under this concept as well. YouTube influencers or YouTube celebrities make and post videos to the website, and they have a following of people who regularly watch them. Professional video uploaders, on the other hand, are not regarded as influencers (for example, a brand's YouTube account). YouTube influencers' impact will expand beyond the site if they become well-known for their distinct personalities or content (Lange, 2007). Advertisements inserted within popular YouTube videos can also be used to promote products and services effectively.

2.1.5. Mobile Marketing

Rather than describing mobile phone settings, the term “mobile” has been used to refer to certain portable computing devices and mobile services over the last decade (Investopedia, 2018). Mobile has transformed the way advertisers engage with their customers and has offered up new marketing opportunities. Furthermore, according to BusinessWire (2019), the revenue potential of mobile marketing is predicted to exceed $ 183 billion in the next years, and more than half of the global population will own at least one mobile device (Statista, 2019).

Because of the targeted individualized ad characteristics, mobile marketing differs from traditional marketing strategies. To put it another way, marketers can design and distribute highly relevant and tailored mobile targeted material based on real-time consumer circumstances like location, time, setting, and dynamic competition via mobile channels (in-app, SMS and push notifications) (Grewal & Stephen, 2019).

In the era of mass marketing, marketers have exploited traditional media venues like television and newspapers to make one-size-fits-all advertising. With the rise of the Internet, advertisers gained a greater understanding of their customers’ online actions and targeted them with digital segmentation. Furthermore, having access to mobile devices from everywhere allows advertisers instant access to hyper-context information from customers via the built-in GPS, gyroscope and sensor on the device. Using extensive mobile data on behavioral and environmental circumstances, marketing professionals may create more adaptive and personalised pricing and marketing tactics. Consumers are drawn to emerging mobile platforms and services, such as the app and mobile Vblog, since they offer greater social capabilities and are regarded as more personal by users. As a consequence, mobile marketing adds value to traditional marketing by allowing for central personalization (Huang & Rust, 2018).

Marketers may use hyper-context insights to create more personalized mobile ads. These can be listed as follows: When customers use their mobile phones to look for items (where), how they look for information and make purchases (how), and whether they are alone or with someone else (with whom). Marketers can more reliably predict consumer behavior and reveal previously unknown patterns using groundbreaking individual-level mobile data, pioneer artificial intelligence (AI) applications, and deep learning algorithms (Castelo & Thalmann, 2019).

2.1.6. Remarketing

Remarketing is an advertising model that tracks visitors when they visit certain products or services on the web portal. It's a more sophisticated version of Google's AdWords marketing algorithm. A self-induced cookie is set when a consumer visits the web portal but does not decide to buy, and the retargeting program is designed to deliver adverts for the same service or product to other sites when the same client roams on the web.

Figure 2. 3 Google Remarketing

Gmail, YouTube, Apps, Remarketing Search Listings Ads and Display Network are just a few of the platforms or networks that allow us to reach out to targeted customers through display ads. Digital fingerprints (traces left by users when they visit a search engine or website) are used to acquire information on customers' personalities, buying habits, and other consumption-related characteristics (Aswani et al., 2018). According to Grewal and others (2016), companies need to understand digital fingerprints, particularly when interpreting big data about customers. This analysis helps businesses in generating new data in order to better target their future customers via remarketing strategies. (Arya, Sethi & Verma 2018).

2.1.7. Affiliate marketing

Affiliate marketing is based on a commission system. Companies or users who want to make money as affiliates can build their own network and enhance their income model. As standard rules suggest, the affiliate is only paid if (1) A user visits an affiliate's website, (2) clicks on an affiliate link that is particular to the seller, and (3) makes a purchase from the firm (Edelman, 2013). Most banner advertisements require the advertiser to pay when a website displays an advertisement to a client, therefore these criteria differ substantially from online advertising tactics. As a result, practically every search ad must be paid for by the advertiser. Hence, affiliate marketing payment standards are recognized to safeguard advertisers from budget mismanagement.

Advertisers take a big risk when they spend on banner ads. Similarly, advertisers will overspend if irrelevant users, competitors, or scammers click on their ads (Wilbur & Zhu 2009). Advertisers must pay in each scenario due to standard contracts. On the contrary, in affiliate marketing, the advertiser pays when a user makes a purchase. As a result of this condition, the advertiser’s ad costs are more closely matched with their revenue and profit. (Commission Junction, 2014).

2.1.8. Native advertising

Native advertising, also known as the tactic of undermining a content publisher's credibility by delivering sponsored material in a medium and place that is interwoven with the publisher's original material, has already proven to be a major force in the internet marketing industry (Aldridge, 2016). While most online marketing efforts use user tracking, audience data, filtering based on collaboration, and other techniques to target users by topic with a narrow approach, native advertising not only presents users with content that fits the niche of the creator's original content, but it also does so by copying the format of free content. Sponsored posts on social media websites, sponsored videos on websites that produce sponsored links and original content, and suggestion blocks on search engines from content providers are all examples of native ads (Wojdynski & Golan, 2016).

2.1.9. Content ads – Blogs

A blog, short for "web log," is a website where daily updates are uploaded on a routine basis and displayed in reverse order (Wright, 2006). Since the year 2000, blogging has grown into an internet phenomenon. As this medium has grown in popularity, a new trend called blog advertising has emerged, which refers to bloggers being paid to mention, evaluate, advertise, and/or sell things in their blog entries. As ideas posted on blogs can be very effective at a relatively low price in comparison to reader reach and conventional advertisements, more companies are embracing this type of advertising.

A blog is an author's self-portrait in a sense that contains important points about the author's real identity (Gilly & Schau, 2003). Since the blogger contributes to the advertisement material and promotes the products he or she writes about, the blogger's credibility and reputation are inextricably connected to his or her credentials. Second, advertising messages are placed within entries that conceal it is actually an ad. The ad message might be perceived as the blogger's advice or a

personal experience he or she wants to share. Because the textual ad is given in a friendly, genuine, engaging, and relatively casual manner, readers are oblivious that it is an advertising or marketing message. Since blog ads resemble personal diary-style, messages can entice people to become more engaged with the content than other types of advertising. This feature indeed provides great advantages in convincing readers (Wright, 2006).

2.2. The transformation of digital advertising

With the rise of digital in recent years, advertising has gone through a period of significant change and transformation. During the day, we are continuously exposed to different types of advertisements from our computers and mobile phones that we always have at our hands. Advertisers have a lot of options in this field, thanks to the increased specificity of targeting and the rise of new models. The mass use of goods, the rapid advancement of internet access, and the imminent rise of social media introduced consumers to an entirely new era. Henceforth, processes in almost every field have become easier and faster. Consumers today are not only more informed but also more interconnected to the rest of the world. Multinational corporations, cultural associability, technological exposure, and consumer perception all contributed to advertising innovations.

Digitalization has also significantly impacted the general media industry, resulting in a rise in internet advertising investment. Furthermore, the growing popularity of tablets, smartphones, and mobile applications continue to drive up global mobile ad spending in digital media.

The keys to the evolution of digital marketing are social engagement, propagation, and interaction, and businesses have increased engagement by contacting clients, telling them about goods and services, and then selling them those goods and services (Ko, 2019). Digital advertising has progressed beyond the notion of promoting items and services to the use of digital channels for activities, entities,

and processes that have been made simpler by digital technologies. The digital advertising industry is a flexible, technology-enabled process in which companies collaborate with their consumers and partners to create, communicate, display, and maintain value for all parties involved (Guercini, Bernal & Prentice, 2018). Institutions build core abilities to produce reciprocal benefits for their customers and themselves through procedures, new service experience, and customer interactions in new digital settings.

Social media, which has been around for over a decade, now incorporates new information and communication tools, including mobile connection, blogging, and photo/video sharing that appeal to a wide range of users' interests (Kim, 2018). Social networking has evolved from a specialized tool for a select few users to a tool that is now an integral part of the daily lives of millions of individuals all over the world. After social media, digital technology-based marketing communications such as artificial intelligence (AI) services, omnichannel networks, augmented reality (AR), and virtual reality (VR) are now shaping digital marketing communications (DMC) and providing new directions for future work (Kim & Yang, 2018; Zhang & Dholakia, 2018).

2.3. Big Data

In contrast to conventional data, big data refers to massive, growing data sets with a variety of formats. It is possible to sort them as structured, unstructured and semi-structured data.The framework for big data is complicated, necessitating the employment of advanced technologies and algorithms. As a result, current business intelligence methodologies for big data applications are ineffectual. The following three basic characteristics are used by most data scientists and experts to characterize big data (3V) (Furht & Villanustre, 2016):

1. ***Volume:*** Millions of devices and applications (ICTs, smartphones, social networks, product codes, smartphones, sensors, diaries, etc.) generate vast volumes of digital data on a regular basis. In 2012, McAfee et al. (2012) estimated that 2.5 exabytes of data were produced every day. This amount doubles approximately every 40 months. The total digital data generated, duplicated, and consumed in 2013 was predicted to be 4.4 Zettabytes (ZB) by International Data Corporation (a research firm). This volume of data doubles every two years. By 2015, digital data had increased to 8 ZB (Rajaraman, 2016). Besides, the IDC report announced in 2016 that the data volume would reach 40 Zettabytes by 2020 (Kune et al., 2016).

2. ***Velocity:*** Data is generated rapidly, and it must be analyzed swiftly to obtain useful information and insights. For instance, every hour, Walmart (a multinational retailer) produces over 2.5 PB of data out of its customers' transactions. YouTube is another example showing the velocity of big data.

3. ***Variety:*** Big data comes from a variety of sources and is available in a variety of formats (videos, comments, documents, diaries, etc.). Unstructured and structured data, private or public, remote or local, private or shared, incomplete or complete data make up large data sets.

Thanks to technology improvements, companies can today create several forms of organized, semi-structured, and unstructured data. Unstructured data includes photos, text, video, audio, sensor data, and click data all of which lack the standardized structure crucial for effective computing. Semi-structured data does not conform to the features of relational databases, but it may be designed to meet the structural requirements of applications. Extensible Business Reporting Language, which was created for sharing financial data between government and companies agencies, is an illustration of semi-structured data. Structured data is predetermined and can be found in a wide variety of standard databases. As new

analytics tools are developed, unstructured data is created quicker than structured data, reducing data kinds from being a barrier to analysis.

Big data is widely recognized as one of the most important topics of future information technology, and it is fast growing as a result of the Internet of Things (IoT) and social media phenomena. Big data infrastructure enables companies to transform themselves into data-driven organizations. Since big data has the potential to become a game-changer, every firm needs to develop skills and capabilities to benefit from big data to remain competitive in the game. Per IDC (2015), services industry and the big data technology would increase at a 23.1 percent annual pace from 2014 to 2019, reaching $ 48.6 billion in annual expenditure in 2019. At the current point, it is obvious that this number is far from utopian.

Despite the fact that structured data is an important component of big data, a rising quantity of data is being created in unstructured formats such as videos and photos, which are inaccessible to traditional data management solutions. Billions of IoT devices, like smart home appliances, wearables, and sensor data, have generated most of the world's data (Gartner, 2015). To fulfill the ever-increasing storage and processing demands of big data, several platforms, including Hadoop as an open-source framework, are being developed for NoSQL1 databases and extensively distributed commodity hardware clusters as an alternative to traditional relational databases.

2.3.1. Big Data and Evolution of Data Analytics

Though big data is assumed to have recently emerged, large-scale data processing and storage date back to the early 1950s when the first commercially available mainframe computers were released. Owing to the extremely high costs of computing, storage, and data networks during the period from the early 1950s to the 1995-1996, data improved comparatively slowly. The data is highly organized

to support primarily operational and transactional information systems during this time span. The early 1990s had seen the introduction of the 'world wide web' (-www-), which resulted in a rapid increase in data and the advancement of big data analytics. Since the emergence of the internet, big data and data analytics have gone through three stages.

2.3.1.1. Big Data 1.0 (1994-2004)

It coincides with the introduction of e-commerce in 1994. User-generated material was just a small percentage of the overall online content due to the technological constraints of online applications. Web mining techniques have been developed in this era to analyze users' online behavior. There are three forms of web mining: web usage mining, web structure mining, and web content mining. Web usage mining is the use of data mining techniques to uncover web users' online behavior patterns. Usage data reveal a user's identity or origin, as well as their surfing habits. It is possible to provide customized services by monitoring individual users' searches, mouse clicks, and browsing status. The method of evaluating the structure of a website or web page is known as web structure mining. Web content mining is a technique for collecting useful information from web page content. A web page can consist of images, text, sound, video, or Extensible Markup Language-based data. Text mining has been widely applied to web content mining. Text mining is the extraction of information from unstructured text using techniques from Information Retrieval (IR) and Natural Language Processing (NLP). In its most basic form, text mining extracts a single word or a collection of words that appear often throughout the text. Web content mining entails extracting information from web sites, grouping them, and categorizing them as cyber terrorism, spam filtering, email fraud, and so on. Although there were image processing and computer vision mining techniques, their deployment was minimal in the Big Data 1.0 era (Kaplan & Haenlein, 2010).

2.3.1.2. Big Data 2.0 (2005--2014)

It is led by the social media and Web 2.0 phenomenon. Web 2.0 is a web model that originated from 1990s web technology, enabling web users to connect with and add to websites with their own content. Social media embodied Web 2.0 principles and created a paradigm transition that means working and collaborating for companies (O'Reilly, 2007). Since social media is so common among customers, businesses can directly communicate with them at a low cost and with a broad scope (Kaplan & Haenlein, 2010). It supports social media analytics, usage mining, social media content mining and structure mining activities. User interests, online surfing habits, friend lists, emotions, occupations, and ideas are all analyzed and interpreted using social media analytics. Companies may create successful relationship marketing strategies for targeted consumer groups using social media analytics by better understanding consumers and tailoring goods and services to their needs and interests (Fan & Gordon, 2014).

Social networking services such as Facebook, Twitter, and LinkedIn provide a single platform for personal information exchange and online interaction (Jamali & Abolhassani, 2006). According to Scott (2012) to understand the structure of a network, social network analysis employs a number of techniques. These approaches range from simple ways such as counting the amount of edges a node has or calculating path lengths to more complex ways such as estimating eigenvectors to locate essential nodes in a network (Fan & Gordon, 2014).

2.3.1.3. Big Data 3.0 (2015 -)

Ardito et al. (2018) stated that Big Data 3.0 includes data coming from Big Data 1.0 and Big Data 2.0. IoT applications that generate data in the form of pictures, audio, and video are the largest sources to Big Data 3.0. The Internet of Things

(IoT) is a technical ecosystem in which sensors and devices are assigned unique IDs that allow them to exchange and cooperate on data through the Internet without requiring human interaction. As primary sources of big data, devices and sensors connected to IoT are predicted to outperform social media and e-commerce websites in terms of growth.

2.3.2. Big Data and Advertising

If we aim to comprehend what big data is and how it is used in advertising, it is important first to grasp why we have big data and how it is generated. As Sivarajah et al. (2017) pointed out, determining the meaning of "large" is problematic since what appears to be enormous now will most certainly become commonplace in the not-too-distant future. Large amounts of data created at extraordinary velocities from diverse sources are sometimes referred to as the "3 Vs" (Laney, 2001). Sivarajah et al. (2017) presented an expanded V list with the concepts of veracity, variability, visualization and value. Emani, Cullot, and Nicolle (2015) also made more V extensions with certain arguments to better define Big Data. These plugins are as follows:

1. Vision means a purpose,
2. Verification refers to the data processed per some specifications,
3. Validation, the purpose is fulfilled,
4. For a variety of industries, valuable, relevant data may be retrieved,
5. Due to Complexity, changing data relationships, Big Data is hard to arrange and analyze.
6. Immutability, if data is collected and retained, Big Data can be permanent.

They’re often described as data sets that are so big and complex that conventional computing systems and data processing methods can’t manage them. These definitions of big data illustrate their fundamental characteristics, which set them apart from small data sets.

The digitization of certain phenomena has resulted in big data (Kumar & Gupta, 2016). Despite the fact that big data is a catchphrase for so many, digital media that generates big data is discussed in the advertising field and is expected to grow in the future. Big data and digital brand contact points are inextricably linked: Big data is generated by digital interactions, which may subsequently be utilized to drive future digital contact point decisions.

2.3.2.1. Brand Actions

These involve all consumer interactions initiated by the brand, as well as media (content) like brand actions, advertising, press releases, and sales promotions. Brand replies to consumer messages are often included in brand activities (Van Noort and Willemsen 2012). The majority of brand actions are digital and are documented by the company. A contact history archive usually saves all outgoing messages aimed at specific users, such as email and direct mail.

It's now possible to find out how consumers respond to a brand's actions. Brands will see whether a customer has received an email, opened it, and clicked on a link within it. Clicks on display ads can be detected. It is possible to determine if a customer skips or watches an ad on YouTube until the finish. It is possible to find out different ad-skipping types from digital streaming services and digital video recorders. Content marketing consumption can also be tracked by brands. They can tell whether a user has visited the organization's website, downloaded files, or seen a webinar, for instance (Zeng et al., 2020).

2.3.2.2. Dialogue Behaviors

All actions other than the focus customer's purchase, like sharing, reviewing, liking, blogging, posting a Tweet, and posting user-generated content about a brand on social media, are considered dialogue behavior (Van Doorn et al., 2010). For a long time, consumers have dialogs about brands. But here is the difference; currently, most of the dialogs are recorded as text, image and even video to big data clusters.

Companies may benefit from knowing a customer's dialogue behavior on topics other than the brand. For example, like a certain celebrity can be related to a certain business, and the universe of individuals who like this celebrity might be used to identify potential purchasers or influence focused advertising decisions.

2.3.2.3. Shopping Behaviors

All consumer actions that end in a purchase are classified as shopping behaviors (Koehn, Lessmann & Schaal, 2020). Search histories, web browsing records, wish lists, and shopping carts are examples of data sources from online shopping settings. Internet marketers also have access to information about any product that potential consumers view when shopping, including what items are added to their shopping carts or wish lists, posted on social media, purchased, and discarded. They record which search keywords consumers use on the retailer's website and on search engines, and which are more likely to result in a conversion. They can also determine whether a potential customer is reading user or expert reviews, watching a video demo of the goods, testing out a virtual model, or sharing the goods with their friends by looking at the page's user or expert reviews. Technological innovations, such as smartphones and wearable devices that monitor consumer movements, are being implemented to track physical shopping habits.Mobile location data reveals travel patterns and can notify a store when a consumer approaches (Jin, Fang & Wang, 2020). Video views of retail outlets also generate large data sets. As a result, big data behavioral sets can be used to capture the specifics of the shopping journey. The majority of these activities are preceded by advertising, and big data allows for improved assessment of the purchase process.

2.3.3. Big Data, Algorithms and Transparency

In a setting where our lives are increasingly being transformed into computerized data, these data are being transformed into information, which opens up new possibilities for managing people or processes (Mayer-Schönberger & Cukier,

2013). While there are some who think that these advancements are progressing for society, there are social engineers who fear big data (Watts, 2013). The key source of this fear is a scenario in which society's deeper characteristics are no longer understandable. This fear is tackled thanks to qualitative analysis methods like interviews, but rather than gathering ex-post data about an encounter or occurrence, which is just secondary reflection, society will be going live in an observable way in the modern world so that we can abandon interpretive methods.

In the near future, social-scientific skills could lose their validity (Törnberg & Törnberg, 2018). Society would become more manageable as a result of this loss. The slogan in such a situation would be, "The more we can make society and social structures transparent through data, the more we can understand how society operates and behaves, and the smoother it will be for us and others to interfere in society." (Poster, 1995). Poster (1995) raised concerns about the fact of exposure by stating that in a given culture, we are all becoming visible without any privacy. According to this viewpoint, self-learning algorithms are a mysterious mechanism enclosed in the computer's black box (Pasquale, 2015). The only thing that we can observe in such an environment is input and output. Their codes, on the other hand, are kept confidential, and their activities are unavailable and elusive to the majority of us (Fuller & Goffey, 2012).

Transparency is a mechanism for interference that creates its own reality as an urge and promise to gain access to knowledge (Flyverbom et al., 2015). Transparency as a necessity produces and presents reality rather than reflecting or genuinely making transparent the universe. The same applies to big data and algorithms. Algorithms cannot make a world that is already over there but not visible to us become visible. Instead, they widen worlds and, therefore, new ways of thinking and behaving. During that time, algorithms take on the challenge of computing and systematizing reality via quantitative abstractions (Fazi, 2019). One might argue that it is a world in the algorithm universe where no one knows what is possible (Krasmann, 2019).

In the light of all these, algorithm logic can be considered as autonomy, rationality and representations.

2.3.3.1. Autonomy

In several ways, machine learning algorithms act autonomously of humans. The capacity of algorithms to turn a vast volume of data on the Internet into recognizable and meaningful formats for human cognition and perception is the first thing to mention here. Digitalized computing may not be smarter than us, but it is faster (Smith, 2018). When we use search engines, online providers, or social media, we become collaborators of algorithms that are parasitic. Because we, humans, are the ones who first teach machines about us and provide them with enough data for them to learn (Vignola, 2016). Algorithms are capable of appealing to each of us individually and claiming to know our tastes (de Vries & Schinkel, 2019).

2.3.3.2. Rationality

Algorithms, in comparison to human reasoning, use a somewhat different mode of cognition. Even though they can create and read words and sentences, they are unable to interpret them (Rouvroy, 2012). Algorithms establish their own associations by combining various parameters based on similarities and comparison (Aradau, 2015). Classic statics can be useful when understanding this way of thinking. While experts create statistics to gather data according to predetermined rules and assumptions, big data can be collected continuously as a default (Kitchin, 2014). Observation and measurement are important and gain value in themselves.

2.3.3.3. Representation

Algorithms do not rely on representative examples and try to represent reality. A value in statistics denotes the number of people who answered yes to a question in a survey, for example, while algorithms can process fairly unrelated data. Predictive

computing methods show the facts ahead of time when predicting the unknown in order to anticipate consumer preferences (Reigeluth, 2014). Furthermore, predictive algorithms are based on probabilities and are usually carried out using statistical analysis. Information is provided by comparing different data, in addition to using past experiences to guess future events. Yet, algorithms can never predict the future. Somewhat more, they show mere probabilities, implying what our needs might be or what we might be expected to do until tomorrow (Rouvroy, 2012). It's worth noting how algorithms can help us make better decisions and meet our own goals. As Esposito (2018) points out, algorithms do not see; they just construct the future, and their interference increases the likelihood of this version of the future becoming real.

2.3.4. Personalized Ads

Advertisers use personalization to display content tailored to each user's personal attributes, which is particularly important on mobile devices. Messages tailored to a person's characteristics are personalized to the consumer's unique preferences and characteristics (Hirsh, Kang & Bodenhausen, 2012). In mobile settings, machine learning methods can extract new information from people's social media profiles, and broad data sets include details about their personality characteristics. The corresponding algorithms create a new profile through personalization, and an ad collection appropriate for this profile is created and shown to the individual instantly. However, we can say that there has been a violation of privacy. The "personalization-privacy paradox" expresses the relation between personalization and privacy issues (Awad & Krishnan, 2006). According to empirical studies, the more worried people are about their privacy, the less targeted advertising influences them (Gurau, Ranchhod & Gauzente, 2003).

2.3.5. Data Mining

The science of finding structure and trends in large data sets is known as data mining. From this description, it is clear that data mining is closely linked to the areas of statistics, machine learning, and pattern identification in data analytics. Despite the fact that there is a strong link between various disciplines, each of the aforementioned subjects has its own weight. The scale of the data sets, the quality/poor quality of the data, and the breadth of the structure types sought differentiates data mining from other areas (Provost & Fawcett, 2013).

Instead of data mining, the term 'Big Data' has gained popularity in recent years. In this situation, data mining can refer to the branding of the word by concentrating on larger and more diversified data sets. Distributed or cloud systems are used to store large datasets. Advanced data collection hardware, as well as data flow and expert software infrastructures, are required. The obtained data is then submitted to a data mining process, which results in the development of models. These models then provide data in a variety of domains.

The majority of data mining studies are conducted for commercial purposes. Large databases include potential market-leading discoveries, as well as the ability to organize consumers, particularly for sales reasons, and create models to predict consumer behavior (Tsiptsis & Chorianopoulos, 2009). As a result of their footprints, it is utilized to assess client purchase behavior and recommend items that will satisfy their demands. It also allows businesses to assess internal elements like production planning, pricing, and employee abilities, as well as external aspects like competition, economic indicators, and market structure (Tekin et al. 2019). In this way, the factors that influence consumer satisfaction with a company's product, as well as its sales and profit, may be identified. Data mining is typically utilized in scientific investigations, in addition to marketing, advertising, and financial transactions. Bioinformatics, astronomy, telecommunications, and medicine are among the scientific sectors that employ data mining methods.

Companies use Data Mining to uncover previously unknown information and enhance their product decision-making processes. Costs can be decreased, income and productivity may be increased, new possibilities for businesses may be created, and customer experiences may be enhanced using data mining tools (Adams, 2012). To offer a basic example, corporations organize their consumers according to the models they acquire as a consequence of using data mining technologies to analyse data acquired from big data, and then provide them with adverts suited to their requirements via point-and-shoot. Productivity and revenue grow as a result of tracking consumer behavior. Customers' actions guarantee that they gain experience as a result of their actions.

2.4. eCPM (Effective Cost per Mille)

When serving ads to an app, ad broker software seeks to optimize the app's ad revenue by determining which ad networks to request ads from in which order. It does so by requesting ads from the ad network that can produce the maximum revenue from the ad display. The concept of eCPM (Effective Cost per Mille) is used to express the revenue per ad impression in the digital advertising industry. The eCPM figures that will appear in the ad broker software are estimated by field specialists and updated in the system based on the indications. Machine learning algorithms can be used to find the variables that may influence the eCPM value and to detect patterns between these variables and eCPM (Wang, Liu & Guo, 2017). For algorithm detection processes, advertising companies can make analyses by recruiting experts inside their own departments, just as outsourcing services.

2.5. Footprint in digital advertising

In traditional media, a single expert source can distribute the advertising message to the target audience and send the same message to everyone, whereas in internet-based media, one-to-one communication and targeted applications are possible. Personalization of advertising messages, rather than sending the same advertisement message to everyone, is preferred for the effectiveness of the advertisement as technology and software programs develop. There are two ways to present advertising messages almost in a personalised way and the first is to create a profile about the individual by evaluating their digital footprints, likes, shares, and friendships created on the internet, and the second is to use the consumer as a tool during the creation and dissemination of advertising content. Thus, the self-propagation feature of digital media advertisements emerges (Micheli, Lutz & Büchi, 2018).

The increasing use of algorithms and artificial intelligence (AI) in various areas of life requires an extensive investigation of digital footprints. Many algorithms rely heavily on personal data, not just online data, to automate complex tasks (Beer, 2017). A digital footprint can be created by algorithms and other internet users, as well as content production and sharing. It, therefore, relies on data produced by both active and passive forms of participation (Lutz & Hoffmann, 2017). “Active participation” is online content creation, while “passive participation” is a new concept in digital inequality research that has not been fully explored. Passive participation is subject to decision processes that are beyond the person's control. There are two types of passive participation: (1) data generated by platforms as a result of users' online behaviour (2) data published by other users but linked to an individual. Both passively generated digital footprints are a very significant threat. It contributes to people leaving digital footprints on social media platforms and many simple user actions such as liking, favouriting, following or commenting. Browsing histories, search queries, purchase histories, and geolocation information are other types of sensitive data that contribute to their digital footprint, even if they

are hidden from users. Platform algorithms have a very important function in producing such data (Sandvig et al.,
2014).

2.6. Personal Data Protection Law

Unauthorized use of the information of people using online platforms such as the Internet, social media and shopping sites may cause some ethical problems. However, users should be aware that while actively using online platforms, they leave a footprint on the sites with their interactions. However, the areas where personal data are used are secured by law. According to article 4 of the Personal Data Protection Law (KVKK) numbered 6698, which was accepted on March 24, 2016, and published in the Official Gazette No. 29677 on April 7, 2016, in the processing of personal data, compliance with the law and honesty rules, being accurate and up-to-date when necessary, it is obligatory to comply with the principles of processing for clear and legitimate purposes, being linked to the purpose for which they are processed, being limited and proportional, and keeping them for the period required by the relevant legislation or for the purpose for which they are processed. According to (2) (b) of Article 4 of the KVKK, personal data must be processed following the general principle of being accurate and up-to-date when necessary. The data controller must take all reasonable steps to ensure that inaccurate personal data is deleted or rectified without delay, taking into account the purposes for which they are processed. For the data controller to keep the data accurate and up-to-date, it would be appropriate to provide the data subject with access to the processed personal data. The data controller is not under the obligation to update the personal data periodically and to confirm the accuracy of the personal data. However, if the data is not accurate or up-to-date, it may require a periodic update or deletion by the data controller to ensure that the personal data is correct and up-to-date. However, according to (2) (c) of Article 4 of the KVKK, personal data must be processed for certain clear, legitimate purposes. The principle of fit

for purpose is a principle to be taken as a basis in the evaluation of all other principles.

3. MATERIAL AND METHODS

3.1. Research Method

This research was carried out using the Phenomenology method, one of the Qualitative Research Methods. Qualitative research is a type of study in which different qualitative data collection methods, such as observation, interviewing, and document analysis, are used in conjunction with a qualitative process to reveal perspectives, perceptions, and events in a natural setting in a realistic and holistic manner (Creswell, 2014). Qualitative research is based on various disciplines such as Sociology, Anthropology, Psychology, Philosophy, Education, Linguistics with some commonalities in the study of human behaviour. All of these disciplines emphasize that human behavior can be best understood only in its environment, based on the assumption that human behavior has a complex and multidimensional structure, and that a different understanding appropriate to the nature of human behavior, as opposed to the mechanistic understanding commonly used in positive sciences, should be adopted. As a result, there are distinctions in the ways in which various fields employ qualitative research methodologies (Creswell, 2014).

One of the qualitative research methodologies is phenomenology, which is based on the works of twentieth-century philosopher Edmund Husserl. The aim of phenomenology is to understand human experience (van Manen, 2007). With this in mind, it is clear that Phenomenology is a philosophical movement that attempts to make sense of the experiences that have occurred since the turn of the twentieth century (Wilson, 2015). Phenomenology is a qualitative research approach that allows individuals to communicate their knowledge, feelings, viewpoints, and perceptions about a certain occurrence or topic, and it is used to describe how they experience it (Rose, Beeby & Parker, 1995). In its most comprehensive sense, Phenomenology refers to all the lived experiences of a person (Giorgi, 1997).

Phenomenology is concerned with things that we are aware of but do not fully comprehend. In our daily lives, we may come across various phenomena, such as events, sensations, perceptions, or circumstances, in a variety of ways. This does not, however, imply that we completely comprehend the aforementioned facts. As a result, phenomenology is utilized in research to explore phenomena that we encounter on a daily basis, that are not alien to us but that we cannot fully comprehend, and that provide an adequate research platform (Creswell, 2014).

Phenomenology, a widely used qualitative research technique in academia, provides an approach that focuses on human phenomena and follows a route consistent with many phenomenological streams, depending on the philosophical assumptions and viewpoints on reality advanced by researchers. Phenomenology is a method that may be used in both a postpositive and an interpretive/constructive paradigm (Guba & Lincoln, 1994). As per Guba and Lincoln (1994), phenomenology contributes morally, artistically, personally, and socio-politically by providing empirical information in the form of descriptive and explanatory theory and understanding of research that leads to practically applicable information, as well as study.

To make an accurate assessment of phenomenology, as Giorgi (1997) argued, it is necessary to understand its specific traits. The basic feature of phenomenology, which sprang from a philosophical movement aimed at comprehending human experience, is that it attempts to make meaning of lived experience. As a result, by stressing the "phenomena" to be researched in phenomenological research, the participants' views and views on this phenomenon, as well as how they make sense of it, experience it, and describe it, are highlighted. A notion, an idea, or an emotion can all be used to describe this focused phenomenon.

The most significant difference between phenomenology and other techniques is that it is founded on the notion that shared experiences are the essence. This assumption has been phenomenological research's distinguishing trait.

Phenomenology explains the basic meanings and experiences (essence) of understandings created through a shared experienced reality based on this assumption. In phenomenology, the word "experience" is given a more definite definition (Patton, 2018; Creswell, 2014). For example, the significance of a worker's experience at the firm he works for, or the essence of being a mother, a woman.

3.2. Data Collection Process and Analysis

Data was obtained in this Phenomenology study by utilizing the researcher's Semi-Structured Interview Form and Interview technique. The questions on the interview form were written one-to-one relationship with the research questions and in this context participants were asked (1) whether they benefit from big data and algorithms in their marketing activities, (2) how customers reach their shopping-related information (consumer behavior), and especially through which programs/platforms they access information, (3) they can see the difference between using traditional data and using big data in their projects or marketing activities, (4) information about the advantages and disadvantages of advertising using big data and (5) algorithms and the reasons for using big data were requested.

Data is often acquired through interviews or focus groups in qualitative research, however many sorts of text can also be used. Each method entails the careful selection of individuals who have knowledge of the phenomenon under study. The concept or experience studied is the unit of analysis. Large samples may not be required to develop rich datasets because a single person can develop hundreds or thousands of concepts. The actual number of participants required and the amount of interviews per individual are determined by the study's objectives (Starks & Trinidad, 2007). According to Creswell (2014), data forms in qualitative research are basically gathered under four types of information which are observations, interviews (closed-open-ended), documents (private-official documents) and audio-visual materials (photos, emails, video recordings). In most

phenomenological studies, data is gathered through in-depth and numerous interviews. Participant observation, action research, focus groups, and study of personal texts are some of the methodologies that can be used. What matters is a balance of minimum structure and maximum depth, bound in practice by time and opportunity, to keep attention on research topics while avoiding undue researcher influence. Gaining deep information requires establishing a good relationship and a high level of empathy, especially when studying the participant's powerful personal experiences (Giorgi, 1997).

In the phenomenological method, it is critical to acquire detailed information from each participant. A sympathetic and trustworthy connection between the researcher and the subject should be created in order to get this deep knowledge. The researcher's participation in acquiring data is unavoidable at this stage. Although the researcher must be able to communicate, his understanding of the subject matter will aid in the development of an empathic, trust-based connection with the participant.

3.3. Data Analysis

This study used content analysis, one of the qualitative data analysis methodologies, to examine all of the acquired data. The purpose of content analysis is to conduct a systematic analysis of the information gathered. Texts, images, and sounds can be included in content analysis (Flick, Kardorff, & Steinke, 2004). Content analysis clarifies emotions, thoughts, and attitudes by making raw data meaningful and interpretable.

Data analysis, data preparation for analysis, coding the data, bringing the codes together and reducing them to themes, and lastly presenting the data in figures, tables, or a discussion are all part of qualitative research. These stages, according to Creswell (2014), are a universal procedure followed by all researchers and serve as a general template for qualitative researchers. However, there are certain structured analysis methods developed by Moustakas (1994), especially in

Phenomenology. The general stages of phenomenological data analysis are data preparation (bracketing/bracketing), phenomenological reduction of data (cascading and phenomenological reduction/reduction), creative variation (imaginary variation), and revealing the essence of experience (synthesis of meaning and essences) (Kleiman, 2004; Groenewald, 2004). In this study, the mentioned steps were followed and analyzes were carried out within the framework of the research questions.

3.4. Validity and Reliability

Determining the validity and reliability of qualitative research at a specific level has an impact on the research's credibility and acceptability. A qualitative researcher must satisfy crucial expectations such as taking the appropriate measures (validity) to get the accurate information and defining the research method and data in a clear and precise manner (reliability) that allows another researcher to assess (Creswell, 2014). Due to the nature of qualitative research, a phenomenological study will not provide definitive and generalizable conclusions, but it will provide results, instances, explanations, and experiences that can aid in a deeper understanding of a phenomenon (Guba & Lincoln, 1994). As a result, phenomenological research analyses can be expanded for a variety of reasons, including giving extensive information, selecting sample strategies, assuring the researcher's objectivity, and avoiding preconceptions.

In addition, in terms of validity, researchers; bracketing to avoid personal judgments throughout the study, participant checks as assumptions cannot always be avoided, asking participants for interview transcripts to confirm researchers' understanding, triangulation of data with the help of a second researcher (in data, theory, method and researchers), without analyzing the data so that researchers can see how their biases have changed they must first make a statement of subjectivity by identifying their biases and beliefs about the phenomenon, and pay attention to

issues such as presenting participants' background information and a detailed description of the study to further validate the data and enable readers to understand how the data are interpreted (Baker et al., 1992).

In order to ensure validity and reliability in this study, a semi-structured interview form prepared in the light of the literature was sent to two experts in the field and they were provided with feedback. The form was revised, taking into consideration the feedback received, and took its final shape. The volunteers were then given this form to fill out. Following the analyses, it was discovered that the questions posed to the participants were of the kind of addressing the research questions. As a result, the form can be said to provide construct validity.

The credibility of the qualitative investigation is jeopardized by errors such as managing inadequate results, themes based on closed answers, and misinterpreting data. One of the measures for reliability that may be used is to ask persons with general knowledge of the study issue and expertise in qualitative research methodologies to analyze the study in several aspects. To confirm the reliability of the data analysis results, a peer debriefing method was used in this study, and the findings of the analyses were forwarded to three experts in the area, who approved the codes, categories, and themes that emerged. Changes were made to the analysis in light of the input received, and an expert opinion was obtained for the final status of the results before the procedure was completed.

3.5. Participants

Purposive Sampling method was used in this study. Purposive sampling is a widely used technique in qualitative research for identifying and selecting information-rich cases for the most effective use of limited resources. This sampling method involves identifying and selecting individuals or groups who are knowledgeable and experienced in the subject of interest. The most commonly used purposeful

sampling methods in qualitative research; homogeneous sampling, maximum variation sampling, snowball sampling, convenience sampling, extreme or deviant case sampling, theoretical sampling, critical case sampling, criterion sampling, typical case sampling and quota sampling (Palinkas at al., 2015). In this investigation, quota sampling was used. Quota sampling is when a researcher collects people from the research population who have specific characteristics and collects a sample from them until a particular number is attained (Suri, 2011).

People who have worked in digital advertising companies for a long time and are actively involved in the transformation of digital advertising through the use of big data and algorithms make up the sample group for this study. The companies where the research participants work receive expert support from outside the company to process big data. Since none of the advertising firms has employees who perform big data analysis, there are no data analysis participants among the research participants. Participants use useful data obtained from big data and personalized data gained through algorithms in digital advertising.

The study group of the research consists of 23 people, 16 men and 7 women. In determining the participants, the groups that would make a difference according to the independent variables of the study were taken into consideration. Demographic information of the participants is given in Table 1:

Table 3. 1 Demographic information of the participants

Code	Gender	Education Status	Occupation	Age
P1	Men	Master's Degree	Digital Marketing Manager	32
P2	Men	Bachelor Degree	Digital Marketing Specialist	35

P3	Women	Master's Degree	Creative Director	37
P4	Women	Master's Degree	Digital Marketing Manager	31
P5	Women	Bachelor Degree	Digital Marketing Manager	34
P6	Men	Bachelor Degree	Advertising Agency Owner	45
P7	Men	Bachelor Degree	Software Engineer	55
P8	Men	Doctorate Degree	Corporate Communications Manager	42
P9	Women	Bachelor Degree	Digital Content Manager	32
P10	Women	Doctorate Degree	Game Design Agency Owner	48
P11	Man	Bachelor Degree	Digital Content Manager	35
P12	Man	Master's Degree	Advertising Agency Owner	43
P13	Man	Bachelor Degree	Content Marketing Agency Owner	41

P14	Man	Bachelor Degree	Director	37
P15	Women	Bachelor Degree	Advertising Agency Owner	55
P16	Man	Bachelor Degree	Mobile Application Agency Owner	43
P17	Women	Bachelor Degree	Software Specialist	33
P18	Man	Bachelor Degree	Digital Content Manager	29
P19	Man	Master's Degree	Strategy and Marketing Manager	44
P20	Man	Bachelor Degree	Digital Content Manager	32
P21	Man	Bachelor Degree	Digital and Strategy Agency Owner	48
P22	Man	Doctorate Degree	Advertising Agency Owner	59
P23	Man	Bachelor Degree	Digital Content Manager	30

The distribution of the sample group by gender in Table 1 shows that the frequency values are not close to each other. Men are more active in the research topic industry than women, which explains why.

4. FINDINGS

In this study, participants' views on the effect of big data and algorithms on digital advertising were tried to be described.

The data were recorded on the obtained data and codes were created with content analysis on it. Visual modifiers were used to present the findings.

4.1. Findings on the theme, category and codes of the research

Codes were created with content analysis on the data obtained from the interviews. The generated codes are grouped together according to their similar characteristics and grouped under categories. Categories are presented by associating with themes.

In the preliminary examination of the data obtained from the interviews conducted in the research, the 5 main categories created in parallel with the research questions were associated with the subcategories and were matched with the subcategory clusters created by the help of codes collected under groups. Figure 1 was created from the findings obtained on this subject:

Figure 4. 1 The Themes and Categories of the Research

4.2. Big data and algorithms in marketing activities

Participants were asked whether they benefited from big data and algorithms in their marketing activities, and the data obtained from the interviews with the participants were analyzed by content analysis. The codes consisting of the answers given by the participants are given in Table 4.1:

Table 4. 1 Codes created for participants to benefit from large data and algorithms in their marketing activities.

Kategories	**Codes**
The importance of big data and algorithms in marketing activities	Yes, we use big data and algorithms. (23)
	We have been using big data for nearly 15 years.
	Big data is a revolutionary issue, relevant to all aspects of our lives, from businesses to consumers and from science to government.
	Big data affects marketing activities at a significant level
	We use software that uses big data algorithms to adapt to a transforming world.

	With the introduction of technology, mobile phones and social media into our lives, individuals have come to produce data even when they search for a topic from Google.
	Smart devices that we have used in the home are now talking to sensors among themselves and providing data flow.
	Since our customers are now part of this transformation, they expect us to use this and similar technology.
	Big data is also important in achieving ideal pricing.
The use of big data and algorithms in marketing activities	Our agency uses third-party software based on artificial intelligence algorithms for both social media and digital media. In this way, it creates a marketing strategy that will be reduced from the target audience to the target person.
	We use these algorithms in many areas, from information technologies to retail and public services.
	By collecting information and learning about user behaviors, we reach people who target the right product
	We contribute to the development of brands by using technology in terms of tracking and analysis.
	We analyze the consumer by reporting weekly, monthly and annually. In this way, we increase the profitability rates and sales of companies.
	We use these datas to better understand and identify patterns in users' behavior.
	We use it to show ads to customers through platforms such as Facebook Ads, Google Ads and Insider for remarketing.
	Big data that we can use in our Facebook, Instagram, Twitter and Adwords ads is already offered to us by these channels.
	We prepare blog, web, product, seo content for companies, select the most striking one and make special content appear to visitors.
	We use big data algorithms in our development and marketing activities.
	We use big data algorithms in our decision-making mechanism.
	We create personalized campaigns and increase sales efficiency.
	With the algorithms we have used, we offer visitors personalized experiences.
	We use Google Analytics, Yandex Analytics and Facebook Analytics to spy on customer habits and interests.
	We process data and make it analytical.
	We engage in “customer-oriented” marketing activities by taking advantage of the results obtained through Big Data and the algorithms we design, which are the biggest tool of our main activity.
	We create all our data through the software we have developed.
	We benefit from many uses of big data in marketing activities.
	We use it when providing services to consumers who are entering websites and looking for a quick solution to any issue.
	We started to use it in our business models.

All participants benefit from large data and algorithms in their marketing activities. Participants pointed out the importance of using big data and algorithms in marketing activities and how they use them. Because of this, codes are collected under these two categories.

Participants stated that with the introduction of technology, mobile phones and social media into people's lives, people produce data in all areas. Participants pointed out that big data and algorithms are a revolutionary topic related to all aspects of our lives. Participants stated that they used big data algorithms to adapt to the transforming World and mentioned the importance of big data to achieve Ideal pricing.

Participants use big data and algorithms in many areas, from information technologies to retail and public services. Participants use big data and algorithms,

- in their business models.
- when providing services to consumers who are entering websites and looking for a quick solution to any issue.
- in their development and marketing activities.
- in their decision-making mechanism.
- and offer visitors personalized experiences.
- and create personalized campaigns and increase sales efficiency.
- to show ads to customers through platforms such as Facebook Ads, Google Ads and Insider for remarketing.
- to better understand and identify patterns in users' behavior.

Also they uses third-party software based on artificial intelligence algorithms for both social media and digital media. In this way, it creates a marketing strategy that will be reduced from the target audience to the target person. Furthermore, participants stated that they contribute to the development of brands by using technology in terms of tracking and analysis. One of the participants prepare blog, web, product, seo content for companies, select the most striking one and make special content appear to visitors. Other participant stated that they analyze the consumer by reporting weekly, monthly and annually. In this way, they increase the profitability rates and sales of companies.

4.3. The role of big data in reaching customers' shopping information

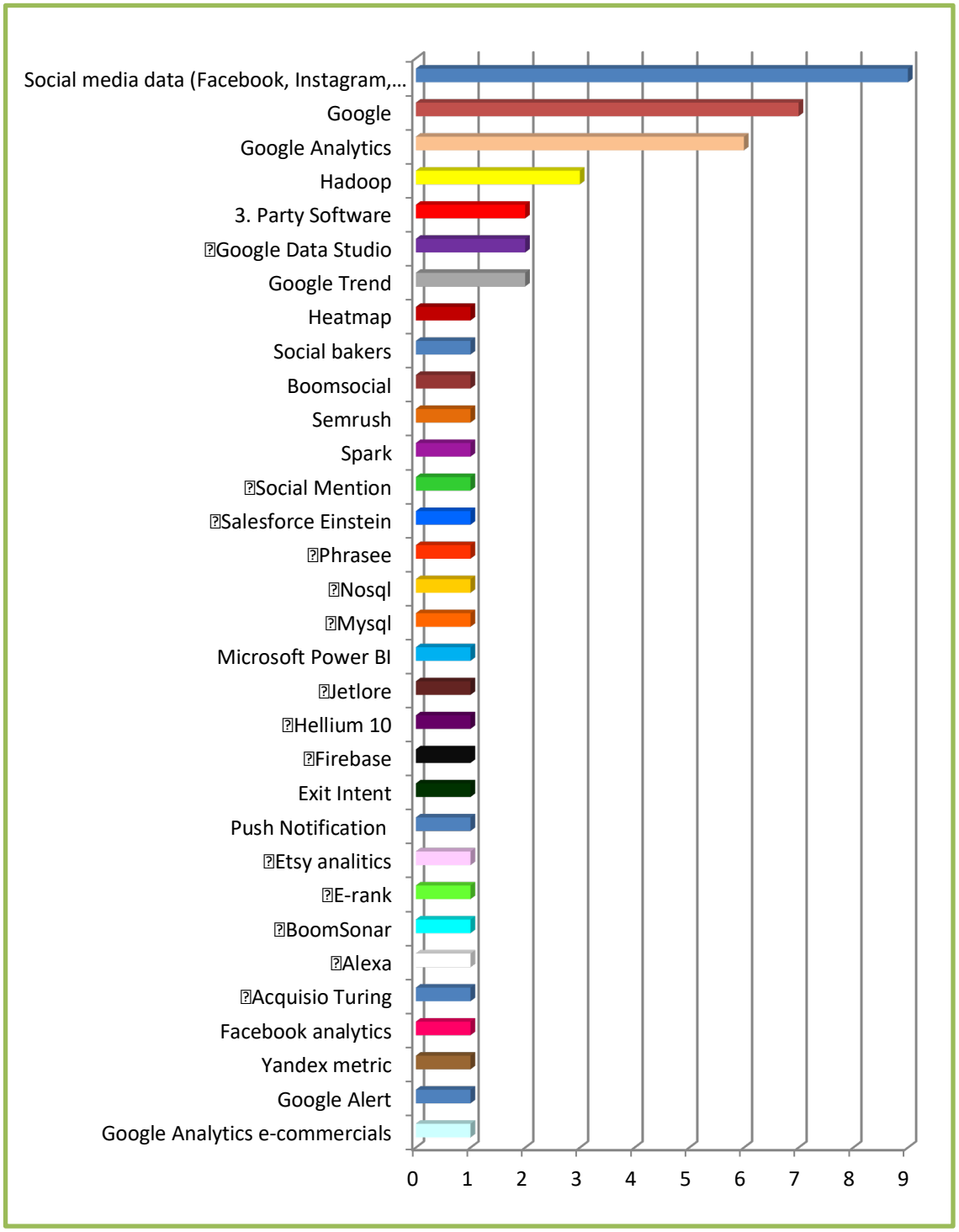
Participants were asked how they achieved customer information about shopping (consumer behavior), and the data obtained from the interviews with the participants were analyzed by content analysis. The codes consisting of the answers given by the participants are given in Table 4.2.:

Table 4. 2 Codes created for participants about how they achieved customer information about shopping

Codes	**f**	**%**
Social media data (Facebook, Instagram, Youtube)	9	39,1
Google	7	30,4
Google Analytics	6	26,1
Google Trend	2	8,7
Google Data Studio	2	8,7
Google Analytics e-commercials	1	4,3
Google Alert	1	4,3
Yandex metric	1	4,3
Facebook analytics	1	4,3
Hadoop	3	13,0
3. Party Software	2	8,7
Acquisio Turing	1	4,3
Alexa	1	4,3
BoomSonar	1	4,3
E-rank	1	4,3
Etsy analitics	1	4,3
Push Notification	1	4,3
Exit Intent	1	4,3
Firebase	1	4,3
Hellium 10	1	4,3
Jetlore	1	4,3
Microsoft Power BI	1	4,3
Mysql	1	4,3
Nosql	1	4,3
Phrasee	1	4,3
Salesforce Einstein	1	4,3
Social Mention	1	4,3
Spark	1	4,3
Semrush	1	4,3
Boomsocial	1	4,3
Social bakers	1	4,3
Heatmap	1	4,3
We develop our own data and create our own database.	1	4,3
From Information Companies That Provide Information Data	1	4,3

Thanks to the traceability system we have developed, the product development processes are transferred to the last consumer and made by points or evaluation methods.	1	4,3
Customer interaction and data are registered and used in the system within the scope of KVKK.	1	4,3
All of the data created by the transactions such as communication, search, purchase and sharing on the internet in the daily life of a normal consumer are also stored.	1	4,3
We use our own developed CRM.	1	4,3
Consumer behavior is revealed by the examination and analysis of data from the past years.	1	4,3
We're getting consumer behavior from web, blog data.	1	4,3
We collect data through our websites.	1	4,3
Monitoring programs	1	4,3
We use our own applications.	1	4,3

Figure 4. 2 Codes created for participants about how they achieved customer information about shopping



Most of the participants use social media and internet data to access customers' shopping information.39.1 % of the participants stated that they had access to the shopping information of customers through social media data (Facebook, Instagram, Twitter, …) Also 30.4 % of the participants stated that they had access to the shopping information of customers through Google. Participants use Google tools such as Google Analytics, Google Trend, Google Data Studio, Google Alert. Furthermore participants use Yandex metric, Facebook analytics and other programs to analyze internet and social media data. Some participants ' opinions on this issue are as follows:

> *P14: "We access it from various sources such as Facebook, Twitter and video content. Social media has become a platform for communication and socialization of individuals. It is said that the number of photos uploaded to Facebook is 350 million per day, with the widespread use of smartphones and instantaneous data produced by individuals. It has become very easy to access big data on social media. In addition, the posts and comments made on Twitter are important for community data.While consumers are purchasing or valuing products, they reflect their thoughts on the like buttons.*

> *P13: "In addition, billions of kilobytes of data are obtained every day thanks to social media posts. Today, all of the data created by the transactions such as communication, search, purchase and sharing on the internet in the daily life of a normal consumer are also stored."*

> *P10: "In addition, the follow-up and accurate analysis of the posts made on social media are indispensable for successful marketing campaigns."*

> *P2: "There are about 5 billion mobile phones currently in use worldwide. The majority of our consumers use social media from their mobile phones. We provide access to consumers through social media networks.*

We collect data on social media sites, Facebook, Instagram and Twitter. We access user data from video, news and content clickstreams.By examining interpersonal relationships on social networks, we advertise to people who can buy the same product.

Approximately 30 billion posts are shared per month on Facebook. On Facebook, a user's connections with other users, shares, likes, interests, video shares, page likes, ad viewing times can all be monitored, apart from their own profile features. This feeds big data and provides data access. Even in Turkey alone, there are 7 million tweets sent from Twitter every day. While it makes it easier for us to reach the masses with the use of hashtags on Twitter, it also facilitates the increase of our access rates. In short, we collect users' specific location, age, demographic information through hashtags and use them in marketing."

In addition, participants use the Hadoop program in big data analysis.Other programs used by participants are 3. Party Software, Acquisio Turing, Alexa, BoomSonar, E-rank, Etsy analitics, Push Notification , Exit Intent, Firebase, Hellium 10, Jetlore, Microsoft Power BI, Mysql, Nosql, Phrasee, Salesforce Einstein, Social Mention, Spark, Semrush, Boomsocial, Social bakers, Heatmap. Some particants use their own applications, programs and data. Some participants' opinions on this issue are as follows:

P14: "In big data analysis, Hadoop is fast in scaling and reliable in storage."

P13: "We use a mixed structure as a data system.

** MySql*

** Firebase*

** NoSql*

We have Exit Intent, Push Notification systems."

P9: "In the last 5 years, many service programs have been produced. In the process of tracking and reporting our brands on social media and online platforms; we use

** Social Mention*

** BoomSonar*

** Google Alert*

** Google Analytics*

monitoring tools programs. In this way, we can collect all kinds of content shared on online and social platforms. We also develop applications ourselves."

4.4. Difference between traditional data and Big Data

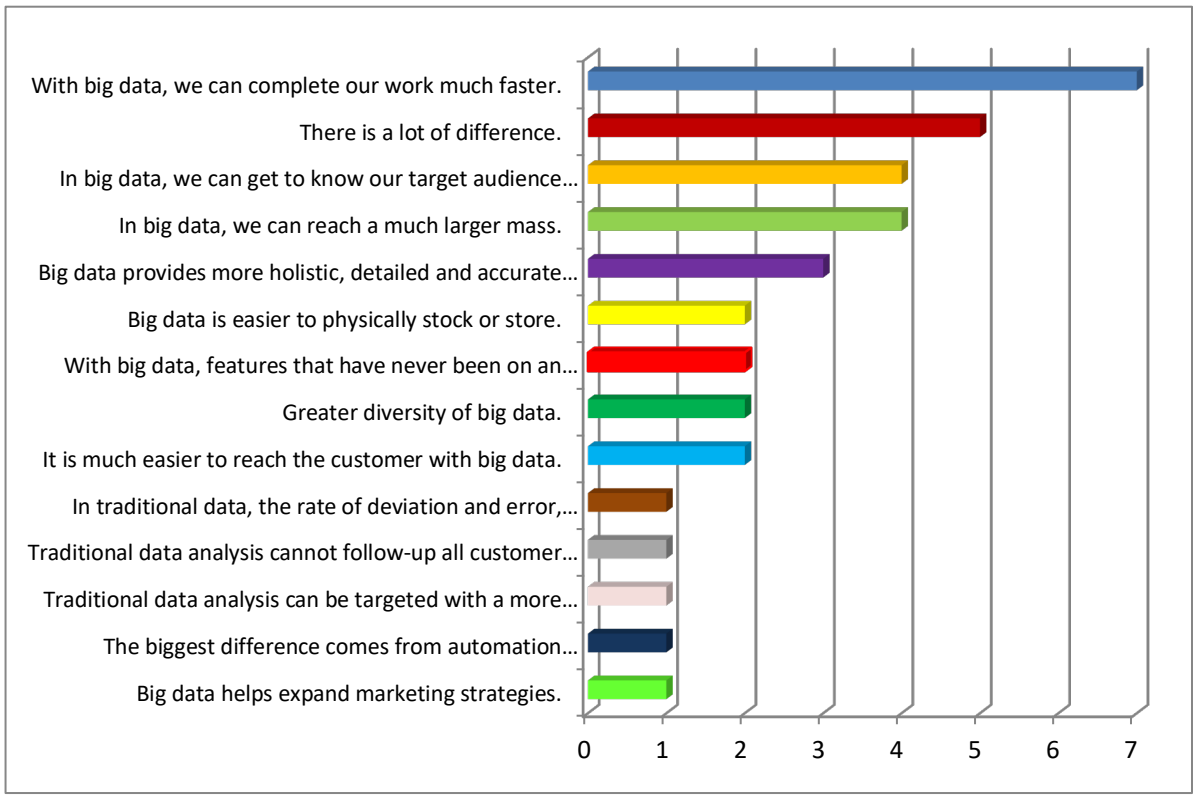
Participants were asked if there is a difference between using traditional data and big data in their projects., and the data obtained from the interviews with the participants were analyzed by content analysis. The codes consisting of the answers given by the participants are given in Table 4.3 :

Table 4. 3 Codes created for participants opinions about if there is a difference between using traditional data and big data in their projects

Codes	f	%
With big data, we can complete our work much faster.	7	30,4
There is a lot of difference.	5	21,7
In big data, we can reach a much larger mass.	4	17,4
In big data, we can get to know our target audience and potential customers better.	4	17,4
Big data provides more holistic, detailed and accurate results	3	13,0
It is much easier to reach the customer with big data.	2	8,7

Greater diversity of big data.	2	8,7
With big data, features that have never been on an account can be noticed	2	8,7
Big data is easier to physically stock or store.	2	8,7
Big data helps expand marketing strategies.	1	4,3
The biggest difference comes from automation processes.	1	4,3
Traditional data analysis can be targeted with a more focus group.	1	4,3
Traditional data analysis cannot follow-up all customer movements.	1	4,3
In traditional data, the rate of deviation and error, based on human predictions, is high	1	4,3
It's impossible for us to do this with traditional data.	1	4,3
There are situations where we use traditional data, but Big Data is huge	1	4,3
We run everything through Big Data.	1	4,3
Without artificial intelligence, we wouldn't be able to do this job. Even if we collected enough data, we couldn't analyze it.	1	4,3

Figure 4. 3 Codes created for participants opinions about if there is a difference between using traditional data and big data in their projects



The biggest difference in big data compared to traditional data is that it is much faster. Using big data, participants can complete the work in a much shorter time.

30,4 % of participants emphasized this issue. Another difference between big data and traditional data is with traditional data participants can reach a much larger mass. Participants can reach very large audiences, especially using social media and internet data. In addition, participants in big data, participants can get to know our target audience and potential customers better. In this way, they can organize their strategies better. 17,4 % of participants emphasized this issues. Also participants stated that big data provides more holistic, detailed and accurate results and it is much easier to reach the customer with big data. In traditional data, the rate of deviation and error, based on human predictions, is high. The variety of big data is greater than traditional data and with big data and features that have never been on an account can be noticed. Traditional data analysis cannot follow-up all customer movements. Furthermore big data is easier to physically stock or store. Big data helps expand marketing strategies and there is a lot of difference between big data and traditional data in automation processes. However, traditional data analysis can be targeted with a more focus group. Some participants' opinions on this issue are as follows:

> *P4: "At the beginning of the important factors that separate traditional data from big data is speed. Using big data, we can complete the work in a much shorter time, which can take days or even weeks. Moreover, we are able to get more detailed and accurate results. We can get to know our target audience and potential customers better and organize our messages accordingly."*

> *P6: "There are quite large differences between traditional data and big data in terms of standardizing data and storing data from a physical point of view. At the same time, the use of time is the most discriminatory element for us."*

> *P7:" While the share of deviation and error based on human predictions is high in traditional data, we can see which products the target audience is searching for and turning to sales by using the next*

generation of digital tools. Traditional data requires months of research, while using digital tools we can access data instantly."

P9: "Yes, there's a lot of difference. If I give an example; in one of our campaigns, we designed a game app for a store that the global sneaker brand has just opened in Turkey. We have previously accessed information about shoppers from the online store. We also sent information to potential customers via e-mail marketing, advertising via Facebook, Instagram and Twitter, campaign posts and social media (by reaching their likes and shares). We also made the sense of the game and the current campaign discount to people passing by the store and the mobile phone of the consumer sitting in the shopping mall store area. People who won the game were given gift certificates. The goal was to increase the store's awareness, make its announcement. In this campaign, we used customer data very intensively."

P15:" We can say that we have no traditional data. We collect all data into Big Data. Because we have marketing activities through many channels, we run everything through Big Data. The biggest difference comes from automation processes. For example, if we have a user who has not used our game for 15 days, they automatically receive a push notification. For this purpose, we do not need to give any additional commands. We use Marketo for marketing automation."

P16:" Big data use allows us to analyze customers very quickly. We retain app download information that our customers purchase from us (from the App Store or GooglePlay). After our big data analysis, we found that our customers ' average application deletion time is 2 months. Every week, we pull out a list of our customers who have filled out 2 months and introduce them to our new applications. In this context, we have recorded a big increase in our sales. The biggest

difference in using big data is the emergence of customer habits that we don't realize, and we develop new marketing strategies accordingly."

4.5. The advantages and disadvantages of Big Data and algorithms

Participants were asked the advantages and disadvantages of advertising using Big Data and algorithms, and the data obtained from the interviews with the participants were analyzed by content analysis. The codes consisting of the answers given by the participants are given in Table 4.4 :

Table 4. 4 Codes created for participants opinions about the advantages and disadvantages of advertising using Big Data and algorithms

Cat.	Codes	f	%
ADVANTAGES	Personalized and accurate targeting	11	47,8
	Decrease of advertising costs and budget optimization	10	43,5
	Increasing Sales	2	8,7
	It allows to use data, time and human resources more effectively	2	8,7
	It allows us to get to know our customers more closely and even analyze which products they will buy in the future.	2	8,7
	Reporting	2	8,7
	It is an assistant available 24/7.	1	4,3
	Data is more accurate.	1	4,3
	We can examine how competing brands work.	1	4,3
	Thanks to big data, we prevent the sharing of personal data and can re-advertise data that we do not collect ourselves using the Instagram channel.	1	4,3
	Advertising using big data has created a more transparent structure.	1	4,3
	Allows trial and error method.	1	4,3
	Ad automation and remarketing	1	4,3
	It offers an enhanced communication experience.	1	4,3
	Real-time customer feedback	1	4,3
	It allows us to get to the target quickly.	1	4,3
	To be able to clearly follow the return of every advertisement we give.	1	4,3
	It is fast and storable.	1	4,3
	Much simpler to use.	1	4,3
	We have learned about customer segmentation and we have marketing activities according to those segments.	1	4,3
	Automate and personalize the sales cycle for potential sales.	1	4,3
	You have the opportunity to predict the development of the market.	1	4,3
	It enables easy management of organizations such as marketing, pricing, stock, advertising and customer relations.	1	4,3
	With periodic analysis, we can determine our future steps.	1	4,3
	It increases the impact of advertising.	1	4,3

	It contributes to the measurement and evaluation of satisfaction related to the product-sales - service - company.	1	4,3
	Variety, velocity, volume, verification and value	1	4,3
	Ability to follow site visitors	1	4,3
DISADVANTAGES	Increased ad density and users are now insensitive to them	5	21,7
	If a good analysis cannot be done and not reported, the data can turn into garbage.	4	17,4
	Information Reliability	3	13,0
	Long and costly learning time of algorithms. Especially for overseas markets.	1	4,3
	We can't process the return of billboard and newspaper ads in big data yet.	1	4,3
	Big data is a data that remains constantly alive and is not constant	1	4,3
	Receiving, storing and processing big data at the same speed also brings problems.	1	4,3
	You may have a well-learned model that you have created very well, but as a result of what we call overfitting or memorizing, you can only reach a group of customers and lose potential customers.	1	4,3
	The problem of how much the quality of the data obtained reflects the target customer behavior.	1	4,3

Figure 4. 4 Main Advantages of Big Data and algorithms according to the participants' answers

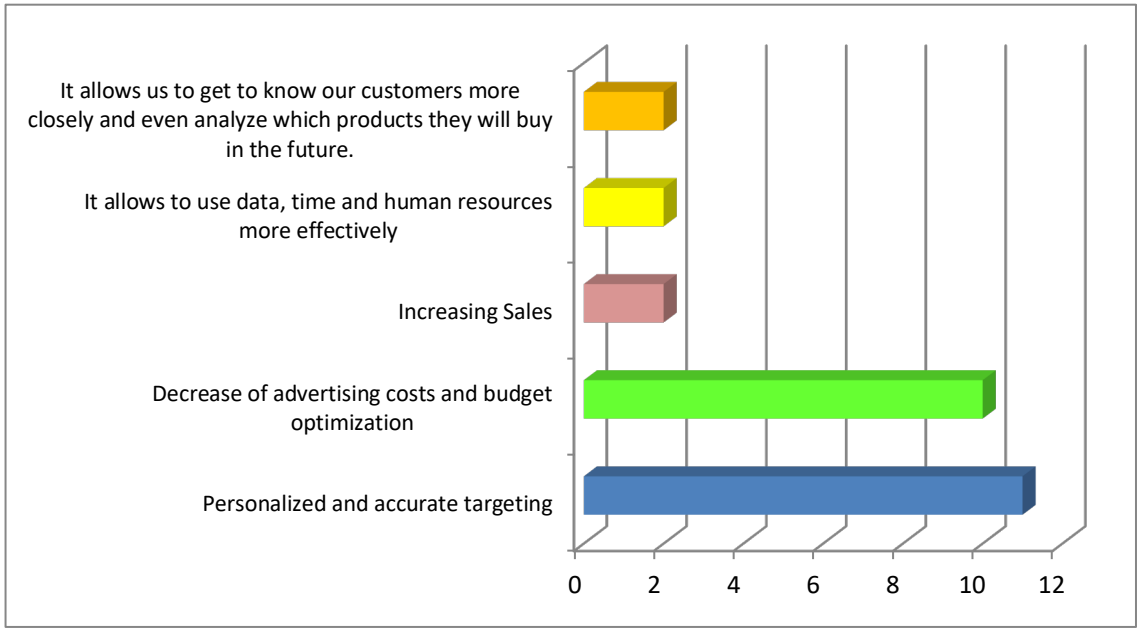
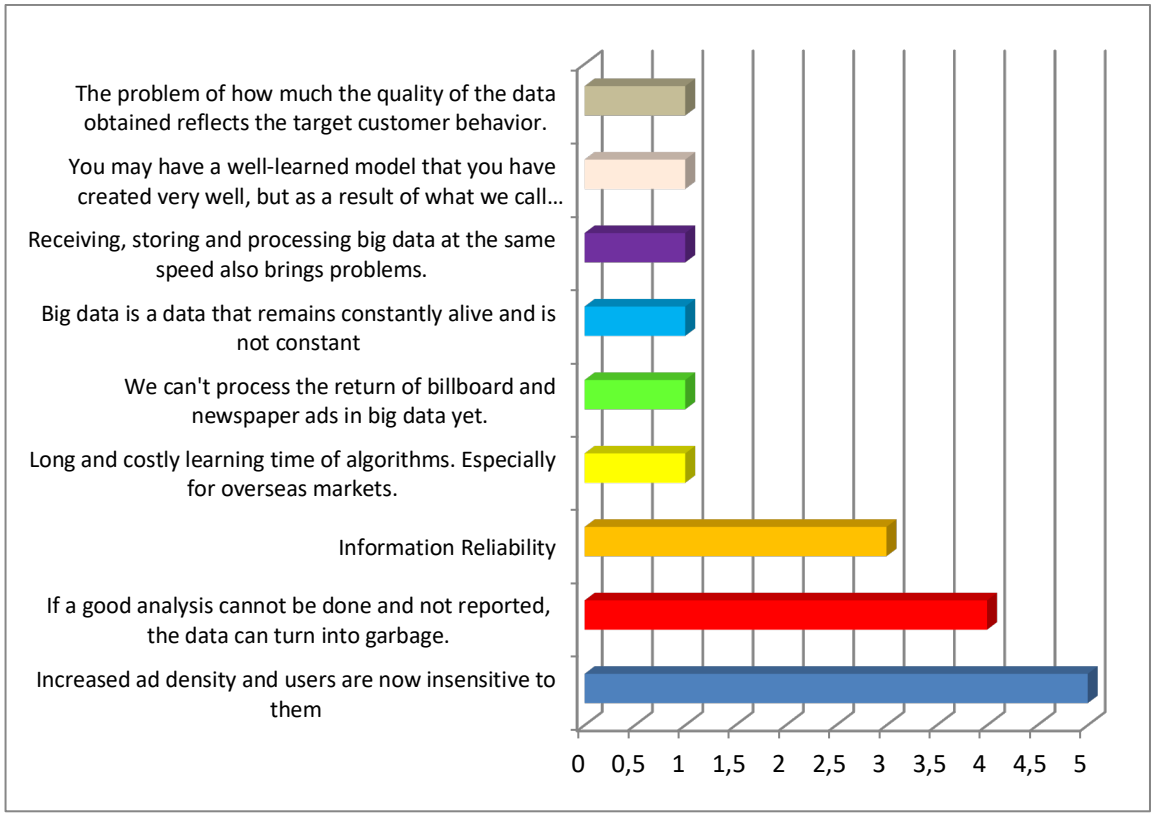


Figure 4. 5 Disadvantages of Big Data and algorithms according to the participants' answers



According to the participants main advantage of Big Data and algorithms is personalized and accurate targeting. Thanks to Big Data, ads reach directly the target customer, and in this way advertising budgets reduce and sales increase. 47.8 % of participants emphasized personalized and accurate targeting. Also 43.5 % of participants emphasized the decrease of advertising costs, and budget optimization. Furthermore, Big Data and algorithms allow to use data, time and human resources more effectively. Big data and algorithms are also important for reporting. Thanks to big data and algorithms, you can follow the return of your ads, make predictions for the future, and determine strategy by analyzing the data of yourself and competing companies. Big data and algorithms allow trial and error method and allow you to try new advertising campaigns without spending too much budget. You can reach the real-time customer feedbacks by big data and algorithms. Big data and algorithms contributes to the measurement and evaluation of satisfaction related to the product- sales - service - company. Other advantages of big data and

algorithms are variety, velocity, volume, verification and value. It allows you to get the target quickly and variety. Some participants' opinions on this issue are as follows:

> *P1: "Big Data algorithms are very useful for customer-oriented and targeted advertising and marketing method. We, as a company, prefer to realize the products we develop with word of mouth marketing method and we overcome them with the result of "what our customers like and want", which we have acquired thanks to Big Data and algorithm.*
> *Thanks to these data, we can reduce advertising costs and prevent unnecessary advertising. Using the necessary data and algorithms in the right way and in the right place allows you to reach the goal faster and identifies the elements that need to be improved immediately, otherwise advertising budgets may reach very high costs and may be inefficient. Namely, you can advertise customer-focused if data is available, but if there is no data, you may need to target a wider range of consumers and this may not be cost and time efficient."*

> *P7:" We are reducing the target audience to the target individual, not to big data. Thus, we are showing the product or service by reaching individuals with the word 'you'. Thus, unnecessary advertising expenditures are prevented. Because thanks to artificial intelligence, it is now easier to reach similar people by learning all the users who interact with the relevant ad."*

According to the participants main disadvantage of Big Data and algorithms is by the increased ad density and users are now insensitive to ads. Especially in social media platforms advertisement density increase. As a result of this, users bans or ignores the advertisements in order to avoid the advertisements. Another disadvantage of big data and algorithms is that if this data is not analyzed well, dealing with this data leads to a loss of time and money. Big data is a data that

remains constantly alive and is not constant. Receiving, storing and processing big data at the same speed also brings problems. Long and costly learning time of algorithms is another disadvantage of big data and algorithms. Furthermore information reliability and verification is another problem. You need to check whether incoming data is secure. Whether data should remain hidden or to whom it should appear, these are also among the problems. Some participants' opinions on this issue are as follows:

P1: "The disadvantage that arises in the use of Big Data and algorithms is that since Big Data is a data that is constantly alive and unstable, it should not be overlooked that the diversity and frequency of advertising should be increased and integrated with today's conditions."

P2: "The disadvantages are, day by day, social media platforms are becoming an advertorial. The consumer bans or ignores the advertisements in order to avoid the advertisements. This decreases the effect of ad clicks. Perhaps the most significant disadvantage is that it neutralizes insight for marketers and strategists."

P7: " Disadvantages today, people can be uncomfortable with the fact that digital is so close to them. So when you're trying to show a lot of ads, you can get repulsive. As a solution to this, we think that a good media plan should be made."

P8: " On the disadvantage point, you may have a well-learned model that you have set up very well, but as a result of the event we call overfitting or memorization, you can only reach a group of customers and lose your potential customers."

P13:" Verification can also be seen as another data component when we need to check whether incoming data is secure during the flow of data that is growing so fast. This data may be visible to the correct people or needs to remain hidden."

P14:" The disadvantage is that with the increasing variety and speed of data that surrounds us, we can't seem to be able to keep up. Receiving, storing and processing big data at the same speed also brings problems. In addition, we cannot be sure how reliable big data is. The high variety of big data complicates the process of ensuring the quality and reliability of the analyzed data. The quality of the resulting data also suggests the question of whether it reflects the behavior of the target audience."

4.1. **Reasons to Use Big Data and Algorithms**

Participants were asked their reasons for using Big Data and algorithms, and the data obtained from the interviews with the participants were analyzed by content analysis. The codes consisting of the answers given by the participants are given in Table 4.5 :

Table 4. 5 Codes created for participants opinions about the reasons for using Big Data and algorithms

Category	Codes	f	%
Current events and changes in the world	Since Corona came out, we've seen serious changes in customer habits. Thanks to big data, we have developed our product delivery policy, taking into account preferred short shipping times.	13	56,5
	We are closely following an advertising automation system that can be connected to our own CRM. We intend to buy and use it as soon as it is developed.		
	We follow automation programs very closely and use newly released automations with low budgets.		
Increase and change in customer demands	Thanks to the advantages of big data, we can develop products according to gender and age group.	20	87,0
	Chatbots can help improve business efficiency while making customers happier than ever.		
	Thanks to our ability to detect the correct segmentation, there is an increase in customer demand.		
	you can instantly see customer fluctuations and capture them by running artificial intelligence accordingly.		
	Customer demands are easier to capture with trend Tracking.		

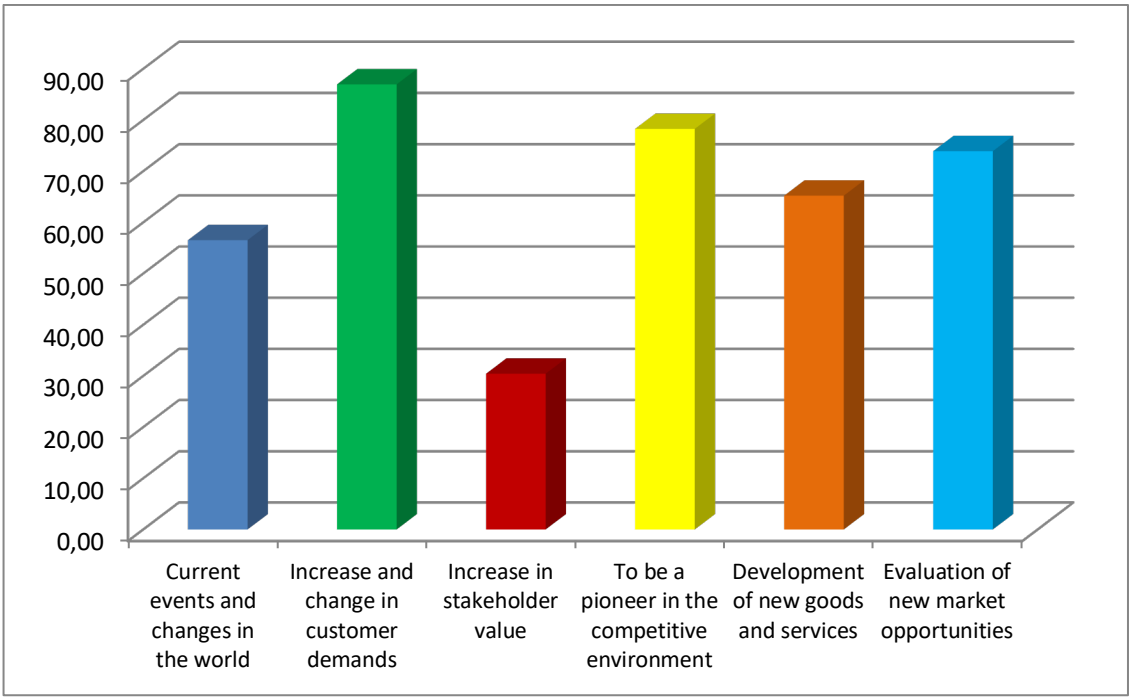
	Understanding the current perspectives of our customers and providing appropriate solutions are among our priorities.		
	It can monitor our customers ' purchasing habits and allows us to make cross-sales.		
	Customers' expectations are changing day by day. It is necessary to benefit from big data in order to predict this change and take the next step.		
	Thanks to Remarketing campaigns, we have gained significant optimization in customer targeting.		
	The change in technology has also changed customer needs.		
	The rapid change of technology affects customer demands and market needs.		
	Thanks to big data, we can measure consumers and get to know our customers better.		
	We introduce our newly developed games according to customer segments, which brings us new sales.		
	Thanks to the suggestion of new interests, we can reach potential customers that we do not know.		
	Thanks to our remarketing activities, we regained lost customers with very low budgets.		
Increase in stakeholder value	We can identify the most common problems in CRM and produce solutions according to them	7	30,4
	Thanks to the use of heatmap, we can see which buttons our players press and the features they like most, and make data-based improvements accordingly.		
	Our customers are very happy with the reminder SMS, special occasions messages.		
To be a pioneer in the competitive environment	We heard that our competitors who do not use big data and similar systems and platforms suffered	18	78,3
	When using big data, we reach the customer potential consumer in a faster and more reliable way. In this way, we get ahead of other companies in the competitive environment.		
	Thanks to Dyzio tracking, we are the first to detect the trending influencers at the earliest and become the first to communicate with them, and we bring them to our agency.		
	With influencer tracking programs (such as Trendstop), we can look at what our competitors produce or their preferred models and make data-based competitor analysis.		
	When analyzing marketing insights, we can also measure campaigns.		
	We observe the products produced by our competitors and work on our production plan and seasonal models accordingly.		
	All brands and companies that want to differentiate and stand out from their competitors should benefit from big data in their business processes. In this way, the distance between production and consumption can gradually decrease and effective results can be achieved.		
	With the help of technology, those who can predict the future can be more easily separated from their competitors.		
	Those who use big data automation tools and can offer personalized suggestions will also be the ones who gain a competitive advantage by making a difference.		
Development of new goods and services	We pass on questions from our chat bot to big data. We receive the most incoming requests on a monthly basis in our development program.	15	65,2
	Target individuals at one end of the world can get in touch with you to help you improve your products.		

	Big data supports us to see season-based and color-based trends. Thanks to a service called Trendstop, we analyze the color combinations and products that most highlight the phenomena and make data-based predictions on fabrics and models that will be preferred in the coming seasons.		
	As we develop our new services, we are also exploring how we can incorporate them into our processes.		
Evaluation of new market opportunities	Thanks to supercomputers that can rapidly process a large number of data, we can access opportunities beyond the ocean in a short time. Thus, we can get ahead by increasing our competitive power.	17	73,9
	Those who can see opportunities without becoming obvious step forward.		
	We pay particular attention to the age group, and develop new games according to the customer age group. This gives us opportunities as new markets.		
	We follow the download figures of competing games through AppTopia. As soon as we see a game that wins a high revenue or fast download, we start developing a similar one.		
	If you want to reach new markets, it's easy to stop being local and open up to the global.		
	We are experimenting with new markets with low budgets. We decide to enter these markets when we observe high returns.		

Table 4. 6 Codes created for participants opinions about the reasons for using Big Data and algorithms

Categories	f	%
Current events and changes in the world	13	56,52
Increase and change in customer demands	20	86,96
Increase in stakeholder value	7	30,43
To be a pioneer in the competitive environment	18	78,26
Development of new goods and services	15	65,22
Evaluation of new market opportunities	17	73,91

Figure 4. 6 Codes created for participants opinions about the reasons for using Big Data and algorithms



Participants' reasons for using big data and algorithms were grouped under 6 categories. While 86.96 % of the participants cited "the increase and change in customer demands" as the most important reason for using big data and algorithms, 78.26 % the participants stated "to be a pioneer in the competitive environment", 73.91 % stated "evaluation of new market opportunities", 65.22 % stated "development of new goods and services", 56.52 % stated "current event and changes in the world" and 30.43 % stated "increase in stakeholder value" as the reason for using big data.

Big data and algorithms are very important to determine the change in customer demands. Participants stated that customers' expectations are changing day by day. The rapid change of technology affects customer demands and market needs. It is necessary to benefit from big data in order to predict this change and take the next step. Thanks to big data and algorithms, participants follow their customers' behaviour. Some participants use remarketing activities, for customer targeting.

Some participants use chatbots to improve business effiency. Some participants' opinions on this issue are as follows:

> *P15: "Thanks to Remarketing campaigns, we have gained significant optimization in customer targeting. We use the same advertising budget much more efficiently. We promote our newly developed games according to customer segments, which gives us new sales."*

> *P17: "Our business is entirely based on big data. We follow big data developments closely. Thanks to our ability to detect the correct segmentation, there is an increase in customer demands. In addition, we direct our influencers according to seasonal trends. For example, while asking them to share clothing skins in the winter, summer holiday posts are in demand and bring us more customers."*

Another reason for using big data and algorithms is to be a pioneer in the competitive environment. Participants stated that by using big data, they reached the potential customer in a faster and more reliable way. In this way, they are ahead of other companies in the competitive environment. It has been also stated that all brands and companies that want to differentiate from their competitors and stand out should benefit from big data in their business processes. Participants noted that competitors who did not use big data and similar systems and platforms made loss. Participants observe the products produced by their competitors and work on their production plans and seasonal models accordingly. Some participants' opinions on this issue are as follows:

> *P10: " With the help of technology, those who can predict the future can be more easily separated from their competitors. Those who use big data automation tools and can offer personalized recommendations will also be the ones who gain a competitive advantage by making a difference. For example, by identifying customers who have not shopped for a while, you can organize special campaigns for them,*

remind them of products they have reviewed on your website but left without buying."

P17: " We use big data in competitor analysis. We use Dyzio platform and follow local influencers through Dyzio. Infleuncers generally prefer to work with a single agency. Thanks to Dyzio tracking, we are the first to identify trending influencers, and we are the first to contact them and bring them to our agency."

Another reason for using big data and algorithms is evaluation of new market opportunities. Participants stated that those who can see opportunities without becoming obvious are one step ahead, and opening up the global market to reach new markets becomes very easy with big data. Some participants noted that they tried new markets with low budgets and decided to enter these markets when they observed high returns. Some participants' opinions on this issue are as follows:

P4: " Thanks to supercomputers that can quickly process a large amount of data, we have short access to even opportunities beyond the ocean. In this way, we can move forward by increasing our competitiveness."

P9: " With big data, it is now much easier to reach global audiences. The world has become more accessible. For example, you can reach the consumer with a hastag on Instagram."

Another reason for using big data and algorithms is development of new goods and services. As participants develop their new services, they explore how to incorporate them into their processes. Also they develop their new products with big data and algorithms. Some participants' opinions on this issue are as follows:

P11: " In particular, big data supports us to see season-based and color-based trends. As an example, we predict future trends thanks to big data. Thanks to a service called Trendstop, we analyze the color

combinations and products that most highlight the phenomena and make data-based predictions on fabrics and models that will be preferred in the coming seasons."

Another reason for using big data and algorithms is current events and changes in the world. It is very important for businesses to keep track of current events and changes occurring around the world. The latest example of this has been observed in the corona virus process. Some participants changed their product delivery policies in this process, taking into account the preferred short shipping times. In addition, participants follow automation programs very closely and use newly released automations with low budgets. Some participants' opinions on this issue are as follows:

P11: "Since Corona came out, we've seen serious changes in customer habits. Thanks to big data, we have developed our product delivery policy, taking into account preferred short shipping times."

Last reason for using big data and algorithms is increase in stakeholder value. Participants can track the features that their customers like the most, thanks to big data, and develop strategies accordingly. Some participants' opinions on this issue are as follows:

P15: " The fact that we can see all the data in one place saves a lot of value from the management point of view. In addition, thanks to the use of heatmap, we see which buttons our players press and what they like, the features they use the most, and make data-based improvements accordingly."

P16: " Our customers are very happy with the reminder SMS, special occasions messages. In addition, we can identify the most common problems in CRM and produce solutions according to them. In this way, we add value to our stakeholders."

5. CONCLUSION

Four research questions were addressed as a consequence of the analysis of the data acquired via the interviews in this study, which demonstrates the organic connection of big data and algorithms with digital advertising through the eyes of individuals who work actively in the sector. Analysis results are presented in the Findings section in detail. Below, each question of the research is presented under headings and these questions are answered in the light of the analysis.

5.1. What function do big data and algorithms play in the evolution of digital advertising?

The answer to this question may be found in two categories in the analysis findings. The relevance of big data is covered in the first category, while the usage of big data and algorithms is covered in the second, and when these responses are reviewed, the research question is answered. Big data and algorithms are deemed particularly significant in digital advertising, according to the relevant codes. It was acknowledged that big data and algorithms helped all of the research participants, and they cited the fact that individuals from all walks of life used technology as a cause for this. The relevance of big data and algorithms for digital advertising comes when individuals create data as a result of their proximity to technology. The world is changing rapidly, and the big data and algorithm revolution are having an impact on digital advertising. Furthermore, in a competitive market where big data and algorithms are becoming more important, failing to use them in digital advertising means being unable to make optimal pricing decisions, and in such a case, it will be impossible to survive.

5.2. How do digital advertising companies utilize big data and algorithms?

Big data and algorithms aid participants in a variety of fields, from information technology to retail and public services. In general, in business models, while providing services to consumers who enter websites and looking for a quick

solution to any problem, while performing development and marketing activities, using decision-making mechanisms, providing personalized experiences to visitors, creating personalized campaigns to increase sales efficiency, Facebook Ads for remarketing, Big data and algorithms are used when sharing advertisements with customers through platforms such as Google Ads and Insider, interpreting the behavior of users, creating a marketing strategy, and making follow-up and analysis for the development of brands.

It is understood that the participants mostly use big data and algorithms to reach the shopping information of the customers. Accordingly, customer information is mostly (39.1%) obtained from social media data (Facebook, Instagram, Twitter, etc.). In addition, participants also collect customer information by using Google tools such as Google Analytics, Google Trend, Google Data Studio, Google Alert. Yandex metrics, Facebook analysis tools, and the Hadoop software are among the most common users of this information. Some firms use their own software in addition to these, while others utilize 3. Party Software, Acquisio Turing, Alexa, BoomSonar, E-rank, Etsy analytics, Push Notification, Exit Intent, Firebase, Hellium 10, Jetlore, Microsoft Power BI, Mysql, Nosql, Phrasee, Salesforce Einstein, Social Mention, Spark, Semrush, Boomsocial uses Social bakers, Heatmap software programs.

5.3. What are the advantages and disadvantages of big data and algorithm-based ads for companies?

The largest benefit of Big Data and algorithms, according to the participants, is personalisation and precise targeting (47.8 %). Thanks to Big Data, advertisements reach the targeted customer directly. In this way, while advertising expenditures decrease (43.5%), product sales increase. Another benefit of big data and algorithms is that they allow for more efficient use of data, time, and human resources. Furthermore, by utilizing big data and algorithms, more accurate reporting, feedback tracking, competition analysis, and accurate forecasts can be

established. Big data and algorithms, in addition to these, allow for the measurement and evaluation of product-sales-service-company satisfaction, as well as acting within the circle of variety, velocity, volume, truthfulness, and value. As a result, objectives can be met more rapidly.

The largest downside of big data and algorithms, according to the participants, is the increasing advertising density, which causes customers to get desensitized to commercials and, as a result, the adverts are automatically blocked. Furthermore, incorrect data collection might waste time and money. Because big data is made up of dynamic data, retrieving, storing, and analyzing data at the same time can generate a variety of issues. However, learning algorithms takes a long time and costs a lot of money, information reliability and verification difficulty, and a lot of work to keep some data confidential are some of the drawbacks.

5.4. Why do companies use big data and algorithms?

Traditional data is substantially slower than big data. Although traditional data can reach a larger number of clients, big data's personalisation capabilities make it simpler to reach the right audience. As a result of big data and algorithms, companies can better recognize consumers and arrange business strategies. The usage of big data and algorithms seem to be more appealing because the mistake rate in consumer predictions created with traditional data is high.

The reasons for the participants to use big data and algorithms can be listed as:

1. the increase and change in customer demands (86,96 %),
2. to be a pioneer in the competitive environment (78,26 %),
3. evaluation of new market opportunities (73.91 %),
4. development of new goods and services (65,22 %),
5. current event and changes in the world (56,52 %),
6. increase in stakeholder value (30,43 %)

Another reason to use big data and algorithms is to survive in a competitive environment. According to the participants, in a competitive environment, other companies can be avoided since potential clients may be contacted more quickly and reliably utilizing big data. Furthermore, one of the reasons for using these systems is to observe the loss of rivals who do not use big data and algorithms.

Another reason to use big data and algorithms is to seize new market opportunities. Because in a competitive world, companies who can spot opportunities before they occur are always one step ahead. One of the reasons for using this system is the possibility to generate new goods and services using big data and algorithms. Companies may be immediately updated about current events and developments in the world thanks to the technology. For example, we are notified about new automation initiatives in this manner. The recent emergence of the pandemic has raised the significance of big data and algorithms in terms of reducing delivery times once again. Big data and algorithms are also used by participants since they boost stakeholder value. In this approach, companies may develop new strategies based on their customers' interests.

DISCUSSION

In practically every field, technology has had a revolutionary influence in the twenty-first century. For the great majority of companies, technology has opened up new ways to get to know and remain in touch with consumers, as well as being a factor in product and service diversification. For this reason, it is clear that the digital advertising industry's scope is broadening thanks to big data and algorithms. Data has grown more valuable as a result of these applications, and collaboration across all areas of a company has improved. Depending on their contribution to digital advertising, practically every advertising company today has benefitted from big data and algorithms.

As a consequence of the extensive literature study, it was discovered that no qualitative study based on interviews on big data, algorithms, and digital advertising had ever been conducted in Turkey. However, the findings of this study, in which the impacts of big data and algorithms on the transformation of digital advertising are attempted to be established, are somewhat consistent with earlier research.

As a result of this study, the participants stated that they mostly utilize big data to predict client purchase behavior. The significance of social media data was also underlined. Ergen (2018) presented real instances in his study to demonstrate that Facebook is highly valued for obtaining personal information. The participants, according to the findings of this study, use a variety of applications as well as social media to gain from big data and algorithms. While 40.79% of the companies participating in Raguseo's (2018) research use visualization tools for big data, 38.16% use Scripting Languages. According to the same study, 27.63% of the companies stated that they use MapReduce and Hadoop Software and 22.40% of them use Machine learning. Natural Language Processing (NLP) software, social media analytics software, and predictive analytics software have been discovered to be the least used technologies in big data (Raguseo, 2018). This study's

participants said they use a wide range of software, including Hadoop Software. As a result, the participants' visions are open to a wide range of innovation.

Tiago and Verissimo (2014) investigated the internal and external pressures faced by businesses that are unable to keep up with digital transformation and participate in the digital platform. According to the results of a survey of marketing department managers, businesses should have an effective communication network with their customers. Similarly, the participants in this study noted that, thanks to big data and algorithms, they are aware of customer behavior and feedback on products, and thus can communicate with them. The participants underlined that they are conscious of why they employ big data and algorithms, and that they must continually refresh themselves in order to keep up with the market competition. Companies are racing to capitalize from this new income stream, according to Goodman (2016), and turn their data infrastructures, which were previously cost centers, into profit centers. As a result, it is reasonable to believe that the participants are justified in continuing to participate in this transition.

Kaisler and others (2013), the values of big data for a firm are listed as:

- Creating transparency by making big data openly available for business and functional analysis,
- Supporting experimental analysis, which can test decisions or approaches such as market programs,
- Helping to define market segmentation at narrower levels based on customer information,
- Support real-time analytics and decisions based on complex analytics applied to datasets from customers and embedded sensors

These values are generally considered by research participants as reasons for using big data.

In addition, Owais and Hussein (2016) stated the benefits of big data to institutions are listed as

- Management data in big data enables many use cases using smart tools.
- While data can be created in different formats, it is successfully uncovered for specific purposes.
- The storage space, which is evaluated within the scope of the benefits of the Internet, is used.
- Data from big data can be visualized, read and analyzed using business intelligence software.
- In terms of capabilities, data obtained from big data will improve analysis methods.

These benefits were mentioned as an advantage by the participants of the study.

Big data has spawned a slew of ethical quandaries. Big data ethical issues such as user privacy and information security are at the forefront (Zwitter, 2014). On the other hand, it is widely asserted that there are concerns in the collecting, storage, and use of big data, such as violations of personal privacy (Siapera, 2017; Zhang, 2018). Individuals who use social media platforms are tracked and turned into a consumable and marketable commodity. The behavior of each user is purchased and sold on a piecemeal basis. This demonstrates that big data has both legal and ethical implications. The participants in this study acknowledged that the privacy problem was a drawback of using big data and algorithms, according to the findings. The use of internet user information for customization of adverts and commercialization of people's private digital spaces is rising, thanks to data analytics and algorithms. Human experience is transformed into behavioral data and functions as the raw material of the market during the period Zuboff (2019) calls "surveillance capitalism," and this raw data can be processed through machine learning and software and used to change people's socio-economic and political decisions.

Akan and Mazcı (2020) discovered that customers have a negative attitude toward internet advertisements (due to the fact that they are considered distracting), that their knowledge of internet advertising and online behavioral advertising is insufficient, that they lack basic information about how the system works, and that

they lack any protection or protection. They discovered that they were unable to initiate shutdown procedures. A comparable condition was reported as a disadvantage by the participants in this research. People are bored of digital commercials, according to participants, and they dismiss websites without looking at tailored adverts, resulting in some advertising efforts being wasted.

RECOMMENDATIONS

The following recommendations for future research are based on the experiences acquired throughout the study and the results derived from the data collected:

- Quantitative and qualitative studies on the trio of big data, algorithms and digital advertising are very limited in Turkey. As can be seen from the results of this research, big data and algorithms have taken digital advertising to a whole new level. Therefore, academic studies on this trio should be increased.
- From the results of the research, it was seen that the participants had ethical and privacy concerns about big data. Although it is a global and legal problem, this situation should be included in academic studies in detail.
- Especially for the data obtained from social media platforms, it is necessary to obtain the permission of the people. There is a need for regulations regarding the use of unauthorized data.
- Participants use a wide variety of software to take advantage of big data and algorithms. The advantages and disadvantages of these softwares against each other should also be revealed through academic studies.
- The scope of this research conducted with qualitative research methods can be expanded. Mixed studies, which include both quantitative and qualitative data, can be carried out by expanding the number of samples.

REFERENCES

Adams, N.M. (2012). Perspective on data mining. *Int. J. Market Res., 52* (1), 11–20.

Aldridge, C. (2016, February). Native ads becoming core strategy. Retrieved from http://www. giantmedia.com/native-ads-stealing-budget-share-according-to-new-survey

Allam, Z., & Dhunny, Z. A. (2019). On big data, artificial intelligence and smart cities. *Cities, 89,* 80–91.

Akan, N. A. & Mazıcı, E. T. (2020). Reklamın Değişen Yüzünde Çevrim İçi Davranışsal Reklamcılık: İnternet Kullanıcıları Perspektifinden Bir Araştırma. Journal of Erciyes Communication, 7(2), 1453-1479.

Andrews, M., Goehring, J., Hui, S., Pancras, J. & Thornswood, L. (2016). Mobile promotions: A framework and research priorities. *Journal of Interactive Marketing, 34*, 15–24.

Aradau, C. (2015). The signature of security. Big data, anticipation, surveillance. *Radical Philosophy, 191*, 21–28.

Ardito, L., Scuotto, V., Del Giudice, M., & Messeni, A. (2018). A bibliometric analysis of research on Big Data analytics for business and management. *Management Decision.* https://doi.org/10.1108/MD-07-2018-0754

Arya, V., Sethi, D., & Verma, H. (2018). Are emojis fascinating brand value more than textual language? Mediating role of brand communication to SNS and brand attachment. *Corporate Communications: An International Journal, 23*(4), 648–670

Aswani, R., Kar, A. K., Ilavarasan, P. V., & Dwivedi, Y. K. (2018). Search engine marketing is not all gold: Insights from Twitter and SEOClerks. *International Journal of Information Management, 38*(1), 107–116.

Awad, N. F., & Krishnan, M. S. (2006). The personalization privacy paradox: An empirical evaluation of information transparency and the willingness to be profiled online for personalization. *MIS Quarterly,* 13–28.

Bang, H., & Wojdynski, B. W. (2016). Tracking users' visual attention and responses to personalized advertising based on task cognitive demand. *Computers in Human Behavior, 55*(B), 867–876.

Baysinger, T. (2017). Snapchat 2017 ad revenue forecast trimmed to $770 million. Reuters. Retrieved from http://www.reuters.com/article/us-snap-advertising/snapchat2017-ad-revenue-forecast-trimmed-to-770-million-emarketer-idUSKBN16L1JC

Beer, D. (2017), The social power of algorithms. *Information, Communication & Society, 20* (1), 1-13.

Bleier, A. & Eisenbeiss, M. (2015). Personalized Online Advertising Effectiveness: The Interplay of What, When, and Where. *Marketing Science, 34*(5): 669–688.

Brinker, S. (2019). Marketing Technology Landscape Supergraphic (2019): Martech 5000 (actually 7,040). Retrieved from https://web.archive.org/web/20190801223536/https://chiefmartec.com/2019/04/marketing-technology-landscape-supergraphic-2019/

Burns, K.S. & Lutz, R.J. (2006). The function of format: consumer responses to six on-line advertising formats. *Journal of Advertising, 35*(1), 53–63.

BusinessWire. (2019). Global Mobile Marketing Market to Reach $183.5 Billion by 2024, with a CAGR of 23.4% - Analysis Segmented by Solution Type, Organization Size, End-user and Geography. Retrieved from businesswire.com website: https://www.businesswire.com/news/home/20190325005436/en/GlobalMobile-Marketing-Market-Reach-183.5-Billion

Castelo, N., & Thalmann, N. (2019). Robot or human? Consumer Perceptions of Human-Like Robots. Working Paper.

Castillo, M. (2017, January 25). Snapchat's ad rates drop as brands find problems. CNBC. Retrieved from https://www.cnbc.com/2016/02/18/snapchats-ad-rates-drop-as-brands-find -problems.html

Chatterjee, P. (2008). Are Unclicked Ads Wasted? Enduring Effects of Banner and Pop-up ad Exposures on Brand Memory and Attitudes. *Journal of Electronic Commerce Research, 9*(1), 51–61.

Cho, C. H., & Lee, H. (2018). Digital marketing 4.0. Seoul: Green Pine Media. eMarketer 2018. US programmatic TV ad spending, 2016–2020. Retrieved from https://www.emarketer.com/ Chart/US-Programmatic-TV-Ad-Spending-2016-2020-billions-change-of-TV-ad-spending/223921.

Cho, C. H., Lee, J. G. & Tharp, M. (2001). Different Forced-Exposure Levels to Banner Advertisements. *Journal of Advertising Research, 41*(4), 45–56.

Commission Junction. (2014). Pay for Performance: CPA Is in Our DNA. Retrieved from http://www.cj.com/ advertiser/pay-performance

Courbet, D., Fourquet-Courbet, M. P., Kazan, R. & Intartaglia, J. (2014). The Long-Term Effects of EAdvertising: The Influence of Internet Pop-ups Viewed at a Low Level of Attention in Implicit Memory. *Journal of Computer-Mediated Communication 19*(2): 274–293.

Das, S. & Nayyar, A. (2019). Digital sustainability in social media innovation: a microscopic analysis of Instagram advertising & Its demographic reflection for buying activity with R. *Advances in Economics, Business and Management Research, 81,* 377-382.

De Mauro, A., Greco, M. & Grimaldi, M. (2016). Essential Features. *Library Review 65*(3), 122-135.

De Vries, P., & Schinkel, W. (2019). Algorithmic anxiety: Masks and camouflage in artistic imaginaries of facial recognition algorithms. *Big Data & Society, 6,* 1–12.

Drèze, X. & Hussherr, F. X. (2003). Internet Advertising: Is Anybody Watching? *Journal of Interactive Marketing, 17*(4): 8–23.

Du, R. Y. & Kamakura, W. A. (2012). Quantitative trendspotting. *J. Marketing Res. 49*(4), 514–536.

Duff, B. R. L., & Faber, R. J. (2011). Missing the Mark. *Journal of Advertising, 40*(2): 51–62.

Edelman, B. (2013). The Design of Online Advertising Markets, in *The Handbook of Market Design,* Nir Vulkan, Alvin Roth, and Zvika Neeman, eds. Oxford, UK: Oxford University Press.

Emani, C. K., Cullot, N. & Nicolle, C. (2015). Understandable big data: A survey. *Computer science review, 17*, 70–81.

eMarketer. (2019). Digital Ad Fraud 2019. Retrieved from https://web.archive.org/web/20190824032234/%20https://www.emarketer.com/content/ digital-ad-fraud-2019.

Ergen, Y. (2018). Büyük Veri, Sosyal Medya ve Etik: Facebook Örneğinde Bir Değerlendirme. *Yeni Düşünceler, 10,* 53-64

Esposito, E. (2017). The production of contingency by algorithms. *Zeitschrift für Soziologie, 46*(4), 249–265

Falls, J. (2009*). Public relations pros must be social media ready*. Social Media Explorer.

Fan, W., & Gordon, M. D. (2014). The power of social media analytics. *Communications of the ACM, 57*(6), 74 – 81.

Fazi, B. M. (2019). Digital aethetics: The discrete and the continuous. *Theory Culture and Society, 36* (1), 3–26.

Flyverbom, M., Christensen, L. T., & Hansen, H. K. (2015). The transparency–power nexus: Observational and regularizing control. *Management Communication Quarterly, 29*(3), 385–410.

Freberg, K., Graham, K., McGaughey, K., & Freberg, L. A. (2011). Who are the social media influencers? A study of public perceptions of personality. *Public Relations Review, 37*(1), 90–92.

Fuller, M., & Goffey, A. (2012). *Evil media. A philosophical manual of media power for the network age.* Cambridge: MIT

Furht, B., & Villanustre, F. (2016). *Introduction to big data. In Big Data Technologies and Applications* (pp. 3–11). Cham: Springer International Publishing.

Gartner. (2015, November 10). Gartner says 6.4 billion connected things will be in use in 2016, up 30 percent from 2015. Retrieved from http://www.gartner.com/newsroom/ id/3165317

Gilly, M. C. & Schau, H. J. (2003). We Are What We Post? Self-Presentation in Personal Web Space. *Journal of Consumer Research, 30*(December), 385-403.

Goodman, M. (2016). Geleceğin Suçları. İstanbul : Timaş Yayınları.

Goncalves, H. M., Rey-Marti, A., Roig-Tierno, N., Miles, M. P., Alves, H., Fernandes, C., & Raposo, M. (2016). Social media marketing: A literature review and implications. *Psychology & Marketing, 33*(12), 1029–1038.

Grewal, D., Bart, Y., Spann, M., & Zubcsek, P. P. (2016). Mobile advertising: A framework and research agenda. *Journal of Interactive Marketing, 34*, 3–14.

Grewal, L., & Stephen, A. T. (2019). In Mobile we trust: The effects of Mobile versus nonmobile reviews on consumer purchase intentions. *Journal of Marketing Research, 56*(5), 1-18.

Guercini, S., Bernal, P. M., & Prentice, C. (2018). New marketing in fashion e commerce. *Journal of Global Fashion Marketing, 9*(1), 1–8.

Gurau, C., Ranchhod, A., & Gauzente, C. (2003). To legislate or not to legislate: A comparative exploratory study of privacy/personalisation factors affecting French, UK and US web sites. *Journal of Consumer Marketing, 20,* 652–664.

Hand, D. J., & Adams, N. M. (2015). Data Mining. *Wiley StatsRef: Statistics Ref erence Online,* 1–7.

Harms, B., Bijmolt, T. H. & Hoekstra, J. C. (2019). You Don't Fool Me! Consumer Perceptions of Digital Native Advertising and Banner Advertising. *Journal of Media Business Studies 16*(4), 275–294.

Hirsh, J. B., Kang, S., & Bodenhausen, G. V. (2012). Personalized persuasion: Tailoring persuasive appeals to recipients' personality traits. *Psychological Science, 23,* 578–581.

Huang, M.H., & Rust, R. T. (2018). Artificial Intelligence in Service. *Journal of Service Research, 21*(2), 155-172.

IBIS World 2016. IBISWorld's industry research reports. Retrieved from https://www.ibisworld.com/industrytrends/

IDC. (2015). New IDC forecast sees worldwide big data technology and services market growing to $48.6 billion in 2019, driven by wide adoption across industries [Press Release]. Retrieved from http://www.idc.com/getdoc.jsp?containerId=prUS40560115

Internet Advertising Bureau (IAB). (2019). IAB Internet Advertising Revenue Report - 2019 half year results. Retrieved from https://s3.amazonaws.com/media.mediapost.com/uploads/1stHalfInternetAdRevenueReport.pdf

Investopedia. (2018). Mobile Advertising Definition. Retrieved from Investopedia website: https://www.investopedia.com/ terms/m/mobile-advertising.asp

Jafarzadeh, H., Aurum, A., D'Ambra, J. & Ghapanchi, A. (2015). A systematic review on search engine advertising. Pacific Asia Journal of the Association for Information Systems, 7(3), 1-32.

Jamali, M., & Abolhassani, H. (2006). Different aspects of social network analysis. In Proceedings — 2006 IEEE/WIC/ACM International Conference on Web Intelligence (pp. 66—72). Hong Kong: IEEE.

Jenny, F. (2021). Competition law and digital ecosystems: Learning to walk before we run. ESSEC Business School. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3776274

Jin, W., Fang, L. & Wang, L. (2020). Research on the Application of Mobile Navigation System Based on Cloud Computing. *Journal of Physics: Conference Series, 1648,* 1-5.

Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013, January). Big data: Issues and challenges moving forward. In 2013 46th Hawaii International Conference on System Sciences (pp. 995-1004). IEEE.

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons, 53*(1), 59–68.

Kaye, B. & Medoff, N. (2001). *Just A Click Away: Advertising on the Internet.* Massachusetts: Allyn and Bacon.

Kim, E. Y., & Yang, K. (2018). Self-service technologies (SSTs) streamlining consumer experience in the fashion retail stores: The role of perceived interactivity. *Journal of Global Fashion Marketing, 9*(4), 287–304.

Kim, J. (2018). Social dimension of sustainability: From community to social capital. *Journal of Global Scholars of Marketing Science, 28*(2), 175181.

Kitchin, R. (2014). Big data, new epistemologies and paradigm shits. *Big Data & Society, 1,* 1–12.

Ko, E. (2019). Bridging Asia and the world: Global platform for the Interface between marketing and management. *Journal of Business Research, 99*(3), 350–353.

Koehn, D., Lessmann, S., & Schaal, M. (2020). Predicting Online Shopping Behaviour from Clickstream Data using Deep Learning. *Expert Systems with Applications, 150,* 1-16.

Krasmann, S. (2019). Secrecy and the force of truth: Countering post-truth regimes. *Cultural Studies, 33*(4), 690–710.

Kumar, V., & Gupta, S. (2016). Conceptualizing the Evolution and Future of Advertising. *Journal of Advertising, 45* (3), 302–317.

Kune, R., Konugurthi, P. K., Agarwal, A., Chillarige, R. R., & Buyya, R. (2016). The anatomy of big data computing. *Software: Practice and Experience, 46,* 79–105.

Laffey, D. (2007). Paid search: The innovation that changed the Web. *Business Horizons, 50*(3), 211-218.

Laney, D. (2001). 3D Data Management: Controlling Data Volume, Velocity, and Variety. Application Delivery Strategies from META Group. Retrieved from https://blogs.gartner.com/doug-laney/files/2012/01/ ad949-3D-Data-Management-Controlling-Data-Volume-Velocity-andVariety.pdf

Lange, P. G. (2007). Publicly private and privately public: Social networking on YouTube. *Journal of Computer-Mediated Communication, 13*(1), 361–380.

Lambrecht, A., Tucker, C., & Wiertz, C. (2018). Advertising to Early Trend Propagators: Evidence from Twitter. *Marketing Science, 37*(2), 177–199.

Lee, H., & Cho, C.-H. (2019). An empirical investigation on the antecedents of consumers' cognitions of and attitudes towards digital signage advertising. *International Journal of Advertising 38*(1), 97 - 115.

Lee, H., & Cho, C.-H. (2020). Digital advertising: Present and future prospects. *International Journal of Advertising, 39*(3), 332–341.

Le, T. D., & Vo, H. (2017). Consumer Attitude Towards Website Advertising Formats: A Comparative Study of Banner, Pop-up and In-line Display Advertisements. *International Journal of Internet Marketing and Advertising 11*(3): 202–217.

Liu, W., Liang, X. & Liu, F. (2019). The Effect of Webpage Complexity and Banner Animation on Banner Effectiveness in a Free Browsing Task. *International Journal of Human–Computer Interaction 35*(13): 1192– 1202.

Lutz, C. & Hoffmann, C. P. (2017). The dark side of online participation: exploring non- passive and negative participation. *Information, Communication & Society, 20*(6), 876-897.

Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think.* London: John Murray.

McAfee, A., Brynjolfsson, E. et al. (2012). Big Data: The Management Revolution. *Harvard business review, 90*, 60–68.

McCoy, S., Everard, A., Polak, P. & Galletta, D.F. (2007). The effects of online advertising. *Communications of the ACM, 50*(3), 84–88.

Micheli, M., Lutz, C. & Büchi, M. (2018). Digital Footprints: An Emerging Dimension of Digital Inequality. Journal of Information Communication and Ethics in Society, 16(3), 242-251.

O'Reilly, T. (2007). What is Web 2.0? Design patterns and business models for the next generation of software. *Communications and Strategies, 65,* 17—37

Quinton, S. & Khan, M.A. (2009). Generating web site traffic: a new model for SMEs. *Direct Marketing: An International Journal, 3*(2), 109-123.

Owais, S. S., & Hussein, N. S. (2016). Extract five categories CPIVW from the 9V's characteristics of the big data. International Journal of Advanced Computer Science and Applications, 7(3), 254-258.

Pasquale, F. (2015). *The black box society. The secret algorithms that control money and information.* Cambridge: Harvard University Press

Poster, M. (1995). *The second media age.* Cambridge: Polity

Provost, F. & Fawcett, P. (2013). *Data Science for Business: What You Need to Know About Data Mining and Data-Analytic Thinking.* O'Reilly Media.

Rajaraman, V. (2016). Big data analytics. *Resonance, 21,* 695–716.

Reigeluth, T. (2014). Why data is not enough: Digital traces as control of self and self-control. *Surveillance & Society, 12*(2), 243–254.

Robinson, H., Wysocka, A. & Hand, C. (2007). Internet Advertising Effectiveness: The Effect of Design on Click-through Rates for Banner Ads. *International Journal of Advertising 26*(4): 527–541.

Rodgers, S. & Thorson, E. (2018). Special issue introduction: Digital engagement with advertising. *Journal of Advertising, 47*(1), 1–3.

Rouvroy, A. (2012). The end(s) of critique: Data-behaviourism vs. due-process. In M. Hildebrandt & K. de Vries (Eds.), *Privacy, due process and the computational turn*. Philosophers of law meet philosophers of technology (pp. 143–167). New York: Routledge

Sandvig, C., Hamilton, K., Karahalios, K., & Langbort, C. (2014). Auditing algorithms: research methods for detecting discrimination on internet platforms, paper presented at the Data and discrimination: converting critical concerns into productive inquiry preconference of the 64th Annual Meeting of the International Communication Association, May 22, 2014, Seattle, WA.

Schwab, K. (2016). The fourth industrial revolution. World Economic Forum, Geneva, Retrieved from http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf.

Scott, J. (2012). Social network analysis (3rd ed.). Thousand Oaks, CA: Sage

Sen, A. (2018). Evolution of online advertising. *Indian Institute of Management Calcutta*, 814/November, 1- 31. https://www.iimcal.ac.in/sites/all/files/pdfs/anindyasen_wp.pdf

Sherman, L. & Deighton, J. (2001). Banner Advertising: Measuring Effectiveness and Optimizing Placement. *Journal of Interactive Marketing, 15*(2): 60–64.

Siapera, E. (2017). Understanding New Media. California, USA: Sage

Sigurdsson, V., Menon, R. G., Hallgrímsson, A. G., Larsen, N. M., & Fagerstrøm, A. (2017). Factors affecting attitudes and behavioral intentions toward in-app mobile advertisements. *Journal of Promotion Management, 24*(5), 694–714.

Sivarajah, U., Kamal, M. M., Irani, Z. & Weerakkody, V. (2017). Critical Analysis of Big Data Challenges and Analytical Methods. *Journal of Business Research, 70*, 263–286.

Smith, G. J. D. (2018). Data doxa: The affective consequences of data practices. *Big Data & Society, 5* (1), 1–15.

Smock, A. D., Ellison, N. B., Lampe, C. & Wohn, D. Y. (2011). Facebook as a toolkit: A uses and gratification approach to unbundling feature use. *Computers in Human Behavior, 27*(6), 2322–2329.

Snap Inc. (2018a). Number of daily active Snapchat users from 1st quarter 2014 to 4th quarter 2018 (in millions). Retrieved from https://www.statista.com/statistics/545967/snapchat-app-dau/

Snap Inc. (2018b). Worldwide Snap sales from 2015 to 2017 (in millions of US dollars). Retrieved from https://de.statista.com/statistik/daten/studie/673298/umfrage/umsatz-vonsnapchat-weltweit/

Söllner, J., & Dost, F. (2019). Exploring the Selective Use of Ad Blockers and Testing Banner Appeals to Reduce Ad Blocking. *Journal of Advertising 48*(3), 302–312.

Statista. (2019). Number of Mobile Phone Users Worldwide 2015–2020. Retrieved from statista.com website: https://www. statista.com/statistics/274774/forecast-of-mobile-phone-usersworldwide/.

Tang, D. (2019). The New Situation of Marketing in the Self-Media Era-Taking Tik Tok as an Example. 2019 2nd International Workshop on Advances in Social Sciences (IWASS 2019), pp. 1557-1560.

Taylor, C.R. (2009). The six principles of advertising. *International Journal of Advertising*, *28*(3), 411-418.

Tellis, G., MacInnis, D. J., Tirunillai, S., & Zhang, Y. (2019). What drives virality (sharing) of online digital content? The critical role of information, emotion, and brand prominence. *Journal of Marketing, 83*(4), 1–20.

Terrance, A. R., Shrivastava, S. & Kumari, A. (2018). Importance of Search Engine Marketing in the Digital World. Proceedings of the First International

Conference on Information Technology and Knowledge Management pp. 155–158.

Tekin, M., Etlioğlu, M., Koyuncuoğlu, Ö. & Tekin, E. (2019). Data Mining in Digital Marketing. Symposium for Production Research 2018, pp. 44–61, 2019.

Tiago, M. T. P. M. B., & Veríssimo, J. M. C. (2014). Digital marketing and social media: Why bother?. Business horizons, 57(6), 703-708.

Törnberg, P., & Törnberg, A. (2018). The limits of computation: A philosophical critique of contemporary big data research. *Big Data & Society, 5,* 1–12

Truong, Y., McColl, R. & Kitchen. P. (2010). Practitioners' perceptions of advertising strategies for digital media. *International Journal of Advertising, 29*(5), 709 - 725.

Tsang, P. M. & Tse, S. (2005). A Hedonic Model for Effective Web Marketing: An Empirical Examination. *Industrial Management & Data Systems 105*(8): 1039–1052.

Tsiptsis, K. & Chorianopoulos, A. (2009). *Data mining techniques in CRM: Inside Customer Segmentation*. Wiley Hoboken.

Van Noort, G., & Willemsen, L. (2012). Online Damage Control: The Effects of Proactive versus Reactive Webcare Interventions in ConsumerGenerated and Brand-Generated Platforms. *Journal of Interactive Marketing, 26* (3), 131–140.

Vahl, A. (2011). Create EPIC Instagram Ads. Publication of Hubsport.

Vaynerchuck, G. (2013). How to master the 4 big social-media platforms. Inc. Magazine. https://www.inc.com/magazine/201311/ gary-vaynerchuk/how-to-master-the-four-major-social-media -platforms.html

Virgile, M., Vines, M., Bates, N. & Walejko, G. (2016). U.S. Census Bureau; Sam Hagedorn, Kiera McCaffrey and John Otmany, Reingold Inc. Retrieved from https://www.census.gov/newsroom/blogs/researchmatters/2016/05/digital-advertising-encouraging-participation-in-the-decennial-census.html

Voorveld, H. A., Noort, G. V., Muntinga, D. G., & Bronner, F. (2018). Engagement with social media and social media advertising: The differentiating role of platform type. *Journal of Advertising, 47*(1), 38–54.

Watts, D. J. (2013). Computational social science. Exciting progress and future directions. *The Bridge, 43*(4), 5–10.

Wang, H. W., Liu, Z. & Guo, Y. (2017). An Explorative Study of the Mobile App Ecosystem from App Developers' Perspective. Conference: the 26th International Conference.

Wikipedia. (2021). Banner. Retrieved from https://tr.wikipedia.org/wiki/Banner

Wilbur, K., & Zhu, Y. (2009). Click Fraud. *Marketing Science, 28*(2), 293–308.

Wojdynski, B. W., & Golan, G. J. (2016). Native Advertising and the Future of Mass Communication. *American Behavioral Scientist, 60*(12), 1403–1407.

Wright, J. (2006). Blog Marketing—the Revolutionary New Way to Increase Sales, Build Your Brand, and Get Exceptional Results. McGraw-Hill.

Yang, Y., Asaad, Y., & Dwivedi, Y. (2017). Examining the impact of gamification on intention of engagement and brand attitude in the marketing context. *Computers in Human Behavior, 73,* 459–469.

Youtube. (2021). Retrieved from https://www.youtube.com/intl/en-GB/about/press/

Zeng, F., Ye, Q., Li, J., & Yang, Z. (2020). Does self-disclosure matter? A dynamic two-stage perspective for the personalization-privacy paradox. *Journal of Business Research.*

ZenithOptimedia. (2016). Advertising Expenditure Forecasts March 2016. http://www.performics.com/executive-summaryadvertising-expenditure-forecasts-march-2016/.

Zhang, M., & Dholakia, N. (2018). Conceptual framing of virtuality and virtual consumption research. *Journal of Global Scholars of Marketing Science, 28*(4), 305–319.

Zhang, D. (2018, October). Big data security and privacy protection. Proceedings of the 8th International Conference on Management and Computer Science (ICMCS 2018). Netherlands: Atlantis Press.

Zhang, S. & Cabage, N. (2016). Search Engine Optimization: Comparison of Link Building and Social Sharing. *Journal of Computer Information Systems, 57*(2), 148–159.

Zwitter, A. (2014). Big Data ethics. Big Data & Society, 1-6.