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BIG DATA AND ITS IMPLICATION IN MARKETING

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ABSTRACT

The manifest use of new technologies in the context of Industry 4.0, makes it relevant to know the implications of Big Data in Marketing, it is for this reason that the raison d'être of this article is to analyze various information with a qualitative approach in a descriptive and critical aspect. In order to understand the relevance of Big Data today. For this work we collected articles published in various scientific databases, to give us a referential vision in a broader context about the advantages, importance and certain disadvantages of Big Data. Emphasizing its current and future implications of great impact on the business world, so that in this way companies continue to adapt to 4.0 technologies. Challenge that is important to emphasize from the point of view of Marketing, since the treatment of data will be the basis for the development of information, essential for taking actions and decisions, allowing to personalize communication with our customers and thus have more satisfied and loyal customers based on their own needs and desires, providing the opportunity to meet the expectations at the highest possible levels and even not seen before.

Keywords: Big Data, Marketing, Industry 4.0, Technology 4.0, massive data, social networks, communication, digital communication, data management.

RESUMEN

El uso manifiesto de las nuevas tecnologías en el contexto de la industria 4.0, hace relevante conocer las implicaciones del Big Data en el Marketing, es por este motivo que la razón de ser del presente artículo es analizar diversa información con un

enfoque cualitativo en un aspecto descriptivo y crítico. Con el fin de comprender la relevancia del Big Data en la actualidad. Para este trabajo se recolectó artículos publicados en diversas bases de datos científicas, con afán de darnos una visión referencial en un contexto más amplio sobre las ventajas, importancia y ciertas desventajas del Big Data. Haciendo énfasis en su implicación actual y a futuro de gran impacto en el mundo empresarial, para que de esta manera las empresas se sigan adaptando a las tecnologías 4.0. Reto que es importante hacer hincapié desde el punto de vista del Marketing, ya que el tratamiento de los datos será la base para el desarrollo de información, fundamental para la toma de acciones y decisiones, permitiendo personalizar la comunicación con nuestros clientes y de esta manera tener clientes más satisfechos y fieles con base en sus propias necesidades y deseos, brindando la oportunidad de cumplir las expectativas en los niveles más altos posibles e incluso no antes vistos.

Palabras clave: Big Data, Marketing, Industria 4.0, Tecnología 4.0, datos masivos, redes sociales, comunicación, comunicación digital, gestión de datos.

BIG DATA E AS SUAS IMPLICAÇÕES PARA O MARKETING

RESUMO

A utilização manifesta das novas tecnologias no contexto da Indústria 4.0 torna relevante conhecer as implicações do Big Data no Marketing, razão pela qual a razão de ser deste artigo é analisar diversas informações com uma abordagem qualitativa numa vertente descritiva e crítica. Com o objectivo de perceber a relevância do Big Data na actualidade. Para este trabalho recolhemos artigos publicados em várias bases de dados científicas, de forma a dar-nos uma visão referencial num contexto mais alargado sobre as vantagens, importância e algumas desvantagens do Big Data. Salientando as suas implicações actuais e futuras de grande impacto no mundo empresarial, para que as empresas possam continuar a adaptar-se às tecnologias 4.0. Um desafio que é importante salientar do ponto de vista do Marketing, uma vez que o tratamento de dados será a base para o desenvolvimento de informação, fundamental para a tomada de acções e decisões, permitindo-nos personalizar a comunicação com os nossos clientes e, desta forma, ter clientes mais satisfeitos e fiéis com base nas suas próprias necessidades e desejos, proporcionando a oportunidade de satisfazer as expectativas ao mais alto nível possível e até mesmo nunca antes visto.

Palavras chave: Big Data, Marketing, Indústria 4.0, Indústria 4.0, Tecnologia 4.0, big data, redes sociais, comunicação, comunicação digital, gestão de dados.

1. INTRODUCTION

The global economy is undergoing a new cycle characterized by the digital world and connectivity. Technologies such as artificial intelligence, cloud computing, the Internet of Things, 3D printing, Big Data, among others, emphasize the importance of the industry through product personalization (Basco et al., 2018). In the case at hand, we will analyze the significance of one of these technologies, which is Big Data. As described in the study based on it, Big Data allows for the desired personalization for customers, complementing the conventional human interface that was the core of marketing before the existence of the internet (Kotler et al., 2019).

The literature review involves analyzing information from various bibliographic sources regarding the use of Big Data in Marketing, its current and future impact on the business world, as well as latent issues or areas for future study. This is done through a detailed bibliographic analysis of sources such as scientific articles, books, and doctoral and master's theses, in order to describe and analyze the specific impact of Big Data on Marketing.

The aim is to generate an understanding of the implications, complications, and challenges that companies currently face when using Big Data for personalization in various aspects of the marketing mix toward their customers or potential customers.

2. OBJECTIVES

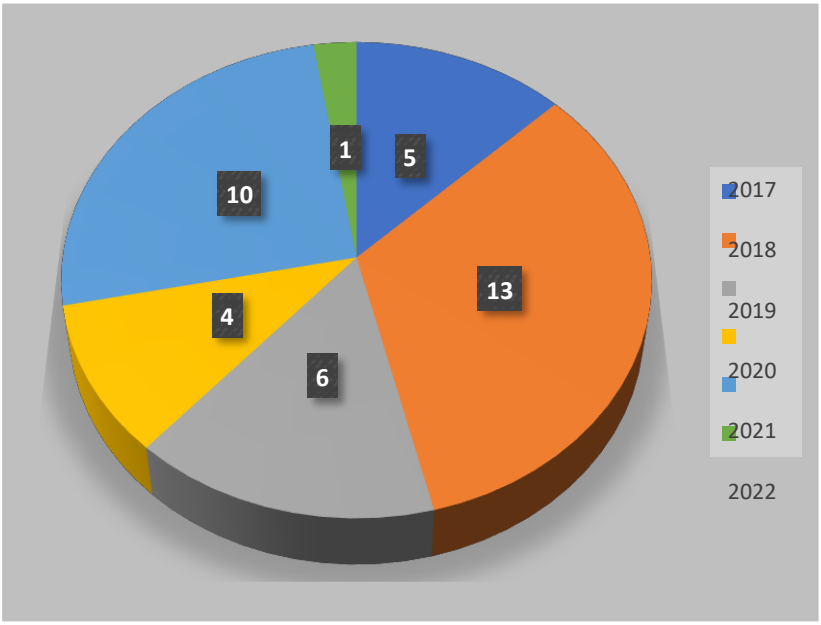
The present study aims to analyze the concepts proposed in different bibliographic sources regarding the use and relevance of Big Data in Marketing. It also seeks to examine its impact on companies and describe potential issues generated by its use.

3. METHODOLOGY

The methodology used in this study consists of a bibliographic analysis, based on the need to understand the implications of Big Data in Marketing through a comprehensive analysis of various sources. The information was collected within an inductive and deductive process based on the gathered data. In this regard, the information was obtained from search engines such as Google Scholar, Dialnet, among others, using the following keywords: Big data, marketing, Big data marketing, social Big data, one-to-one marketing, content marketing, and personalized advertising.

A total of 39 references were reviewed and analyzed, including books, scientific articles, and master's and doctoral theses. The search was conducted for references from the year 2017 to 2022, as shown in Figure 1.

Figure 1
Distribution of years with revised references.



Source: Author´s own work.

4. DISCUSSION

Starting from the origin of what we can understand as data processing and storage, it is based on an activity attributed to computers since their beginnings. The first commercially available computer was manufactured in 1951 and sold to the United States Census Bureau. Its name was UNIVAC 1, and it demonstrated its power in performing calculations and statistical predictions that were previously impossible. One of its most notable successes was predicting the outcome of the 1952 United States presidential election based on only 1% of the total votes, contradicting the statements made by political commentators who had predicted Stevenson to win over Eisenhower. UNIVAC's prediction turned out to be accurate (Caballero and Martín, 2022).

However, in recent years, the progress of statistics has been influenced by the emergence of the concept of big data. The availability of more complex data has become the preferred framework in fields such as administration, finance, industry, and services. Therefore, the generation and application of specialized statistical techniques have become a fundamental requirement. In the not-too-distant future, a problem to be studied will be the paradox that data does not speak for itself due to its vast volume. Big data can be characterized by the so-called 5Vs: variety, veracity, value, velocity, and volume. It is considered that big data not only refers to the size of the data but also to its complexity, the speed at which it is captured, and the quantity and variety of different variables involved. From a general perspective, it can be defined as a large and complex accumulation of data of a diverse and/or longitudinal nature, originating from a wide variety of measuring tools and sensors. When referring to large datasets, it is described as "wide," and when dealing with a large number of variables, it is referred to as a "wide" big data problem (Naya, 2018).

Big data is considered a technological, social, and cultural phenomenon that has emerged as a result of the datafication of the material, social, and subjective world, which has experienced significant growth in recent years in conjunction with digitization. The term was introduced in the field of information technology about a decade ago to highlight the computational challenges associated with handling massive volumes of data. It later gained popularity in the business consulting field with firms like Gartner and IBM, who began incorporating the V-word list (previously detailed) in their marketing materials. These V-words can be found in the majority of definitions. (Becerra & López-Alurralde, 2021). Big data refers to the real ability to collect large amounts of information at minimal cost, with fast processing capabilities that lead to a broad and accurate potential for analysis. (Turletti, 2018).

Before describing the implications of Big Data in Marketing, it is important to know the data sources that feed it. In this way, we have the following sources: Biometric sources focused on the automatic recognition of people based on their anatomical properties and unique features; Transactional sources provide information recorded in establishments such as messaging, billing, and documentation registration; Machine-to-Machine sources provide information obtained from a diverse range of interconnected devices; Web and social media sources provide information originating on the internet, with a large portion coming from social networks; and, Human-generated sources originate from call center recordings, email, and other electronic records. Similarly, it is important to detail their functionalities, which are data query

and generation, data extraction, data visualization, predictive modeling, and optimization to improve information acquisition. It is also opportune to define the concepts surrounding Big Data, such as Data Warehousing, which is a set of architectures that make data mining and business intelligence processes easier. A common method for this process is known as batch processing, in which data is divided into small, set-sized parts that are sent by different layers and stored in warehouses. Another concept is NoSQL, which includes technologies and tools related to data storage that do not comply with the rules of relational databases (Codd), including computer architectures and languages to access data. This is a tool widely used in Big Data. Finally, there is Cloud Computing, also known as cloud computing, which is a key tool for data processing. It enables them to be reduced or expanded depending on the activity executed, without requiring companies to invest in hardware (Villares-Pazmiño et al., 2017).

4.1 Big Data Applied to Marketing

The number of organizations that use Big Data is increasing. The use of Big Data is being employed to predict the behavior of potential customers or consumers, establish specific profiles, and consequently define new designs of products or specialized services adapted to their needs (González-Molina, 2021).

Through statistical deduction, simulations, and foresight, which require billions of linear equations, it is possible to predict knowledge of consumption patterns. In the fashion industry, for example, a fairly accurate forecast is made. In the insurance sector, driving style serves as a reliable guide for offering more expensive or affordable policies. Supermarkets improve their revenue levels through linked promotions. In the automotive sector, sales prices and moments of high demand throughout the year are predicted. It should be noted that the analysis of Big Data and the applied algorithms do not always have the highest accuracy in predicting behavior, but they generally reveal patterns of individual behavior. Each group of consumers shares common traits with a strong tendency towards personalization and individualization of aspirations and needs. To understand current and potential customers, it is opportune to map out the different journeys, such as pre-purchase, purchase, consumption, and post-purchase. Until recently, the traditional purchasing journey was short and static. Consumers had a small set of brands in mind, to which they added a few others. Information flowed through advertising in conventional media, lukewarm direct impulses from distributors and manufacturers, and word of mouth. New brands under consideration were added to this trajectory in a highly specific way; after evaluating their attributes, they entered the set of reference brands. This process led to the purchase action, resulting in gratification, representation, and a true reflection of self-value and personality. Contact was made in stores, which maintained the same prices during regular periods and offered discounts at the end of seasons or for exceptional circumstances. The purchase action was a unique point of contact in most situations in the distribution and production process. Loyalty affirmed a job well done. Bonds of attachment were formed in the pre-purchase and purchase phases to close the circle. The consumer was a customer of certain brands that provided comfort and trust. On the other hand, now the purchase journeys are much larger in the pre-purchase and post-purchase phases: contemplating what to buy, options and brands, price comparison, writing product reviews, and sharing impressions. Furthermore, the processes are no longer

linear; they are triggered by emotional impulses generated by various sources directly related to aspirations. The empowerment of consumers makes them the core of any decision. Access to multiple sources makes them more knowledgeable about products and services than employees and distributors. They move through social networks, applications, and the Internet (Valls, 2017).

Thus, the conjunction of statistical data and data mining algorithms is used, and the main objective of this is the storage of large amounts of information. Through AI and the use of expert systems based on it, the goal is to predict the possible future behavior patterns of customers. To achieve all this, past consumer behavior patterns are studied, analyzed, and exploited, and they are combined with historical data. The aim is to identify potential opportunities or risks based on certain patterns. The ultimate goal is to construct models based on these patterns, and once the model is built, predictions can be made according to our needs (Ostos-Mota, 2021).

The globalized market has eliminated barriers of a geographical, sectoral, or inherent nature in the distribution chain. Organizations must have an extremely broad vision of their environment to anticipate emerging opportunities and threats. This is where Big Data can contribute with a broader and therefore more enriching perspective than traditional systems (Solé-Moro and Campo-Fernández, 2020). In this way, companies can leverage the potential of data analytics. The alignment of organizations should consider data analytics as a key factor and as the foundation for uncovering hidden knowledge about customers (AEMARK, 2019).

Big Data can revolutionize the world of marketing. Traditionally, in an advertising campaign, a message is sent to the same segment, which is only relevant to a small percentage of it. With Big Data in Marketing, there is the power to send personalized messages, not only related to the customer's purchase but also to spread experiences and sensations. By managing a large amount of information analyzed thoroughly, which was impossible with traditional marketing processes, companies can focus based on their customers' demands for their products, creating an ideal scenario that benefits the internal workings of the company, generating valuable information available to everyone. Peter Drucker states that "the aim of marketing is to know and understand the customer so well that the product or service fits him and sells itself" (1992, p. 64), and nowadays, this is possible through technologies that collect, understand, and analyze customer information. Marketing activities are no longer based on intuition but on data provided by consumer interactions. Data-driven marketing serves not only to increase sales but also to gain detailed knowledge about customers and reach them with value propositions that surpass the competition. While data has been used to generate reports for a long time, it can also be used to observe real-time customer behaviors, compare them, and anticipate the future. Therefore, the concept of Big Data in Marketing encompasses the process of collecting, analyzing, and executing insights generated from Big Data in order to optimize customer relationships, improve marketing performance, and measure internal business reliability. It is important to note that Big Data includes both structured and unstructured information obtained from digital and traditional sources. It is essential to integrate all this information with business data to enable companies and their marketing departments to make effective use of this combination. As mentioned, the collected data can be unstructured, semi-structured, and structured from digital and traditional sources. These sources can

include SMS, email, mobile app notifications, in-app messages, and social media posts (Martínez-Acuña et al., 2017).

This is how Big Data can also generate value in terms of profits and efficient generation of new products. Data processing generates information that optimizes decision-making. This information, combined with the experience of generating new knowledge, will be useful for creating, innovating, improving current processes, and reducing costs. It will allow us to gain detailed knowledge of products, components, and variables, and understand the internal workings of companies, influences, environment, behavior towards products, interaction with stakeholders, and identify suggestions and expectations in search of greater satisfaction. With Big Data, it is possible to drive a transformation in products and markets, positioning them in a privileged way. By leveraging knowledge and data processing in combination with sources, and innovative and creative processes, companies can transform themselves through the search for relevant information. Through social media, it is possible to explore the relationships and combinations of data, which provide detailed insights into opinions, preferences, likes, needs, and sentiments towards a brand for its valuation in the market (Vega-Chica and González, 2018).

As expressed by Tovar (2018), the new explosion of digital information provides managers with the means to deepen their understanding of business and eventually make decisions that seek optimal performance and efficiency. Online commerce offers the opportunity to significantly improve the understanding of consumer habits and trends. Online companies can not only identify buyers but also track their navigation on websites, assess the influence of promotions, draw insights from reviews, and with some additional effort, determine similarities among groups and individuals. The author concludes that the use of Big Data is transforming the way companies make decisions by providing them with a processed, analyzed, and knowledge-based information environment. An informed entrepreneur relies less on "gut feelings" that have traditionally guided their decisions. Beyond the use of Big Data, entrepreneurs must still maintain a vision to lead and remain influential in the business world. Many sectors are increasingly adopting these new tools to enhance their understanding of markets, sales, trends, business strategies, and technologies, thereby reducing information asymmetry.

Organizations dedicated to data analysis are implementing more sophisticated platforms that allow users to keep up with the pace of analysis. By 2015, people began accepting the cloud, recognizing its ease of use and scalability. It was discovered that cloud analytics provides agility, and an increasing number of companies are using the cloud for agile analysis, making it a reliable tool. It is also important to consider that with the advent of the Internet of Things, everyday items can become sources of information through sensors. As the sources of data increase, the possibility of receiving more information also increases. In terms of marketing, this allows us to understand the target sector for campaigns, focus strategies on it, capture ideas from dissatisfied customers, and identify their thoughts and desires. It also helps in identifying and monitoring trends, understanding customer experiences and perceptions through social networks, adapting them to our products, and finally, knowing their feelings about our brand (Rodríguez, 2017).

In the same vein, as stated by Miquel and Toledo (2020), their study coincides with the previously mentioned points, but it adds the possibility of ultra-segmenting messages to target audiences, making the messages adapt to customers in terms of perspective and narrative, thus making them more effective. Big Data provides us with the tools to communicate in a multifaceted, sophisticated, rigorous, personalized, and direct manner all at the same time. One of their findings concludes that content trees are now being structured with different axes linked to specific target audiences, ranging from niches to even individuals, combined with the message appearing at the right moment and place.

The information and knowledge from the most important universities that publish on Big Data allow us to define the importance that the academic world gives to these business topics. The following statistics are presented, demonstrating that universities in the United States and China are at the forefront of research in this field, with only one European university appearing in this ranking (Rodríguez-Insuasti, 2021).

Table 1. *Ranking Universities that Research Big Data.*

	Organizations	**Records**
1	Hong Kong Polytech University	38
2	Rutgers State University	23
3	University Kent	23
4	Northeastern University	22
5	Tsinghua University	22
6	Chinese Academy Science	20
7	Politecn Of Milan	20
8	University Tennessee	20
9	Arizona State University	19
10	City University Hong Kong	19

Source: (Rodríguez-Insuasti, 2021).

2.5 quadrillion bytes are generated daily, 500 terabytes are uploaded to Facebook each day, Instagram hosts 80 million photos, YouTube plays 1 billion hours of content daily, 204 million emails are sent in a day, 10 million ads are viewed, and 4 million searches are made on Google in a minute. Nearly all the data recorded in human history has been generated in recent years. As a reference, by 2025, the amount of data generated will have multiplied 14 times compared to what was generated by 2015. The world has never been so complex and fragmented. Data travels instantly from one point to another anywhere on the planet and is stored in what we know as the cloud. For the first time, humanity accumulates data that it does not have the capacity to process and analyze. It is possible to know what people think, want, buy, need, listen to, what they reject and what they don't, segmenting them by consumption, interests, tastes, or fears, and based on various specific traits, individualize and group them. This can be done without the need to actively seek this data, without surveys, and even without people being aware of it. It's just a matter of correctly casting the net into the vast ocean of Big Data. All devices connected to the Web leave behind "digital footprints" that can be recorded, analyzed, reviewed, and monetized. We voluntarily leave behind

these fragments of information every time we use the internet, GPS, or mobile apps (Galup, 2019).

Now, regarding segmentation, in the study by Villacis and Almeida (2018), it is stated that consumers indicate that preferences in purchases have become more widespread, increasing market variables to meet their needs. Therefore, it is essential to classify customers using the different resources provided by digital channels, such as social media worldwide and individualized email marketing. Segmentation must be done using Big Data. The majority of people conduct their searches and interact through social media, which is likely where potential customers can be found. People want to follow their favorite brands on social networks as it provides them with important brand perception information and improves communication with customers. Therefore, it is important for brands to have a presence on social media, considering the benefits of connecting people with our brand. In this way, it is important for companies to store information in order to segment their social networks according to customer requirements. To use Big Data in social media segmentation, it will be necessary to investigate the acquisition and implementation of Big Data technology, which allows us to have an understanding of customer preferences and demands, as well as our weaknesses and those of competitors, in order to gain a competitive advantage. However, companies must have a complex infrastructure to ensure the security of their data.

Today, digital web interactions are governed by computer programs that provide us with personalized suggestions based on our own questions and answers. Computer algorithms serve to transform the process and outcome of an online operation into an automatic one. When we use the internet through computers, smartphones, tablets, or other devices, our browsing records are stored, and this data is what Big Data collects by merging various media or resources with data, resulting in a personalized profile with our preferences, interests, and desires. With this data, individual profiles are generated, followed by target audiences. The use of Big Data has two main projections: the descriptive aspect and the predictive aspect (Valdiviezo-Abad and Bonini, 2021).

Thanks to the endless amount of accessible and processed data, companies like Facebook can be considered advertising companies with constant surveys and polls that allow for personalized messages. Moreover, considering that potential advertising clients themselves generate content that will interest other customers. Unlike traditional media, there are no individuals making decisions about whom to offer products to; instead, this task is carried out by an algorithm. Thus, it becomes a learning program that offers content based on users' interests. These algorithms also learn through trial and error in order to improve their performance (Magnani, 2017).Technologies based on AI, when combined with Big Data, facilitate the achievement of personalized advertising impacts. This technology has enabled the creation of advertising messages that are considered relevant to the target audience within an efficient timeframe and taking into account the optimal location of potential recipients. As a result, the effectiveness of advertising investment improves significantly. Additionally, the interaction that can be included in advertising segments transforms traditional advertising into a conversation. The opportunity to identify user

profiles allows us to personalize messages and advertising, facilitating rapid and immediate measurement of advertising effectiveness (Gonzáles-Oñate, 2019).

Real-time decision-making integrated with marketing is part of its evolution as a discipline and will have a significant influence on competitive advantage. Historical data should guide our actions, strategies, and future plans (Jabbar et al., 2020). Furthermore, with the use of Big Data, we have the ability to predict the right decisions. As repeatedly described, predictive behavior and marketing behavior allow us to anticipate decisions for the company in order to encourage production success (Saidali et al., 2019).

In the commercial use of e-commerce, Ballestar (2018), based on their study, concludes that a predictive model based on customer loyalty is based on digital community recommendations. It enables the customization of incentive campaigns in real time through word-of-mouth recommendations. This optimal marketing investment incentivizes only users who attract other active prospective users and, as they become more active, they become more profitable for the e-commerce business.

On the other hand, among the emblematic and relevant cases of Big Data application, we can highlight its involvement and impact in political marketing.

It is not new that in electoral campaigns, marketing techniques appeal to the emotional sphere of voters in order to influence voting behavior. The effectiveness of these behaviors is explained through cognitive sciences and marketing. With the addition of Big Data, an electoral campaign becomes much more sophisticated, increasingly personalizing messages and analyzing the attitudes and sentiments of voters through their social media. By using algorithms, what seems to be hidden in official surveys is brought to light (Revuelta-Bayod, 2018).

Obama used a large database, exceeding what was officially allowed, through Facebook. In support of Obama, people subscribed to the "Are you in" application and granted Obama's team access to their contacts, including names, conversations, gender, and origin. From there, thematic segmentation was employed so that these supporters' profiles automatically posted content in favor of the candidate. It was assumed that by using the application, users accepted the terms and conditions. With this database, micro-segmentation was used to identify patterns and uncover the concerns and details of specific segments in order to send tailored messages and sway their vote. In 2016, during Donald Trump's campaign, large amounts of information were processed on Facebook, and profiles were categorized differently from ordinary citizens. This enabled the communication of 175,000 versions of the same message with variations in images, colors, subtitles, or explanations. For example, when Trump expressed "I support the right to bear arms," some individuals received this message with an image of a criminal entering a house, categorizing them as fearful individuals. On the other hand, those considered patriots received the same message with an image of a person hunting with their child. As previously mentioned, a total of 175,000 variations were generated (Pineda-Sánchez, 2018).

In the negative aspect of using Big Data in political marketing, one significant issue was the unauthorized acquisition of information. Furthermore, starting in 2015, Big

Data strategies were employed by Google, Facebook, and other platforms, which led to the emergence of fake news. Fake news is used to manipulate and spread false messages (Ardini and Nahúm-Mirad, 2020).

Similarly, we can mention certain cases that demonstrate the application of Big Data in the commercial sector.

For example, in 2012, there was an article in The New York Times stating that Target (a supermarket in the USA) had predicted a young woman's pregnancy. The father of the teenager was upset because his daughter had been receiving promotional coupons via email for baby items. Later, he discovered that she was indeed pregnant. This happened because Target had created an algorithm to predict the likelihood of someone being pregnant based on demographic information and purchase history. The Big Data analysis revealed a specific purchasing pattern among pregnant women, which was used to predict future purchases. This effort was aimed at sending relevant coupons via email (Kotler et al., 2021).

In the pilot study conducted in Spain within the company Pastelerías Ascaso, using a platform called Bersut for behavior analysis in their stores, the authors Marta-Lazo et al. (2018) were able to obtain the following tangible results with the use of Big Data. The company under study was able to understand aspects of customer behavior, relationships between their products, specific characteristics of each point of sale, and more. The data sources were diverse, including purchase ticket data from their stores, customer emails, the sales team's experience, etc., as well as data sources related to the products themselves. Additionally, sensors were placed in the stores to gather data about the physical environment. In this regard, it was possible to predict the batch of products with the highest probability of demand during the Christmas season of 2017, and the platform assisted in designing the Christmas basket.

Another example is Big Data Scoring, which is a tool used to measure credit risk in banking institutions. It allows for the evaluation of customer solvency based on information from social networks, such as the time spent on Facebook, the professional qualifications of their network of friends, likes, and preferences. This data is cross-referenced with information from other companies to identify any inconsistencies. For example, if someone claims to have a Harvard degree on LinkedIn but none of their friends on the social network have this qualification, it may indicate that this claim is not likely (Vega-Chica and González, 2018).

In Ecuador, Big Data is used to evaluate trends, increase sales levels, and geolocate consumers. This is related to the existing digital divide and the segmentation of strategies based on the demographic and cultural characteristics of different regions. Among the most commonly used Big Data strategies, content marketing (sending valuable content through social networks or email) and inbound marketing (sending personalized text messages) stand out. These strategies are directly linked to creating a valuable relationship with the customer, and these characteristics have been strengthened through the use of Big Data, thanks to the high level of segmentation that can be achieved. When it comes to data storage, cloud storage is the primary option for preserving data. However, it is important to consider the existing legal gaps regarding this aspect. In Ecuador, despite being a recent topic, companies have quickly

adapted to Big Data (Valarezo-Luzuriaga and Román-Rivera, 2021).

Continuing with this in-depth analysis, as we have seen, the utility of Big Data in marketing is of great relevance to society, particularly for the business sector, as its use offers multiple benefits that lead to the implementation of strategies that provide competitive advantages beyond those offered by traditional marketing. However, it is worth detailing various implications from a negative perspective and those present in other spheres. According to Martínez and Pérez (2021), the consulting firm Gartner predicted that, in 2018, half of the companies would incur ethics violations due to the misuse of Big Data. Meanwhile, Colmenarejo-Fernández (2018) suggests that Big Data should be considered a socio-technological phenomenon because it is modifying the culture of communication and social interactions. The collection, storage, management, and massive utilization of data, often for profit-driven purposes, can give rise to problems related to privacy, ownership, intimacy, trust, or reputation. While it is true that these problems cannot be considered new, it is evident that they are now overflowing due to the inherent nature of what we understand as Big Data.

While large companies can offer highly personalized experiences due to the amount of information available about their users, data industries are becoming increasingly aware of individuals' psychological biases. People respond to positive incentives, while others respond in the opposite way. The analysis of massive data allows for message personalization and has a direct effect on generating behaviors. However, concerns arise regarding the transition from personalized experiences to manipulation. Psychological manipulation based on personal information will not only improve, but it will become so effective that we won't even notice its presence (González-Guerrero, 2019).

In addition to this, as Moreno et al. (2018) conclude, despite researchers in the field of Big Data repeatedly warning about ethical and legal issues, it doesn't seem to be a concerning topic for communicators in Latin America. Furthermore, in addition to algorithms, extensive knowledge about stakeholders, their behaviors, and attitudes is necessary. Similarly, it is vital to understand communication processes and opinion formation in order to generate ideas and obtain results from the data. In the future, education plans for communication and public relations professionals will need to consider the significant challenges posed by Big Data and automation.

However, as Pineda-Sánchez (2018) states, segmentation based on information filters is responsible for creating personal bubbles. If things continue as they are, each person will live in a bubble where they only receive communication that aligns with their preferences. Similarly, another danger highlighted by Valle and García (2021) is that our free will, the power of choice, and the decision-making process of our actions and behaviors would be jeopardized. From simple to complex decisions, they will be in the hands of algorithms and artificial intelligence, acting as a god-like entity capable of providing answers and solutions to any problem. This would generate a culture or interpretation of the world and a way of existence that is shaped, conditioned, or determined by machines.

Thanks to Big Data, as we have seen, we are able to identify patterns, trends, and predict events that have not yet occurred. In this sense, it is also being used in the

prediction of criminal behavior. Using statistical models, authorities are informed about where and by whom a new crime is likely to be committed. This approach provides an appearance of objectivity and questionable statistical certainty. This technology presupposes that human beings are not free, as our actions can be measured and predicted using mathematical models. Predicting human behavior in the context of criminal prosecution puts criminal law at risk because it promotes crime without criminal conduct. Citizens are viewed as threats to be neutralized and criminalized based solely on probabilities rather than facts (Pardo-López et al., 2021).

5. CONCLUSIONS

As we have seen in the various bibliographic sources consulted in this study, the positive implications of applying Big Data in marketing have been verified. It is important to emphasize that it is not just about the data, but rather about our ability to retrieve, analyze, and make decisions based on it. The Big Data strategy is not only relevant for implementation but also for leveraging it to improve competitiveness. It is necessary to learn from best practices to ensure that our actions are decisive (González-Castro et al., 2018). One of the most significant aspects involves identifying consumer behavior based on evidence in order to identify market opportunities and improve our positioning. Its main virtue lies in the relationship between each company and its customers, thanks to the wealth of information that can be obtained through Big Data tools. In this way, we can gain in-depth knowledge of our customers and create personalized strategies for purchasing, promotion, and advertising, resulting in a more homogeneous and specialized segment. It becomes possible to understand our customers better and establish a more natural and specific relationship with them. These data help us understand their behaviors, habits, and the brand interactions that lead them to make a potential purchase.

Another advantage is that consumers receive personalized information, which in turn increases the sales ratio. This is because, thanks to more detailed segmentation, organizations can send much more relevant and specific information to their customers and potential customers, thus providing a better opportunity to build customer loyalty. There is a higher likelihood that a customer will purchase a product based on their previously analyzed interests by the company.

Furthermore, through the application of Big Data, we can understand customer interaction and behavior, including identifying malpractices. The process of applying Big Data in marketing focuses on real-time measurement of the information provided by the collected data. This enables organizations to gain insights into customer behavior within a network or specific website. Based on this, it contributes to the detection of malpractices and potential fraudulent actions by users, allowing for preventive measures to be taken before such acts occur.

One equally tangible advantage is that it allows for the creation of value relationships and communities around specific audiences. In other words, if we can better understand our customers or users and their needs, we can use the information extracted from this data to execute communication strategies aimed at improving our relationships with them by providing added value. An example of this is content marketing, as through it, customers end up associating our brand or product in a more reliable way than with traditional strategies. Additionally, it is possible to enhance

interaction and communication with consumers or customers, who can play the role of brand ambassadors, sharing information about the organization through various social media platforms. This leads to the creation of a virtual community around the brand to which different audiences can join.

Additionally, it is vital to note that through the use of Big Data, we can better control information and have real-time access to it. Collecting, studying, and analyzing data, allows us to anticipate, prevent, quantify, and evaluate in real-time the evolution of strategies regarding the marketing campaigns employed, and thus the achievement of the set business objectives. This way, we can observe and analyze whether they are working or if adjustments to the actions or redesign of the strategies are necessary.

It is important to mention that Big Data in marketing not only allows us to have an intrinsic view but also an extrinsic one to identify possible trends within the sector in which our operations are carried out. In other words, it could provide us with answers to questions such as: What is being purchased more? What is being searched for more? or Which product is starting to succeed? Furthermore, it enables us to understand the perception and impressions that our brand generates in our customers or consumers through the emotions it evokes. It also allows for a thorough analysis of our organization's direct competition, encompassing these aspects mentioned.

Although Big Data in marketing sounds like a relevant pillar due to all the advantages described previously, it is important to emphasize that the collection of information does not always arise from ethical and legal principles. In many cases, information is collected without authorization, based on deception or half-truths, not to mention the presence of fake news that has become part of our daily lives on social media. This represents a risk to our privacy as individuals, especially when in countries in Latin America or Ecuador, laws regarding information are unclear or nonexistent. Furthermore, going beyond the improper collection of data, for example, there is an intention to use it to support crime prevention. However, this also creates a criminal problem as people are judged based on possibilities rather than facts, generating a concerning bias that limits free will and erodes the foundations of society. In this sense, the question arises: What does crime have to do with marketing? Well, in the same way, we become numbers in a large process of algorithms for companies, and this not only seeks persuasion but can go further to manipulation. As described earlier, we are a range of different possibilities for companies based on our information, which immerses us in a scenario where we may be trapped in a bubble of amplified tastes and desires, or where companies may want to indoctrinate us based on ourselves. This limits our ability to have more options or the capacity to decide in a free market. As Pineda (2018) stated, it turns us into a static and limited version of ourselves, or in other words, an endless loop of ourselves.

While these issues may not yet be of great relevance, from our perspective as authors, we believe that there should be supervision and regulation regarding these critical aspects for our development as a free society.

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