Main Martechs in Brief

5

5.1 Introduction

Technology has revolutionized marketing and introduced new ways of marketing which are more effective in reaching out audiences in comparison with traditional marketing. In fact, we are living in a digital world which is highly competitive and marketers have to get familiar with and utilize various technologies in order to win the competition.

We introduced the main martechs in Chapter 4 and in this chapter, we will discuss these technologies in more detail.

5.2 Artificial Intelligence

The decision-making and problem-solving abilities of the human mind are imitated by computers and machines (Kumar et al., 2021).

AI engines do not learn independently. Instead, they need to be taught using algorithms. Big data that provides contextual examples is relevant to them. At last, they are able to understand the algorithms and interpret the data in its entirety. Artificial Intelligence replaces human intelligence with computer algorithms to accomplish certain tasks. A computer can learn in two ways: under supervision or without it. Human programmers map the method in input–output or if–then format for supervised learning. One such example is chatbots, which enable customers to ask questions from a predetermined list only.

On the other hand, with the least amount of human intervention, an unsupervised AI system uses historical data to learn and identify patterns that were

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previously unknown to humans. One of the most critical applications of unsupervised AI is to draw and interpret insights from big data. AI enables businesses to do data-driven market segmentation and targeting so they can offer personalization in product recommendations, pricing and content marketing campaigns. It can cluster clients based on transaction history, social media posts and other behavioral data. The computer learns and adjusts its algorithm based on how customers react to these offerings (Kotler et al., 2021).

Through the creation of content, multichannel orchestration, real-time customization and conversational interactions, artificial intelligence (AI) is revolutionizing business (Gartner, 2018).

AI enables more intelligent targeting by delivering suitable offers to the appropriate clients at the appropriate times. In addition, personalizing items and even enabling customers to modify their purchases guarantees a better product fit. Customers are more satisfied and loyal when AI is used for personalization, which raises their acceptance of data sharing. Furthermore, it facilitates enhanced consumer engagement through customized content delivery and closer client interaction. Lastly, AI gives advertisers the ability to forecast the behavioral patterns of their target population more accurately and efficiently (Kotler et al., 2021; Mogaji et al., 2020; Verma et al., 2021).

Artificial intelligence has some use cases in marketing, including chatbots, automation and prediction, which we will discuss in more detail and as a separate technology due to their importance in marketing.

5.2.1 AI in Marketing

New technologies give businesses a competitive edge by making service and customer product offers easier (Balaji & Roy, 2017; Khanagha et al., 2017; Liao, 2015).

Artificial intelligence (AI) is rapidly growing and becoming increasingly important in today's technological landscape. It is commonly utilized to assist businesses in tracking real-time data, analyzing it and quickly meeting client needs. It enables businesses to make better decisions, increase efficiency and improve customer satisfaction (Wirth, 2018).

Artificial Intelligence provides consumer behavior insights that are crucial for attracting and retaining customers. AI redefines the entire experience and influences the customer's next move (Tjepkema, 2019). AI tools assist in determining client expectations and planning for the future (Shabbir & Anwer, 2015).

The computer industry, known as Artificial Intelligence, aims to create and improve computer systems that simulate human activities, displaying abilities that resemble essential cognitive functions (Škavić, 2019). Developing machine comprehension, as per John McCarthy, involves creating knowledge and methodology (Dick, 2019).

Because it eliminates human errors, including prejudiced approaches, delays and other little problems, artificial intelligence has become a vital tool for marketers (Katyal, 2019). Marketers are familiar with terms such as artificial intelligence, automation, big data, pattern recognition and artificial neural systems. These are some of the terms and methods that shaped modern marketing. Artificial intelligence-driven chatbots, such as Microsoft's Cortana, Amazon's Alexa, Apple's Siri and Google Assistant, are meant to converse with users and help them by providing various information and attending to their other information needs. Due to this evolution, achieving excellent marketing outcomes for businesses has gotten easier.

Artificial Intelligence (AI) and technology have significant and widely acknowledged implications for marketing. Recently, ChatGPT has emerged as a technology that leverages artificial intelligence. Since its inception, it has caused a global boom and has important ramifications for all business activities. Since 1955, the field of Artificial Intelligence (AI) has experienced remarkable growth. John McCarthy, the individual who first used the term "artificial intelligence", defined it as the discipline concerned with designing and building intelligent machines (Hamet & Tremblay, 2017). AI has gained popularity in various industries, from e-commerce to education, banking (Sheth et al., 2022) to healthcare, and academicians have also used AI to enable and enhance their research (Dwivedi et al., 2021; Mogaji & Nguyen, 2021; Zhang & Lu, 2021). From robotics (Gaur et al., 2021; Vrontis et al., 2022), large-scale data analysis (Bag et al., 2021; Lv et al., 2022), a chatbot (Abdulquadri et al., 2021; Mogaji et al., 2021) and human activity recognition (Gupta et al., 2022), marketing researchers and practitioners have explored the vast prospects and opportunities of AI and Metaverse (Dwivedi et al., 2023b).

The objective of value-driven marketing is to produce substantial and valuable results in the lives or businesses of your clients, as opposed to traditional product marketing, which focuses solely on the product itself. In the future, artificial intelligence (AI) will change marketing strategy and customer conduct substantially. It is building from extant research and extensive interactions with practice.

McKinsey Quarterly archive analyzes six significant changes that promise to transform future value-driven marketing efforts. These factors have widely proved

to be as impactful as forecasted and continue to form current challenges. In this regard, AI is considered as one of key influential factors. Today's challenges are still being shaped by the influential forces that were predicted to have a significant impact. Today, Change is an important fact of life in every business. Nowadays, one of the most desirable management skills is the capacity to handle and take advantage of changes. This is especially evident in the field of marketing, where the rate of Change is continuously accelerating (Kumar et al., 2022).

1. The dominance of the customer
   Companies need to keep up with the changing times. As the end-users of a company's products are constantly changing in terms of their makeup, number and location, understanding and predicting future customers' needs is becoming increasingly crucial. This ongoing evolution requires businesses to stay vigilant and adaptable.
2. The spread of marketing research

– Artificial Intelligence Applied to Data Gathering
  Technology can help automate or simplify these procedures. Experiments, surveys, panels, interviews and sales data are still frequently used to obtain information on key approaches for marketers to obtain data. Surveys and experimental approaches tend to be more theory-driven, even though other methods are typically more data-driven. Additionally, marketers frequently rely on thirty-party syndicated data (like YouGov), particularly when gathering sophisticated external data for the company. The data supplied is frequently delayed, incomplete in context and irregular—that is, it is not gathered during the process of creating the data but rather at irregular intervals after the occurrence (after consumption). As opposed to this, new methods use wearable, sensor and connected technologies to automate the majority of data collecting (e.g., Fitbit, smartwatch, IoT, mobile apps and social networking sites). These mechanical AI techniques monitor and record data in real time as it happens. Consequently, the data are pertinent to the customer, the setting and the consumption experience. Such impromptu data gathering is typically more data-driven. But they can also be theory-driven if theories can be created prior to updating ongoing data collecting and directing (Huang & Rust, 2021).
– Use of artificial intelligence in market analysis
  The process of analyzing structured data for marketing insights mainly depends on statistical analysis. Even said, machine learning-based analysis is quickly taking the place of market analysis. Additionally, it is typical for businesses to buy data and research from outside parties, particularly for external

competition and market study. Because this kind of analysis is typically performed by many organizations (with just a little amount of customization), the insights it yields are less useful in developing a distinctive value proposition. Additionally, companies monitor and assess first-party data, particularly for internal data-available analyses of their firm's marketing resources and current consumer base.

In contrast, the new methods for marketing intuition include machine learning and big data analytics. Data can be found in image, text, audio or video formats, and it is possible to mine opinions, behaviors and evaluations found online. When the question is straightforward (e.g., a well-known brand), supervised machine learning can be used for theory-driven analysis. On the other hand, the current question is not particularly obvious.

Unsupervised machine learning can be used to gain data-driven insights (e.g., a new brand). Balducci and Marinova (2018) outline several techniques for marketing data analysis that aren't structured. Utilizing deep learning techniques, such as customization algorithms, natural language processing systems, predictive analytics and computational creativity, to generate intuitive recommendations for marketing strategies is one of the most sophisticated methods of marketing analysis (Huang & Rust, 2021).

– Use of artificial intelligence in customer understanding
Nowadays, most practices use focus groups to gather qualitative information about their clients. Focus groups take a lot of time and effort and are not representative. In order to comprehend consumer preferences and underlying motives, marketers also watch how consumers behave, respond and select products in response to promotions. However, rather than being deduced from psychometrics, information about customers' moods, feelings and emotions can be directly obtained from their interactions with AI (such as conversational bots) and analyzed using feeling analytics (such as social media posts, chat transcripts and voice recordings of customer interactions). Because emotional data are personal and contextual, feeling analytics may find customer insights at scale and cost-effectively. Understanding customers in context yields richer insights about their preferences and identity (Huang & Rust, 2021).
– Use of artificial intelligence in marketing strategy (STP)
Artificial intelligence can aid marketers in strategy and planning by supporting segmentation, targeting and positioning (STP). In addition to STP, AI may help marketers visualize a company's strategic orientation (Huang & Rust, 2021). Machine learning and Text mining algorithms can be used to identify profitable client categories in a variety of industries, including retail, banking and finance, tourism and art marketing (Dekimpe, 2020; Netzer et al., 2019;

Pitt et al., 2020; Valls et al., 2018). The targeted client base can also be reduced by combining machine learning, causal forests and data optimization strategies (Chen et al., 2020). Marketers can now use segmentation, targeting and positioning with the three AI intelligences. For companies that base their marketing strategy on data rather than marketing research findings, this stage may be more crucial.

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Segmentation

The present method chooses a small number of segmentation characteristics, such as demographics, behavioral variables and psychographics, to slice the market based on the marketer's domain expertise and intuition. Instead of seeing each client as an individual, this approach sees them as a collective. For example, certain customer equity models (e.g., Blattberg & Deighton, 1996; Gupta et al., 2004) focus more on categorizing customers based on their acquisition and turnover rates than they do on the idea that every client is individually unique. As a result, marketers frequently apply artificial characters to these segments in an effort to humanize and relate the aggregate groupings. On the other hand, when employing data mining to segment the market, marketers no longer need to decide on segmentation criteria ahead of time because unsupervised machine learning can identify the trends. An almost infinite variety of factors can be used to piece together the market in a unique fashion that frequently surpasses any pattern that human marketers are able to identify. It is comparable to the customer lifetime value model, which holds that every customer has some worth. One famous example is the Target store, which discovered a daughter was pregnant before her father did by looking into the daughter's purchasing habits.

Targeting

At the moment, the primary methods of targeting are based on the marketers' subjective assessment of the firm's resources, competitive advantage and segment value. Typically, it is not at the individual level but also at the segment level and often trades off segment size for effectiveness. By contrast, after very refined segmentation, the AI recommends the best segment(s) to target. It will likely be a segment of one since personalization is the strength of thinking AI. Targeting is becoming more and more prevalent at the individual customer level in developing practices due to its limitless methods to slice the market. Online advertisements, for instance, follow specific users throughout the Internet using cookies to target them. In addition to being flexible, the new targeting can disaggregate a segment if heterogeneity

within it becomes apparent or combine individual customers into a segment if they have similar preferences (e.g., like-minded customers' recommendation, aggregating long-tail customers even when each customer may not be valuable). Targeting is picking out a market niche and deciding if it is worthwhile to pursue. The decision of whether or not to pursue it will be based on predicting the outcome; individual predictions can only be scaled with AI's help.

Positioning

Because placement involves creativity, intuition and judgment—all of which machines still struggle with—it is now a human task (Davis & Marcus, 2015; Schoenick et al., 2016). Kelly (2019) contends that novelty and social acceptability are key components of creativity. For a fresh idea to be deemed innovative, it must be embraced by the community. Since creativity is socially rooted, the intended audience will view a strong stance as advantageous. AI has a long way to go before it can be as creative as people and still be valuable strategically, despite the growing number of examples of AI engaging in the creative process, such as employing AI to create short tales and compose its music. For instance, AI used machine learning to write the script for the 2018 Lexus "Driven by Intuition" TV commercial. In order to engage viewers, Lexus provided machines with award-winning luxury advertisements, brand information and emotive data that explained how the company created the new ES executive saloon automobile. The ad seems legitimate on the surface as a premium automobile advertisement. But, given its hazy client segmentation and vague messaging, this campaign might require a more calculated approach (Rust & Huang, 2020). This real-world illustration indicates that placement will probably involve both human and artificial intelligence collaboration for the foreseeable future.

– Use of artificial intelligence in marketing action
  The two most important things to find out are which AI to use and how to use it in marketing efforts.

Product

Artificial intelligence-based marketing analytics tools are able to evaluate how well a product design meets customer needs and how satisfied customers are as a result (Dekimpe, 2020). The system can accommodate further designs and improvements by using subject modeling (Antons & Breidbach, 2018). Marketers can use the preference weight assigned to product attributes during product search to better understand and plan their campaigns for a product recommender system

(Dzyabura & Hauser, 2019). Finding new places and tailoring the suggestion for a point of interest can be aided by deep learning (Guo et al., 2018). According to Kumar et al. (2019), artificial intelligence provides the ability to tailor services to meet the needs of the client.

Nowadays, conjoint analysis is used to decide which level of product attributes to include in product development; test markets are used to assess whether and to what extent a product will be accepted, and aggregate sales results after the product launch are used as a proxy for customer feedback. Using mechanical AI to automate industrial and service activities is becoming more common (e.g., Huang & Rust, 2020); use feeling AI, such as conversational bots and social robots, to communicate with consumers in order to get immediate, useful insights; and use thinking AI, such as cognitive technology, to facilitate product research and development (which is currently more common in drug development). The process of direct feedback about the product can become an adaptive loop that continuously improves the end product based on feedback from clients.

Price

Before settling on a final price, pricing is a labor-intensive procedure that involves assessing a number of distinct criteria. The natural time price adjustment based on variations in demand is what is making the pricing problem more complicated. Artificial intelligence-powered multi-armed bandit algorithms are capable of dynamically changing prices in real time (Misra et al., 2019). Bayesian inference in machine learning algorithms can swiftly alter the price points to match the competitor's price in a scenario where pricing changes often, such as an e-commerce platform (Bauer & Jannach, 2018). According to Dekimpe (2020), in order to maximize dynamic pricing, the best response pricing algorithms incorporate supplier networks, customer preferences and rival strategies.

While price menus found online are easier to compare than those found offline, making them more complex and labor-intensive to alter, the current practice involves listing prices on retail stores, mobile apps or websites, setting prices discriminately based on segments and having salespeople handle price negotiations. Setting prices typically involves thorough calculations taking into account a number of variables; when negotiating prices, especially for expensive goods, art rather than science is involved. The three new practices are using mechanical AI to automate price setting and modifications, thinking AI to personalize prices, and feeling AI to negotiate prices. Price updates are a simple, normal process. Price determination may be done by an intelligent machine capable of self-reasoning and calculation. Additionally, it may be tailored to each individual customer's tastes and sensitivity levels. Price

negotiations are possible when AI detects a customer's reaction to the suggested price in real time.

Place

Product access and availability are essential elements of the marketing mix that increase client happiness. Product distribution depends on a number of interconnected logistics, inventory management, warehousing and transportation issues, most of which are repetitive and mechanical in nature. Drones for delivery, cobots for packaging and the Internet of Things (IoT) for order tracking and restocking are all made possible by artificial intelligence, making it the ideal answer for location management (Huang & Rust, 2020). Customers and suppliers benefit from the distribution process's standardization and automation. AI provides chances for client engagement in a service setting and its usefulness in distribution management. When it comes to surface acting, service robots with emotional AI programming are useful (Wirtz et al., 2018). Customers must be delighted by the interaction and greeting of embodied robots, but human characteristics must also be present in the service environment. AI-powered service process automation presents more chances to boost output and performance (Huang & Rust, 2018).

In order to streamline operations, the existing method depends on self-service for repetitive delivery, labor-intensive physical distribution for order processing, materials handling and delivery, frontline staff for emotional labor and unskilled labor at the frontline to provide uniform help. Distribution, logistics and delivery are rapidly expanding fields that can be largely automated with mechanical AI. For instance, product monitoring systems let businesses monitor where their products are in the supply chain and let customers know when to anticipate their orders to arrive. Artificial intelligence (AI) that can think has been applied to help clients find products, such as personal shopping assistants. Conversational bots, or feeling AI, can be used to simulate emotions in customer interactions without the customer having to feel those feelings themselves (Wirtz et al., 2018).

Promotion

It includes search engine optimization, media planning, scheduling and administration of advertising campaigns. Physical marketing methods are being supplanted by digital ones. Social media campaigns and digital marketing become more popular as a result of the worldwide shift to digital media. The world has changed due to technology, and now consumers choose the time, place and content. AI enables the customization and personalization of communications according to the recipient's preferences and profile (Rust & Huang, 2020). Content analytics can be used to optimize communication efficacy and value. Emotional AI systems allow for

the tracking of customer preferences in real time. Networked social media content offers marketers additional opportunities to customize their campaigns based on user preferences (Rouhani & Savoji, 2016; Tripathi & Verma, 2018; Verma & Yadav, 2021). Because media planning is a repetitive process, mechanical AI has a higher degree of automation in this area of promotion. Even though there is less automation involved in the content generation aspect of advertising, thinking AI—such as AI writers—is increasingly used to either produce material autonomously or inspire human creativity. Conventional marketing research techniques are still the main tool used to gauge consumers' responses to promotions. Using feeling AI, such as feeling analytics, to perceive, respond and modify promotions in real time depending on customers' emotional reactions is an emerging approach.

The level of the information input significantly affects how well the marketing output is produced. Therefore, as the desire for more scientific marketing grows, the importance and value of marketing research are likely to increase.

3. Expanded use of test marketing
   To reduce the likelihood of making a mistake when implementing marketing adjustments, more controlled testing.
4. Metamorphosis of field selling
   To make a profitable sale and see a satisfactory return on this investment, instead of just bringing in volume, the salesperson must focus on selling profitably. The role of a salesperson is now more about marketing integrated systems than just presenting the company's product line.
5. Global market planning
   The product or service should be designed and made considering that it will be sold worldwide. It increases the target customers and sales as well.
6. The rise of the computer
   The emergence of electronic data-processing equipment as a major tool of scientific marketing not only for reporting data but also, more importantly, for planning and control by management. Companies have dragged their feet in taking advantage of electronic data-processing analyses, online communications, and information-retrieval systems as tools to help make marketing more efficient.

5.3 Chatbots

An AI-powered computer program that is developed to mimic human conversation, primarily online, is referred to as a chatbot (Adamopoulou & Moussiades, 2020). Chatbots are able to handle client inquiries and deliver prompt responses by learning from historical customer inquiries, identifying patterns and anticipating likely customer behavior.

Chatbots have some benefits for businesses, including (Brush & Scardina, 2021; Techtarget, 2021):

- Hiring additional employees is a more expensive and time-consuming investment than implementing a chatbot, which provides a cost-effective and efficient solution.
- The use of chatbots can help minimize expensive issues resulting from human mistakes.
- Chatbots can be utilized to automate recurring tasks, which can enable employees to focus on crucial responsibilities and also minimize customer wait times by providing instantaneous responses.
- Businesses can use chatbots to gather feedback from customers during interactions, which can be utilized to enhance their services, products and website optimization. They can also give organizations insight into consumers by tracking users' behaviors and purchasing patterns. Thus, organizations can use this data to market their products and services better.
- It is possible for chatbots to address the concerns and questions of customers in many different languages. Customers can utilize them around the clock, regardless of the time, due to their 24/7 availability.

Throughout the buyer's journey, chatbots have the ability to enhance lead generation by inquiring and sharing information that could convince the user and ultimately result in a lead.

5.3.1 Chatbots in Marketing

Despite being established around 1960, chatbots have only lately come to the attention of businesses and are being utilized to enhance consumer communication (Barış, 2020).

Through conversation interactions, chatbots learn and improve their communication abilities over time. As a result, they create their own rules for

communication and respond appropriately. Personalized services are another way to offer professional services. In order to facilitate more effective communication between humans and machines, chatbots have surfaced. These tools use natural language analysis and protocol development.

Consequently, chatbots are able to respond to queries promptly, provide relevant responses and troubleshoot issues while comprehending the intent of the users. Thus, a chatbot becomes a technological reflection of humans. The chatbot may respond to a variety of queries, advertise goods, services and events, attract new clients, schedule chats and gather insightful client feedback by utilizing the data that is currently available. Although bots used for marketing strategies offer methods for deciphering and comprehending certain material or reality, they might be useful in brand activities on social media networks. Social media management is necessary, but it takes up time for businesses. It's essential to set aside time for researching and sharing information, updating profiles and answering consumer inquiries. Chatbots are very useful in this regard. It provides a swift turnaround to almost all customers and shares the timed content. They also take over the management required to maintain employment. They have the ability to schedule meetings, respond to emails, gather information for the brand and—above all—provide customers with conversational updates. There is extremely little possibility of error when doing this in a proper manner. Chatbot usage varies based on the objectives the brand wants to achieve, but in this sense, it represents the brand. Chatbots powered by data can influence consumer decisions and enhance a brand's reputation. Chatbots that are powered by data can influence consumer decisions and enhance a brand's reputation.

Furthermore, a chatbot can differentiate the brand from its rivals by saving clients time and providing practicality. Compared to other marketing tools, it is more accurate, social and friendly—especially when it makes contact, strikes up a conversation or seeks to build a relationship. Furthermore, sophisticated chatbots anticipate their requirements and recommend goods and services based on their prior interactions. Consequently, sales rise as the brand is promoted. Customer support chatbots were used by over 67% of global consumers in 2019, according to an investor research firm. Data from the SMSAPI report also showed that about 53% of Polish respondents were happy with this kind of communication. Chatbots allow businesses to stay ahead in terms of customer expectations by enhancing brand prestige and showing innovation to consumers. Because chatbots respond more quickly and can answer 80% of queries, they can reduce customer care costs by up to 30%, which can save organizations a sizable sum of money. It provides the most enjoyable and engaging method of interacting with the business or brand while generating sales chances because of its recommendation algorithms. As a

result, it accelerates and improves the effectiveness of the applicable marketing operations (Barış, 2020).

5.3.2 Types of Chatbots

Chatbots are classified into different types according to which platform they are on, what technology they are developed with or what purpose they serve. The following classification divides chatbots into two groups by evaluating their interaction, integration competencies and intelligence. Task-oriented chatbots are singular programs that concentrate on performing a task. Because this chatbot lacks sophisticated levels, artificial intelligence usage is minimal. By selecting from the various choices or typing precise terms, the user carries on the conversation. These chatbots follow exact guidelines and require precise communication. These chatbots generate content by asking often asked questions. Its purpose is rather straightforward even though the Natural Language Process is used. These are currently the chatbots that are used the most. Virtual assistants, or digital assistants, are frequently equipped with data-driven and predictive chatbots. These chatbots are far more advanced, interactive and customized than task-oriented chatbots. Such chatbots are highly aware. Over time, they learn their natural language understanding (NLP and ML) and change their structure. In order to personalize depending on user profiles and previous behavior, they gather and examine data. Digital assistants are capable of anticipating requirements, making recommendations and gradually learning about a user's preferences. They can also communicate directly with the customers using this information. These chatbots are not just limited to word or emotion recognition; they can also comprehend written language, follow the conversation and respond appropriately to questions that follow (Barış, 2020).

5.4 Predictive Analytics

There are four key types of data analytics: Descriptive, which answers the question, "What happened?" Diagnostic, which answers the question, "Why did this happen?" Prescriptive, which answers the question, "What should we do next?" Predictive, which answers the question, "What might happen in the future?" The ability to predict future events and trends is crucial across industries. Predictive analytics appears more often than you might assume—from your weekly weather

forecast to algorithm-enabled medical advancements (Cote, 2021). Making predictions about unknown events in the future is what predictive analytics is all about. It leverages various techniques, such as data mining, artificial intelligence, modeling, machine learning and statistics to make these determinations.

Generally, companies can adopt predictive analytics for predicting the next moves in the segment, identifying opportunities, preventing security breaches, optimizing marketing strategies, mapping the behavior and habits of consumers and employees, improving operations, increasing efficiency and reducing risks.

In advertising and marketing, the utilization of predictive analytics holds significant importance. By utilizing predictive models, enterprises can identify customers who are more likely to respond positively to sales campaigns. This helps companies to focus their efforts on such customers. Predictive analytics also has a noticeable impact on manufacturing costs, enabling organizations to evaluate the likelihood of failure or success of a product before its launch (Halton & Rasure, 2023).

5.4.1 Predictive Analytics in Marketing

There are some critical applications of predictive analytics in marketing. They include (Hair, 2007; Brenner, 2021):

1. **Targeting and segmenting customers**: Companies can design fresh ads based on the stage of the buyer's journey that their target audience is in by using behavioral and demographic data.
2. **Personalizing content**: Businesses can personalize content by learning which type of content best fits the audience and which channel they use most.
3. **Predicting customer behavior**: Businesses can predict future customer behavior by gathering demographic data and historical behavior patterns from clients.
4. **Predictive lead scoring**: Lead scoring is all about giving value to people according to where they are in the buyer's journey. Marketing and sales teams can focus on potential clients and predict future purchases by analyzing different leads.
5. **Predicting customer lifetime value**: Businesses may determine which consumers are the most profitable, which marketing initiatives have the biggest return on investment and which customers are the most loyal by using historical data. They are able to forecast the future worth of their clientele, the

anticipated length of their partnership and the volume of money they will bring in for the company.
6. **Determining better product or service fit**: By integrating lead information, purchase history and customer behavior data, businesses can gain a deeper understanding of what their present clientele desire. They can then forecast what more they might require or want in the future using this information.
7. **Upselling and cross-selling to current customers**: Companies can boost revenues by cross-selling or upselling to customers based on their purchase history. Through the identification of trends in behavior, they may more efficiently market to their current clientele.
8. **Reducing customer churn rate**: Businesses can identify problems before losing a customer using predictive analytics.
9. **Optimizing future marketing campaigns**: Businesses can benefit from faster growth and higher ROI by using predictive analytics because it helps businesses to plan better and implement their marketing campaigns.

Propensity modeling is a useful technique to determine whether a customer is likely to make a purchase, the price they are likely to pay and whether they are likely to return. This is achieved through predictive analytics, which uses data to forecast customer behavior, identify trends and predict future outcomes. The primary applications of predictive analytics in digital marketing include:

1. Improving your understanding of your customers: As a digital marketer, you need to offer relevant content to your customers. Propensity modeling helps to boost email click and bounce rates by providing insights about your customers.
2. Identifying online actions that trigger offline decisions: By using predictive analytics, you can identify events that are likely to occur and determine what online content can trigger offline actions.
3. Optimizing email frequency: Predictive analytics help you determine the optimal frequency for sending emails to customers to ensure a higher conversion rate without irritating them.
4. Improving lead scoring: Propensity modeling helps you identify customers who are ready to buy, saving you time and money by avoiding wasted efforts on customers who are not ready to buy.
5. Selecting the most suitable social media influencers: Predictive analytics can help you understand which social media platforms are best for advertising and which influencer is most suitable for your audience based on factors such

as engagement, clicks and impressions. Adopting predictive analytics in digital marketing can help you make data-driven decisions, improve customer engagement and increase your ROI.

5.5 Big Data

Gathering, analyzing and utilizing vast amounts of digital information in marketing constitutes big data.

The main objective is to enhance business operations. Marketers can benefit from big data in multiple ways. To begin with, it can help them improve store layouts and visual merchandising by identifying where customers spend their time in-store. Additionally, big data can allow marketers to personalize their messages to each customer by analyzing which promotions are most effective for them. By knowing the exact location of their customers, marketers can also offer them real-time deals. Furthermore, by analyzing customers' transaction histories, marketers can forecast their future purchases. Lastly, big data can help marketers anticipate future customer needs and manage their inventories more efficiently (Wright et al., 2019; Verhoef et al., 2015; Kotler et al., 2017; Saidali et al., 2019).

There are several ways that big data can revolutionize marketing and sales (Capgemini, 2015; Court et al., 2015: Forrester, 2015; *Forbes*, 2016):

1. According to McKinsey & Company, it is becoming increasingly feasible to achieve differentiation in pricing strategies for individual customers and products and optimize pricing by using big data.
2. Big data is changing the way companies gain significant insights into their customers.
3. Among the industries that utilize big data the most frequently are sales and marketing. Customer analytics, operational analytics, fraud and compliance, innovative new product and service development and enterprise data warehouse optimization are common use cases.
4. By leveraging big data and related technologies, businesses can now incorporate intelligence into contextual marketing.
5. Big data analytics can help marketers move beyond campaign execution and focus on how to build stronger customer relationships.
6. The biopharma industry is starting to use analytics to optimize selling strategies and go-to-market plans.
7. Big data has a significant impact on marketing programs related to search engine optimization (SEO) and marketing, email marketing and mobile.

8. Advanced analytics and big data can help businesses increase customer engagement and loyalty.
9. Big data provides actionable intelligence and greater insights into each critical driver of an enterprise's business.
10. Leading marketers use customer value analytics to deliver consistent omnichannel experiences.

Big data technology has the capability of expanding the information obtained from marketing research. In the realm of marketing research, big data is set to revolutionize the process (Volker, 2016).

Big data is currently categorized into three stages concerning marketing research:

The first stage involves data primarily sourced from the central business's OLTP data, including users, commodity information, transaction data and collection data. In the second step, log data is used, which is now another source of data due to the rise of ad and tailored recommendation systems. Cookies can be used to gather certain data.

The development of applications that allow for the direct collection of wireless users' activity data is the third step. Similar interface programs are built by a number of businesses, including Umeng, talking data and Taobao, to gather this wireless information.

Finding and monitoring market trends is the main goal of market research. Industrial policies, scale, industry expansion, profitability, consumption, technological advancements, upstream and downstream changes, channel changes, category development, notable head patterns and brands are a few examples of market trends. An overall trend assessment is reached by the use of inductive analysis with this data. A more detailed description of the user behavior trajectory will follow. The first step in the big data-driven era of digital marketing is to "clean" and mine data, then refine and perform in-depth analysis and supply data from feasibility reports for forecasting or decision-making. Big data is not focused on solving issues. Consumer insight and prediction are the two primary directions of marketing research. GfK research has identified that in most marketing research, big data must include essential variables. Also, despite several studies on consumer behavior using big data, it is still necessary to determine conclusively whether big data can simultaneously measure consumers and groups with such behavior (Li et al., 2022).

5.5.1 Big Data in Marketing

Use of Big Data in market research: Studying the actions and attributes of users to gain insights. Big data provides the capability to analyze all users theoretically. By increasing the sample size, the accuracy of the results improves. By scrutinizing big data, we can gain valuable insights into customer behavior during various stages, such as problem identification, search, evaluation, decision-making and after-sales (Yoseph et al., 2019).

It is possible to predict future behavior from past user behavior. This entails examining user traits and behavior in addition to the trajectory of that behavior. There are dynamic and static parameters that make up the trajectory. Population, age, place of residence, gender, income, education, family status, employment, belief and social class are examples of static factors for consumer products. Static criteria for enterprise customers consist of industry, scale, income, business attributes, organizational structure and reputation. The term "user portrait" is frequently used to describe this section (Kriegel, 2019).

Based on consumption patterns, dynamic parameters for the behavior trajectory are obtained. Problems with user identification, information search, decision-making, frequency of purchases and number of purchases are some of these. A labeled user model can be created with the help of the behavior trajectory. Currently, web and mobile behavior, recognition models and techniques and recognition systems are the main areas of study for user behavior trajectory research. An open-source Java project called Clickstream is used to monitor users' web server surfing history. We can learn more about the path, bottleneck, hotspot connections and other topics by examining past data. Log interception, JavaScript script plug-ins, open-source clickstream collection technology and other techniques are used to gather user behavior trace data from the website and the background. To comprehend the trajectory of a product, detailed records of dealer purchases, sales, inventory, second batches and terminals must be kept. The route of a product that follows from the manufacture to distribution, purchase and usage is referred to as its "product trajectory". Understanding the psychological trajectory, which encompasses both static and dynamic elements, is the most difficult yet crucial part of this.

Static parameters pertaining to the psychological trajectory of users include their values, behavior preferences and personality features. Demand motivation, attitudes, cognitive traits, risk awareness, sense of experience, expectancies and satisfaction are examples of dynamic parameters. Technologies like dynamic Java code injection, HTTP access interception, JS code insertion and more are needed to gather user behavior trajectory data. The original system must be transformed

and made cooperative in order to incorporate user behavior trajectories, which might be a substantial task.

An effective way to handle and analyze data for multidimensional analysis and decision assistance is with data mining technologies. For data mining purposes, a variety of mobile applications offer useful sources of transaction, online and user-generated content (UGC) data. Some of the data mining technologies used to extract user behavior and feature knowledge from UGC data are text standardization, tokenization tools, stem analysis technology for text and gray processing and GLCM approaches for images. Precision marketing analysis, client screening and big data analysis can all improve an organization's quality of service and product (Hamilton & Sodeman, 2020).

Analyzing large amounts of data is another intangible resource. Decision-making is today driven by the capacity to create, investigate, gather, disseminate and transform information and knowledge rather than experience and intuition. Entrepreneurs have a hard time figuring out who among their friends, fans and fellow users is the most valuable. Businesses can screen important target users by using big data to locate innumerable bits of information and some rules to associate and synthesize it. Based on the detailed log information of online marketing (about consumers, transaction time, products, transaction price, trade volume, etc.), which appears to be a powerful predictor in relevant predictions, businesses can infer new information about customers' marketing behavior, preferences and interests.

Through the discovery of hidden insights, like the potential elements of text, big data can be extremely valuable. For example, semantic-based picture retrieval can mine information data concealed in photo semantic annotation, while rating analysis can estimate subjective opinions and the relevance of each element. Another crucial aspect of text analysis is text classification, which has been well researched. Many techniques have been developed, including text classification using support vector machines (SVM), the bag of words model and the hidden document body generation model of late Dirichlet allocation (LDA).

Researchers also extract useful data for user analysis, behavior prediction, customer classification, customer loyalty study and other purposes by extracting information features from huge characteristics using PCA and cluster analysis. Market forecasting also takes advantage of consumer behavior in marketing, including audio and video data from Vine, Netflix, YouTube and Facebook. Prediction analysis employing AI models, particularly support vector regression (SVR), CNN and long-term and short-term memory (LSTM), dominates the prediction models using such UGC data despite the fact that working with such data types may slightly increase the complexity of data analysis (Zheng et al., 2022).

5.6 Quantum Computing

Utilizing the principles of quantum physics, quantum computing is a developing technology that stores data, performs computations and increases available computing power to help solve problems that cannot be tackled with existing computers. Quantum computers can crack codes quickly and disrupt existing security methods that use encrypted data (Gyongyosi & Imre, 2019).

Due to its incredible processing power, Quantum computing enables businesses to gather, store and analyze more data. This can increase the effectiveness of marketing. In addition, the outstanding computing power in data analysis increases the possibilities for simulations. Quantum computing can allow for accurate prediction by taking into account multiple variables.

Quantum computing, an emerging technology, has the potential to completely transform a wide range of industries. Quantum computers use bits that can exist in numerous states concurrently, known as quantum bits, as opposed to binary digits or bits, which are used in classical computers. Because of this special property, quantum computers can complete some computations tenfold quicker than those of classical computers. Modern commerce can be transformed by quantum computing in several domains, most notably e-commerce.

Complex algorithms are used by e-commerce companies to handle supply chain logistics, customize recommendations and optimize prices. Still, conventional computers need to get better at doing these kinds of jobs. A novel method of calculation provided by quantum computing has the potential to greatly improve e-commerce operations (Kop, 2022).

In customer behavior and market trends, Quantum computers can process extensive amounts of data and make more accurate predictions (Cusumano et al., 2020).

E-commerce greatly benefits from the application of quantum computing, particularly in the field of optimization. E-commerce companies frequently deal with difficult optimization problems, such as choosing the best course of action for pricing or figuring out the most effective way to distribute products. Quantum computers are particularly good at solving these kinds of problems because they can evaluate several options at once and identify the best one faster than a classical computer could. Another possible use for quantum computing is to increase the security of online transactions. Using the concepts of quantum physics, quantum cryptography is a novel form of communication security that generates unbreakable codes.

This might lessen the risk of cyberattacks on important consumer data, including credit card numbers and personal information (Cusumano et al., 2020).

Furthermore, quantum computing has the potential to completely change the e-commerce sector by providing quicker, more precise and safer answers to a wide range of commercial issues. To keep ahead of the competition, e-commerce companies should think about investing in quantum computing research and development as the technology advances and becomes more widely available.

With quantum technology, the e-commerce industry has a significant opportunity to improve security, productivity and customer experience. Despite their potential benefits, creating and running quantum computers is still a major technological task. Before quantum computers can be applied in real-world situations, a number of challenges need to be addressed, including the need for error correction and the challenge of scaling up quantum systems. However, the potential of quantum computing has spurred significant investment in research and development from the public and corporate sectors, making it an exciting and quickly developing field of study (Alijafari & Hajebrahimi, 2023).

5.6.1 Quantum Computing in Marketing

Quantum in Social Commerce: Quantum computing has the potential to revolutionize different business sectors, one of which is social commerce—the act of utilizing social media sites for online shopping (Mehta & Panda, 2022).

There are several potential applications of quantum computing in social commerce that can be explored: Social commerce offers a significant advantage in providing tailored recommendations to its audience, considering their past purchases and surfing.

Quantum computing may be used to evaluate massive amounts of data from social media and other sources to generate ever more specific and personalized user recommendations. Fraudulent transactions are a major risk in social commerce, and detecting and thwarting them can sometimes be difficult and unreliable. Quantum computing opens the door to more accurate and quick fraud pattern recognition as well as real-time transaction data analysis. Quantum computing can be used to optimize the complex supply chains involved in social commerce. Organizations can reduce expenses and boost productivity by utilizing quantum algorithms to analyze data related to inventory levels, shipment delays and other factors. Quantum computing may improve customer service in social commerce in terms of both quality and speed. Quantum computing could be used to analyze large amounts of pricing data to help businesses optimize their prices in real time. Businesses could adjust their prices to maximize profits and stay competitive by analyzing customer behavior, competition and other

factors. For example, a chatbot powered by quantum technology could provide customized suggestions based on a customer's past purchases and respond to customer inquiries promptly and accurately. Although quantum computing has a lot to offer social commerce, there are still a lot of challenges to overcome, like the high cost and complicated nature of building and maintaining quantum computing systems. But as quantum computing advances and becomes more widely available, more companies will probably start looking into how to use it for social commerce and other purposes (Alijafari & Hajebrahimi, 2023).

5.7 Customer Data Platform

A customer data platform (CDP) is used by Marketers to gather data from all sources and create a unique, comprehensive profile for each customer. This enables them to maintain a seamless and unified customer database that can be shared with other marketing technology systems (Martech, 2024).

Customer data is highly vulnerable to cyberattacks and breaches. Thus, a CDP must understand the critical challenges associated with data management, such as the marketing consent of consumers and the protection of sensitive customer information. Suppose the customer has opted out of permission to use their data, in that case, it is necessary to add them to a direct mail suppression list under CDP. And ensure that it does not receive unwanted marketing content through other channels. Thus, customer data privacy and compliance with data privacy laws are crucial to adopting CDP solutions.

CDPs have multiple benefits for businesses (Hubspot, 2021):

- CDPs collect data on anonymous visitors, analyze lifetime customer behavior and customer journeys, track both online and offline customer data and are designed to manage several data points from various sources.
- CDPs can help businesses avoid data silos, i.e., data accessible to a single department but segregated from other organizational units.
- CDPs unify customer data and employees and ensure the data is accurate and accessible.
- CDPs help organizations know their customers better.
- With the use of CDPs, businesses may precisely and successfully manage their client connections and target their marketing.
- Through the provision of aggregated, reliable data, CDPs streamline cross-channel marketing initiatives.

5.8 Virtual Reality

Through the use of electrical gear-like gloves or special eyewear with sensors, people may interact inside a simulated three-dimensional environment through a computer-generated simulation known as virtual reality (VR).

Customers' involvement with a product might rise when they are immersed in a virtual reality experience that offers them a different environment. Virtual reality (VR) has the promise of presenting fresh and inventive approaches to narrating a campaign and generating fresh ideas for a shopping journey.

Virtual reality has some benefits, including personalizing ad experiences, improving social shopping experiences, experiencing new things virtually, continued adoption of both virtual and in-person experiences, empowering pre-decision-making processes and providing novel approaches to branding and acquisition (*Forbes*, 2021).

Toms, a shoe brand known for charitable work, has effectively leveraged virtual reality technology. For every pair of shoes sold, the company donates another pair to those in need. Toms developed a VR experience to create an emotional connection with their customers that simulate a giving trip to Peru, where customers can gift a pair of shoes to someone in need. This marketing campaign has proven highly effective in driving sales and promoting their cause (Kotler et al., 2021).

The consumer marketplace has undergone a significant transformation with the advent of digitalization in the last two decades. Furthermore, the outbreak of COVID-19 at the end of 2019 has led to a surge in digitalization. As a result of the COVID-19 pandemic, stores were closed, and public events were canceled, leading to the increased popularity of digital marketing. Companies are now exploring various channels to reach consumers digitally, and some are allocating their entire marketing budgets to digital marketing (McKinsey, 2021).

Marketing for interior designers is especially difficult since, in order to present their design concepts to clients, designers must connect directly with them and learn about their preferences. On the other hand, clients seeking interior design services typically favor putting design concepts into practice. For this reason, the majority of conventional interior design companies depend on physical storefronts to draw in and keep clients. Artificial intelligence (AI) and virtual reality (VR) technologies have made it possible for online platforms to present design thoughts and ideas to clients in an engaging and interactive way in the digital age. Designers can present their concepts to clients with the aid of an interior design platform that has interactive virtual reality (IVR) capabilities. Furthermore, clients may easily manipulate design elements like color, placement and embellishment

and instantly see how their changes translate onto the digital platform. Virtual reality (VR) technology enables the online visualization of digital content and offers an immersive and interactive digital experience in real-world settings. In order to affect the digital marketing strategy, it builds a virtual world. Interior design companies can promote their new digital marketing strategy and cultivate a positive consumer image by utilizing virtual interior design elements on the web platform. Therefore, it is crucial to investigate how the digital platform might improve the industry's current digital marketing methods.

The majority of research on digital marketing examines how companies may improve their capacity for digital marketing in order to draw in customers. Still, not much study has been done from the perspective of the consumer. Tang et al. looked at the impact of digital information systems on customer satisfaction by using an Internet of Things (IoT)-based information system in Logistics 4.0. Some companies think that B2C companies are the only ones that should use digital marketing. However, B2B businesses may also profit from digital marketing, as demonstrated by the success stories of digital marketing from organizations like Cisco and IBM. Digital marketing content is essential for assisting consumers in making decisions.

We carried out a useful poll on the interior design sector to learn about the viewpoints of consumers and ascertain what elements of a business's IVR digital marketing efforts are most significant to them. Our research shows that three key factors—the quality, usability and aesthetics of digital marketing—have an impact on customer behavior when it comes to buying and using products in digital marketing. For customers, quality is the most crucial of these elements. This paper advances the research on customer satisfaction and the ways in which IVR may influence how consumers behave toward interior design firms.

As far as we are aware, not much study has been done on the use of IVR and digital marketing to gauge consumer satisfaction and behavioral intention in the interior design sector. The theory of planned behavior (TPB) and the acceptance model (TAM), two common behavior/intention models of technology, are also intended to be expanded by this study by accounting for the influence of COVID-19 on shifts in consumers' perceptions and behavior in interior design. Digital marketing can effectively illustrate how technology shapes consumers' attitudes toward IVR in interior design. Specifically, we use technology that influences consumers' perceptions of its ease of use in a positive way. In the end, this influence will show up in positive post-COVID-19 attitudes toward users' propensity to use technology and perceived benefits of technology. In comparison to TAM and TPB, the updated model is generally the "optimal" model for determining customer behavior. This paper contends that a theoretical framework for IVR in

interior design may be created by utilizing the TPB and TAM theories. This combination is helpful for using the structural equation modeling (SEM) method of analysis and expanding the body of knowledge in this area.

This study helps academics understand the substantial shifts in consumers' views about technology in the post-COVID-19 environment, which is important for both the interior design community and technology researchers. In order to take advantage of these developments, it also makes recommendations for future research topics and interior design business strategies (Tang et al., 2023).

5.9 Augmented Reality

AR is an interface that allows digital marketing technologies to add interactive content to the physical environment (Chylinski et al., 2020).

The primary objective of AR is to highlight specific physical world features, enhance comprehension and produce smart, practical insights that can be applied in real-world scenarios. This data can be used to aid businesses in decision-making and gain an understanding of consumer spending habits (Hayes et al., 2024).

AR technology has the potential to help companies better engage with their customers. Through AR integration into social media, we have seen the emergence of numerous authentic campaigns that combine enjoyable filters, virtual experiences and a fascinating fusion of everyday items into a new world.

Real-world things can have digital elements superimposed on top of them to create an immersive digital experience known as augmented reality. A furniture brand, IKEA, has integrated augmented reality into its app to allow customers to visualize furniture in their space before purchasing. This technology has had a positive effect on customer experience (McKinsey, 2017).

Mixed reality (MR) made it possible to blend real and virtual environments technology, creating a new form of reality where things are digital and physical and interact.

MR can eliminate the need for expansive venues and provide a better brand experience. Graphical processing, computer vision, display technologies, input systems and cloud computing have all contributed to the development of MR. It offers instinctual interactions with data in the living spaces. For example, the AR filters people use on Instagram are mixed reality experiences.

MR technology provides a complete immersion experience that allows users to seamlessly place digital objects in the physical world through holograms and interact with them as if they were physically present. In addition, users can create

avatars and stream information through the cloud to embed themselves in the virtual world from the physical world, enabling them to engage with MR-enabled spaces in a truly immersive way (Microsoft, 2022).

MR enables companies to interestingly and funnily include extra content and narratives into their products. Customers will then be able to see themselves using and observing the items as a result. Thus, customers can consume the product before buying it (Kotler et al., 2021).

Virtual and augmented reality coexist on a continuum with mixed reality. At one extreme of the spectrum are the actual physical settings in which people live and work with tangible objects. The digital world, which was created through computer programs and software, is at the other end of the spectrum.

Near the digital end of the spectrum, where most content people engage with is virtual but they are still physically present in the real world, is where VR is most prevalent. Conversely, augmented reality (AR) is more closely aligned with the physical reality side of the spectrum, where much of the stuff humans interact with and view is genuine but slightly enhanced by digital means. Compared to both of these complimentary technologies, mixed reality is more in line with the middle of the pack (Microsoft, 2022).

5.10 5G Technology

The most recent advancement in the field of cellular technology, known as fifth-generation wireless (5G), boosts the responsiveness and speed of wireless networks. Data sent via wireless links can move quickly via 5G (Techtarget, 2021).

The introduction of fast 5G technology will increase efficiency and improve business and marketing in many aspects (Martech Alliance, 2021):

1. Digital ads can be seen on more screens and surfaces, appearing in more areas due to the faster internet speed. Providing customers with a smooth and uniform experience can be immensely advantageous.
2. With 5G, mobile devices will generate incredible data due to the constant connectivity. This data can provide insights into the customer base and benefit customers from more personalized experiences.
3. More VR and AR will be introduced into daily life with faster internet speed. Thus, not only ads but also marketing content can become more attractive.
4. 5G enables deeper connections between devices. Therefore, IoT devices will improve significantly on a 5G network, and more data will be collected due to more connections.

5. 5G provides more connectivity and allows people to use more smartphones and other devices for internet content. 5G improves the online content, such as higher-quality images, animations and video, to create better experiences.
6. With 5G, mobile commerce will also increase. This includes leveraging gamification in marketing, promoting in-app purchases or fostering real-time consumer interactions with suggestions, sponsored dialogues and user-generated content.

5.11 Voice and Visual Search

The future of digital marketing lies in voice search technology, which is rapidly gaining popularity among consumers. It is important for businesses to take this trend seriously and adapt their marketing strategies accordingly. Users prefer voice search to typing. Voice search is voice recognition technology that Users can now easily perform searches by speaking into their device, such as a computer, smartphone or smart home assistant (Smart Insights, 2020).

Machines now enable people to interact with devices verbally with the help of Siri, Google, Alexa and other smart devices.

Additionally, Visual search is an AI technology that allows users to search the Internet using images instead of keywords. The process of a visual search begins with a picture, which is analyzed by deep neural networks that take into account various factors such as color, size and shape to determine what it represents. The user is then presented with the exact object or place they are searching for or something similar to it. For example, Google Lens enables visual search and can recognize the images. Google Lens works in real time and recognizes over a billion products.

Visual search has some practical applications in marketing (Hubspot, 2021):

1. Visual search enables customers to find exactly what they want faster than text-based searches.
2. Visual search technology can identify and label clothing items worn by an influencer in a photo. Then, users can search each piece of the outfit to get the whole look. Thus, customers are prompted to buy more from a retailer.
3. Marketers can use visual search to direct users to products through elegant images. This gives the content marketers generate to be more influential.
4. Visual search helps marketers work more efficiently on their SEO optimization. It utilizes deep tagging; a feature automatically tags images with relevant text to improve search engine interpretability. Deep tagging is a process that

can generate a diverse range of tags for an image, thereby enhancing its content description.
5. Visual search can give customers what they did not know they wanted. This is possible by analyzing what customers are searching for and using AI to offer the most similar products.

5.12 Social Media and Messaging Apps

For businesses, social networks and Social media are valuable tools to market services and products. By using these platforms, companies can connect with potential and existing customers and promote their demands. Moreover, it allows marketers to personalize their messages based on user data.

Social media allows companies to access people's data and target ideal customers by showing ads to the right people. In addition, companies can leverage the historical data on social media to use for future campaigns and build audiences. Finally, companies can directly track the return on investment from their marketing campaigns with the help of social media. This can help advertisers cut undesirable campaigns and scale well-performing campaigns by tracking how their ad spend is performing (*Forbes*, 2021).

Undoubtedly, people are more active on instant messaging apps. Thus, brands should start connecting with people on these platforms. The use of messaging apps has gained widespread acceptance as a means of communication for companies to communicate with a large audience by sending short and personalized messages.

Messaging apps are online communication channels that facilitate free, instant messaging between people. Some famous examples include Facebook Messenger, WhatsApp and WeChat.

Messaging apps have several advantages for companies, including sending personalized messages to customers, creating direct relationships between buyers and sellers, better engaging customers by tracking their data and facilitating the customer service experience (*Forbes*, 2022).

5.13 Automation

Automation uses technology to perform tasks without a lot of intervention of a human, improving efficiency and speed. This makes digital marketing easier and more efficient. Automation has several use cases for marketing, including (*Forbes*, 2020):

1. Companies can enhance their productivity by automating their workflows, generating valuable insights and accessing previously unavailable data to increase their decision-making capabilities (PwC, 2022).
2. Automation can transmit information in real time, which helps departments communicate and collaborate effectively.
3. Automation helps companies to have multiple interactions with customers along the sales funnel based on their behavior.
4. Automation allows companies to segment and target customers' data through different channels automatically. This enables a personalized customer experience, encouraging customer retention and increased conversions.
5. Automation helps measure campaigns by using analytics and ensures reports and data are current.
6. Automation reduces costs for the business by eliminating the need for several resources, such as multiple kinds of software, and it can streamline processes using fewer resources.

5.14 Blockchain

Information is electronically stored in a shared, distributed database among nodes in a computer network. And this is what is known as a blockchain. A blockchain collects information in groups called blocks. When a block reaches its storage capacity and then is closed, through a blockchain structure each block connects to the previous block. Blockchain has several benefits, which include (Hayes et al. 2023):

1. A network of computers verifies transactions on the blockchain network. This eliminates most of the need for human intervention during the verification process, leading to fewer mistakes made by humans and ensuring that the information is precise.
2. Blockchain does not need a third party and, therefore, does not bear its cost.
3. Blockchain stores information across a network of computers rather than a central location. Thus, tampering with blockchain becomes more difficult.

4. It works around the clock. Thus, transactions are completed in ten minutes and, after a few hours, can be secured. This is exceptionally functional for business in the field of international, which usually takes a long time because of the problem of time zones and the need for confirming payment processing by all parties.
5. Everyone can see the list of blockchain transaction history that works as a public database.

Blockchain has some implications for marketers and advertisers as described below (*Forbes*, 2021; Kotler et al., 2021; Kumar et al., 2021):

1. Blockchain allows marketers to use micropayments to motivate consumers to share their personal information without needing an intermediary.
2. Blockchain enables fraud verification by taking advantage of micropayments, which destroy the concept of mass phishing spam. Blockchain can also prevent bots from opening social media accounts that are fake, sending misleading messages to users, and burglary dollars from big brands in online advertising.
3. Blockchain allows companies to improve quality control and copyright protection over content. Content creators will automatically receive payments for content usage.
4. People have more control over how much time they spend interacting with advertisers and how they share personal information. Companies can have better control over inbound traffic quality, leading to improved customer behavior understanding.
5. Blockchain is peer-to-peer and can eliminate the go-between. This can lower the cost of advertising and enable businesses to save money.
6. Blockchain rewards customers for providing essential information companies need to provide better advertising.
7. Blockchain can transform influencer marketing campaigns. Marketers can see whether the influencer's followers are actual people or bots. Thus, blockchain will reduce the number of influencers and keep only the authentic influencers.
8. Blockchain can be applied for customer data management. It can integrate various data and simultaneously reduce any transactional friction.

5.15 Internet of Things

The concept of IoT relates to the communication between machines and devices that are interconnected. Network connections include Wi-Fi, Bluetooth and near-field communication (NFC) (Kenton et al., 2022; Kumar et al., 2021). For instance, a smart bottle utilizing NFC technology was created by Malibu Rum, which allows customers to interact with the brand either in-store or at their homes. By tapping the bottle with their phone or scanning the QR code, customers can access the Malibu summer promotional materials, which provide them with recipes and the opportunity to win prizes.

Some instances of linked devices include mobile phones, wearable technology, household appliances, automobiles, intelligent power meters and monitoring cameras (Kotler et al., 2021).

The category of IoT includes wearables such as Apple Watches. These devices are equipped with microchips, sensors and wireless communications, allowing them to collect data, track activities and personalize experiences to meet the specific needs and wants of users (Fricker & Deshayes, 2018). Each wearable can provide new data to marketers and companies.

IoT offers several benefits to organizations. It decreases waste and improves service delivery. This makes manufacturing and delivering goods less expensive. In addition, IoT enables businesses to automate processes and reduce labor costs, monitor their overall business processes, enhance employee productivity, integrate and adapt business models and generate more revenue (Techtarget, 2022).

IoT has some applications for marketing, including (*Forbes*, 2023; Kenton et al., 2022):

- Internet of Things (IoT) device proliferation provides marketers with more customer data and insights than ever before. Consequently, they can leverage this data to create more effective products and services that cater to the specific needs of their customers. IoT allows marketers to market their products and services more successfully because Marketing messages can be tailored to each customer's data, enabling personalization.
- IoT enables marketers to create different experiences bridging the digital and physical worlds. For example, IoT is utilized by Home Depot to link the shopping carts and wish lists of customers who shop online with mobile apps available in-store.
- IoT transforms the way of pricing and offering products. In other words, marketers will sell products embedded with sensors based on variable usage or features.

- IoT can integrate platforms. Marketers can craft customized customer experiences by utilizing the seamless integration across various platforms and devices and learn more about their behaviors and preferences. This can, in turn, lead to deeper and more authentic engagement.
- IoT helps companies' market to consumers more effectively. Retailers can recommend tailored products and increase their sales by tracking a consumer's behavior inside the store. After purchasing the product, customers can be informed of the upcoming service schedules of that product.
- IoT enables marketers to gather, organize and analyze client data, providing insights into their buying journey. This helps marketers provide the appropriate information and nurture prospects toward making a purchase.

5.16 Geo-fencing

An app or software program can use various technologies such as RFID, GPS, Wi-Fi and cellular data through a location-based service known as geo-fencing, such as email, advertisement in social media or text. When a phone or an RFID tag goes across a virtual geographic boundary, an application notification should be sent.

An excellent example of a business that uses geo-fencing technology is Uber. Geo-fencing is utilized by this organization to enclose areas such as nightclubs, hotels and airports. After disembarking from a flight, Uber sends a notification to users, informing them of the availability of nearby Uber drivers who can transport them to their desired location.

Geo-fencing provides advantages to companies (*Forbes*, 2019; Tong et al., 2020):

- Geo-fencing can limit marketing spend and waste by enabling businesses to target customers who are marketing for products and focus on individuals who have a high level of interest in their products.
- Geo-fencing enables marketers to achieve people at the right place and on time and engage them with relevant and timely messaging.
- With geo-fencing, marketers spend money on prospects most likely to take action.
- Geo-fencing can improve data collection. Collecting data enables marketers to enhance the user experience, boost engagement and gain deeper insights into user behavior. The data can be used to target people with customized messaging.

- Marketers can personalize the customer experience by making use of geo-fencing. By targeting a specific area, marketers can analyze the demographics of the local population and tailor their promotions accordingly.
- Geo-fencing provides real-time data and analytics on the day the campaign is performed. This allows marketers to improve the ads based on their performance.
- Geo-fencing increases brand awareness because as people receive location-based ads, they recognize and trust the brand. This trust results in conversion rates.

5.17 Progressive Web Apps

Websites that are created to function like mobile applications are known as Progressive Web Apps (PWAs); they provide the features of a native mobile app while not being limited to a single platform. PWAs also use sophisticated application programming interfaces (APIs) and can work across multiple platforms. They can even work offline.

Trivago is an online travel platform that uses Progressive Web App (PWA) technology to provide its customers with a smooth and hassle-free experience. The interface of Trivago's PWA is user-friendly and allows travelers to effortlessly compare prices of various hotels, read reviews and book their preferred hotel with ease.

PWAs offer several advantages that businesses can leverage (*Forbes*, 2019; Smart Insights, 2019):

- PWAs can function offline and reduce page loading time, while native mobile apps cannot work in areas of poor network coverage.
- Users can easily navigate from their social media profiles to various e-commerce pages through PWAs.
- PWAs enable personalized information to be sent with just one click, reducing the communication gap between marketers and customers and fostering loyalty and trust.
- PWAs enable marketers to engage customers by sending interactive push notifications that promote their brand. PWAs are also able to keep the customers engaged by using features of devices like GPS, face detection and the camera.
- PWAs have a much lower development cost than native apps, making them a cost-effective solution that can effectively solve the problem of ROI.

- PWAs consume very little data compared to native apps and deliver a faster browsing experience. This can increase brand awareness and improve sales.
- PWAs don't require installation and can be installed easily by clicking on the "Add to home screen" button. This feature can boost the website's conversion rate and sales.

5.18 Self-Service Technologies

These technologies allow customers to get a service without interacting with service providers via an interface (Meuter et al., 2000). This can increase the convenience of the interaction and give the customers a greater sense of control over their experience (Marketing91, 2021). McDonald's has adopted self-service technology, enabling customers to order food using kiosks.

Self-service technologies have some advantages for businesses, including (Bitner et al., 2002):

- Self-service technologies free businesses from hiring more staff to offer services to customers.
- Self-service technologies can enable retailers to upsell products without needing human cashiers. Instead of employees, kiosks can suggest pricey add-ons and specials easily.
- Self-service machines can easily collect data on customers' purchasing behaviors. This can help marketers know their customers' needs and serve them better.
- Self-service technologies improve the quality of services that companies provide for their customers.

5.19 Neural Analytics Tools

Neuroscience was created by Gerald Zaltman to help marketers understand the physiological impact of advertising. Neuroscience helps marketers understand the effects of advertising on potential consumers (Vences et al., 2020).

Neuromarketing involves the utilization of neuroscience and cognitive science to evaluate specific advertising, marketing, packaging, content, etc., to accurately understand the reaction of customers at the unconscious level. It can apply research knowledge to improve marketing without testing specific materials.

Therefore, neural analytics tools can help marketers analyze people's brain activity and nervous system to determine which content they find engaging. These tools include EEG (electroencephalogram) imaging, fMRI (functional magnetic resonance imaging), facial coding, implicit association testing, eye tracking and pupillometry. Other standard tools do not directly measure brain or neural activity and only measure biometric data, such as heart rate and galvanic skin response (Harrell, 2019).

Neural analytics tools can help marketers use the data collected from these tools for adequate packaging; gain insights into human behaviors and use them to make their advertising more effective; identify the emotional response a person has to a product, advertisement, etc.; test different design features of a product and then launch a final product which is more likely to result in buying; design website layouts effectively; and choose memorable headlines which people more probably notice.

For example, Hyundai used EEG technology to analyze consumers' emotional responses to various aspects of cars, leading to the discovery that certain features were more attractive than others. This resulted in the modification of their vehicle designs to reflect these findings.

5.20 Sensory-Enabling Technologies

Sensory-enabling technologies can inform consumers about a product's texture, smell and taste, which are typically not available in most online environments (Petit et al., 2019).

In the future, marketers can improve their performance by utilizing these technologies to enhance the online experience, making it more engaging, immersive, informative and enjoyable for users through multisensory means. In the online marketplace, companies can set themselves apart from their competitors by utilizing this approach (Gallace et al., 2012; Petit et al., 2019; Rose et al., 2012).

Here is a summary of different sensory-enabling technologies for various senses (Petit et al., 2019):

1. The visual experience can be improved by incorporating different components such as font, icons, images, videos, 3D interactive view, virtual try-ons and augmented reality.

2. Auditory: Headphones, speakers and multisensory experiences with sound inputs like food simulators and straw-like user interfaces can enhance auditory experiences.
3. Tactile: Interfaces such as mouse, touchscreen, vibrotactile interfaces, body-grounded tactile actuators and mid-air haptics can be employed to enhance the tactile experience.
4. Olfactory: Multisensory experiences with smell inputs, such as Season Traveler and MetaCookie+, can be used to enhance olfactory experiences.

Advanced technologies that enhance visual perception encompass a wider range of options such as zooming in and out, enlarging, offering alternative views from different angles, providing 3D interactive views from all sides as consumers drag their mouse and enabling virtual try-ons for various products. These cutting-edge technologies provide customers with the ability to examine products more closely by zooming in, rotating them and viewing them from different angles. This revolutionizes the way consumers interact with online content.

By mimicking the sense of touch, haptic-based technologies allow users to interact with a variety of interfaces, such as touch displays and mice. The loss of tactile feedback is compensated for by these interfaces. Body-grounded tactile actuators (which include tapping, squeezing and twisting), vibrotactile interfaces and mid-air haptics are some of the various gadget types that have been developed to improve haptic interactions through the Internet (Ablart et al., 2017; Brengman et al., 2018; Chung et al., 2018; Kim et al., 2013). Additionally, researchers have created digital tools such as Shoogleit (Cano et al., 2017), which lets users visually pinch and scrunch a portion of the fabric on a tablet to assess apparel. Increased user engagement can be facilitated by this type of interaction.

Customers can interact with several senses through the Internet thanks to multimodal technologies. For instance, users of the AR gadget MetaCookie+ can change the flavor of food (such as a basic cookie) by adjusting its look and adding other scents (like strawberry and chocolate) to it (Narumi et al., 2011). In a similar vein, Ranasinghe et al. (2017) created a way for people to digitally share their online drinking experiences. They developed a gadget that measures the pH and color of lemonade and sends the information to a special tumbler that is filled with water somewhere else. The tumbler uses LEDs to modify the color of the water and stimulates the user's tongue electrically when they touch the glass with their tongue.

5.21 ChatGPT

The public's use of AI tools is primarily restricted to voice assistants and Smart Home technologies like Siri and Amazon Alexa. Through academic research, the impact of AI on stakeholders and consumers has been widely examined. In the marketing business, ChatGPT's recent launch has attracted a lot of interest and enthusiasm from both practitioners and academics. Marketing is the process of developing, delivering, trading and offering goods and services that are beneficial to the public, business associates, partners and consumers via a variety of platforms and channels, according to the American Marketing Association. Key marketing initiatives consist of strategic planning, identifying the target market, creating a competitive edge, doing marketing research and analysis and upholding client relations. Disruptive technologies like blockchain, IoT, big data and AI have altered both how people live their lives and how businesses run. AI has the highest potential to change the marketing of all these disruptive technologies (Rivas & Zhao, 2023).

The marketing industry will be significantly impacted by ChatGPT's recent development. ChatGPT makes it possible to produce marketing material—such as product descriptions and promotional messages—more effectively and at a higher standard than with human content writers. Because of ChatGPT's capacity to condense and analyze massive amounts of data, social media conversations and customer reviews can be gathered. Accordingly, marketing research becomes more effective to comprehend the language, attitudes and views of consumers regarding goods and advertising campaigns. With little human work, personalized emails and recommendations may be created and adapted to each individual customer, effectively treating them as individuals with their own needs and desires met. Traditional chatbots' impersonal tones and generic responses can be overcome by training automated customer care chatbots to offer round-the-clock assistance with a human touch. ChatGPT can be used by call center customer support representatives to comprehend client inquiries. Find pertinent facts, offer potential answers and act fast. This lowers the cost of human intervention while boosting problem-solving accuracy and efficiency. The new product development team might leverage the data that ChatGPT can collect about user behavior trends to create new product innovations based on real-time data that is gathered from various sources. These are but a few instances of the marketing applications for ChatGPT. The introduction and appropriate application of ChatGPT is expected to bring about major advancements in the marketing area in the next years.

To make sure that ethical considerations are satisfied, it is essential to be aware of the potential hazards and limitations of ChatGPT and to carefully analyze the

data and algorithms employed. Additionally, it is crucial to confirm the outcomes of ChatGPT-generated insights using additional data sources and to be open and honest about the limitations and uncertainties of the results (Rivas & Zhao, 2023).

ChatGPT is an AI-powered tool that has recently been launched and has gained widespread popularity globally. Its impact on business practices is significant and cannot be ignored.

There is a growing call to understand better how it will shape business research and practices (Dwivedi et al., 2023a).

ChatGPT (Generative Pre-trained Transformer) is an extensive language model created by OpenAI. Modern language models like ChatGPT employ deep learning to develop human-like responses to natural language inputs. Based on the GPT language model technology, ChatGPT is a public tool designed by OpenAI (Kirmani, 2022). It is a sophisticated chatbot that can handle various text-based demands, including answering basic queries, carrying out more complicated tasks such as writing stories or letters and assisting people in difficult productivity-related discussions (Liu et al., 2021). ChatGPT accomplishes user requests through its extensive data stores and effective architecture to comprehend and interpret them, producing suitable responses in almost human-like language.

ChatGPT is an equally important and valuable tool to marketing researchers and practitioners, providing many opportunities to both groups. It helps researchers curate, synthesize and accumulate information to generate ideas and build on theories. Researchers can focus on the most creative and analytical elements of their work by using ChatGPT to assist them in saving time and effort on tasks such as literature reviews, text generation, data analysis, summarizing and answering queries (Lund & Wang, 2023).

Future Prospects of ChatGPT on Marketing Research and Practices

Since its November 2022 launch, ChatGPT has gained popularity due to its ability to perform various functions such as conducting research, content production, idea generation, coding, debugging, sales process automation, translation and customer support. ChatGPT can present some challenges when applied to marketing research. However, the potential benefits it offers in different aspects of marketing, such as consumer behavior, advertising, branding and sales, are substantial. This section briefly discusses the future scope of the applicability of ChatGPT in different areas of the marketing discipline (Jain et al., 2023).

Risks of ChatGPT in Marketing

Figure 5.1 shows how ChatGPT, one of the AI marketing technologies, might present a number of dangers to customers, marketers and other stakeholders. Using AI marketing solutions like ChatGPT exposes marketers to a variety of possible hazards. Inaccurate information may be provided if data is extracted from dubious sources. The results will be erroneous if there is erroneous data present in the entire set. Second, ChatGPT needs to be updated frequently because it produces responses based on current data. Outdated data would be of limited use to proactive and forward-thinking marketers. Thirdly, ChatGPT responses to identical prompts from many marketers could be homogeneous or similar, which could damage the marketer's or the brand's reputation. The issue for marketers, a profession that prizes creativity and innovation, is to continue to be innovative in their strategic marketing decision-making in an AI-driven world. Fourthly, as AI marketing tools like ChatGPT become more complex, businesses risk becoming overly dependent on them, making them susceptible in the event that the tools malfunction or the data used to train them become more accurate. Fifth, because ChatGPT and other AI marketing tools automate certain marketing jobs that were formerly performed by people, they may cause employment losses. For instance, if ChatGPT can produce writing more rapidly and effectively, copy editors and creative writers would switch from writing more to editing more. Data would be automatically and swiftly gathered, processed and analyzed by data analysts and marketing experts. AI-powered solutions can take the place of human customer service personnel by offering round-the-clock support. Sixth, it is uncommon for AI systems to be totally objective.

For instance, if ChatGPT can produce writing more rapidly and effectively, copy editors and creative writers would switch from writing more to editing more. Data would be automatically and swiftly gathered, processed and analyzed by data analysts and marketing experts. AI-powered solutions can take the place of

Fig. 5.1 Responsible integration of ChatGPT in marketing practices requires a strategic approach toward risk mitigation, which should be based on informed understanding (Rivas & Zhao, 2023)

human customer service personnel by offering round-the-clock support. Sixth, it is uncommon for AI systems to be totally objective (Rivas & Zhao, 2023).

5.22 Summary

Artificial intelligence (AI) is the machine imitating human intelligence, particularly in computer systems. The utilization of computers and machines enables artificial intelligence to replicate the human mind's ability to solve problems and make decisions.

A chatbot is an AI-based computer software intended to simulate discourse with human users, especially over the Internet.

Predictive analytics is an innovation that makes assumptions regarding certain unknowns in the future.

The process of collecting, evaluating and applying vast volumes of digital data to enhance corporate processes is known as big data.

Data is stored using quantum computing, which uses quantum physics features, performs computations and increases available computing power to help solve problems that cannot be tackled with existing computers.

A platform for consumer data is a system administered by marketers that is intended to gather client information from any source to build unique, unified profiles of each customer.

Interacting with a computer-generated three-dimensional environment using electronic gear-like gloves with sensors or special screen goggles is what virtual reality is all about.

Augmented reality, on the other hand, uses digital visual elements, sound or various sensory inputs provided by technology to enhance the representation of the physical world.

Real and virtual worlds are combined to create new landscapes and representations in a mixed reality where digital and physical things coexist and communicate in real time. MR can eliminate the need for expansive venues and provide a better brand experience.

The newest version of mobile technology, 5G, enhances the speed and responsiveness of wireless networks. This technology allows for high-speed transmission of data over wireless connections.

Voice search, powered by voice recognition, enables users to search for information by simply speaking into their device. Visual search, an artificial

intelligence-based technique, allows users to perform internet searches using pictures instead of words.

Social media and networks can be leveraged for marketing products and services. Businesses can utilize social media to engage with their existing client base, attract new customers and promote their brand and objectives. It also enables marketers to customize their messages based on user data. Messaging apps are online communication channels that facilitate free, instant messaging between people.

Automation replaces manual processes with digital ones, utilizing technology to create and deliver goods and services with little human involvement.

A distributed database shared by the computer network's nodes is called a blockchain, and stores information electronically. A blockchain collects information in groups called blocks. A data chain known as blocks form the blockchain, each with a set amount of storage space; when a block is filled, it is closed and connected to the one before it.

The Internet of Things alludes to the communication-capable machines and gadgets' interconnectedness.

Geo-fencing is a service that, based on location, allows software and applications to target marketing campaigns based on cellular data, Wi-Fi, GPS or radio frequency identification (RFID), such as social media advertisement, email and app notification, when RFID tag or a mobile device arrives or departs a digital geographic divide.

Progressive web applications are websites that work similarly to mobile apps. They can work across multiple platforms and even work offline.

Self-service technologies allow customers to get a service without interacting with providers via an interface.

Neuromarketing refers to the use of neuroscience and cognitive science in evaluating particular functions and tasks of marketing such as advertising, relationship marketing, packaging, content marketing, etc., to better understand the reactions of customers at the unconscious level accurately.

Marketers can use neural analytics tools to examine people's nervous systems and brain activity to discover what material they find interesting.

Sensory-enabling technologies can help notify consumers about the sensory aspects of a product that are typically unavailable in online settings.

Questions

1. What is artificial intelligence, and how is it applied in marketing?
2. How does chatbots work?
3. What are the applications of predictive analytics in marketing?

4. How can big data revolutionize marketing?
5. What is a customer data platform, and what are its benefits for businesses?
6. How do mixed reality, augmented reality and virtual reality vary from one another?
7. In what ways might voice and visual search help marketers?
8. What are the advantages of social media and messaging apps for marketers?
9. What is automation, and what are some of its use cases in marketing?
10. How does blockchain help marketers, and how does it work?
11. Please explain the Internet of Things and its implications in marketing.
12. What is geo-fencing and its advantages for businesses?
13. What are the benefits of self-service technologies in marketing?
14. Please name some of the neural analytics tools and explain some of their implications for marketers.
15. What are the latest sensory-enabling technologies for different senses?

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