CROSS-CULTURAL MANAGEMENT JOURNAL

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The impacts of artificial intelligence on the future of marketing and customer behaviour

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Citation: Odeibat, A., S. (2024). The impacts of artificial intelligence on the future of marketing and customer behaviour. *Cross-Cultural Management Journal, XXVI* (1), 19-34.

Received: 15 February 2024
Revised: 25 May 2024
Published: 31 May 2024

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Abstract: Artificial Intelligence (AI) is quickly transforming the marketing landscape, providing unprecedented opportunities for businesses to optimize strategies and improve customer experiences. This literature review looks at the various applications of AI in marketing and their potential impact on consumer behavior. The study delves into key aspects of AI, from its intelligence to ethical concerns about its use. Furthermore, it investigates how AI is used in various aspects of marketing, such as planning and strategy, product management, pricing, location management, and promotion. Previous research findings highlight AI's transformative potential for increasing marketing efficiency, effectiveness, and customer engagement. However, the study emphasizes the importance of responsible implementation and raises ethical and societal concerns about AI adoption.

Keywords: Artificial Intelligence; automation; marketing; customer behavior; AI ethic;

JEL Classification: M15; M54; M31; M37;

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INTRODUCTION

Artificial Intelligence (AI) transcends mere technological innovation, serving as a potent catalyst for aiding and reshaping societies. It achieves this by enhancing consistency and reliability, reducing costs mitigating risks, and introducing novel solutions to complicated challenges (Taddeo & Floridi, 2018). The pervasiveness of AI applications and systems spans various sectors and industries (Campbell et al., 2020), offering a myriad of opportunities for marketing strategies and initiatives (Huang & Rust, 2021b), additionally enhancing customer experiences (e.g., Puntoni et al., 2021), engagement and relationships (e.g., Kumar et al., 2019; Libai et al., 2020).

In the midst of the digital age, also referred to as the information age, which began in the mid-20th century, we are witnessing a profound shift from traditional industries to an economy centered around information technology. This era is characterized by the predominance of digital information and the ubiquitous presence of computer-based activities. Within this transformative landscape, AI emerges as a game-changing factor in the marketing realm. This technological advancement is fundamentally altering how businesses establish connections with and comprehend their target audiences. Leveraging its capability to process and interpret vast volumes of data, AI is reshaping the landscape of customer interaction, envisioning a future where predictive and personalized marketing is not only a concept but a standard practice (Campbell et al., 2020). The incorporation of AI into marketing strategies holds the promise of transforming the customer journey, providing organizations with unprecedented capabilities to anticipate consumer preferences and deliver customized experiences (Kumar et al., 2019). Consequently, AI is establishing a new standard for customer behavior and satisfaction, compelling marketers to adjust and innovate to fully leverage the potential of this formidable digital technology (Hermann, 2022).

AI has garnered significant attention within the realms of management and marketing science, yet its role in other fields remains somewhat contradictory. Throughout its evolution, AI has experienced cycles of emergence and decline, contingent upon its scalability and perceived utility. This technology's potential and proficiency, particularly within marketing, have sparked considerable interest and extensive discourse since its initial widespread commercial adoption. The advent of AI, coupled with its ability to gain knowledge, has facilitated the development of advanced AI systems (Agrawal, Gans, & Goldfarb, 2017). These systems are capable of processing artificial data encompassing various forms such as text, images, vibrations, numerical outputs, and subsequently analyzing and formatting this data for future research and applications across diverse digital platforms (Dhar, 2016). Artificial data refers to data generated by a computer to mimic real-world scenarios, aiding in various fields like data science, artificial intelligence, and natural language processing (Wang et al., 2019).

Moreover, AI may very well influence marketing strategies and sales procedures, encompassing shifts in business models and customer service offerings, and potentially impacting customer behaviors. This potential is evident across various industries. For instance, the impending changes expected in the transportation sector. The advent of driverless cars integrated with AI technology is on the horizon, poised to revolutionize both business frameworks and consumer behaviors. Companies in the taxi and ride-sharing sectors must fit to avoid being relegated by these AI-driven transportation innovations. Consequently, there may be a decrease in the demand for automobile insurance among individual consumers, as well as breathalyser devices, while the need for security systems aimed at protecting vehicles from cyber threats is likely to rise (Hayes, 2021).

Autonomous vehicles could potentially influence the desirability of real estate due to two main factors. Firstly, these vehicles can travel at higher speeds, resulting in reduced commute times. Secondly, passengers in driverless cars can utilise their travel time more productively by working safely while in route to their destination. Consequently, remote suburban areas may gain increased appeal compared to their current standing.

Another example, AI will have an impact on sales processes across diverse industries. Presently, many sales professionals heavily rely on telephone calls or their equivalents as pivotal components of the sales procedure. However, in the future, sales personnel are likely to be supported by AI agents that observe these conversations in real-time. For instance, employing advanced voice analysis, an AI agent might discern from a customer's tone that an undisclosed problem persists, and subsequently offer immediate feedback to assist the human sales representative in adapting their approach. While AI has the potential to develop the capabilities of salespersons, it also raises fears about potential unintended consequences, particularly if customers feel discomfited about AI surveillance during conversations (Davenport et al., 2020).

In addition, AI has exerted a notable influence on marketing across several dimensions. It has been

instrumental in predictive modeling, customer personalization, and the innovation of new products (Shaik, 2023). Furthermore, AI has instigated shifts in marketing methodologies, including dynamic pricing approaches, growth hacking, and remarketing (Bezuidenhout et al., 2023).

Moreover, AI's impact extends to the marketing mix, where natural language processing and machine learning play pivotal roles in product development and content generation (Reis, 2022). The integration of AI has also enhanced analytics capabilities, facilitated the automation of marketing tasks, and enabled real-time performance assessment (Anoop, 2021). Additionally, the adoption of AI in marketing necessitates that marketing leaders possess technical insight and support consistent customer policies. In general, AI has transformed marketing by boosting effectiveness, modifying service characteristics, and shaping pricing tactics.

However, there is a possibility that if customers realize they are engaging with a bot, they might feel uneasy, leading to adverse outcomes (Doyle & Dean, 1996; Davenport et al., 2020). These instances underline why numerous scholars and industry professionals anticipate that AI will reshape marketing strategies and customer behaviors. Indeed, a survey conducted by Salesforce indicates that AI is poised to be the most widely adopted technology by marketers in the foreseeable future (Columbus, 2019).

Therefore, it is important to understand not only the ultimate promise of AI but also its developmental pathway and timelines. In addition to considering challenges associated with AI, such as data privacy, ethics, and algorithmic biases (Hermann, 2022). There is also a need to emphasize the potential of AI technologies and explore their business implementations (Anoop, 2021). Consequently, this research aims to investigate AI applications in marketing and their potential impact on marketing and customer behavior.

METHODOLOGY

This research endeavors to investigate the impact of AI application technologies on marketing strategies and customer behavior. To systematically identify pertinent scholarly works pertaining to AI in marketing, a comprehensive search of published papers was conducted.

Initially, a keyword search was performed across various electronic databases, including Scopus, Google Scholar, EBSCO Discovery Service (UDiscover), ProQuest, Elsevier, Web of Science, and ScienceDirect. Keywords such as "artificial intelligence," "AI," "machine learning," "algorithm," "robot," "marketing," "consumer," "customer," and "AI trust" were employed either individually or in combination. In addition to electronic databases, relevant books, reports, and online sources were also consulted.

The search encompassed abstracts, titles, keywords, and full-text fields to ensure a comprehensive literature review. Subsequently, reviews and seminal articles by notable authors such as Shaik (2023), Davenport et al. (2020), Hermann (2022), Huang & Rust (2021b), and Anoop (2021), were included, with a focus on English-language articles. Furthermore, an ancestry tree search was conducted by screening all articles citing these seminal papers. Moreover, a manual search of prominent journal outlets known for publishing articles on AI in marketing and business was carried out. Journals including but not limited to the Journal of Interactive Marketing, Frontiers in Psychology, Journal of Business Ethics, Journal of the Academy of Marketing Science, Journal of Marketing, Russian Law Journal, International Marketing Review, Journal of Intelligent Management Decision, Journal of Global Economics, International Journal of Recent Technology and Engineering, International Journal on Data Science and Technology, and Asian Journal of Management, Digital and Social Media Marketing were scrutinized. This broad search process, coupled with screening of abstracts and titles, yielded a substantial number of articles, from which only the most relevant ones were selected for further detailed analysis.

Through this systematic examination of the literature on AI in marketing, the focal areas of AI application in marketing were identified, and the most pertinent principles related to AI and customer behavior were mapped. These findings were synthesized to inform a conceptual analysis of the benefits and concerns associated with AI in marketing. It's worth noting that this article is not restricted by a specific timeframe, although the review of articles was limited by access constraints to the full text of the papers found.

ARTIFICIAL INTELLIGENCE BACKGROUND

Artificial intelligence is a computer science field focused on creating systems capable of intelligent behavior. It originated in the mid-20th century and has evolved significantly, incorporating subfields like machine learning (ML) and natural language processing. ML assists systems to improve tasks through experience, while natural language

processing allows computers to understand human language.

AI applications span various industries, enhancing efficiency and decision-making. As AI progresses, it holds the potential for further significant impacts on technology and society (Odeibat, 2021; Nilsson, 2009; Odeibat & Matkó, 2021). AI now exerts a significant and increasingly profound impact on industries (Syam & Sharma, 2018).

Leaders worldwide are consistently investing in AI to facilitate the exploration of new market opportunities, with promising returns demonstrated by AI pioneers (Meteab, Sadiq & Hadrawi, 2020; Huang & Rust (2018). According to Bughin et al. (2018), it is anticipated that an additional $13 trillion in AI-generated revenue will materialize by 2030, accompanied by an annual world GDP growth rate of approximately 1.2%.

Many experts believe that marketing stands to benefit immensely from the adoption of AI technologies (Murár, 2023; Verma et al., 2021), with numerous strategies now widely employed within the realm of machine learning (Canhoto & Clear, 2020). For instance, AI-powered chatbots deployed on websites, such as those offered by Drift, have revolutionized customer service interactions, providing immediate responses to inquiries and facilitating seamless user experiences. Additionally, experts assert that the adoption of AI technologies holds substantial promise for marketing. AI has the capacity to assist marketers in enhancing product development, gaining deeper insights into their audience's data patterns, and delivering more pertinent advertisements (Murár, 2023).

Furthermore, it can enhance website navigation, streamline repetitive tasks, and tailor advertisements to specific audiences. The combination of AI into marketing practices is predicted to surge in the forthcoming years, offering potential advantages such as increased sales, heightened productivity, cost savings, innovation, and attainment of organizational objectives (Krishna et al., 2023). The mixture of big data and AI analytics has the potential to transform marketing strategies and find applications across diverse sectors, including education, healthcare, government, e-commerce, and business (Rathod, 2023; Krishna et al., 2023).

By harnessing AI-powered marketing intelligence tools, companies can optimize marketing strategies, automate marketing endeavors, customize messaging, and gain real-time insights into consumer behavior and market trends. According to the CEO of Emerj Artificial Intelligence Research, marketing ranks among the thriving industries benefiting from AI adoption, owing to its vast data volume and its direct correlation with revenue growth (Anoop, 2021).

A recent survey conducted by the same organization among 50 brand managers from companies actively engaged with AI reveals numerous advantages of machine learning applications in marketing, ranging from search and consumer segmentation to targeting and recommendation engines, as well as business forecasting (Anoop, 2021).

It is imperative to recognize that advancements in technology and IT services across industries lead to heightened customer demand. Hence, study analysts should possess the ability to discuss computer teaching and other AI methods alongside their understanding of the marketing industry. This necessitates the involvement of communications leaders well-versed in technology, analytics, and corporate strategies. In a global survey, 79% of CEOs expressed their commitment to investing in skills or training to enhance ML productivity in marketing as part of ongoing revolution efforts (Canhoto & Clear, 2020; Anoop, 2021).

DEVELOPING A MULTIDISCIPLINARY FRAMEWORK FOR ANTICIPATING THE EVOLUTION OF ARTIFICIAL INTELLIGENCE

The following section will discuss expanding upon knowledge derived from marketing and broader business realms, as well as insights from social sciences like psychology and sociology, along with expertise from computer science and robotics. This framework aims to aid both individuals and enterprises in forecasting the probable trajectory of AI development. We examine four key dimensions of AI: levels of intelligence, task categories, integration within robotic systems, and ethical considerations surrounding AI utilization.

Level of intelligence

Davenport and Kirby (2016) distinguish between context awareness and task automation. Task automation refers to AI applications that operate based on standardized rules or protocols, necessitating consistency and logical imposition (Huang & Rust 2018). For instance, on the Symphony of the Seas cruise ship, robots like Rock 'em and Sock 'em prepare cocktails for patrons, while Pepper greets customers. Similarly, IBM’s Deep Blue utilized fixed rules and robust algorithms to defeat the top human chess player, showcasing its effectiveness in scenarios with well-defined rules and predictable outcomes, such as chess.

Despite these AI applications operating within structured environments, many organizations encounter difficulties in their implementation, often seeking assistance from specialized firms like Noodle and Infinia ML, or consulting entities such as Deloitte or Accenture to initiate AI initiatives.

On the other hand, efforts in computer science persist in advancing context awareness within AI, transitioning from mere task automation to a deeper understanding of context (e.g., Mnih et al., 2015; Ghahramani, 2015).

Context awareness represents a level of intelligence wherein machines and algorithms are tasked with "learning how to learn" and surpassing their initial human programming. These advanced AI systems can tackle intricate, personalized tasks by employing holistic thinking and tailored responses to specific contexts (Huang & Rust, 2018). Nonetheless, achieving such capabilities remains challenging; a survey conducted in 2016 among AI researchers suggested that there was only a 50% probability of attaining context awareness or its equivalent by the year 2050 (Müller & Bostrom, 2016).

The variances between context awareness and task automation align with the notions of narrow and general AI (Kaplan & Haenlein, 2019; Baum, Goertzel, & Goertzel, 2011; Reese, 2018). Also, Kaplan and Haenlein (2019) assert, that both general and narrow AI have the potential to match or surpass human capabilities, yet narrow AI is restricted to particular domains and lacks the capacity to adapt to unfamiliar ones, whereas general AI possesses the ability to expand into novel domains.

The psychological aspects of automation (Longoni, Bonezzi, & Morewedge, 2019) delve into how individuals might react to AI. Despite AI potentially offering greater accuracy and reliability than humans, consumers harbour concerns regarding its adoption, particularly as AI progresses toward context awareness. These escalating concerns adversely affect the inclination to adopt and utilize AI.

Limited research has been dedicated to investigating customer trust in AI. However, existing studies indicate that trust holds pivotal importance in the acceptance and adoption of AI-driven technologies like digital assistants and chatbots (Chen et al., 2022). Various factors, including perceived functional and social attributes of the AI system, conversational cues, and individual inclinations toward trusting technology, shape the development of trust.

Moreover, trust in AI systems significantly influences behavioral intentions such as loyalty and engagement (Liu, 2022). Users of AI systems tend to selectively embrace AI outputs following verification activities and factor in domain knowledge and context when assessing trust-related aspects and making decisions (Troshani et al., 2021). In general, trust plays a critical role in fostering successful relationships between AI systems and humans. It seems that customers have elevated expectations for AI, surpassing what is typically considered reasonable (Gray, 2017), as illustrated by the example of autonomous vehicles.

Ideally, customers should embrace AI if its implementation results in a notable reduction in accidents. However, instead of aiming for a significant decrease in accidents, customers often demand flawless performance, striving for zero accidents from AI. It is crucial to comprehend the underlying reasons for this heightened level of caution. Task characteristics play a significant role in AI adoption. Tasks that involve subjectivity, intuition, or emotions make customers less comfortable with AI, as they perceive it to lack the necessary emotional understanding (Castelo, 2019). Consequently, customers are hesitant to use AI for such tasks (Castelo, Bos, & Lehman, 2018).

Additionally, the perceived consequences of a task influence its suitability for AI implementation; tasks with higher stakes are seen as riskier to entrust to AI, reducing adoption intentions. Moreover, customer characteristics, such as task salience to identity, also affect AI adoption. When tasks are central to a customer's identity, they may resist AI adoption due to a desire to personally take credit for outcomes, perceiving AI use as undermining their contribution (Leung, Paolacci, & Puntoni, 2018). Thus, tasks linked to a customer's identity may face barriers to AI adoption. In the realm of AI usage, understanding how AI communicates with customers is crucial. Customers often perceive AI as programmed rather than having autonomous goals. Consequently, they focus more on "how" AI performs rather than "why." Messages from AI are more effective when they align with customers' perceptions of the AI's characteristics and content. For instance, emphasizing "how" to use a product rather than "why" it should be used is more persuasive. Factors affecting customer engagement with AI include concerns about AI's ability to recognize and relate to its unique characteristics. Customers with a strong sense of uniqueness tend to have more reservations about AI. Additionally, disclosure that a customer is interacting with an AI bot significantly decreases purchase rates, as customers perceive AI bots as less empathetic and therefore interact less warmly with them (Longoni, Bonezzi, & Morewedge., 2019).

Task categories

The text discusses the concept of task type in AI applications, distinguishing between analysing numeric data and non-numeric data such as text, images, voice, or facial expressions. While both types of data are used for decision-making, analyzing numeric data is generally considered easier. Various processing methods, including heterogeneous computing and benchmark evaluations, are used to handle AI tasks. However, despite studies providing insights into AI tasks and processing methods, there is a limited direct discussion on the distinction between analyzing numeric and non-numeric data (Barr & Shaw, 2018; (Davenport et al., 2020).

Professionals, including senior executives at Infinia ML, have a slight perspective on this classification. They emphasize that data structured in tabular formats are notably simpler to analyze compared to unstructured data. For instance, Stitch Fix collects information from customers through direct inquiries about their preferences as well as indirect cues from their Pinterest activities and interests. Stitch Fix employs proprietary AI algorithms to analyze this non-numeric data, which they find highly valuable. This is because they've recognized that customers may not always express their preferences using numerical scales.

Another approach involves leveraging Internet of Things (IoT) technology, enabling firms to gather customer data to enhance Customer Relationship Management (CRM) systems. Utilizing IoT enables the identification of correlations between the utilization of this technology and the data quality obtained, which can subsequently be analyzed within CRM systems (Boldt Sousa, 2022).

As a significant portion of data exists in non-tabular formats, this enhances AI's impact when comprehended and analyzed. AI applications are increasingly analyzing non-numeric inputs like text, voice, images, and facial expressions. Despite current limitations, advancements are underway to improve AI's ability to process such data types, like IPSoft, which processes words spoken to customer agents to interpret what customers want. Another example is the new Samsung Galaxy S24's AI in-call translation, which makes talking in other languages shockingly easy (Priday, 2024). Legacy infrastructures may impede the analysis of unstructured data, as noted by a senior manager at Infinia ML, while companies like Kroger utilize AI for tasks like visual inspection of out-of-stock items (You et al., 2016; LeCun, Bengio & Hinton, 2015).

Integration within Robotic Systems

AI has transformed robotics, empowering robots to autonomously execute intricate tasks and adjust to different situations. Robotics leverage diverse AI techniques including planning/control, natural language processing, machine learning, and computer vision. Intelligent robots play a vital role in industrial automation, enhancing productivity, precision, and versatility. The integration of AI and robotics aims to create projects imbued with human-like attributes such as learning, reasoning, and comprehension (Hans et al., 2023; Holthöwer & van Doorn, 2021). The spectrum between virtuality and reality encompasses most AI applications.

While many AI systems exist in virtual realms, like Replika on smartphones or Libratus on digital platforms, AI can also manifest within physical entities or robots to some degree. The degree of virtuality or embodiment represents its placement on the Milgram virtuality-reality continuum (Milgram et al., 1995). Rather than viewing virtual and real forms as separate entities, researchers and practitioners should perceive them as endpoints along a continuum, accommodating the diverse manifestations of AI entities.

Industrial robots are commonly utilized in production and manufacturing, and their application is expanding into service-oriented sectors. By 2016, the revenue generated by customer service robots globally had already reached US$53.77 million. Forecasts suggest that the market for customer service robots will experience rapid growth, expected to increase seven times faster than that of industrial robots (Business Insider, 2015). By the conclusion of 2022, the market value for customer service robots is anticipated to reach US$87.97 million (Holthöwer & van Doorn, 2021).

Using robots provides significant benefits, particularly in interactions with customers. Research suggests that customers tend to establish stronger personal connections with robots compared to non-embodied AI systems. For instance, individuals prefer interacting with a physically present robot over a simulated one on a computer or one presented via teleconference (Wainer et al., 2006). Moreover, customers often empathize with robots. Whether in a virtual form like Apple's Siri or in a physical form like Pepper or the Star Wars character C-3PO, embodied AI allows robots to perform both non-physical and physical tasks autonomously, even in complex environments (Jörling, Böhm & Paluch, 2019).

Moreover, robots can exhibit either humanoid or non-humanoid features. At one end of the spectrum is Sophia, a humanoid robot with strikingly human-like appearance, who was notably granted

citizenship by Saudi Arabia, marking the first instance of legal personhood granted to a robot globally. Non-humanoid robots, such as the Roomba vacuum cleaner and the da Vinci Surgical System, are on the opposite end of the spectrum (Wirtz et al., 2018).

Beyond the realm of AI adoption, we shift focus towards customer interactions with AI-infused robots. Initial studies indicate that such interactions can evoke discomfort, often associated with the Uncanny Valley Hypothesis (UVH), leading to subsequent negative compensatory behaviors such as purchasing status goods or increased consumption of food (Mende et al., 2019).

Broadly, sociologists are contemplating the potential economic and societal transformations brought about by AI, particularly robots with embedded AI (Boyd & Holton, 2018). For instance, advancements in cloud-based technology enable robots to engage in deep learning through repeated interactions with humans. Sociologists are particularly interested in exploring how robots may permeate various aspects of social life, extending beyond conventional domains like service and transportation to encompass areas such as the arts and music. The integration of robotics and AI offers a plethora of potential advantages for organizations, encompassing cost reduction, heightened reliability, increased productivity, scalability, enhanced security and compliance, revenue growth, as well as bolstered customer retention and managerial creativity. Furthermore, the utilization of AI and robots can serve as a remedy for industries grappling with workforce shortages, such as healthcare (Holthöwer & van Doorn, 2021).

The ethical considerations surrounding AI

The discussion surrounding the ethical and moral implications of AI traces back to 1960 (Samuel, 1960). However, the significant advancement, utilization, and societal impact of AI in recent times have prompted widespread calls for ethical guidelines, marking a mainstream shift in the ethical discourse (Morley et al., 2020, p. 2141).

In a comprehensive examination, Jobin, Ienca, and Vayena, (2019) analyzed the ethical guidelines and principles advocated by various private, public, and research entities. Interestingly, none of the 84 analyzed documents referenced a single ethical principle universally. Nonetheless, there exists a convergence around key principles such as justice and fairness, transparency, non-maleficence, privacy, and responsibility, which feature in over half of the documents (Hermann, 2022). Transparency is the most commonly referenced principle, appearing in 73 out of 84 documents, followed by justice and fairness (68), nonmaleficence (60), responsibility (60), and privacy (47).

Additionally, Jobin, Ienca, and Vayena, (2019) make notable observations, suggesting that the prominence of transparency might be attributed to its role as a foundational condition facilitating or hindering other ethical practices or principles, a viewpoint previously proposed by Turilli and Floridi (2009, p. 105).

Secondly, the frequent mentions of justice and fairness, non-maleficence, and privacy indicate a cautious approach toward the potential risks associated with AI. Thirdly, the higher frequency of references to non-maleficence compared to beneficence suggests a moral obligation to mitigate any negative impacts of AI, potentially indicating a bias toward negativity. Fourthly, trust emerges as a pivotal ethical concern in AI governance, albeit facing opposition and ambiguity regarding its status as a standalone principle or an outcome of other foundational principles (e.g., Ryan, 2020; Glikson & Wolley, 2020).

Although solidarity, which involves redistributing AI benefits to maintain social cohesion, is mentioned in only a few documents, considering the significant wealth disparities globally, it should be regarded as a central ethical principle of AI (Luengo-Oroz, 2019). The principles of solidarity and beneficence highlight the importance of leveraging AI's positive effects for societal well-being.

Consequently, discussions on AI ethics also emphasize ethical frameworks aimed at promoting social good. In this regard, Floridi et al. (2018) distilled five ethical principles: beneficence, non-maleficence, autonomy, justice, and explicability. Beneficence involves promoting well-being and the common good, while non-maleficence underscores the importance of safety, security, and privacy, along with preventing both accidental and deliberate harm caused by AI (Floridi et al., 2018; Floridi, 2021; Hermann, 2022). Beneficence and non-maleficence, though seemingly similar, coexist rather than being opposite ends of a spectrum (Floridi et al., 2018). Autonomy pertains to self-determination and equitable decision-making power between humans and AI (Morley et al., 2020; Floridi et al., 2018). Justice advocates for fairness, addressing biases and past inequalities, and promotes solidarity by sharing benefits (Morley et al., 2020). Although solidarity is infrequently mentioned in official documents, it aligns with the broader scope of justice principles (Jobin, Ienca & Vayena, 2019).

Explicability, akin to transparency, involves intelligibility and accountability, facilitating evaluations of beneficence, justice, non-maleficence, and autonomy by shedding light on AI functionalities and responsibilities. These principles mirror bioethical principles and effectively address ethical challenges posed by AI. Ethical AI frameworks offer a dual advantage of harnessing benefits while mitigating potential harms, and contributing to societal welfare (Floridi et al., 2018). The discourse on AI ethics primarily revolves around high-level ethical principles, with limited reference to philosophical ethical theories (Stahl et al., 2021).

However, critics question the practicality of this principled approach, emphasizing the need for concrete socio-technical governance and policies (Theodorou & Dignum, 2020). Additionally, there's a gap between high-level principles and practical implementation, highlighting the necessity for mid-level norms and low-level requirements (Hagendorff, 2020). While AI ethics principles address specific technological features and their consequences, practical guidance is needed to bridge the gap between practice and principles (Stahl et al., 2021; Royakkers et al., 2018; Hermann, 2022).

In essence, ethical considerations related to AI in marketing encompass understanding consumers' ethical apprehensions and how perceived risks influence attitudes toward AI. Moreover, there's a notable link between perceived risk, ethical worries, and societal standards. Prior to AI implementation, businesses should address ethical matters like accountability, transparency, discrimination prevention, and alignment with human values. Effective digital leaders prioritize actions that foster trust in AI outcomes, productivity, explainability, and fairness (Gonçalves et al., 2023).

MARKETING TECHNOLOGY AND CUSTOMER BEHAVIORS

Artificial intelligence is rapidly transforming marketing practices, leveraging advanced technologies like machine learning to optimize strategies and enhance customer experiences (Mikalef et al., 2023; Hermann, 2022). In the financial services sector, AI enables the creation of hyper-personalized customer profiles and facilitates predictive analytics to anticipate consumer demand, thereby improving operational efficiency.

AI-driven marketing tools offer valuable insights into consumer behavior, market trends, and operational inefficiencies. By analyzing vast datasets, AI automates tasks like content creation, social media management, and lead generation, while also providing real-time insights to inform marketing decisions. This transformative technology enhances sales, reduces costs, boosts productivity, fosters innovation, and contributes to achieving organizational goals. In essence, AI revolutionizes marketing by driving revenue growth, optimizing strategies, and delivering exceptional customer experiences (Murár, 2023; Dimitrieska, Stankovska, & Efremova, 2018; Shaik, 2023).

AI's role in marketing has grown significantly, revolutionizing research, strategy, and customer interactions (Davenport et al., 2020; Kumar et al., 2019; Huang & Rust, 2021b). As AI continues to evolve across various industries, its applications in marketing are expanding rapidly. From reshaping services to enhancing customer experiences and decision-making, AI is pervasive in areas like retailing and customer engagement (Hoyer et al., 2020). At its core, AI strives for personalized and data-driven customization of services, products, and marketing strategies throughout the customer journey (Huang & Rust, 2021a). This focus on personalization aims to engage customers effectively and optimize the value of their experiences (Puntoni et al., 2021; Kumar et al., 2019).

Marketing is a business field dedicated to understanding and fulfilling customer needs and desires by selling, promoting, and distributing products to potential consumers (Anuradha, Sivakumar & Sivaraman, 2023). It serves as a social process that aims to balance product supply and demand while aligning with societal goals, guiding companies to adopt customer-centric approaches (Czinkota et al., 2021).

Marketing tactics vary based on contextual factors and evolve over time to suit changing trends and consumer preferences. Ultimately, marketing endeavors aim to boost sales, enhance brand recognition, and generate leads. Central to marketing is fostering a dialogue between producers and customers. The upcoming section will discuss AI with marketing strategies and customer behavior, focusing on leveraging AI in planning and strategy, utilizing of AI in product management, utilizing AI in pricing management, employing AI in place management, using AI in promotion management, and AI and customer behavior.

AI and marketing strategy

Due to its predictive capabilities, AI offers the potential for significant enhancements in firms' ability to forecast customer purchasing behavior. This may even prompt substantially changes in business models, where goods and services are

continuously provided based on predictive data regarding customer needs. Various research avenues arise, particularly concerning different customer buying patterns and marketing approaches. A key area of interest could involve investigating the effectiveness of AI-driven algorithms in foreseeing demand for entirely new products (RNPs), as outlined by Zhao, Hoeffler & Dahl, (2012). AI is anticipated to play a crucial role not only in forecasting customer preferences but also in determining optimal pricing strategies and the necessity of price promotions (Shankar, 2018). Pricing and promotional tactics are recognized as pivotal factors influencing sales performance (Biswas et al., 2013; Guha et al., 2018). AI offers significant potential to enhance various aspects of marketing strategies due to its predictive capabilities. Here are several key areas where AI is being leveraged in marketing:

a. Planning and Strategy

Artificial intelligence offers valuable support to marketers in devising strategies and planning marketing initiatives, aiding in segmentation, targeting, and positioning (STP). Additionally, AI contributes to shaping the strategic direction of companies beyond STP considerations (Huang & Rust, 2017). Utilizing text mining and machine learning algorithms, industries such as finance, banking, art marketing, tourism, and retail can identify lucrative customer segments (Netzer, Lemaire & Herzenstein, 2019; Pitt, Bal & Plangger, 2020). Employing a blend of data optimization methods, machine learning, and causal forests enables the refinement of targeted customer segments (Verma et al., 2021; Chen et al., 2020).

b. Product management

Marketing analytics tools powered by artificial intelligence can evaluate product design's alignment with customer preferences and subsequently gauge customer satisfaction (Dekimpe, 2020). Incorporating topic modeling enhances system capabilities for service innovation and design (Antons & Breidbach, 2018). Assigning preference weights to product attributes during product searches enables marketers to comprehend product recommendation systems and tailor marketing strategies for effective product management (Dzyabura & Hauser, 2019). Deep learning facilitates personalized recommendations for points of interest and aids in exploring new locations (Guo et al., 2018). Through artificial intelligence, offerings can be customized to better suit customer needs (Kumar et al., 2019).

c. Pricing management

Pricing is a complex procedure that involves considering various factors and requires intensive calculations. The dynamic nature of demand further complicates pricing decisions, as prices need to be adjusted in real-time. Artificial intelligence offers solutions to address these challenges. For instance, the multi-armed bandit algorithm can dynamically adapt prices in real-time scenarios (Misra, Schwartz & Abernethy, 2019). In dynamic pricing environments like e-commerce, Bayesian inference in machine learning algorithms enables quick adjustments to match competitors' prices (Bauer & Jannach, 2018). Dekimpe (2020) suggests that best response pricing algorithms optimize dynamic pricing by incorporating customer preferences, competitor strategies, and supply network dynamics.

d. Place management

Ensuring product availability and access is crucial in the marketing mix to improve customer satisfaction. Product distribution involves managing relationships, logistics, inventory, warehousing, and transportation, which often involves repetitive tasks. Artificial intelligence (AI) is particularly effective in managing distribution channels, offering solutions such as cobots for packaging, drones for delivery, and IoT for order tracking and replenishment (Huang & Rust, 2021b). Standardizing and mechanizing distribution processes benefits both suppliers and customers by enhancing convenience. Additionally, AI enables customer engagement through service robots equipped with emotional AI, although human interaction remains important for optimal customer experience (Wirtz et al., 2018). Automating service processes with AI presents chances for improving productivity and performance (Huang & Rust, 2018).

e. Promotion management

Promotion management encompasses various activities such as scheduling, media planning, advertising campaign management, and search engine optimization. With the rise of digital transformation, promotion tactics are evolving from physical to 'phygital,' blending physical and digital elements. Digital marketing and social media campaigns have achieved prominence globally, allowing customers to influence content, placement, and timing. AI plays a crucial role in personalizing messages according to customer profiles and preferences, enabling customization for enhanced engagement (Huang & Rust, 2021b). Content analytics optimize message effectiveness, while emotive AI algorithms track real-time customer preferences. Netnography, analyzing social media

content, provides marketers with insights to alter strategies to customer favorites (Verma & Yadav, 2021; Verma et al., 2021).

AI and customer behavior

AI has transformed online consumer behavior within e-commerce, introducing advanced functionalities (Ho & Leow, 2023). Research indicates that interactions with AI can influence attitudes and behaviors differently compared to human interactions. In the mobile industry, AI-driven solutions facilitate customer engagement across various user life cycle stages (Kunal et al., 2023). Within e-commerce, AI predicts customer behavior and personalizes shopping experiences, enhancing accuracy and conversion rates (Puntoni et al., 2021). Studies have explored AI's impact on consumer purchasing behaviors and analyzed its relationship with consumer behaviors.

AI adoption faces challenges due to various factors, leading to negative perceptions among customers, which hinder its acceptance. These opposing views usually arise from the belief that AI lacks emotional understanding (Gray, 2017; Castelo, Bos & Lehman, 2018) and struggles to recognize individual uniqueness (Longoni, Bonezzi, & Morewedge, 2019). Besides, customers perceive AI bots as lacking empathy. Adoption of AI is further deterred in domains with significant consequences (Castelo, Bos & Lehman, 2018) and tasks central to personal identity (Davenport et al., 2020; Castelo, 2019; Leung, Paolacci & Puntoni, 2018). Chen et al. (2022) found that AI has a negative moderating impact on the proposed relationships, contrary to prior research suggesting AI improves the connection between customer satisfaction and loyalty. This complexity in AI adoption within home-sharing platforms prompts researchers to reassess the presumed positive impact of AI in the context of the sharing economy. According to Longoni, Bonezzi, and Morewedge, (2019), allowing customers to make minor adjustments to the AI could help overcome uniqueness neglect, prompting them to appreciate the benefits of customization more. This approach could also serve to address the concerns mentioned earlier.

The concern with AI is heightened when it is integrated into robots. As robots become increasingly human-like, customers tend to find them unsettling due to the uncanny valley hypothesis (UVH). Early attempts to address this issue involve attempting to evoke empathy by persuading customers that robots possess some capacity to understand things from their perspective and to sympathize with them if they are experiencing distress (Castelo, 2019). Sociologists are intrigued by how AI-powered robots might integrate into society, particularly regarding cultural preferences and consumer acceptance. Research can explore cultural differences in attitudes toward robots (Li, Rau & Li, 2010), as well as other factors influencing the acceptance of robot-provided services like hairstyling or childcare/elderly care. Some sociologists also indicate that robots could contribute to spiritual well-being (Davenport et al., 2020).

When AI is integrated into robots, they often serve significant roles in customers' lives, acting as frontline service providers, nannies, companions, or substitutes for pets (Wirtz et al., 2018). It's crucial to understand when customers view AI-embedded robots unfavorably and whether these perceptions can change over time. Additionally, if customers' desired preferences differ from their past behaviors, AI might hinder their ability to identify and pursue their preferred options by offering choices based solely on their previous actions. The downstream effects of AI adoption raise pertinent research areas. For instance, customers may feel a sense of diminished autonomy if AI accurately predicts their preferences.

While AI-driven micro-targeting marketing can enhance the appeal of offerings by reducing search costs, it may also challenge customers' perceived autonomy, influencing their evaluations and decisions. Some customers may intentionally select non-preferred options to assert their autonomy upon learning that AI algorithms can predict their preferences (Luo et al., 2019; Davenport et al., 2020). Furthermore, there exists a widespread apprehension regarding the potential loss of human connection if individuals develop emotional attachments to robots equipped with AI. Media coverage often amplifies concerns that robots with embedded AI might outshine humans as companions. For instance, robots like Harmony by Realbotix are seen as promising contenders due to their ability to adopt various personas and exhibit expressions. However, such robots could pose societal risks by exacerbating social isolation, diminishing marriage rates, or further decreasing birth rates, particularly in countries like Japan where birth rates are already declining. This observation presents intriguing avenues for research (Davenport et al., 2020).

DISCUSSION

After examining various studies, research findings, and academic papers, this section will succinctly outline the results across diverse domains, including

business, marketing, sociology, and psychology. In the realm of business, AI has brought about notable advancements and implications across various dimensions. Firstly, AI has demonstrated its capability to significantly reduce the costs associated with predictive tasks, as evidenced by studies such as that by Agrawal, Gans and Goldfarb (2018). Moreover, its application extends to a wide array of business and marketing outcomes, encompassing the automation of processes, extraction of insights from data, and fostering engagement among both customers and employees. A fundamental distinction in AI lies between task automation, characterized by rule-based systems, and context awareness, which involves learning beyond initial programming (Davenport & Kirby, 2016). The concept of Artificial General Intelligence (AGI), aspiring to match human-like intelligence, is explored, with estimates suggesting its potential realization by mid-century (Müller & Bostrom, 2016). Additionally, the discourse distinguishes between narrow and general AI, along with analytical and humanized AI variants (Reese, 2018). However, despite these advancements, the prevailing state-of-the-art in AI predominantly leans towards task automation rather than achieving context awareness (Davenport, 2018).

In the marketing domain, customer attitudes towards AI are influenced by subjective perceptions and identity-related concerns. Tasks perceived as subjective or involving intuition are met with reluctance from customers due to perceived deficiencies in AI's affective capabilities (Castelo, 2019). Additionally, customers are hesitant to adopt AI for activities central to their identity, fearing a loss of credit post-consumption (Leung, Paolacci, & Puntoni, 2018). AI persuasion messages are found to be more effective when focusing on "how" rather than "why," aligning with customers' low-level construal mindset when engaging with AI. Moreover, reservations about AI's understanding of uniqueness contribute to customer skepticism, particularly among those with a strong personal sense of uniqueness (Longoni, Bonezzi, & Morewedge, 2019). Despite AI's potential to reduce search costs through micro-targeting, concerns regarding autonomy and privacy persist, shaping customers' evaluations and choices (Davenport et al., 2020).

In the Computer Science/Robotics domain, a multidisciplinary approach is emphasized for a comprehensive understanding of AI (Holthöwer & van Doorn, 2021). This involves exploring how machines learn from experience through probabilistic machine learning (Ghahramani, 2015) and reinforcement learning, enabling artificial agents to generalize from past experiences to new circumstances (Mnih et al., 2015). Advances in deep learning have notably enhanced visual and speech object recognition (You et al., 2016). Studies reveal human empathy towards physical robots compared to simulated ones, as demonstrated in experiments involving administering electric shocks. Furthermore, interactions with robot diet coaches tend to be more prolonged compared to virtual coaches or traditional methods like pen-and-paper diaries. Notably, individuals exhibit reciprocity towards robots (Lammer et al., 2014), indicating the potential for robots to learn from past experiences and employ reinforcement learning algorithms for effective functioning (Wirtz et al., 2018).

In the Sociology domain, distinctions between narrow and general AI, as well as analytical AI versus humanized AI, are akin to the differentiation between task automation and context awareness, as highlighted by Reese (2018). While AGI remains a theoretical concept, its realization is uncertain, as cautioned by Baum, Goertzel, and Goertzel, (2011). Discussions within sociology ponder the potential social inferences arising from the combination of robotics and AI, prompting inquiries into unprecedented societal transformations (Boyd & Holton, 2018). Furthermore, concerns are raised regarding the utilization of social robots in various domains such as care facilities, medical treatment, and private homes, accompanied by ethical considerations, as outlined by Hermann (2022).

In the Psychology domain, customers' attitudes toward AI exhibit a tendency to set higher expectations, potentially influenced by a perceived lack of emotional depth in AI systems, as suggested by Gray (2017). Moreover, the adoption of AI for significant tasks is perceived as riskier, particularly among conservative consumers and women, who are more risk-averse, drawing from previous research by Gustafsod (1998), and Castelo and Ward (2016). Milgram et al. (1995) propose the virtuality-reality continuum, exploring the perception of human-likeness in robots, indicating a threshold beyond which human-like appearance may evoke negative responses (UVH), as observed by Mori (1970). Gray and Wegner (2012) note that attributing emotions to machines intensifies discomfort, contrasting their perceived capability to perform tasks.

CONCLUSIONS

In conclusion, this research paper examines the applications of artificial intelligence in marketing and its potential effects on marketing strategies and customer behavior. Through a comprehensive

literature review, several key findings have emerged. Initially, the investigation highlights the multidimensional nature of AI's evolution, encompassing levels of intelligence, task categories, integration within robotic systems, and ethical considerations.

This multidisciplinary framework provides concrete insights into how AI influences marketing technology and shapes customer behaviors by integrating perspectives from business, marketing, psychology, sociology, and computer science. By examining these diverse fields, the framework helps identify key trends, predict future developments, and formulate strategies for leveraging AI to enhance marketing effectiveness and customer engagement.

The study shows that AI holds enormous potential for revolutionizing marketing practices. Therefore, it offers marketers unprecedented opportunities to enhance efficiency, effectiveness, and customer engagement. Moreover, the research underscores the importance of recognizing the nuanced ways AI intersects with consumer behavior. While AI-driven personalization and automation can provide significant benefits, they also raise concerns related to autonomy, privacy, and trust. Understanding these dynamics is crucial for marketers navigating the evolving landscape of AI-powered marketing.

Moving forward, future research should explore the nuanced influences of AI on consumer decision-making and the ethical considerations associated with AI adoption in marketing. Additionally, empirical studies examining the real-world implementation of AI technologies in marketing contexts could provide practical guidance for businesses.

In summary, this study contributes to our understanding of AI's transformative potential in marketing and underscores the importance of adopting a multidisciplinary approach to studying its implications. By embracing AI ethically and responsibly, marketers can control its power to operate innovation, improve customer experiences, and ultimately, attain sustainable competitive advantage in an increasingly digital world.

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