Revolutionizing Marketing Research Through AI: comprehensive review of the past, present, and future

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Abstract
In the last years, as artificial intelligence (AI) is more and more widely accessible to everyone, a breakthrough for the course of business growth is also available. Having this in mind, the purpose of this study is to provide a comprehensive review of the impact of AI on the practice of marketing research. For this study a comprehensive literature review was included focusing on academic papers, research articles, industry reports, and relevant sources to gain insight into the application of AI in marketing research. The main findings of this research paper demonstrate how AI can revolutionize market research by improving data analysis, enabling personalization, enabling real-time insights, and addressing ethical concerns. Altogether, this study highlights the transformative impact of AI on market research, emphasizing its potential to improve data-driven decision-making, enable personalized marketing strategies, and address ethical concerns, thereby providing valuable insights for organizations seeking effective and integrative insights. AI provides practical recommendations and future research directions to help organizations realize the potential of AI and make informed decisions for successful integration implementations.

1. Introduction

In recent years, the use of artificial intelligence (AI) has become a growing concern for marketing researchers. In particular, the use of AI in the research and development of marketing strategies has proven to be a powerful tool in increasing the effectiveness of marketing campaigns. One of the research tools that has gained popularity lately is eye-tracking, which measures the visual behavior of consumers as they interact with different marketing elements.

This paper focuses on exploring the literature review of using AI in marketing research. The main purpose of this paper is to understand better the use of AI in marketing research practices and the benefits of it.

2. Literature Review on Marketing Research and Artificial Intelligence

Neuromarketing has become an area of interest in both academia and business, as advances in neural recording techniques and interpretation algorithms make it a powerful tool for detecting consumers' unspoken responses to marketing stimuli. Neuromarketing is an emerging field with business and advertising opportunities. Therefore, advances in this field require proper documentation to capture the state of the art (Rawnaque et al., 2020). Neuromarketing techniques have the potential to provide insights into the consumer mindset that traditional methods in marketing research cannot provide this is why researchers have established the foundations of this field with the method of "selling to the old brain" by conducting research on sales, marketing and neuroscience (Ahmed et al., 2022).

Also, Iacobucci et al. (2019) specifies that nowadays for having a new approach in research marketing analytics requires a holistic approach that combines multiple techniques, ideally using different types of data that fit the company profile and are interpreted in context. This is why combining AI in neuromarketing gives the potential to revolutionize marketing strategy by combining neuroscience, data analytics and machine learning. AI is a technology that simulates human intelligence in machines, which aims to make computers solve real-world problems with formal reasoning and decision-making capabilities (Bansal and Gupta; 2023).

AI has touched almost all aspects of human life, including industries, business, education, health, and consumer goods (Bansal and Gupta; 2023). AI is popular among marketers and can help recognize patterns in consumer behavior by extracting and processing personal information from social media, browsing behavior and online shopping(Bansal and Gupta 2023; Shapiro 2017).

Combined with neuromarketing, AI can create a very powerful marketing mix that captures data on the impact of brain signals in response to certain stimuli (Bansal and Gupta, 2023). Neuromarketing tools can help understand emotional reactions to marketing stimuli and make accurate, unbiased consumer judgments (Varghese, 2022). Neuro-impulse and activity monitoring systems such as EEG and Eye-tracking can help in conducting marketing studies (Varghese, 2022). AI can use consumers' cognitive processes to draw conclusions from data provided by neural pulses, facial expressions, and emotions (Varghese, 2022). In his study, Varghese (2022) claims that the combination of AI and Neuromarketing can remove limitations and make tools and methods more accessible for the business to make decisions and take action.

Using the current literature background, a research project based on secondary resources was developed as a way to learn about the current need for using AI in marketing research field in order to adapt to new technological changes and opportunities. Therefore, this article complements the current review on how to integrate a system in marketing research that is sustainable for the present and future through AI.

3. Secondary research: methodology & results
3.1. Methodology

In search of an exploratory approach, a research project based on secondary sources was chosen in order to gain insight about the use of AI in use of marketing analytics. This research project objective related to getting a better understanding of the evolution of AI in marketing research, by getting a comprehensive overview of the field, from past, through present and towards the future. The search for the papers on this topic was based on keywords like 'AI in marketing research', 'neuromarketing' and 'AI in neuromarketing'. The criteria used to select the papers included in this secondary data research project related to the publishing year: there were three major reference time frames included for the three major categories of this analysis – past, present, future, and also to the scientific databases where the keywords returned valuable results: Sagepub, Emerald, MDPI, SpringerOpen, Wiley Online Library, CEEOL. As a result,

a total of 18 papers on AI & marketing research were included in the present analysis, as seen in the following subchapters.

3.2. Using AI in Marketing Research: Past

The foundations for artificial neural networks were indeed laid in the 1940s and 1950s. McCulloch and Pitts (1943) proposed a non-learning computational model for neural networks that set the stage for the study of both biological processes and the use of neural networks in artificial intelligence. This work led to research into neural networks and their connection to finite state machines.

In 1958, the perceptron, a pattern-recognition algorithm, was created that provided significant progress in this field (Rosenblatt; 1958). However, research stagnated after the publication of a book by Minsky and Papert (1969), which highlighted the limitations of fundamental perceptrons and the lack of sufficient computing power to process useful neural networks. However, by that time, deep learning methods for multilayer perceptrons (MLP) were already known.

In the 1960s, the first deep learning MLP was proposed by Alexey Grigorevich Ivakhnenko and Valentin Lapa in 1965, which used incremental layered training based on regression analysis (Schmidhuber, 2015). And, in Werbos (1982) applied backpropagation to MLPs in a way that has become standard.

The more complex multilayer artificial neural networks that form the basis of much of modern machine learning did not come to fruition until the 1980s with Werbos study and beyond, when significant advances were made in the implementation and application of these techniques.

3.3. Using AI in Marketing Research: Present

AI has become increasingly prevalent in marketing research, with numerous studies exploring its potential applications. One such study by Verma et al. (2021) conducted a comprehensive review of AI in marketing using bibliometric, conceptual, and intellectual network analysis of extant literature. The review aimed to provide the information that artificial intelligence is the future of our society. With the development of technology, the world has become a network of interconnected networks. Technology deployment led to investment in artificial intelligence (AI) to analyze big data to generate market insights. Meanwhile, Mariani et al. (2022) conducted the that offered an integrated view of the body of knowledge of AI that has been published in the marketing field and states that marketing automation uses both active and passive ways to get to know potential buyers, where the last ones rely on past transaction information or click data. This is an inherent need for researchers to understand how consumers make AI-supported decisions and the use of big data is also identified as an opportunity to better understand consumer behavior.

Another study by Chintalapati and Pandey (2022) categorized marketing research based on inferences from earlier studies and explored the use of AI in marketing as an emergent stream of research. This study reveals several key findings. The most researched areas for the application of AI in marketing are "digital marketing and e-commerce" and the human aspects of AI, especially in terms of its functional impact on sales and marketing. Researchers are increasingly interested in studying the impact of artificial intelligence on marketing from a technical and strategic marketing perspective. This demonstrates the wide application of AI in marketing and highlights the need for further research to fully understand its potential in different fields.

All these studies highlight the potential for AI to revolutionize marketing research and offer insights into future directions for research in this field. AI has the potential to enhance

various aspects of marketing research, including data collection, analysis, and interpretation (Chintalapati and Pandey; 2022). With the growing availability of huge data, improved computational processing power, and novel AI approaches, learning algorithms, and applications, the practical use of AI in marketing research has significantly accelerated in the past decade (Perifanis and Kitsios 2023).

AI can help marketers to identify patterns and insights in large volumes of data that would be impossible for humans to detect. It can also be used to create more personalized and targeted marketing campaigns, which can improve consumer satisfaction and loyalty. However, there are also challenges associated with the use of AI in marketing research. These include issues related to data privacy, ethics, and transparency. To fully leverage the potential of AI in marketing research, further research is needed to develop more advanced algorithms and methods for data analysis and interpretation (Chintalapati and Pandey; 2022).

The study conducted by Chintalapati and Pandey (2022) examined how MLP and AI technologies are leveraged to improve business strategies and identified key classification variables for each application using the Structured Content Analysis approach. The resulting taxonomy provides a structured description of the subject under analysis and includes managerial and practical use cases of machine learning in marketing. It was found that digital-native firms are overly represented in MLP utilization for marketing due to larger availability of data, and that technology, online entertainment, and social media are the most active industries in using ML for marketing. Furthermore, most MLP implementations in marketing fall into the 'product' category, referring to consumer experience improvement (Chintalapati and Pandey; 2022).

3.4. Using AI in Marketing Research: Future

The role of AI in advancing marketing research is comprehensive and its future implications are significant (Perifanis and Kitsios 2023). Neuromarketing is another aspect where AI can be used in marketing communication. Neuromarketing proposes to adapt neuroscientists and AI research to better understand consumer behavior and decision-making processes (Rawnaque et al., 2020). The objective of neuromarketing is to develop experimental models to better understand consumer behavior, decision making and processes applying method and theory from neuroscience and AI research (Rawnaque et al. 2020).

It is essential to review relevant research on AI tools and future trends to understand the scope and penetration of AI in marketing activities. AI can be used in marketing communication for personalization, marketing automation, neuromarketing, viral marketing, voice recognition and conversion optimization to achieve business goals and create discovery using AI (Bahman Peyravi et al., 2020). Additionally, AI can capture data on the impact of brain signals in response to certain stimuli, unlike focus groups and surveys. AI has also improved user experience to a great extent, leading to better analysis of mass data and better understanding of consumer behavior (Bansal and Gupta, 2023).

Furthermore, AI can help marketers make pricing decisions with less hesitation (Bansal and Gupta, 2023). By integrating with neuromarketing tools, AI can accurately measure consumers' emotions to understand their decision-making process (Bansal and Gupta, 2023). The application of machine learning in marketing further helps to understand and predict human behavior (Bahman Peyravi et al. 2020). AI is revolutionizing the marketing landscape and has become one of the most powerful modern tools for digital marketing experts as it improves communication and engagement with customers (Bansal and Gupta, 2023)(Bahman Peyravi et al. 2020). Impressively, marketing is now the fourth largest use case for AI technology in terms of resources spent, indicating the usefulness of AI in marketing

communication (Bansal and Gupta, 2023). All in all, integrating AI into marketing communication provides intelligent solutions that can lead to successful marketing strategies.

Artificial intelligence (AI) presents ethical challenges regarding fairness, transparency, privacy, autonomy, accountability, economic impact, security, and long-term implications. These concerns involve avoiding bias and discrimination, ensuring explain ability of AI decisions, respecting privacy, and data protection, maintaining human control, establishing accountability and liability frameworks, addressing job displacement and socioeconomic disparities, guarding against malicious use, and considering broader societal implications. To navigate these challenges, collaboration between stakeholders is essential, with a focus on transparency, accountability, fairness, and human well-being in AI development and deployment.

The future holds tremendous potential for advancements in artificial intelligence, automation, the Internet of Things, healthcare, sustainability, virtual and augmented reality, and the development of ethical and regulatory frameworks. These advancements may lead to sophisticated AI systems, changes in the job market, increased interconnectivity, improved healthcare outcomes, sustainable solutions to address climate change, immersive virtual experiences, and the establishment of guidelines to ensure responsible technology use. However, it's important to recognize that the future is uncertain, and these predictions are speculative, subject to unforeseen events, and require ongoing evaluation and adaptation as we progress.

4. Conclusions

Artificial intelligence has a long history in market research, with important milestones dating back to the 1940s and 1950s. Over the years, advances in neural networks such as perceptron algorithms and deep learning MLPs have shaped the field and paved the way for its current and future applications. Today, artificial intelligence is increasingly being used in market research, opening up opportunities for data analysis, personalization of marketing campaigns, and better understanding of consumer behavior. Looking ahead, the potential for artificial intelligence in market research is huge, with promises ranging from neuromarketing to pricing decisions to improving communication with customers, among others. However, ethical considerations must be considered, with a focus on transparency, fairness, privacy, and accountability to ensure responsible development and use of AI in market research.

This research has certain limitations that need to be recognized. First, the study relied on secondary data sources, such as academic articles and industry reports, rather than incorporating primary data collection methods. This reliance on the existing literature may have restricted the depth of the analysis. Secondly, the selection criteria used to include articles in the analysis may have introduced subjectivity, which could affect the completeness of the findings. Although efforts were made to ensure a representative sample, the inclusion/exclusion criteria could have influenced the results.

Future research directions should consider primary-data-based research, in-depth analysis through focus groups or interviews with both academics and practitioners in the field of marketing research and communication.

Acknowledgments

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