Ai In Decision-Making Marketing: Considerations And Strategic Applications within Organizational Contexts

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Abstract

Artificial Intelligence (AI) has seen remarkable growth in recent years, driven by advancements in computational power and Big Data technologies. AI applications have become integral to decision-making, enabling companies to make informed strategic decisions. This systematic literature review aims to investigate the roles of AI in influencing decision-making within the strategic organizational contexts of marketing, identify emerging AI applications in strategic settings, and explore how AI impacts decision-making processes within organizational strategies. The study utilizes a framework categorizing organizational decision-making into strategic, tactical, and operational levels. A Large Language Model (LLM) is employed to classify the collected articles. The study contributes to expanding the knowledge of strategic decision-making with the application of AI, offering new insights into this critical organizational process.

Keywords: Decision-Making, Large Language Model, AI.

Track: Marketing Strategy & Theory

1. Introduction

The term artificial intelligence (AI), introduced in the 1950s, refers to a machine's ability to learn from experience and perform tasks similar to those done by humans (Duan et al., 2019) or its ability to correctly interpret external data and learning to achieve specific goals (Haenlein & Kaplan, 2019). Although the concept of AI has been developing for decades, the field of AI has seen remarkable growth in recent years, propelled by enhancements in computational power and Big Data technologies, which have driven the development of sophisticated algorithmic models (Haenlein & Kaplan, 2019; Mariani et al., 2022). These factors have been crucial for developing the current AI applications, enabling complex and efficient systems that can handle tasks ranging from daily interactions to complex business decision-making at different levels and roles (Duan et al., 2019).

Technological advancements have made AI integral to the decision-making process, empowering companies to make informed strategic decisions crucial for their growth and adaptation in a rapidly evolving market environment. Despite adopting AI-based systems and their impact on decision-making processes, a considerable gap still needs to be addressed in fully comprehending their use in business marketing strategies. Historically, AI technology developers have focused on creating systems that emulate human intelligence (Haenlein & Kaplan, 2019) instead of merely collecting data for statistical analysis to aid human decision-making. According to Eriksson et al. (2020), AI-based systems in marketing center around two distinct viewpoints: tactical and strategic. From the tactical perspective, AI-based systems are perceived simply as a tool for specific marketing tasks, essentially serving as an advanced data analysis machine, deemed unsuitable for developing comprehensive marketing strategies. In contrast, the strategic perspective regards AI-based systems as an asset in strategic decision-making, with one expert emphasizing its role in strategic management.

Moreover, Generative Artificial Intelligence (GAI) has emerged as a proficient technology in creating multimodal content. It produces outputs that seem intelligent in response to human-generated prompts, covering a variety of formats, including text, code, simulations, images, 3D objects, and videos (Peres et al., 2023). The GAI could establish a new management research paradigm, potentially impacting strategic, functional, and administrative managerial activities. This technology may influence decision-making, particularly at the strategic level, as managers could use it to gain insights or recommendations for specific scenarios (Korzynski et al., 2023).

AI applications are prevalent across various business domains, impacting daily life and organizational practices and enhancing decision-making processes (Ljepava, 2022). In marketing, the primary role of AI lies in aiding decision-making, more recently through the collaboration of human and artificial intelligence capabilities (Huang & Rust, 2022). This partnership allows humans to concentrate on tasks requiring emotional intelligence and talent while utilizing AI to improve their decision-making effectiveness (Kaplan & Haenlein, 2019; Sobocińska, 2021).

Considering these factors, our study addresses the following research questions through a systematic literature review to evaluate state of the art from AI's decision-making perspective: (RQ1)What roles does AI play in influencing decision-making within the strategic organizational contexts of marketing? (RQ2) What are the emerging applications of AI in strategic organizational settings, and how do they intersect with decision-making methodologies? (RQ3) How is AI influencing decision-making processes within organizational strategies, and what are the anticipated future trends in this realm?

Expanding the understanding of strategic decision-making with the application of AI offers a new dimension to this critical organizational process. The present study seeks to investigate AI-based marketing systems' roles and elucidate how these systems can aid decision-making throughout different phases of the marketing process. A framework grounded in Edwards et al. (2000) was utilized to accomplish this goal, categorizing organizational decision-making into strategic, tactical, and operational levels. Consequently, the research was organized into clusters for analysis, focusing on methodologies, technologies, and theories employed at each level.

2. Method

To synthesize the corpus and answer the questions formulated in this research, we conducted a systematic literature review (SLR) examining the latest scholarly articles available in academic databases, encompassing publications from 1973 to 2024. The data for our SLR was extracted and consolidated from Scopus and Web of Science, among the most extensive repositories of indexed academic works. To ensure comprehensive coverage, we conducted detailed searches using a predefined list of specific AI-related terms encompassing various aspects of marketing AI applications.

The detailed information on the identified keywords for this review, considering publications up to July 16, 2024, and conducted a search using a combination of these terms within the fields of "title," "abstract," and "keywords," employing the operator "and, " Next, we refined

the sample by intersecting it with the keywords "marketing," "decision," and one of the terms from AI, artificial intelligence, automation, autonomous, big data, chatbot, computer vision, data mining, data science, fuzzy logic, genetic algorithm, Internet of Things (IoT), k-means, machine learning, natural language processing, neural network, prediction, recommendation, robot, innovative technologies, soft computing, text mining; related to artificial intelligence, as outlined by Duan et al. (2019) and Mariani et al. (2022). The following parameters were applied to the search to include only articles or journal entries and narrow the focus to specific subject areas. Web of Science: the categories "Business Economics" and "Social Sciences Other Topics" were selected; Scopus: the categories chosen were "Business, Management, and Accounting" and "Social Sciences"; the search yielded 2,174 articles.

Our approach diverges from traditional methods that rely on authors, references, keywords, or terms extracted from titles, abstracts, or the body of documents (Aria & Cuccurullo, 2017). We have developed an innovative technique that employs a LLM (Large Language Model) to analyze article abstracts. Consequently, based on the classification levels, we categorized the articles gathered for this study into operational, tactical, and strategic activities. The classification process utilized the OpenAI GPT-4 Mini model, ranked as one efficient with approximately 1.76 trillion parameters, and used the Transformer architecture.

With its concept of self-attention-head attention, the Transformer architecture has been successfully applied to various tasks, including reading comprehension (Vaswani et al., 2017). Additionally, it powers language models that transcend the meaning of individual words and sentences, enabling them to effectively distinguish essential information (Bukhtiyarov & Gusev, 2020). Therefore, the approach emphasizes understanding and context over word frequency, making it possible to read abstracts and classify text based on the definitions and examples provided in the prompt.

We developed a Python script to interact with the OpenAI API, passing a prompt that utilizes the definition of Levels (operational, tactical, and strategic) as discussed by Edwards et al. (2000) and examples according to the items:

(1) Levels: Strategic; Definition: Strategic planning is designed to answer for the long-term integrity of the organization as a whole, in effect defining the goals and nature of the organization; Examples: decision support systems and expert systems; predicting outcomes in emerging marketing environments; pricing decisions;

(2) Levels: Tactical; Tactical decision level, strategic goals are interpreted into targets and operating criteria; Examples: Campaign automation; Creative optimization, product development; Advanced targeting and attribution; Programmatic sampling; Retargeting; Programmatic media buying; Marketing analytics; Sales promotion; Purchase prediction; Dynamic pricing; Personalization advertising and search; Customer acquisition; User engagement in social media; Email targeting;

(3) Levels: Operational; Definition: At the operational control level, the decisions involved are even more precise and limited in range. They are concerned with managing the day-to-day. Examples: service chatbots, consumer decisions with AI assistants, recommendation systems, automated image analysis, and text, choice modeling, and determining consumer preferences.

It receives a JSON (JavaScript Object Notation), which includes a field for the classification definition, a text explaining the rationale of the LLM analysis, and the percentage of each level.

The LLM's response not only classifies the summary as Strategic, Tactical, or Operational, but it also includes two additional possibilities: "Out of Scope" if the LLM determines that the summary's subject has no relation to marketing approaches, or "Not Identified" if it does not fit any of the previously proposed criteria. We also requested that the LLM return the similarity percentage with each level. It is important to note that the abstract may contain words from different levels, allowing the LLM to provide us with the percentage of proximity each abstract has with each level. We leverage the LLM's text classification and generation capabilities to produce the JSON output.

After receiving the articles' classifications into their respective levels, the next step was to identify the roles addressed at each level, map the AI applications that support decision-making in the marketing context, and discuss the topics covered according to the grouping of levels. Thus, the study presents how AI has played significant roles in decision-making within strategic organizational marketing contexts.

3. Analysis of results

The analysis section begins by presenting the descriptive analyses of the data collected and generated by the LLM classification. Subsequently, it explores AI's roles and applications in decision marketing for each identified category. Thus, we examine how AI contributes to optimizing marketing decisions, highlighting specific cases and practical examples demonstrating

its effectiveness in various contexts and classifications.

3.1. Descriptive Analysis of Research

In the classification conducted by the LLM, a significant number of articles were categorized as tactical, 1,122 total records, while 789 were identified as strategic. However, despite the substantial focus on these two domains, the analysis also revealed that 120 articles were classified as out of scope for the study, which included research in areas such as health and finance and didn't align with the core objectives of this specific investigation focused on applications of AI in marketing. Additionally, 74 articles could not be identified, and only 69 were explicitly categorized as operational, indicating a lower incidence of studies concentrating on AI's practical and daily applications in the marketing environment.

The uneven distribution in the classification of research on AI applications in marketing decisions reveals a dominant focus on tactical strategies followed by strategic ones. In contrast, operational applications are significantly underrepresented. Skewed emphasis might stem from several contextual and methodological factors, including the specific areas selected for data collection and intrinsic trends within the academic field.

We highlight that the restricted collection of articles from domains like Business, Management, and Accounting could significantly influence the type of predominant research. Therefore, fields typically concentrate on tactical issues due to their immediate focus on applicability and impact on businesses' daily operations and short-term outcomes. The gap between theory and practice in management can be bridged by applying theoretical ideas from academic research (Jansen, 2018). Therefore, research may focus more on solving practical management problems, which could explain the observed distribution trends.

We present the annual distribution of articles classified into strategic, tactical, and operational categories from 1973 to 2024. A notable trend is the overall increase in the volume of publications over the years, highlighting a growing interest and expansion in AI applied to marketing. Tactical research articles have shown a significant upward trend, particularly in recent years, indicating a strong preference for studies addressing practical, short-term issues that are directly applicable and offer concrete solutions to everyday management problems. Strategic articles also demonstrate a steady rise, though at a slightly slower pace than tactical ones, likely focusing on long-term visions and planning essential for guiding the future directions of companies. Operational research is markedly less prevalent throughout the period, suggesting a

gap in the literature focused on the daily implementation and integration of AI solutions into company operational processes. The complexity of applying AI theories in real operational environments and the challenges in obtaining and directly measuring relevant data may contribute to this underrepresentation.

Since approximately 2007-2008, there has been a substantial increase in publications, possibly due to technological advancements and greater access to AI tools and data, enabling a more profound exploration of various aspects of AI in marketing. The peak in 2023-2024 for tactical research may indicate recent developments or a response to an emerging need for quick solutions in an increasingly data-driven business environment.

The emergence of generative models, exemplified by the success of systems like ChatGPT, has significantly influenced the volume and focus of research in artificial intelligence. ChatGPT and similar models demonstrate advanced capabilities in natural language processing (NLP), which have opened up new avenues for engaging with customers through chatbots (Chang et al., 2023), generation and optimization on social media (Gupta & Khan, 2024) or understanding consumer behavior (Wang, 2024), for example. This technological leap has spurred a surge in tactical and strategic research as organizations seek to harness these tools to enhance decision-making processes and improve customer interactions.

The success of generative models has expanded the research scope and intensified interest in the strategic implications of AI technologies. Companies are increasingly investigating how these tools can be integrated into their long-term strategies to maintain competitive advantages, drive innovation, and create personalized marketing strategies. Furthermore, the accessibility of these advanced AI models has democratized AI research, allowing more entities to participate in innovation and explore new applications. As a result, we observe an increase in research that pushes the boundaries of what AI can achieve in operational settings, aiming to turn these strategic insights into everyday applications within the marketing domain.

4. Conclusions and suggestions for future research

In this systematic literature review, we have explored the role of AI in marketing decision-making, providing a comprehensive overview of current applications and emerging trends at operational, tactical, and strategic levels. Our analysis reveals that AI increasingly integrates into marketing decision-making processes, from customer interactions to long-term strategic planning. While tactical AI applications predominate in the literature, there is growing interest in strategic

applications, with operational uses still needing to be represented.

The research highlights how AI is redefining customer interactions through voice assistants, recommendation agents, and personalization of consumer journeys. A paradigm of collaboration between humans and AI is emerging, where technology complements rather than replaces human capabilities. This shift emphasizes the importance of balancing AI-driven rationality with human intuition and creativity in marketing strategies. Our findings underscore significant ethical considerations in implementing AI in marketing, particularly regarding data privacy and algorithmic transparency. The trust of consumers and managers in AI systems has emerged as a crucial factor for their adoption and effectiveness in marketing contexts. This trust is closely linked to brands' perceived authenticity and ethical behavior employing AI technologies.

Looking ahead, several key areas warrant further research. More in-depth exploration of AI applications at the operational level is needed to address the identified gap in the literature. Developing and testing effective collaboration models between marketing professionals and AI systems is another crucial area for future study. Additionally, research should focus on evaluating how AI is changing long-term strategic decision-making processes in marketing. Developing robust metrics to assess the effectiveness of AI applications in various marketing contexts is essential. Future studies should also investigate the balance between AI-driven personalization and consumer privacy concerns, an issue of growing importance in the digital age.

In conclusion, this review highlights the transformative potential of AI in marketing and the challenges associated with its implementation. As technology evolves, future research will ensure that AI is used ethically, effectively, and beneficially for organizations and consumers. The field of marketing stands on the threshold of a new era, where the symbiosis between human and artificial intelligence promises to revolutionize how we understand and engage with consumers. By addressing the research directions outlined above, scholars and practitioners can contribute to shaping a future where AI enhances marketing practices while maintaining ethical standards and human-centric approaches.

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