The Role of Ontology in Marketing Management Decisions in Manufacturing Companies: A Scoping Review

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Abstract

As a manager, it is necessary to have curiosity and knowledge in determining a decision. Managers can integrate ontology as their framework to determine their marketing strategy. Managers analyze current market demand or trends or see "what" and "how" a situation occurs that can be developed into a strategy. The purpose of this scoping review is to map how marketing managers apply ontology in making their decisions. The article survey resulted in 5 articles that fit the research objectives. This research aims to determine the role of ontology in determining marketing management decisions. From the four articles, it was found that managers' decisions do not consider emotions but rational data and managers must have a marketing strategy that is in accordance with the achievement of organizational goals. This research can be used by marketing managers to consider creating a framework with an ontological foundation to decide marketing strategies in their organizations and further research references related to ontology in management decisions, especially marketing management.

Keywords : Ontology, Manager Decisions, Strategy, Marketing

INTRODUCTION

A product is recognized by consumers due to marketing efforts. Marketing is a strategy and practice aimed at understanding and meeting consumer needs, especially in this era where technological advancements influence consumer behavior, thereby affecting marketing strategies. Marketing prioritizes understanding consumer behavior and preferences, ensuring strategies align with customer needs (Czinkota, Kotabe, Vrontis, & Shams, 2021). Factors such as market share, potential markets, competitor analysis, and promotional strategies significantly influence the outcomes of marketing management (Nur Mastuti et al., 2024). If marketing management solely relies on traditional marketing theories, it will hinder innovation in a rapidly changing market driven by technological developments. Management decisions must adapt to technological advancements that influence consumers. Management decisions are the process of determining actions to solve marketing problems.

In making decisions, a structured framework or way of thinking is necessary. By integrating ontology, marketing management decisions can be enhanced. Thinking ontologically means that managers understand the environment for decision-making. Ontology in science is about the "What," "How," and "Which" of a truth. There are four (4) ontological foundations for the development of science: supernaturalism, materialism, dualism, and pluralism. These ontological foundations represent the perspective of science toward reality (Sianturi, 2023). Based on research by Porello, Guizzardi, Sales, Amaral, & Guarino (2020), ontology is applied in economic management as a conceptual framework foundation to enhance understanding and application in various economic contexts, including analyzing economic exchange, value, risk, and competition. By utilizing ontology to analyze the "what," "how," and "which" in decision-making, problem-solving alternatives can be formed. Managers can then understand consequences and integrate relevant information, leading to more informed decisions and reducing subjectivity by acquiring accurate information (Girase, Patnaik, & Patil, 2017; Mansingh & Rao, 2014).

A key factor determining the success of an organization's marketing is managerial thinking. By integrating ontology into decision-making, managers must adhere to ethical standards. Ethical standards guide managers in considering the moral implications of their actions. According to

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research by Chatterjee, Chaudhuri, Sakka, & Apoorva (2021), international marketing managers are now required to undergo proper training on ethical issues to work effectively in cultures different from their own. With technological advancements, marketing can reach other countries with cultures distinct from the organization's. Ethical decision-making fosters trust and accountability, which are essential for sustainable business practices. Additionally, based on research by Nordin & Ravald (2023), marketing managers face challenges requiring activeness, innovation, and reflexivity in decision-making. With an ontological foundation, managers can combine data, knowledge, adaptability, and ethics in their decisions to create effective organizational strategies that achieve organizational goals. This approach also helps managers adapt to changing market conditions and consumer preferences by utilizing their data and knowledge to improve decision quality (Wahab & Rahman, 2018).

Based on previous research related to the role of integrating ontology in marketing decision-making, which has a positive impact on marketing management decisions but remains rarely discussed, this study aims to map the existing literature regarding the role of ontology in determining marketing management decisions. It seeks to provide insights for further exploration and serve as a framework or reference for future research, as research on this topic is still limited. The researchers collected articles related to marketing management decisions. This study employs a scoping review method and focuses on management decisions by integrating ontology within manufacturing companies. A scoping review is conducted because it can be used to map a topic with a less rigid approach than systematic reviews (Tricco et al., 2016). According to the research goals and benefits, scoping reviews are utilized when the purpose is to "identify knowledge gaps, the scope of literature, clarify concepts, investigate research implementation, or inform systematic reviews" (Munn et al., 2018).

METHOD

The scoping review method adopted in this study is based on Arksey & O'Malley (2005). Arksey & O'Malley (2005) proposed a five-step scoping review approach, as follows:

1. Identifying the Research Question

    The research question is identified in the initial phase of the scoping review. By defining the research question, researchers can design strategies to conduct literature searches while ensuring that substantive areas are covered (Arksey & O'Malley, 2005). The research question in this study is: "What is known from the existing literature about the role of ontology in marketing management decisions?"

2. Identifying Relevant Studies

    To identify literature relevant to the research question, keyword terms are formulated. The key search terms related to this study include: "ontology," "manager," "management," "manager decision," "marketing," and "manufacturing." This study uses electronic literature sources from reputable journals, making literature searches through electronic databases more effective and efficient. The selected electronic databases are Taylor & Francis, Sage, and Emerald. The time frame used is five years, from 2019 to 2024. This five-year range is considered relevant as it represents recent and up-to-date work. All empirical studies on managerial decision-making within manufacturing companies were included. The type of articles used are research articles.

3. Study Selection

    The search results from the three electronic literature sources using the determined keywords yielded 558 articles, comprising 200 articles from Taylor & Francis, 127 articles from Sage, and 231 articles from Emerald. These articles were then examined to determine their relevance to the research question. The articles were also checked for potential duplicates across different databases. At this selection stage, 553 articles were excluded. Most articles excluded from the review did not meet the research question criteria due to: Not specifically discussing ontology, Not discussing ontology in management, Not addressing managerial decision-making,

Not discussing marketing management, and Research not conducted within manufacturing companies.

4. Charting the Data

At the data charting stage, selected articles were extracted to summarize the most substantial data. The data recorded include: author(s), year of study, research objectives, design/methodology, and findings.

Table 1. Charting the Data

No.	Author(s)	Year	Research Objective	Methodology	Findings
1	Saku Mantere & Richard Whittington	2021	To explore the ontological role in identity work and analyze the relationship between strategy discourse and identity	Qualitative (interviews with 19 senior managers)	The study found that strategy discourse influences managerial identity.
2	Sarah Mueller-Saegebrecht	2024	To explore the effects of Business Model Innovation (BMI) decision-making and identify key characteristics of BMI group decisions	Qualitative (interviews with 26 managers)	Managers prioritize information over emotions in BMI decision-making.
3	Ashok Ashta, Peter Stokes, Paul Hughes & Max Visser	2024	To analyze values, beliefs, and attitudes in marketing strategies and examine the customer satisfaction orientation of Japanese executives in India	Qualitative (interviews with 6 senior executives)	Individual values significantly influence intercultural marketing actions.
4	Mamta Tripathi, David Jarvis, & Kate Broadhurst	2024	To provide a historical account of competitive strategies used by traditional manufacturing sector firms in the West Midlands	Qualitative (interviews with 40 owners or top management of traditional manufacturing firms)	Understanding competitive strategies by integrating strategic management and resilient, collaborative, compliant, and persistent behavior.
5	Chun-Liang Chen	2020	To explore how manufacturing SMEs can collaborate with the cultural content industry	Qualitative (interviews with 15 participants from 6 SMEs)	Four types of cross-disciplinary value creation strategies were identified for Taiwanese textile SMEs in the context of Industry 4.0.

Source: By The Researcher

5. Compiling, Summarizing and Reporting Results

The final stage of the scoping review is to compile, summarize and report the research results. Compiling produces a table containing the extracted articles from the data mapping stage. Summarizing produces the main themes or patterns of the main findings, and reporting produces the format of the report, which in this case is for publication purposes.

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RESULTS AND DISCUSSION

Within the 5-year period from 2019 to 2024, only five empirical studies were identified as most relevant to the research questions and keywords established. During this timeframe, three articles were found in 2024, while only one study was identified in 2021 and 2020. No studies aligned with the research questions and keywords were found for the years 2019, 2022, or 2023. All the research data were derived from primary sources, employing qualitative methods involving participant interviews. The findings of this scoping review aim to explore what is known about the role of ontology in marketing management decision-making, focusing on manufacturing companies. The review reveals that more empirical research is needed to further investigate the ontological foundation integrated into management decisions, particularly in marketing management, which has been underexplored and could inform future research directions. Mantere & Whittington (2021) aimed to understand how mid-level and senior managers navigate the complexity of strategists' identity. They identified three identity work tactics used by managers to mobilize strategists' identity: self-measurement, self-construction, and self-actualization. The role of ontology in this study relates to personal ontology as a subject of individual development. A strategic discourse that can be both disciplinary and emancipatory is influenced by managers' sense of ontological security. With an ontological foundation, it is evident that becoming a strategist involves not only cognitive skills but also self-transformation, requiring profound socio-psychological processes.

Mueller-Saegebrecht (2024) explored how managing directors interact as a group when making business model innovation (BMI) decisions. The findings identified four typical group biases affecting BMI decision-making: groupthink, social influence, hidden profiles, and group polarization. Additionally, key characteristics of BMI decisions were identified, emphasizing managerial cohesion and conflict readiness, as well as information-based and emotion-based decision-making. With this approach, managers can mitigate risks and improve BMI decision quality by leveraging information, preventing hasty decisions. Ashta, Stokes, Hughes, & Visser (2024) investigated the values, beliefs, and attitudes (VBA) influencing the effectiveness of Japanese marketing strategies in a business-to-business (B2B) context in India. Their research aimed to analyze customer satisfaction orientation among Japanese business executives and gain insights into cultural VBA to enhance marketing strategies. The findings highlighted that VBA significantly impacts customer satisfaction orientation. The importance of long-term relationships in customer satisfaction orientation, as expressed by Japanese business leaders, underscores that maintaining such relationships is crucial for marketing effectiveness. Ontologically, Japanese business leaders analyzed the "what," "how," and "why" of B2B marketing strategies with India. Tripathi, Jarvis, & Broadhurst (2024) examined the impact of globalization on four traditional manufacturing sectors in the West Midlands: automotive, ceramics, glass, and apparel. The study sought to validate the changing environment in which traditional manufacturing operates and responds. The findings identified four distinct competitive behaviors exhibited by companies in traditional manufacturing sectors: resilient, collaborative, compliant, and persistent behaviors, reflecting their responses to globalization challenges. In making decisions, managers must adopt participatory and proactive policy approaches to advance organizations amid challenges such as Brexit, Covid-19, and climate change. These findings contribute to understanding competitive strategies for market competitiveness by integrating strategic management.

Chen (2020) explored how manufacturing SMEs can collaborate with the cultural content industry to participate in the global value chain (GVC) under the Industry 4.0 framework. The study also focused on understanding the role of interdisciplinary communication and collaborative strategies in enhancing the competitive advantage of SMEs. The findings revealed four types of cross-disciplinary value creation strategies for Taiwanese textile SMEs in the context of Industry 4.0: enhancing digital product display capabilities, integrating cultural content design and online marketing, creative brand marketing with cyber-physical channel integration, and emotional marketing combined with smart services. Adopting Industry 4.0 technologies is crucial for SMEs to improve their competitive advantage and effectively participate in the GVC. The importance of collaboration and cultural integration enhances value creation and storytelling in marketing.

Discussion

The development of Industry 4.0 technology and various phenomena such as environmental, political, and socio-cultural factors compel organizations to continuously innovate to adapt and achieve their objectives. In this context, managers play a key role as primary decision-makers in addressing these phenomena. Managers must be able to "read" opportunities from ongoing events. Marketing managers, who are the focus of this study, must quickly adapt to changes in market conditions by leveraging data and information. However, beyond utilizing data and information, managers must also consider their emotions when making marketing or competitive decisions. Research shows that while data-driven decision-making is crucial, emotional factors significantly influence managerial performance and team dynamics. In the research articles included in this scoping review, ontology serves as a framework for individual self-development. For example, Mantere & Whittington (2021) highlight that managers use self-measurement, self-construction, and self-actualization tactics in decision-making. These interconnected tactics shape both individual and organizational development. Such approaches help organizations develop resilience and competitiveness to adapt to changing phenomena, thereby enhancing their market presence. Managerial decisions often combine data with emotional considerations. Understanding emotional responses to marketing tactics can significantly impact consumer habits and preferences. Although Mueller-Saegebrecht (2024) found that managers prioritize information over emotions in business model innovation (BMI) decisions, structured decision-making and emotional engagement remain essential. Advances in technology have led to an over-reliance on data, potentially stifling creativity and intuition in marketing strategies. Creativity is particularly vital in marketing strategies, especially when collaboration with cultural elements is required, such as in international expansion efforts. Research by Ashta et al. (2024) and Tadajewski (2019) emphasizes that individual values and habits influence cross-cultural marketing actions.

In addition to self-development, ontology also acts as a guide or framework for managerial thinking. Marketing managers face the challenge of maintaining long-term relationships with B2B partners and distributors. Ontology-based thinking helps managers analyze and evaluate what needs to be done to enhance product marketing. Although this ontological thinking is likely already practiced in day-to-day activities, explicitly grounding decisions in ontology ensures they are meaningful. Such decisions are based on data and facts, informed by managers' experiences and discussions with peers or divisions. Thus, integrating ontology into managerial decision-making processes enhances the efficiency and effectiveness of decisions across various organizational contexts. By providing a structured framework for knowledge representation, ontology facilitates a deeper understanding of complex decision-making environments. This enables managers to comprehensively evaluate alternatives while considering the phenomena at play.

CONCLUSION

This review explores the role of ontology in marketing management decisions. Ontology serves as a tool for self-development for managers. It is used as a framework or guideline for managers in making decisions. With ontology, managers can understand what is happening, how to respond to these phenomena, and what actions to take to maintain or adjust decisions to effectively achieve organizational goals. Although ontology is closely related to reality and facts, in practice, making decisions based solely on reality, facts, and data needs to be balanced with the emotions within the manager. There are phenomena that need to be addressed by grounding decisions in both data and emotions. Therefore, it can be concluded that ontology is crucial for making decisions with the right resources to determine marketing strategies that align with the organization's objectives. This research is expected to be implemented in organizations and contribute to the advancement of research related to the application of ontology in decision-making, particularly in improving marketing. It also aligns with the purpose of this scoping review to serve as a reference for further research on the role of ontology in management decisions and exploring its application through different research methods to investigate the implementation of ontology more effectively.

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