Artificial Intelligence Application in the Three Stages of Marketing: An In-Depth Case Study of Tesla.

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Abstract. Driven by emerging technologies, the traditional marketing style is undergoing a profound change. Artificial Intelligence, as a cutting-edge technology, plays a crucial role in this revolution process. This study aims to understand and explore the general application of AI models in marketing activities by deeply analyzing the different types of applications of AI in the three stages of Tesla's marketing. Since the application of AI in marketing has a relatively short history, there is a lack of core literature and primary data, ambiguity of related concepts, and unclear development direction, this study draws on the three-stage framework of marketing strategic planning, including the marketing research stage, the marketing strategy stage, and the marketing action stage, and focuses mainly on the application of AI in Tesla's marketing practices based on the various AI types in these three stages respectively. Meanwhile, this study combines the theory of STP strategic analysis and deeply explores the wide application and value of AI in the real marketing environment. Therefore, this paper expects that through in-depth research and understanding of the application of AI in real marketing, it can not only advance the depth and breadth of academic research but also provide valuable insights and inspiring action guidelines for real-world enterprise marketing departments.

Keywords: Artificial Intelligence, Marketing Strategy, Tesla, Three-Stage Strategic Marketing Planning Framework, STP Theory.

1. Introduction

1.1. Background and the Impact of AI on Traditional Marketing

As the digital revolution driven by disruptive technologies unfolds across business sectors, organizations can address challenges and deliver higher customer value through innovative solutions. In particular, Artificial Intelligence has been applied in several business sectors and has become one of the important technological advances in marketing [1]. The introduction of AI has provided us with new tools and methods that enable us to achieve specialized, refined, and personalized marketing more efficiently and enhance the competitiveness of our companies in a complex and dynamic market environment. For example, companies can use AI to more effectively manage marketing campaigns, collect market data, improve the marketing mix, increase marketing efficiency, innovate marketing strategies, and enhance the skills of their marketing teams [2].

1.2. Research Topic and Methodology

This study aims to explore the application and effects generated by AI in three different stages of marketing through an in-depth analysis of the Tesla example. Based on the three-phase strategic marketing planning framework proposed by Huang and Rust [3], as well as combining the STP strategy analysis theory, this paper reveals how AI can help marketing in an all-round and multi-dimensional way, from data collection and processing in the initial stage to marketing strategy analysis and decision-making in the middle stage to marketing action organization and execution in the later stage.

1.3. Research Objectives and Significance

Although some systematic progress has been made in various applications of AI in marketing [4], there is still a limited understanding of how to effectively integrate AI technology with marketing through specific cases. Therefore, the goal of this study is to elucidate the value of AI applications in

real marketing environments, and to provide some theoretical insights and practical guidance for further AI applications in the marketing field, thereby advancing the integration and development of academic research and business practices.

2. Research Topic and Methodology

2.1. Introduction of Artificial Intelligence

Since Turing put forward the question of "can machines think" in 1950, which constitutes the earliest conception of the nature of AI: "think" and "machine". Nowadays, artificial intelligence, as an emerging technology widely used based on algorithms and mathematical models, can help companies reduce professional barriers, track real-time data, analyze and quickly respond to customer needs in cross-application research in marketing [5], and its core goal is to create machines or software that can accomplish tasks that humans cannot, for example, by understanding natural language, visual recognition, analyzing consumer behaviour, and other technologies to solve problems. Although the application of AI in marketing is still in its infancy, it can be summarized and analyzed initially based on current practical applications in real business [6], and since the application of AI in marketing is wider in scope and increasingly diversified in terms of content involved, this summary focuses mainly on analyzing different applications of AI categories in the direction of marketing strategy.

2.2. General Application of Artificial Intelligence in Marketing

For example, by applying Artificial Intelligence (AI) and Internet of Things (IoT) technologies, traditional retail stores can be transformed into smart retail stores that utilize visual and verbal information analysis and precision marketing technologies to achieve more accurate market targeting. Brick-and-mortar businesses can optimize their business processes with AI technologies such as visual retail analytics and supply and value chain analytics. Machine learning analysis of footage from 24/7 surveillance cameras inside and outside the store may reveal key metrics that are closely related to business operations. For example, face recognition technology can be used to understand and predict consumer behavioral patterns, or to analyze the impact of merchandise display layout on sales results. Smart retail stores have upgraded retail operations by enhancing customer experience and shopping convenience, as well as improving supply chain management. However, the application of AI is not limited to brick-and-mortar stores; it also provides guidance for online businesses. For example, machine-driven language-generating AI technologies enable communication with each consumer or potential consumer in a highly personalized manner, with the goal of constructing a relevance as well as an emotional connection with the consumer that inspires specific behaviors. Sha & Rajeswari describe the advancements in AI and state that AI can support machines with the ability to track five human senses (sight, hearing, taste, smell and touch) [7]. The findings of the study reveal that the consumer-brand connection and product-brand association in e-commerce business has been significantly improved.

2.3. Research Topic and Methodology

In the formulation of marketing strategies, artificial intelligence through the combination of algorithms and deep learning on the market dynamics of various industries, competitive dynamics and customer demand for in-depth research, analysis and prediction to constantly adjust and optimize the marketing strategy. At the same time, different AI technologies can support marketers in segmentation, positioning and targeting (STP), providing strong support for the strategic planning of marketing activities. In addition to this, AI can also help marketers make forward-looking considerations on the overall strategic direction of the organization [8]. At the same time, artificial intelligence (AI) plays an indispensable role in focusing on user experience and after-sales service, for example, AI can continuously improve the quality of products and services by predicting user

behavior, implementing satisfaction surveys, collecting customer feedback, etc., so as to win high social credits and good reputation for the brand.

In short, the application of AI technology in marketing can be explained as marketers leveraging algorithms, neural networks and deep learning to better understand service performance, consumer behavior and product innovation. Just like in the real life, it is a learning process based on the previous experience that predicts the future, which is the essence of AI. Ultimately, customers will be attracted to this unique experience that developed by AI and feel the brand's deep understanding of their demands due to the appeal of the personalized service, which is the key role played by AI in marketing applications.

3. Theoretical Framework

3.1. Three-Stage Strategic Marketing Planning Framework

In the paper "A strategic framework for artificial intelligence in marketing", Huang and Rust [3] designed a three-stage strategic planning framework based on the marketing research–marketing, strategy–marketing action cycle. The framework not only provides a practical guide for companies to maximize the efficiency of AI in these stages, but also builds a theoretical framework for academics to help fill the gaps in the field of AI marketing research. This framework relies on the core capabilities of three different types of AI: Mechanical AI, Thinking AI and Feeling AI. Mechanical AI applied for automated and repetitive marketing task execution, Thinking AI is used for data analysis and driven decision making, and Feeling AI for human-computer interaction and sentiment analysis [3] and all these types of AI can be applied in every marketing stage. It is worth noting that while this three-stage framework is dynamically cyclic in the original paper (as shown in Figure 1), in this study, the author designed the three stages as a linear and irreversible process in order to simplify the process and to more clearly depict the application of AI in the different stages.

Fig. 1 Linear Three-Stage Strategic Marketing Planning Framework

3.2. STP Strategic Analysis Theory

STP is the core strategy of marketing, including market segmentation, targeting and product positioning. In the three-stage strategic marketing planning framework of this study, combined with STP theory, in the middle stage, which is the stage of marketing strategy, Market segmentation can benefit from the implementation of mechanical AI, targeting can leverage the capabilities of thinking AI, and product positioning can be enhanced by the incorporation of feeling AI.

4. Tesla's AI Marketing Applications: An In-depth Case Study

As a global leader in the electric vehicle industry, Tesla started to lay out the application of AI technology in marketing as early as 2013. This paragraph uses the three-phase framework proposed by Huang & Rust [3] and combines three different types of AI tools and utilizes the STP theory in the stage of formulating the marketing strategy and analyzes how Tesla applies AI technology to marketing under the guidance of these theoretical frameworks in detail, and the next section will show how Tesla applies AI technology to each marketing stage. The next section will show how Tesla applies AI in each marketing phase.

4.1. Marketing Research Stage (Pre-Stage)

During the marketing research stage, Tesla leveraged mechanical artificial intelligence technology to automate large-scale data collection, relying on the large number of sensors built into Tesla vehicles. Vehicle usage, driver behavior patterns, and road environment are continuously monitored, recorded, and uploaded, thus creating a dynamic mesh data system that is updated in real-time. With the help of this massive database, Tesla could accurately understand the performance of its products in real-world scenarios. For example, by automatically scanning the vehicle's power consumption, driving speed, tire condition and other data, it can know the condition of the vehicle itself, which improves the overall safety factor. By analyzing the driver's driving behavior characteristics, such as braking frequency, steering amplitude, speed changes, etc., the author can know the driver's own mental or physical condition, so that can switch to automatic driving mode at any time. At the same time, visual recognition technology is used in conjunction with the front camera to capture various data such as time series changes in road traffic conditions in front of the vehicle at any time [9].

Subsequently, Tesla's business unit combines Thinking AI's ability to analyze and process a comprehensive database including sales data, media data, and in-vehicle data to identify the latest trends and dynamics in the marketplace, and these applications can help businesspeople better develop and evaluate more suitable products. Finally, Tesla uses perceptual artificial intelligence to predict consumers' intention to buy a car or analyze consumers' online feedback to gain insights into their satisfaction with the product. These applications not only demonstrate the ability of different types of AI to process different data, but also fully demonstrate Tesla's deep mastery of AI technology. The results of these applications have important underlying value for Tesla to better understand consumer behavior, optimize product design, and improve user experience, laying a solid foundation for the development of subsequent marketing strategies [10].

4.2. Marketing Strategy Building Stage (Mid-Stage)

At this stage, three different types of AI are applied to each of the three components of the STP theory to form a synergistic whole. Specifically, Mechanical AI is mainly used to perform market segmentation, and with its outstanding data processing capability, it can gain more accurate insight into the characteristics and needs of each market group. Thinking AI is mainly responsible for the selection of market targets, and its ability to analyze and understand a large amount of information can assist enterprises in determining the most appropriate target market. Sensing AI, with the help of deep learning and human-computer interaction technology, can understand the behavior and thinking of target consumers, thus realizing more accurate market positioning.

4.2.1 Mechanical AI To Implement Market Segmentation

Tesla uses the powerful algorithmic capabilities of mechanical AI to distill customer information from massive amounts of data, such as consumer purchasing behavior, shopping preferences, and other data. These data analyses can assist Tesla in segmenting the market into user groups with different needs and behavioral characteristics. For example, some customers may be attracted to the appearance of the Model 3, others may prefer to buy the latest Tesla model, and still others may prefer a more technologically advanced model. With this type of segmentation, Tesla is able to better understand consumer behavior, develop a more targeted marketing strategy for each group, and provide better-matched products and services to different user groups.

4.2.2 Thinking AI To Select Market Targets

In the selection of market targets, Tesla uses the data processing and analyzing capabilities of Thinking AI to explore the potential value of each market segment and Tesla's own competitive advantages, so as to select the most appropriate target market. For example, the Thinking AI can prioritize the markets where resources need to be invested by analyzing key indicators such as market size and market growth rate. It can also analyze competitors and the intensity of competition to

confirm the market suitability of Tesla's products, thus ensuring that Tesla can maximize the benefits from its overall marketing strategy.

4.2.3 Feeling AI For Market Positioning

In order to achieve more accurate market positioning, Tesla adopts the deep learning technology of perceptual AI to capture the purchasing behavior of customers in the target market and collects customer feedback by deeply analyzing data such as user evaluation and social media interaction through human-computer interaction technology. With the application of this kind of AI, Tesla can more accurately understand the needs of target customers and better position its products and services.

To summarize, through the effective combination of three different types of AI and STP theory, Tesla has achieved more efficient intelligence as well as more targeted strategy formulation at this stage, better meeting consumer demand and enhancing overall market competitiveness.

4.3. Marketing Action Stage (Late-Stage)

With the support of extensive data research in the pre-marketing phase and the direction of marketing strategy in the mid-term, Tesla applies the three different types of AI to standardize the production process, to uniquely personalize customer service, and to bring customers closer to the brand. For example, Tesla uses the characteristics of mechanical AI to automate and standardize the production process, ensuring that every car that leaves the factory meets strict quality standards. This model not only improves productivity, but also greatly reduces the possibility of errors. In the sales process, Thinking AI empowers the marketing team to have a higher degree of precision in understanding and meeting the needs of target customers, thus providing a more attentive and personalized service to each customer. Finally, Perceived AI plays a vital role in handling after-sales issues or finding solutions that maximize benefits for customers, taking the customer's perspective while also maximizing the company's interests, thus further increasing customer satisfaction and loyalty to the Tesla brand.

This application of AI in the action phase of marketing by Tesla fully demonstrates its leadership in innovation and technology application, and further proves that AI has significant value and great potential in the application of modern marketing.

5. Discussion

Based on Tesla's excellent performance in this study, the authors strongly recommend that marketing departments, in particular, actively explore and apply various types of AI technologies to maximize the efficiency of their marketing activities. Of course, there are different levels of AI applications, and marketing departments can choose the AI tools that suit their actual situation. In terms of application dimension, it not only includes traditional marketing data analysis, but also includes more complex customer behavior analysis, and even all kinds of dynamic market trend prediction and other deeper applications. However, it should be emphasized that AI is not omnipotent, and enterprises need to pay attention to its limitations and possible risks in the application process. Although this case study provides us with a useful perspective on the application of AI in marketing, it lacks the support of actual data, so for a more generalized scenario, need to conduct a large-sample study and practical application in various market environments. In addition, in order to draw more persuasive conclusions, need to incorporate large sample data for modelling and empirical analysis. In this way, can better understand and apply the possibilities and potential of AI in marketing.

6. Conclusion

To summarize, artificial intelligence is the lighthouse of today's era, its application in marketing is also a necessary way for enterprises to develop, the reality of enterprises need to combine their own specific circumstances, in market research, strategy development and implementation of the action of the various stages of the selection of suitable for their own AI tools, so as to obtain a place in the

highly competitive market, through the AI tools to continue to innovate the marketing model, and at the same time to strengthen the control of the risk of artificial intelligence, improve their core competitiveness. Researchers will continue to innovate the marketing model through AI tools, and at the same time, strengthen the ability to control the risk of AI to improve the core competitiveness of our own enterprises.

References

[1] Ljepava, N. (2022). AI-Enabled Marketing Solutions in Marketing Decision Making: AI Application in Different Stages of Marketing Process. tem Journal-Technology Education Management Informatics, 11(3), pp.1308-1315.

[2] Jarek, K., & Mazurek, G. (2019). Marketing and Artificial Intelligence. central European Business Review, 8(2), pp. 46-55.

[3] Huang, MH., Rust, R.T. (2020) A strategic framework for artificial intelligence in marketing. j. of the Acad. Mark. Sci. 49, 30-50. https:/ /doi.org/10.1007/s11747-020-00749-9.

[4] Verma, S., Sharma, R., Deb, S., & Maitra, D. (2021). Artificial intelligence in marketing: systematic review and future research direction. International Journal of Information Management Data Insights, 1(1).

[5] Wirth, N. (2018). Hello marketing, what can artificial intelligence help you with. International Journal of Market Research, 60(5), 435-438.

[6] Sujata, M., Khor, KS., Ramayah, T., & Teoh, AP. (2019) The role of social media on recycling behavior. sustainable Production and Consumption, 20,. 365-374.

[7] Sha Nazim, S, & Rajeswari, M (2019). Creating a Brand Value and Consumer Satisfaction in E-Commerce Business Using Artificial Intelligence with the Help of Vosag Technology. International Journal of Innovative Technology and Exploring Engineering, 8(8), 1510-1515.

[8] Huang, M. H., & Rust, R. T. (2017). Technology-driven service strategy. journal of the Academy of Marketing Science, 45(6), 906-924.

[9] Carson Qing & Wei Hao, 2018. "A Methodology for Measuring and Monitoring Congested Corridors: Applications in Manhattan Using Taxi GPS Data," Journal of Urban Technology, Taylor & Francis Journals, vol. 25(4), pages 59-75, October.

[10] Kumar, V., Rajan, B., Venkatesan, R., & Lecinski, J. (2019). Understanding the role of artificial intelligence in personalized engagement marketing. California Management Review, 61(4), 135-155. https://doi .org/10.1177/0008125619859317