

AI-Enabled Marketing Solutions in Marketing Decision Making: AI Application in Different Stages of Marketing Process

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Abstract – The digital transformation led by disruptive technologies can help organizations address numerous challenges and deliver better customer value through innovative technologies in all business areas. Artificial intelligence (AI) is finding its application in various business disciplines and is expected to be one of the most important technological tools used in marketing in the years to come. The paper addresses the expected role of artificial intelligence solutions in marketing decision-making throughout the five steps of the marketing process. The study provides a systematic review of the research articles addressing the application of AI for marketing decision-making published in the period from 2020 to 2022. Identified applications are then mapped to five steps of the marketing process: analysis, strategy, tactics, customer relations, and value proposition creation. The findings indicate that most of the current AI applications are utilized in the first stage of the marketing process related to understanding and predicting customer behaviour and in the tactical stage of creating a marketing mix. The paper concludes with recommendations for marketing practitioners and recommendations for further research.

Keywords – AI marketing, machine learning, decision-making, marketing process

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1. Introduction

Technology has become an enabler of various business processes in the past twenty years, with an increasing number of business functions being impacted by digital transformation. Technology facilitated the shift from the analog to the digital era, starting the comprehensive digital transformation while integrating computer software and technological applications with all business processes.

As a consequence of this shift, an increasing number of organizational functions are expected to be automated in the following years, using smart, automated machines, artificial intelligence bots, and mobile applications. According to [14] the major drivers of digital transformation are increased profitability and revenue, increased operational efficiency, gaining competitive advantage, increased employee productivity, and increased overall customer satisfaction.

Digital transformation can help organizations address numerous challenges and deliver better value to customers by applying innovative technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), robotics, and Blockchain. Price Waterhouse Coopers conducted a comprehensive study to identify the essential technologies for the future. Among more than 250 emerging technologies, the Artificial Intelligence has been identified as one of the essential eight technologies for the future, along with augmented reality (AR), Blockchain, drones, Internet of Things (IoT), robotics, 3D printing and virtual reality (VR). As a result, both businesses and governments have begun to adopt artificial intelligence-based technologies in various sectors to address the challenges of the comprehensive digital transformation process. [14]

The innovations brought by disruptive technologies led to the new interdependence of the various elements of the new industrial revolution. This revolution, "the fourth industrial revolution," has the potential to help governments and businesses to

address numerous issues such as the slow-growing economy, high unemployment rate, increase in production and improvement of service quality and customer relationships through the innovative technological solutions also called "next tech" [18]. All these changes will significantly affect the future of work since digital transformation requires radical changes in management, business strategies, and corporate culture.

Mechanization was a leading force of the first industrial revolution in the 18th century; it profoundly changed the production processes, influenced the workforce structure and opened the way for the forthcoming industrialization and economic development, having a significant impact on all areas of life and work. Similarly, the propulsive development of information and communication technologies at the end of the 20th century influenced all business processes. As a result, business processes have witnessed a remarkable improvement in terms of speed, efficiency, and accuracy. Artificial intelligence and other emerging technologies are expected to have a similar role in future development in all business and everyday life areas.

Artificial intelligence (AI) is a type of technology that aims to simulate the decision-making and cognitive processes of the human brain. John McCarthy defined AI as "machines that can perform tasks that are characteristics of human intelligence" [1]. More recently, several other definitions of artificial intelligence emerged; one of the widely used definitions is Accenture's definition of AI as the "use of multiple technologies that enable computers to sense, comprehend, act, and learn, including techniques such as machine learning, natural language processing, knowledge representation, computational intelligence." [1]. In the past few years, the application of artificial intelligence in different areas has been increasing, and along with other technological tools, it is one of the main drivers of the fourth industrial revolution and automation.

Machine learning is another term that is often used interchangeably with artificial intelligence, especially in the past few years. This term was coined in the 1950s when Arthur Samuel explained machine learning as the "ability of the machine to learn without being explicitly programmed." Machine learning applies processes similar to humans' contextual learning by analyzing data and making contextual links based on the patterns identified in the available datasets [3]. Computers can learn from the various data sets based on predefined processes and algorithms while recognizing patterns and getting different insights. However, instead of traditional software coding that typically includes very specific and precisely defined instructions and

routines, machine learning is based on the idea that algorithms can change, adjust and improve – "learn" – based on the results yielded in data analysis. The primary goal of these self-learning algorithms is to uncover predictive patterns underlying big datasets [40].

There are two types of artificial intelligence – general (strong) AI and applied (weak) AI. While strong AI is generalized artificial intelligence that can simulate the human brain functions and, in theory, handle any assigned task, weak AI is a type of artificial intelligence specifically designed to automate routine tasks in various industries. The primary goal of developing a strong AI is to develop a program that could mimic human intellectual capability and cognitive processes and make sense of the vast amount of information available. On the other hand, weak AI often includes pre-programmed responses and tasks; based on pre-programming, they classify the requests and respond in a way that has been previously programmed [31]. The examples of the weak AI are the popular voice assistants like Alexa, Siri or Bixby, process automation tools like Amazon MTurk, face recognition programs (Haystack) or credit scoring tools like Lendo [11]

There have been numerous discussions of AI applications in all areas of business. Artificial intelligence is expected to influence all spheres of everyday life and business practices profoundly. At its infant stage, AI is already finding its way into our everyday activities through virtual assistants on smartphones, website chatbots, or the interpretation of voice commands through natural language processing (NLP) [14]. The use of AI in business opens opportunities for utilizing and analyzing large datasets that could not be analyzed using traditional methods and tools. Artificial intelligence can also analyze different types and formats of data, structure, unstructured and semi-structured, coming from different platforms and develop a recommendation based on the analysis, extensively supporting the decision-making processes in the organization [31].

According to [34] there are four main potential options related to the application of AI in human decision-making:

- Complete human to AI delegation (e.g., automation of digital advertising, fraud detection)
- AI to human decision making (e.g., application in HR where AI conducts initial selection)
- Human to AI decision making (e.g., application in health)
- Aggregated AI and human decision-making (e.g., top management decision making)

Artificial intelligence is estimated to influence business practices, the public sector, and workforces

globally, as it will contribute to new production automation, improved service quality, and cost reduction. All this is expected to make businesses more competitive and enable companies to overcome future challenges [8].

2. AI in Marketing Decision-Making

In marketing, there are high expectations for the future applications of AI. Artificial intelligence is expected to impact customer segmentation, develop a more personalized experience based on individual data, enable a more profound understanding of the consumers, and make predictions based on previous consumer behaviour [16]. Additionally, artificial intelligence is also expected to map the individual customer journey and optimize customer experience, conduct a micro-segmentation, and develop predictive models for future customer behaviour. It is expected that artificial intelligence will completely reshape marketing by bringing new practices and techniques, relying heavily on automation and predictive modelling [21].

Data utilized in marketing are typically unstructured and can be found in various forms and formats. Marketing data can come from social media posts, behavioural data, app usage, geolocation services, transaction and purchasing history, and browsing history. It includes various formats ranging from textual data to video materials and images. Based on behavioural patterns, AI can cluster the customers in various groups based on their online behaviour, preferences, and previous transactions, thus enabling data-driven marketing practices that include contextual advertising driven by predictive algorithms.

Receiving insights from this big unstructured data generated through various online activities enables personalized and customized product recommendations and advertisement offerings and more precise targeting. These techniques are already implemented in contemporary marketing practices and have already found a wide application in the marketing field, mostly in digital marketing. Combined with the advanced "next tech," such as virtual and augmented reality, this will, in future, enable companies to target customers with more realistic, visualized offerings [18]. Additionally, biometrics face recognition technologies can enable personalization of the offerings in the real world by identifying the individual customers and offering them customized products or services powered by the predictive power of AI-enabled algorithms [20], [41].

Many of these technologies are already in practice, along with powerful tools for marketing analytics. However, according to [36] the main characteristic which distinguishes AI from the current marketing

analytics tools is the complete analytics process – not only the data collection and aggregation presented through the advanced dashboards but also encompassing the complex predictive and prescriptive analytical tools along with the managing of the complete campaigns.

According to [36] the main application of artificial intelligence in marketing is related to making decisions related to various personalization engagement marketing strategies and has an important impact on the everyday behaviour of individuals. Personalization is passive while customization is active; personalized ads are part of the marketing mix created in a way to attract customers. On the other hand, customization is active and is applied when the customer is proactively searching for the product or service. Both processes are based on the collected customer data – either first-party (company data) or third-party data. Nevertheless, the success of personalization and customization will always depend on the quality of the customer data collected, the volume of available data, the analytical capabilities of the analytical algorithms to provide the correct insights and the implementation of those insights [12]

Various parameters are used to predict behavioural patterns and generate personalized and customized offerings – from previous purchase history, online behaviour patterns, social media data and preferences (for example, page liked, hashtags followed), and demographic data from social media. The algorithm's goal is to understand customer preferences and predict behaviour. AI solutions are also utilized in marketing for social listening – following the social media conversations and recognizing the relevant conversations and images [12]. As a result, AI can improve the company's value proposition by targeting customers with their preferred goods and services, contributing to higher customer satisfaction and higher retention, and leading the customers through the sales funnel more efficiently and with higher success. The application of these technologies long-term is expected to provide an increased competitive advantage, and the companies that are lagging will not be able to follow the market trends and maintain their market share.

However, although the application of AI-driven solutions is now visible in the companies' marketing practices on the tactical level, the application of AI on the strategic marketing level and in strategic decision-making is still beginning. According to [36] we can expect that in the years to come, AI agents will be implemented more extensively for strategic decision-making (for example, choice of the business models, choice of the market entry strategy, choice of the communication channels, pricing decisions.). Furthermore, the wider application of AI-enabled

solutions in strategic decision-making will require a shift toward more prescriptive AI models. Five areas in strategic marketing which will be impacted by AI technologies in the recent future are proposed: marketing decision-making, identification of missing data, reduced cognitive bias by the human decision-makers, improved experiential-based learning and an overall increase in the quality of all segments of the marketing process.

The marketing process, according to [17], consists of five steps: (1) understanding the marketplace and customer needs and wants, (2) designing a customer-driven marketing strategy, (3) constructing an integrated marketing program (marketing mix), (4) building profitable relationships with customers and (5) capturing value to create profitable relationships and customer equity. Every step of the marketing process involves either strategic or tactical decision-making, and they are all interrelated. Therefore, managerial decision-making in marketing occurs at each stage of the marketing process.

The marketing research and analysis phase serves as a baseline for developing marketing strategies. Information collected during the phase of marketing research serves as an input for strategic decision making, and its successful transition to marketing strategy is a key to business success and maintaining a competitive advantage. Furthermore, marketing professionals need to make tactical decisions about creating an integrated marketing mix based on strategic decision-making. Customer relationship management also includes a variety of decisions ranging from the establishment and maintenance of customer databases to establishing effective communication with customers. Last but not least, the decisions related to managing drivers of customer equity—value equity, brand equity, and relationship equity may show as crucial for long-term profitability and customer retention [17].

Traditionally, marketing managers relied on expert knowledge, intuition, and experience in decision-making. However, this all changed with the availability of a plethora of marketing data and the orientation toward data-driven decision-making. It is now expected to base managerial decisions on valid and reliable data, and the available technologies can provide the tools and techniques needed to create effective decision support systems [3].

In the data-rich marketing environment, various types of marketing data can contribute to better decision-making in different stages of the marketing process.

The present study aims to explore the current AI-enabled marketing solutions and provide a better understanding of how those solutions can be applied to support decision-making in various stages of the

marketing process. Therefore, the following research questions are proposed:

1. What are the current areas of application of AI in marketing?
2. How can AI support marketing decision-making throughout the five stages of the marketing process?

3. Method

A systematic literature review of the most recent journal articles published in academic databases from 2020 to 2022 was performed. Following the formulation of the research questions, the following criteria for inclusion and exclusion of the reviewed studies were formulated:

Criteria 1: Articles related to the practical applications of the AI solutions in marketing

Criteria 2: Articles published between 2020-2022

Criteria 3: Articles published in English

Criteria 4: Non-related or loosely related articles not focused on the practical application of AI solutions in marketing were excluded.

In the next step, the search strings and keywords are specified, and a review of the available studies from the predefined academic databases is conducted. The process is shown in Figure 1.

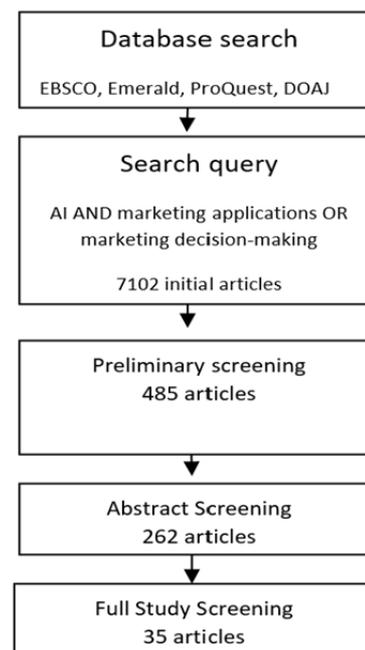


Figure 1. The review process

The research was conducted in five steps, as shown in Graph 1. First, the four scholarly databases were identified: EBSCO, ProQuest, Emerald, and DOAJ. Then the search strings and keywords were formulated, and the initial search was conducted. The initial search yielded 7102 results. The initial search was followed by preliminary screening, where the

irrelevant articles and duplicates shown in several databases were removed. In the next steps, the article abstracts were evaluated to determine the relevance of the identified article for the study. In the last step, the full studies were reviewed. The final sample includes 35 most relevant studies, as shown in the results section.

4. Results

Based on the systematic review of scholarly journals conducted in four academic databases, the

applications of AI in different stages of the marketing process have been identified. The applications are mapped with the five stages of the marketing process (1) analysis - understanding the marketplace and customer needs and wants (2) strategy – creating marketing strategies (3) tactics - creating the elements of an integrated marketing mix (4) customer relations - creating the CRM system that enables customer retention and loyalty and (5) value proposition – creating customer equity. The results are shown in Table 1.

Table 1. AI application in different stages of the marketing process

Stage	Area of application	Articles
Analysis	Text analytics for sentiment analysis Machine learning to discover insights from large datasets and improve efficiencies of the existing processes Predictive analytics Automated image analysis Choice modelling Determining consumer preferences based on the conjoint analysis model	Ayyub, et al. (2021); Brei, V.A.(2020); Grandinetti, R. (2020); Lee et al. (2020); Micu et al. (2022); Neeli, A. K. (2020). Urban, G., Timoshenko, A., Dhillon, P., & Hauser, J. R. (2020); Verma, S., Sharma, R., Deb, S., & Maitra, D. (2021) Villarroel Ordenes, F., & Silipo, R. (2021); Yanamandram, V., Akter, S., Hossain, M., & Gunasekaran, A. (2022);
Strategy	Creative analytics Decision support systems and expert systems Predicting outcomes in emerging marketing environments Forecasting Pricing decisions	Brei, V.A. (2020);Grandinetti, R. (2020). Stone, M., Aravopoulou, E., Ekinci, Y., Evans, G., Hobbs, M., Labib, A., . . . Machtynger, L. (2020).; Mogaji, E. and Nguyen, N.P. (2021); Wisetsri,et al (2022)
Tactics	Campaign automation Creative optimization, product development Advanced targeting and attribution Programmatic sampling Retargeting Programmatic media buying Marketing analytics Sales promotion Purchase prediction Recommendation systems Dynamic pricing Personalization – advertising and search Customer acquisition User engagement in social media Add targeting Email targeting	Al Ghamdi, I (2021); Brei (2020); Cabrera-Sánchez et al. (2020); Cortinas et al. (2021); Enache, M. C. (2020); Huynh, T., Nguyen, H. D., Zelinka, I., Nguyen, K. V., Pham, V. T., & Hoang, S. N. (2021); Kim et al. (2021); Koehn et al.(2020). Ming-C., & Kai-Hsiang, C. (2021); Micu et al.(2022); Neeli, A. K. (2020); Nair, K., & Gupta, R. (2021); Nestic, S., Aleksic, A., Gil, L., & Ljepava, N. (2022); Rafeian and Yoganasimhan (2020); Serravalle, F. and Pantano, E. (2021), Sehtya A (2021); Verma, S., Sharma, R., Deb, S., & Maitra, D. (2021). Villarroel Ordenes, F., & Silipo, R. (2021). Yin, J., & Qiu, X. (2021)
Customer relations	CRM Churn management Automated implementation of CRM Chatbots	Brei, V.A. (2020); Khoa, BT (2021); Ho, R. C. (2021). Ming-C., & Kai-Hsiang, C. (2021);Hollebeek, L. D., Sprott, D. E., & Brady, M. K. (2021); Neeli, A. K. (2020).Rana et al. (2021). Yau, A.K., Saad, N,M,,Chong, Y, M (2021); Sidaoui, K., Jaakkola, M., & Burton, J. (2020)
Value proposition	Reinforcing customer journey Evaluating brand image	Nufer, G., & Muth, M. (2022); Rana et al (2021)

The comprehensive literature review identified that most of the AI-enabled solutions can be found in stage one and stage three of the marketing process: the stage that includes marketing research and

understanding consumer needs and the stage of development of marketing tactics and a comprehensive, integrated marketing mix. The lowest number of AI applications

has been found in the final stage of the marketing process - capturing volume and creating customer equity. Additionally, only several examples of AI-based solutions utilized in creating marketing strategies have been found.

An overview of major AI applications and solutions for each step of the marketing process is provided next.

Stage 1 Analysis: AI-based solutions that can provide decision support in the first stage of the marketing process mostly belong to text analytics and sentiment analysis solutions [30], [25], [38], and predictive and big data analysis tools [2], [3]. Additionally, an emerging area of big data precision marketing focused on identifying specific customer behaviours and predicting their needs and purchase intentions have been identified [22], [43]. The interdisciplinary field of big data precision marketing integrates marketing concepts with machine learning and elements of operation research to apply modelling in marketing decision-making and optimization through mathematical modelling and complex decision support systems. AI solutions can also be applied for automated image analysis, choice modelling, and determining consumer preferences based on the conjoint analysis models [3], [15], [21], [39].

Stage 2 Strategy: Not many studies discussed artificial intelligence systems related to making strategic managerial decisions in marketing. Several authors argued that artificial intelligence could be used as a decision support system in creating marketing strategies [9], [13], and as a tool in strategic marketing decision-making [23], [36]. Additionally, AI solutions could support pricing decisions, predict outcomes in emerging marketing environments, and serve as decision support and expert systems [3]

Stage 3 Tactics: At this moment, AI technologies are finding their widest application in creating marketing mix and integrated marketing campaigns. The largest number of applications is found in digital marketing, where many AI-based solutions have already been in use for years [5], [6], [7], [44]. The application areas are many – from campaign automation to personalization, advanced targeting and retargeting, to programmatic sampling and media buying, purchase and sales prediction and development of the recommendation systems [4], [6], [26], [32], [42].

Additionally, marketing analytics tools are also finding their application in this stage of the marketing process since the input generated from those tools is utilized for prompt campaign optimization, retargeting, and creating personalized pricing and content [24], [28], [38]. Artificial intelligence solutions could also support creativity

and new product development by providing data-driven recommendations and options which could be further considered [33], [45]. Recommendation systems based on machine learning models are not new, and they have been applied mostly to understand consumer behaviour. However, they suggest that similar algorithms can also be used to develop "creative" artificial intelligence systems that could support content creation and content curation.

Stage 4 CRM: Most AI solutions applied in the fourth stage of the marketing process are related to chatbots created for consumer interaction or other automated solutions for customer relationship management [10], [14], [19], [35]. Chatbots are becoming widely adopted in different areas of customer service and customer relationship management, and we can expect the number of companies utilizing these AI-based solutions to increase in future further. Additionally, some studies suggest that customer relationship management artificial intelligence can also be used to develop customer churn predictive models, thus identifying customers that might potentially leave the company [3].

Stage 5 Value proposition: The final stage of the marketing process is highly underrepresented when it comes to suitable AI-enabled solutions. Only two studies were found where artificial intelligence solutions are at least partially applied in the domain of creating and capturing customer value. AI could be utilized to quantify brand evaluation based on the various brand attributes [27]. Additionally, the customer journey can be reinforced through artificial intelligence by following the complete customer journey lifecycle from brand awareness to building loyalty and brand equity [29]. Utilizing AI-based solutions like Chatbots, Recommenders, Virtual Assistance, and Interactive Voice Recognition (IVR) can support companies in creating better awareness, CRM and overall customer retention and loyalty.

5. Conclusion

The present study provided a systematic literature review of the most recent scholarly articles covering the application of AI-enabled solutions in the various stages of the marketing process. The findings indicate that AI and machine learning solutions are predominantly used to support decisions related to creating marketing mix – in promotional activities, pricing and product development, while they are least represented in the stage related to creating customer equity.

However, there is a strong trend in the utilization of AI systems in all areas of marketing, and as technologies keep developing and improving, this trend is expected to continue. Supporting managerial

decision-making by AI-driven decision support expert systems can be expected to increase in the coming years, aiming to enhance the decision-making of humans in a business context. As discussed before, intuitive decision-making based on individual expertise and experience had a significant role in traditional managerial decision-making. Marketing decision-making involves data-driven decision-making and intuitive reasoning, and no matter how sophisticated AI solutions are now, they still cannot serve as independent decision-making systems. However, the pace of the technological development will create an increasing need for further automation, optimization, augmentation and application of expert systems in marketing decision making.

The development of marketing expert systems, able to support the decision-making in all stages of the marketing process, can significantly support managerial decision-making by providing relevant, valid, and timely data, prediction and data-driven recommendations. This will also create the need for a new generation of marketers – skilled in efficiently interpreting and utilizing data gained from different platforms and turning them into insights needed to make decisions. The classrooms of the future should recognize this need and adopt an interdisciplinary approach to the education of future decision-makers to effectively utilize the available tools [37].

The limitations of the present study are mostly based on the study design and the specified search terms. Therefore, extending the search keywords might yield additional results. Moreover, considering that the number of publications in this area is increasing every year, it can be expected that some future studies can provide more insights into some stages of the marketing process which have not been covered so far.

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