

Research Article

The Impact of AI and Big Data on Marketing Management, Product Innovation and Pricing Decision

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Abstract: Artificial intelligence and big data are redefining how companies get to know customers, develop products and make pricing choices. Marketing is not promotion or communication anymore, it has been reduced to a data-based decision system wherein the behaviour and digital interactions of customers and market cues drive a managerial response. This paper analyzes how AI and big data will affect the marketing management, product innovation and pricing decisions. The paper is grounded in secondary research and conceptual synthesis of the latest scholarly sources, industry reports and policy papers. It creates a comprehensive AI-Big Data Marketing Decision Framework that bridges digital information sources, big data analytics capacity, AI smartness, marketing decision areas, marketing performance and accountable AI governance. The research points out that AI and big data enhance segmentation, targeting, personalization, customer engagement, idea generation, concept testing, demand forecasting, dynamic pricing and revenue optimization. The research is a contribution as it introduces AI and big data as a strategic instrument in making smarter, faster and more responsible marketing decisions.

Keywords: Artificial intelligence, big data, marketing management, pricing decision, product innovation.

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INTRODUCTION

Artificial intelligence and big data have become a main part of the marketing management core. Previously companies would only utilise data for sales reporting, customer profiling and campaign performance measurement. Today, data is utilized in order to forecast demand, individualize communications, discover product gaps, test out concepts for innovation, and even adjust prices throughout channels. This change has transformed the job of marketing managers. They don't just plan communications. Now, they will have to collaborate with data scientists, product teams, pricing analysts and technology platforms.

AI stands for systems that can perform tasks like learning, classification, prediction, language processing and decision support with the computing abilities. AI applications in marketing include recommendation engines, chatbots, customer journey mapping, advertising optimization, sentiment analysis, churn prediction, and product design and price optimization. Big data is a large amount of data in various formats that move quickly and are generated by digital platforms, social media, ecommerce, mobile apps, CRM systems, sensors and transaction data. AI and big data can transform companies from descriptive to predictive and prescriptive marketing.

The significance of AI in marketing may be better understood by looking at global evidence from the last several years. According to the Stanford AI Index, 78% of businesses reported using AI in 2024, up from 55% the year before (Maslej et al., 2025). Furthermore, the McKinsey's State of AI study identified some of the most prominent typical applications of

generative AI in businesses, including software engineering, marketing and sales, product and service development, and service operations (Singla et al., 2025). Additionally, according to similar statistics, the percentage of OECD enterprises that used AI increased from 8.7% in 2023 to 20.2% in 2025 (OECD, 2026). These are some of the numbers that demonstrate that AI isn't a future reality. It has already started to be integrated in business decision making systems.

AI and big data help with comprehending customers, competition and trends when it comes to marketing management. The company can study how people search, how they browse the internet, how they talk and share information on social media platforms, how they make purchases and how they interact with services, all of which can help to determine what customers need. This can help managers to create more relevant campaigns and improve the customer experience. For product innovation, AI can uncover unmet needs, test product ideas, review the product feedbacks and simulate demand and reduce product development cycles. AI can be used to predict the willingness to pay, determine price elasticity, track competitor pricing, and implement price adjustments, aiding in decision-making. The changes can improve performance, but also raise significant management and ethical issues.

One of the biggest problems is that there are numerous studies focused on AI in marketing, big data analytics or product innovation. The connection of the areas is not yet deeply established. In reality these choices are related. Information provided by the customer for personalization can also be an input for the development of the product. A demand forecast for product planning also can affect the pricing decision. Pricing algorithms have the capacity to affect long-term market positioning, consumer loyalty, and brand trust. To understand how AI and big data affect marketing management systems as linked decision systems, a more comprehensive framework is therefore needed.

This paper is focused on this need and deals with the influence of Artificial Intelligence (AI) and Big Data on marketing management, product innovation and pricing decision. This study is conceptual and review based. It builds on recent peer reviewed literature as well as industry and policy documents to create an integrated framework.

REVIEW OF LITERATURE

Artificial Intelligence in Marketing Management

This section examines the use of AI in marketing management. Without a question, one of the most popular field in marketing research is artificial intelligence. According to Davenport et al. (2019), AI will significantly affect consumer behaviour and marketing strategies. They outline their framework in terms of levels of intelligence, types of tasks and embodiment. This is crucial as there are marketed tasks that are more complex than others. There are some mechanical tasks like sending automated emails. Some are analytical, such as predicting churn. Some are intuitive and are associated with the identification of emerging customer needs. Some need sympathy, like dealing with complaints sensitively. Huang and Rust (2018) also stated that AI transforms service and marketing jobs by three different aspects: Intuitive, analytical, mechanical, and sympathetic intelligence. Repetitive jobs may be automated using mechanical AI. Analytical AI supports categorization and prediction. AI is perceptive and aids in identifying trends and possible choices. Although it is still in the early stages of development, empathetic AI is becoming more common in conversational agents and emotional analytics. For marketing management, this implies AI can assist with mundane tasks as well as strategic choices. AI also improves personalisation. Recommendation systems and predictive targeting, automated content generation which enable businesses to send messaging to certain customers based on their tastes and actions. This can help improve participation and conversion rates. But when customers believe that the firm is using their data without transparency, it turns into a risky situation. Therefore, when it comes to AI marketing, privacy and relevance are crucial considerations. The use of AI in marketing is expanding in terms of consumer experience, digital advertising, service automation, decision-making, and marketing ethics according to bibliometric and review research. The studies further indicate that AI is more beneficial to companies when it is embedded in processes rather than as a standalone solution. This is not to say that AI is merely a technology to be pretty displayed. It needs to be related to strategy, data governance, employee skill and manager control.

Big Data Analytics and Marketing Decision-Making

The ability of a company to collect, aggregate, analyze, and use massive data sets for decision-making is known as big data analytics capabilities. Businesses may segment their consumer base, understand their purchasing processes, forecast customer demand, and evaluate campaign outcomes with the use of big data analytics in marketing. Wedel & Kannan (2016) claim that one of the major developments in data-rich environments is marketing analytics. They said that a new method of monitoring and managing consumers has been brought about by the new data sources. Additionally, big data analytics greatly facilitates marketing agility. Vesterinen et al. (2024) suggested that the capability to use big data analytics facilitates marketing agility and the performance of the firm. Marketing agility is the capacity to feel the shifts in the market and react promptly. In dynamic markets, companies can't afford to wait for annual research reports. They need knowledge that is present or near real-time. They can identify shifts in demand circumstances, rival activity, and customer mood thanks to big data. According to Olabode et al. (2021), there is a favorable correlation between market performance outcomes and big data analytics capacity. This means that data capability is not just a technical resource. This turns it into a strategic marketing tool if it enhances decision quality and market responsiveness. But there is no value in big data in isolation. Businesses

require accurate and complete data, the right variables, analytical tools, and qualified staff. Bad data quality can result in inaccurate customer insights. Unfair targeting can result from biased data sets. If the organisation doesn't know which metrics are important, too much data can also confuse managers. Thus, big data analytics need to be linked with the managerial interpretation. In this unit, learners will examine.

AI, Big Data and Product Innovation

Product innovation is a matter of grasping customer issues, market opportunities and technological potentialities. AI and big data can assist companies to enhance innovation in a number of ways. One is to enable companies to look at customer reviews, social media activity and search trends and their complaint data to find what is still lacking. Second, they assist in idea creation, via analysis of patterns across markets. Thirdly, they assist companies in testing product ideas with simulations, A/B testing and predictive models. Fourth, they enhance the product lifecycle management by forecasting the demand and analysing the feedback after the product launch. Alghamdi & Agag (2023) concluded that big data analytics (BDA) with AI positively affects innovation performance. Strategic agility and market turbulence were also identified as a key part of the study. This means that the value of AI and big data is greater for companies dealing with volatile and rapidly evolving markets. In a stable market, experience will suffice. Under such turbulent markets, businesses must have more sophisticated sensors and faster learning. Generative product design is another way AI can be used. A firm can use machine learning models to analyse design alternatives and make predictions on consumer response, thereby saving time in product development. AI can aid in continuous innovation in digital products since user behaviour data can be gathered post-release and utilized to improve features. This makes product development an iterative learning process instead of a single product invention process. However, there are limitations with AI-driven innovation. While algorithms are great for detecting patterns in existing data, they can often fail to identify the deeper, human need, cultural meaning, or emotional value. Creativity, judgement and strategic positioning are also key to product innovation. Without using historical data, firms can be successful in creating incremental improvements but are unable to generate radical innovations. Hence, AI should be used to complement human creativity instead of replacing it.

AI, Big Data and Pricing Decision

Pricing is one of the most critical decisions in marketing. Given the fact that it has direct impact on revenue, profit, perception of customers and competitive position. The traditional pricing approaches rely on cost, competitors and customer value as inputs. The use of AI and big data has broadened the scope of pricing as firms can now consider real-time signals of demand, competitor price data, inventory levels, estimates of customer behaviour and willingness-to-pay. One of the most apparent use cases for AI in pricing is dynamic pricing. It enables the price to vary depending on demand, supply, customer segment, time, place or competitor actions. Dynamic pricing is a strategy that is frequently employed by airlines, hotels, ride-sharing companies, and e-commerce businesses. AI and dynamic pricing is a developing field of research, according to Chenavaz & Dimitrov (2025), particularly as machine learning can be used to aid more flexible price optimisation. AI-powered pricing can enhance revenue management by adjusting prices to align with fluctuations in demand. This can also minimize manual pricing mistakes and enable companies to make quicker decisions concerning market changes. For instance, machine learning can calculate product or customer segment price elasticity. Reinforcement learning can be used to test policies in dynamic pricing scenarios. Optimization models can be used to suggest prices that optimize for both revenue and margin and market share. AI pricing also gives rise to ethical and regulatory issues, though. When customers feel that prices are unfair or they are being hidden or discriminatory, the trust can fade. The Federal Trade Commission (2025) expressed concern about the practice of surveillance pricing which is the practice of offering a different price or presenting a higher-priced product to the consumer based on their actions. This indicates that pricing analytics is more than a purely technical problem. It's also a matter of consumer protection and trust.

Responsible AI and Marketing Governance

The ethical use of AI has emerged as a major issue in the marketing and commercial sectors. The OECD AI Principles place a strong focus on human rights, robustness, accountability, openness, and reliable AI (OECD, 2024). Responsible AI in marketing implies that companies must employ customer data ethically, transparently inform customers about algorithmic decisions where required, and safeguard privacy and prevent the misuse of data. It is essential for marketing managers to realize that AI systems can introduce bias when the firm is not discriminating in itself. Bias can be introduced via historical data, model design, variable selection or feedback loops. For example, an algorithm could display high-quality products to certain users and lower quality offers to others. A pricing model can have the unintended effect of charging different prices which may seem unfair. If training data isn't strong, a chatbot could provide inadequate responses to a specific set of customers. Clear policies, human oversight, model monitoring, customer consent, and data minimization and audit trails are essential for responsible governance of AI. Compliance and ethics experts, along with the legal, marketing, and IT staff, are also required to be part of the cross functional teams. The aim isn't to halt the uptake of AI. What matters is how AI can be leveraged to promote value while not compromising customer trust.

Objectives of Study

While there is a wealth of literature on AI and big data in marketing, there are gap areas. Firstly, there are numerous studies on AI in marketing management and product innovation and pricing separately. Limited integration of these three areas is

made into one decision framework. In real business practice, these areas are linked to each other. Therefore, the primary goal of this study is to analyse the impact of artificial intelligence and big data in marketing management, product innovation and in pricing decisions. Specific objectives are:

- To develop an integrated conceptual framework linking AI, big data, marketing management, product innovation and pricing decisions.
- To analyse how AI and big data influence marketing management and customer decision-making processes.
- To examine the role of AI and big data in product innovation, product development and market responsiveness.

RESEARCH METHODOLOGY

This study is a secondary investigation that employs a conceptual synthesis technique and a comprehensive literature survey. Analyses peer-reviewed journal articles, academic books, industry reports and policy documents about AI, big data analytics, marketing management, product innovation and pricing decisions. The topic is broad, technology driven and interdisciplinary which is why a secondary research design is suitable. It enables the study to integrate various perspectives on marketing theory, innovation management, pricing analytics, data science, and responsible AI governance. The study uses three categories of sources i.e., peer-reviewed journal articles from marketing, management, innovation and information systems journals, global industry and policy reports from credible institutions such as Stanford AI Index, McKinsey & Company, OECD and FTC, and recent conceptual and review papers on AI marketing, big data analytics, product innovation and dynamic pricing.

Proposed Conceptual Framework

The proposed framework explains how AI and big data influence marketing management, product innovation and pricing decision. The framework has six connected layers:

- Data input layer
- Big data analytics capability
- AI intelligence layer
- Marketing decision domains
- Performance outcomes
- Governance and human oversight

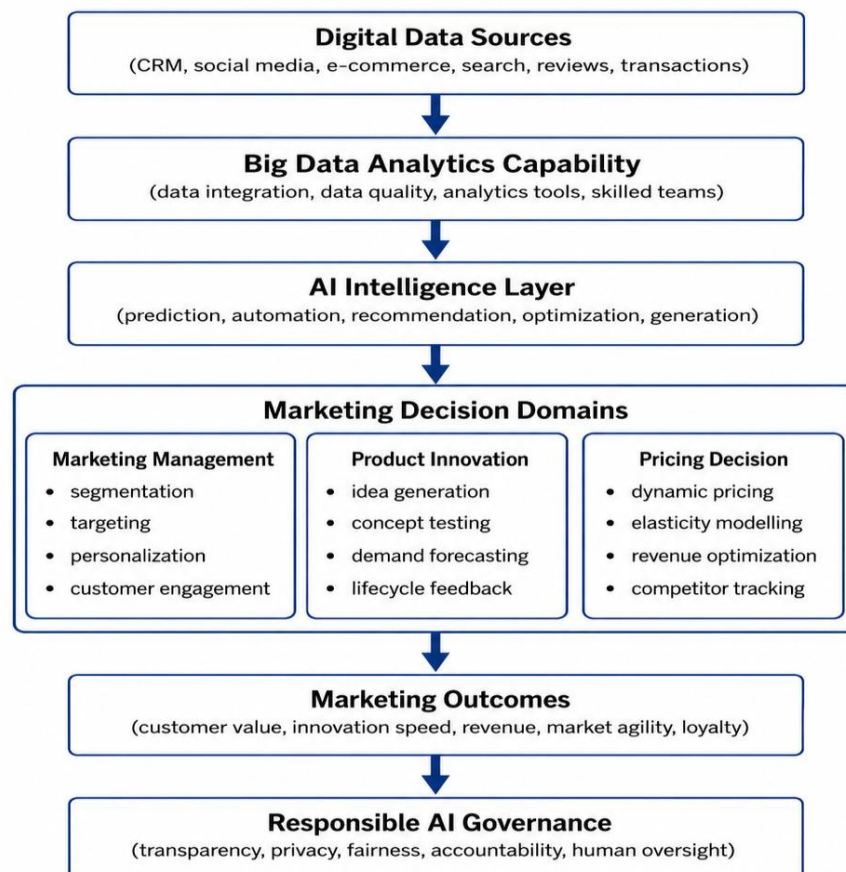


Figure 1

AI–Big Data Marketing Decision Conceptual Framework

The proposed conceptual framework describes how AI and big data work together to make valuable marketing decisions. It starts with the digital data sources that include CRM records, social media, e-commerce sites, search behaviour and reviews and transactions. These data sources go through big data analytics capability wherein data integration, quality, analytical tools and skilled teams are significant. The AI intelligence layer then transforms data into valuable insights via prediction, automation, recommendation, optimization and generation. These knowledge areas contribute to three key areas of marketing decisions: marketing management, product innovation and pricing decisions. AI is applied in marketing management to aid in segmentation, targeting, personalization and customer engagement. It aids in the idea generation, concept testing, demand forecasting, and lifecycle feedback in product innovation. The framework also reveals that the decisions result in improved marketing results including customer value, speed of innovation, increase in revenue, market agility and loyalty. Lastly, the responsibility of AI governance is put at the bottom to demonstrate that sustainable and ethical utilization of AI in marketing requires transparency, privacy, fairness, accountability and human oversight.

RESULT AND DISCUSSION

AI and Big Data Improve Decision-Making in Marketing Management

According to the literature, AI and big data improve marketing management by strengthening market sensing, customer knowledge, and decision-making speed. Data available online allows companies to know what their customers search, compare, buy, and review and dismiss. This provides managers with a more in-depth picture of customer behaviour as compared to traditional surveys only. Segmentation is also improved by AI. Conventional segmentation is usually based on demographic factors like income and location, age. AI-driven segmentation may consist of behaviour, preferences, frequency of purchase, browsing history and engagement history. This enables companies to develop micro- markets and customize the communication. The ability to personalize is among the most powerful AI effects on the marketing management process. AI is able to suggest products, tailor emails, produce content and determine when to contact customers in the most efficient way. This improves relevance. Nonetheless, the personalization should be open. Personalization may decrease trust in case the customers feel stalked or manipulated. Campaign evaluation is another aspect enhanced by big data. Managers have the ability to monitor impressions, clicks, conversions, customer acquisition cost, retention and lifetime value. This assists in changing marketing decisions which are intuition only, to evidence-based decisions. But figures do not eliminate the element of judgement. The brand meaning, consumer psychology as well as cultural context still require marketing managers to learn.

Table 1: Impact of AI and Big Data on Marketing Management

Marketing function	AI and big data application	Expected benefit	Risk
Customer segmentation	Behavioural clustering and predictive profiling	More accurate targeting	Privacy concern
Customer engagement	Chatbots, recommendation systems, personalized content	Better response and experience	Over-automation
Campaign management	AI-based media buying and performance analytics	Higher efficiency	Metric dependency
Customer retention	Churn prediction and loyalty analytics	Reduced customer loss	Biased prediction
Market sensing	Sentiment analysis and trend tracking	Faster response to market change	Misinterpretation of noisy data

Source: Author's synthesis based on Davenport et al. (2019), Huang and Rust (2018), Vesterinen et al. (2024), and Cruz & Rosario (2025).

AI and Big Data are used to support Product Innovation

The second conclusion is that by improving idea creation, concept testing, and product-market fit, AI and big data promote product innovation.. Firms are able to review and analyse the reviews, complaints and online discussions to detect product weaknesses. They are also able to view the emerging needs earlier than competitors. The innovation of products can be accelerated when companies implement AI to test the product concepts. As an illustration, historical data and digital experiments can be used to predict consumer response to various attributes of products. In online services and online retailing, A/B testing enables the companies to make comparisons of products during a live period. This reduces uncertainty. The AI is also used in demand forecasting. Firms are able to study the market trends, competitor activity and interest of the customers before rolling out a product. Once it has been launched, the firms will be able to track the feedback and improve the product. This contributes to a more continuous innovation. Nevertheless, the innovation of products based on AI must not turn into simply a data-driven imitation. When firms simply watch the already existing information they might end up developing products like those already in the market. Radical innovation may need imagination and taking strategic risks. Thus, AI must be considered as a system of support of innovation, rather than a producer of product strategy.

Table 2: AI and Big Data Applications Across Product Innovation Stages

Innovation stage	Data input	AI/big data tool	Managerial use	Source
Opportunity identification	Reviews, complaints, social media	Text mining and sentiment analysis	Identify unmet needs	Alghamdi & Agag (2023)
Idea generation	Search trends, competitor data	Pattern detection and generative AI	Develop product concepts	Davenport et al. (2019)
Concept testing	Survey, clickstream, A/B testing	Predictive modelling	Estimate customer response	Wedel & Kannan (2016)
Product development	Usage data, design data	Simulation and optimization	Improve features	Witkowski & Wodecki (2025)
Post-launch improvement	Feedback, sales data, service data	Demand forecasting and anomaly detection	Product refinement	Olabode et al. (2021)

Source: Author's synthesis based on cited literature.

Implications of Study

The research has practical implications to marketing managers, product or pricing decision-makers. It demonstrates that AI and big data could help to make marketing choices more precise, timely and customer-centric. Customer data enable managers to enhance their segmentation, targeting, personalization and engagement. Ai-based insights can help product teams detect unmet needs and test product ideas prior to launch. Analytics can help pricing managers to comprehend demand, competitor prices and revenue potentials. The research also indicates that companies should not rely on automated decisions. Data still requires human intervention to be interpreted to safeguard brand value and customer trust. Thus, the responsible AI governance cannot be regarded as a technical problem but as a component of the marketing strategy.

CONCLUSION

The research comes to the conclusion that AI and big data are emerging as key forces in contemporary marketing management. They assist companies to learn customers more and react to market shifts faster. AI enhances more segmentation, targeting, personalization and customer engagement. Big data analytics also assists managers in shifting their decisions towards intuition as opposed to evidence-based decisions. In product innovation, the AI assists companies to learn what customers want, to test and refine products after their introduction. AI assists in pricing (Dynamic price), elasticity and competitor modelling. Nonetheless, there are also issues to do with privacy, fairness, transparency and trust which are brought about by the application of AI. As the proposed conceptual framework indicates, the collaboration between digital data and analytics capability and AI intelligence will generate marketing value. Meanwhile, customer data needs to be governed responsibly and controlled by humans to prevent abuse. All in all, AI and big data may enhance the marketing performance provided the companies employ them in a moral, strategic, and controlled manner.

Limitations and Future Direction of Study

This paper is founded on secondary research, and thus does not entail primary data of customers and managers. The results are based on the available literature, reports and conceptual analysis. Therefore, in subsequent research, surveys or interviews may be used to test the suggested framework. Researchers can obtain information in marketing managers, product or pricing specialists. SEM can also be used in future studies to test the relationships between the AI capability and marketing outcomes using regression or PLS-SEM. Comparison can also be applied in terms of industry, particularly the retail, banking, hospitality, healthcare and e-commerce. Future studies should also examine consumer perceptions of pricing volatility and AI-based customisation. Further study is needed on the governance of responsible AI, especially in the areas of privacy, fairness, openness, and human monitoring of marketing choices.

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