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Revisiting the Interlink between Artificial Intelligence, Market Competition, and Consumer Behaviour

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ABSTRAK

Tujuan. Kecerdasan Buatan (AI) telah muncul sebagai kekuatan transformatif dalam bisnis modern, mempengaruhi dinamika persaingan dan membentuk ulang perilaku konsumen. Seiring dengan berkembangnya aplikasi AI di berbagai industri, pemahaman tentang dampak strategisnya terhadap persaingan pasar dan keterlibatan konsumen menjadi semakin penting untuk keberlanjutan dan inovasi bisnis.
Metode. Penelitian ini menggunakan pendekatan metode campuran yang menggabungkan analisis bibliometrik dan tinjauan literatur sistematik untuk mengkaji keterkaitan antara AI, persaingan pasar, dan perilaku konsumen. Analisis bibliometrik dilakukan dengan menggunakan database Scopus untuk periode 2015–2025, dengan VOSviewer digunakan untuk memetakan ko-occurence kata kunci dan kluster tematik. Selanjutnya, tinjauan literatur kualitatif dilakukan pada artikel-artikel yang relevan secara tematik dan sangat banyak disitasi untuk memperoleh wawasan mengenai implementasi praktis AI, implikasi kompetitif, analitik konsumen, dan masalah etika.
Hasil. Temuan penelitian mengungkapkan adanya peningkatan perhatian akademis terhadap strategi bisnis berbasis AI, khususnya antara tahun 2023 dan 2024. AI terbukti mempengaruhi persaingan pasar dengan meningkatkan efisiensi operasional, mendorong inovasi, mendukung pengambilan keputusan berbasis data, dan meningkatkan adaptabilitas strategis. Dalam hal perilaku konsumen, AI memungkinkan pengenalan pola, responsivitas waktu nyata, pemasaran yang dipersonalisasi, dan peramalan permintaan, yang berkontribusi pada kepuasan dan loyalitas pelanggan. Selain itu, operasi bisnis yang didorong oleh AI—seperti sistem penetapan harga dinamis dan rekomendasi produk—lebih lanjut mengoptimalkan kinerja. Namun, tantangan etika, termasuk privasi data, bias algoritma, dan celah regulasi, menekankan perlunya adopsi AI yang bertanggung jawab.
Kesimpulan. AI berfungsi sebagai penggerak teknologi sekaligus aset strategis dalam ekosistem bisnis kontemporer. Pengaruhnya melampaui otomatisasi, menawarkan keuntungan kompetitif bagi perusahaan melalui peningkatan kelincahan dan strategi yang berfokus pada konsumen. Untuk memanfaatkan potensi AI secara maksimal, perusahaan harus menyeimbangkan inovasi dengan pertimbangan etika, memastikan tata kelola yang transparan dan pengawasan manusia dalam integrasi AI.

Kata Kunci
Kecerdasan Buatan; Persaingan Pasar; Perilaku Konsumen; Strategi Bisnis; Analisis Bibliometrik

ABSTRACT

Backgrounds. *Artificial Intelligence (AI) has emerged as a transformative force in modern business, influencing competitive dynamics and reshaping consumer behavior. As AI applications expand across industries, understanding their strategic impact on market competition and consumer engagement becomes increasingly vital for business sustainability and innovation.*
Methods. *This study employs a mixed-method approach combining bibliometric analysis and systematic literature review to examine the interrelationship between AI, market competition, and consumer behaviour. Bibliometric analysis was conducted using the Scopus database for the period 2015–2025, with VOSviewer utilized to map keyword co-occurrences and thematic clusters. Subsequently, a qualitative literature review was performed on thematically relevant and highly cited articles to extract insights on AI's practical implementations, competitive implications, consumer analytics, and ethical concerns.*
Results. *The findings reveal a marked increase in scholarly attention to AI-driven business strategies, particularly between 2023 and 2024. AI is shown to influence market competition by enhancing operational efficiency, fostering innovation, supporting data-driven decision-making, and improving strategic adaptability. In terms of consumer behaviour, AI enables pattern recognition, real-time responsiveness, personalized marketing, and demand forecasting, contributing to customer satisfaction and loyalty. Additionally, AI-powered business operations—such as dynamic pricing and product recommendation systems—further optimize performance. However, ethical challenges, including data privacy, algorithmic bias, and regulatory gaps, underscore the need for responsible AI adoption.*
Conclusions. *AI serves as both a technological enabler and strategic asset in contemporary business ecosystems. Its influence extends beyond automation, offering firms competitive advantage through improved agility and consumer-centered strategies. To fully leverage AI's potential, businesses must balance innovation with ethical considerations, ensuring transparent governance and human oversight in AI integration.*

Keywords
Artificial Intelligence; Market Competition; Consumer Behaviour; Business Strategy; Bibliometric Analysis

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I. INTRODUCTION

Digitalization has made significant changes in the business world. Businesses are required to continue to innovate, digitalize, implement cost-efficiency, and improve their performance and competitive advantage (Hidayat *et al.*, 2022; Wang *et al.*, 2023). Therefore, businesses have been attempting to be agile by adapting rapidly to the ever-changing digitalization. One of the interesting aspects of digitalization today is the existence of artificial intelligence (AI). AI has several roles in business, for example, in automating, verifying, and also predicting upcoming scenarios (Himeur *et al.*, 2023; Sarker, 2022). Therefore, AI is something that cannot be neglected by people, businesses, and organizations.

The global AI market generated a revenue of $638.23 billion in 2024. Looking ahead, the market is projected to expand significantly, reaching approximately $3,680.47 billion by 2034 (Figure 1). This growth is expected to occur at a compound annual growth rate (CAGR) of 19.20% over the period from 2025 to 2034 (Zoting, 2025). According to (Gregoire, 2024), only 4% of companies have successfully developed advanced AI capabilities across multiple functions and consistently generated significant value from these initiatives. An additional 22% have formulated a clear AI strategy, established sophisticated capabilities, and are beginning to realize notable benefits. In contrast, 74% of companies have yet to demonstrate measurable value from their AI investments. Over the past three years, firms identified as AI leaders have achieved 1.5 times higher revenue growth, 1.6 times greater shareholder returns, and 1.4 times higher returns on invested capital compared to their peers. Beyond financial performance, these companies also outperform in areas such as patent generation and employee satisfaction.

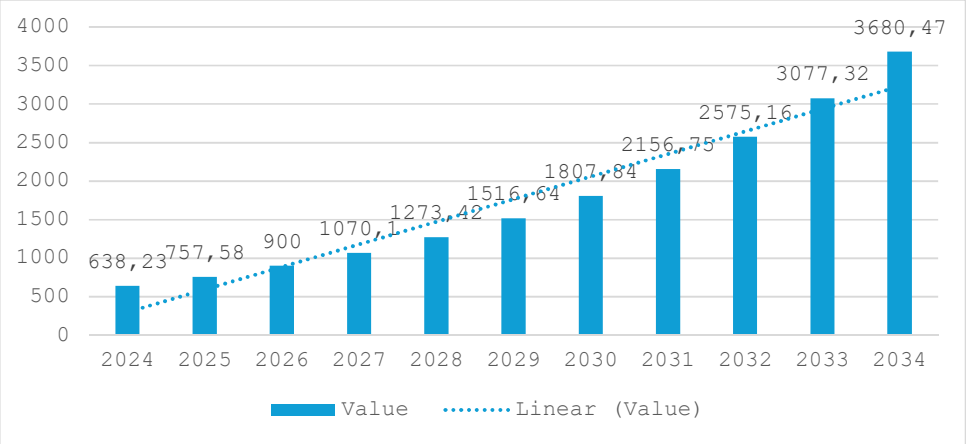

Figure 1. Artificial Intelligence Market Size 2024 to 2034 (USD Billion). Source: Precedence Research (2025)

Some of the business processes that AI has affected are consumer behavior and market rivalry. Various market competition metrics, such as the number of followers on social media, market prices, and manufacturing processes, can be studied and optimized through the use of AI (Gołąb-Andrzejak, 2022; Grover *et al.*, 2022). In addition, customer journey ranging from advertisements to purchases made by customers can also be seen as data, analyzed, and used to inform learning through AI and machine learning (Kietzmann *et al.*, 2018; Rana *et al.*, 2022). Therefore, businesses that utilize AI would outperform their competitors and achieve more success in their business ventures.

This paper aims to examine and study how AI can help companies in winning market competition and recognizing the consumer behavior of their customers in detail. Through a bibliometric and literature review approach, relevant and up-to-date information will be collected and synthesized, thus providing a comprehensive picture of AI's contribution to business sustainability.

II. THEORETICAL OVERVIEW

2.1 Artificial Intelligence

AI refers to the ability of computers to mimic human intelligence. AI is often defined as a technology that allows machines to mimic a variety of intricate human abilities. AI is alternatively defined as “systems that display intelligent behavior by analyzing their environment and taking actions, with some degree of autonomy, to achieve specific goals" (Sheikh *et al.*, 2023). AI has the ability of a computer to carry out cognitive tasks connected to human minds, such as seeing, thinking, learning, interacting with the environment, solving problems, making decisions, and even exhibiting creativity (Rai *et al.*, 2019).

With major economic and societal ramifications, AI seeks to replicate certain characteristics of human intelligence through technology. Its goal is to develop technological systems that can solve issues and perform jobs and obligations that are

typically performed by the human mind (Konar, 2018). The increased focus on AI in the business sector is a result of technological maturity attained in computational computing as well as the capacity to analyze vast amounts of data in any format quickly and in real time. From a business standpoint, AI and data analysis tools enable people to organize information that is typically already available on the markets in a disaggregated manner, turning data into business decisions (Sestino & De Mauro, 2022).

2.2 Market Competition

Competition can be defined as a collective effort to win the race rather than to eliminate rivals. Competition in local markets is aimed at consumers, and rivals compete to gain clients, either permanently or temporarily. However, the competition may become more strategic and tactical in the business-to-business process to surpass competing companies. Competition can be viewed as a controlled battle in this sense. Generally speaking, the norms of economic competition do not include the destruction of rivals (Rajagopal, 2012). Competitiveness is now regarded as a major worldwide concern. It is regarded as a way to accomplish sustainable development and desired economic growth. The capacity to establish a steady and suitable position in global marketplaces is known as competitiveness. In a time when globalization is accelerating, competitiveness is a crucial topic for businesses, industries, and policymakers worldwide (Kordestani & Mohammadi, 2016).

Any business that operates in the market wants to strengthen its competitive advantages by meeting consumer needs more efficiently than its rivals and so gaining a more favorable market position. An organization's ability to compete in the dynamic market, draw in new clients, and maintain a more competitive position is what determines its longevity (Straka, 2016). Being competitive entails taking advantage of every market opportunity with a carefully considered competitive strategy in order to outperform the competition (Malega *et al.*, 2019).

2.3 Consumer Behaviour

Consumer behavior is the study of how people, groups, or organizations choose, acquire, use, and discard products, services, experiences, and concepts related to meeting their needs and how these choices affect people, businesses, and society as a whole (Baker & Hart, 2008). It encompasses a broad range of activities and psychological processes, including perception, motivation, learning, beliefs, attitudes, decision-making, and post-purchase evaluation. Consumer behaviour not only involves rational economic decision-making but also emotional, cultural, and social influences that shape how individuals and groups engage with the marketplace (Chan, 2024). By understanding these patterns, businesses can design more effective marketing strategies, improve customer satisfaction, and foster long-term loyalty.

In the digital era, consumer behaviour has evolved into what is often referred to as digital consumer behaviour, reflecting the growing influence of technology on purchasing processes and experiences. Digital consumer behaviour examines how consumers interact with brands, products, and services through digital platforms such as e-commerce sites, mobile applications, social media, and artificial intelligence-powered interfaces (Efendioğlu, 2024). Factors such as instant access to information, personalized recommendations, peer reviews, and the use of smart devices have transformed traditional buyer journeys into dynamic, non-linear, and highly individualized experiences. Understanding digital consumer behaviour is crucial for businesses aiming to thrive in increasingly competitive and data-driven markets, where consumer expectations are shaped by immediacy, personalization, and seamless omnichannel experiences.

III. RESEARCH METHOD

This study adopts a mixed-method approach that integrates bibliometric analysis and literature review to comprehensively examine the interrelationship between artificial intelligence, market competition, and consumer behaviour. Bibliometric analysis provides a quantitative mapping of the intellectual landscape over the past decade, offering insights into publication trends and key research themes. Complementing this, a literature review offers a qualitative exploration of the thematic patterns, theoretical frameworks, and empirical findings emerging within the identified corpus of literature. Together, these methods ensure a robust and multidimensional understanding of the research domain.

The bibliometric analysis was conducted using the Scopus database, widely recognized for its breadth and depth of peer-reviewed academic literature (Gunawan, 2025). The search strategy employed the keywords ("Artificial Intelligence" OR “AI”) AND ("Market Competition" OR "Consumer Behaviour" OR “Consumer Behavior”), restricted to publications from 2015 to 2025 to capture the most recent and relevant advancements. Using VOSviewer software, the retrieved data were analyzed to visualize keyword co-occurrences and thematic clusters. Only English-language documents were included to maintain data quality and relevance.

Following the bibliometric mapping, a literature review was conducted to synthesize critical insights from the most influential and thematically relevant articles. Selected papers were examined for their conceptualization of AI applications, empirical evidence on competitive advantage, consumer behaviour implications, and ethical considerations. This dual methodological design enables not only the identification of quantitative research trends but also the qualitative interpretation

of how AI is transforming business strategies and consumer interactions. By combining these approaches, the study aims to present a more nuanced and comprehensive analysis of the evolving intersection between AI, competition, and consumer engagement.

IV. RESULTS

4.1 Bibliometrical Insights

The search in the Scopus database yielded 492 documents. The distribution of the publication trends was presented in Figure 2. The record of publications from 2015 to 2025 reveals a clear upward trajectory in scholarly interest related to the topic. The number of documents steadily increased from just 9 publications in 2015—the lowest recorded output during the period—to a peak of 134 publications in 2024, representing the highest level of research activity. This growth highlights the expanding relevance of the subject matter over time. Although there appears to be a decline to 46 publications in 2025, it is important to note that this decrease likely reflects the fact that data for 2025 is incomplete, given that the year is still ongoing. Overall, the linear trendline illustrates a sustained increase in research output, suggesting a growing academic and practical interest in the intersection of artificial intelligence and related fields.

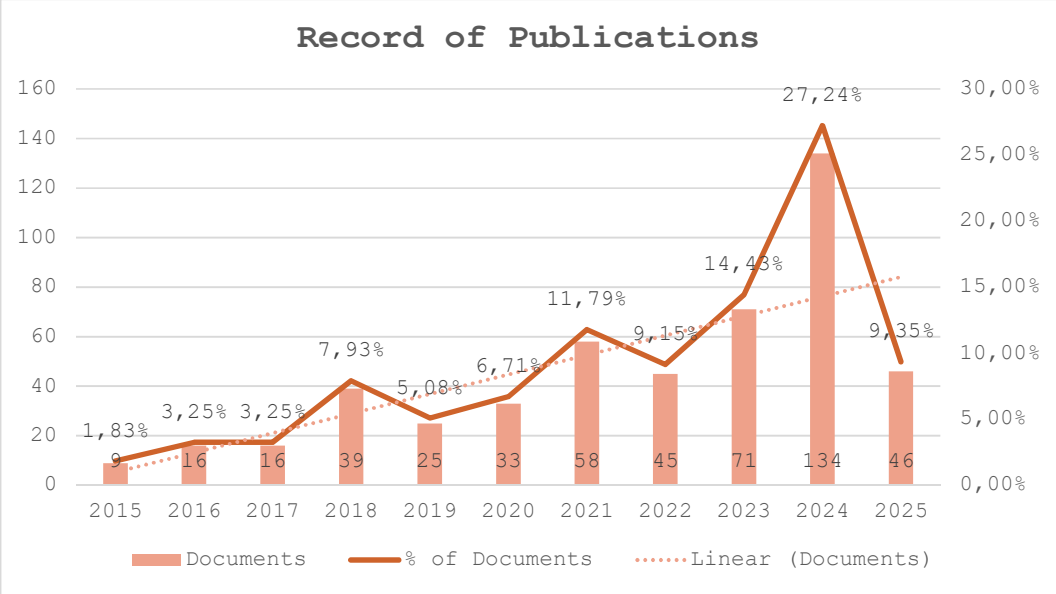

Figure 2. Publication Trends of Selected Keywords. Source: Author (2025)

The surge in publications, particularly the sharp increase observed in 2023 and 2024, can be attributed to several converging factors. Technological advancements, such as breakthroughs in machine learning algorithms, natural language processing, and generative AI, have significantly expanded the potential applications of artificial intelligence across industries. Furthermore, heightened market competition and growing corporate investments in AI solutions have driven academic and practical interest in understanding AI's strategic impact. Policy initiatives and regulatory discussions around the ethical use of AI have also intensified globally, prompting researchers to explore not only technological dimensions but also societal and economic implications. These combined forces have contributed to the notable rise in research activity, reflecting AI's central role in shaping the future of business, innovation, and consumer behavior. Next, the landscape of research trends was highlighted in Figure 3.

The network visualization map offers a detailed depiction of the structure of research on AI based on keyword co-occurrence patterns. The keyword "artificial intelligence" emerges as the most central and dominant theme, strongly interconnected with critical keywords such as "machine learning," "consumer behaviour," "commerce," "sales," and "learning systems." The map reveals 6 distinct clusters, each representing a thematic grouping. The green cluster focuses on AI's integration with "machine learning," "humans," and "algorithms," emphasizing the technical and cognitive aspects of AI. The blue cluster centers on "commerce," "electronic commerce," "competition," and "market competition," highlighting AI's role in transforming digital markets and business competitiveness. The red cluster revolves around "consumer behaviour," "marketing," "social media," and "customer satisfaction," indicating a strong focus on how AI influences consumer decision-making and engagement. The yellow cluster is relatively smaller and pertains to "human," "adult," "male," and "questionnaire," suggesting research related to demographic studies and human-centered AI evaluation. The purple cluster captures technical themes like "optimization," "sustainability," and "digital storage," underlining the operational and environmental optimization facilitated by AI. Lastly, the light blue cluster is linked to "internet of things," "energy

utilization," and "automation," portraying the synergy between AI and IoT-driven innovations. Collectively, these clusters demonstrate the interdisciplinary nature of AI research, spanning technological, commercial, consumer, and societal dimensions.

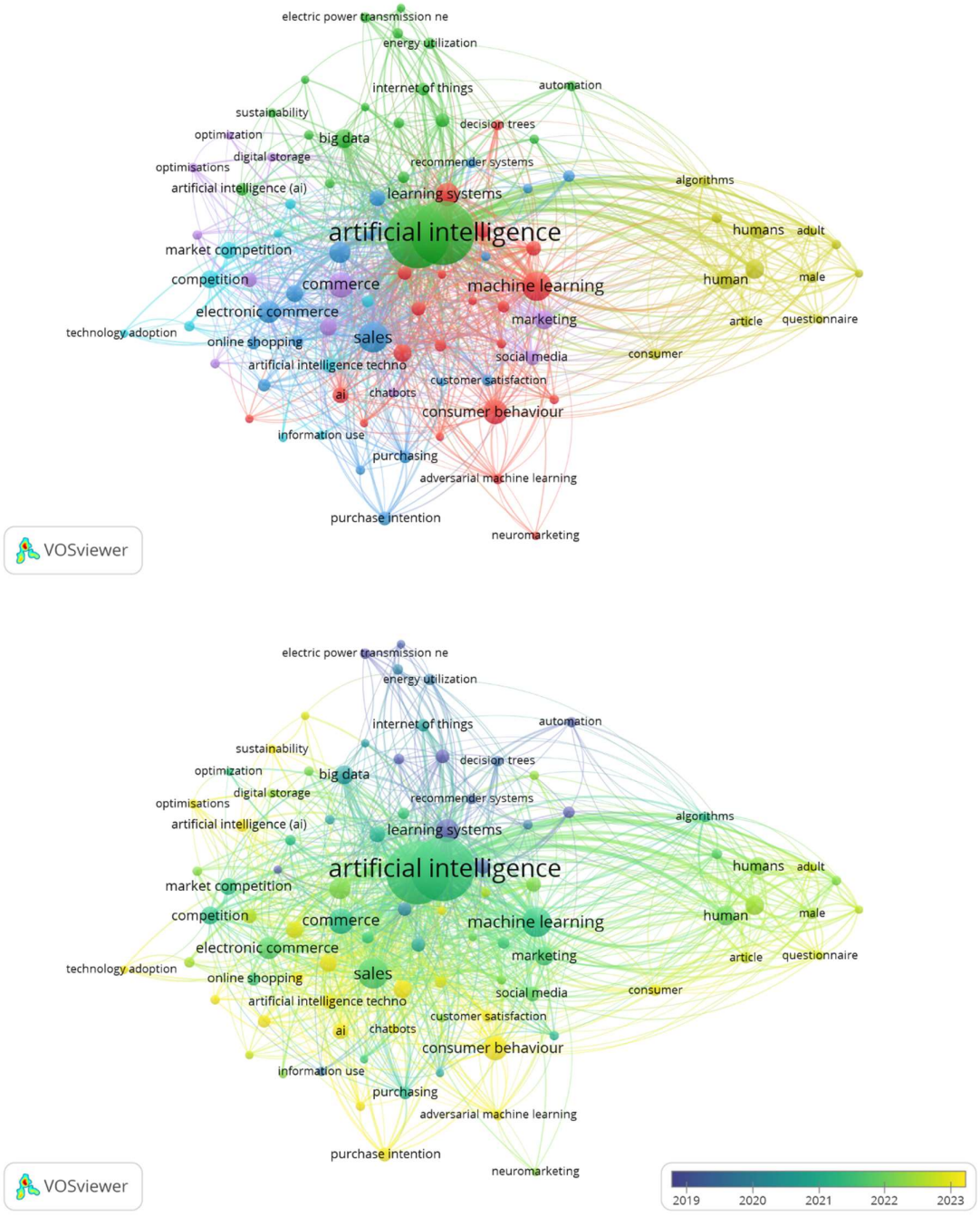

Figure 3. Research Trends based on Keywords and Clusters. (A) Network Visualization. (B) Overlay Visualization. Source: Author (2025)

The overlay visualization complements this structural analysis by illustrating the temporal evolution of AI research themes. Early research, depicted in blue to green hues (circa 2019–2020), predominantly centered on fundamental technological themes such as "learning systems," "recommender systems," "internet of things," and "energy utilization," reflecting an initial focus on developing core AI functionalities and infrastructure. Over time, research focus has shifted toward application-driven themes, as indicated by the yellow hues representing 2022–2023. Newer studies have increasingly emphasized "consumer behaviour," "sales," "online shopping," and "social media," marking a transition from technical development toward consumer-centric applications of AI. This shift suggests that AI research is progressively moving

beyond theoretical and infrastructure concerns to explore its broader impacts on market behavior, customer experiences, and commercial strategies. The overlay visualization effectively captures this dynamic transformation, illustrating how AI has evolved from a purely technological innovation into a critical tool for shaping modern commerce and consumer interactions.

4.2 Artificial Intelligence and Market Competition

AI has increasingly influenced various aspects of market dynamics, including competition, innovation, and consumer behavior. To provide a clear overview of the existing research relevant to this topic, the reviewed studies were presented in Table 1.

4.2.1 AI for Gaining Competitive Edge

(Krakowski et al., 2023) examined how AI adoption reshapes competitive capabilities and performance by analyzing chess tournaments involving human, AI, and hybrid play. The results show that AI triggers both substitution and complementation dynamics: it renders traditional human capabilities obsolete while fostering new human-machine capabilities that are often unrelated—or even negatively related—to the original skills. Performance in AI-driven environments depends not on human or AI abilities alone, but on a novel resource emerging at their intersection. The study highlights that to maintain a competitive advantage in an AI-based landscape, managers must develop new, AI-integrated capabilities rather than relying on traditional strengths. As a key figure in an organization, these combined efforts between manager and AI will become the key source for competitive advantage.

Drawing evidence from the readymade garment industry, one of the largest manufacturing sectors closely tied to export markets, (M. A. Hossain et al., 2022) employed a multi-phase research design to examine the strategic role of marketing analytics capabilities. The study finds that these capabilities are instrumental in enhancing firms' ability to sense, seize, and reconfigure market opportunities, thereby contributing to sustained competitive advantage. Notably, the adoption of AI strengthens the effectiveness of marketing analytics platforms, further amplifying firms' dynamic capabilities. These insights not only open new avenues for academic inquiry at the intersection of AI and marketing analytics but also offer practical implications, equipping managers with a clearer understanding of how to build organizational resilience within the context of a competitive and export-driven industry.

(Hussein Al-shami et al., 2022) investigates the transformative role of AI in service delivery within the hotel industry, particularly focusing on five-star hotels in the United Arab Emirates. Using a qualitative approach through semi-structured interviews with hotel managers, the researchers reveal that AI is actively integrated into key service areas, including trip planning, reception, and room services. The analysis identifies four critical drivers that enhance AI performance: infrastructure flexibility, strategic alignment, managerial support, and workforce skills. Additionally, the study highlights four indicators through which AI contributes to competitive advantage, mainly through improvements in service quality, cost efficiency, market share, and customer satisfaction.

(F. Hossain et al., 2024) argued that AI is transforming business strategies by enabling personalized marketing, optimizing operations, and enhancing decision-making through predictive analytics. It supports automation in customer service, product innovation, and new business models, while also facilitating global expansion and market localization. These advancements help boost efficiency, innovation, and customer satisfaction. However, challenges such as data privacy, algorithmic bias, and regulatory constraints present ongoing barriers. To sustain a competitive advantage, businesses must adopt responsible AI practices, invest in workforce reskilling, and ensure compliance. Additionally, integrating AI with technologies like blockchain and IoT opens new pathways for growth, requiring alignment with ethical standards and long-term strategic goals.

A broader view by (Chowdhury, 2024) stated that the convergence of AI and machine learning is transforming modern business operations by enhancing efficiency, automating processes, and enabling data-driven decision-making. These technologies personalize customer interactions and streamline operations, providing strategic advantages and optimizing resource use. As businesses adopt AI, they improve customer satisfaction and gain a competitive edge in an increasingly dynamic market. However, ethical considerations, security concerns, and regulatory challenges remain critical in managing this technological transformation.

(Shokran et al., 2025) stated that businesses who spend money on organized AI training programs see improvements in decision-making, productivity, and innovation.Businesses that use AI-driven workforce development can also better adjust to the quick changes in the market. The study emphasizes incentives and support mechanisms for staff engagement, highlighting the role of leadership in creating an AI-driven learning culture. A well-thought-out AI strategy improves staff competencies, guaranteeing resilience in the digital economy and long-term business success. Businesses can gain a competitive edge and protect themselves from digital threats by proactively implementing AI and providing personnel the

necessary training. Businesses that use AI to develop human talent rather than replace it will foster ongoing innovation, long-term success, and sustainable growth.

4.2.2 Economic Benefits of AI Adoption

(Sanil et al., 2022) suggests that widespread adoption of AI could significantly accelerate economic growth, with projections indicating that AI could nearly double annual growth rates in developed countries by 2035. For instance, AI is expected to increase the U.S. growth rate from 2.6% to 4.6%, contributing an additional $8.3 trillion to the economy, while in the UK, it could boost GDP by £814 billion. Beyond macroeconomic gains, AI is transforming the business landscape by empowering startups with competitive tools and enabling large enterprises to innovate. From industrial robots and self-driving cars to intelligent healthcare systems, AI is becoming embedded in various sectors. The integration of AI with big data analytics further strengthens its potential, and future advancements in machine learning are expected to surpass human capabilities in many domains. As AI reshapes development trajectories, a core challenge remains in fostering effective human-machine collaboration. (Sun et al., 2022) agree with these facts, stating that the AI innovation ecosystem can bring economic value and relationship value to enterprises.

(Wu & Monfort, 2023) highlighted the economic benefit of AI by demonstrating that implementing AI as a marketing strategy significantly improves firm performance. Specifically, AI enhances marketing capabilities, fosters customer value co-creation, and strengthens market orientation—factors that together drive competitive advantage and growth. Through structural modeling and qualitative analysis of food firms, the study confirmed that these elements are both necessary and sufficient for achieving superior business outcomes, showing how AI contributes directly to economic performance by optimizing marketing effectiveness.

(Ahmad, 2024) explores the economic benefits of AI by highlighting its transformative potential across industries, particularly in optimizing business processes and driving innovation. AI enhances decision-making, enables smarter supply chains, and supports more effective marketing strategies, contributing directly to improved productivity and cost efficiency. These advancements not only streamline operations but also open new opportunities for value creation, product development, and market competitiveness. However, the study also emphasizes the importance of responsible AI implementation, as the economic gains must be balanced with ethical considerations, such as job displacement and data privacy. Ultimately, AI holds vast economic promise if managed through inclusive, ethical, and environmentally conscious approaches.

Table 1. Studies on Artificial Intelligence and Market Competition.

Number	Authors (Year)	Research Title	Journal
1	(Krakowski et al., 2023)	"Artificial Intelligence and the Changing Sources of Competitive Advantage"	"Strategic Management Journal"
2	(M. A. Hossain et al., 2022)	"Marketing Analytics Capability, Artificial Intelligence Adoption, and Firms' Competitive Advantage: Evidence from the Manufacturing Industry"	"Industrial Marketing Management"
3	(Hussein Al-shami et al., 2022)	"Artificial Intelligent towards Hotels' Competitive Advantage: An Exploratory Study from the UAE"	"Foresight"
4	(Sanil et al., 2022)	"Role of Machine Learning in Changing Social and Business Eco-System – A Qualitative Study to Explore the Factors Contributing to Competitive Advantage During COVID Pandemic"	"World Journal of Engineering"
5	(Sun et al., 2022)	"Impact of Value Co-Creation in the Artificial Intelligence Innovation Ecosystem on Competitive Advantage and Innovation Intelligibility"	"Systems Research and Behavioral Science"
6	(F. Hossain et al., 2024)	"Unlocking Artificial Intelligence for Strategic Market Development and Business Growth: Innovations, Opportunities, and Future Directions"	"Edelweiss Applied Science and Technology"
7	(Wu & Monfort, 2023)	"Role of Artificial Intelligence in Marketing Strategies and Performance"	"Psychology & Marketing"
8	(Chowdhury, 2024)	"The Evolution of Business Operations: Unleashing the Potential of Artificial Intelligence, Machine Learning, and Blockchain"	"World Journal of Advanced Research and Reviews"
9	(Shokran et al., 2025)	"Harnessing AI Adoption in the Workforce: A Pathway to Sustainable Competitive Advantage through Intelligent Decision-Making and Skill Transformation"	"American Journal of Economics and Business Management"

10	(Ahmad, 2024)	"The Impact of Artificial Intelligence on Business & Social Values: Benefits, Challenges, and Future Directions"	"Educational Administration: Theory and Practice"

4.3 Artificial Intelligence and Consumer Behaviour

The integration of AI into consumer-facing technologies has significantly reshaped how businesses interact with and influence customers. To provide a clear overview of the existing research relevant to this topic, the reviewed studies were presented in Table 2.

4.3.1 AI for Analyzing Consumer Behaviour Patterns and Market Demands

AI, particularly through machine learning and data mining techniques, has revolutionized the way businesses understand consumer behavior. By analyzing vast volumes of structured and unstructured data, AI can detect purchasing patterns, predict future buying behavior, and uncover hidden trends that may not be visible through traditional analytical methods (Madanchian, 2024; Rehman *et al.*, 2024). These insights enable companies to tailor their strategies more effectively to meet evolving consumer expectations, such as by embracing big data marketing intelligence, digital commerce ecosystem, knowledge management for tourism, digital transformation and analytics for decision-making within the organizations. However, there are significant challenges, including data privacy concerns, the integration of computing resources, and the limited applicability of these models in real-world scenarios.

Machine learning algorithms can process consumer data in real-time, adapting to behavioral shifts and contextual changes in the marketplace (Khamaj & Ali, 2024). This dynamic responsiveness is especially crucial in fast-moving consumer goods and e-commerce industries, where preferences and demand change rapidly. By continuously learning from user behavior, AI tools can recommend products, identify churn risks, and suggest retention strategies.

Data mining, another core AI function, enables deeper segmentation of consumer bases. Companies can identify niche groups with specific preferences and customize offers accordingly. For instance, sentiment analysis using natural language processing allows businesses to assess consumer emotions from reviews, social media posts, or customer support interactions, providing a more nuanced understanding of satisfaction and demand drivers (Ahmed *et al.*, 2022). Moreover, AI helps bridge the gap between raw consumer data and strategic decision-making. Predictive analytics can forecast product demand, optimal launch timings, and seasonal buying patterns, enhancing inventory and supply chain efficiency (Tadayonrad & Ndiaye, 2023). This reduces the risk of overstocking or stockouts, ultimately contributing to a more balanced, cost-effective operation.

AI's ability to interpret complex consumer data and market signals allows firms to proactively shape their offerings, communication, and service experiences. The outcome is more relevant, personalized interactions and stronger customer loyalty, fostering competitive advantage in a customer-centric marketplace. Big data analytics has transformed digital marketing by helping businesses better understand and influence consumer behavior. By analyzing metrics like page visits, clicks, time on site, and search patterns, companies can create personalized marketing strategies that increase user engagement and satisfaction (Theodorakopoulos & Theodoropoulou, 2024). Tracking consumer behavior enables marketers to tailor messages and offers, improve website design, and predict future trends, leading to better user experiences, higher conversion rates, and stronger customer loyalty. Big data allows businesses to make more informed decisions and stay competitive in a rapidly evolving digital market.

4.3.2 AI for Better Business Operationalization

AI-powered dynamic pricing models allow businesses to adjust prices in real-time based on demand fluctuations, competitor pricing, inventory levels, and consumer behavior. Algorithms analyze these variables to identify the optimal price points that maximize revenue without alienating customers. In sectors like travel, e-commerce, and hospitality, dynamic pricing has become a standard practice that helps businesses remain competitive and profitable (Kumari & Kumar, 2024).

Furthermore, AI can personalize pricing strategies by offering tailored discounts or promotions based on customer profiles. For instance, loyal customers might receive special offers, while first-time buyers are presented with introductory prices (Yılmaz Benk *et al.*, 2022). This targeted pricing boosts conversion rates and customer satisfaction while maintaining profitability margins. Importantly, AI also monitors competitors' pricing, enabling faster and more informed adjustments. AI tools also aid businesses in refining their product portfolios by identifying high-performing products and those with diminishing returns. Using sales data, customer feedback, and market trends, AI can suggest modifications, bundling strategies, or retirement of underperforming items. This ensures the product mix is closely aligned with current consumer demands and market conditions.

Product recommendation systems, powered by collaborative filtering and deep learning algorithms, allow businesses to suggest relevant products to customers based on past purchases and browsing behavior (Messaoudi & Loukili, 2024). These

systems not only increase cross-selling and up-selling opportunities but also enhance the customer shopping experience by reducing decision fatigue and improving satisfaction. Additionally, AI can identify gaps in the market—areas where demand exists, but current offerings are insufficient. Businesses can then use this information to innovate or develop new products, increasing their market share and staying ahead of competitors. In essence, AI helps businesses remain agile and responsive to shifting consumer needs.

In marketing, AI provides valuable insights that enable highly personalized, targeted, and automated campaigns (V. Kumar et al., 2024). It identifies which messages resonate with different segments of the audience and determines the best channels and times to reach them. AI also assists in content generation, helping marketers create email subjects, advertisements, and social media posts optimized for engagement. Campaign performance is continuously tracked by AI algorithms, allowing real-time adjustments. If a particular message or creative isn't performing well, AI can modify it or shift the budget allocation to more effective tactics. This maximizes ROI and ensures marketing dollars are used efficiently and impactfully.

Predictive analytics tools also empower marketers to anticipate customer behavior, such as the likelihood of purchase or churn (Segun-Falade *et al.*, 2024). Based on these predictions, companies can proactively initiate engagement campaigns, loyalty programs, or retention strategies. This forward-looking capability gives brands a critical edge in customer relationship management. Sentiment analysis using natural language processing further refines strategy by gauging public opinion and identifying potential reputation risks. Companies can adapt their messaging to address consumer concerns or capitalize on positive trends. This responsiveness reinforces trust and brand loyalty. Ultimately, AI in marketing turns intuition-based decisions into data-driven strategies, reducing guesswork and increasing precision. By delivering the right message to the right person at the right time, businesses enhance both effectiveness and customer satisfaction.

Table 2. Studies on Artificial Intelligence and Consumer Behaviour.

Number	Authors (Year)	Research Title	Journal
1	(Madanchian, 2024)	"Generative AI for Consumer Behavior Prediction: Techniques and Applications"	"Sustainability"
2	(Rehman et al., 2024)	"Big Data in Marketing: A New Paradigm on Trends, Developments and Insights"	"International Journal of Technology Marketing"
3	(Khamaj & Ali, 2024)	"Adapting User Experience with Reinforcement Learning: Personalizing Interfaces based on User Behavior Analysis in Real-Time"	"Alexandria Engineering Journal"
4	(Theodorakopoulos & Theodoropoulou, 2024)	"Leveraging Big Data Analytics for Understanding Consumer Behavior in Digital Marketing: A Systematic Review"	"Human Behavior and Emerging Technologies"
5	(Ahmed et al., 2022)	"Business Boosting through Sentiment Analysis using Artificial Intelligence Approach"	"International Journal of System Assurance Engineering and Management"
6	(Tadayonrad & Ndiaye, 2023)	"A New Key Performance Indicator Model for Demand Forecasting in Inventory Management Considering Supply Chain Reliability and Seasonality"	"Supply Chain Analytics"
7	(Yılmaz Benk et al., 2022)	"A New 360° Framework to Predict Customer Lifetime Value for Multi-Category E-Commerce Companies Using a Multi-Output Deep Neural Network and Explainable Artificial Intelligence"	"Information"
8	(Messaoudi & Loukili, 2024)	"E-commerce Personalized Recommendations: A Deep Neural Collaborative Filtering Approach"	"Operations Research Forum"
9	(V. Kumar et al., 2024)	"AI-Powered Marketing: What, Where, and How?"	"International Journal of Information Management"
10	(Segun-Falade et al., 2024)	"Utilizing Machine Learning Algorithms to Enhance Predictive Analytics in Customer Behavior Studies"	"International Journal of Scholarly Research in Engineering and Technology"

4.4 Ethical Considerations in Using Artificial Intelligence

The ethical implications of AI have been explored across multiple studies, shedding light on the complex interplay between technology, business practices, and societal values. (Attard-Frost et al., 2023) emphasized that current AI ethics guidelines disproportionately focus on algorithmic decision-making while underrepresenting the political and economic ramifications of AI business operations. They argued that fairness, accountability, sustainability, and transparency are often undermined

by competitive norms, ethics washing, corporate secrecy, and other detrimental practices. Complementing this, (Eitel-Porter, 2021) stressed that ethical AI concepts alone are insufficient without strong governance frameworks. Businesses must integrate process management tools, audit trails, and ethics boards to ensure responsible AI deployment, ultimately facilitating safer and more scalable AI adoption.

Expanding the discussion, (Du & Xie, 2021) identified key ethical challenges such as algorithmic bias, consumer privacy, cybersecurity, autonomy, well-being, and the risk of increased unemployment. They advocated for corporate social responsibility (CSR) initiatives to promote ethical AI development, emphasizing the broader societal impacts of these efforts. (Bankins & Formosa, 2023) further analyzed the influence of AI on meaningful work through a five-ethical-dimensions framework: beneficence, non-maleficence, autonomy, justice, and explicability. Their findings revealed that AI can both enhance and undermine meaningful work, supporting skill development and belonging when used thoughtfully, but risking deskilling, reduced autonomy, and inequality when deployed without care. Transparent and ethically sensitive deployment strategies were identified as crucial to securing equitable outcomes.

Governance emerged as another critical theme. (Camilleri, 2024) reviewed the landscape of AI governance and CSR, noting that while few jurisdictions have comprehensive legal frameworks, major firms like IBM and Microsoft have established internal protocols to uphold accountability, transparency, fairness, and privacy. Nonetheless, governments face a "pacing problem," struggling to regulate rapidly evolving technologies. To address this, performance-based or co-regulation models were suggested, alongside the necessity for collaboration among AI developers, policymakers, and stakeholders to build trustworthy AI ecosystems. Strengthening internal capacities and continuously educating human capital on AI governance were deemed vital for sustainable innovation.

To operationalize ethics within organizations, (Brendel et al., 2021) introduced the Ethical Management of Artificial Intelligence (EMMA) framework. This triadic approach emphasizes ethical decision-making, the development of flexible ethical reference frames, and the consideration of environmental and stakeholder dimensions. Integrating these components ensures that AI initiatives align with broader ethical standards and societal expectations, highlighting the need for a dynamic, holistic approach to responsible AI management. Meanwhile, (De Cremer & Kasparov, 2021) critically addressed a growing misconception that AI systems possess their own moral compass. They asserted that AI is inherently unethical and that human input fundamentally shapes the ethical quality of AI outputs. This underscores the urgent need to cultivate human ethical awareness alongside technological advancement to prevent misplaced reliance on autonomous AI morality.

Specific ethical concerns in marketing were explored by (D. Kumar & Suthar, 2024), who discussed issues related to discrimination, bias, manipulation, privacy, cybersecurity, and intellectual property rights. They recommended transparency, explainability, ethical leadership, and multidisciplinary research to foster responsible AI marketing practices and build consumer trust. (Hermann, 2022), analyzing similar issues through the ethical dimensions framework, argued that beneficence and non-maleficence cannot be presumed in AI marketing. As AI grows more intelligent, ethical complexities multiply, necessitating a shift from purely rule-based (deontological) approaches toward frameworks that balance benefits and harms (utilitarian perspectives). Hermann highlighted the potential for AI to drive sustainability and social good if deployed responsibly, but cautioned against exacerbating vulnerabilities among consumers.

Finally, (Baker-Brunnbauer, 2021) provided insights from a management perspective, revealing that while managers are generally aware of AI ethics issues, practical implementation remains limited. The dominance of technical expertise, the absence of formal ethical guidelines, and business pressures contribute to these shortcomings. Managers valued transparency and robustness but often restricted openness due to intellectual property concerns. Importantly, the study emphasized the necessity for early ethical standard-setting, external certifications, and stronger dialogue between policymakers and businesses to guide future AI development.

To sum up, the literature reveals a broad consensus that while AI holds significant potential for innovation and societal benefit, ethical considerations must be deeply embedded into its development and deployment processes. Governance structures, corporate responsibility, transparency, and human ethical awareness emerge as key pillars for ensuring that AI systems contribute positively rather than exacerbate inequalities or ethical dilemmas. Moving forward, addressing the "pacing problem" between technological advancement and regulatory frameworks, fostering multidisciplinary collaboration, and promoting responsible innovation practices will be crucial for aligning AI progress with societal well-being and sustainability.

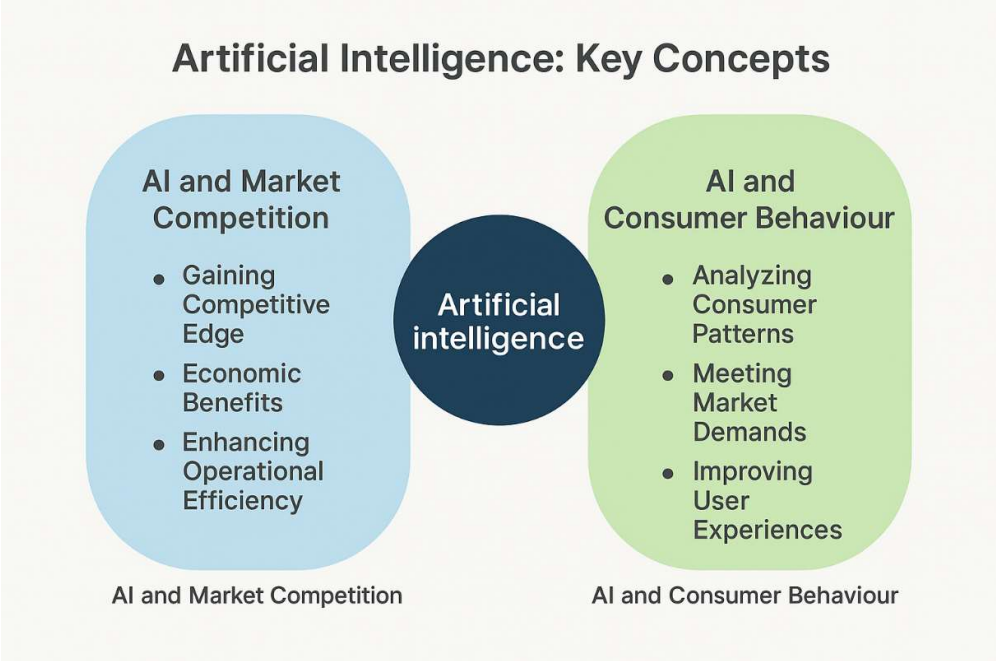

Figure 4. Summary of Key Concepts

V. CONCLUSION

This study provides a comprehensive examination of the evolving role of AI in shaping modern business dynamics, particularly in terms of market competition and consumer behaviour. Through a bibliometric and literature review approach, it is evident that AI is not merely a technological tool but a strategic asset that enables firms to gain a competitive edge, optimize operations, and develop consumer-centric business models. AI enhances marketing strategies, supports predictive analytics, and facilitates personalized consumer engagement, allowing businesses to remain agile in increasingly dynamic markets. Additionally, the study highlights the significant economic benefits of AI adoption, including improved productivity, innovation, and market expansion potential across industries.

However, the implementation of AI is not without its challenges, particularly in the realm of ethics. The research underscores the need for robust governance frameworks, ethical leadership, and responsible innovation to mitigate risks related to bias, privacy, and inequality. As businesses continue to embrace AI, a balanced approach that integrates technological advancement with ethical considerations is essential. Future efforts must focus on promoting transparency, human oversight, and regulatory alignment to ensure AI contributes positively to both business performance and societal well-being. Ultimately, AI's integration into business practice must be guided by a commitment to sustainability, inclusivity, and long-term value creation.

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