

# A STUDY ON ARTIFICIAL INTELLIGENCE'S EFFECTS ON E-COMMERCE WITH A FOCUS ON TRICHY

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## Abstract

As science, innovation, and the economy rapidly evolve, the adoption of artificial intelligence (AI) has become more prevalent, significantly shaping both our professional and personal lives. Within e-commerce, AI technologies have gained significant traction and yielded remarkable outcomes. AI has become an essential factor in propelling the expansion of online commerce. This paper aims to explore the important effects and significance of artificial intelligence in the growth of e-commerce. Online merchants use artificial intelligence (AI) in the e-commerce sector to offer Chatbot services, evaluate consumer reviews, and provide online customers with individualized experiences. A 2019 survey by Unbiased found that 40% of online customers actively look for exclusive offers and discounts using chatbots, and one in five consumers indicated that they would be prepared to buy goods or services through these bots. Gartner estimates that by 2020, AI technology would manage about 80% of all client transactions without the need for human intervention, with global e-commerce sales expected to exceed \$4.8 trillion in 2021. So, in 2019, how has AI changed the way people shop online? This section will discuss some of the most important uses of AI in e-commerce, backed up by actual business cases. An overview of the growth of e-commerce to date and the prospects of AI technology is presented in this study. Using Baidu Takeaway as a case study, it looks at AI-powered e-commerce assistants, intelligent logistics, recommendation systems, and dynamic pricing methods. It also looks at how artificial intelligence has a big impact on the expansion of e-commerce. The study primarily

examines the effects of AI on Trichy City consumers' online buying habits. With a sample size of 122 Trichy City customers involved in AI-driven e-commerce, data was gathered from primary and secondary sources via random sampling. The results were assessed using correlation analysis.

*Keywords: Business development, E-commerce, Online retailers, Artificial intelligence.*

## I. Introduction

E-commerce, or electronic commerce, encompasses the activities and services related to purchasing and selling products or services over the internet. As customer demand for online offerings increases, more companies are participating in e-commerce, seeking to gain a competitive advantage. However, businesses encounter difficulties with this digital sales approach due to the integration of rapidly changing, easily accessible, and cost-effective information technology (IT). This situation forces companies to continuously adapt their business models to address changing customer needs. The emergence of artificial intelligence (AI) marks the latest development in such technologies. It is transforming e-commerce by allowing for the precise analysis of external data, learning from that information, and utilizing those insights to achieve specific goals and tasks through flexible approaches. Depending on the context, AI can be classified as a system, tool, technique, or algorithm. It provides organizations with the opportunity to gain a competitive edge by utilizing big data to customize their services according to the distinct preferences of their customers.

In the past few decades, there has been remarkable progress in the field of artificial intelligence. Initially, AI was primarily used in expert systems and knowledge-based applications to offer guidance. Now, in this era of technological progression, artificial intelligence has evolved to exhibit more human-like traits and improved capabilities in problem-solving, learning, object manipulation, and navigating physical environments. Consequently, these advancements and a more effective use of technology have led to the development of intelligent systems that can oversee and manage business models with less human involvement. The advancements in artificial intelligence have yielded substantial economic advantages for society, enhanced nearly every facet of daily life, and significantly fostered social development, marking the dawn of a new era.

Artificial intelligence is seen as an innovative interdisciplinary technological field that creates theoretical frameworks, technologies, and applications designed to enhance and stimulate human intelligence. The application of artificial intelligence has been examined in numerous sectors, including healthcare, business, education, manufacturing, marketing, and financial management. Achieving a consistent and precise definition of artificial intelligence remains difficult. Russell and Norvig have classified the various definitions of artificial intelligence systems into two categories. These systems should have capabilities such as processing information to communicate in natural language, storing and presenting information, performing automatic reasoning—using stored information to answer questions and draw new conclusions, learning from experience to adapt to new circumstances, and recognizing new behavioral patterns. As a result, artificial intelligence can carry out the automated functions of cognitive work by mimicking and enhancing human intelligence. The core of artificial intelligence is intelligent technology, which serves as the basis for creating intelligent tools that replicate human intellectual activities. One approach used in artificial intelligence is blurred logic. This tool is capable of simulating human behaviors and processing and interpreting information and knowledge as if performed by a human. The effective use of blurred logic in combination with artificial intelligence promotes better planning, objective professional assessments, risk evaluation, sound decision-making, and management.

## **II. E-Commerce Business Model**

The e-commerce business model includes the different approaches and frameworks that online companies use to provide goods and services to

customers. With the incorporation of artificial intelligence (AI), these models have transformed to be more effective, tailored, and focused on the customer. AI technologies allow businesses to streamline their operations, improve customer interaction, and boost sales conversion rates. Essential elements of the e-commerce business model consist of:

### **Customer Interaction and Service**

AI-driven chatbots and virtual assistants enable immediate interaction with customers, offering prompt assistance and tailored suggestions. This enhances customer satisfaction and minimizes the necessity for human involvement.

### **Personalized Marketing and Recommendations**

Algorithms powered by AI examine user information like online activity, buying patterns, and personal preferences to provide customized product recommendations, discounts, and ads. This focused strategy enhances customer interaction and fosters loyalty.

### **Inventory and Supply Chain Management**

Smart logistics systems leverage AI to predict demand, control inventory levels, and streamline delivery routes, leading to reduced costs and quicker order completion.

### **Dynamic Pricing**

AI-powered pricing strategies modify product prices instantly according to market trends, rival pricing, and customer habits to enhance profitability and competitive edge.

### **Data Analytics and Decision-Making**

AI analyzes large volumes of data to deliver practical insights for strategic planning, market evaluation, and improving overall business efficiency.

## **III. Benefits of Artificial Intelligence in Online Retail**

Artificial Intelligence (AI) provides a wide range of advantages for the e-commerce sector, altering the manner in which companies function and how customers shop online. Among the primary benefits are:

### **Personalized Customer Experience**

AI examines customer information to provide tailored recommendations, suggest products, and offer targeted promotions, which improves customer satisfaction and boosts conversion rates.

### **24/7 Customer Support**

Chatbots powered by AI offer immediate support to customers 24/7, addressing questions, assisting in purchases, and solving problems without requiring human intervention.

**Efficient Inventory Management** Chatbots powered by AI offer immediate support to customers 24/7, addressing questions, assisting in purchases, and solving problems without requiring human intervention.

#### **Improved Pricing Strategies**

By utilizing dynamic pricing algorithms, AI modifies prices instantly according to market conditions, competitors, and consumer actions, assisting companies in optimizing profits while staying competitive.

#### **Enhanced Fraud Detection**

Artificial intelligence can rapidly detect unusual trends and possible deceitful activities, enhancing security and safeguarding both the company and its clients.

#### **Better Marketing Insights**

Artificial intelligence examines extensive data sets to identify customer preferences and market trends, enabling businesses to develop more efficient marketing campaigns and make better use of their advertising budgets.

#### **Streamlined Logistics and Delivery**

Artificial intelligence streamlines delivery paths and effectively oversees supply chains, leading to shorter shipping durations and lower expenses, thus enhancing the overall experience for customers.

#### **Reduced Operational Costs**

The use of AI to automate repetitive tasks reduces reliance on manual labor, which in turn cuts down on operational costs and enhances efficiency.

### **IV. The Role of Technology and Advancements in Artificial Intelligence Fueling E-Commerce Growth**

The swift expansion and evolution of e-commerce have primarily been driven by advanced AI technologies and improvements. These advancements have allowed online retailers to provide smarter, more efficient, and tailored experiences for their customers. Important AI technologies and advancements that are influencing e-commerce growth include:

1. Machine learning algorithms evaluate large volumes of customer data to uncover trends and anticipate actions. This technology fuels recommendation systems that propose products customized to personal preferences, boosting sales and improving customer interaction.

2. Natural language processing (NLP) enables chatbots and virtual assistants to understand and respond to consumer queries in conversational, natural language. This development enhances customer service by providing immediate assistance, managing intricate interactions, and enabling more seamless

communication.

3. Computer vision technology enables AI applications to analyze and understand images and videos. In the realm of e-commerce, it facilitates visual search capabilities that allow customers to upload images to locate comparable products, enhancing the shopping experience and assisting in product discovery.

4. Predictive analytics powered by AI predicts customer demand, enhances inventory management, and foresees market trends. This enables companies to minimize overstock and stock outs, boost supply chain effectiveness, and make proactive choices in marketing.

5. Sophisticated AI pricing strategies dynamically modify prices according to elements like customer habits, rival pricing, changes in demand, and stock levels. This maximizes revenue and enables competitive pricing.

6. Automation and AI-driven robots are being utilized more and more in warehouses for activities such as sorting, packing, and shipping goods, optimizing logistics and minimizing delivery durations.

7. Voice-activated devices and assistants become more prevalent, voice recognition technology is revolutionizing the way consumers find and buy products online, enhancing accessibility and convenience in shopping.

8. Advanced algorithms used by AI identify atypical transaction behaviors, marking potential fraudulent activities with great precision and improving safety for both shoppers and businesses.

### **V. Objectives**

- To investigate the impact of Artificial Intelligence on E-Commerce in relation to Trichy City.
- To explore consumer attitudes towards the utilization of AI in searching for information.
- To suggest practical solutions for E-Commerce.

### **VI. Review of Literature**

**BimalenduPandy (2023)** showed that “Role of AI in Business Management”. This Study examined that benefits of AI, including increased efficiency and productivity, improved accuracy and precision, and

better customer experience. This Study concluded that AI is rapidly transforming the way businesses operate, from sales and marketing to supply chain management, customer service, and financial analysis. AI-powered tools can help businesses to understand customer needs, create personalized marketing campaigns, and improve customer engagement.

**Rahul Pal (2022)** revealed that “Applications of Artificial intelligence in Company Management, E-Commerce and Finance”. This Study discussed the applications of machine learning and artificial intelligence in e-commerce, business management, and finance. The most often used applications are sales growth, profit maximization, forecasting, inventory management, security, fraud detection, and portfolio management. This Study concluded the uses of machine learning and artificial intelligence in e-commerce, business management, and finance. Sales growth, profit maximization, sales forecasting, inventory management, security, fraud detection, and portfolio management are just a few of the most popular uses.

**Harikumar Pallathadka et.al (2021)** in their study viewed that Application of artificial intelligence in business management, e-commerce and finance. This Study examined the machine learning and artificial intelligence application in e-commerce, corporate management and finance. This article concluded the uses of machine learning and artificial intelligence in e-commerce, business management, and finance. Some of the most common applications include sales growth, profit maximization, sales forecasting, inventory management, security, fraud detection, and portfolio Management.

**Prabha (2021)** in her study on Impact of Artificial Intelligence in E-Commerce. This Study identified the impact of artificial intelligence in e-commerce and understand the present status of e-commerce. This Study concluded that artificial intelligence has helped e-commerce websites in providing with better user experience.

**Javier Andreu-Perez (2016)** revealed that, Artificial Intelligence in Robotics. Artificial in new plagiarism technique has been proposed based on K-NN method. This method clusters the string and matches words with neighbors’. A counter is used to the count number of the string matched in compared files. Firstly, the file is compared with the existing set of files. The set of words which are matched are selected as copied words and showed as output. This technique finds the frequency of every matched copied word in the file. It also calculates the percentage of matched copied words.

## VII. Research Methodology

This research investigates the influence of Artificial Intelligence (AI) on e-commerce, particularly focusing on consumer experiences in Trichy City. To accomplish this goal, the investigator employed a mixed-methods approach, integrating both primary and secondary data sources. Primary data was gathered directly from consumers who actively use AI-driven e-commerce platforms, while secondary data came from relevant literature, reports, and prior research in the field. The sampling technique used was random sampling, which provided each participant an equal chance of being included in the study, thereby enhancing the reliability and generalizability of the results.

The sample population consisted of 122 consumers from Trichy City, chosen based on their engagement with AI-driven features in online shopping, such as personalized recommendations, interactions with chatbots, voice assistant usage, and dynamic pricing models. The collected data was systematically analyzed through correlation analysis to assess the strength and nature of the relationships between various AI applications and consumer behaviors in the e-commerce landscape. This analytical approach enabled the researcher to uncover significant trends and draw insightful conclusions regarding how AI technologies impact consumer satisfaction, buying choices, and overall online shopping experiences in the area.

### VIII. Analysis and Interpretation

**Table 1: Correlation among selected factors and E-Commerce**

Factors	E-Commerce	
	R – Value	P – Value
Forecasting analysis	.304	.000
Visual exploration and image identification	.381	.000
Tailored suggestions	.447	.000
Customer sentiment evaluation	.345	.000
Adaptive pricing	.246	.000
Suggestion systems	.307	.000

**Source:** Primary data and Secondary data, with a sample size of 122. Results are significant at the five percent threshold.

To investigate the connection between different independent variables and the adoption of E-commerce, Pearson correlation analysis was utilized. The independent variables considered were Predictive Analysis, Visual Search and Image Recognition, Personalized Recommendations, Customer Sentiment Analysis, Dynamic Pricing, and Recommended Engines, whereas the dependent variable was E-commerce. The research aimed to test the following null hypothesis:

H<sub>0</sub>: There is no significant connection between the chosen variables and E-commerce.

The correlation findings indicated a positive and statistically significant relationship between all independent variables and E-commerce, suggesting that these technological elements play a role in the increasing adoption of E-commerce in Trichy City. Among the variables analyzed, Personalized Recommendations demonstrated the strongest correlation ( $r = 0.447$ ,  $p = 0.000$ ), underscoring its crucial importance in improving user experience and fostering consumer engagement. Visual Search and Image Recognition followed with a correlation of  $r = 0.381$  ( $p = 0.000$ ), reflecting its rising importance in product discovery. Customer sentiment evaluation ( $r = 0.345$ ), Forecasting analysis ( $r = 0.304$ ), and Suggestion systems ( $r = 0.307$ ) also showed moderate but significant positive correlations with E-commerce, suggesting that data-driven personalization and automation enhance user satisfaction and aid in decision-making. Dynamic Pricing, while still positively correlated ( $r = 0.246$ ,  $p = 0.000$ ), exhibited the weakest

influence, indicating that although price changes can draw in consumers, their effect may be less significant compared to personalization and user-focused technologies.

All p-values were below 0.05 ( $p = 0.000$  for each), leading to the rejection of the null hypothesis. Consequently, it can be inferred that a statistically significant positive correlation exists between the chosen digital tools and E-commerce adoption in Trichy City. These results emphasize the necessity of incorporating AI-driven technologies—particularly Personalized Recommendations and Visual Search—to enhance consumer engagement and sales effectiveness in the E-commerce industry.

### VI. Findings

The outcomes of the correlation analysis indicate that all chosen independent variables exhibit a positive and statistically significant connection with E-commerce, signifying that each factor contributes—whether moderately or strongly—to the growth of E-commerce adoption. Nevertheless, the intensity of these connections differs among the variables. In particular, Forecasting analysis ( $r = 0.304$ ), Visual exploration and image identification ( $r = 0.381$ ), Customer sentiment evaluation ( $r = 0.345$ ), Adaptive pricing ( $r = 0.246$ ), and Suggestion systems ( $r = 0.307$ ) all show correlation coefficients below 0.40, suggesting that their effect on E-commerce, although positive, is relatively moderate. These lower correlation values suggest that while these technologies facilitate the expansion of E-commerce,

they may not be as effective or influential as others in promoting consumer engagement or enhancing business performance. Among all the variables examined, Personalized Recommendations stands out with the highest correlation value ( $r = 0.447$ ), indicating a stronger association with E-commerce and highlighting its vital role in shaping consumer experiences through customized content and product suggestions.

This finding is consistent with industry trends, where personalization is increasingly recognized as a crucial factor driving customer satisfaction and conversion rates in online retail. Additionally, the statistical analysis verified that all variables are significant at the 0.001 level, as shown by their p-values ( $p < 0.05$ ), justifying the rejection of the null hypothesis that posited no significant relationship between the independent variables and E-commerce. Therefore, the study concludes that there is a substantial and positive correlation among Predictive Analysis, Visual Search and Image Recognition, Customer Sentiment Analysis, Personalized Recommendations, Dynamic Pricing, and Recommendation Engines in relation to E-commerce, especially concerning consumer behavior in Trichy City. These results suggest that businesses seeking to enhance their E-commerce presence should prioritize the integration of advanced technologies—particularly those emphasizing personalization and user engagement—while also acknowledging the supportive roles played by pricing strategies, predictive tools, and AI-driven recommendation systems.

## IX. Suggestions

- **Personalized Recommendations:** Algorithms powered by AI examine customer habits, likes, and past purchases to offer tailored product recommendations. This improves the customer experience, heightens engagement, and drives sales by suggesting pertinent items.
- **Trend and Demand Prediction:** AI analyzes vast amounts of data to forecast market trends, consumer behavior, and demand fluctuations. This aids in optimizing inventory control, pricing tactics, and focused marketing efforts, ultimately enhancing operations and boosting revenue.
- **Visual Search and Image Recognition:** Visual search driven by AI enables users to locate products through images rather than words. Technology for image recognition assists e-commerce sites in pinpointing and suggesting similar items by analyzing visual features, thereby improving the shopping experience.

- **Supply Chain Optimization:** AI enhances supply chain operations by forecasting demand, optimizing inventory management, refining logistics, and accelerating delivery speeds. This leads to reduced costs, increased operational efficiency, and improved customer satisfaction through quicker order processing.
- **Sentiment Analysis:** AI technologies evaluate customer reviews, social media engagement, and feedback to gauge customer sentiment and highlight areas needing improvement. This enables companies to refine their product offerings, marketing approaches, and customer service by utilizing actionable insights.
- **Dynamic Pricing:** AI algorithms assess market circumstances, competitor pricing strategies, demand fluctuations, and consumer behavior to modify prices dynamically. This strategy enhances revenue by providing competitive pricing while also maximizing profit margins.
- **Recommendation Engines:** Recommendation systems powered by AI utilize collaborative filtering, content-based filtering, and hybrid approaches to recommend products, encourage up selling or cross-selling, and tailor promotions according to individual tastes and actions.

## X. Conclusion

The main objective of this paper is to examine the core principles of e-commerce and artificial intelligence (AI), emphasizing their primary advantages and relationships. It investigates the significance of AI in the e-commerce sector, referencing findings from previous research to illuminate its present influence and prospective future uses. In the swiftly changing landscape of digital technology, e-commerce has become an essential element of business activities, propelled by the widespread daily engagement with the Internet by consumers.

Today's consumers are more willing to explore new products and brands, yet they are also selective and expect smooth, personalized, and effective shopping experiences. Consequently, e-commerce platforms are perfect avenues for fulfilling these elevated consumer demands. At the same time, the incorporation of artificial intelligence within e-commerce has gained significant interest from scholars, business professionals, and industry leaders who acknowledge the potential of AI to revolutionize the industry. Prior research has emphasized the need for additional inquiries focused on broadening understanding and formulating successful strategies for the implementation of AI in e-commerce. With the swift progress in AI technologies and their

increasing integration, it is expected that AI will be increasingly woven into e-commerce functions, ultimately becoming a crucial component for nearly all enterprises operating in this field. This transformation is set to boost personalization, enhance operational efficacy, and foster competitive superiority in a progressively digital market.

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