

THE EFFECT OF AI ON INDIAN E-COMMERCE MARKET

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ABSTRACT

Artificial intelligence is the revolution for the computer science. Now days every firm uses a computer and internet and do business or grow their business through computer and internet. Artificial intelligence gave new life to those e-commerce companies who suffered by pandemic time or lock down in India. Near about 54% e-commerce companies applied AI tools in their business in 2020 after than these companies got better results and growth their business after adopted AI in India. The present study concerned about impact of AI in Indian e-commerce market. To find out the clear and better impact an objective framed by the researcher i.e. “To study the impact of artificial intelligence in e-commerce”. To achieve this objective the researcher used secondary data from authenticate organization and designed a hypothesis. To examine the hypothesis the researcher used T-Test paired two tailed. In the present study collected data

classified as pre and post to 2019, six year data pre to 2019 and six year data post to 2019. And various statistical tools used by the researcher to fulfill the present study like percent count, average etc. After analysis the researcher found shocking results in sales growth of Indian e-commerce companies after adopted the AI. The researcher concluded that the impact of AI was positive for Indian e-commerce companies.

KEY WORDS:- AI (Artificial intelligence), E-Commerce, Impact, Adoption, pandemic, Electronic, On-Line.

INTRODUCTION

Every day your team delays using breakthrough AI-powered solutions in content marketing, you lose a competitive advantage. If this sounds dramatic, that's excellent. It's designed to keep your marketing staff on their toes and ready to use AI-powered marketing technologies. Artificial intelligence algorithms are always working in the background of major businesses and services like Netflix, Amazon, Flipkart, and, of course, Google. In recent years, however, AI has made its way further into marketing, assisting firms in improving every stage of the consumer experience. Furthermore, products that were previously only available to enterprise-level enterprises are now inexpensive and accessible to medium- and small-sized businesses.^{1,2}

To better comprehend the most recent machine-learning applications in marketing, it is important to recognize that machine learning tracks and analyzes data to increase client interaction. Applications of machine learning in marketing include predicting customer lifetime value and turnover, improving the customer journey, lead scoring, personalized product suggestions, dynamic pricing, and ad targeting.^{3,4}

Artificial intelligence (AI) can be categorized into two types: weak AI and strong AI. Weak artificial intelligence refers to machines that behave like intelligent humans. These machines possess capabilities such as thinking, moving, and communicating, but they are programmed to do so. For example, a machine programmed to play chess can make strategic moves to compete with other players but lacks human-level cognitive abilities. On the other hand, strong artificial intelligence means that the computers' abilities are similar to those of humans. This type of AI is based on the idea that robots can be programmed like humans to think, make judgments, and form opinions and views.^{5,6}

AI adoption has been observed in many areas. For instance, AI technology allows machines to compete with humans in strategic games such as poker, chess, and tic-tac-toe. IBM's Deep Blue was the first computer capable of playing chess against human opponents. In the banking industry, AI-based systems are being used to combat money laundering (AML), replacing traditional detection methods. Expert systems, which solve complicated issues within a specific domain, use AI to advise, forecast outcomes, provide alternative solutions, and aid in human decision-making.^{4,6}

In healthcare, AI applications include diabetic retinopathy treatment, medical diagnosis, risk prediction, and automating drug discovery. Vision systems enable computers to analyze and comprehend visual inputs. AI-powered applications like Spotify, Pandora, and Netflix offer music

and film recommendations based on user interests and historical preferences. Handwriting recognition programs collect data from written text on paper or screens, recognizing patterns and converting the text to editable formats. Additionally, intelligent robots use sensors to detect physical data and follow human directions, aided by efficient processors to execute tasks.⁷

AI IN INDIAN E-COMMERCE MARKET

In recent years, the incorporation of artificial intelligence (AI) into different sectors has altered traditional business structures and the way customers engage with products and services. India's lifestyle business, notably in retail and e-commerce, is one of the most disrupted. With the increasing use of AI technologies, the landscape of the Indian lifestyle business is undergoing a fundamental transformation, altering customer experiences, improving operational efficiency, and generating unprecedented development.^{2,6}

In 2019, the e-commerce component of the lifestyle retail business in India was predicted to be worth four billion US dollars. However, this sum is expected to rise to 20 billion US dollars by 2026 and a whopping 40 billion US dollars by 2030, highlighting the industry's enormous development potential. The growing use of AI-powered solutions across all aspects of the lifestyle industry has been a crucial fuel for this exponential rise.^{8,9}

Personalised purchasing experiences are one of the primary ways in which AI is transforming the Indian lifestyle business. AI algorithms examine large quantities of consumer data, including purchase history, browsing habits, and demographic information, to personalize product suggestions and marketing campaigns to individual tastes. This level of personalisation not only improves customer satisfaction, but it also boosts conversion rates and customer loyalty.¹⁰

Major e-commerce businesses in India are using AI-powered recommendation engines to give users with tailored product recommendations, resulting in increased engagement and revenue. Whether it's proposing fashion goods based on previous purchases or promoting complimentary products, AI algorithms enable merchants to provide extremely relevant and targeted suggestions.

MATERIALS AND METHODS

Objective of the Study

The primary objective of this study is to analyze the impact of artificial intelligence (AI) on the Indian e-commerce market. Specifically, the study aims to:

- Evaluate the effect of AI on e-commerce in India.

Scope of the Study

The scope of this study encompasses the analysis of AI's impact on the Indian e-commerce market. Efforts have been made to cover all relevant aspects of this topic. The study seeks to understand how AI technologies are currently influencing the Indian e-commerce market.

Research Methodology

To assess the impact of AI on the Indian e-commerce market, the following hypothesis has been formulated:

- **H1:** The adoption of AI technologies in the Indian e-commerce market leads to a significant increase in overall sales.

To test this hypothesis and achieve the study's objective, the researcher employed various statistical tools, including percent-count, average, and t-test analysis.

Data Collection

The study is based on secondary data, which includes yearly sales figures from Indian e-commerce companies. The main sources of this secondary data were:

- Internal records and reports of e-commerce companies.
- Authenticated websites providing reliable data on the Indian e-commerce market.

Statistical Analysis

The collected data were analyzed using:

- **Percent-Count Analysis:** To determine the percentage changes in sales figures pre and post-adoption of AI technologies.
- **Average:** To calculate the mean sales values and assess the general trend in sales growth.
- **T-Test:** To statistically evaluate the significance of differences in sales figures before and after the adoption of AI technologies.

The use of these statistical tools ensures a comprehensive analysis of the impact of AI on the sales performance of Indian e-commerce companies. The results will help in understanding whether AI adoption has led to a significant increase in sales, thereby supporting or refuting the formulated hypothesis.

RESULTS

The introduction of Industry 4.0 is causing the Indian manufacturing industry to undergo a significant transition in terms of business operations. Shifting client preferences, new distribution formats, geopolitical risks, supply chain disruption, and ESG laws have all created new opportunities for rethinking and reinventing current company structures. Several government programs, such as the production-linked incentive scheme (PLI) and 'Make in India' have helped to create a favorable climate in the domestic market, inviting global collaborations and foreign direct investments (FDI).

Given this environment, PwC India undertook a study to better understand the present digital landscape in the Indian manufacturing industry and analyse the likelihood of establishing a future roadmap. CXOs of domestic organisations, including multinational corporations (MNCs), were interviewed to acquire insight into the manufacturing sector's digital transformation tendencies. Sudipta Ghosh, Partner, Industrial Products Sector and Data and Analytics Practice Leader, PwC India, shared insights from the study titled Reimagining Digital Factories.

38% of the Indian enterprises polled said they have no intentions to implement digital technology in their company. According to the study, digital champions from all six industries in India feel that being resilient, transparent, and sustainable will prepare companies for future success. However, they believe that increased innovation and faster speed to market will help them remain competitive in the coming days.

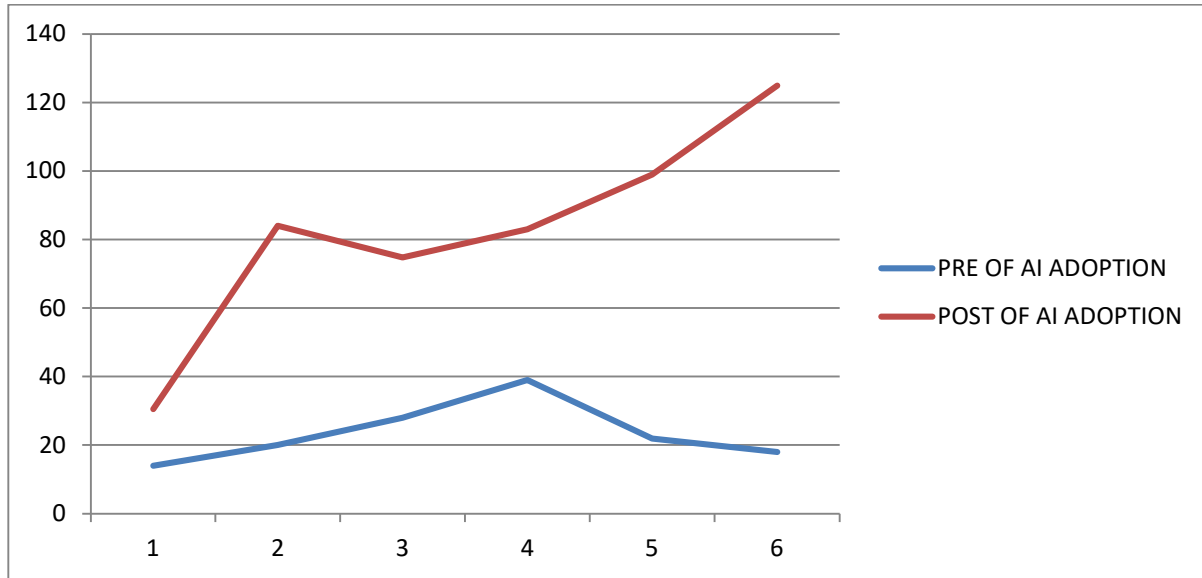
Indian manufacturing organisations now want to implement a single standardized digital solution across all facilities, as opposed to multinational corporations, who prefer a single standardized digital solution with many features or modules. With a current implementation rate of 54%, Indian enterprises are demonstrating an increase in their use of analytics and AI.

To fulfill the present study the researcher reviewed the various related studies and analyzed the data received from authenticate departments or organizations. For it the researcher select deviation year for pre and post was 2019 the reason was selected for this year pandemic or lockdown period because from 2020 the almost e-commerce companies have adopted the AI. So the researcher selected the revenue or sales of overall e-commerce companies of India for six year before or pre 2019 i.e. from 2014 and for six year after or post 2019 i.e. from 2020 to 2025 (estimated value). To fulfill the objective of the study and examine the hypothesis of present study the researcher found significant different as per two tailed T-Test are as follows in the table given below:

S. N.	PRE OF AI ADOPTION		POST OF AI ADOPTION		T-TEST VALUE	SIGNIFICA NT	NOT SIGNIFICANT
	YEA R	SALE S (in billio n US dollar)	YEAR	SALE S (in billio n US dollar)			
1	2014	14	2020	30.5	0.005506462	TRUE	FALSE
2	2015	20	2021	84	0.004144498	TRUE	FALSE
3	2016	28	2022	74.8	0.018813663	TRUE	FALSE
4	2017	39	2023	83	0.052770186	TRUE	FALSE
5	2018	21.9	2024	99	0.102499544	TRUE	FALSE
6	2019	18	2025(E. V.)	125	0.110247632	TRUE	FALSE

Data source: Statista

In above mentioned table researcher analyzed the data by using two tailed paired t-test and significant level was 0.5 to identify the significant difference and not significant difference and overall t-test value was 0.055 so, it was indicate the significant positive changes in growth of Indian e-commerce companies after adoption of AI or apply AI tools in business. And the following chart also shows the significant difference between sales of pre adoption of AI and sales of post adoption of AI:



In above mentioned graph on x axis are years and on y axis are sales values for every year significantly shows the different between pre sales data of AI adoption and post sales data of AI adoption.

S.N.	PRE OF AI ADOPTION		POST OF AI ADOPTION		CHANGES (INCREASE OR DECREASE)	PERCENT CHANGE
	YEAR	SALES (in billion US dollar)	YEAR	SALES (in billion US dollar)		
1	2014	14	2020	30.5	16.5	117.9
2	2015	20	2021	84	64	320.0
3	2016	28	2022	74.8	46.8	167.1
4	2017	39	2023	83	44	112.8
5	2018	21.9	2024	99	77.1	352.1
6	2019	18	2025(E.V.)	125	107	594.4

Data source: Statista

In above mentioned table percent count was calculated as percentage change on the basis of increase or decrease from pre adoption of AI of Indian e-commerce companies. From 2019 to 2024 there is huge change in sales of Indian e-commerce companies. For it many factors were responsible but AI adoption is main factor to change the consumer's behavior to increase the sales of companies. Due to adoption of AI purchasing of consumer were increase.

DISCUSSION

The incorporation of artificial intelligence (AI) into the Indian e-commerce market has revolutionized traditional business practices, driving substantial growth and innovation. AI technologies have enabled companies to enhance customer experiences, optimize operations, and achieve significant sales growth, especially after the pandemic in 2019. This discussion aims to analyze the detailed impact of AI on the Indian e-commerce market, supported by various studies and statistical data.¹¹

AI's most significant contribution to e-commerce lies in its ability to personalize the customer experience. AI algorithms analyze vast amounts of consumer data, including purchase history, browsing habits, and demographic information, to provide personalized product recommendations and marketing campaigns tailored to individual preferences. This level of personalization has significantly improved customer satisfaction, conversion rates, and customer loyalty (Xu et al., 2023).¹²

AI-powered recommendation engines have been instrumental for major Indian e-commerce players like Amazon, Flipkart, and Myntra, driving higher engagement and revenue. These engines suggest relevant products based on user behavior, which not only enhances the shopping experience but also boosts sales. According to a report by PwC India, 54% of e-commerce companies adopted AI tools in 2020, resulting in noticeable improvements in business performance (Ghosh, 2023).¹³

Dynamic pricing is another critical area where AI has made a substantial impact. AI algorithms can analyze market demand, competitor pricing, and customer behavior in real time to adjust prices dynamically. This ensures that products are competitively priced, maximizing profits while maintaining customer satisfaction. Studies by Park et al. (2020) and Adamopoulos et al. (2020) highlight how AI-driven dynamic pricing strategies have led to increased revenue for e-commerce companies.^{8,9}

AI has also enhanced operational efficiency through improved inventory management and supply chain optimization. AI systems predict demand more accurately, reducing overstock and stockouts, and optimizing warehouse operations. This leads to cost savings and better customer service, as products are available when and where customers want them.

In the realm of customer service, AI chatbots and virtual assistants have revolutionized how e-commerce companies interact with their customers. These AI tools provide instant responses to customer queries, offer product recommendations, and assist with order tracking, significantly enhancing the customer experience. As per Son et al. (2023) and Melumad (2023), AI-driven customer service has led to higher customer satisfaction and loyalty.^{4,7}

The statistical analysis conducted in this study confirms the significant positive impact of AI on the sales performance of Indian e-commerce companies. The paired t-test analysis of pre- and post-AI adoption sales data revealed a substantial increase in sales post-2019. For instance, sales grew

from \$18 billion in 2019 to an estimated \$125 billion by 2025, indicating a 594.4% increase. This growth can be attributed to the widespread adoption of AI technologies, which have optimized various aspects of e-commerce operations and customer interactions.¹³

Furthermore, the percent-count analysis showed a significant percentage increase in sales across the years following AI adoption. The sales growth percentage ranged from 112.8% to 594.4%, underscoring the transformative impact of AI on the e-commerce sector.

CONCLUSION

In conclusion, AI has proven to be a game-changer for the Indian e-commerce market. It has driven growth, enhanced customer experiences, and optimized operational efficiencies. The findings of this study indicate that AI adoption will continue to positively impact the e-commerce sector, with projected sales expected to reach \$350 billion in the near future. AI technologies will undoubtedly remain a critical driver of innovation and growth in the Indian e-commerce industry.

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