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A Study on Impact of Artificial Intelligence on E-Commerce Industry with Reference to Customers Buying Behaviour

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Abstract

Artificial intelligence has advanced over six decades, permeating every facet of our economy and society, yielding many remarkable accomplishments. For instance, in 1997, IBM's Deep Blue computer defeated the reigning human world chess champion, signifying the onset of the AI era. Subsequently, in 2016, Google's AlphaGo triumphed over the esteemed human professional Go player, Lee Se-dol, cementing artificial intelligence as a harbinger of the future. In 2017, the State Council issued a development plan for the next generation of artificial intelligence, formally establishing China's national strategic objective in this domain. AI, which has already demonstrated its efficacy across various sectors such as marketing, healthcare, finance, and education, is now expanding its footprint into e-commerce.

Despite its numerous benefits, AI raises ethical, societal, and technical challenges. The ethical implications involve issues like bias in AI algorithms, job displacement due to automation, and privacy concerns. Ensuring that AI systems are transparent, accountable, and fair poses a significant challenge. AI contributes a fair percentage in the development of E Commerce industry. This article will aid the marketer to understand the demographic implications in application of AI to understand customer's buying behavior.

Keywords – Artificial Intelligence, E-Commerce, Customer's buying behavior, Application of AI .

Introduction

[1]Song, X., Yang, S., Huang, Z., & Huang, T. (2019, August). In recent years, the field of e-commerce has witnessed significant advancements. While people have been enjoying the convenience offered by e-commerce, their expectations have also been escalating. The advent of artificial intelligence (AI) technology has introduced fresh concepts and models for e-commerce development. According to Gartner, a market research firm, by 2020, over 80% of customer service roles will be automated with AI. Companies like Alibaba, Rakuten, and Amazon are leveraging AI technology for tasks such as sentiment analysis, chatbot creation, personalized product recommendations, and handling large-scale data processing. An Ubisend report presents intriguing data: one out of every five consumers make purchases through chatbots, with an average spending of over $317.74 per transaction; 40% of consumers utilize chatbots to discover deals. Furthermore, Google made a significant investment of £400 million in DeepMind, an AI company.

[1] Song, X., Yang, S., Huang, Z., & Huang, T. (2019, August). The application of artificial intelligence in electronic commerce. In *Journal of Physics: Conference Series* (Vol. 1302, No. 3, p. 032030). IOP Publishing.

E Commerce:

[2]Holsapple, C. W., & Singh, M. (2000). E-commerce, or electronic commerce, encompasses activities and services associated with the purchase and sale of goods or services conducted over the internet. [3]Gielens, K., & Steenkamp, J. B. E. (2019). Companies are increasingly engaging in e-commerce due to the growing demand from customers for online services and its potential to establish a competitive edge.

Artificial Intelligence: [4]Haenlein, M., Kaplan, A., Tan, C. W., & Zhang, P. (2019). Artificial intelligence (AI) represents the latest among such transformative technologies. It is revolutionizing e-commerce by its capacity to accurately interpret external data, learn from this data, and utilize these insights to accomplish specific goals and tasks through adaptable adjustments. [5]Benbya, H., Pachidi, S., & Jarvenpaa, S. (2021). The role and characterization of AI can vary depending on the context; it might be described as a system, a tool, a technique, or an algorithm.

[6]Mahajan, V., Venugopal, V. K., Murugavel, M., & Mahajan, H. (2020). It presents opportunities for firms to gain a competitive edge by harnessing big data to tailor personalized services that uniquely cater to their customers' needs.

Application of AI in E Commerce:

[7]Pallathadka, H., Ramirez-Asis, E. H., Loli-Poma, T. P., Kaliyaperumal, K., Ventayen, R. J. M., & Naved, M. (2023). Most of the e-commerce and financial websites are integrating chatbots to enhance customer satisfaction and deliver improved services. These chatbots, developed using artificial intelligence and machine learning techniques, possess the ability to emulate human behavior. [8]Kalia, P. (2021). Various business processes such as marketing, purchasing, selling, and servicing of products and services are undertaken by companies involved in e-commerce. These businesses rely entirely on e-commerce applications and internet-based technologies to execute marketing, discovery, transaction processing, and product and customer service tasks. E-commerce websites facilitate interactive marketing, ordering, payment, and customer support processes on the World Wide Web. Additionally, e-commerce encompasses e-business processes, where suppliers and customers access inventory databases through extranets (transaction processing), or sales and customer service representatives utilize customer relationship management (CRM) systems via the internet (service and support), while customers engage in product development collaboration through email and social media channels (marketing/discovery).

Statement of Problem:

Chatbots are computer programs crafted using AI technology. Their purpose is to assist customers, simplify human interaction within digital marketing platforms, and adeptly handling natural language conversational queries. It revealed that majority of the consumers agree that AI provides information about brand name and quality, better services for consumers complaints, satisfied with security measures implemented by e-commerce to use AI and it gives virtual assistants while choosing a product. But majority are not convinced with the privacy of their data while interacting with AI features in e-commerce websites. The efficiency of these AI applications & chatbots can be enhanced by keeping demographic features of consumers in mind to study the pattern in behavioral changes.

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[2] Holsapple, C. W., & Singh, M. (2000). Toward a unified view of electronic commerce, electronic business, and collaborative commerce: A knowledge management approach. *Knowledge and Process Management*, *7*(3), 151-164.
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[4] Haenlein, M., Kaplan, A., Tan, C. W., & Zhang, P. (2019). Artificial intelligence (AI) and management analytics. *Journal of Management Analytics*, *6*(4), 341-343.
[5] Benbya, H., Pachidi, S., & Jarvenpaa, S. (2021). Special issue editorial: Artificial intelligence in organizations: Implications for information systems research. *Journal of the Association for Information Systems*, *22*(2), 10.
[6] Mahajan, V., Venugopal, V. K., Murugavel, M., & Mahajan, H. (2020). The algorithmic audit: working with vendors to validate radiology-AI algorithms—how we do it. *Academic radiology*, *27*(1), 132-135.
[7] Pallathadka, H., Ramirez-Asis, E. H., Loli-Poma, T. P., Kaliyaperumal, K., Ventayen, R. J. M., & Naved, M. (2023). Applications of artificial intelligence in business management, e-commerce and finance. *Materials Today: Proceedings*, *80*, 2610-2613.
[8] Kalia, P. (2021). 2 Artificial Intelligence in E-Commerce. *Artificial intelligence: Fundamentals and applications*, 9.

Objectives of the study

1. Understand the correlation between Artificial Intelligence and the demographic features of consumers and their buying behaviour.

2. To study the impact of AI on the E-Commerce industry with reference to customer's buying behaviour.

Hypothesis:

1. **Demographical analysis (Gender) on acceptance level of AI**

H_0: There is no significant relation between gender and acceptance level of AI in E commerce.
H_1: There is a significant relation between gender and acceptance level of AI in E commerce.

2. **Demographical analysis (Age group) on acceptance level of AI**

H_0: There is no significant relation between age group and acceptance level of AI in E commerce.
H_{11}: There is a significant relation between age group and acceptance level of AI in E commerce.

Research Methodology

The research methodology used in this study is empirical and descriptive, the data collection has been done by using both primary and secondary data. Primary data is collected through survey methods using questionnaires and secondary data is accumulated from books, Scopus, WoS, Google Scholar journals, magazines and newspapers. Data analysis of demographical consumer behavioral impacts are analysed by ANOVA single factor test on collected primary data.

Scope of the study

Use of AI in the E-Commerce industry will be beneficial for consumers and the e-commerce industry. The geographical scope is limited to Navi Mumbai City.

Limitations of the study

1. The sample size is collected only from respondents in and around Navi Mumbai city. This study have geographical generalisation limitations.
2. The study is restricted to e-commerce industry only, AI is multifaceted and can be used in many areas and sectors of business and management.

<u>Data Analysis and Interpretation</u>

1. **Demographical analysis (Gender) on acceptance level of AI**

H_0: There is no significant relation between gender and acceptance level of AI in E commerce.
H_1: There is a significant relation between gender and acceptance level of AI in E commerce.

Anova: Single Factor				
SUMMARY				
Groups	Count	Sum	Average	Variance
Gender	116	69	0.59483	0.2431
Do you think AI has made the shopping process more efficient for you?	116	53	0.4569	0.2503
ANOVA				

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.10345	1	1.10345	4.4728	0.03551	3.88221
Within Groups	56.7414	230	0.2467			
Total	57.8448	231				

We performed a one-way ANOVA to examine the impact of gender and AI's impact on internet exposure, shopping process and acceptability. Total no of participants were 116 with a variance of .24 and P Value of 0.03551 the null hypothesis that There is no significant relation between gender and acceptance level of AI in E commerce is failed to be accepted. This means that, there is a significant relation between gender and acceptance level of AI in E commerce.

2. Demographical analysis (Age group) on acceptance level of AI

H_0: There is no significant relation between age group and acceptance level of AI in E commerce.
H_{11}: There is a significant relation between age group and acceptance level of AI in E commerce.

Anova: Two-Factor Without Replication				
SUMMARY	Count	Sum	Average	Variance
Age Group	116	3450	29.74138	56.8021
Are you satisfied with the personalized product recommendation provided by AI algorithms	116	50	0.431034	0.247376

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Rows	3071.276	115	26.70675	0.88017	0.752595	1.360754
Columns	49827.59	1	49827.59	1642.159	6.28	3.923599
Error	3489.414	115	30.34273			
Total	56388.28	231				

We performed Anova: Two-Factor without Replication to examine the impact of age groups and AI's impact on internet exposure, shopping process and acceptability. Total no of participants were 116 with a variance of 56.80 and P Value of 0.75 the null hypothesis that There is no significant relation between age group and acceptance level of AI in E commerce is accepted and There is a significant relation between age group and acceptance level of AI in E commerce. Is failed to be accepted which depict that there is no significant difference in age groups's preferences to AI. .

Findings

1. It was observed that majority of the participants are inclined to use AI in their E commerce purchases.

2. It was observed that 45 percent of the respondents belong to the age group of 40 yrs. and above. But there is no significant relation between age group and consumer's buying behavior due to use of AI in e-commerce industry.

3. It was observed that majority of the respondents were professionals i.e. 65 percent. But there is no significant relation between occupation and consumer's buying behavior due to use of AI in e-commerce industry.

4. It was revealed from the study that majority of the consumers prefer online shopping.

5. It was found that majority of the consumers experienced change in online shopping due to integration of AI tools.

6. It was found that majority of the consumers were satisfied with the personalized product recommendations provided by AI algorithms.

7. It was revealed from the study that majority of the consumers think that AI had made shopping process more efficient.

8. It was found that majority of the consumers were satisfied with the security measures implemented by e-commerce platform that use AI.

9. It was revealed from the study that majority of the consumers thought that privacy of their data will be affected while interacting with AI features on e-commerce websites.

10. It was observed that majority of the consumers thought that AI play a significant role in shaping the future of e-commerce.

11. It was found that majority of the consumers thought that AI provides better services for consumers complaints and concerns while doing online shopping.

12. It was observed that majority of the consumers believe that AI gives a virtual assistants while choosing a product and guide about the brand name and quality while buying online.

Conclusions and Suggestions:

1. It was concluded that majority of the consumers were satisfied with the personalized product recommendations provided by AI algorithms. So, companies should analyze customer data and behavior, understand customer's unique preferences and interests to provide personalized recommendations and enhance online shopping journey.

2. It was observed that majority of the consumers believe that AI gives a virtual assistants while choosing a product. So, companies should utilize the power of AI Chabot and virtual assistants to deliver efficient and personalized customer support 24/7.

3. It was concluded that majority of the consumers thought that AI provides better services for consumers complaints and concerns. So, companies should incorporate Natural Language Processing into search algorithms to understand customer queries and provide more precise search results.

4. It was observed that majority of the consumers thought that privacy of their data will be affected while interacting with AI features on e-commerce websites. So, companies should leverage AI technology to enhance fraud detection accuracy, protect customer data and establish trust among customers.

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