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A study on Impact of Artificial Intelligence in E-Commerce and Logistics

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Abstract:

The incorporation of Artificial Intelligence in e commerce and logistics has significantly transformed how businesses operate and how customers interact in digital markets. Technologies such as machine learning natural language processing predictive analytics and computer vision are improving customer experience through personalized recommendations dynamic pricing and intelligent chatbots. This study examines AI adoption trends in e commerce using bibliometric analysis and identifies major research themes and future directions. A systematic bibliometric review was conducted using Scopus indexed articles published between 2004 and 2024 with the PRISMA framework for screening. In logistics AI technologies support efficient inventory management demand forecasting route optimization and last mile delivery. These innovations help organizations optimize supply chains improve operational decisions and meet rising consumer expectations for speed and convenience. Artificial intelligence has become widely recognized as a solution that simplifies complex problems and improves efficiency in many sectors. Its application in e commerce aims to influence consumer behavior and support product and brand promotion through intelligent systems. AI applications include price optimization chatbot services inventory control intelligent logistics and trend prediction. Within logistics predictive analytics helps businesses anticipate market demand and reduce stockouts or overstock situations. AI driven robotics and computer vision technologies improve warehouse productivity by automating tasks such as picking packing and quality inspection. Overall AI continues to emerge as a powerful tool that strengthens e commerce performance and enhances the efficiency of logistics operations.

Keywords: Artificial Intelligences, Logistics, E-commerce

1.1 Introduction:-

E-commerce logistics refers to the process of fulfilling online customer orders within a company's supply chain. It involves the journey of a product from the stage of production to the point where it reaches consumers. It entails overseeing inventory, transportation, storage, and delivery. The incorporation of AI in e-commerce has transformed business operations, improving customer interactions, product recommendations, fraud detection, and supply chain efficiency. AI-powered chatbots, recommendation engines, and extrapolative analytics have facilitated e-commerce firms offer personalized shopping experiences, automate inventory management, and enhance cybersecurity. An E-Commerce business possesses a proficient management system regarding logistics. They must oversee their stock, strategize, and predict to avoid depleting products during busy sales times. They must establish a system for shipping products both within the country and abroad, as well as for storing them when needed. Ultimately, it is their responsibility to ensure that distribution channels operate efficiently. Along with product recommendations, online retailers in the e- reliably, commerce industry employ artificial intelligence to provide chatbot services, analyze user evaluations, and provide online clients with specialized services.Based on the items; artificial intelligence is being utilized to forecast consumer behavior. The hours at which consumers make purchases, revolutionizing the e-commerce sector Customer expectations for quick delivery and low prices have shifted, altering the entire perspective on E-commerce logistics. To adapt to the evolving landscape of business, consider these methods that can help you enhance your logistics operations for greater customer satisfaction and an improved delivery experience. Logistics involves the planning, management, and control of the flow and storage of goods, services, and information from the origin to the end consumer. It includes tasks such as transportation, storage, inventory oversight, order processing, and shipping, guaranteeing that products arrive at the correct location punctually, in optimal condition, and at the appropriate cost. Artificial intelligence (AI) is quickly becoming a crucial component of E-Commerce. In addition to other fields of knowledge and creation, artificial intelligence is largely grounded in a broad range of technological disciplines, such as biology, computer science, psychology, linguistics, mathematics, and engineering. The potential of e-commerce continues to grow thanks to technological advancements like virtual reality, software as a service, artificial intelligence, and digital transformation. Because technology is developing at an exponential rate, online retailers are constantly up against new products. There are always interesting and novel things to do; the difficult part is figuring out which ones are best for your online store. A systematic bibliometric review was conducted on Scopus-indexed research articles (2004–2024) using the PRISMA framework for systematic screening. Biblioshiny (R-based tool) and VOSviewer were utilized to analyse citation networks, keyword co-occurrence, and thematic clusters. The findings indicate a significant rise in AI research in e-commerce since 2018, with China, India, and the U.S. leading in publications. Four key research themes emerged: customer experience and personalization, operational efficiency and supply chain, fraud detection and cyber security, and ethical AI and regulatory challenges. While AI adoption continues to advance, challenges such as data privacy concerns, algorithmic bias, and regulatory gaps remain critical.

1.2 Objective of the Study:-

1. To use online platforms backed by effective delivery networks to reach clients around the world. Offer smooth buying experiences, simple payment methods quick shipments and dependable return policies.
2. Utilize AI powered customization is online sale while co-coordinating logistics to meet customized needs. Connect logistics and digital system to provide clear visibility into shipments and stock level.
3. Increase revenue prospects by utilizing logistics efficiency and E-commerce reach. Create system with strong logistics that can accommodate a variety of E-commerce models.

1.3 Limitations of the Study:

1. Unlike physical stores, customers cannot see, feel, or try products. This creates trust issues, especially for clothing, furniture, or high-value items.
2. Product descriptions and images may not always match reality, leading to dissatisfaction and higher returns.
3. A strong internet connection, updated apps, and digital literacy are essential. In underdeveloped areas, poor connectivity limits access. Server downtime or website crashes can lead to loss of sales and customer trust.

1.4 Scope of the Study:

- To utilize online platforms supported by efficient delivery systems to connect with customers globally. Provide seamless purchasing experiences, straightforward payment options, prompt deliveries, and reliable return policies.
- Lower expenses by optimizing supply chains and minimizing physical infrastructure to enhance logistics for meeting delivery commitments, promoting repeat purchases and bolstering trust.
- Employ AI-driven personalization in online sales while managing logistics to address tailored requirements. Link logistics and digital systems to offer transparent insight into shipments and inventory levels.

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1.5 Review of Literature:

- ✓ (Singh, C., et al. 2024).Online shopping assistants (OSA) are interactive and automated applications that facilitate online purchasing for customers. No comprehensive framework of OSA acceptability in e-commerce has been developed yet that incorporates ideas from sociopsychology, information security, and many information system disciplines. The goal of the research by was to fill this void by empirically investigating end users' intent to adopt OSAs from four different perspectives: operational, social, interpersonal, and safety. To ascertain the OSA acceptance in e-commerce, a comprehensive literature review was conducted. The study experimentally validated the recommended model using partial least squares structural equation modeling (PLS-SEM). Anthropomorphism, attitude, ease of use, enjoyment, privacy, confidence, and efficacy are some of the aspects that the results showed impact consumers' adoption of OSA. There was a large moderate influence of the respondents' gender and education level on this research.
- ✓ (Rane, et.al 2023) In this era of Industry 4.0, there is a great deal of data available, and AI is essential for intelligent data analysis and the development of intelligent automated systems. Product suggestions, inventory management, and customized purchasing are the most common applications of AI in e-commerce.
- ✓ (Pai et.al 2022) AI also aids businesses in making use of digital tools for machine learning, deep learning, image recognition, speech recognition, biometrics, text analysis, and natural language processing (NLP). AI is driving new solutions and pleasant customer experiences in the e-commerce space.
- ✓ Bawack, R. E at.el (2022) say that the study provides a complete synthesis of AI research in e-commerce through bibliometric analysis and carefully evaluating the literature. The findings indicate that Chinese colleges are leading the way in this field and that the most crucial study areas are recommender systems, sentiment analysis, trust, customisation, and optimisation.
- ✓ (Adam et.al 2021) to enhance the online shopping experience for consumers, many AI-powered solutions have been launched, including virtual try-on systems (VTOs), recommendation agents, and chatbots. Customers' purchasing decisions are influenced by these technologies, which aim to enhance the technological interaction between customers and brands.
- ✓ (Koe & Sakir, 2020) Further, the change in the market competition landscape from traditional to digital-based shows the need for businesses and organisations to adopt e-commerce to remain relevant and to survive in the competitive market.
- ✓ (Pandey and Parmar,2019) expected To examine the variables influencing shopper's web based shopping behavior, The concentrate on results recommend that consumers 'online shopping conduct is being impacted by a few elements like segment factors, social variables, customer internet shopping experience, information on utilizing web and PC, web architecture, virtual entertainment, situational factors, working with conditions, item qualities, deals limited time plot, instalment choice, conveyance of products and after deals administrations assumes a significant part in internet shopping.
- ✓ (Tshepo et al. 2019) used the snowball technique to do a comprehensive study on the topic of AI in e-commerce and its applications in the economic environment of South Africa. 117 publications were cited in this investigation. Moreover, they concluded that several experts have stressed the significance of trust and client loyalty in online commerce. Rules and laws concerning ethical AI, cybercrimes, etc. must be drafted and enacted immediately to meet the critical need for change. South African countries have seen a substantial increase in the use of AI in e-commerce, which has revolutionized online purchasing for consumers.
- ✓ (Alyoubi, 2015; Lekmat, 2018; Mthembu et al., 2018).The technological context refers to the government support and legal regulations because these will eliminate barriers such as a lack of infrastructure, inadequate financial resources and insufficient IT skills which can promote the intention for e-commerce adoption .
- ✓ (Yang, Song & Tong, 2017) This e-commerce fashion marketplace provides one to two days of free shipping, which its customers followed up through a survey according to which fast delivery of the e-commerce fashion companies is the primary reason why they shop from them and prefer to buy online instead to go and shop from stores.

1.6 Research Methods:

1.6.1 Type of Research: It is a Mixed methods approach Quantitative and Qualitative approaches .The **Purpose** is to investigate how AI tools like recommendation systems, chatbots, personalization, etc. influence consumers' purchase decisions, preferences, and satisfaction in online retail.

1.6.2 Data Collection Methods:Both Primary and secondary data. Primary data was collected through surveys and questioner distributed to online shoppers to assess their experiences with AI in e-commerce platform. The questioner includes multiple choice questioners and closed ended. The secondary data consists of Review of existing literature, case studies, reports, and analytics from e-commerce platforms and research journals articles, Magazines etc.,

1.6.3 Sample Size: A sample of 100 respondents was selected for the study to ensure a meaningful and diverse representation of the people population.

1.6.4 Sampling Techniques:

Sampling strategy to select a representative sample of consumers within the e-commerce sector. This could involve a mix of demographic variables, such as age, gender, and online shopping frequency. This research paper employs a convenient sampling technique to investigate consumer preferences in the context of e-commerce.

1.6.5 Analysis and Interpretation:

1.6.5.1 Percentage Analysis:

Table: 1 -GENDER OF THE RESPONDENTS

SI.NO	GENDER	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Male	72	48
2	Female	78	52
3	Others	0	0
	Total	**150**	**100**

Table 2 - OCCUPATION

SI.No	OCCUPATION	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Student	62	41
2	Working Professional	36	24
3	Home Maker	30	20
4	Others	22	15
	Total	**150**	**100**

Table 3- MONTHLY INCOME

SI.No	MONTHLY INCOME	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Below 20,000	34	23
2	20,000-40,000	62	41
3	40,000-60,000	36	24
4	Above 60,000	18	12
	Total	**150**	**100**

Table 4- TYPE OF AREA

SI.No	TYPE OF AREA	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Rural	39	26
2	Urban	72	48
3	Semi-Urban	39	26
	Total	**150**	**100**

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Table 5- FREQUNCY IN PURCHASE IN ONLINE SHOPPING

SI.No	PURCHASE IN ONLINE SHOPPING	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Daily	0	0
2	Weekly	40	27
3	Monthly	58	39
4	Rarely	52	35
	Total	**150**	**100**

Table 6-WIDELY USED E-COMMERCE PLATFORM

SI.No	E-COMMERCE PLATFORM	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Amazon	50	33
2	Flipkart	42	28
3	Myntra	10	7
4	Meesho	48	32
	Total	**150**	**100**

Table 7- WIDELY PURCHASED IN ONLINE SHOPPING

SI.No	PRODUCTS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Electronics	43	29
2	Fashion & Accessories	65	43
3	Groceries & Food	12	8
4	Home Appliances	30	20
	Total	**150**	**100**

Table 8- FACTORS THAT INFLUENCES ONLINE SHOPPING

SI.No	FACTORS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Price Discount	40	27
2	Convenience & Time Saving	58	39
3	Wide product Variety	42	28
4	Fast Delivery	10	6
	Total	**150**	**100**

Table 9-FREQUENTLY USED LOGISTICS SERVICES

SI.No	LOGISTICS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Courier Service	32	21
2	E-Commerce Delivery	62	41
3	Air Transport	10	7
4	Road/Ship Transport	46	31
	Total	**150**	**100**

Table 10- FACTORS INFLUENCING CHOICE OF THE LOGISTICS SERVICES PROVIDED

SI.No	SERVICES	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Delivery Speed	54	36
2	Real Time Tracking	40	27
3	Customer Support	41	27
4	Cost Efficiency	15	10
	Total	**150**	**100**

Table 11- RATING FOR E-COMMERCE PLATFORM

SI.No	RATING	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Very Satisfied	58	39
2	Satisfied	62	41
3	Netural	26	17
4	Dis-Satisfied	4	3
	Total	**150**	**100**

Table 12- ISSUES FACES WITH E-COMMERCE

SI.NO	ISSIUES	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Late Delivery	15	10
2	Damaged product	21	14
3	Wrong product Delivery	20	13
4	Return/Refund	40	27
5	None of the Above	54	36
	Total	**150**	**100**

Table 13- QUALITY OF LOGISTICS SERVICES

SI.NO	QUALITY	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Excellent	42	28
2	Good	71	47
3	Average	15	10
4	Poor	22	15
	Total	**150**	**100**

Table 14- ISSUES EXPERIENCED IN E-COMMERCE PURCHASED

SI.NO	EXPERIENCED	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Delayed Delivery	30	20
2	Damaged Product	20	13
3	Lost Shipment	18	12
4	Poor Customer Support	20	13
5	None of the Above	62	41
	Total	**150**	**100**

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Table 15- SECURE OF ONLINE PAYMENT

SI.NO	PAYMENT	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Yes	85	57
2	Somewhat	50	33
3	No	15	10
	Total	**150**	**100**

Table 16- AWARENESS OF AI-BASED PRODUCT RECOMMENDATION OR CHATBHOTS ON E-COMMERCE WEBSITES

SI.NO	AWARNESS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Yes, and I find them useful	84	56
2	Yes, but not very useful	61	41
3	No, I have never noticed	5	3
	Total	**150**	**100**

Table 17- AWARENESS IF TECHNOLOGY USED IN LOGISTICS LIKE (INTERNET OF THINGS, ARTIFICIAL INTELLIGENCES, CHATBHOTS)

SI.NO	AWARNESS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Yes	90	60
2	Some What aware	50	33
3	No	10	7
	Total	**150**	**100**

Table 18- POSSIBILITY OF IMPROVING DELIVERY SPEED AND COST EFFICIENCY IN LOGISTICS BY AUTOMATION

SI.NO	RECOMMENDATIONS	NO.OF RESPONDENTS	PERCENTAGE (%)
1	Yes	84	56
2	May be	66	44
3	No	0	0
	Total	**150**	**100**

1.6.5.2 Chi- Square Analysis:-

1. Chi-Square Using Equal Expected Values for Monthly Incomes.

Total respondents = 34 + 62 + 36 + 18 = **150**

Expected per income group = 150 / 4 = **37.5**

Monthly Income	Observed	Expected	$(O-E)^2/E$
Below 20,000	34	37.5	$(34-37.5)^2 / 37.5 =$ **0.3267**
20,000-40,000	62	37.5	$(62-37.5)^2 / 37.5 =$ **16.0333**
40,000-60,000	36	37.5	$(36-37.5)^2 / 37.5 =$ **0.0600**
Above 60,000	18	37.5	$(18-37.5)^2 / 37.5 =$ **10.1500**
Total	**150**		**26.57**

The Chi-square analysis indicates that the distribution of respondents across different monthly income categories is not evenly distributed. The calculated chi-square value of **26.57** with **3 degrees of freedom** is substantially higher than the critical value at the 5 percent significance level. This clearly shows that the observed frequencies differ significantly from the expected frequencies. In particular, the **₹20,000–₹40,000 income group shows a noticeably higher representation**, while the **above ₹60,000 category appears underrepresented** compared with the expected count. This variation suggests that the respondents in the study are concentrated mainly in the **lower-middle income segment**, which may influence their financial behavior, purchasing patterns, or digital adoption tendencies depending on the context of the studChi-Square Using Equal Expected Values for E-commerce Platforms.

Amazon = 50,Flipkart = 42,Myntra = 10,Meesho = 48=Total = 150

Expected (E) = 150 / 4 = **37.5 each.**

Platform	Observed	Expected	$(O-E)^2 / E$
Amazon	50	37.5	$(50-37.5)^2 / 37.5 =$ **4.1667**
Flipkart	42	37.5	$(42-37.5)^2 / 37.5 =$ **0.5400**
Myntra	10	37.5	$(10-37.5)^2 / 37.5 =$ **20.1667**
Total	**150**		**27.81**

The observed number of users across the selected e-commerce platforms shows the following distribution: Amazon 50, Flipkart 42, Myntra 10, and Meesho 48, with a total of 150 respondents. Assuming equal preference among the platforms, the expected frequency for each category is 37.5. The calculated Chi-Square value is 27.81 with 3 degrees of freedom, which indicates a statistically significant difference between the observed and expected frequencies. This result suggests that platform usage among respondents is not evenly distributed. In particular, Amazon and Meesho have higher user representation than expected, while Myntra records considerably lower usage, and Flipkart remains relatively closer to the expected level. Therefore, the findings clearly indicate that respondents demonstrate distinct preferences toward certain e-commerce platforms rather than distributing their usage equally.

1.7 Suggestions:

E-Commerce Trends

AI driven personalization is improving customer experience and making product recommendations more accurate. Mobile first commerce is expanding rapidly because consumers prefer quick and convenient purchases through mobile applications. Social media platforms such as Facebook Instagram YouTube and WhatsApp are playing a major role in promoting social commerce and influencing buying decisions. Seamless digital payment systems like UPI and Buy Now Pay Later services have become essential for enabling fast and flexible transactions. At the same time direct to consumer brands are growing steadily as they focus on better customer service stronger brand connection and personalized engagement with customers.

Logistics Trends

Quick commerce delivery within 10 to 30 minutes is expanding rapidly in metropolitan areas as consumers expect faster service and instant access to products. The use of micro warehouses and advanced demand forecasting helps companies store products closer to customers and improve delivery speed. Efficient last mile delivery systems play an important role in reducing operational costs while ensuring faster and more reliable order fulfillment. At the same time automation and robotics in warehouses help minimize errors and speed up the order processing cycle. Customers now expect accurate delivery updates and real time tracking which improves transparency and trust in the service. In addition sustainable logistics practices such as the use of electric vehicle fleets and recyclable packaging are gaining importance as companies aim to reduce environmental impact while maintaining efficient delivery systems.

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Combined Trends

1. Achieving success relies on the implementation of AI, automation, and data analytics for forecasting, planning, and analyzing customer behavior.

2. Omni channel approaches like click-and-collect and the integration of online and offline channels are increasingly essential.

3. Streamlined return logistics (reverse logistics) boosts customer satisfaction while lowering operational costs.

4. Collaborating with third-party logistics providers (such as Delhivery, Shadowfax, and Shiprocket) enables brands to grow more rapidly.

5. A strong emphasis on transparent tracking, prompt delivery, and efficient payment systems significantly improves the overall customer experience.

Conclusion:-

E-commerce and logistics are currently advancing at an unprecedented pace, fueled by increasing customer demands, technological advancements, and the necessity for speed and convenience.Contemporary e-commerce platforms heavily depend on artificial intelligence, mobile-first designs, tailored recommendations, and seamless payment systems to provide a smooth and engaging shopping experience.Simultaneously, logistics has emerged as the foundation of this ecosystem, with innovations such as rapid commerce, last-mile optimization, automation, and real-time tracking facilitating quicker and more dependable deliveries. Sustainability initiatives, including electric vehicles and eco-friendly packaging, are becoming standard practices in the industry.Collectively, these advancements indicate that the success of any online enterprise now hinges on the integration of intelligent technology, effective supply chain management, robust customer-focused strategies, and adaptable delivery options.In summary, the ongoing growth of e-commerce and logistics is continuously transforming the way consumers shop and how businesses function within a fiercely competitive digital marketplace.

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