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### The Role of Artificial Intelligence in E-Commerce Sector of India with Special Reference to Flipkart Pvt. Ltd.

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#### Abstract

India's E-Commerce sector is rapidly evolving due to the country's growing mobile population and advancements like 5G networks, Open Network for Digital Commerce, Hyper local Delivery, and Quick Commerce. An online retail company, Flipkart, has deployed AI in marketing, data analysis and campaign optimization to enrich users' experience, marketing initiatives and operational productivity. AI algorithms automatically understand user needs, rephrase queries, extract and analyze information and direct users to right answers. However, the deployment of AI brings ethical as well as privacy challenges concerning collection and use of personal data. This paper explores the impact of AI on the e-commerce sector in India by focusing on Flipkart Pvt. Ltd., as well as describes opportunities provided by these technologies along with associated risks and their implications for the sector. The contribution of the study is that AI has made a big difference in the sector of e-commerce in India through customized recommendations made to consumers, higher rate of customer satisfaction, increased conversion rate, etc. These benefits have enabled businesses to formulate very strong campaign strategies, but there are also new risks due to AI, such as overreliance by customers on the recommendations from machines or bias of algorithm-based decisions. The research methodology involves review of many research articles and collection of secondary data. Flipkart is focusing on AI-based products and setting up a base in the heart of Silicon Valley in California. It has also partnered with Microsoft to enhance its online shopping experience, coupled with the launch of AI for India, aimed at capitalizing on the growing internet user base and smart phone markets.

*Key Words:* E-Commerce, Artificial Intelligence, Flipkart Pvt. Ltd., Mobile Population, 5G Network, Digital Commerce.

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#### 1. INTRODUCTION

India's e-commerce sector is rapidly evolving due to the country's growing mobile population. As of October 31, 2022, there are 1.143 billion connections worldwide, including both urban and rural regions. The increasing number of mobile devices is driving the advancement of e-commerce in India and paving the way for a bright future. India's e-commerce progress is synchronized with other advancements such as the introduction of the 5G network, Open Network for Digital Commerce, Hyperlocal Delivery, and Quick Commerce. There is no doubt that e-commerce made its first entries in India towards the end of the 20<sup>th</sup> first and the beginning of the 21<sup>st</sup>. century. IndiaPLza, which was formerly called Fabmart and converted to a retail store, had been among the first companies to use e-commerce like 22 years ago. This time was marked by the disadvantage of a few online payments and a low internet penetration rate as the major problems facing the industry. A key e-commerce achievement was the increasing number of the internet users which had come about due to the expansion of internet services. Booming e-commerce industry was driven by one of the main e-commerce companies called Flipkart in 2007 with the first sales in online books before they moved to other product categories. According to the reports, the gross merchandise value of Flipkart is about \$23 billion GMV, the figure almost makes up 30% of the whole e-commerce market. Founded in 2007, Flipkart is an online retail group composed of Flipkart, Myntra, Flipkart Wholesale, Flipkart Health+, Shopsy, and Cleartrip. With 4.2 lakh sellers, Flipkart sells the highest amount of stuff at the Diwali festive sale with the 62% of the total GMV in the Diwali festive sale. Flipkart Plus, one of the prime contestants to Amazon Prime, offered a free signup and loyalty program upon its introduction in 2018. They did put up the Shopsy app as well that promotes the local small entrepreneurs. Flipkart also works with NSIC to provide assistance in the process of skill development to MSMEs.

Generally, the Fusion of AI in Flipkart amplifies customer experiences, marketing strategies, and operational efficiency. Artificial Intelligence (AI) is responsible for not only providing impressive customer experience, but also in enhancing marketing strategies, and product analysis at Flipkart. Besides, AI is the driving force for personalized customer programs, the product reviews' analysis for sentiment, and summary of the product comments. The company has implemented AI in the marketing technique, data Analysis for customer interactions and for the efficient campaign optimization . Also, among other things, Flipkart employs AI applications to automatically assess users 'requirements through intelligent interfaces, rephrasing requests, extracting and analyzing data and even guiding customers to suitable solutions making the problem solving quicker .

The implementation of AI in e-commerce also rises the problem of the ethical and privacy issues, especially about gathering and using personal data. Hence, it is essential for commerce enterprises to maintain the balance between the advantages of AI personalized services and the duty of protecting customers' privacy and data rights. In this research paper, we are going to investigate the role of AI in e-commerce sector of India with special reference to Flipkart Pvt. Ltd. Along with different techniques and technologies being used, the gains and issues presented by these methods, and the possible effects on e-commerce sector as a whole. Through the review of the literature we present a well-rounded description of this important and rapidly changing area of AI in ecommerce.



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#### 2. **R**EVIEW OF LITERATURE

The study given by **Boguda (2019)** emphasis on challenges billion dollar companies face in managing information. It's focuses on the need of the such companies to understand real time customer trends and patterns with technological breakthroughs like data science, machine learning, artificial intelligence to best serve the customers. It especially focus on chatbox service powered by AI to enhance customer engagement, increase market share and return on investment.

Artificial intelligence (AI) is a branch of computer science that centers on learning, logical thinking and self improvement. It plays a growing role, in business by deciphering customer needs and fulfilling them. Machine learning, a known component of AI aids in enhancing customer satisfaction optimizing processes and fighting against activities. The study given by **Lari et al. (2022)** examines articles on how AI's utilized in E commerce and finds that it notably boosts the effectiveness of online businesses resulting in higher investments, for their development and prosperity.

The article by **Gupta et al. (2023)** provides an overview of the introduction of Artificial Intelligence (AI) in e-commerce, especially at Amazon.com and Flipkart.com. AI is transforming the world everything such as wearable technology, self-driving car, intelligent smartphone apps and home automation devices etc. From last 10 years, most of the drastic technical improvement has occurred in e-commerce sector only. AI is used for customer data management to recognize prospective customers and interacting via chat bots also for enhancing product selection decisions. Through AI-enabled competition, competitors develop customer oriented business plans, retargeting potential consumers and improving sales pipeline performance. Overall review on role artificial intelligence (AI) in e-commerce industry now-a-days with future development architecture were discussed.

The effectiveness of machine learning algorithms in e-commerce fraud detection is assessed through a systematic literature review. Machine learning can greatly improve the accuracy of fraud detection, but poorer quality data distribution is the most prominent challenge. Random forests are the most accurate machine learning approach. The study given by **Damayanti andAdrianto (2023)** contributes to existing research on machine learning for e-commerce fraud detection and offers managerial implications for e-commerce firms to select appropriate fraud-detection techniques. It also calls for improved data distributions and better machine learning approaches.

The academic paper given by **Sharma (2023)** explores how Artificial Intelligence (AI) is utilized to anticipate customer actions and customize the shopping journey, in retail. It delves into existing research on customer behavior, personalization strategies and various forms of AI. The findings suggest that AI has the potential to enhance precision and boost conversion rates by offering suggestions. However it highlights the importance of addressing privacy concerns when leveraging AI in e commerce. It emphasizes the need for transparent use of AI, by businesses.

The study given by **Bhatt (2024)** aims to investigate consumer perception towards Artificial Intelligence in E-commerce in Ahmedabad City. Consumer Perception on AI-powered product recommendations, customer service support system and fraud detection system as AI based





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applications are measured for better understanding of its role and consumers' perspective towards it.

Another paper given by **Bhuiyan (2024)** investigates the influence of AI on three domains – Virtual Assistant, Chatbots and Last Mile Delivery. For this, we have studied academic papers published between 2014-19. The results indicate that the potential advantage of artificially intelligent virtual shopping assistants, hotel personal assistants and financial planners can improve customer interaction with businesses in an unprecedented fashion.

The study given by **Aggarwal et al. (2024)** focuses on how Artificial intelligence (AI) has transformed the online shopping with personalized suggestion, fraud detection and customer engagement applications. AI chatbots have emerged as a solid tool to obtain instant solution of the query. In addition, over time AI will be more involved in the inventory and supply chain management process; virtual try on technology likely reduces return percentage of ordering products. Overall, it added more personalization, security, customer support and product discovery in the online shopping

The research paper by **Dubey (2024)** examines how Flipkart commercialize focusing e-commerce presence building approach and use of customers centric strategy to attract customer. It further assesses their most important branding element which determines overall perception about an organization or brand in customers mind, helps effective customer service operation. Further, we observe different advertisement components that uses for magnetizing large numbers of customers both qualitatively as well as quantitatively and to check acceptability level among users review are reviews given by public after using any product or services (Marketing Elements Research Measuring Instruments: Factor analysis), interviews held with stakeholders & Top management personnel's Of flipkart.com Secondary data taken from business announcements released ever quarter on financial parameters including all other kind of ratios and figures industry reports etc.

#### 3. Objectives of the study

- [i] To study the role and application of Artificial intelligence in e-commerce sector of India with special reference to Flipkart Pvt. Ltd.
- [ii] To study the initiatives taken by Flipkart Pvt. Ltd. to implement artificial Intelligence strategies in India.
- [iii] To understand the benefits of using artificial intelligence in e-commerce sector of India with special reference to Flipkart Pvt. Ltd.
- [iv] To study the various challenges involved in implementing artificial intelligence strategies in India.

#### 4. **Research methodology**

For collection of data for the study, secondary data is used and the various research articles are reviewed in order to understand the impact of Artificial Intelligence in the E-commerce sector of India specifically with a focus on Flipkart Pvt. Ltd. Newly published newspaper, books, journals, conference proceedings, and web pages are also referred during the study.



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# 5. ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN E-COMMERCE SECTOR OF INDIA WITH SPECIAL REFERENCE TO FLIPKART PVT. LTD.

AI has a strong influence on the way e-commerce operates in India. Flipkart one of the key players in this arena, has begun to use AI to increase its effectiveness, improve customer satisfaction, and stay competitive. Let's explore how AI is transforming Indian e-commerce using Flipkart as our primary case study.

#### 5.1 Personalization to Address Client Concerns

Artificial intelligence can be used in creating customized solutions for customers especially in the e-commerce sector. For instance, Flipkart uses AI to create personalized search suggestions and uses image recognition for recommendations, product discovery, catalog search, and product grouping. Machine learning models also suggest products to customers based on factors such as user search history, size matrixes, previous purchases of similar products, conversion rates influenced by similar users' behavior and brand preferences. Natural Language Processing (NLP) AI is used in chatbots in absorbing the knowledge through customers and prevent negative reviews. The most priority is to reach the audience in smaller city-tiers, where almost 90% of Indians are familiar only with Indian languages. This makes flipkart to manage customer and business fine.

#### 5.2 Customer Service and Chatbox

In a bid to enhance customer experience and loyalty, Flipkart has integrated its chatbot with AI that offers tailored recommendations, efficient support and 24/7 help. Chatbots utilizing artificial intelligence are built with natural language processing capabilities. These can read customers' emotions as well as offer the best solution before it becomes a problem. The research also shows that AI among other things improves the relationship between the firm and consumers. Understanding generational preferences is important in developing an AI chatbot strategy suited for different demographics.

#### 5.3 Voice and Image Search and Recognition:-

A.I. technology can tell e-commerce websites which products customers do not know about, give them descriptions, and make suggestions on the same. This obviates the need for consumers to input search terms. Besides, clients may upload images related to particular goods for further insights. Companies can take advantage of A.I. to lead interested parties towards what they want in making a purchase decision. Consequently, it improves customer satisfaction and increases conversion rates while at the same time developing effective marketing plans that will enhance return on investment (ROI).

#### 5.4 Virtual Reality Experience

Through the adoption of the following strategies, Flipkart aims at improving customer experience through providing information that is relevant at that particular time including through incorporating virtual reality (VR) on its platform. This involves the use of a VR glass, a telecommunication device and an image screen through which the audience will be able to view the product and interior images. It also develops virtual spaces, indicates directions for augmented reality images, and imports product reality images to enhance the shopping

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experience. In addition, there are systems that recognize the access of the user to the physical store and retrieve information about virtual shopping.

#### 5.5 Personalized Marketing

The inclusion of AI in recommender systems in e-commerce sites such as Flipkart adds value to the customer experience by determining and interpreting the customers' purchasing patterns and providing relevant products to the customers. These generate high-quality details of the image descriptions for fashion advice and enable the customers to get customized outputs. Basic and applied research for advanced e-commerce comes from the integration between artificial intelligence and digital customer experience that enables personalization of content, customer service, and recommendations, giving the user a memorable experience. Smart store AI-based location-aware recommendation technologies benefit from improvement in stock management thus resulting in high sales and client satisfaction.

#### 5.6 Supply Chain and Logistics Optimization

In companies like Flipkart, Artificial Intelligence (AI) is revolutionizing supply chain and logistics management. Flipkart is leveraging technologies such as machine learning, natural language processing, and robotics to enhance operational efficiency, strategic innovation, and sustainability. Flipkart uses AI-powered analytics to accomplish demand forecasting, inventory management, and logistics optimization to make better decisions, reduce costs, and allocate resources more effectively. AI applications in logistics and supply chain management support improved route optimization, resource management, and delivery efficiency in order to bolster overall efficiency and customer experience.

#### 5.7 Marketplace Insights and Pricing Optimization

Using AI technology boosts Flipkart's competitive leverage in marketplace analysis and price strategies. Flipkart can utilize AI-driven behavioral analytics, AI assistants, recommendation engines, and optimal pricing algorithms to improve marketplace configuration. These AI-driven technologies can also offer unique market understanding, pricing strategy understanding, and improve on existing market positions. AI combined with robotic process automation efficiencies gives us a unique opportunity for competitive edge and market footing. In addition to these stated AI capabilities, within pricing strategies, AI algorithms like Q-learning and Particle Swarm Optimization can also be utilized.

#### 5.8 Fraud Detection and Security

Fraud detection in e-commerce platforms is significantly enhanced by AI-powered machine learning algorithms such as deep learning and neural networks. These algorithms are capable of analyzing transaction data in order to identify fraud patterns to detect fraud. Machine learning algorithms and deep learning outperform traditional methods. Layered solutions like real-time monitoring and manual verification contribute to the effectiveness of the fraud detection system. Machine learning models like support vector classifiers and random forests also increase transaction security and increase consumer trust in the system.



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#### 6. INITIATIVES OF ARTIFICIAL INTELLIGENCE (AI) APPLICATION BY FLIPKART PVT. LTD.

#### 6.1 Partnering with Microsoft

In 2017, Flipkart partnered with Microsoft to improve its online shopping experience. They adopted Microsoft Azure as their exclusive public cloud computing platform, focusing on AI, analytics, and machine learning to optimize data for innovative merchandising, customer service, marketing, and advertising.

#### 6.2 Project Mira

Flipkart's project "Mira" is about making online shopping more personal and exciting than shopping offline. Developed after analysis of the patterns of product returns, the project is designed to give customers an in-store sales experience assisted by artificial intelligence and digital channels. Users can search for products like earphones or speakers, for example, and the project will ask Flipkart, about the product, brand, the size, and the sound quality. The approach aims to provide online customers with the opportunity to find the perfect product, similar to offline shopping.

#### 6.3 AI for India

In 2017, to leverage the upsurge in internet users and smartphone market, Flipkart introduced AI for India. With the help of artificial intelligence, the wing focuses on service differentiation, consumer expertise building, and back-end activity automation. Its main purpose is to enhance the customer experience and remedy prevalent issues wrong with the Indian e-retail environment.

#### 6.4 Voice Assistants

Flipkart has introduced the Voice Assistant feature in Supermart, a grocery store, to enhance the buying experience. The AI-powered platform offers voice commands in Hindi and English, allowing customers to explore and purchase products. It includes Speech Recognition, Natural Language Understanding, Machine Translation, and Text to Speech for Indian languages. The platform can automatically detect the user's language and translate, transcribe, transliterate, or understand their preferences in real-time, enhancing shopping-related interactions in various Indian languages.

#### 6.5 Silicon Valley Ambition

With F7 Labs, its US-based research division, Flipkart is concentrating on AI-based products and growing its footprint in Silicon Valley, California. According to Director of Product Mihir Naware, Flipkart has AI issues with things like color recognition and compensating for variations in kurta length in the Indian context. In the Indian context, F7 Labs is more intriguing because of its advancements in natural language processing to comprehend colloquial English.

# 7. **B**ENEFITS OF USING ARTIFICIAL INTELLIGENCE (AI) IN E-COMMERCE SECTOR OF INDIA WITH SPECIAL REFERENCE TO FLIPKART PVT. LTD.

AI is invading the world of e-commerce in a way that can help businesses design tailored marketing solutions according to the clients' expectations. Thus, AI is capable of making AI recommendations about the product or service price based on the data obtained through social





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media platforms, the customers' shopping history and browsing habits. This can facilitate customer loyalty, something that is very essential for any organization particularly those in the e-commerce sector.

The principles of automation are also being applied to AI, thus freeing the companies for their core responsibilities, which include growth as well as sales. Businesses are provided services which make operations easier, meaning that businesses are able to expand while still being cost efficient. AI also encompasses consumer feeling and behavior by previous searching records and thus offering a better-targeted marketing approach and options.

Virtual assistants and implementing the chatbots can improve the customer service because they can handle simple requests and take the clients' concerns to the live support specialists. These agents are online always, evening low-level questions and problems can be solved at any time of the day.

Yet another advantage of AI is that it makes it easier to differentiate clients. Being able to manage more business/customer data and computational power, AI strategies can analysemany different and detailed ways of interacting with the customer and select the best one and improve performance with more data arriving in the future. This way marketer can set limits and let the AI decide how to optimize and even learn to be as specific as possible.

#### 8. CHALLENGES FACED BY FLIPKART PVT. LTD. IN APPLICATION OF ARTIFICIAL INTELLIGENCE (AI)

Flipkart has several hurdles to cross in order to effectively leverage artificial intelligence (AI) for all aspects of the business. These include data quality and quantity, algorithmic complexity, resource allocation, platform integration, ethical and privacy concerns, user adoption and acceptance, scalability, competitive pressure, regulatory landscape, and talent acquisition and retention.

Data quality and quantity are of utmost significance for AI to train on, as Flipkart operates with large volumes of data through transactions, customer experience and logistics etc. It is important that AI algorithms priorities are in sync with other business needs and it's not that Flipkart only invests in AI at the cost of something else. It's difficult to implement AI cross platform, when there are several platforms like Flipkart.

Ethical and privacy issues, as well as user adoption and acceptance, are concerns. Scalability is a key, because Flipkart keeps growing, so we must innovate and operationalize AI properly to stay ahead. Keeping up with the pace of constantly evolving regulations around AI, data privacy and consumer protection is another challenge we face.

To address these challenges, a strategic approach is needed, as well as collaboration across teams, continuous innovation, and commitment to responsibly leverage AI for business growth and customer's satisfaction.

#### 9. CONCLUSION

E-commerce AI is the application of artificial intelligence technology and methodologies in the sphere of internet-based business. This entails the use of machine learning algorithms, natural language processing, and computer vision to improve various aspects of e-commerce. AI in E-commerce is all about enhancing customer service, personalization, recommendation engines, fraud prevention systems, inventory control and supply chain optimization. With help from AI



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technology companies can provide services that are more custom-made and efficient which results in greater customer satisfaction as well as overall growth in electronic commerce industry. The research delves into how AI's used in the E commerce industry looking at leading company, Flipkart Pvt. Ltd., its benefits and possible challenges. It suggests that AI is reshaping E commerce by introducing trends and altering business practices. AI has the capacity to supplant shopping approaches enabling companies to engage and retain customers effectively. Moreover it expands the horizons for conducting business operations and facilitates analysis of datasets. The future foresees a surge in demand for AI, within the E-Commerce domain.

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