APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN E-COMMERCE: A SYSTEMATIC LITERATURE REVIEW

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Abstract

In the past few years, new technologies have directly affected companies and industries in many fields. Artificial intelligence (AI) has gotten a lot of interest as one of these new ideas. This is a study topic that needs to be looked at in a broad way and is important to many fields. A lot of businesses, including e-commerce, have gone through quick and big changes because of AI. E-commerce companies are using AI technologies more and more to make their operations more efficient and productive. AI offers big benefits in terms of cost, efficiency, and speed. Because of this, e-commerce companies that want to succeed in the global market must use AI technologies in their operations. The goal of this article is to help explain how AI is changing the e-commerce business by looking at research trends in this area. The focus was on co-authorship, co-citation, and keyword analysis in a systematic review and detailed network analysis. The findings reveal a growing trend in academic studies on AI in e-commerce. The article adds to the field by explaining the difference between theory and applied research, keeping the topic current, and giving advice to future researchers in this area.

Keywords:-Artificial intelligence - AI - Machine learning - E-commerce - Electronic commerce

INTRODUCTION

Recent quick progress in information technologies are having a huge effect on every industry. The latest technology advances and inventions are part of the fourth industrial revolution. This comes after factories became mechanized, automated, and digitalized in the previous stages (King, 2019).Marketing and shopping can benefit from the increased opportunities, software, and technological advancements brought forth by the current information era. These new technologies encourage businesses to be more innovative (J G. , 2019). Technologies are very important for making business services more efficient, better, and more cost-effective. Today's innovation depends a lot on how far information and communication technologies have come (L K. , 2020).These technologies also have a big impact on how the business world grows. Several things affect how well these technologies work, such as how much money is spent on human resources and how well e-commerce solutions are integrated. (Delina R, 2006) Retail is one area where the digital change and importance of e-commerce are most clear. Websites and other digital tools are replacing or adding to traditional ways of doing business(Hagberg J, 2016).

1.1 Meaning of E-commerce:-

People have changed the way they buy things since the Internet and other digital tools have improved. Now, more and more people are using e-commerce to make purchases(Menaka B, 2018). E-commerce, or electronic commerce, is the business of doing business over the Internet. The Internet acts as a central hub for buyers and sellers to connect with each other(S T. , 2013).According to (L U. , 2013), E-commerce refers to all business activities that happen online. This group includes any website that is meant to make money and can be seen on computers, tablets, and cell phones.

Artificial intelligence (AI) is used by e-commerce companies to make their businesses run more smoothly in many ways. One of the most important parts of artificial intelligence is data. Data is very important for a business in a world where customers are becoming more varied and information is becoming more common(Vanneschi, 2018).

This study wants to add to the body of academic research by looking into the newest ways that artificial intelligence can be used in the e-commerce market. It will look at how these new methods can be used and how they affect both internal and external stakeholders in the industry. The aim of the study is to look into artificial intelligence in a planned way. This topic has been the subject of many science papers. When it comes to trade and economic growth, e-commerce is very important to the world economy. On top of that, the e-commerce industry is very open to using new technologies.

The benefits of e-commerce for online retailers (see Fig. 1) primarily include reaching a larger customer base, receiving more orders, and providing better information. Online retailers can operate their stores at lower costs compared to traditional brick-and-mortar stores, which ultimately leads to increased sales(C, 2021).
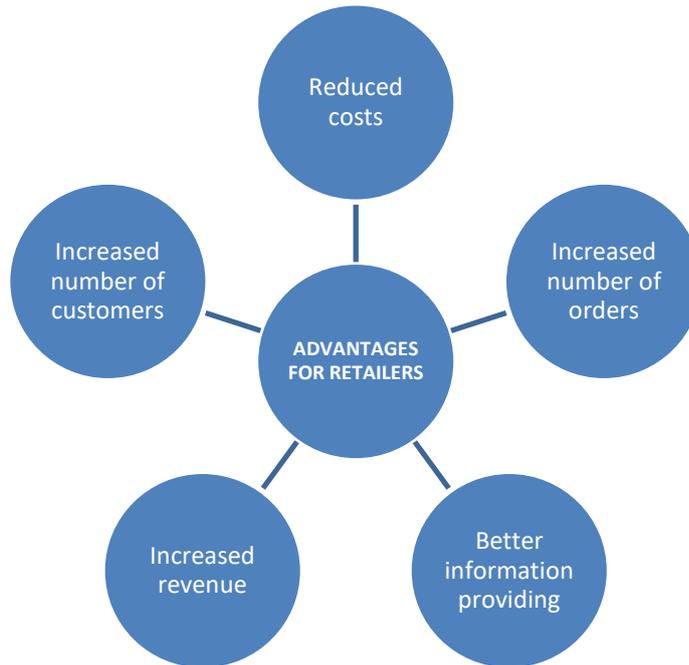

Figure 1 ADVANTAGES FOR RETAILERS

Ganapathi (R G. , 2015) describes a few good things about shopping online for people(see Fig.2). Customers save time because they don't have to go to shops. They also get a lot of goods to choose from and can compare prices and items. A lot of the time, online shops offer deals that you can't get in regular stores. One big benefit is that it's open 24 hours a day, seven days a week, so customers can buy things from anywhere at any time.

Figure 2 ADVANTAGES FOR CUSTOMERS

Customers are now making different demands, and it's getting harder for businesses to meet these needs. In order for a company to use e-commerce, it needs to make big changes to its current business models and actions, as well as adopt and use new digital technologies. (Kim TY, 2017).As the Internet becomes more important, people who sell things online have an advantage over those who don't. It gives companies from all

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over the world access to a global online market where they usually have the same chances to succeed. (Nisar TM, 2017).

1.2 Meaning of Artificial Intelligence

In the last few decades, uses of artificial intelligence have come a long way very quickly. AI was first used to make suggestions in expert and knowledge systems. Today, as technology keeps getting better, AI has become more like humans, with better problem-solving, learning, object manipulation, and movement in real places (Duan Y, 2019). Intelligent systems can manage and keep an eye on business models with little help from people. This is possible thanks to new ideas and better use of technology (Di Vaio A, 2020).

Advances in artificial intelligence have brought huge economic benefits to people, made almost every part of life better, and helped society grow in a big way, starting a new era (Lu Y, 2018). Artificial intelligence is a new field of technology that combines ideas from different fields to create theories, technologies, and tools that can mimic and improve human intelligence. Artificial intelligence has been looked at in many fields, such as business, education, healthcare, industry, marketing, and financial management(Pee L, 2019).

AI systems should be able to do things like process information so that it can be communicated in natural language, store and show information, automatically reason—using stored data to answer questions and come to new conclusions, learn from experience to adapt to new situations, and find new patterns of behavior(Huang MH, 2018).

Artificial intelligence mimics and improves human intelligence to carry out mental activities automatically. Fundamentally, artificial intelligence (AI) uses clever technology to build tools like voice assistants, picture recognition software, and robots that simulate human cognitive processes. Control commands can be promptly responded to by these tools (Kim TY, 2017). Another essential element of AI is fuzzy logic, which allows computers to process and interpret data as if it were done by a human and to mimic human activities. Fuzzy logic enhances risk assessment, planning, objective professional evaluation, logical decision-making, and management when used with AI. Additionally, it can lessen mistakes brought on by human error (Dwivedi YK, 2021).

Artificial intelligence plays an essential role in societal development, offering significant benefits (see Fig. 3) such as improving work efficiency, reducing labor costs, optimizing human resource structures, and generating new job opportunities (Duan N, 2019). Davenport and Ronanki(Davenport TH, 2018)further highlight additional business advantages of AI, including enhanced decision-making, the improvement of existing products, allowing employees to focus on more creative tasks, the creation of new products, and the exploration of new markets.

A lot of the fast progress in artificial intelligence, especially in its ability to make choices in complicated and unpredictable work settings, is due to more money being put into new technologies and a lot of data being available (Swathi B, 2019). Studies show that by 2030, around 70% of businesses will use some kind of artificial intelligence technology to run their businesses. Adopting AI and combining it with other advanced technologies is likely to become more popular (Bughin J, 2021).

Figure 3 ADVANTAGES OF ARTIFICIAL INTELLIGENCE

2. Role of Artificial Intelligence in E-commerce

E-commerce is one of the businesses that uses AI the most today. It helps them build a large customer base, understand what those customers want, do research in real time, come up with the best solutions, and more(VD, Emerging roles of artificial intelligence in ecommerce, 2020). Some studies that look at the role of AI in e-commerce are summed up in Table 1. It lists the studies' authors, their goals, themes, and most important results.

2.1 Artificial Intelligence Use in E-commerce

There are different ways that artificial intelligence can show up. In software, it includes search engines, virtual assistants, picture analysis tools, and systems that can recognize speech and faces. Robots, self-driving cars, and drones are all examples of physical objects that use AI (Europarl, 2021).

Artificial Intelligence Assistants—Chatbots

The e-commerce website is open 24 hours a day, seven days a week, and virtual assistants and chatbots are available 24 hours a day, seven days a week to help buyers. The chatbot's main job is to automatically answer questions from customers, follow simple voice orders, and use natural language to suggest products recommendations using a natural language processing system. Chatbots can also be defined as a type of software application that uses artificial intelligence to have voice or text chats online with people who are visiting a certain website or app. Chatbots can answer questions and requests from customers and help them find the right goods, check on the status of their orders, compare products, and make payments. When customers have complaints or more complicated problems, they are sent to customer service staff, who handle them.(Song X, 2019), (VD, Challenges and solution for artificial intelligence in cybersecurity of the USA,, 2021), (Kar R, 2016).

Table 1 Selected studies about artificial intelligence in e-commerce

Reference	Objective	Study theme	Findings
Soni (VD, Emerging roles of artificial intelligence in ecommerce, 2020)	Look into how artificial intelligence is used in e-commerce businesses.	E-commerce with artificial intelligence	AI can help people in the e-commerce business make more sales and build better ties with their customers.
(Kar R, 2016)	To analyze specific integration of chatbots in the IoT systems	Applying chatbots to the Internet of Things	Chatbots can help people find goods, check on the status of their orders, compare products, and get in touch with customer service staff.
KumarandTrakru(Kumar T, 2019)	To present impact of artificialintelligencein e-commerce	Artificialintelligence in e-commerce	Integrationofartificial intelligence in e-commercecompanies can help create sophisticated solutions and will impact transactions, customer retention, satisfaction, and efficiency
Pallathadkaetal. (Pallathadka H, 2021)	To discuss machine learningandartificial intelligence applications in e-commerce,corporate management, and finance	Artificialintelligence in business management, e-commerce,and finance	The most common applications include sales growth, profit maximization, sales forecasting,inventory management,security, fraud detection, and portfoliomanagement
Shankar(V, How artificial intelligence (AI) is	Topresentaframework for understanding	Artificialintelligence in retailing	Artificial intelligence will enable retailers better

reshaping retailing. , 2018)	artificial intelligence, outline applications of it in different facets of retailing.		understand consumer psychology by getting them closer towhatthehumanbrain is thinking at any given moment
Songetal.(Song X, 2019)	To analyze the present situation of the applicationofartificial intelligence technology in the field of e-commerce	Artificialintelligence in e-commerce	Artificial intelligence will become an importantdrivingforce for the transformation of e-commerce
Makridakis(S M. , Forecasting the impact of artificial intelligence, Part 3 of 4: The potential effects of AI on businesses, manufacturing, and commerce. Foresight:, 2018)	To present changes caused by AI, contrasts with the industrial revolution, the impact on developed and developing countries.	Thepotentialeffects of artificial intelligence on businesses, manufacturing, and commerce	Relationship between artificial intelligence and humans will strengthen;companies will focus on creating values through collaborationbetween the human workforce and artificial intelligence tools
Loureiroetal. (Loureiro SMC, Artificial intelligence in business: state of the art and future research agenda., 2021)	Toprovideanoverview of state-of-the-art research on artificial intelligence in the business context and propose an agenda for future research	Artificialintelligence in business	Future trends inartificial intelligence are the development of advanced automated systems, integration of neurostimulators, and nanochips into thebrain, smart devices connected to artificial intelligence systems
Zhangetal.(Zhang D, 2021)	To explain how artificial intelligence technology,people,and processes should be managed to successfully create value	Artificialintelligence in e-commerce	The key artificial intelligencecapabilities generated include forecasting, planning, and learning. They are not independent—they interact and coevolve withhumancapabilities tocreatebusinessvalue.

RECOMMENDATIONS TOOL

Statistical programming, forecasting, and consumer behavior analysis can be used on big datasets along with an artificial intelligence algorithm to figure out which products are most likely to sell. The algorithm keeps track of important details from recent searches by customers. The recommendation tool then uses this information to make relevant suggestions for the browser, which helps customers find the goods they want more quickly.(Song X, 2019), (Kumar T, 2019), (Pallathadka H, 2021).

Visual and Voice Search
Websites can now do both visual and audio searches thanks to artificial intelligence. Algorithms for processing images and sounds are used in these searches. Customers don't have to type in keywords anymore; they can use a picture or their voice to look for goods (V, How artificial intelligence (AI) is reshaping retailing. , 2018). When someone does a visual search, they put in a picture or photo instead of words. The customer either takes a picture of an item or shares an image of it. The search engine then recognizes the image and shows it in the search results (RC, Fifty shades of manipulation. , 2016). Voice search lets people type in questions by speaking them out loud. The system shows the results after the voice question is typed in. Voice search uses advanced technologies to recognize and process natural speech. It can give users spoken answers or appropriate text and image results (Pastierová, 2021).

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Customer Relationship Management

E-commerce businesses depend on their customers a lot. Companies used to rely on workers to handle their relationships with customers, but these days, AI systems are becoming more and more popular. AI can guess how people will act, figure out which goods certain customers are most likely to buy, and help businesses build and keep strong relationships with those customers. AI lets a business learn more about how happy its customers are and plan ahead for how to meet those needs and standards, no matter the time or place. AI makes it easier to create a balanced setting where people and machines can work together to make money and sell things (VD, Challenges and solution for artificial intelligence in cybersecurity of the USA,, 2021), (Pallathadka H, 2021).

2.2 Perspective of Artificial Intelligence in E-commerce

In e-commerce, people's intelligence often seems limited when they have to do certain jobs, like predicting demand and managing the supply chain. And this is where artificial intelligence comes in handy (Soni N, 2021). These are rough spots for companies. Shankar (V, How artificial intelligence (AI) is reshaping retailing., 2018)[37] says that AI makes e-commerce more profitable by giving businesses more tools for personalized suggestions and faster payment processes. It also helps with customer relationship management, logistics, and making the best use of goods. AI is now used in marketing and retail to analyze large amounts of data to make unique profiles of customers and guess how they will behave while shopping. It's more important than ever to understand and predict what customers will want through linked supply chains, and AI technology is set to play a big part in this (Dwivedi YK, 2021). For AI to grow and be used, it will need to be accepted by a lot of people in the future. Businesses can match product information with what customers are looking for by using this technology, which makes sure that goods and services are used efficiently (J S. , 2017), (RC, Fifty shades of manipulation. , 2016). AI helps online stores keep up with changing customer wants and market trends. Companies can collect a lot of information about their customers, look at how they act, and then provide excellent services in response. Businesses can expect better customer comfort and satisfaction as well as better alignment of supply and demand mechanisms (L K. , 2020), (Soni N, 2021) once the right reaction is found.

Kumar and Trakru(Kumar T, 2019) identify potential dangers and problems in e-commerce that impede the efficiency and efficacy of artificial intelligence in fulfilling commercial objectives. Consequently, it is imperative to perpetually investigate novel possibilities and prospects in reaction to the changing wants of consumers in e-commerce. To facilitate progress in AI research in the business sector, it is essential to evaluate the efficacy of AI within a multidisciplinary framework. Experts and researchers, possessing a comprehensive understanding, will be better positioned to establish goals and tasks that facilitate more efficient administration of investments in critical AI domains, including e-business(Loureiro SMC, Artificial intelligence in business: state of the art and future research agenda. , 2021).

According to Juniper Research (R J. , 2023), the need for artificial intelligence will increase a lot from 2019 to 2023. During that time, chatbots will handle about 22 billion contacts, up from 2.6 billion now. The study shows a new trend: businesses are putting a lot of money into AI to help them analyze trends, plan logistics, and keep track of their goods. Virtual Mirror and Visual Search are two AI-driven innovations that are meant to improve how customers interact with brands and connect the real and virtual shopping experiences.

There is no doubt that artificial intelligence has a lot of promise, but there are still some problems that need to be fixed before it can be fully used. Shankar (V, How artificial intelligence (AI) is reshaping retailing., 2018) says that researchers should try to figure out how AI affects customers in ways that were not meant. Luo et al. (Luo X, 2019)say that research should be prioritized to make bots better and get rid of their flaws. This could help consumers believe companies more. They also say that companies should make it easier for AI to be used on social media. According to Moriarty (Moriarty, 2021)more study needs to be done on the link between AI and virtual reality apps. Tousignant (Tousignant, 2021)says that more research should be done on the connection between AI and internet reviews, especially on how to spot fake reviews.

In the future, experts believe the relationship between humans and AI will grow stronger. This is different from the old idea that AI would replace people. New companies that enter the market in the future are likely to focus on making value by combining human workers and AI tools to work together. A big part of being successful will be forming relationships where AI does the processing and prediction work and people explain things and decide what to do next. In this way, people can focus on jobs that add value, like designing, analyzing, and interpreting AI outputs (Wang L, 2016)(S M. , Forecasting the impact of artificial intelligence, Part 3 of 4: The potential effects of AI on businesses, manufacturing, and commerce. Foresight:, 2018).

According to the results of another study, the e-commerce system can be made more efficient and fair by mixing artificial intelligence and blockchain technology. Based on AI research, the paper shows a creative way

to make websites work better. The e-commerce platform structure improvement suggested in the study works, as shown by simulation tests. The article also suggests more study be done on the design's theoretical analysis system, evaluation standards, and statistical calculations to find holes in how websites allocate their resources. (Li, 2020) (Loureiro SMC, Artificial intelligence in business: state of the art and future research agenda., 2021).

A study looked at the best ways for AI-powered e-commerce sites to make suggestions based on binary producers and competition in the industry. The writers made a game model to look at how levels of competition and commission rates affect how makers choose the best prices and how the platform makes suggestions (Zhou, 2023).

CONCLUSION

This research aimed to examine the characteristics of e-commerce and artificial intelligence, as well as their advantages. It offers an assessment of the importance of AI and its prospective applications in e-commerce, grounded in existing research on the topic.

AI systems, which use a lot of different technologies, like machine learning, data science, deep learning, and voice assistants, make shopping online more enjoyable. Chatbots, search engines, and personalized customer service apps also make shopping online better organized. A big chunk of the digital marketing funds of companies that do most of their business online go to apps that use artificial intelligence. Some of the best things about artificial intelligence are that it saves time, makes things more efficient, helps businesses understand customer data better, makes marketing decisions more useful, boosts returns on investment, and makes customers happy.

In today's digital landscape, e-commerce plays an essential position. Individuals utilize the internet daily; they show an interest to explore new products and companies while maintaining a critical and analytical attitude. In this situation, e-commerce serves as an optimal solution to fulfill their requirements. The incorporation of artificial intelligence in e-commerce has emerged as a central topic for numerous business professors and specialists. Prior study emphasizes the necessity for additional studies to augment understanding and methodologies for implementing AI in e-commerce. AI is expected to be increasingly integrated into e-commerce, becoming indispensable for all enterprises within this sector.

Chatbots can help e-commerce companies improve their customers' online shopping experiences by allowing them have real talks and making things easier. Companies can also work on Chatbot technology to handle users' issues about privacy and the lack of maturity in technology. When Chatbots are designed and used in e-commerce, both practical and emotional factors need to be taken into account.

Large e-commerce companies and businesses are constantly using artificial intelligence (AI) and improving their platforms to make them more competitive. With AI's help, e-commerce will grow in more areas, and customers' connections and experiences will get even better through new apps. Chatbots should be able to answer questions right away, 24 hours a day, seven days a week. Similarly, interactions on WhatsApp and social media sites should be treated quickly. Web and mobile apps, not call centers are now the main ways that customers canget in touch with businesses.

Traditional inventory management can only look at how much stock is on hand at any given time. AI-assisted inventory management, on the other hand, can predict how to keep stock by looking at past sales trends, expected changes in product demand, and possible supply chain problems. Automated robots are changing warehouse operations as well as inventory management. These robots will likely play a major part in the future of AI in e-commerce.

This article provides a literature review of research on artificial intelligence in e-commerce. The key research topics in this area include e-commerce optimization, trust and personalization, sentiment analysis, and AI-related technologies. The article aims to support future researchers in this field by analyzing the findings of studies conducted in this area. A limitation of this study is that it relies solely on the Web of Science database for its analysis. As a result, future research could expand the analysis by incorporating additional databases such as Scopus or other alternatives.

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