



International Journal of Business and Economics Research

[www.drbgrpublications.in](http://www.drbgrpublications.in)

*Proceedings of*

One day National Level Conference



## **The Role of AI in E-Commerce Industry**

Organized by  
Department of Commerce

Convener  
Mr.V.M Kannan

Released by

**Virudhunagar Hindu Nadars'  
Senthikumara Nadar College**

*(An Autonomous Institution, Affiliated to Madurai Kamaraj University)  
(Accredited with 'A' Grade by NAAC)*

*76<sup>th</sup> Rank at College Category in NIRF Ranking 2023*

**Virudhunagar, Tamil Nadu, India**

Published by

**Dr. BGR  
Publications**

International Journal of Business and Economics Research (IJBERR)

**e-ISSN:2455-3921**

# VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE



An Autonomous Institution, Affiliated to Madurai Kamaraj University

Re - accredited with 'A' Grade by NAAC  
76<sup>th</sup> Rank in College Category by NIRF 2023



## DEPARTMENT OF COMMERCE

### *Invitation*

One Day National Level Conference on  
THE ROLE OF AI IN E-COMMERCE INDUSTRY

### RESOURCE PERSONS



#### **R. Rajesh Kannan**

Principal Enterprise Architect/AI Solutions  
LTIMindtree, Chennai

Venue : COE Hall  
Date : 13-03-2024

#### **DR. V. Subburaj**

M.E., Ph.D, Professor,  
Vemu Institute of Technology, Andhrapradesh



### WELCOME ADDRESS

Mr.V.M. Kannan, M.Sc., M.Phil., Convener

### INAUGURAL ADDRESS

Thiru M.D.Sarpparajan, B.B.A., Secretary

### FELICITATIONS

Thiru V.Palanichamy, B.A., President

Thiru V.P.P.K.V.N.Rajamohan, B.B.A., Vice President

Tmt G.Ramya, B.A., Vice President

Thiru S.S.S.A.S.Sakthi Babu, B.B.A., Treasurer

Dr.A.Sarathi, M.Sc., M.Phil., Ph.D., Principal

Dr.A.Kalidass, M.A., M.Ed., M.Phil., Ph.D.,  
Coordinator-SF Programmes

Dr.B.Ravichandran, M.Com., M.Phil., M.A., B.Ed., M.B.A., Ph.D.,  
Head of Department

### VOTE OF THANKS

Mr.N.Kanagavel, M.Com., M.Phil., Coordinator

*You are cordially invited*

Head, Staff and Students  
Department of Commerce



### About College

Virudhunagar Hindu Nadars' Senthikumara Nadar College, the sanctum of knowledge was founded in 1947. Ever since, the awe-inspiring institution with its celestial vision has been shaping every generation to reach skylights in their lives. The Institution has attained an eminent status with 25 UG, 15 PG, and 10 Ph.D programmes. The UGC granted Autonomous status to the institution in 2012. The College is accredited with 'A' Grade by NAAC in the fourth cycle of accreditation. The institution has secured 76th rank in NIRF Ranking 2023 in College category by the Ministry of Human Resource Development, New Delhi. To add few more feathers to its cap, the College has been recognized as a DST-FIST sponsored College and DBT STAR College. Today, after 75 years of its inception, VHNSN College has grown from strength to strength, scaling new heights and crossing many milestones on the academic road. The College of 150-acre campus comprises of sufficient infrastructure, to satisfy the need of curricular, co-curricular and extra-curricular activities.

### About Department

The department of commerce of our college, started in the year 1953, offers under graduate and post graduate courses in commerce. It's a recognized Research Center in Commerce. It pursues research on various business and management related issues. It has produced more than 250 M.Phil, and 75 Ph.D. Apart from spacious classroom, separate conference hall, library and computer facilities with internet, and the department is equipped with a dedicated team of 17 staff members who are specializing on divergent and emerging areas of commerce.

### About the Conference

Artificial Intelligence (AI) is revolutionizing e-commerce for small and big businesses. AI is being used by various e-commerce companies to get a better understanding of customers. AI powered e-commerce is of great help as it enables customer-centric online searches, identifies prospective customers, answers customer's queries, simplifies sales techniques, establishes actual conversations with customers through chatbots, etc.

## Topics

- Role of AI in E-Commerce Industry
- AI in Inventory Management
- AI Powered E-Mail Marketing
- Internet of Things (IOT)
- AI in Enhanced Customer Service
- Challenges and limitations of AI in E-Commerce
- AI in Sustainability and Green Logistics
- AI for control and Decision systems
- AI Application in E-Commerce
- AI for E-Health
- AI for Neuroscience and Neuro engineering
- AI in Smart Logistic

## VHNSN College Managing Board

Thiru V.Palanichamy, B.A President

Thiru M.D. Sarpparajan, B.B.A Secretary & Correspondent

Thiru V.P.P.K.V.N Rajamohan, B.B.A Vice-President

Tmt G.Ramya, B.A Vice-President

Thiru S.S.S.A.S.Sakthi Babu, B.B.A Treasurer

Dr. A.Sarathi, Principal

Dr. A.Kalidass, Co-ordinator Self-Finance Programmes

## Organizing Secretary

Dr. B.Ravichandran, Head & Associate Professor of Commerce

## Convener

Mr. V.M.Kannan, Assistant Professor of Commerce

## Co-ordinator

Mr. N.Kannagavel, Assistant Professor of Commerce





### Organising Committee Members

Dr. G.Senthil, Associate Professor of Commerce

Dr. V.Manohar, Associate Professor of Commerce

Dr. S.Muthulakshmi, Assistant Professor of Commerce

Dr. J.Kamatchi Eswaran, Assistant Professor of Commerce

Dr. C.Chelladurai, Assistant Professor of Commerce

Dr. S.Maheshwari, Assistant Professor of Commerce

Dr. R.K.Manju@Mahalakshmi, Assistant Professor of Commerce

Dr. R.Jeyanthi, Assistant Professor of Commerce

Dr. R.Shanthi, Assistant Professor of Commerce

Dr. P.Geetha, Assistant Professor of Commerce

Dr. R.Shobana Devi, Assistant Professor of Commerce

Dr. N.Vijayalakshmi, Assistant Professor of Commerce

Dr. R.Sivajothi, Assistant Professor of Commerce

Dr. N.Padmavathy, Assistant Professor of Commerce



### Guest Editorial Board Members

#### Chief Editor

Mr.V.M.Kannan, Assistant Professor of Commerce, VHNSN College (Autonomous), Virudhunagar, India.  
[kannan.vm@vhnsnc.edu.in](mailto:kannan.vm@vhnsnc.edu.in)

#### Co-editor in Chief

Dr.S.Muthulakshmi, Associate Professor of Commerce, VHNSN College (Autonomous), Virudhunagar, India.  
[muthulakshmi@vhnsnc.edu.in](mailto:muthulakshmi@vhnsnc.edu.in)

Dr.J.Kamatchieswaran, Assistant Professor of Commerce, VHNSN College (Autonomous), Virudhunagar, India.  
[kamatchieswaran@vhnsnc.edu.in](mailto:kamatchieswaran@vhnsnc.edu.in)

Dr.C.Chelladurai, Assistant Professor of Commerce, VHNSN College (Autonomous), Virudhunagar, India  
[chelladurai@vhnsnc.edu.in](mailto:chelladurai@vhnsnc.edu.in)

#### Editor

Dr.Aloysius Edward, Dean, Kristu Jayanti College (Autonomous), Bengaluru, India  
[Edward@kristujayanti.com](mailto:Edward@kristujayanti.com)

#### Associate Editor

Dr.Alice Mani, Professor, Department of Commerce, Christ University, Bangalore, Karnataka, India.  
[alice.mani@christuniversity.in](mailto:alice.mani@christuniversity.in)

Dr.A.Revathi, Head & Assistant Professor of Commerce, G.Venkataswamy Naidu College (Autonomous), Kovilpatti, India.  
[revathi@gvncollege.edu](mailto:revathi@gvncollege.edu)

Dr.G.Venkateshwaran, Assistant Professor of Commerce, Kalasalingam Business School, Demeed University, Krishnankoil, Srivilliputhur, India  
[gvenks123@gmail.com](mailto:gvenks123@gmail.com)

#### Assistant Editor

Dr.R.Thanga Selvi, Assistant Professor of Commerce, Ambai Arts College, Ambasamudram, India.  
[shamithaselvi@gmail.com](mailto:shamithaselvi@gmail.com)

#### Reviewers

Dr.Balamurugan Muthuraman, Assistant Professor, School of Commerce, The American College, Madurai, India.  
[dr.balamurugan@americancollege.edu.in](mailto:dr.balamurugan@americancollege.edu.in)



**VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA  
NADAR COLLEGE**

(An Autonomous Institution Affiliated to Madurai Kamaraj  
University)



[Re-accredited with 'A' Grade by NAAC]  
Virudhunagar – 626 001.



**Thiru M.D.Sarpparajan, B.B.A.  
SECRETARY**



It is indeed a matter of immense pleasure to announce that the Department of Commerce, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar is organizing the National Level Conference on the “Role of AI in E-Commerce Industry” on 13.03.2024. I am confident that the conference discussion and the publication of the conference proceeding will bring opportunities among the academicians, corporate delegates, research scholars and students to present their innovative ideas, most up-to-date findings, and technical proficiency in the various fields of Artificial Intelligence. On behalf of V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar, I heartily welcome the Honorable Keynote Speakers, eminent academicians, corporate delegates and all the paper presenters. I wish all success for the National Level conference on the “Role of AI in E-Commerce Industry”

With regards,

*M. D. Sarpparajan*

**VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA  
NADAR COLLEGE**

(An Autonomous Institution Affiliated to Madurai Kamaraj  
University)



[Re-accredited with 'A' Grade by NAAC]  
Virudhunagar – 626 001.



**Dr.A.Sarathi,M.Sc., M.Phil., Ph.D.**  
**PRINCIPAL**



I am really happy to know that the Department of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar is organizing the One Day National Level Conference on the "The Role of AI in E-Commerce Industry", on 13-03-2024 at VHNSN College (Autonomous), Virudhunagar. I hope the conference would surely induce modern ideas among the participants by paving way for new inventions. I wish that the deliberations of conference shall be useful to students, scholars and technocrats.

I also take pride in the successful accomplishment of the conference and its pivotal role in discussing the "Role of AI in E-Commerce Industry". The conference role is to promote scientific investigation. It is a mission of V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar to influence, promote and equip students and researchers to take up in projects that help in the development of science and betterment of human existence. The zealous and mammoth task of organizing the National Level conference by the Department of Commerce shows the interest of the Department. I appreciate the untiring collective efforts of the Organizing Team in making this conference possible. I wish all the contributors and the organizing team a fruitful conference experience.

With regards,



**VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA  
NADAR COLLEGE**

(An Autonomous Institution Affiliated to Madurai Kamaraj  
University)



[Re-accredited with 'A' Grade by NAAC]  
Virudhunagar – 626 001.



**Dr. A. Kalidass, M.A., M.Phil., M.Ed., Ph.D.**  
Coordinator SF Programme



I am really happy to know that the Department of Commerce is organizing the National Level Conference on "Role of AI in E-Commerce Industry" on 13.03.2024. The conference will improve the academic ambience which is the main pillar of any institution. I hope that this Conference would surely induce innovative ideas among the Participants paving way for new inventions. I wish that the deliberations of the conference with innovations shall be useful to the students, scholars, Academicians and Industrialists- New findings of the conference should always help to solve society related problems. I whole heartedly congratulate and wish all success for the National Level Conference on the "The Role of AI in E-Commerce Industry"

With regards,

**VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA  
NADAR COLLEGE**

(An Autonomous Institution Affiliated to Madurai Kamaraj  
University)



[Re-accredited with 'A' Grade by NAAC]  
Virudhunagar – 626 001.



**Message**

Artificial Intelligence is a third eye and seventh sense for the E-Commerce Industry. The Department of Commerce, V.H.N.S.N. College (Autonomous), Virudhunagar took a very meticulous effort to organize a National Level Conference on “The Role of Artificial Intelligence in E-Commerce Industries” and release the book with various articles reflecting the changing and challenging dimensions of AI in E-Commerce Industries.

I am very delighted to express my wishes for the success of the National Level Conference. Every article in this book hold the promise of unlocking new insights, sparking innovations and illuminating the transformative potential of AI in the E-Commerce landscape.

The One day National Level Conference inspires countless minds, guiding them towards a deeper understanding of how AI can revolutionize customer experiences, optimize operations and drive unprecedented growth in Online Commerce. May this conference insight empower businesses to harness the power of AI to adopt, evolve and thrive in an ever-changing digital marketplace.

I wish the conference every success and my best wishes to the organizers, resource persons, participants and authors.

With regards,

**Dr. B. RAVICHANDRAN**

Head & Associate Professor  
Department of Commerce  
V.H.N.S.N. College  
(Autonomous)  
Virudhunagar.



## Index

S.No	Paper Id	Name of the Authors	Title of the Paper
1	AI-2024-01	T. Dayana Mercybai & Dr. J. Kamala Juliet Isaac	Driving Economic Growth: A Study of the Challenges and Opportunities Faced by the Indian Startup Ecosystem
2	AI-2024-03	D. Sangeetha	Applications of Internet of Things
3	AI-2024-04	K. S. Suresh & C. Venil ilavarasan	E-commerce, AI, and the Evolution of B2B/B2C Dynamics in Shaping the Future of Film
4	AI-2024-05	S. Manikandan & Dr. V. Manohar	AI's Place in India's Insurance Sector
5	AI-2024-07	R. Preethi	The study on customer Perception towards artificial intelligence based customer service with reference to people in Virudhunagar
6	AI-2024-09	G. Abinaya & Dr. V. Manohar	The Role of Artificial Intelligence in Email Marketing Strategies
7	AI-2024-10	A. Rajakamatchi & Dr. S. Vijayalakshmi	Role of Artificial Intelligence in Stock Trading and Investment Decisions
8	AI-2024-11	Tresena Machado C & Dr. S. Daniel David Annaraj	Role of Artificial Intelligence (AI) in Marketing
9	AI-2024-12	K.T. Nirmala Devi & Dr. S. Vijayalakshmi	Artificial Intelligence in Conversational Payments on UPI
10	AI-2024-13	H. Aravinth & K. Chitra	Influence of IoT (Internet of Things) on Business and Commerce
11	AI-2024-15	J. Nagasudha	The Role of AI in Healthcare
12	AI-2024-17	Dr. S. Chitra Devi & Dr. D. Jeya Priya	Applications of AI in E-Commerce Industry
13	AI-2024-18	Dr. M. Jubi	Impact of Artificial Intelligence on Employee Wellbeing in the workplace
14	AI-2024-19	B. Jeyalakshmi	A Study on Challenges and Limitations of Artificial Intelligence in E-Commerce
15	AI-2024-20	P. Varshaa & E. Sweetline Priya	A Study on Artificial Intelligence in Inventory Management
16	AI-2024-21	Dr. K. Sounthara Priya & Dr. A. Josephine Stella	Problem and Prospects of AI Technology in E-Commerce Industry
17	AI-2024-22	Anaswara Mohan & E. Sweetline Priya	A Study on Chatbots and Virtual Assistants – AI Powered Customer Service
18	AI-2024-23	Dr. T. Jebasheela & Dr. C. Anupriya	Reshaping e-Commerce: The Influence of Artificial Intelligence
19	AI-2024-24	R. John Samuel Abishegh & E. Sweetline Priya	Study on 'The Role of Artificial Intelligence in Fraud Detection and Prevention in e-Commerce'
20	AI-2024-25	Dr. M. Jubi & Hema. K.R	Impact of AI in e-Commerce
21	AI-2024-26	M. Ponuselvi	A Study of Customer Perception towards Artificial Intelligence in Banking Customer Services-With Reference to Nationalized Banks in Virudhunagar



22	AI-2024-27	V. Shunmathy & K.B. Hariny	A Study on Role of AI in e-Commerce Industry
23	AI-2024-30	Dr. P. Sumalatha & Nazeer Shaik	Innovative Applications of AI in E-commerce: Trends and Insights
24	AI-2024-31	M. Kallaganadi & Dr. P. Ramalakshmi	A Study on Consumer Satisfaction Level of Granites
25	AI-2024-32	Biji Jose & Dr. S. Muthulakshmi	The influence of chatbots using GPT on academic writing among college students
26	AI-2024-35	R. Maheswari	Smart Farming Agriculture using IOT
27	AI-2024-36	Dr. K. Uma Maheswari, R. Deepa & N. Bhagyashree	AI's Effects on Customer Relationship Management in the Banking Sector
28	AI-2024-37	Sathyanarayana. R	AI and Fintech Companies
29	AI-2024-41	Dr. S. Rukkumani	The Strategic Integration of AI for Elevating E-commerce
30	AI-2024-42	Dr. S. Kartheeswari	Artificial Intelligence as a Boon in Food and Beverage Industry
31	AI-2024-43	Dr. N.Vijayalakshmi	Challenges and Opportunities for AI in E-Commerce
32	AI-2024-44	A. Nagavaratharajan, J. Porkodi & M. Sivasankar	Revolutionizing E-Commerce: The Impact of AI-Enabled Technologies
33	AI-2024-47	Dr. K. Latha	Role of Artificial Intelligence in E-commerce: Present and Future
34	AI-2024-48	Dr. R. Shanthi & Dr. B. Nandhini	Role of Artificial Intelligence in Business Transformation (A study with special reference to Virudhunagar)
35	AI-2024-49	M. Sivasankar, V.M. Kannan & A. Nagavaratharajan	Digital Marketing Trends Analysis in AI
36	AI-2024-50	A. Ummul Barhana & R. Mercy	The Role of AI in E-Commerce Industry
37	AI-2024-51	M. Govindammal & A. Sathya	The transformative Influence of Artificial Intelligence in E-Commerce: A Comprehensive study
38	AI-2024-52	Dr. R. Jeyanthi & Dr. N. Padmavathy	A Study on the Impact of Artificial Intelligence in E-Commerce Industry
39	AI-2024-57	M. Kallaganadi & M. Esakkiammal	Job satisfaction of Arts and Science College faculty members in Tirunelveli District
40	AI-2024-60	Dr. S. Maheshwari & Dr. P. Geetha	A Study on the Awareness of AI Applications among College Students in Online Shopping
41	AI-2024-63	Dr. P.V. Muthu Perumal & Dr. K. Mangayarkarasi	Artificial Intelligence In Business Decision Making
42	AI-2024-65	B. Roja & Dr. S. Muthulakshmi	Role of Artificial Intelligence in Solar Energy
43	AI-2024-67	Dr. P. Uma Shanthi & Dr. J. Kamatchi Eswaran	Role of Artificial Intelligence In E-Commerce Industry
44	AI-2024-68	V.M. Kannan & M. Saraswathi	Applications of AI in E-Commerce Industry



# Driving Economic Growth: A Study of the Challenges and Opportunities Faced by the Indian Startup Ecosystem

**T. Dayana Mercybai<sup>1\*</sup> and J. Kamala Juliet Isaac<sup>2</sup>**

<sup>1</sup>Research Scholar of Commerce, Sarah Tucker College, Tirunelveli, Tamilnadu, India.

<sup>2</sup>Assistant Professor of Commerce, Sarah Tucker College, Tirunelveli, Tamilnadu, India.

\*Corresponding Author e-mail iD: [Mercydayana5@gmail.com](mailto:Mercydayana5@gmail.com)

## Abstract

India's startup ecosystem has seen tremendous growth in recent years. The country's large and diverse population, along with increasing internet penetration, has created fertile ground for innovation and entrepreneurship. In 2018, there were around 50,000 startups in the country, with 8,900–9,300 of them being technology-led. Additionally, over 1,300 new tech startups were born in 2019 alone, indicating that 2-3 tech startups are born every day in India. The government has also recognized the importance of startups in driving economic growth and has set criteria to recognize and support them. The ecosystem includes support organizations, well-established companies, universities, funding agencies, service providers, and research organizations, which work together to create an environment that enables startups to grow and thrive. Despite this impressive growth, the startup ecosystem in India continues to face numerous challenges. This paper aims to study these challenges, along with the opportunities available to startups, and analyze how the dynamics of the startup economy have changed over the years. By understanding the current state of the startup ecosystem and its history, better decisions can be made towards the development of the country.

**Keywords:** India, startup ecosystem, growth, population, internet penetration, innovation.

## Introduction

Startups are new companies that aim to quickly expand and build in a short period. They have been entities that were established not before 7 years (10 years for biotechnology startups) with an annual turnover of less than INR 25 crore in any preceding financial year and are working towards innovation and development with high potential to generate employment or wealth creation. The Indian government has set criteria to recognize startups and support them in driving economic growth. Over the past few years, India has emerged as a pioneer in entrepreneurship, with a growing number of startups and entrepreneurs making their mark in

various sectors. The country's large and diverse population, along with its increasing internet penetration, has created fertile ground for innovation and entrepreneurship. Small businesses were one of the earliest forms of start-ups in India, and they played a crucial role in the country's economy by providing services and goods that larger companies could not. On the other hand, startups have made a significant contribution to the Indian economy by creating more than 4 million jobs, both direct and indirect, as of 2021. They have been at the forefront of innovation, developing new products and services that are changing people's lifestyles. Many of these startups are using emerging technologies such as artificial intelligence, blockchain, and the Internet of Things to create disruptive solutions. In conclusion, it is crucial to support startups in India, as they have the potential to create jobs, contribute to economic growth, and foster a culture of innovation and risk-taking.

### Objectives of Research

- 1) To analyze the growth patterns of the Indian startup ecosystem over the years.
- 2) To analyze the impact of Indian startups on the Indian economy.
- 3) Researching the support provided by the Indian government to startups

### Research Methodology

The following paper is based on descriptive research that considers secondary data. The information and inputs gathered from various secondary sources are used to form arguments and counterarguments about startups in India. Sources of information for this study include reports from various government departments, research work done on similar and related fields, articles published in newspapers and magazines, and relevant online and offline information.

### Research analysis and interpretation

As per the official website of Startup India, a startup is defined as an entity, incorporated or registered in India for no more than ten years, with an annual turnover not exceeding INR 100 crore in any preceding financial year, and working towards innovation, development, deployment, or commercialization of new products, processes, or services driven by technology or intellectual property.

### ***Key components that make up a startup at a legal level.***

To qualify for benefits through the Startup India program, an entity must first establish an account on the Startup India website. Once the account is created, the entity can then proceed

to apply for DPIIT recognition. Following submission of the application, The application will be thoroughly assessed and the certificate will be granted.

**Entity type:** A startup can be any form of entity, including a private limited company, limited liability partnership, one-person company, or partnership firm.

**Incorporation or registration:** The startup must be incorporated or registered in India.

**Age of the entity:** The startup must not be more than ten years old from the date of incorporation or registration.

**Annual turnover:** The annual turnover of the startup must not exceed INR 100 crore in any preceding financial year.

**Innovation:** The startup must be working towards innovation, development, deployment, or commercialization of new products, processes, or services.

**Technology or intellectual property:** The startup must be driven by technology or intellectual property in its work towards innovation, development, deployment, or commercialization of new products, processes, or services. These are the key components that make up a startup at a legal level.

### The Impact of Startups on the Indian Economy

Startups have had a huge impact on the Indian economy in recent times. They have been instrumental in creating many job opportunities, fostering innovation, and driving economic growth. Their contribution has been crucial in attracting investment, developing new products and services, and expanding existing businesses. Furthermore, startups have played a vital role in elevating India's economic status by promoting foreign investment and increasing exports. Startups are a key factor in India's economic success, and their continued growth is essential for the country's future development.

**Job creation:** Startups have been a crucial driver in creating job opportunities in the country, especially in the technology and service sectors.

**Innovation:** Startups have been at the forefront of innovation, developing new products and services that cater to the needs of the Indian market.

**Economic growth:** Startups have contributed significantly to the overall economic growth of the country by attracting investment and promoting entrepreneurship.

**Investment:** Startups have attracted a significant amount of investment, which has led to the development of new businesses and the expansion of existing ones.

**Exports:** Startups have played a vital role in increasing exports from India, which has contributed to the country's economic development.

**Foreign investment:** Startups have also been instrumental in promoting foreign investment in the country, which has helped India become a preferred destination for global investors.

**Technological advancement:** Startups have been at the forefront of technological advancements in the country, which has helped India become a hub for innovation and entrepreneurship. Overall, startups have made a significant contribution to the Indian economy in multiple ways, and their continued growth is essential for the country's future development.

### The Evolution of the Indian Startup Ecosystem

The Indian startup ecosystem has undergone an incredible evolution, driven by a combination of various factors. The ecosystem can be defined as a network of individuals, institutions, and resources that work together to support and nurture new businesses in India. Its importance lies in its ability to foster innovation, create employment opportunities, and contribute to the country's economic growth. The evolution began in the 1990s and early 2000s when India saw the emergence of a few successful IT companies like Infosys, Wipro, and TCS. These companies laid the foundation for the growth of the IT industry in the country, creating a pool of experienced entrepreneurs and executives who would later become instrumental in building the startup ecosystem. The contributions of these companies to shaping the startup ecosystem cannot be overstated. The mid-2000s and early 2010s witnessed the rise of angel investors and accelerators in India. These investors and accelerators provided seed funding and mentorship to startups, which helped nurture them into successful businesses. This period saw the rise of successful companies such as Flipkart, Ola, and Paytm, which attracted significant funding from investors. In 2014, the Indian government launched the Startup India initiative, which aims to promote entrepreneurship and create a supportive ecosystem for startups. The government has since launched several policy initiatives to support startups, such as the Make in India initiative, the Digital India campaign, and the Atmanirbhar Bharat Abhiyaan. These initiatives have helped to attract investment and talent to the startup ecosystem, which has further contributed to its growth. In recent years, the Indian startup ecosystem has seen the emergence of startups in a variety of sectors, such as healthcare, fintech, edtech, agritech, and cleantech. This diversification has helped to create new opportunities for startups and has attracted a wider range of investors and talent to the



ecosystem. In conclusion, the evolution of the Indian startup ecosystem has been a remarkable journey. Its importance cannot be overstated, as it has contributed significantly to the country's economic growth and innovation. The success of the ecosystem is a culmination of the collective efforts of individuals, institutions, and government initiatives.

### Growth of startups over the years

Startups have seen significant growth over the years, with more and more entrepreneurs venturing into the industry. This has been fueled by the increasing availability of funds, advances in technology, and a growing demand for innovative solutions. The startup ecosystem has become more diverse, with a range of industries being disrupted by new players.

Year	Significant Movement
1990	The first Indian startup, Infosys, was founded.
1995	Sabeer Bhatia and Jack Smith founded Hotmail.
2007	Flipkart was founded by Sachin and Binny Bansal.
2010	Ola Cabs was launched by Bhavish Aggarwal and Ankit Bhati.
2011	Paytm was founded by Vijay Shekhar Sharma.
2014	Inmobi became the first Indian unicorn.
2015	Zomato acquired Urban Spoon for \$60 million.
2016	Reliance Jio was launched by Mukesh Ambani.
2018	Swiggy raised \$210 million in funding.
2020	Byju's became the second Indian unicorn to be valued above \$10 billion.
2021	Nykaa became a unicorn after raising \$100 million.
2022	Razorpay became the latest Indian fintech unicorn.
2023	Dream11 became the first Indian gaming unicorn.

Source: secondary data

### State- and sector-wise split of startup funding in India

For any startup, securing funding is an essential step towards success. The amount of capital required for different stages of development varies depending on whether you are at the seed stage, early growth stage, or late growth stage. Self-financing, which involves using the owner's funds, is a common way that startups obtain funding. Other options include loans from commercial banks, crowdfunding, and seeking investment from angel investors. Angel

investors typically offer funding in exchange for a percentage of business equity or royalties from the company. Government loan schemes can also provide financing for startups, as can non-banking financial companies (nbfc) and microfinance institutions (mfis). For startups with lower initial funding requirements but a need for additional funds at a later stage, credit cards for business purposes can also be beneficial.

including a large pool of talent, growing investor interest, and government initiatives aimed at promoting entrepreneurship. When it comes to funding, the Indian startup ecosystem has seen a surge in investments in recent years, with the total amount of funding increasing by over 50% in 2020 compared to the previous year. Most of the funding has been directed towards the technology sector, which has attracted over 60% of the total investments in the past year. This is not surprising given that India is home to some of the world's leading tech companies, including Flipkart, Dream 11, and Ola. In terms of state-wise distribution of startup funding in India, Karnataka, Maharashtra, and Delhi are the top three states. These states are home to some of the country's leading startup hubs, including Bangalore, Mumbai, and Delhi. These cities have attracted the highest amount of funding, with Bangalore alone accounting for over 40% of the total investments in the past year. Apart from the technology sector, other sectors that have seen significant funding in the Indian startup ecosystem include e-commerce, healthcare, and fintech. E-commerce is the second most funded sector, with companies like Flipkart, Myntra, and BigBasket attracting substantial investments in recent years. Healthcare and fintech are also emerging as key sectors, with companies like Practo, PolicyBazaar, and RazorPay leading the way. It is interesting to note that startups in Tier-2 and Tier-3 cities are also attracting significant funding. This indicates that startup culture is spreading across the country and is not limited to just a few cities. The government of India has been taking steps to promote entrepreneurship and startup culture in the country, which has further contributed to the growth of the ecosystem. The government has launched several initiatives, including Startup India and Digital India, aimed at providing support to startups and creating a favorable business environment.

India's startup ecosystem has experienced a significant boom in recent years. Reports suggest that the country's startup funding has increased, and various sectors and states have contributed to its growth. Karnataka, home to Bangalore, also known as the Silicon Valley of India, has emerged as the leading state for startups, followed by Maharashtra, Delhi, and Tamil Nadu. These states have created a conducive environment for startups and have a vast pool of skilled talent, which has resulted in their success. When it comes to sector-wise

funding, e-commerce, fintech, and enterprise tech have been the top sectors that have attracted a significant amount of funding in recent years. E-commerce has benefited from the rise of online shopping, while fintech has gained popularity due to the ease of online banking and digital payments. Enterprise technology has seen significant growth due to increased digitization in the business world. Healthcare, edtech, and agritech are other sectors that have seen significant funding in the recent past. It's essential to note that the startup ecosystem in India is dynamic and constantly evolving, with new sectors and states emerging as promising destinations for startups. Overall, the growth of the Indian startup ecosystem is a positive sign for the country's economy and the global business community.

#### **Different initiatives that have helped startups boom in India are**

In recent years, India's startup ecosystem has seen a significant boom. Several factors have contributed to this growth, including government initiatives, favorable economic conditions, increased access to funding, and a growing culture of entrepreneurship. One of the most significant initiatives that has helped startups in India is the government's Startup India program. Launched in 2016, this program aims to encourage and support entrepreneurship in the country by providing various benefits and incentives to startups. These benefits include tax exemptions, easier access to funding, and streamlined regulatory processes, among others. Another essential factor that has contributed to the growth of startups in India is the availability of funding. In recent years, India has seen a surge in the number of venture capitalists and angel investors looking to invest in promising startups. This increased access to funding has enabled startups to scale up their operations and grow at a faster pace. The rise of digital technology has also played a crucial role in the growth of startups in India. With the proliferation of smartphones and the internet, startups have been able to reach a larger audience and offer innovative solutions to problems that were previously unsolvable.

incubators and accelerators, which provide startups with guidance and support during their early stages. Additionally, several venture capital firms in India invest in startups, providing them with the necessary funding to grow and scale. These initiatives have played a pivotal role in the success of startups in India, especially those that do not require high initial funding but need capital at later stages.

Finally, the growing culture of entrepreneurship in India has also contributed to the rise of startups. With more and more people looking to start their businesses, there is a greater acceptance of failure and risk-taking, which are essential qualities for any successful

entrepreneur. Overall, these factors, along with many others, have helped startups boom in India in recent years. With the government's continued support and the growing availability of funding and resources, the Indian startup ecosystem is poised for even greater growth and success in the future.

### Findings

Based on the research conducted on the Indian startup ecosystem, the following findings can be observed:

1. The Indian startup ecosystem has seen significant growth over the past decade, with the number of startups increasing rapidly. As of 2021, India had over 50,000 startups, making it the third-largest startup ecosystem globally.
2. The funding landscape for Indian startups has also undergone significant changes, with venture capital investments growing at a compound annual growth rate of over 30% between 2016 and 2021. In 2021 alone, a total of \$10 billion was invested in Indian startups.
3. India has produced several unicorns, indicating the potential of the ecosystem. As of 2021, India had over 50 unicorns, including companies like Flipkart, Nykaa, Ola, and Byju.
4. The Indian startup ecosystem has diversified significantly, with startups emerging in various sectors, including e-commerce, fintech, healthcare, edtech, agritech, and more.
5. The Indian government has launched various initiatives, such as Startup India and Digital India, to promote entrepreneurship and support startups. Additionally, the government has eased regulations and introduced tax incentives to encourage entrepreneurship and investment in startups.
6. Despite the growth of the Indian startup ecosystem, there are still challenges that need to be addressed, such as access to funding, talent, and infrastructure. The COVID-19 pandemic has also brought its own set of challenges for startups, but it has also highlighted the need for innovation and adaptation in the ecosystem.
7. The findings suggest that the Indian startup ecosystem has tremendous potential for growth and success in the future, but further work is needed to overcome the challenges and support the ecosystem's continued development.

In conclusion, the findings suggest that the Indian startup ecosystem has come a long way and has the potential for further growth and success. The government's initiatives and support have boosted the ecosystem's development, but more work is needed to address the challenges and ensure that the ecosystem continues to thrive.



## Conclusion

In conclusion, the Indian startup ecosystem has come a long way in the last decade, overcoming significant challenges and establishing itself as a promising platform for entrepreneurship and innovation. Successful startups like Dream11, Zomato, and Razorpay have contributed to the momentum of the ecosystem, and initiatives like Startup India and Digital India have further fueled its growth. The increase in venture capital funding and the rise of unicorns in India indicate the potential for continued growth and success. However, there are still challenges that need to be addressed, such as improving infrastructure, providing easier access to capital, and reducing regulatory hurdles. With continued support from the government and investors, the Indian startup ecosystem is poised for further growth and success in the future.

## Reference

A study on the issues and challenges of startups in India, Dr. G Suresh Babu, Br. K Sridevi, *International Journal of Financial Management and Economics* 2019, 2(1): 44–48.

Indian Startup Ecosystem: Analyzing Investment Concentration and Performance of Government Programmes, Fakhri Amrin Kamaluddin and Kala Seetharam Sridhar, ISEC Working Paper No. 514, May 2021.

<https://www.startupindia.gov.in/content/sih/en/resources/market-research.html>

An inside view of Indian startups, Tripda Rawal, *IJCRT*, Volume 6, Issue 1, February 2018, ISSN: 2320-2882

<https://www.srcc.edu/sites/default/files/1.Vol.%202%20Issue%201.pdf>

<https://amity.edu/arjta/pdf/vol1-2/10.pdf>

## Applications of Internet of Things

**D. Sangeetha**

*Assistant Professor of Commerce, Dr. G R Damodaran College of Science, Coimbatore, Tamilnadu, India*

*Corresponding Author e-mail iD: [sangibala18@gmail.com](mailto:sangibala18@gmail.com)*

### Abstract

Internet of Things plays a vital role in everyday life of many people. The devices can range from everyday objects to industrial machineries, vehicles etc. IoT enables these devices to collect and share information, leading to increased automation, efficiency, and connectivity in various domains such as healthcare, agriculture, transportation, manufacturing and many more applications in regular life. The potential applications of IoT continue to expand as technology advances and new use case emerge.

**Keywords:** Internet of Things, Applications of IoT

### Introduction

The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention. The personal and business possibilities are endless. A ‘thing’ can refer to a connected medical device, a biochip transponder (think livestock), a solar panel, a connected automobile with sensors that alert the driver to a myriad of possible issues (fuel, tire pressure, needed maintenance, and more) or any object, outfitted with sensors, that has the ability to gather and transfer data over a network.

The IoT is a transformative technology that connects everyday objects to the internet, enabling them to send and receive data. This connectivity allows for remote monitoring, control and automation of devices, leading to increased efficiency, productivity, and convenience in various aspects of life. From smart homes and wearable devices to industrial machinery and smart cities, IoT is revolutionizing the way the user interact with the world around us.

Today, businesses are motivated by IoT and the prospects of increasing revenue, reducing operating costs, and improving efficiencies. Businesses also are driven by a need for regulatory compliance. Regardless of the reasons, IoT device deployments provide the data and insights



necessary to streamline workflows, visualize usage patterns, automate processes, meet compliance requirements, and compete more effectively in a changing business environment.

### Applications of IoT

IoT has many applications; the top few IoT applications are explained:

- Smart Home:

Whenever we think of IoT systems, the most important and efficient application that stands out every time is Smart Home ranking as highest IoT application on all channels. The number of people searching for smart homes increases every month with about 60,000 people and increasing. Another interesting thing is that the database of smart homes for IoT analytics includes 256 companies and startups. More companies are now actively being involved in smart homes than similar other applications in the field of IoT. The estimated amount of funding for Smart Home startups exceeds \$2.5bn and is ever growing. The list of startups includes prominent startup company names such as AlertMe or Nest as well as a number of multinational corporations like Philips, Haier or Belkin etc.



- Wearable

Just like smart homes, wearables remain a hot topic too among potential IoT applications. Every year, consumers all across the globe await the release of Apple' smartwatch. Apart from this there are plenty of other wearable devices that make our life easy such as the Sony Smart B Trainer, or LookSee bracelet, the Myo gesture control.



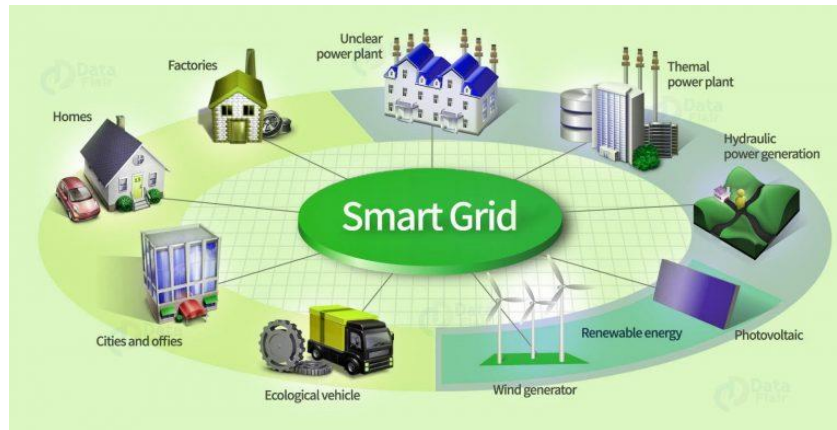
- Smart City

The smart city like the name suggests is a very big innovation and spans a wide variety of use cases, from water distribution to traffic management to waste management, environmental monitoring, and urban security. The reason why it is so popular is that it tries to remove the discomfort and problems of people who live in cities. IoT solutions offered in the Smart City area solve various city-related problems comprising of traffic, reduce air and noise pollution and help make cities safer.



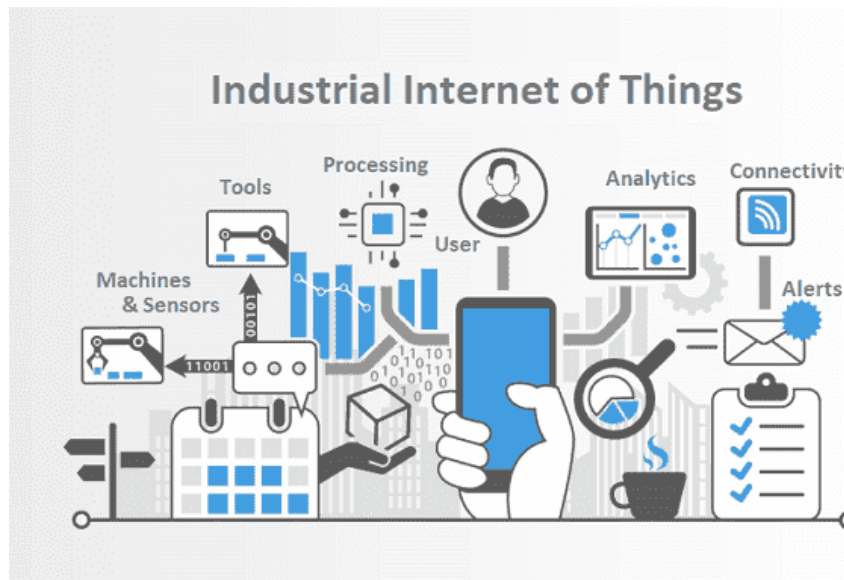
- Smart Grids

Smart grids is another area of application that stands out. A smart grid basically promises to extract information on the behaviors or consumers and electricity suppliers in an automated fashion in order to improve the efficiency, economics, and reliability of electricity distribution. 41000 monthly Google searches is a testament to this concept's popularity.



- Industrial Internet

One way to think of the Industrial Internet is, as connecting machines and devices in industries such as power generation, oil, gas, and healthcare. It is also made use of in situations where unplanned downtime and system failures can result in life-threatening situations. A system embedded with the IoT tends to include devices such as fitness bands for heart monitoring or smart home appliances. These systems are functional and can very well provide ease of use but are not reliable because they do not typically create emergency situations if a downtime was to occur.



- Connected Car

Connected car technology is a vast and an extensive network of multiple sensors, antennas, embedded software, and technologies that assist in communication to navigate in our



complex world. It has the responsibility of making decisions with consistency, accuracy, and speed. It also has to be reliable. These requirements will become even more critical when humans give up entirely the control of the steering wheel and brakes to the autonomous or automated vehicles that are being successfully tested on our highways right now.



- Connected Health (Digital Health / Telehealth / Telemedicine)

IoT has various applications in healthcare, which are from remote monitoring equipment to advance and smart sensors to equipment integration. It has the potential to improve how physicians deliver care and also keep patients safe and healthy. Healthcare IoT can allow patients to spend more time interacting with their doctors by which it can boost patient engagement and satisfaction. From personal fitness sensors to surgical robots, IoT in healthcare brings new tools updated with the latest technology in the ecosystem that helps in developing better healthcare. IoT helps in revolutionizing healthcare and provides pocket-friendly solutions for the patient and healthcare professional.



- Smart Retail

Retailers have started adopting IoT solutions and using IoT embedded systems across a number of applications that improve store operations such as increasing purchases, reducing theft, enabling inventory management, and enhancing the consumer's shopping experience. Through IoT physical retailers can compete against online challengers more strongly. They can regain their lost market share and attract consumers into the store, thus making it easier for them to buy more while saving money.



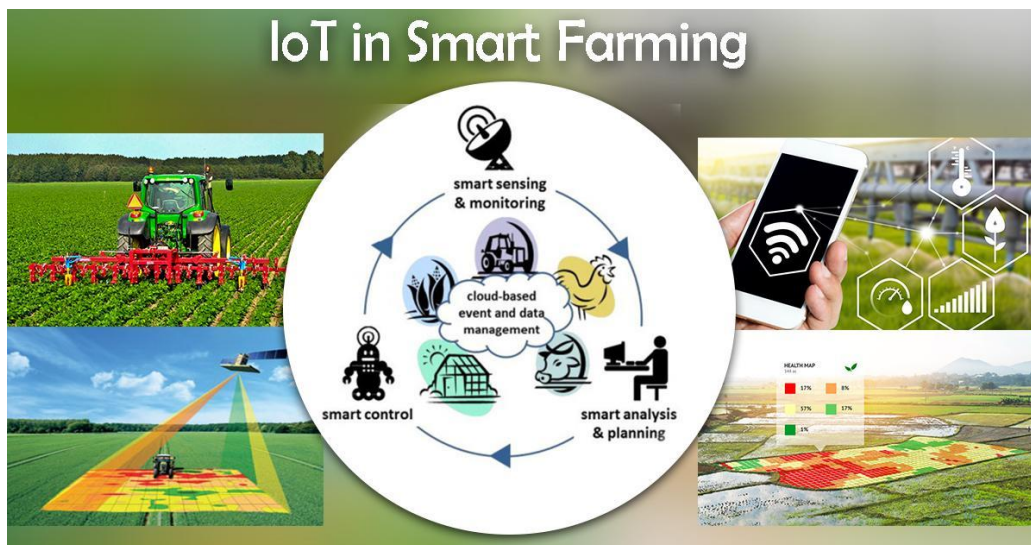
- Smart Supply Chain

Supply chains have already been getting smarter for a couple of years. Offering solutions to problems like tracking of goods while they are on the road or in transit, or helping suppliers exchange inventory information are some of the popular offerings. With an IoT enabled system, factory equipment that contains embedded sensors communicate data about different parameters such as pressure, temperature, and utilization of the machine. The IoT system can also process workflow and change equipment settings to optimize performance.



- Smart Farming

Smart farming is an often overlooked IoT application. However, because the number of farming operations is usually remote and the large number of livestock that farmers work on, all of this can be monitored by the Internet of Things and can also revolutionize the way farmers work. But this idea is yet to reach a large-scale attention. Nevertheless, it still remains to be one of the IoT applications that should not be underestimated. Smart farming has the potential to become an important application field specifically in the agricultural-product exporting countries.



## Conclusion

An IoT application involves summarizing its benefits, potential challenges, and future outlook. For instance, the user could emphasize enhancement of IoTs efficiency, enables data-driven decision-making, and improves user experiences. Additionally mention considerations

like security, privacy and scalability. Finally, the evolution of IoT technology and its expanding role in various industries, suggested continuous innovation and adoption in the field.

#### Reference

<https://www.spiceworks.com/tech/iot/articles/top-applications-internet-of-things/>

<https://www.geeksforgeeks.org/top-applications-of-iot-in-the-world/>

# E-commerce, AI, and the Evolution of B2B/B2C Dynamics in Shaping the Future of Film

K. S. Suresh<sup>1\*</sup> and C. Venil ilavarasan<sup>2</sup>

<sup>1\*</sup>Assistant Professor of IT, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>2</sup>Assistant Professor of CS, Sri Krishnasamy Arts & Science College, Mettamalai, Sattur, India.

\*Corresponding Author e-mail iD: [kalaisuresh0@gmail.com](mailto:kalaisuresh0@gmail.com)

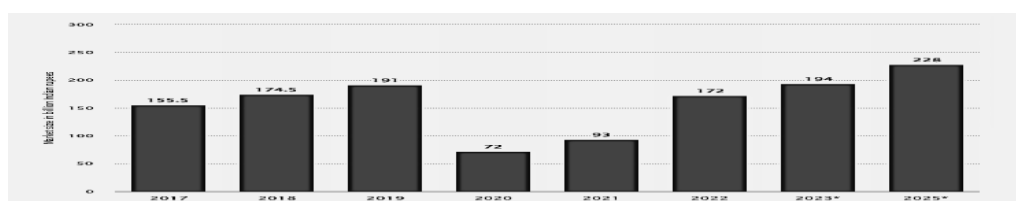
## Abstract

Imagine a film industry where AI writes scripts, e-commerce platforms streamline production, and audiences have personalized access to content. "Shaping the Future of Film" explores how e-commerce, artificial intelligence (AI), and shifting B2B/B2C dynamics are revolutionizing every aspect of the industry. From the democratization of film access to the transformative role of AI in scriptwriting, marketing, and audience engagement, this article showcases the profound changes underway. Highlighting specific examples, such as ScriptBook's AI script assessment tool and Netflix's personalized recommendation engine, illustrates the tangible impact of these innovations. With AI-powered tools predicted to save the industry billions of dollars within the next decade, stakeholders must embrace collaborative and responsible integration to unlock unprecedented opportunities for growth, creativity, and engagement. This forward-looking examination appeals to industry professionals, researchers, and enthusiasts, offering a glimpse into the exciting future of film.

**Keywords:** E-commerce, B2B, B2C, Artificial Intelligence, Film Industry, ScriptBook Tool

## Introduction

The film industry is undergoing a profound transformation, driven by the convergence of e-commerce, artificial intelligence (AI), and the dynamic interplay between business-to-business (B2B) and business-to-consumer (B2C) models. This evolution is reshaping how films are created, distributed, and consumed, ushering in an era of innovation and growth.

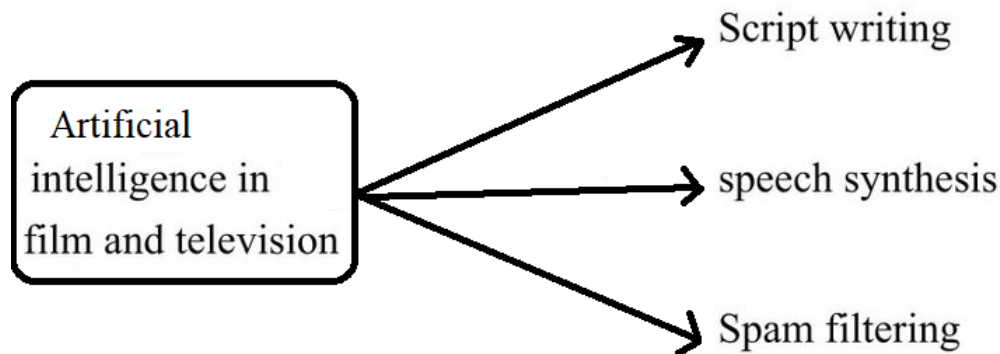


**Figure 1:** Trade measurements of the film industry across India from financial year 2017 to 2022, with calculated approximate prediction until 2025



## E-commerce's Ascendancy: Empowering Creatives and Audiences

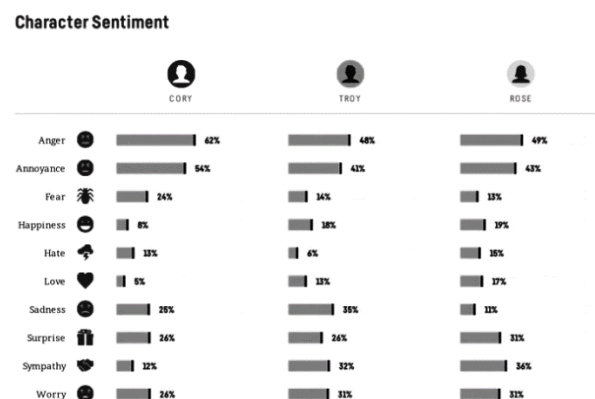
Once confined to traditional retail sectors, e-commerce has become integral to the entertainment landscape. E-commerce platforms serve as vital conduits for B2B and B2C transactions, offering production companies streamlined access to equipment, props, and talent, while granting audiences convenience in purchasing tickets, merchandise, and digital content. This democratization of film access not only broadens revenue streams for studios but also enhances the overall cinematic experience for audiences worldwide.



**Figure 2:** Implementation of artificial intelligence in film and television media

## AI's Influence: Redefining the Art and Craft of Filmmaking

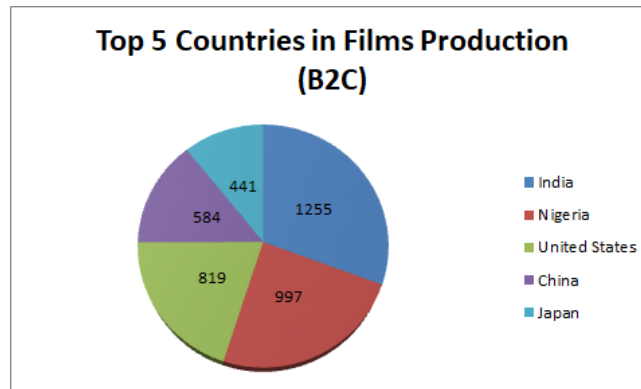
At the heart of this revolution lies artificial intelligence, revolutionizing every aspect of the filmmaking process. AI algorithms drive innovation in scriptwriting, pre-production, marketing, and audience engagement. For instance, tools like ScriptBook analyze data to assess script viability, while AI-powered recommendation engines personalize promotional campaigns and target specific demographics effectively. Moreover, AI-driven editing tools empower filmmakers to explore new realms of creativity, enhancing storytelling and visual effects in unprecedented ways.



**Figure 3:** Specimen character examination from ScriptBook tool

### B2B/B2C Dynamics: Navigating Global Perspectives

While the impact of e-commerce and AI is felt across the globe, regional variations exist in their adoption and adaptation. In emerging markets like India and Nigeria, where traditional distribution channels coexist with digital platforms, these technologies offer opportunities to overcome logistical challenges and reach wider audiences. Conversely, in established film industries like Hollywood, they drive further advancements in production, distribution, and audience engagement, pushing the boundaries of cinematic innovation.



**Figure 4:** According to B2C (Business-to-Consumer) e-commerce model, Top 5 Countries in Films Production

### The Fusion: Bridging Technology and Creativity

This convergence blurs the boundaries between B2B and B2C realms, with AI serving as a catalyst for innovation. Yet, amidst these technological advancements, it's essential to recognize the enduring importance of human creativity and expertise. While AI enhances efficiency and offers valuable insights, it cannot replace the nuanced storytelling and artistic vision of filmmakers. Ultimately, it's the collaboration between human ingenuity and technological innovation that fuels the magic of cinema and captivates audiences worldwide.

COMP - ACTUAL	WAS PREDICTED?	COMP - PREDICTED
x-men_apocalypse	TRUE	the_magnificent_seven
john_wick_chapter_2	TRUE	jason_bourne
doctor_strange	TRUE	john_wick_chapter_2
batman_v_superman_dawn_of_justice	TRUE	terminator_genisys
suicide_squad	TRUE	the_legend_of_tarzan
deadpool	FALSE	mad_max_fury_road
terminator_genisys	TRUE	the_revenant
mad_max_fury_road	TRUE	independence_day_resurgence
ant-man	FALSE	spectre
captain_america_civil_war	FALSE	rogue_one_a_star_wars_story
star_trek_beyond	TRUE	the_hunger_games_mockingjay_part_1
independence_day_resurgence	TRUE	the_accountant
the_magnificent_seven	TRUE	star_trek_beyond
avengers_age_of_ultron	FALSE	suicide_squad
kingsman_the_secret_service	FALSE	the_martian
arrival	FALSE	x-men_apocalypse
split	FALSE	batman_v_superman_dawn_of_justice
rogue_one_a_star_wars_story	TRUE	san_andreas
fantastic_beasts_and_where_to_find_them	FALSE	doctor_strange
Furious 7	FALSE	mission_impossible_-_rogue_nation

**Figure 5:** Forecasting upcoming audience using computer vision tool by Data Science team of Google

### Challenges and Opportunities: Navigating the Path Forward

Despite the promise of this technological revolution, challenges abound. Privacy concerns, digital piracy, and the concentration of power among industry giants pose significant hurdles. Moreover, as reliance on data-driven decision-making grows, questions of transparency, accountability, and ethical AI usage come to the fore.

### In Conclusion: Embracing the Future of Film

The convergence of e-commerce, AI, and B2B/B2C dynamics heralds a new era of innovation and accessibility in the film industry. Through collaborative and responsible integration of these technologies, stakeholders can unlock unprecedented opportunities for growth, creativity, and engagement. As the allure of cinema continues to captivate audiences worldwide, the future of film promises endless possibilities and boundless creativity.

### References

- [1] The Impact of Artificial Technology on Authors of a Cinematographic Creation MA Radetzky - Hasanuddin Law Review, 2024
- [2] “Reel” ing it in: The Indian film industry's survival and growth in the post-pandemic era HG Rammal, R Kamineni, V Pereira, RW Tang, 2023
- [3] Futuristic Scenarios: Utilization of AI Technological Settings to Foster the Filmmaking Visual Creation & Mass Production S Nassar - *International Design Journal*, 2024
- [4] Prediction with deep learning neural networks: the careers in show business AC Günhan, K TOPAL - *Artificial Intelligence Studies*, 2023
- [5] Development Trends and Challenges of the Animation Film Industry in the context of Information Technology R Shi - *Highlights in Business, Economics and Management*, 2023
- [6] The Evolution of Generative AI: Implications for the Media and Film Industry K Totlani
- [7] Business and Management Research on the Motion Picture Industry: A Biblio-metric

Analysis LJ Gutzeit, V Tiberius - Journalism and Media, 2023

[8] Sentiment Classification of Movie Reviews Based on the Ensemble Machine Learning Model Proceedings of the 2023 International Conference on Image, Algorithms and Artificial Intelligence (ICIAAI 2023), Zicheng Gan, 2023

[9] Sentiment Analysis of BNI Mobile Application Using The K-Nearest Neighbor Algorithm (KNN) With Particle Swarm Optimization (PSO) Feature Selection Vol 6 No 2 (2023): INTECOMS: Journal of Information Technology and Computer Science



## AI's Place in India's Insurance Sector

S. Manikandan<sup>1\*</sup> and V. Manohar<sup>2</sup>

<sup>1\*</sup>Assistant Professor of Commerce, M.G.R. College, Hosur, India.

<sup>2</sup>Associate Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [vnrmnikandan@gmail.com](mailto:vnrmnikandan@gmail.com)

### Abstract

The capacity of a computer or robot to carry out operations that are normally associated with human intellectual processes is known as artificial intelligence (AI). It's a branch of computer science that creates and investigates intelligent devices. The swift progress of artificial intelligence (AI) technology has brought about a dramatic transformation in the insurance business, as it has in many other sectors. In his 2018–19 budget speech, the Honorable Finance Minister directed NITI Aayog to create the National Program on AI, with the goal of directing research and development in new and emerging technologies. This was done in recognition of AI's potential to revolutionize economies and the necessity for India to strategically approach the subject. There are several benefits to integrating AI into the Indian insurance industry, ranging from increased operational efficiency to better client experiences. These opportunities do, however, come with difficulties that need for thoughtful thought and deliberate preparation.

**Keywords:** AI, Insurance, India

### Introduction

The capacity of a computer or robot to carry out operations that are normally associated with human intellectual processes is known as artificial intelligence (AI). It's a branch of computer science that creates and investigates intelligent devices. Large volumes of data can be processed differently by AI technology than by humans. Artificial Intelligence (AI) aims to mimic human abilities such as pattern recognition, decision – making, and judgment.

### Growth of AI in life insurance Sector

The swift progress of artificial intelligence (AI) technology has brought about a dramatic transformation in the insurance business, as it has in many other sectors. AI has shown itself to be a potent instrument that is revolutionizing the insurance industry in a number of areas,



including risk assessment, underwriting, claims processing, and customer service. Insurance firms have discovered creative methods to improve client experiences, streamline processes, and maintain competitiveness in a market that is always changing by utilizing artificial intelligence. Because AI can scan large volumes of data and identify patterns, insurers are able to make data – driven choices that lead to more precise risk assessments and customized insurance solutions.

### Laws Regarding AI in India

India has a big part in the AI revolution as it has the second-largest population in the world and the fastest-growing economy. In his 2018–19 budget speech, the Honorable Finance Minister directed NITI Aayog to create the National Program on AI, with the goal of directing research and development in new and emerging technologies. This was done in recognition of AI's potential to revolutionize economies and the necessity for India to strategically approach the subject. In order to achieve the aforementioned goals, NITI Aayog has chosen a three-pronged strategy: working with a variety of experts and stakeholders; conducting experimental proof-of-concept AI initiatives in diverse domains; and developing a national plan for creating a thriving AI ecosystem in India. NITI Aayog has worked with numerous top AI technology companies since the beginning of this year.

### India uses artificial intelligence (AI) in a variety of contexts, such as:

#### **Healthcare:**

AI-powered platforms can lower costs, increase access to treatment, and lessen the burden on healthcare systems. Medical mistake solving can also be aided by AI.

#### **Agriculture:**

AI has a lot of applications that can boost agricultural output. In India, there are over a thousand agritech start-ups providing cutting-edge AI-based agricultural solutions.

#### **Education:**

AI can provide individualized curricula and tailored learning experiences.

#### **Infrastructure and smart cities:**

Artificial Intelligence can assist address India's fast urbanizing population. Intelligent mobility and transportation can also benefit from AI.

**Environmental management:**

Predictive analysis in environmental monitoring may be achieved with AI.

**Payment Gateways:**

Razorpay reduces fraud losses by using AI intelligence.

**Additional applications:**

AI may assist with semiconductor technology, 5G technologies, and administrative duties.

### Opportunities and Difficulties for Artificial Intelligence and Insurance in India

The insurance sector is changing quickly, and integrating artificial intelligence (AI) has become a game-changer. Investigating the potential and difficulties that artificial intelligence (AI) brings in the context of the Indian market is essential for content managers of Indian life insurance companies. This blog will discuss how artificial intelligence (AI) is changing the insurance industry in India, as well as the opportunities and challenges that lie ahead for this technology.

### Prospects for the Insurance Industry in India

**Improved Client Relationship**

AI has the power to completely change how customers and insurers communicate. Artificial intelligence (AI)-powered chatbots and virtual assistants can offer prompt, individualized support, answering consumer questions and assisting them through the intricate insurance process. This raises client satisfaction levels and boosts customer service operations' efficiency.

**Data-Based Underwriting**

In the insurance industry, risk assessment accuracy is essential. Large volumes of data may be analyzed in real time by AI systems, enabling more accurate underwriting choices. This lowers the risk for insurers and makes it possible for them to provide a wider spectrum of clients with more cheap and personalized coverage.

## **Fraud Prevention and Identification**

The insurance sector has serious concerns about fraudulent claims. When it comes to seeing trends and abnormalities in data, artificial intelligence (AI) may be a very useful tool for spotting possibly fraudulent activity. This helps to preserve the integrity of the whole insurance ecosystem in addition to protecting the insurer's interests.

## **Using Predictive Analytics to Make Better Decisions**

Predictive analytics powered by AI can help insurance businesses make wise judgments. Insurers may anticipate future risks and market shifts by evaluating past data and patterns, which gives them the ability to proactively modify their strategy. This can be especially helpful in India's dynamic and changing insurance industry.

## **Automation of Processes for Efficiency**

From the issue of policies to the processing of claims, the insurance industry entails many intricate procedures. These procedures can be streamlined by AI-powered automation, which will minimize mistakes, cut down on manual involvement, and accelerate productivity as a whole. This improves operational effectiveness while freeing up staff time for more strategic work.

## **Difficulties in Using AI in the Indian Insurance Industry**

### **Data protection and Privacy Issues**

Ensuring the protection and privacy of sensitive client data is one of the main obstacles to the insurance industry's use of AI. Strong cyber security measures are required to guard against data breaches and unauthorized access as insurers gather and handle enormous volumes of personal data.

### **Adherence to Regulations**

To protect policyholders' interests, the insurance sector is subject to strict regulatory frameworks. Following these rules is necessary for the implementation of AI, although it may be difficult and time-consuming. The effective integration of artificial intelligence (AI) into the Indian insurance market necessitates striking the correct balance between innovation and compliance.

## **The Skills Gap and Workforce Restructuring**

AI in the insurance industry can only be successfully implemented with a staff that is competent in creating, deploying, and managing AI systems. Upskilling current workers and luring in fresh personnel with experience in AI and similar technologies are challenges facing the business.

## **Moral Aspects to Take into Account**

Artificial intelligence (AI) algorithms rely largely on data, and prior data biases may be carried over into AI-driven decision-making. One of the main concerns is making sure AI models are transparent and equitable. The deployment of AI has to prioritize ethical issues in order to avoid unforeseen repercussions and foster customer trust.

## **Concerns about ROI and Integration Costs**

Even though artificial intelligence (AI) has a lot of potential, many insurance companies—especially the smaller ones in the industry—may find it difficult to afford the upfront integration expenses. Widespread adoption may be hampered by worries about return on investment (ROI) and the length of time it takes to see noticeable advantages.

## **Conclusion**

There are several benefits to integrating AI into the Indian insurance industry, ranging from increased operational efficiency to better client experiences. These opportunities do, however, come with difficulties that need for thoughtful thought and deliberate preparation. Through careful navigation of these obstacles and responsible use of AI, the Indian insurance sector may establish itself as a leader in innovation, offering improved services and safeguarding policyholders' futures throughout the country.

## **Reference**

<https://www.bhartiata.com/be-smart/life/ai-artificial-intelligence-and-insurance-in-india>  
<https://indiaai.gov.in/article/ai-s-impact-on-the-indian-insurance-sector>

# The study on customer Perception towards artificial intelligence based customer service with reference to people in Virudhunagar

**R. Preethi**

*Assistant Professor of Information Technology, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.*

*Corresponding Author e-mail iD: [preethi@vhnsnc.edu.in](mailto:preethi@vhnsnc.edu.in)*

## Abstract

In today's digital world, companies are moving towards artificial intelligence (AI) to develop their customer service experience. AI in customer service has the prospective to change the way businesses interact with their clients, offering many aids such as 24/7 availability, quick response times, and personalized support. So, it is crucial to understand the various viewpoints and perceptions that customers hold about this technology. Customer perception towards customer service using artificial intelligence (AI) differs among persons. Few customers appreciate the convenience, speed, and availability that AI-powered customer service offers, while others may have concerns about the human touch and personalized attention being substituted by AI technology. Learning about customer perception towards customer service using artificial intelligence is important for companies to prosper in today's competitive landscape. By gaining a deeper understanding of customers' attitudes and experiences, companies can create more effective, efficient, and customer-centric AI-powered customer service strategies.

**Keywords:** Customer Perception, Artificial Intelligence (AI), Customer Service

## Introduction

Customer service is a vital part of any business, as it denotes the appearance of a business in its customer's mind. The assistance and help provided by a business to its customers before, during, and after the purchase of a product or service is the customer service. This complete support aims to address customer concerns, resolve issues, and ensure their satisfaction, which in turn nurtures loyalty and positive word-of-mouth. The introduction of artificial intelligence (AI) has changed the way companies interact with their customers. Customer service systems with AI give solution to customer queries in a personalized way.





This has AI-driven customer service systems provides a better efficiency, lesser response times, and improved customer satisfaction.

However, the integration of AI in customer service also raises concerns about the human touch and empathy that may be lost in interactions with machines. Customers may still prefer human interaction for complex issues or situations that require emotional intelligence. From previous studies it is understood that up to 42% of B2C customers expressed more interest in buying after receiving good customer service. Further, 52% of them stopped buying because of a single bad customer service experience. Businesses are implementing technology to offer customers reliable service and experience. Artificial intelligence (AI) is transforming customer service by improving consumer engagement and delivering 24/7 customer care. It not only changes customer service but also increases the consumer loyalty and brand awareness.

### Significance of the study

This study helps in gaining insights into customer's attitude towards AI-based customer service. This can help businesses to customize their plans to meet specific needs and preferences, ultimately leading to higher satisfaction levels. It also helps in addressing concerns and providing personalized experiences can foster long-term relationships with customers, reducing the risk of them seeking alternatives. Learning from customer perception can help companies improve their AI systems, ensuring they are effective, efficient, and well-aligned with customer expectations. Adapting to the evolving preferences of customers, including their attitudes towards AI, is essential for businesses to stay ahead of the competition. Understanding customer perception can lead to the development of new AI-based solutions that cater to customer needs and desires, driving innovation in the customer service industry.

### Objective of the study

- To identify perception of customer towards AI-driven customer service.
- To gain insights into how customers perceive and interact with AI-driven customer service systems.

### Review of literature

Anli Suresh (2020) has told that AI revolution in e-commerce will create plenty of new data science, machine learning and engineering and this will generate IT jobs to develop and maintain the systems and software. Chenzhuoer Li's (2020) in his research found that

consumers generally accept artificial intelligence customer service because of its 24-hour service capabilities, more neutral and objective positions, and the future development trends that it represents. Mohannad A. M. Abu Daqar (2019) has told that there is a positive relationship between AI and customer experience and that there is a direct relationship between providing personalized customer service and after-sale customer support, and AI.

### Research Methodology

The study is empirical in nature. The primary data was collected from the users of internet who were the students, businessmen, house wife and employee of different age group, background and income level. Primary data was collected through structured questionnaire. The secondary data was collected from sources. The study was conducted with a sample size of 200 people in Virudhunagar. The technique used to identify the respondent is convenient sampling. For analyzing the data Chi-square, Garrett's ranking and Weighted average were used. The test was conducted on 5% level of significance.

Research methodology for The study on customer Perception towards artificial intelligence based customer service with reference to people in Virudhunagar

- Research design: Survey research
- Sampling frame: Virudhunagar
- Sampling unit: Customers of different age group, educational background and income level
- Sampling method: Convenience sampling
- Sampling size: 200
- Type of data: Both Primary and Secondary data
- Method of data collection: Questionnaire
- Types of questionnaire: Open ended and close ended questions
- Statistical tools used: Percentage analysis, Weighted average, Chi square and Garrett ranking
- Software used: SPSS

## Result and Discussion

### Percentage Analysis

**Table.1. Percentage Analysis**

Demographic variables		No. of respondents	Percentage (%)
Gender	Male	83	41.5
	Female	117	58.5
	Total	200	100
Age	< 20	12	6
	20-30	74	37
	30-40	65	32.5
	40-50	32	16
	>50	17	8.5
	Total	200	100
Education	Below 12 <sup>th</sup>	22	11
	UG	93	46.5
	PG	73	36.5
	PhD	12	6
	Total	200	100
Occupation	Student	102	51
	Employed	32	16
	Self – Employed	24	12
	House wife	21	10.5
	Others	21	10.5
	Total	200	100

From The above Table.1 shows that 117 (58.0%) respondents are female, it also reveals that 74(37.0%) respondents are between the age category 20-30 years of age and 93 (46.5%) respondents have completed their under graduation and 102 (51%) respondents are students.

### Customer perception on features of AI based customer service

The Table.2 shows the Customer perception on features of AI based customer service. The features such as personalized support, fast and consistent support and 24/7 service are considered as most preferred features of AI based customer service and the features such as offer multilingual support, provide active recommendations and save time by automatically identifying intention are considered as less preferred features of AI based customer service.

**Table.2. Weighted average of customer perception on features of AI based customer service**

Features of AI	Mean Score	Rank
AI provide you with 24/7 service	4.21	3
AI provide you active recommendations	3.78	6
AI boosts you with customer satisfaction and customer retention	4.08	4
AI deliver you with personalized support	4.26	1
AI save your time by automatically identifying your intention	3.98	5
AI delivers you fast and consistent support	4.25	2
AI offer you the multilingual support	3.87	7

**Customer perception on barriers of AI based customer service**

The Table.3 shows the customer perception on barriers of AI based customer service. The barriers such as Backend data quality affect responses and Privacy issue are more important barriers of AI based customer service and the barriers such as Technical Issues and Language and context understanding are less important barriers of AI based customer service.

**Table.3. Weighted average on barriers of AI based customer service**

Features of AI	Mean Score	Rank
Lack of Emotional Connection and Human Interaction	4.24	3
Privacy issue	4.71	2
Technical Issues	3.81	5
Language and context understanding	3.51	4
Backend data quality affect responses of AI	4.84	1

**Source: Primary Data****Suggestions**

The study provides valuable insights into customer perception towards AI-based customer service in Virudhunagar and here are few suggestions

- From the study it is clear that respondent prefer AI-based services for personalized support so companies can provide personalized assistance to each and every customer by analyzing customer data and preferences which in turn will result in a more engaging and satisfying customer.



- Respondents prefer AI-powered services 24/7 so companies have to build an AI system that can handle real-time customer interactions without sacrificing quality or efficiency.
- The study reveals that backend data quality affect the responses of AI so the companies can invest in training for employees and software which provide high quality data.
- Most of the respondent feel that there is Lack of Emotional Connection and Human Interaction so the companies can AI based support system with human agents so that it will offer the customer the solutions with personal touch.
- Privacy issue is the another concern for the respondents so the company can safeguard customer data by implementing strict privacy and security measures, ensuring that sensitive information is protected and that customers feel confident in the AI system's ability to handle their data securely.

## Conclusion

AI based customer service offer numerous benefits, such as personalized support, fast and consistent support and 24/7 service. However, businesses must also consider the limitations, including as Backend data quality affect responses and Privacy issue. By implementing best practices, such as combining AI with human agents, continuously monitoring and improving system performance, and focusing on user experience, businesses can unlock the full potential of AI based customer service and deliver exceptional support to their customers. As technology continues to evolve, we can expect AI based customer services to become increasingly sophisticated, further transforming the way businesses interact with and support their customers. Overall the study concludes that the customer prefers AI based customer service.

## Reference

Daqar, M. A. A., & Smoudy, A. K. A. (2019, July 1). THE ROLE OF ARTIFICIAL INTELLIGENCE ON ENHANCING CUSTOMER EXPERIENCE. *International Review of Management and Marketing*, 9(4), 22–31.



Enshassi, M., Nathan, R. J., Soekmawati, S., Al-Mulali, U., & Ismail, H. (2024, March 1). Potentials of artificial intelligence in digital marketing and financial technology for small and medium enterprises. *IAES International Journal of Artificial Intelligence (IJ-AI)*, 13(1), 639.

Tiautrakul, J., & Jindakul, J. (2019). The Artificial Intelligence (AI) with the Future of Digital Marketing. *SSRN Electronic Journal*. van Esch, P., & Stewart Black, J. (2021, August).

Artificial Intelligence (AI): Revolutionizing Digital Marketing. *Australasian Marketing Journal*, 29(3), 199–203.

Piduru, B. R. (2023, March 31). The Role of Artificial Intelligence in Content Personalization: Transforming User Experience in the Digital Age. *Journal of Artificial Intelligence & Cloud Computing*, 1–5.

# The Role of Artificial Intelligence in Email Marketing Strategies

G. Abinaya<sup>1\*</sup> and V. Manohar<sup>2</sup>

<sup>1\*</sup>Research Scholar of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>2</sup>Associate Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: abiaarthy16@gmail.com

## Abstract

Artificial Intelligence (AI) in email marketing uses machine learning algorithms to personalize content, optimize send times, and segment audiences. The digital transformation fostered by the increasing leverage of AI has been a critical influencing factor unleashing the next wave of enterprise business disruption. Contemporary marketing has begun to experiment with modern, cutting-edge technologies, such as AI, deploying them in mainstream operations to ensure accelerated success. Email marketing has long been a powerful tool for businesses to reach and engage with their customers. With the advancement of technology, the role of artificial intelligence (AI) in email marketing has become increasingly important. This research aims to investigate the role of AI tools on the effectiveness and efficiency of email marketing campaigns.

**Keywords:** Artificial Intelligence, email, marketing

## Introduction

AI in email marketing involves leveraging artificial intelligence to enhance and automate various aspects of your email campaigns. In recent years, artificial intelligence (AI) has taken the digital marketing world by storm, revolutionizing the way businesses engage with their customers. One area in which AI has had a significant role is in email marketing. Email is also one of the easiest ways to contact your target audience directly, and many consumers now cite it as their preferred way to interact with brands. It's low-stress for them and has an impressive conversion rate for you. However, email marketing is more complicated than drafting copy and hitting send. The most effective email marketing campaigns are carefully segmented, tested, and refined to deliver the best results. All of that takes time, but thanks to AI email marketing tools, you can create incredible email marketing campaigns faster than ever.



The growing role of AI in email marketing is revolutionizing the way businesses target and engage with their customers, leading to more personalized and effective communication strategies.

Let's delve into how AI is revolutionizing email marketing:

1. **Personalization:** AI uses machine learning algorithms to personalize content for each subscriber. By analysing historical data, it tailors email messages to individual preferences, increasing engagement and relevance.
2. **Optimized Send Times:** Predictive AI identifies the best moments to send emails to individual recipients. By analysing customer engagement patterns, it ensures that emails reach recipients when they are most likely to engage.
3. **Segmentation:** AI helps segment audiences effectively. It analyses data to group recipients based on behaviour, demographics, or other relevant factors. This segmentation allows marketers to send targeted and relevant content.
4. **Generative AI:** Beyond predictive insights, generative AI creates new, relevant content or solutions tailored to specific user needs. It operates at speed and scale, automating the email marketing process.
5. **Lead Scoring:** AI assigns lead scores based on customer responses to email campaigns and website interactions. This score indicates the likelihood of conversion, helping marketers prioritize leads.
6. **Lifetime Value Prediction:** AI provides insights into the potential revenue generated by each customer over their lifetime with the brand. This information informs marketing strategies and resource allocation.

In summary, AI in email marketing aims to improve engagement, customer satisfaction, and campaign performance. As marketers, understanding how this technology works enables us to optimize and deliver effective email campaigns.

Best Practices for Integrating AI into Email Marketing Strategies Include:

1. **Understanding Your Audience and Their Preferences:** Utilize AI to analyse customer data and behaviour to gain insights into their preferences, habits, and interests. This allows for the creation of highly targeted and personalized email campaigns that are more likely to resonate with recipients.

2. **Testing and Experimentation:** Use AI to conduct A/B testing and experimentation to identify the most effective subject lines, content, and timing for email campaigns. AI can help analyse the results and optimize future campaigns for improved performance.
3. **Monitoring and Fine-Tuning AI Algorithms:** Regularly monitor the performance of AI algorithms used in email marketing to ensure they are delivering the desired results. Adjust and fine-tune these algorithms based on the performance data to continually improve campaign outcomes.
4. **Compliance with Regulations and Ethical Standards:** When utilizing AI for email marketing, ensure that data privacy regulations and ethical standards are strictly followed. This includes obtaining consent for data use, respecting unsubscribes requests, and ensuring that AI algorithms do not lead to discriminatory or unethical targeting practices. By incorporating these best practices, businesses can leverage the power of AI to enhance their email marketing strategies, resulting in improved targeting, engagement, and conversion rates.

#### Use of AI in Email Marketing

- ❖ **Time Savings:** Routine processes happen instantly, allowing faster campaign launches.
- ❖ **Performance Improvement:** Machine learning uses data points to optimize strategies.
- ❖ **Benchmarking:** Compare your performance against competitors to identify areas for improvement.

#### AI-Powered tools can be implemented to enhance email marketing strategies

- A. **Natural Language Generation (NLG) Tools:** NLG tools can create personalized email content at scale by analysing customer data and generating tailored messages for each recipient. These tools can be used to craft engaging subject lines, product recommendations, and personalized offers based on customer preferences and behaviour.
- B. **Predictive Analytics Platforms:** Predictive analytics tools leverage AI to forecast customer behaviour, allowing marketers to anticipate the needs and preferences of their audience. By analysing historical data, these platforms can identify patterns and trends, enabling the creation of targeted email campaigns that resonate with recipients.

- C. **Dynamic Content Optimization Tools:** AI-powered dynamic content optimization tools can personalize email content in real-time based on recipient behaviour, device type, location, and other variables. These tools ensure that emails are dynamically adjusted to maximize relevance and engagement for each individual recipient.
- D. **Smart Segmentation Tools:** AI-driven segmentation tools can categorize customers based on various attributes such as demographics, purchase history, and engagement levels. By automating the segmentation process, marketers can create highly targeted email campaigns that resonate with specific customer segments, leading to improved engagement and conversion rates.
- E. **Automated Campaign Optimization Platforms:** AI-powered platforms can automate the optimization of email marketing campaigns by adjusting send times, content, and other variables to maximize engagement and conversion rates. These platforms use machine learning algorithms to iteratively improve campaign performance based on real-time data and customer interactions.
- F. **Predictive Customer Lifetime Value (CLV) Tools:** AI tools can predict the potential lifetime value of individual customers, allowing marketers to prioritize and personalize email communications based on the long-term value of each customer. By focusing on high CLV customers, marketers can tailor email content to maximize customer retention and loyalty.

Implementing these AI tools can help businesses create more personalized, targeted, and effective email marketing campaigns, leading to improved engagement, conversion rates, and overall marketing ROI.

### AI to Write Email 10X Faster

AI email writer is an AI email writing tool that helps you generate high-quality email copy in minutes. These tools are usually backed by AI which utilize NLP and machine learning to generate the copy. These tools help you in researching, grammar, syntax, tone checking and even personalization. Overall, an AI email writer can be your personal copy expert to generate amazing email copies.

## AI Offers Benefits for Email Marketing

1. **Personalization:** AI can analyse consumer data and behaviour to personalize email content, such as product recommendations, tailored offers, and personalized subject lines. This level of personalization can lead to higher engagement and conversion rates.

2. **Automation:** AI can automate various aspects of email marketing, including sending personalized messages at optimal times, segmenting audiences, and even generating email content. This automation saves time and resources while ensuring timely and targeted communication.

3. **Predictive analytics:** AI can analyse vast amounts of data to predict consumer behaviour, such as identifying when a customer is likely to make a purchase or churn. This insight can help marketers tailor their email strategies accordingly, resulting in more effective campaigns.

4. **A/B testing and optimization:** AI can conduct A/B testing on a large scale and quickly identify the most effective email content, subject lines, and designs. This continual optimization can lead to better-performing campaigns and improved ROI.

5. **Improved targeting and segmentation:** AI can analyse customer data to create highly targeted segments for email campaigns, ensuring that the right message reaches the right audience. This precision can lead to higher engagement and conversion rates.

6. **Enhanced deliverability and engagement:** AI can analyse senders' and recipients' behaviour to optimize email deliverability and engagement. By monitoring open rates, click-through rates, and other metrics, AI can improve email performance over time.

7. **Content generation:** AI can help in generating content by providing insights into effective subject lines, body copy, and calls to action. This technology can be particularly beneficial for content creation and testing variations at scale.

Overall, AI empowers marketers to create more effective, personalized, and targeted email campaigns while automating time-consuming tasks and optimizing performance based on real-time data and insights. These benefits contribute to improved ROI and customer experience.



## Objections of AI in Email Marketing

### 1) **AI is too complex and expensive:**

It is true that integrating AI into email marketing requires some upfront investment and technical expertise. However, the long-term benefits far outweigh the initial costs. AI-powered email marketing platforms can analyse vast amounts of customer data to create highly targeted and personalized campaigns. This level of precision in targeting leads to higher conversion rates and greater return on investment.

### 2) **AI will replace human creativity in email marketing:**

While it is true that AI can automate certain aspects of email marketing, it does not diminish the importance of human creativity. By freeing up time spent on repetitive tasks, AI allows marketers to focus on creating more engaging and relevant content for their email campaigns. AI can also help identify trends and patterns in customer behaviour, providing valuable insights that can inform creative strategies.

### 3) **AI may lead to less ethical marketing practices:**

There is a common concern that AI-powered email marketing may lead to more intrusive and unethical tactics, such as spam or aggressive targeting. However, when used responsibly, AI can actually enhance ethical marketing practices. AI algorithms can analyse customer behaviour and preferences to deliver personalized content that is more relevant and valuable to the recipient. This leads to better engagement and stronger relationships with customers.

### 4) **AI is impersonal and will alienate customers:**

The fear that AI-powered email marketing will make communications feel impersonal is a valid concern. However, when implemented correctly, AI can actually enhance personalization. By analysing customer data, AI can help marketers segment their audience and deliver relevant, personalized content that resonates with each individual. This level of personalization can lead to greater customer satisfaction and stronger brand loyalty.

### 5) **AI is only beneficial for large companies with big data:**

While it is true that AI can leverage big data to deliver highly personalized email marketing campaigns, it is not limited to large companies. Many AI-powered email marketing platforms are designed to be accessible to businesses of all sizes. These platforms can still

provide valuable insights and automation that can help small and medium-sized businesses improve their email marketing efforts.

### Conclusion

The integration of AI in email marketing has the potential to revolutionize the way businesses engage with their customers. By addressing the common objections to AI in email marketing and highlighting its benefits, it is clear that AI has the potential to improve the effectiveness and efficiency of email marketing campaigns for businesses of all sizes. As technology continues to advance, it is important for marketers to embrace AI as a powerful tool for achieving better results in their email marketing efforts. The advancement of AI in email marketing presents exciting opportunities for businesses to engage with their audience in a more personalized and effective manner. As AI continues to evolve, it will undoubtedly play a pivotal role in shaping the future of email marketing strategies and driving improved results.

### Reference

<https://clickup.com/blog/ai-email-marketing-tools>

<https://www.mailmodo.com/guides/ai-in-email-marketing/>

## Role of Artificial Intelligence in Stock Trading and Investment Decisions

A. Rajakamatchi<sup>1\*</sup> and S. Vijayalakshmi<sup>2</sup>

<sup>1\*</sup>Research Scholar of Commerce, Kamaraj College, Thoothukudi, India.

<sup>2</sup>Assistant Professor of Commerce, Kamaraj College, Thoothukudi, India.

\*Corresponding Author e-mail iD: [rajakamatchi2410@gmail.com](mailto:rajakamatchi2410@gmail.com)

### Abstract

In recent days Artificial intelligence is used in every industry. The adaptation of AI in financial sectors has also seen a significant growth. Artificial Intelligence can process and analyse vast data sets both structured and unstructured using algorithms. It identifies patterns and trends that may not be easy for humans to make a connection to. There are many internal and external factors for the fluctuation of stock price to rise and fall. These make stock investment subjected to various risks but with the use of AI and AI tools fund managers and investors are able to analyse the historical data, predict the trend and pricing, and make investment to build a successful portfolio. So it is necessary to understand how AI is used to analyse the vast data and how it helps the investors in making investment choices. AI techniques like machine learning, natural language processing and sentimental analysis are widely used in stock market analysis for analysing structured and unstructured data. Currently with the help of AI trading platforms and AI trading tools the investors are able to make predictive analysis which helps the investors in making better informed investment decisions. The use of AI in trading and investment has its own pros and cons, while an investor should consider all the factors before making an investment. This article is focused on understanding the various AI tools that are available and the benefits and challenges of using artificial intelligence in stock trading and investment decisions.

**Keywords:** Artificial Intelligence, AI tools, Trading, Investments

### Introduction

“Artificial Intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable (John McCarthy)”. AI aims to enhance computer-based learning,



reasoning and perception. In simple term AI is all about teaching a machine to think like a human.

Stock Trading broadly refers to buying and selling of stocks. People usually buy and sell stocks online through trading platforms. The main objective of the investor is to make a profit from selling the investment. The investor usually buy the stock when the price of the particular share is low and sells the stock when the price is high to make profit. Stock market prices are influenced by different factors. People have no control over the price fluctuations. Stock brokers, investors and other fund managers try their best to predict the fluctuation with past market trends to make the best investment choice. The advent of AI has made it easy for investors to analyse past data and get accurate information.

Investment Decision is allocation of financial resources in different kind of investments, so an investor would be able to make a profit after a period of time. It is necessary for an investor to consider the risk profile of the investment, the goal of the investor, and the return on investment. With the modern AI tools and AI trading platforms the investor is able to analyse his risks, return and personalise his investment to meet his investment goals.

The most used AI techniques are machine learning, natural language processing and sentimental analysis. These techniques are able to analyse past data, identifying market trends, predicting patterns and understanding the relationships between data sets.

Machine learning is a subset of AI. It can adapt algorithms to analyse large sets of historical data. It can recognise patterns and relationships between data which can help in the predictions and movements of market.

Natural Language Processing is used to analyse news articles and social media happenings related to a particular stock or investment.

Sentimental Analysis is an application of natural language processing which trains a computer software to understand text similar to humans. It is done to understand whether the text has a positive or a negative opinion of financial matters.

## Objectives

- To Understand the role of AI in stock trading and investment decisions
- To understand the benefits and risks of AI in stock trading.

## Research Methodology

Methodology used for this paper is secondary data method. The data is collected from various secondary resources such as journals, articles, government websites and news articles.

## Literature Review

(Chowdhury, 2019) This article “Use of artificial intelligence in stock market” highlights the use of AI algorithms to analyse structured and unstructured data, how the high frequency trading can reduce transaction costs, helps the investors to take unbiased decisions and talks about the transparency and accountability of AI algorithms in decision making process.

(Nair & Malik, 2020) In their research “A Study On Application Of Artificial Intelligence In Stock Market Prediction” they have focused on AI in Stock market predictions, how the application of AI benefit the investors, and the implementation of AI tools. They have explained that the implementation of AI has a positive outcome as the machines are much quicker in analysis than the human traders and the AI provide adequate data to make investment decisions.

(Gupta, 2021) This research article “Impact of Artificial Intelligence on Financial Decision Making: A Quantitative study” has studied how the AI driven algorithms in investment strategies have replaced the traditional investment strategies and how AI technologies contributes in enhancing customer service experiences through AI-powered chatbots and virtual assistants, leading to improved customer satisfaction and resource allocation efficiency.

(Rahul, 2023) This paper “Role of Artificial intelligence in financial decision making: Opportunities, challenges and ethical considerations” has studied that AI in finance offers much better accuracy, efficiency, risk management, personalised financial services and fraud detection. The challenges include addressing of the ethical concern and regulation compliances.

(Soni, Tewar, & Krishnan, 2021) This paper “Machine learning approaches in stock price prediction: a systematic review” has focused on the different techniques used in the prediction

of stock prices from traditional machine learning methods and deep learning methods to neural networks and graph based approaches. The authors has suggested to combine the sentimental analysis of stock related information and the numeric value associated with the historical value of stock predicted. Deep learning used for further extraction techniques.

(Soni, Kumar, & motwani , 2022) The authors in their research article “Feasibility Study of Stock Market Prediction for Sentiment Analysis using Artificial Intelligence” have studied the sentimental stock market prediction. They have concluded that the stock market predictions can be more accurate with the combination use of sentimental analysis, Artificial Neural Network and machine learning.

(Chen & Ren, 2022) In this research article “Do AI powered Mutual Funds perform better?” the researcher has found that AI powered mutual funds do not outperform the market but they have outperformed their human managed peers. AI powered mutual funds have superior stock selection and it can overcome behavioural biases.

(Rane, Choudhary, & Rane, 2023) This paper “Leading-edge Artificial intelligence (AI)-powered financial forecasting for shaping the future of investment strategies” discusses the potential of AI in financial forecasting, challenges and ethical considerations, including concerns about the 'black box' nature of advanced AI models, biases in historical data, and the need for accountability and transparency in decision-making. The researcher says that it is necessary to striking a balance between innovation and ethical responsibility to ensure the integrity and fairness of AI-powered financial forecasting.

### **Artificial Intelligence tools for Stock trading and Investments**

Analysing stock, organising and categorising data to derive meaningful insight is possible with the help of artificial intelligence. It has made the studying of the unique behaviour of each stock easy, AI forecast movements and identify signals that can affect the investment decisions. AI's ability to predict the market movements can help investors to make informed investment decisions. India has created its first AI trading platform “Shoonya by Finvesia” in partnership with “I know first” which offers AI based predictions and signals for investors. It is a zero brokerage trading platform. It uses AI powered analytical tools to gain information about Indian stocks. It provides unbiased insights which helps in the decision making.



There are plenty of AI tools used by investors for trading analysis. These are the few popular AI tools used in market analysis and prediction:

Signodial - Employs AI to predict the behaviour of capital markets and to find the correlation between the assets.

Trade Ideas - It uses AI trading management technologies. Provides vital stock data in one convenient view for the ease of price comprehension and for making informed decisions

Signal stack- It takes signals from data sources and turn them in to actual trade in real time.

Trend Spider- It is software for analysing stock for active day traders and casual investors. It is a trading bot which will fulfil a pre-determined condition when needed.

Tickeron- It is used in predicting the trends. This platform employs AI powered trend prediction engine that analyses past pricing data to forecast future market movements.

Equibot- This tool keeps up with the latest financial news. It is used in evaluating news articles and social media happenings.

Kavout-This AI tool uses categorisation and regression to generate a predicted ranking for the stocks and other investments. This platform identifies the finest stock investments.

### **Benefits of AI in Stock trading and Investment**

Thorough Analysis- AI is used to analyse and indicate market movements as it can handle large sets of data.

Predictive Modelling- AI can understand patterns and trends of the market, which in turn can help in predicting the price movement. It helps investors in identifying the potential investment opportunities. Since AI can predict to an extent it also helps in calculating the expected returns.

Portfolio Management- AI driven asset managements can help in optimising the spread of investment, Optimising the proposition of assets and rebalancing the investments when needed. It can minimise risks to a large extent.

**Risk Assessment-** various macroeconomic indicators, company's financial health, regulatory changes and market vitality can affect the investor's investment. AI has an ability to quantify them into comprehensible and measurable qualifiers.

**Automated-** AI observes the market conditions 24x7 to match the suitable investment strategy to the investor's objectives.

**Detecting Fraud-** Since AI is constantly analysing and studying patterns it is possible to detect potential frauds and market manipulation.

**Customer Centric-** It gives personalised investment recommendations. Ai tools like chat bots and virtual assistance can help investors by answering their queries and help them in making informed decisions.

**Emotion Proof Investing-** As humans we make financial decisions with emotional bias, but in case of AI the decisions are made on the basis of data collected and analysed. AI helps investors in taking rational and collected decision instead of impulsive actions.

### **Risk of AI in Stock trading and Investment**

**Occasional inaccuracies-** Inaccuracies may occur as AI can't predict market trends during market disruptions.

**Technical issues-**There are possibilities for technical glitches which can cause heavy loss to the investors.

**Lack of technical knowledge-** AI algorithms and its working can be difficult to understand for an investor. It is crucial for an investor to understand the AI tool to make informed investment decisions.

**Reliability-** The investor may over rely on the AI predictions. In few cases AI predictions can be wrong.

**Regular human intervention-** AI can handle most parts of the stock market prediction but it is also necessary for humans to intervene and oversee the process as they may not recognise few market turns.

Lack of Ethical Consideration- One winning AI strategy cannot work if everyone follows it. AI can't incorporate ethics into its decisions. Ethics and morality are essential parts of decision-making. AI has limitation in understanding emotions and morals, which can limit its abilities on a larger scale.

### Overview of AI in Investment and Trading

With reference to previous studies it can be understood that Artificial Intelligence can be used in Investment and stock trading to a large extent. In few cases the AI powered stock has not out did the market but it has performed much better than the human managed funds. Since AI makes predictions based on Past Structured Data it is able to predict correctly to a large extent. AI has its own cons like it has difficulties and limitations in analysing unstructured data's like Texts, so in few cases it can't predict accurately. In such situations it is necessary for human intervene to teach the machine about the market fall. AI has made investing much easier for investors. With the help of AI tools investors are able to make investment decisions based on data analysis. AI has also helped investors to have easy access to information about their investment, returns and predicted risks in the market. In many situations many investors are not aware of AI in trading, lack knowledge about AI and access to AI trading tools. AI market prediction has come a long way to help retail investors and asset managers to make informed investment decisions.

### Conclusion

In conclusion the advent of AI has created a revolution in the stock trading and investment industry. The modern AI tools are developed to analyse large historical data, understand pattern, and predict price and trends which can be hard for humans. All these technical advancements has eased the investor's decision making process. AI has its own advantages and challenges in case of predicting future price of an investment. Artificial Intelligence is evolving day by day, researchers are finding new ways to make human jobs easier. In the future there may be more accurate prediction AI tools for Stock trading and investment, which can be easily accessed and understood by investors.

## Reference

- Chen, R., & Ren, J. (2022). Do AI-powered mutual funds perform better? Financial research letter.
- Chowdhury, D. K. (2019). Use of Artificial Intelligence in Stock Trading . *Munich Personal RePEc Archive*.
- Gupta, S. (2021). Impact of Artificial Intelligence on Financial Decision Making: A Quantitative study. 2130-2137.
- Nair, S., & Malik, G. (2020). A study on application of artificial intelligence in stock market prediction. *International Journal of Creative Research Thoughts (IJCRT)*, 1403-1414.
- Rahul. (2023). Role of Artificial intelligence in financial decision making: Oppertunities, challenges and etical considerations. *International Journal of Creative Research Thoughts (IJCRT)*, 5-9.
- Rane, N. L., Choudhary, S. P., & Rane, J. (2023). Leading-edge Artificial intelligence (AI)-powered financial forecasting for shaping the future of investment strategies. *SSRN Electronic Journal*.
- Soni, P., Tewar, Y., & Krishnan, D. (2021). Machine Learning Approaches in Stock Price Prediction: A Systematic Review. *Journal of Physics: Conference Series*.
- Soni, S., Kumar, A., & motwani , D. (2022). Feasibility Study of Stock Market Prediction for Sentiment Analysis using Artificial Intelligence. *Engineering and Technology Journal for Research and Innovation*, 11-14.

## Websites

<https://wealthdesk.in/blog/ai-investment-decision/>  
<https://indiaai.gov.in/article/ai-in-stock-trading-revolutionising-the-indian-stock-market>  
<https://indiaai.gov.in/article/seven-best-ai-powered-tools-for-stock-market-analysis-in-2023>  
<https://shoonya.com/about#>



## Role of Artificial Intelligence (AI) in Marketing

<sup>1\*</sup>Tresena Machado C and <sup>2</sup>S Daniel David Annaraj

<sup>1\*</sup>Research Scholar of Commerce, St. John's College, Palayamkottai, India.

<sup>2</sup>Assistant Professor of Commerce, St. John's College, Palayamkottai, India.

\*Corresponding Author e-mail iD: [tresenamachado@gmail.com](mailto:tresenamachado@gmail.com)

### Abstract

It is no doubt that technology has brought about a revolutionary change in each individuals life, it has undeniably made life easier. The current obsession in the technical world is Artificial Intelligence, which is believed to be future of technology. AI plays a significant role in e-commerce industry, marketing is a domain where the AI cannot be overlooked, the utilisation of AI brings about efficiency and optimal utilisation of resources, it replaces humans for repetitive tasks which require human-like thinking skills. AI marketing refers to the marketing strategies that employ artificial intelligence to infer insights on consumer behaviour through customer data in order to deliver more optimum and personalised marketing strategy and campaigns. AI simplifies the complexities of analysing, predicting and meeting customer needs and wants. They key element of personalisation in marketing is carried out with ease with the intervention of AI. The role of AI in marketing is remarkable, the impact is undeniable. This article is an attempt to understand the concept of AI and its inevitable role in marketing and an analysis of the various ways in which AI is implemented in marketing.

**Keywords:** Artificial Intelligence (AI), Marketing, Customer Data.

### Introduction

Artificial Intelligence is an eminent branch in science that is concerned with the development of technologies that are capable of performing tasks that require human intelligence, on its own. It functions by analysing the patterns and correlation of data and makes prompt decisions and deliver desired results which are near perfect matches of human decision-making skill. To achieve precision, AI systems are fed with lots of labelled data for training to analyse patterns and correlation and derive desired results. This mechanism of AI is done through Machine Learning, Deep Learning and Natural Language Processing (NLP). Machine Learning (ML) develops algorithms by analysing the patterns in the past data and uses those algorithms to make prediction similar data. Deep Learning (DL) is based on artificial neural networks (ANN), where AI is programmed to deal with complex data. In Deep Learning multiple sets of



data and analysed and are inter connected with each other to deliver wholesome results similar to what the human brain is capable of. Deep Learning has multiple layers and datasets compared to Machine learning. Natural Language Processing (NLP) is enables machines to understand and respond to human language whether text or data. It also helps to translate text from one language to another, summarise large volume of data and recognise and authenticate voice for users. NLP is widely used form of AI by common public in mediums such as mobiles and other electronic devices.

### Objectives

- To understand the concept of AI and its inevitable role in marketing.
- To analyse the various ways in which AI is implemented in marketing.

### Research Methodology

This paper is based on exploratory research and is a conceptual analysis of secondary data. Secondary Data used in this study is collected from research papers, journals, articles, surveys and websites.

### Review of Literature

Sanjeev Verma, Rohit Sharma, Subhamay Deb, Debojit Maitra (2021), in the article “Artificial intelligence in marketing: Systematic review and future research direction. Discusses the role of AI and ML in enhancing customer experiences during the Fourth Industrial Revolution. It stresses the importance of integrated data and predictive analytics to meet customer expectations and foster loyalty. The lack of detailed bibliometric reporting on AI in marketing is addressed through a systematic literature review, revealing a surge in AI-related publications and identifying clusters within the intellectual structure of AI in marketing. Future research directions include exploring semantic knowledge and machine learning for consumer insights and utilizing linguistic patterns for sentiment analysis across languages.

Abid Haleem, Mohd Javaid, Mohd Asim Qadri, Ravi Pratap Singh, Rajiv Suman (2022), in the paper titled, “Artificial intelligence (AI) applications for marketing: A literature-based study.”, states that AI revolutionizes marketing and sales with iterative processing and ML algorithms, efficiently capturing and analysing vast data for real-time consumer profiling and targeted campaigns. Deep learning aids in understanding user queries, enhancing digital marketing strategies like email campaigns for increased engagement and sales. Challenges include data



responsibility, regulatory compliance, and trust issues, yet AI promises personalized brand experiences and optimized strategies through data analysis and real-time decision-making.

Jarek, Krystyna & Mazurek, Grzegorz. (2019) in the article, “Marketing and Artificial Intelligence.”, confirms AI's widespread use in marketing, covering image and text recognition, decision-making, voice recognition, and autonomous solutions. While image and text recognition, along with decision-making, are common, voice recognition and autonomous technologies are less so, mainly developed by major tech firms. Currently, AI in marketing is mainly operational, with cautious implementations. Successful examples like Salesforce Einstein and Albert AI foster trust and encourage adoption. AI enhances consumer experiences with 24/7 customer service, hyper-personalization, convenient shopping, and decision-making support, marking a new era in marketing.

Chintalapati, S., & Pandey, S. K. (2022), in their study on “Artificial intelligence in marketing: A systematic literature review.”, explores AI's broad impact on marketing, identifying active sectors and predicting its evolution. AI's continuous learning and predictive capabilities are expected to drive extreme automation and personalized marketing efforts. However, concerns about security, privacy, and ethical implications persist. As AI becomes more sophisticated, it may challenge human creativity, sparking ongoing debates. The sustainability frontier of AI in marketing is expanding, offering potential for actionable insights. Overall, the field is poised for exponential growth and transformation.

Mahabub Basha (2023), in the article “Impact of artificial intelligence on marketing”, explores AI's impact on marketing from the viewpoint of Indian marketing experts. Through a mix of literature review and qualitative research, including interviews with 15 professionals, it identifies key factors driving AI adoption in marketing, such as competitive pressure and digital maturity. The study highlights benefit like efficiency gains and improved customer insights but also acknowledges challenges such as technical compatibility and data ethics. AI is credited with enhancing marketing effectiveness across functions and contributing to overall corporate performance. The research fills gaps in existing literature by offering practitioner perspectives on AI's role in marketing and provides actionable insights for firms navigating AI implementation.



## AI and Marketing Mix

### Product

With the help of data AI tools analyse market trends, customer preferences, competing products, complimentary products, etc and help in product development. AI holds multiple customer data and can easily help in personalisation and upselling of products according to each individual customer needs and preference. AI helps to efficiently target products to the specific target audience where the marketability of the product is much higher.

### Price

The role of AI in pricing is to determine the point of balance between the company's profit and customer appeal. With AI real time variations of raw material pricing in commodities such as gold or silver can be instantly reflected on the final price of the product. AI can track the customer comparison analysis of products in decision making and come up with competitive pricing to influence customers choose the product over the other.

### Promotion

AI can provide custom made promotional communication for every individual customer such as sending personalised text, mails or notifications and create a unique experience of customers. With the help of analysed data, future purchase preferences can be suggested resulting in upselling. NLP can easily capture customer requirements and provide the apt suggestion. Using Marketing intelligence, AI helps to come up with competitive rebates and discounts.

### Place

AI plays a prominent role in the digital market place. The mass migration of customers to online shopping is efficiently handled by AI and has eliminated the need of sales personnel on digital platforms. AI helps determine the best and cost-effective platforms and channels to showcase the product to the target customer segment. AI has simplified logistics by administering distribution channels.

## Implementation of AI in Marketing

### Market Intelligence

Market Intelligence is information or data collected by a company regarding the marketing environment where it operates or wishes operate. Market intelligence consist of information

regarding competitors, products, competitive price, market shares, size of market, target customers, etc. These data help organisations determine the opportunities and make prompt decisions regarding market segmentation and penetration aiming to yield positive results. Traditionally market intelligence was done through by in person surveying, analysing and reporting. The employment of human personnel in such big data detailed task is time consuming and has many limitations. With AI market intelligence and insights in segmenting, targeting and positioning can be derived instantly.

#### **Analysing and Predicting Consumer Behaviour**

AI helps organisation analyse consumer buying patterns and purchasing behaviour which will be helpful for marketers to formulate strategies. Data such as frequency of purchase, quantity purchased, complimentary purchases, returns etc, can be utilised by AI, which delivers statistics and reports for companies to improve marketing mix. AI helps organisation gain real time insights on consumer behaviour, which lead to customer requisition and customer retention. By analysing real time data AI is also capable of anticipating customers futuristic behaviour, which helps marketers plan and equip for predicted behaviour.

#### **Target Audience**

It is pointless for marketers to spend millions on promoting their product to extensive population on the basis of generalised preferences, it is proved to be very inefficient and ineffective. Focus on precise target audience can be easily achieved with the help of AI. AI is capable of analysing consumers past purchases, segmenting similar customers, predicting prospective customers and personalising marketing strategies for each customer. Personalised messages can reach a vast number of target audience, which otherwise wouldn't be possible without AI.

#### **Personalisation**

The success of any marketing strategy is communicating to the right person at the right time. High level of personalisation in almost any marketing strategy is possible with AI. Personalisation ranging from customised texts and emails to personalised customer shopping experience is possible through Machine Learning in AI. Majority of marketers opt for AI intervention in marketing for the personalisation feature. Personalisation enhance customer behaviour towards the brand and gives a sense of valuation to customers.

### Automated CRM

The most commendable use of AI in marketing is automation. When combined with personalisation, automation delivers the most effective form of marketing. Chat Bots are the most commonly used Automated CRM powered by AI, bots develop one to one chat conversations with customers and respond with desired answers that help customers. The automation feature of AI, during sales and post sales enables to swiftly respond to customer actions and questions. This helps to build strong relationship with customer and also cost-effective and time saving way to enhance maintain customer relationship.

### Voice Assistant

Voice assistant has been revolutionary especially of customer service. Voice assistant responds to speech commands using NLP. In AI voice assistant is highly capable of replacing the sales force. With the help of Voice assistant companies are able to cut down the cost and time taken to address customers general requests and queries and are able to utilise their personnel to focus on other important and high value trade.

### Examples of AI in Marketing

#### Sephora's AI-powered shopping

Sephora is a globally recognised cosmetic brand with a wide product line of beauty products. Sephora realised their vast range of products were overwhelming for customers. Customers were spending more time browsing for the right products. To overcome this challenge Sephora utilises AI powered shopping experience to its customers. By using AI powered chat box Sephora provides its customers the most personalised shopping experience. Customers can take up an interactive quiz where in AI acts as a beauty consultant and can understand customers preferences and issues and suggest products to match their preference and also suggests products. Also, customers can try the different range of products without actually applying them with the help of AI. As a result, Sephora has resulted in 11% conversion rate for in store appointments to try the products suggested by AI.

### Netflix's AI based content suggestion

The leading content streaming service, Netflix has used AI to enhance user experience. Based on customers past content choices, Netflix tailors its content recommendation to personalise user experience. For instance, if a customer's previous viewing history consist of action-based movies, Netflix displays action scenes as posters in its recommendation. The recommendation posters also focus on the customers favourite actors or characters and personalise the content to each user.

### Starbucks AI barista

Starbucks launched Deep Brew, an AI based application which has been a game changer in their operations. What was initially started with as a loyalty program has now become a key in data transformation using ML. Deep brew utilises customer data and tracks their preferences and comes up with suggestions for customers to try. It also manages the stores inventory based on sales forecast. The app also enables customers view menu, locate new stores and even place orders in advance and collect them without any waiting time. This marketing strategy is highly successful for Starbucks as nearly a quarter of their transactions are done through Deep brew app.

### Challenges of AI in Marketing

The major challenge faced by marketers in AI implantation is the lack of IT infrastructure, AI demands highly advanced technical infrastructures, which in turn demands a greater marketing budget, this makes AI beyond reach for small scale companies. For AI to take over, data is the key input, without data AI is irrelevant in marketing. Large quantity of reliable high-quality data is needed for successful AI campaigns. AI requires special skill set, creating an in-house AI marketing solution is possible only by well established companies, even if the software is outsourced training of staff to handle and to analyse the results is needed. Currently AI is seen as a threat in reality because of its capacity to overpower humans. There is also hesitation among customers to fully entrust their data with AI for privacy concerns.

### Conclusion

Undoubtedly AI is a game changing technology with a great potential to transform marketing. AI has provided a boost in productivity and efficiency in marketing strategies. In India AI has not been optimally utilised in marketing compared to developed nations. Indian companies use



AI mostly restricted to customer relations, the scope is well and beyond in marketing. With the unceasing development in technology AI is being easily accessible and has reached in various forms to the entire global population, where in majority are not aware of their interaction with AI. AI is gradually turning into an inevitable skill set a company has to possess to stay relevant in the market. Hence the magnitude of change brought in by AI in marketing has to adhered and implemented by marketers to survive market competition.

## References

Abid Haleem, Mohd Javaid, Mohd Asim Qadri, Ravi Pratap Singh, Rajiv Suman. (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, Volume 3, 2022, Pages 119-132

Sanjeev Verma, Rohit Sharma, Subhamay Deb, Debojit Maitra (2021) Artificial intelligence in marketing: Systematic review and future research direction. *International Journal of Information Management Data Insights*, Volume 1, Issue 1, April 2021, 100002

Jarek, Krystyna and Mazurek, Grzegorz. (2019). Marketing and Artificial Intelligence. *Central European Business Review*. 8. 46-55. 10.18267/j.cebr.213.

Chintalapati, S., and Pandey, S. K. (2022). Artificial intelligence in marketing: A systematic literature review. *International Journal of Market Research*, 64(1), 38-68.

Mahabub Basha (2023), Impact of artificial intelligence on marketing, *East Asian Journal of Multidisciplinary Research (EAJMR)* Vol. 2, No.3 2023: 993-1004 993, ISSN-E: 2828-1519.

## Websites

- <https://digitalmarketinginstitute.com>
- <https://www.sprinklr.com/blog/ai-in-marketing-examples>
- <https://digitalmarketinginstitute.com/blog/some-inspiring-uses-of-ai-in-digital-marketing>
- <https://www.delve.ai/blog/ai-for-marketing>



# Artificial Intelligence in Conversational Payments on UPI

K.T. Nirmala Devi<sup>1\*</sup> and S.Vijayalakshmi<sup>2</sup>

<sup>1\*</sup>Ph.D Research Scholar, PG & Research Department of Commerce, Kamaraj College, Thoothukudi, India.

<sup>2</sup>Assistant Professor, PG & Research Department of Commerce, Kamaraj College, Thoothukudi, India.

\*Corresponding Author e-mail iD: [nirmaladevikt@gmail.com](mailto:nirmaladevikt@gmail.com)

## Abstract

Conversational UPI payments assist in narrowing the gap between individuals who are less technologically aware and those who are digitally literate. Now, anyone may easily access and use digital financial services using a feature phone or a smartphone. This inclusion reaches remote parts of the nation where there is currently little chance of finding conventional banking services. In India, the digital payment scene has seen a revolution with the introduction of the Unified Payments Interface (UPI). UPI has transformed the way people use digital payment and quick money transfer features. Nonetheless, the incorporation of Artificial Intelligence (AI) amplifies the transformational potential of UPI. AI technologies have had a big impact on UPI, helping to make it more convenient, secure, and growing. Conversational AI, stands out as a transformative force, as it offers the potential to enhance the user experience by making interactions with digital systems more natural and intuitive. In the context of digital payments, this translates to a more user-centric and efficient process. The Unified Payments Interface (UPI) of the nation will soon support conversational payments, according to the Reserve Bank of India (RBI). The RBI says the "technology holds immense potential in enhancing the ease of use of the UPI system".while its exploration of conversational payments is in active recognition of AI's rising prominence within the industry.This study will examine how AI is adopt for conversational payment in UPI

**Keywords:** AI, UPI, Conversational payment

## Introduction

With a focus on the use of the Unified Payments Interface (UPI) under the moniker of Conversational Payments, the Reserve Bank of India has opted to include artificial intelligence into digital payments. The central bank has made it clear that it plans to create an artificial intelligence (AI)-powered system that would allow users to "initiate and complete transactions in a safe and secure environment" by using voice commands. The 300 million active users of India's UPI system, which was introduced by the National Payments Corporation of India in



2016 and is said by the RBI to have "transformed the digital payment ecosystem in India," will be able to access the system. Conversational payments are expected to increase the adoption of financial services in India, as they may support both C2C and C2B transactions. At launch, it will be accessible in Hindi and English, with plans to add additional Indian regional languages in the future. The RBI notes that the technology has "immense potential in enhancing ease of use, and consequently reach, of the UPI system," and it is actively recognizing the growing importance of artificial intelligence (AI) in the market by looking at conversational payments. After integrating UPI with the Monetary Authority of Singapore's PayNow digital payment system in February to enhance cross-border payment facilitation, the central bank is also examining UPI's external possibilities.

## UPI

The National Payments Corporation of India (NPCI) created the Unified Payments Interface, or UPI, as an instant payment system in 2016. The interface facilitates peer-to-peer (P2P) and person-to-merchant (P2M) transactions. With mobile devices, it enables the rapid transfer of funds between two bank accounts. It is necessary to register the device's cell phone number with the bank. The recipient's UPI ID can be used to send money. On top of the Immediate Payment Service (IMPS), it functions as an open source application programming interface (API) and is overseen by the Reserve Bank of India (RBI). On August 25, 2016, Indian banks began to make their UPI-capable apps available on the Google Play Store.

## Artificial Intelligence

Artificial Intelligence (AI) is the term used to describe computer systems that can do activities like speech recognition, decision-making, and pattern recognition that have traditionally needed human intelligence. Artificial Intelligence (AI) comprises a broad range of technologies, such as natural language processing (NLP), deep learning, and machine learning. Many argue on whether the technologies in use today truly qualify as artificial intelligence, despite the fact that the word is frequently used to describe a variety of distinct technologies. Some contend that a large portion of today's technology is really very sophisticated machine learning, merely a preliminary step toward true artificial intelligence, or "general artificial intelligence" (GAI). Nonetheless, when most people refer to artificial intelligence (AI) today, they're referring to a suite of machine learning-powered technologies, like computer vision or Chat GPT, that allow machines to perform tasks that were previously only human-capable, like creating written

content, operating a vehicle, or analyzing data. Artificial Intelligence (AI) in the context of digital payments refers to the use of intelligent computer systems to enhance various aspects of payment processes. Here are some ways AI is used in digital payments Fraud Detection and Prevention, Chatbots and Customer Support, Biometric Authentication, Predictive Analytics. Behavioral Analysis and Voice Payments etc.

### Conversational payments

Payments processed during a chat or message session are referred to as conversational payments. The chat operator and the payment provider are the two parties involved in the transaction that takes place during a live chat. Online payments made with conversational payments are quicker because the user does not have to visit another website or application to complete the transaction. Because there won't be a middleman involved and the transaction will happen directly between the two parties, it may also be a safer method of payment. Additionally, these payments allow the chat operator to follow up with the customer and solicit feedback that might help them optimize their business process.

### Review of Literature

1. Lai, P. C. et al (2022) “An Artificial Intelligence-Based Approach to Model User Behavior on the Adoption of E-Payment” “Internet usage increased during the COVID-19 pandemic, providing a new channel for businesses to broaden their commercial opportunities. On the other hand, users of this new channel have unique difficulties. Through the use of machine learning inference, this research attempts to look at how these characteristics and the uptake of electronic payment services With the use of an AI-based analytical pipeline that considers numerous dependent variables, e-payment usage can be forecast. Relationships between the most important items in the analytical pipeline were found with the use of hybrid AI and a tree algorithm. The results demonstrate that a variety of factors, including user attitudes, performance expectations, enabling conditions, and expectations, impact the use of e-payment systems. People who are younger than 25 must have a gamification strategy to adopt e-payment, while those beyond the age of 40 need social aid

2. Latha, S. S. et al. (2022) (2022) “Secured Eye Pay: An E-payment a Application for visually impaired people” “Over the past ten years, it has grown in popularity to offer visibly people who have disabilities using personalized e-service apps. They also have to deal with a number of

challenging daily duties, like paying for products or making payments online. In order to improve e-payment services .This article review discusses a new e-service application that is accessible to the blind. They can swiftly and simply pay their expenses without depending on aid from anyone by using his software. In order to make a payment when utilizing voice assistance, you must first scan the QR code. By writing down the desired amount and then pinning it to the display, the user can start the payment process. Image processing methods are used for character recognition.

3. Nasr et al. (2020) “e-payment systems risks, opportunities, and challenges for improved results in e-business” In order to improve e-payment services This article review discusses a new e-service application that is accessible to the blind. They can swiftly and simply pay their expenses without depending on aid from anyone by using his software. In order to make a payment when utilizing voice assistance, you must first scan the QR code. By writing down the desired amount and then pinning it to the display, the user can start the payment process. Image processing methods are used for character recognition. voice support .The exponential expansion of e-business has made e-payments increasingly becoming more and more crucial for all internet enterprises. Electronic payments have made it simpler for people to get by. Thanks to a payment processor, making purchases has never been easier or more enjoyable.

### Conversational UPI

Advanced payment methods like Conversational UPI will create new avenues for payments of the future. With UPI Conversational Payments, users will be able to make voice-activated UPI payments through UPI applications, phone calls, and Internet of Things (IoT) devices (smart TVs, wearables, smartwatches, etc.)."Users can now give voice commands to enter UPI PIN, transfer funds, and complete the payment process," stated Amit Kumar, Chief Technology Officer of Easebuzz. It operates using voice recognition technology and has two modes: in-app (via any UPI app) and on-call (through a voice call).

Conversational UPI simplicity will make it possible for people without internet connection, senior persons, and people with less technological will know-how to use UPI. UPI Conversational improves customer comfort while keeping digital transaction security at higher level.

Robust speech biometrics for user identification, safe encryption techniques to safeguard data in transit, and multi-factor authentication, unwanted access are some of the security elements

for conversational payments on UPI. Users should employ caution, nevertheless, and protect their gadgets by not disclosing private information.

### **Conversational AI in UPI**

The Unified Payments Interface (UPI) has emerged as a game-changer in India's recent spectacular development of the digital payment ecosystem. Prominent for its intuitive user interface, strong security protocols, and instantaneous performance, UPI has completely transformed the realm of financial transactions. It hit a major worldwide milestone in August 2023 when it recorded over 10 billion monthly transaction volumes. UPI's journey has been built on constant innovation, and the recent announcement regarding "Conversational Payments" in UPI by the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI) represents yet another step towards a more accessible and inclusive digital economy.

Revolutionary breakthroughs have been made possible by the integration of Artificial Intelligence (AI) into several aspects of the digital economy. Particularly conversational AI stands out as a disruptive force because it has the ability to improve user experience by facilitating more intuitive and natural interactions with digital systems. This means that the process of making digital payments will be more user-friendly and effective. In light of this, the RBI's plan to include "Conversational Payments" into UPI is evidence of the Indian Central Bank's progressive thinking and dedication to supporting financial sector innovation.

### **1.Financial Integrity: Overcoming the Gap**

In India, financial inclusion has advanced significantly with the launch of conversational UPI payments. This ground-breaking innovation has the ability to close the gap between individuals who are less tech-savvy and those who are digitally literate. People can now easily access and use digital financial services regardless of whether they have a smartphone or a feature phone. This inclusion reaches far-flung regions of the nation where there has hitherto been little access to official banking services.

The option to pay using telecom calls is revolutionary for people without cellphones. Financial services are now available to all Indians, regardless of their level of technological proficiency; they are no longer just found in cities.

## **2.Overcoming Linguistic Barriers: Using Language to Empower**

Adoption of digital technology has frequently been hampered by language, particularly for people who feel better at ease speaking in their original tongues. Conversational UPI payments welcome and recognize this linguistic diversity. This service, which is currently only available in Hindi and English, will soon be expanded into a number of regional languages, greatly improving financial accessibility.

In a hypothetical situation, if a consumer in a far-off village decides to use UPI to pay for a product they want to buy from a nearby retailer. Rather than utilizing the English payments interface, the user opts to communicate with the payment system using their own language. This removes linguistic obstacles and promotes a feeling of empowerment. It guarantees that people with a variety of linguistic origins can engage with confidence in the digital economy.

## **3.Unmatched Convenience: Effortless Payments**

Conversational UPI payments are revolutionizing digital transaction convenience. Users may now begin and finish transactions with an AI-powered system through natural chats, irrespective of their age or level of technological ability. The procedure is simplified, removing obstacles and enabling everyone to use digital payments.

Think about an elderly person who might have trouble utilizing computer interfaces. They can transfer money or make payments with conversational UPI payments by just expressing their commands. Similarly, this innovation offers a seamless and user-centric solution for people who are disabled or who are looking for easier payment options.

In terms of user ease, the introduction of spoken payments via IOT (Internet Of Things) devices is a huge advancement. With voice command being able to tell smart speaker to pay your utility bills or move money from one bank account to another account with just a voice command. Because everything is voice-based, transactions are as simple as having a chat because laborious manual inputs are no longer necessary.

## **Conversational payments' prospects in India**

India's position in the financial services industry is expected to be strengthened with the adoption of conversational payments. It is anticipated that India will adopt digital payments more quickly as a result of AI's integration into the Unified Payments Interface (UPI) ecosystem through conversational payments. This system can accommodate a wide variety of languages

and dialects in a country as culturally varied as India, where linguistic variances are abundant. Its exceptional ability to grasp and engage in natural language is what makes it so powerful. It can reach a larger range of users by extending the reach of digital transactions.

The RBI's mission to promote financial inclusion and technical innovation is further supported by the introduction of "Conversational Payments on UPI" by the NPCI and RBI. The RBI hopes to reach a wider range of people and simplify payments with this creative solution. These user-friendly interfaces have been crucial in encouraging digital payment uptake among a wide range of user groups. Given the growing number of people using smartphones, the ease with which people can access the Internet, the rapid improvement of technology, and the government's emphasis on encouraging digital transactions, the environment appears to be favorable for conversational payments to take off.

Conversational payments could become more common in a number of industries, including retail, e-commerce, bill payment, and more, as individuals grow more accustomed to using voice and text interfaces for transactions. The total value of transactions made through conversational payments in India may be high because a sizable section of the population\ conducts low-value transactions. Conversational payments have the potential to be integrated into travel, retail, bill payment, and other domains; hence, the total value of these transactions may increase over time. Furthermore, partnerships, advances in the payments ecosystem, and the integration of value-added services could all serve to accelerate the adoption of conversational payments.

**In addition to these, a few additional variables may impact the development of conversational payments in India:**

- Enhanced digital literacy: More people may use conversational payments as their familiarity with digital payment techniques and digital literacy grow.
- Technological developments: Voice recognition and natural language processing (NLP) systems could improve user experience and increase adoption.
- Adoption and competitiveness in the industry: The degree to which companies and sectors include conversational payment choices into their offerings can have a big influence on the development of conversational payments.

Furthermore, fierce competition between digital firms and payment providers may spur additional advancements in the growth-promoting technology.



- Modifications to the regulatory landscape: The expansion of conversational payments may be impacted by legal frameworks that support innovation while guaranteeing consumer protection and data privacy.

Better user experience: Higher transaction volumes and recurrent usage may result from a conversational payment system that is simple to use and intuitive.

### Drawbacks

UPI relies on internet connectivity for real-time transactions. In areas with poor network coverage, users may face delays or transaction failures. Downtime or technical glitches in UPI servers can disrupt services.

UPI transactions involve sensitive financial information, and any security breach can lead to unauthorized access, fraud, or financial losses. While UPI has security measures, AI can enhance threat detection and prevention by analyzing patterns and anomalies in real-time

UPI platforms often lack robust customer support channels. AI-driven chatbots or virtual assistants can offer 24/7 support, address queries, and guide users through transactions.

UPI interfaces may be confusing for users who are not familiar with digital payment systems. AI can simplify the user experience by offering intuitive interfaces and personalized guidance.

### Suggestion

Some suggestions to improve the conventional payment system include artificial intelligence into the UPI (Unified Payments Interface). Encourage users to report any suspicious activity promptly. Make sure that the conversational payment mechanism is simple for users to use. Educate users about common fraud tactics and prevention measures. Provide tips to secure conversational practices. Increase the number of Indian languages that can be supported via conversational payments. Use models of machine learning that pick up knowledge from user interactions. Update the AI system often to accommodate shifting consumer preferences. Keep up with new developments in technology and fashion. Take user preferences into account while customizing the conversational experience. Inform people about safe practices for security through the conversational language. Get user feedback about their experience making payments through conversation. Utilize these suggestions to make future system improvements. Keep an eye on consumer happiness and quickly resolve any issue.

## Conclusion

In conclusion, the application of AI technologies has considerably benefitted the Indian UPI ecosystem. Voice-based transactions are now possible and secured because of AI, which has fundamentally altered how UPI operates. As AI grows and progresses, it is expected to have a greater influence on conventional payment on UPI. In addition to being a technological achievement, conversational AI in UPI holds the potential of a digital payment ecosystem that is more user-centric, inclusive, and accessible. This breakthrough is a tribute to India's commitment to adopting technology for the advantage of every citizen, regardless of background or technological ability, with a strong focus on financial inclusion, linguistic diversity, and unsurpassed convenience. Unquestionably, Conversational AI in UPI is a big step in the right direction for India as it continues to develop into a global leader in digital payments, enabling millions of people to engage in the digital economy.

## Reference

- Lai, P. C., & Tong, D. L, 2022, "An Artificial Intelligence-Based Approach to Model User Behavior on the Adoption of E-Payment" *In Handbook of Research on Social Impacts of E-Payment and Blockchain Technology*, pp. 1-15.
- Latha, S. S., Rai, A. V., Likhith, R., Abhiram, R., & Pai, A. V. 2022, "Secured Eye Pay: An E-payment a Application for visually impaired people" *International Mobile and Embedded Technology Conference*, pp. 632-638.
- Nasr, M. H., Farrag, M. H., & Nasr, M. 2020, "e-payment systems risks, opportunities, and challenges for improved results in e-business" *International Journal of Intelligent Computing and Information Sciences*, vol:20, issue:12, pp.16-27.

# Influence of IoT (Internet of Things) on Business and Commerce

H. Aravinth<sup>1\*</sup> and K. Chitra<sup>2</sup>

<sup>1</sup>\*2<sup>nd</sup> year, Bachelor of Commerce, Sri Paramakalyani College, Alwarkurichi, India.

<sup>2</sup>Assistant Professor of Commerce, Sri Paramakalyani College, Alwarkurichi, India.

\*Corresponding Author e-mail iD: [haravinthhariharan@gmail.com](mailto:haravinthhariharan@gmail.com)

## Abstract

IoT (Internet of Things) is a revolutionary concept which made a drastic change and development in today's modernized world. IoT helps business by making complex manual tasks into easier and automated one. Undoubtedly, IoT is a boon, not only in business aspect but also in the various aspects like medical, retail, even in home usage. Basically, IoT is a concept of making things, connected with internet in order to make them as smart devices. Amazon Alexa is a perfect example for IoT device introduced by Amazon which makes all the things like lights, air conditioner, refrigerator, etc. which supports WIFI or internet connection as smart devices which can be controlled by our voice commands. There are some of the IoT devices like WSN, RFID, NFC, LTE, etc. These kind of IoT devices are used in our daily life while making purchase and instantly paying just tapping the credit/debit card on the scanner, while travelling crossing the tollgates within seconds, etc. without knowing that there is a IoT system working behind. The main objective is to focus on the influence of IoT on business and commerce. IoT influences in supply chain management process, warehouse management process and majorly helps to boost sales. On the other hand, there are some difficulties faced with IoT like security, etc. and some working models of a IoT device is also focused and discussed.

**Keywords:** IoT (Internet of Things), Sales, Management, RFID.

## Introduction

The idea of **Internet of Things (IoT)** is revolutionary and has completely changed how we use technology and live our lives. Here are some key points and research areas related to IoT that you might find useful for your research paper:

**1. Definition and Overview:**

- IoT refers to the interconnection of everyday objects and devices through the internet, allowing them to collect and exchange data.
- It encompasses a wide range of applications, from smart homes and cities to industrial automation and healthcare.

**2. Challenges and Issues:**

- Security and privacy: Ensuring data confidentiality, integrity, and authentication in IoT systems.
- Interoperability: Integrating diverse devices and protocols seamlessly.
- Scalability: Handling the exponential growth of connected devices.
- Energy efficiency: Optimizing power consumption in resource-constrained devices.

**3. Enabling Technologies:**

- **Wireless Sensor Networks (WSNs):** These networks consist of small, low-power sensors that collect data and communicate wirelessly.
- **Radio-frequency identification (RFID):** Used for tracking and identifying objects.
- **Bluetooth, Near-field communication (NFC), and Long Term Evolution (LTE):** Communication technologies enabling IoT connectivity.

**4. Applications:**

- **Smart Cities:** Using IoT for efficient urban management, traffic control, waste management, and energy conservation.
- **Smart Homes:** Home automation, energy monitoring, and security systems.
- **Healthcare:** Remote patient monitoring, wearable devices, and telemedicine.
- **Industrial IoT (IIoT):** Automation, predictive maintenance, and supply chain management.

**5. Research Directions:**

- Investigate novel communication protocols and architectures for IoT.
- Explore edge computing and fog computing to process data closer to the source.

- Address ethical and social implications of IoT, including data privacy and ethical use of IoT technologies.

#### Things to be focused on:

The Internet of Things (IoT) has a significant impact on the following key points. They are,

1. **IoT in Sales:** IoT can increase a company's sales. IoT enables end-users need and customized products accordingly, hence increasing transparency.
2. **Challenges with IoT in Sales:** The challenges associated with IoT sales include the risk that minor involvement through IoT technology would lead to a decrease in currently purchased quantities because of lower expected future transaction costs. Another concern is a decline in the ability to upsell or cross-sell that result from habituation.
3. **IoT in Warehouse Management:** IoT technology is made to process massive volumes of data in real-time as efficiently as possible. It can facilitate the implementation of smart identification, tracking, tracing, and management using various detection tools. Customer satisfaction, job productivity and financial performance are all engaged by IoT. However, innovation require additional investment in implementation and maintenance.
4. **IoT in Supply Chain Management:** IoT is global network of smart devices that indicate physical and digital world. It enhances business communication, business information, data collection, and commodities movement visibility. However, challenges exist due to the lack of top management initiative, new technology acquisition cost, stakeholders' reluctance to accept change, unwillingness to share data, and inadequate interoperability between partners systems.

#### IOT in Sales

The Internet of Things (IoT) plays a significant role in sales by enhancing various aspects of the sales process:

- a. **Improving Customer Satisfaction:** IoT can be used to improve customer satisfaction, which can lead to increased sales both online and in stores.
- b. **Optimizing Operations:** IoT can drive sustainability and resilience to operations, helping businesses adapt to changes more efficiently.

- c. **Inventory Management:** IoT applications allow retail companies to manage inventory more effectively. **For instance:** RFID- based data can be collected via smart shelves equipped with weight sensors, and then the data can be sent to the IOT platforms to automatically check inventory and send out the notification when the things are running slow.
- d. **Personalized Sales Strategy:** IoT provides abundant information, making it easier for businesses to stay informed and develop a dynamic, tailored sales strategy. This strategy ensures businesses are talking to the right people at the right time with the right messaging.
- e. **Post-Sale Opportunities:** Connected technologies and products allow for opportunities after the initial sale that weren't there before. It is now possible for brands to provide updates, new features, and even service enhancements over the duration of a product.

In summary, IoT has the potential to revolutionize the sales process by providing valuable insights, improving customer satisfaction, and creating new opportunities for revenue generation.

#### Some real-life examples:

- **Walmart** utilizes IoT sensors to monitor individual refrigerators and HVAC systems in their stores. This proactive approach prevents breakdowns and minimizes energy consumption without compromising customer experience.
- **Cognizant**, a consulting firm, installed IoT- enabled sensors to predict alarms and failures in a retailer's refrigeration equipment controller, reducing food wastage.
- **Bluetooth geolocation** enables personalized alerts to shoppers, enhancing their in-store experience.

#### Challenges with IoT in sales

The Internet of Things (IoT) has the potential to revolutionize sales by providing valuable data, enhancing customer experiences, and streamlining processes. However, it also presents several challenges:

- ❖ **IoT Security:** IoT opens up networks to the possibility of hacking as it involves connecting many objects to the internet. This includes managing device updates, securing communication and encryption, and detecting vulnerabilities.
- ❖ **Lack of effective and informed government regulations:** IoT is a fast-developing area of technology, and the regulatory landscape struggles to keep pace.
- ❖ **Device compatibility:** Ensuring compatibility between devices, systems, and software can be a significant challenge.
- ❖ **Bandwidth strain:** The large number of connected devices can put a strain on network bandwidth.
- ❖ **End user challenges:** These can include issues with usability, privacy concerns, and resistance to new technology.
- ❖ **IoT device management:** Managing a large number of devices and ensuring they are all functioning correctly can be a complex task.
- ❖ **IoT professional skills gap:** There is a need for professionals with the skills to manage and troubleshoot IoT systems.

#### IoT in warehouse management:

The Internet of Things (IoT) plays an important role in warehouse management, transforming the operations through smart technologies. The following are some significant domains where IoT is transforming warehouse management:

- ❖ **Inventory Efficiency:** IoT improves inventory efficiency and accelerates response to changing customer demand. It provides tremendous efficiency, accuracy, and visibility.
- ❖ **Remote Monitoring and Administration:** By enabling remote monitoring and administration, IoT based warehouse management systems considerably lessen the need for human labor, which in turn lowers operating expenses.
- ❖ **Reducing Supply Chain Errors:** Internet of Things solutions are excellent at reducing supply chain errors, which frequently result in significant financial losses. Warehouses are able to see inventory management in real-time and receive fast, reliable data because of this creative technological integration.



- ❖ **Security:** IoT devices provide strong protection for assets like property, equipment, and stocks. They offer enhanced protection against theft.
- ❖ **Environmental Monitoring:** Temperature, Pressure, humidity and other critical environmental parameters can now be monitored via IoT, which is a valuable tool in warehouse management. Internet of things (IoT) platforms enable innovative techniques to maintain the optimum storage conditions by providing real-time signals and insights.

### Most commonly used IoT device

#### RFID tags



**RFID, or "Radio Frequency Identification,"** smart barcodes are affixed to objects to enable radio frequency technology to quickly and instantly identify them. To put it another way,

radio waves carry information from the tag to the reader, which subsequently sends it to an RFID computer program.

### Components of radio frequency identification (RFID)

There are three main components included in Radio Frequency Identification. They are,

- Active / Passive RFID tags
- Active / Passive RFID scanners
- RFID servers.

### Working Model of RFID

#### 1. ACTIVE RFID TAG, PASSIVE RFID SCANNERS & RFID SERVER

Under this working model, RFID tags sends signals to the passive RFID scanners, then the scanners transmit the data to the RFID servers as shown in the figure,



These kind of working models can be easily witnessed in the Tollgates of highways where the tags attached with the vehicle sends signals to the scanners and further transmits the data about the vehicle to the servers.

#### 2. PASSIVE RFID TAGS, ACTIVE RFID SCANNERS & RFID SERVER

Under this working model, the RFID scanners scans the tag to get to know about the data by sending them signals, the tags respond to those signals and those data are sent to the server to save the data as shown in the figure,



This kind of model used in various aspects but majority of these models are used for the purpose of managing inventories. For example, In a textile industries, the clothes are tagged with these RFID tags, for a fixed duration (i.e once in a month or year), they scan those tags to know about their existing stocks, sales volumes, etc.

### IoT in Supply Chain Management

The Internet of Things (IoT) plays a crucial role in supply chain management. Here are some ways how companies use IoT to improve their efficiency and performance;

- **Tracking and monitoring:** IoT facilitates real-time tracking and monitoring of goods throughout the supply chain. Sensors collect data on location, condition, and movement.
- **Transparency:** IoT brings transparency by providing accurate information about product status, delays and storage condition.
- **Inventory optimization:** With IoT, companies can optimize inventory levels, reducing stockouts and improving planning precision.
- **Predictive measures:** IoT enables predictive measures, minimizes risks associated with product damage or spoilage.

### Conclusion

In conclusion, the advent of the Internet of Things (IoT) has significantly transformed the commerce sector. The seamless integration of IoT devices into commerce systems has enhanced operational efficiency, improved customer experience, and opened up new business opportunities. However, it's crucial to address the associated challenges such as data security and privacy, interoperability, and regulatory compliance to fully harness the potential of IoT in commerce. As technology continues to evolve, the impact of IoT on commerce is expected to grow, making it a pivotal element in the future of commerce. This research underscores the need for businesses to

strategically adopt and adapt to IoT technologies to stay competitive in the rapidly evolving digital marketplace. Further research is recommended to explore the long-term impacts and potential of IoT in specific sectors of commerce.

## References

<https://journal.oscm-forum.org>

<https://www.mdpi.com>

<https://blog.velosiot.com>

<https://www.hologram.io/blog/challenges-in-iot/>

<https://www.rishabhsoft.com/blog/iot-in-warehouse-management>

## The Role of AI in Healthcare

**J. Nagasudha**

*Assistant Professor of IT, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.*

*Corresponding Author e-mail iD: [nagasudha@vhnsnc.edu.in](mailto:nagasudha@vhnsnc.edu.in)*

### Abstract

The integration of artificial intelligence (AI) into the healthcare sector marks a revolutionary development, revolutionizing the landscape of diagnosis, treatment, and patient monitoring. This transformative technology is significantly enhancing healthcare research and results by providing more precise diagnoses and facilitating individualized treatment plans. The rapid analysis of extensive clinical documentation by AI in healthcare empowers medical professionals to discern disease markers and trends that might otherwise go unnoticed. The diverse applications of AI in healthcare are extensive, ranging from swiftly scanning radiological images for early detection to forecasting outcomes based on electronic health records. Implementation of artificial intelligence in hospitals and clinics enhances healthcare systems, making them more intelligent, agile, and efficient in delivering care to millions globally. The incorporation of AI in healthcare is undoubtedly shaping the future, revolutionizing patient care, reducing costs for providers, and enhancing health outcomes. This paper delves into the various AI applications within the healthcare industry, highlighting the benefits of AI adoption. Additionally, it addresses the challenges associated with applying AI in healthcare and explores the future trajectory of AI in the healthcare sector.

**Keywords:** Machine Learning, Natural Language Processing (NLP), Electronic health record systems (EHR)

### Introduction

The healthcare sector holds immense significance within the expansive realm of big data, playing a pivotal role in fostering a productive and flourishing society. The incorporation of AI into healthcare data is a critical consideration, bearing implications that extend beyond mere data analysis to potential life-saving interventions. In the daily routines of healthcare professionals, AI serves as a valuable assistant, aiding doctors, nurses, and other essential personnel. Its impact on healthcare is far-reaching, amplifying preventive care, improving the quality of life, refining diagnostic accuracy, and optimizing treatment

plans for superior patient outcomes. Beyond individual cases, AI's predictive capabilities extend to tracking and forecasting the spread of infectious diseases, utilizing data from governmental, healthcare, and diverse sources. Health-related AI applications primarily focus on deciphering the intricate relationships between clinical data and patient outcomes. These applications span diagnostics, treatment protocol formulation, drug development, personalized medicine, and the ongoing monitoring and care of patients. The distinctive strength of AI technology in healthcare lies in its capacity to assimilate extensive and varied data, process it adeptly, and deliver well-defined outputs to end-users. This capability is harnessed through sophisticated machine learning algorithms and deep learning methodologies.

### **Different Types of Artificial Intelligence Related to Healthcare Industry**

#### **Machine Learning**

Machine learning stands out as a prominent illustration of the symbiotic relationship between artificial intelligence and the healthcare sector. It represents a broad methodology that underpins various approaches to AI and healthcare technologies, featuring multiple iterations. The impact of machine learning on healthcare is evident, particularly in its transformative role in medical diagnostics and treatment. The utilization of machine learning algorithms facilitates rapid processing of extensive clinical documentation, unveiling patterns and providing predictions for medical outcomes with unprecedented accuracy. From scrutinizing patient records and medical images to exploring novel therapeutic interventions, the realm of data science powered by machine learning is empowering healthcare professionals to enhance treatments and streamline costs.

Through the integration of AI technologies such as machine learning in tasks like disease diagnosis or the development of pharmaceuticals, physicians can achieve heightened precision in diagnosing illnesses and tailoring treatments to the unique needs of individual patients. Precision medicine, a widespread application of traditional machine learning, marks a significant stride in the data science practices of numerous healthcare organizations. The ability to forecast the efficacy of treatment procedures based on patient characteristics and treatment frameworks signifies a substantial advancement.

The cornerstone of AI technology in healthcare utilizing machine learning and precision medicine often involves the use of medical images and clinical data for training, where the anticipated outcome is known. This methodology, recognized as supervised learning, is instrumental in refining the accuracy of predictive models in healthcare. In addition to traditional machine learning, deep learning has found its place in artificial intelligence applications within healthcare, notably in speech recognition through natural language processing. The intricacies of features in deep learning models may pose challenges for human observers, as they often lack immediate interpretability. As the field of deep learning evolves, healthcare professionals must grasp the workings of this technology and its effective implementation in clinical settings, recognizing its increasing significance in advancing healthcare practices.

### **Natural Language Processing**

Natural language processing (NLP) represents a facet of artificial intelligence designed to empower computers in the interpretation and utilization of human language, leading to transformative applications in various domains, including healthcare. Within the healthcare sector, NLP is finding widespread utilization across diverse health data applications, contributing to enhanced patient care through heightened diagnostic accuracy, streamlined clinical processes, and the delivery of personalized services.

An illustrative application of NLP in healthcare involves its application to medical records, where it plays a crucial role in accurately diagnosing illnesses by extracting pertinent information from health data. Beyond diagnosis, NLP is instrumental in identifying appropriate treatments and medications tailored to individual patients, with the added capability to predict potential health risks based on historical health data. Moreover, NLP equips clinicians with potent tools for efficiently managing vast volumes of intricate data, a task that would traditionally demand a significantly longer timeframe when done manually.

In healthcare, the integration of natural language processing emerges as an indispensable tool, enabling medical professionals to harness the power of artificial intelligence for more precise illness diagnoses and the delivery of personalized treatments to patients. This manifestation of AI in the healthcare landscape is rapidly evolving into an essential component of modern healthcare practices, and its trajectory suggests further sophistication and expanded applications in the near future.



## **Rule-based Expert Systems**

In the 1980s and subsequent periods, artificial intelligence in healthcare predominantly relied on expert systems employing various iterations of 'if-then' rules. The enduring application of artificial intelligence in healthcare revolves around its extensive use for clinical decision support. Many present-day electronic health record systems (EHRs) come equipped with a suite of rules embedded within their software frameworks.

The development of expert systems typically involves collaboration between human experts and engineers who formulate an extensive set of rules within a specific knowledge domain. These systems perform effectively and are easily comprehensible and executable up to a certain threshold. However, challenges emerge as the number of rules escalates, often surpassing several thousand, leading to potential conflicts and breakdowns within the rule-based structure. Additionally, adapting these systems to significant changes in the knowledge domain becomes a cumbersome and labor-intensive process.

In the contemporary landscape, machine learning is gradually supplanting rule-based systems in healthcare, introducing approaches that center on interpreting data through proprietary medical algorithms. This shift marks a departure from the limitations associated with rule-based systems, offering a more dynamic and adaptive framework for handling the complexities of evolving healthcare scenarios.

## **Diagnosis and Treatment Applications**

The application of artificial intelligence (AI) in healthcare has been primarily centered around the diagnosis and treatment of diseases for the past five decades. Early rule-based systems held promise in accurately diagnosing and treating diseases, yet their acceptance in clinical practice was limited. These systems did not surpass human diagnostic capabilities significantly, and their integration into clinician workflows and health record systems posed challenges.

Regardless of being rules-based or algorithmic, incorporating AI into healthcare for diagnosis and treatment plans often encounters difficulties in aligning with clinical workflows and electronic health record (EHR) systems. The impediment to widespread AI adoption in healthcare lies more in integration issues within healthcare organizations than in the accuracy of diagnostic suggestions. Many AI capabilities in healthcare, focusing on diagnosis, treatment, and clinical trials, are offered as standalone solutions by medical software vendors, each addressing a specific area of care. While some EHR software

vendors are initiating the incorporation of limited healthcare analytics functions with AI into their products, these efforts are still in their early stages.

To fully harness the potential of artificial intelligence in healthcare using a standalone EHR system, providers must either undertake substantial integration projects independently or leverage third-party vendors with AI capabilities that can seamlessly integrate with their EHR systems. This marks a pivotal step toward overcoming integration challenges and fostering the effective incorporation of AI into healthcare practices.

### Benefits of AI in healthcare

In diverse healthcare settings, artificial intelligence (AI) is being harnessed to enhance the efficiency of a wide array of processes, spanning from administrative functions to direct patient care. The ensuing examples illustrate how AI stands to offer benefits to both healthcare staff and patients:

**Remote Patient Monitoring:** AI facilitates the development of remote monitoring systems that keep track of patients' vital signs and health metrics in real-time. This helps in managing chronic conditions, reducing hospitalizations, and improving overall patient outcomes.

**Drug Discovery and Development:** AI accelerates the drug discovery process by analyzing biological data to identify potential drug candidates. This can significantly reduce the time and costs associated with bringing new medications to market.

**Virtual nursing assistants:** Approximately 64% of patients express comfort with AI use for continuous access to support and information from nurses. AI-powered virtual nursing assistants, in the form of chatbots, apps, or other interfaces, prove invaluable in answering medication-related queries, forwarding reports to medical professionals, and assisting patients in scheduling visits. By handling routine tasks, virtual nursing assistants free up clinical staff to focus on direct patient care, where human judgment and interaction are most crucial.

**Dosage error reduction:** AI can play a pivotal role in identifying and preventing errors in patient self-administration of medications. A notable study in *Nature Medicine* revealed that up to 70% of patients deviate from prescribed insulin regimens. An AI tool, discreetly operating in the background akin to a Wi-Fi router, can flag errors in how patients administer insulin pens or inhalers.

**Minimized invasiveness in surgeries:** AI-enabled robotic systems hold promise in conducting surgeries with reduced impact on sensitive organs and tissues. This approach aims

to mitigate blood loss, infection risks, and post-surgery pain, showcasing the potential of AI in advancing surgical procedures.

**Fraud prevention:** The staggering \$380 billion annual healthcare fraud imposes a significant burden on consumers' premiums and out-of-pocket expenses. AI implementation proves instrumental in recognizing irregularities in insurance claims, identifying billing for services not rendered, unbundling procedures, and detecting unnecessary tests aimed at exploiting insurance payments. The integration of AI serves as a proactive measure against fraudulent practices within the healthcare industry.

### Challenges for artificial intelligence in healthcare

Of paramount concern is the issue of data privacy and security, particularly as AI systems accumulate substantial personal health information. Safeguarding this data is crucial to prevent potential misuse and protect against malicious exploitation. Stringent security measures must be in place to fortify defenses against unauthorized access and breaches.

Patient safety and accuracy are paramount challenges in deploying AI in healthcare. Effective training of AI systems involves recognizing patterns in medical data, comprehending relationships between different diagnoses and treatments, and delivering tailored and precise recommendations for individual patients. The seamless integration of AI with existing IT systems poses an additional complexity, demanding a profound understanding of the current technology infrastructure to ensure cohesive operation.

Gaining acceptance and trust from medical providers is fundamental for the successful adoption of AI in healthcare. Physicians require confidence in the reliability of AI advice and assurance that the system adheres to valid, current medical research. Transparency in decision-making processes is essential to allow physicians insight into how AI arrives at its conclusions, fostering trust and facilitating seamless collaboration.

Ultimately, adherence to federal regulations is a non-negotiable aspect of AI implementation, ensuring ethical use that prioritizes patient safety. Overcoming these challenges collectively paves the way for the responsible and effective integration of AI in healthcare practices.

## Future of AI in healthcare

We envision a significant role for AI in the future landscape of healthcare offerings. Through machine learning, it serves as a foundational capability driving the advancement of precision medicine, a crucial development in healthcare. While early attempts at providing diagnosis and treatment recommendations have posed challenges, we anticipate AI mastering this domain as well. With the rapid strides in AI for imaging analysis, it is foreseeable that a considerable portion of radiology and pathology images will be scrutinized by AI systems. Speech and text recognition are already in use for tasks such as patient communication and clinical note capture, with their utilization expected to grow.

The primary obstacle to AI adoption in healthcare domains lies not in the capability of the technologies but in ensuring their seamless integration into daily clinical practice. Achieving widespread adoption necessitates regulatory approval, integration with Electronic Health Record (EHR) systems, standardization to ensure consistency among similar products, clinician training, financial support from public or private payer organizations, and continuous updates in the field. Overcoming these challenges is inevitable, but the process will likely take longer than the maturation of the technologies themselves. Consequently, we anticipate limited AI use in clinical practice within the next 5 years, with more extensive integration within the next decade.

Moreover, it is increasingly evident that AI systems will not replace human clinicians on a large scale; rather, they will complement their efforts in patient care. Over time, human clinicians may transition to tasks and job designs that capitalize on uniquely human skills such as empathy, persuasion, and holistic integration. The potential impact on job displacement is minimal, with the only healthcare providers at risk being those unwilling to collaborate with artificial intelligence.

## Conclusion

Artificial intelligence stands as a crucial and invaluable technology, presenting promising answers to the healthcare sector's requirements. It paves the way for personalized treatment strategies customized to meet the unique needs of individual patients. AI brings forth numerous benefits surpassing conventional analytics and other tools for clinical decision-making. Data precision and accuracy are elevated, providing the healthcare industry with deeper insights into the diagnosis and treatment procedures, ultimately enhancing patient outcomes.

## References

Bajwa, J.; Munir, U.; Nori, A.; Williams, B. Artificial intelligence in healthcare: Transforming the practice of medicine. *FutureHealthcare J.* 2021, 8, e188–e194.

Panch T, Mattie H, Celi LA. The ‘inconvenient truth’ about AI in healthcare. *NPJ Digit Med* 2019; 2:77.

Gawad J, Bonde C. Artificial Intelligence: Future of Medicine and Healthcare *BiochemInd J.* 2017; 11(2):113.

Reddy S, Fox J, Purohit MP. Artificial intelligence-enabled healthcare delivery. *Journal of the Royal society of Medicine.* 2019;112(1): 22-28

Yu KH, Beam AL, Kohane IS. Artificial intelligence in healthcare. *Nature Biomedical Engineering*, 2018

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616181>

## Applications of AI in E-Commerce Industry

S. Chitra Devi<sup>1\*</sup> and D. Jeya Priya<sup>2</sup>

<sup>1\*</sup>Assistant Professor of Commerce (Professional Accounting), V.V.Vanniaperumal College for Women, Virudhunagar, India.

<sup>2</sup>Assistant Professor of Commerce (Professional Accounting), V.V.Vanniaperumal College for Women, Virudhunagar, India.

\*Corresponding Author e-mail ID: [prachimindis@gmail.com](mailto:prachimindis@gmail.com)

### Abstract

***“Artificial Intelligence is not a substitute for human intelligence; it is a tool to amplify human creativity and ingenuity”***

With the current advancements in science, technology, and economic norms, artificial intelligence is widely employed and has a big impact on our day-to-day work. AI technology has also been widely adopted and has yielded great results in the E-Commerce industry. In today's world, AI is an unqualified success as a system for evaluating, refining, and extracting huge amounts of data. Artificial intelligence is making a significant influence in every sector, business, and organization. It is one of the primary drivers of many emerging technologies, and it has a significant impact in every area where it is deployed. Artificial intelligence has emerged as a critical component of the e-commerce business. Many e-commerce organizations began integrating various artificial intelligence methods to better analyze customer purchasing behaviors, such as visual searches, chatbots, strategy analysis, retargeting, and so on. Artificial intelligence has maximized the potential of the e-commerce business and opened up numerous new avenues for improving the customer experience by monitoring consumer behaviours.

**Keywords:** E-commerce, technology, Consumer behavior

### Introduction

Artificial Intelligence (AI) is an innovative tool in the field of computer science that mimics human behavior and thought processes. AI technology mainly focuses on cognitive skills like learning, reasoning, self-correction, and creativity. In the learning aspect, AI emphasizes obtaining data and creating algorithms for how to turn it into actionable information. These algorithms help to complete a particular task with a step-by-step procedure. In the learning aspect, AI concentrates on selecting the correct algorithm to reach an anticipated outcome. Self-correction aspect is designed to fine-tune algorithms and ensure

the most accurate possible outcomes. In the creativity aspect, AI uses neural networks, rules-based systems, Statistical methods, and other AI technologies to generate new images, new music, new text, and new ideas.

AI technology has advanced tremendously over the last few years, and even small e-commerce businesses may now use AI to increase sales and streamline operations. By leveraging AI, e-commerce organizations can improve productivity in a variety of areas, including inventory management, brand identity (via an AI logo generator), customer support, tailored marketing, and product suggestions. This technology enables companies to remain ahead of the competition, satisfy customer expectations, and create one-of-a-kind shopping experiences that fuel growth and success in the ever-evolving e-commerce sector.

Most well-known e-commerce companies use AI chatbots like Manifest AI on their websites to improve the overall client experience. Chatbot-fed examples of text chats can learn to construct lifelike discussions with people, while an image recognition technique can learn to identify and describe items in photographs by analyzing millions of examples. Some of the familiar AI tools are self-driving cars, Siri, Bixby, Alexa and other smart assistants, Robo-advisors, Conversational bots, and Email spam filters. Siri is Apple's voice-enabled AI tool used for machine learning and voice recognition. Amazon has added many AI-related features to Alexa in recent months, including a new generative AI model that gives the virtual assistant a more opinionated personality and the ability to modify its tone and answer to mimic human emotions such as joy or surprise.

### Objectives of the Study

The following are the objectives of the study:

- To investigate the application of artificial intelligence in the e-commerce industry.
- To determine how AI is affecting the e-commerce sector.
- To give suitable suggestions for future development.

### Research Methodology

The present study is based on the secondary data. The secondary method is used to collect data from sources like research articles, websites, publications, magazines etc. Longitudinal data is presented through the bar graph.



## AI and E-Commerce

Nowadays, artificial intelligence has become an essential component of the technology business. Artificial intelligence (AI) has significant benefits for businesses. AI is employed in a variety of fields, including gaming, entertainment, healthcare, and education. Aside from these sectors, e-commerce is heavily impacted by AI use.

Artificial intelligence is being used by e-commerce portals to provide alerts about sales and discounts, as well as to remind users about their wish lists. One of these sectors that best utilizes AI is e-commerce. They are expanding their consumer base, offering more items, etc. by utilizing AI. Self-generated feedback forms, chatbots, and other innovative communication methods are being used by e-commerce enterprises to interact with potential clients. AI facilitates the e-commerce company's search for qualified clients. Similar to how AI technology is greatly benefiting e-commerce companies, it also improves customer pleasure and experience.

According to a recent survey, 40% of online shoppers look for amazing offers and shopping deals from chatbots, and 1 in 5 consumers will purchase goods or services from one of these machines.

## Major AI Applications in E-Commerce

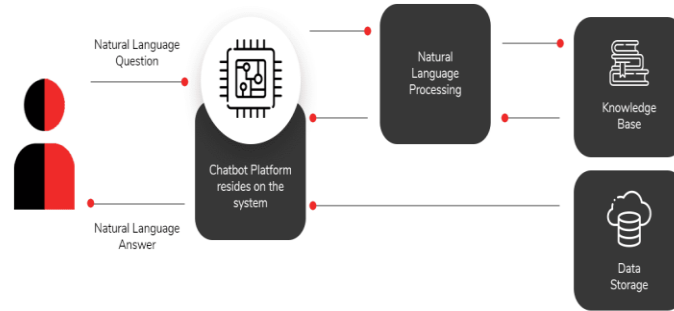
### Chatbots

Chatbots are being used by online businesses to handle client support administration. One application of artificial intelligence is chatbots, which educate users via SMS chatbot messages about the preferences of the buyer. Artificial intelligence (AI) technology, e-commerce retailers are increasingly relying on chatbots or digital assistants to offer round-the-clock assistance to their online customers. These chatbots are becoming more and more user-friendly. Some of the chatbot benefits to businesses and customers are faster and more accurate, work round the clock, economical, offer better customer experience, and deliver personalized experiences. Natural language generation (NLG) is the method by which chatbots create responses that seem human after using natural language processing (NLU) to comprehend human language.

**Natural Language Understanding (NLU)** - It involves processing of human language as data to develop meaning and context from it.

**Natural Language Generation (NLG)** - This involves the use of algorithms and software to automatically generate human-like text or speech from structured data or other input sources.

All the worki



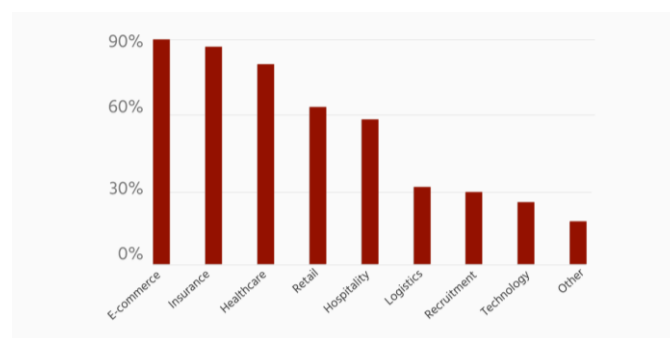
To engage and keep customers, the knowledge base offers a personalized, real-time customer experience.

Chatbots need AI and data to be trained properly. Chatbots learn from the questions and text they are given by using artificial intelligence. Because chatbot training is a continuous process, the data must be stored in a store for the chatbot to carry out more automatic learning.

Chatbots can assist users with product discovery, order tracking, and transaction processing. Chatbots can make more personalized product recommendations by examining a customer's browsing history and activity, which increases the likelihood of a sale. Additionally, they can lessen the need for clients to get in touch with customer service by giving them real-time updates on the status of their orders. Furthermore, chatbots can assist clients with the checkout process, lowering cart abandonment rates and boosting revenue.

**Figure 2**

**Chart showing the percentage of Industries benefit from Chatbots**



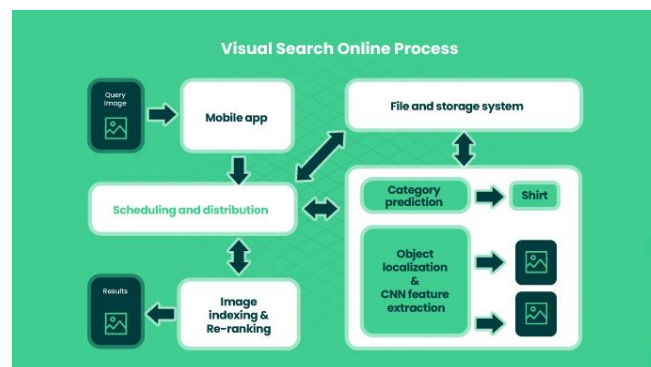
### Intelligent Visual Search

Picture recognition systems can assist visitors to online business websites in matching crucial objects to explicit photographs and conducting picture-based searches instead of text-based ones. One example of a visual search is Pinterest's

"visual hunt," which allows users to select an object from any online photo and then ask the social media platform to display similar objects with image recognition software.

Personalized product recommendations for online customers are one of the primary uses of artificial intelligence in the e-commerce industry, and they are increasing conversion rates. By taking a picture of an item, the customer wishes to purchase and uploading it to their preferred search engine, customers can use visual search to view visually similar products that are available for purchase right away. Some examples of Visual search engines are Google Lens, Bing Visual Search, Pinterest Lens, Snapchat Scan, and Amazon StyleSnap.

**Figure 3**  
**Model of Intelligent Visual Search**



When buying things like clothes or furnishings, over 85% of internet customers prioritize visual information above textual information. The image recognition engine is implemented by ecommerce intelligence, which then provides the result based on the most likely match. The client's work is limited to taking a picture and entering it into the search field.

#### Use of Augmented Reality

Augmented Reality is a technology that uses enhanced imaging to simulate real-life events, giving people a product with a more realistic feel and appearance. According to Google's consumer AR poll, 66% of respondents want to use augmented reality technology to help them shop. Jennifer Liu, Google's Director of Product Management, emphasizes the

significance of augmented reality technology in e-commerce, stating: "For many consumers, it's the next best thing to have the product with them in their own home."

It improves sales, reduces product return rate, and personalized shopping experience, eliminates the need for a physical space, improves customer relationships, and increases customer engagement. The best examples of Augmented Reality in the E-Commerce industry are L'Oreal (French Personal care company), DFS (UK's leading sofa retailer), and ASOS (British Cosmetic retailer).

#### Inventory Management

Inventory management is one of the most difficult job in business. E-commerce businesses must keep track of their inventory. AI monitors product inventory and updates stock data for e-commerce businesses. AI can help industries with inventory management by analyzing past sales data and estimating future demand. AI-enabled inventory management can streamline inventory replenishment procedures by interacting with suppliers to ensure timely replenishment. You can also utilize AI to estimate transit times and shipment delays, and then communicate these developments to stakeholders, including customers.

#### Personalised Product Recommendations

Product recommendations are based on previous consumer behavior, browsing history, and purchase history. Amazon, Netflix, and Spotify are examples of organizations that have effectively incorporated AI-powered personalized product recommendations. These organizations have used AI algorithms to evaluate client data and provide extremely relevant and effective personalized suggestions. Product recommendations provide an excellent return on investment. A recent survey found that 49% of consumers have purchased a product they did not want to buy after obtaining a personalized product recommendation. Product recommendations can occur at any point in your customer journey. It can provide a 360° view to customers, collecting information for greater product recommendations each time they visit the site.

#### Fraud Detection and Prevention

Generative AI is emerging as a significant tool in the e-commerce business, providing creative solutions for fraud protection. It can look for patterns in client behavior, transaction data, and surfing history to detect possibly fraudulent activity. AI can help with fraud

detection and prevention by analyzing data, detecting anomalies, and tracking transactions in real-time. The technology may identify anomalous transactions, such as high-value transfers, many transactions in a short period, or from unknown places, and flag them for further examination.

## Conclusion

In conclusion, the E-commerce industry has benefitted from increased sales, better and more personalized customer service, and reallocation of time and resources. The application of artificial intelligence is transforming this industry, releasing its potential for business leverage. It altered the way shops market their goods and services, as well as the way their customers use them. Artificial intelligence is also assisting the firm to boost its brand recognition by offering many superior service delivery. Even though AI has several benefits in e-commerce, it can also present challenges in the way of data privacy, high initial investment, and potential for poor-quality customer service. As a result, artificial intelligence in e-commerce enables retailers to enhance their products, boost conversion rates, and increase revenues.

## References

Gupta, S., Borkar, D., De Mello, C., Patil, S. (2015). An ECommerce website based Chatbot, *International Journal of Computer Science and Information Technology*, 6(2)

Dhavare, U. and Kulkarni, U. (2015). Natural Language Processing using Artificial Intelligence, *International Journal of Emerging Trends and Technology in Computer Science*, 4(2)

Soni, D.V. (2020). Emerging roles of Artificial Intelligence in ecommerce, *International Journal of Trend in Scientific Research and Development*, 4(5): 223- 225.

<https://ecommercefastlane.com/11-applications-of-artificial-intelligence-ai-in-ecommerce/>

# Impact of Artificial Intelligence on Employee Wellbeing in the workplace

**M. Jubi**

*Assistant Professor, Centre for PG Studies, Sindhi College, Bangalore, India.*

*\*Corresponding Author e-mail iD: jubimothisha@gmail.com*

## Abstract

The impact of Artificial Intelligence (AI) on worker well-being is a crucial issue in contemporary workplaces. The impact of AI technologies on employees' mental, emotional, and even physical health has come to light as these technologies are incorporated into more and more commercial operations. Workplace safety is being revolutionised by artificial intelligence. Predictive analytics allows companies to scan their workspaces for potential risks to worker safety and workplace health using AI software and sensors. The best thing about AI solutions is that they can be customized to aid every professional. AI-powered robots to replace human workers on dangerous jobs altogether. Employing AI software and sensors, predictive analytics enables businesses to examine their workspaces for any threats to employee safety and workplace health. The ability to personalise AI solutions to support any professional is their greatest feature. AI-powered robots will completely replace human labour in hazardous jobs. For most firms, this is not a new phenomenon; most dangerous equipment-related manufacturing tasks are being replaced by robots, and human workers are still in charge of overseeing the production lines. Tools such as micro power apps are widely utilised for task automation. For job safety, having a strong cybersecurity system is crucial. Workflow surveillance using AI may safeguard your employees' health in a number of ways, including occupational safety and preventing accidents at work. The goal of this research is to investigate the complex relationship between AI and worker well-being, taking into account both the advantages and disadvantages. This study attempts to give a nuanced knowledge of how businesses should prioritise the mental and emotional well-being of their workforce while utilising AI's promise through a thorough investigation.

**Keywords:** Artificial Intelligence, Employee welfare, Enhance productivity

## Introduction

Employee benefit plans have traditionally been designed to increase productivity and efficiency while lowering absenteeism. But today, the social welfare programme is more comprehensive and addresses almost all aspects of the advancement and protection of workers in the industrial sector. (Manzini and Grandeur, 2011). It makes sense for welfare initiatives to aim to develop an organization's workforce to be productive, secure, content, and competitive. The aim of offering these amenities is to elevate the quality of life at work and raise living standards. (Priti, 2009). Labor welfare is an all-encompassing term that refers to the distinct advantages, facilities, and initiatives that an organisation offers to its workers in order to promote their professional and social lifestyles as well as their aspirations to enhance productivity and output. (Mishra and Manju, 2007).

The amenities, services, and advantages that companies offer to their staff members for their convenience are all included in the employee's welfare. The measures that promote employee productivity are those that pertain to their security, safety, and well-being. The various welfare services that a business offers its workers directly impact their level of alertness, productivity, and general physical, mental, and health well-being. Accommodations and canteen facilities that fall within the categories of living comfort and working atmosphere are offered by all health services. Employee welfare can be defined as the endeavour to make one's life worthwhile. Human worth will decrease with age due to a cycle of illness, accelerated by stress, and other factors. Improved healthcare will also empower employees, increase productivity, and assist provide adequate and efficient results. When we have good welfare, it's usually an expensive decision, but when we consider the long term, it benefits the company in the long run. It is the procedure used by law enforcement to ensure that an employer stays out of trouble with the law. Social welfare programmes should be emphasised as a prudent investment that, when implemented more effectively, will always produce superior results. Offering welfare benefits to staff members always aids in the development of wholesome, productive, devoted, and contented workers for any organisation.

## Review of Literature

- ☆ **Dr. K. Vijaya Rani (2015)** “Employees Welfare Measures Towards Productivity of Neyveli Lignite Corporation Limited” The study found that the health facilities and



worker safety measures offered by the company have a greater impact on the workers in the mines and thermal power plants.

- ★ **Dr. K. Lalitha (2014)** “A Study on Employee Welfare Measures with Reference to IT Industry” The study aims to determine the employee welfare policies implemented in the IT sector. Anything done for an employee's comfort and well-being beyond their salary—which is not required by the industry—is referred to as employee welfare. Enriching and maintaining the happiness of employees is the fundamental goal of employee welfare.
- ★ **Shelar (2013)**-identified the effective & welfare provisions on manufacturing industrial units & service industrial unit in Karad taluka, District Satara, Maharashtra. She discovered that the management of Karad taluka's service industry does not effectively reduce employee absenteeism through employee welfare and social security initiatives. Both industry units should give their workers with good working conditions, co-operative societies, canteens, and libraries in order to raise employee morale. Both industry units should give their workers with good working conditions, co-operative societies, canteens, and libraries in order to raise employee morale.
- ★ **Ms. Anitha. k, Dr. V. Shanthi, Dr Annie Sam (2021)** “Impact of artificial Intelligence Techniques on Employee Retention being for employee retention” The analysis found that, in the global sector, retaining people is the biggest risk. Businesses are always attempting to come up with new tactics and approaches to keep their personnel. In this cutthroat market, keeping personnel in the company is a struggle for every HR professional. Across the globe, the majority of firms adopt excellent employee well-being practises as one of their strategies.
- ★ **Prabakar S (2013)** "Employee satisfaction and welfare metrics and to know the awareness of the notion of employee's wellbeing" is the stated goal of the study. According to the studies, Although the majority of workers are satisfied with the current assistance programmes, others are not. Management is therefore able to assess the problem impartially by taking the big picture into account.

### Statement of the Problem

Industrial advancement is contingent upon a contented labour force. Effective management was severely hampered by the management's disregard for human resources. An overestimation

or underestimation of a machine's capability will never cause it to react, but an employee will undoubtedly do so. The goal of the study is to determine how Artificial Intelligence is applied as a trustworthy gauge for safety procedures implemented for worker wellbeing. Determining the problem and describing it offers the inquiry a feeling of direction. AI's impact on worker welfare and safety has received adequate consideration.

### Objectives of the Study

- To study the deployment of AI strategies to enhance workplace wellbeing and safety
- To study how employee entitlements boost loyalty and morale while improving employees' paternalistic and altruistic viewpoints.
- To evaluate the effects of AI tools on the implementation of workplace safety protocols for employees.

### Research Methodology

The data collection is one of the important aspects in the research design purely because, it is the way that how we can get answer to the research question. Research methodology is the specific procedure or techniques used to identify, select, process, and analyse information about a topic. In a research paper, the methodology selection allows the reader to critically evaluate a study's overall validity and reliability. The researcher includes surveys interviews focus groups and observation.

### Primary Data

The information gathered from Bangalore South Zone corporate personnel. The researcher inquired about the company's welfare facilities, safety precautions, and benefits. The company's standardised questionnaires were used to gather data from both employers and employees. A total of 180 employees were given questionnaires, of which 172 completed them. The researcher then selected 160 of the completed forms because they contained pertinent data for the investigation. Key information was also obtained by the researcher from the company's leaders and department heads. Researcher has done empirical analysis by using statistical tools like Ranking, Chi-Square test for hypothetical testing.

## Secondary Data

The company's website, as well as books, journals, organisational records, financial reports, and publishing of corporate books, were used by the researchers to gather information.

## Analysis and Findings

### **The Best AI Techniques to Augment Workplace Safety**

By automating repetitive tasks, monitoring potentially hazardous equipment, and employing cyber threat and predictive analytics to keep ahead of potential dangers, artificial intelligence (AI) solutions can increase worker safety. AI solutions may safeguard digital and physical operations for businesses in both the healthcare and financial sectors, resulting in a work environment with less data loss and fewer on-site injuries. Additionally, it can assist in controlling workplace harassment. This is a thorough examination of some of the ways that artificial intelligence is transforming workplace safety.

## Predictive Analytics

- ❖ Using AI software and sensors, predictive analytics enables businesses to examine their workspaces for any threats to employee safety and workplace health. Workers are alerted to the existence of risks and advised to take appropriate action before things get worse once they have been evaluated. Predictive analytics solutions are therefore ideal for employees in mines and industries where it's imperative to react rapidly to situations.
- ❖ The AI software/sensor can utilise the data to determine the appropriate course of action once the machine learning system has narrowed down on a problem. Depending on the risk, this could entail an evacuation siren or a straightforward alert sent via an IoT device. Predictive analysis is more appropriate for professional settings since it can handle multiple inputs at once, even though it shares similarities with human activities in terms of analysis and warning systems.
- ❖ The ability to tailor AI solutions to support any professional is their greatest feature. This also applies to predictive analytics, which is useful for cybersecurity specialists and data scientists.

### Task Automation

- ❖ AI-driven robots can also completely replace human labour in hazardous jobs. This is not a novel phenomenon for most firms, as the majority of hazardous equipment-related manufacturing operations are being replaced by robots; human supervisors continue to oversee the production lines, and job automation technologies such as micro power apps are widely utilised.
- ❖ The benefits of AI task automation extend beyond the production line and personal safety equipment. Drones are a great contender as well. Drones are an effective tool for physical delivery and analysis. They are compact and frequently have cameras, which makes them perfect for examining hazardous areas. They can be adjusted to reach areas that are inaccessible to humans and that make them a great instrument for efficiency and security.

### Cyber Threat Analysis

- ❖ A strong cybersecurity system is necessary for workplace safety since it protects employee communications and any personal or business information that might be misused to harm the business or its workers. This is where artificial intelligence (AI) may help a company's cyber threat analysis.
- ❖ Using state-of-the-art natural language processing and predictive intelligence systems, cybersecurity specialists can leverage artificial intelligence (AI) to investigate vulnerabilities in systems, threats, and defences in real time. To help them make better judgments, these cutting-edge AI technologies can scrape and search the internet for any cybersecurity-related information. Depending on the kind of threat, putting the appropriate remedy into practise is also much simpler.

### Communication Surveillance

Natural language processing, or NLP, has greatly simplified the process of keeping an eye on massive data sets and conversations. By examining both written and oral communication, it speeds up the learning process for AI systems and enables them to generate extensive reports and transcribe meetings.

### Workforce Surveillance

- ❖ Workforce monitoring has been fundamentally transformed by Internet of Things (IoT) sensors that are powered by AI and machine learning (ML) solutions. Artificial Intelligence significantly contributes to worker safety by shielding workers from health hazards in addition to increasing productivity through production line optimization.
- ❖ AI-enabled workflow surveillance may protect your workers' health in a number of ways, including workplace safety and averting mishaps. An employee's location can be tracked, their occupational health can be monitored, and they may be alerted to any potential environmental hazards or workplace accidents by using IoT sensors.

### Equipment Surveillance

- ❖ Drones and manufacturing robots are just two examples of the robotic devices that have improved safety and productivity in workspaces. Despite all of these technologies' benefits, it is important to remember that they still require supervision. AI technologies combined with human workers provide the finest supervision for this equipment.
- ❖ Breakdowns in machinery and malfunctioning equipment can lead to potentially fatal industrial injuries. These threats are a harsh reality for modern firms as machines are taking over different operations across several industries. IoT devices in conjunction with AI solutions, however, are lowering these figures. They prevent equipment malfunctions during production by anticipating issues and providing fixes before things get out of control. The devices' round-the-clock passive monitoring aids in identifying and notifying employees in the event of malfunctions or thefts.

**TABLE NO: 1**

#### **STRATEGIES OF ARTIFICIAL INTELLIGENCE TOOLS IN SAFETY PRACTICES**

Item No	Code	Item depiction	Rank
1	AIS-1	Predictive Analysis	2
2	AIS-2	Task Automation	1
3	AIS-3	Cyber Threat Analysis	3
4	AIS-4	Communication Surveillance	5
5	AIS-5	Workforce Surveillance	4
6	AIS-6	Equipment Surveillance	6

Source: Primary Data

Researchers deduce the influence of AI tools on employee wellbeing from the preceding Table. By analysing oral and written communication, communication surveillance enables AI systems to learn more quickly, transcribe meetings, and produce comprehensive reports. Big data sets and extensive communication monitoring are now much easier to handle thanks to natural language processing. AI-powered workforce surveillance can safeguard workers' health through occupational safety and shield them from accidents at work.

**TABLE NO: 2**  
**BENEFITS OF AI IN THE SAFETY PRACTICES**

SL NO	Code	IMPACT	Rank
1	B1	Mental health support	4
2	B2	Skill Development	3
3	B3	Smart scheduling	1
4	B4	Career pathing	2

Source: Primary Data

Table 2 demonstrates how entrepreneurs use AI solutions that help workers, such as career pathing, skill development, mental health support, and smart scheduling. The business places a strong emphasis on the mental health support that AI-powered chatbots can offer staff members, giving them instant access to information that can help them manage stress and anxiety. Second, focus on skill development. This will help employees stay engaged and upskill. Career pathing tools can also help employees explore possible career paths within the company. While smart scheduling is less responsive, artificial intelligence (AI) can optimize schedules to reduce overtime and distribute tasks among team members.

### Hypothesis

**H<sub>0</sub>:** There is no significant impact of AI tools in the application of safety measures of the employee's workplace.

**H<sub>1</sub>:** There is significant impact of AI tools in the application of safety measures of the employee's workplace.

The Researcher adopted Chi-Square Test to analyse about the impact of AI tools on employee wellbeing. Significance level taken by the researcher is five percent.

**TABLE NO: 3**  
**IMPACT OF AI TOOLS ON EMPLOYEE WELLBEING**

AI TOOLS/IMPACT	MHS	SD	SC	CP	Column Total
PA	7	5	6	6	24
TA	5	4	5	6	20
CTA	8	6	6	5	25
CS	5	7	8	8	28
WS	11	6	4	6	27
ES	13	12	5	6	36
Row Total	49	40	34	37	160

**Source: Primary**

$\chi^2$	8.544591022
DOF	15
P VALUE	0.900101467

The null hypothesis is accepted since the P Value is greater than 0.05, meaning that AI technologies have no discernible effect on worker wellbeing. In this case, the abbreviations PA, TA, CTA, ES, and CS stand for predictive analysis, task automation, cyber threat analysis, workforce surveillance, and equipment surveillance, respectively.

### Conclusion

- Technical safety in AI is essential for worker health because it guarantees that the tools and systems workers use are created, deployed, and utilized in a way that maximizes safety and reduces hazards. This entails adhering to best practices for AI creation, testing, and implementation in order to avoid unintentionally bad outcomes. Ensuring that people work in a safe AI environment also requires regular training, oversight, and addressing potential biases.
- Albeit AI can improve productivity and job happiness, there are drawbacks that may have a detrimental effect on workers' well-being. Achieving equilibrium between the human aspect and technology innovation is crucial. In order to reduce potential hazards





and guarantee that AI favourably impacts employees' general well-being in the constantly changing workplace, organizations must place a high priority on appropriate training, open communication, and ongoing oversight.

## References

[The impact of artificial intelligence \(AI\) on employees' skills and well-being in global labour markets: A systematic review \(researchgate.net\)](#)

[Impact of Artificial Intelligence on Employees working in Industry 4.0 Led Organizations \(researchgate.net\)](#)

[The impact of automation and artificial intelligence on worker well-being - ScienceDirect](#)

[The Impact of Artificial Intelligence and Innovation on Employee Well-Being \(researchgate.net\)](#)

[Impact of artificial intelligence on employees working in industry 4.0 led organizations | Emerald Insight](#)

[The impact of artificial intelligence \(AI\) on employees' skills and well-being in global labour markets: A systematic review \(researchgate.net\)](#)

[The impact of automation and artificial intelligence on worker well-being - ScienceDirect](#)

# A Study on Challenges and Limitations of Artificial Intelligence in E-Commerce

**B. Jeyalakshmi**

*Assistant Professor of Information Technology, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, Tamilnadu, India*

*Corresponding Author e-mail iD: [jeyalakshmi@vhnsnc.edu.in](mailto:jeyalakshmi@vhnsnc.edu.in)*

## Abstract

Artificial intelligence has been gaining in popularity as information and communication technologies have evolved. Artificial intelligence performs a vital role in this computer era. This role vastly penetrated in E-Commerce. The integration of artificial intelligence (AI) in business processes has revolutionized many industries by automating tasks, the use of AI as an innovative tool in the field of ecommerce, it also comes with its fair share of challenges and limitations. The purpose of this paper is to describe the limitations and challenges of artificial intelligence in e-commerce industry.

**Keywords:** Artificial Intelligence, Ecommerce, Challenges, Business.

## 1. Introduction

### 1.1 Meaning of E-commerce

E commerce has become a global trend and is now one of the most popular online activities since it was first described in the 1980s [5]. Consumer behavior has changed as a result of the development of the Internet and the development of digital technologies. Nowadays, more and more people are making purchases through e-commerce [6]. Electronic commerce, or e-commerce for short, is the term for business conducted online via the Internet, which is viewed as a single platform that joins the buyer and supplier [7]. According to Ullman [8], e-commerce includes all commercial transactions carried out online. E-commerce includes the use of the Internet, Web portals, mobile applications, and browsers to make a purchase. These are therefore digitally enabled business transactions between sellers and customers. Almost all Internet users are currently online shoppers [9].

## 1.2 Meaning of Artificial Intelligence

In this day of rapid technological development, artificial intelligence has evolved into something more human-like, with the ability to learn, solve problems, manipulate items, and navigate physical spaces [11]. Thus Intelligent systems that can oversee and manage business models with less human involvement have been developed as a result of innovation and more effective use of technology [12]. The advancement of artificial intelligence has greatly benefited humanity's economy, enhanced practically every element of existence, greatly aided social progress, and ushered in a new era [13]. It is believed that artificial intelligence is a new, multidisciplinary technical discipline that creates applications, tools, and theoretical frameworks for simulating and enhancing human intelligence [10]. A number of industries, including healthcare, business, education, manufacturing, marketing, and finance management, have looked at the use of artificial intelligence [14–16].

## 1.3 E-commerce and Artificial Intelligence

With the advent of the current information era, new software, technological advancements, and opportunities are available for use in marketing and shopping [1]. Technologies help increase the efficiency, quality, and cost-effectiveness of services provided by businesses [2]. Contemporary creativity is based primarily on the development of the so-called information and communication technologies, which have a major impact on the development of the business environment. The effectiveness of information and communication technologies depends on several factors, such as investment in human capital and an appropriate combination of e-commerce solutions [3]. Digital tools, like websites, either partially replace or enhance physical commerce in the retail industry, which is one where the shift to e-commerce and its significance are especially evident [4].

## 2. Types of AI technology used in ecommerce

AI is not a singular technology; it encompasses various models. There are four leading AI technologies used in ecommerce:

- **Natural language processing (NLP):** Natural language processing focuses on enabling computers to interpret and generate natural human language.

- **Machine learning (ML):** Machine learning uses statistical techniques, including algorithms, to enable computers to learn from data and make predictions or decisions without being explicitly programmed. Deep learning models—such as transformers and large language models (LLMs) like OpenAi’s ChatGPT—layer algorithms to understand data better.
- **Computer vision (CV):** Computer vision is a field of artificial intelligence that enables computers to interpret information from images and videos.
- **Data mining:** Data mining is the process of discovering data to inform AI algorithms and systems.

### 3. Benefits of using AI in ecommerce

AI offers several benefits to ecommerce businesses:

- **Increased sales.** AI can help you create a more efficient sales process by gathering and analyzing customer data to personalize your sales funnel.
- **Better and more personalized customer service.** AI can analyze customer feedback and big data from multiple touch points to measure customer interactions [19].
- **Reallocation of time and resources.** AI can help you automate tasks and processes like emailing, order fulfillment, customer service, and payment processing. Automations help you reduce labor costs and improve operational efficiency so you can spend less time on maintenance and more time innovating.

### 4. Applications of AI in ecommerce

#### ➤ **Personalised product recommendations**

Personalised product recommendations use data from past customer behavior, browsing history, and purchase history to suggest products.

#### ➤ **Chatbots and virtual assistants**

Chatbots and virtual assistants can act as customer service representatives for ecommerce business, helping field customer queries and facilitating online shopping by providing tips. They use AI, NLP, and, most recently, generative AI to understand and respond to customer requests.

#### ➤ **Fraud detection and prevention**

AI can assist in fraud detection and prevention by analyzing data, detecting anomalies, and monitoring transactions in real time. The technology can spot unusual transactions, such as high-value transfers, multiple transactions within a short time frame or from unfamiliar locations, and flag them for further investigation.

➤ **Inventory management**

AI can help you manage inventory by analysing historical sales data and predicting future demand.

➤ **Dynamic pricing**

Dynamic pricing allows to adjust your prices and offerings based on real-time user behavior, global supply and demand, and competitors. With the power of AI, you can anticipate optimal discounting opportunities and dynamically determine the minimum discount required to drive a successful sale.

➤ **Customer churn prediction**

AI allows ecommerce businesses to understand customers better and identify new trends. It can analyse customer engagements across POS channels and offer insights for optimization as more consumer data becomes available.

➤ **Generative AI**

Generative AI is an artificial intelligence system that generates text, images, or other media based on prompts. Popular generative tools include ChatGPT and DALL-E. Ecommerce businesses are using generative AI to scale the production of their tailor it to different audiences.

## 5. Examples of How AI Is Being Used in E-commerce today

1. **Amazon:** Amazon uses AI to recommend products to customers, provide customer service, and optimize its logistics operations. For example, Amazon's "Customers who bought this item also bought" feature uses AI to recommend products that are similar to those that a customer has already purchased. Amazon's "Alexa" voice assistant also uses AI to answer customer questions, provide product information, and make purchases.
2. **Walmart:** Walmart is using AI to improve its supply chain management, fraud detection, and customer service. For example, Walmart is using AI to track the movement of

products through its supply chain, identify fraudulent transactions, and provide real-time customer support.

3. **Netflix:** Netflix uses AI to recommend movies and TV shows to customers based on their viewing history and other factors. Netflix's "Continue Watching" feature uses AI to keep track of which movies and TV shows a customer has started watching, and to recommend similar content [20].
4. **Spotify:** Spotify uses AI to recommend music to customers based on their listening history and other factors. Spotify's "Discover Weekly" feature uses AI to create a personalized playlist of new music for each customer [20].

## 6. Risks of implementing AI in ecommerce

- **Removing the human element.** While AI can help provide a personalised experience to customers, it can also make them feel like they're talking to a robot – particularly when it fails to grasp the nuances of how humans naturally communicate. Reliance on AI tools can also lead to trouble, as algorithms are rarely perfect and work best with real human input.
- **It can be a costly investment.** While some are free, many modern AI ecommerce solutions are expensive to implement and come with hefty subscription fees. There is also a cost to learning how to use AI tools correctly.
- **There are data privacy and cyber security risks.** Because machine learning AI collects customer data to make predictions, it can present a security risk that may lead to information leaks or data breaches. Instances Ethical and legal challenges. Many AI tools lack transparency and their decisions are not always obvious to humans. Artificial intelligence may be susceptible to biases learned accidentally or taught by humans that can lead to difficult regulatory and moral challenges that must be carefully navigated.

## 7. Limitations of AI in e-commerce

The future of AI in e-commerce is very bright. As AI technology continues to develop, we can expect to see even more innovative and groundbreaking applications in the years to come

[18]. Here are some of the ways that AI is expected to change the e-commerce industry in the future:

1. **Personalized shopping experiences:** AI will be used to create personalized shopping experiences for customers. This will be done by using AI to analyze customer data, such as purchase history, browsing behavior, and demographics, to create a personalized shopping profile for each customer. This will allow businesses to recommend products that are more likely to be of interest to each customer, and to provide a more tailored shopping experience.
2. **Virtual assistants:** AI-powered virtual assistants will become more common in the e-commerce industry. These virtual assistants will be able to help customers find products, answer questions, and complete transactions. This will make the shopping experience more convenient and efficient for customers.
3. **Fraud detection:** AI will be used to improve fraud detection in the e-commerce industry. This will be done by using AI to analyze transactions and identify patterns that are indicative of fraud. This will help businesses to protect themselves from financial losses.
4. **Logistics optimization:** AI will be used to optimize logistics operations in the e-commerce industry. This will be done by using AI to track inventory levels, optimize shipping routes, and predict demand. This will help businesses to reduce costs and improve efficiency.
5. **Customer service:** AI will be used to improve customer service in the e-commerce industry. This will be done by using AI to answer customer questions, resolve issues, and provide support. This will help businesses to provide a better customer experience and to improve customer satisfaction.

## 8. Challenges of use AI in ecommerce

Here are some of the key challenges that ecommerce businesses face when implementing AI:

1. **Data Quality and Quantity:** AI algorithms require vast amounts of high-quality data to make accurate predictions and recommendations. Ecommerce companies often struggle with data collection, cleaning, and ensuring data privacy compliance.



2. **Data Privacy and Security:** Handling customer data poses significant privacy and security concerns. Ensuring compliance with regulations like GDPR and CCPA is essential, and any data breaches can result in severe consequences.
3. **Integration with Existing Systems:** Many ecommerce businesses have legacy systems in place. Integrating AI solutions with these systems can be complex and costly, and it may require a complete overhaul of the existing infrastructure.
4. **High Initial Costs:** Developing and implementing AI solutions can be expensive, especially for smaller ecommerce businesses. Costs include hiring data scientists and engineers, purchasing hardware, and acquiring or building AI models.
5. **Talent Shortage:** There is a shortage of AI and machine learning talent. Finding and retaining skilled data scientists and engineers can be challenging, and competition for top talent is fierce.
6. **Algorithm Bias:** AI algorithms can inherit biases present in training data, potentially leading to discriminatory or unfair outcomes. Ecommerce companies must actively address and mitigate algorithmic bias to maintain trust and fairness.
7. **Customer Trust:** Implementing AI in ecommerce may raise concerns among customers regarding data privacy, security, and the ethical use of AI. Building and maintaining customer trust is crucial. AI being so advanced typically has this addressed from day 1.
8. **User Experience:** While AI can enhance the user experience by personalizing recommendations and streamlining processes, poor implementation or overreliance on AI can lead to a frustrating customer experience.
9. **Scalability:** As an ecommerce business grows, its AI systems must scale to handle increased data and user interactions. Scalability challenges can arise in both technology infrastructure and the AI models themselves.
10. **Ethical and Regulatory Compliance:** Ecommerce companies must navigate a complex landscape of AI ethics and regulations. Compliance with various regional and industry-specific laws is essential to avoid legal and reputational risks.
11. **Competition:** As more ecommerce businesses adopt AI, competition intensifies. Staying ahead in the AI game requires continuous innovation and adaptation.

**12. ROI Uncertainty:** Measuring the return on investment (ROI) of AI implementations can be challenging. It may take time to see tangible results, and some AI projects may not deliver the expected benefits. On the other hand some AI solutions hit the ground running, and early adopters never look back.

## 9. Conclusion

Artificial intelligence (AI) is rapidly transforming the e-commerce industry, providing businesses with new ways to improve the customer experience, increase sales, reduce costs, and improve efficiency. The study pertains to understand the applications of AI in E-commerce sectors. The study explored in detail all the applications, major limitations, challenges and future scope of AI in E-commerce sectors. AI can change the companies and the framework within which the E-commerce websites work and provides new touch thereby replacing the traditional and physical way of shopping for their customers. The study concludes that AI holds a powerful impact on E-commerce and aims to bring new trends in the near future.

## 10. References

1. Gburová J (2019) Consumer shopping behavior in the e-commerce environment. *J Global Sci* 4(2):1–6
2. Khrais L (2020) Role of artificial intelligence in shaping consumer demand in e-commerce. *Future Internet* 12(12)
3. Delina R, Vajda V (2006) Theory and practice of electronic commerce. Grafotlač, Prešov
4. Hagberg J, Sundstrom M, Egels-Zandén N (2016) The digitalization of retailing: an exploratory framework. *Int J Retail Distrib Manage* 44:694–712
5. Boboc PC (2020) VAT and e-commerce. Current legal framework and the 2021 changes. *Cluj Tax F.J.*, 39
6. Menaka B, Seetha K (2018) Recent trends in E-commerce. *Shanlax Int J Commerce* 6(1):40–44
7. Tan S (2013) Ecom hell: how to make money in ecommerce without getting burned. Ecom Hell, San Francisco
8. Ullman L (2013) Effortless e-commerce with PHP and MySQL. New Riders, San Francisco
- 688 R. Fedorko et al.
9. Laudon KC, Traver CG (2021) E-commerce 2020–2021- business—technology—society.

Pearson Education Limited, United Kingdom

10. SongX, Yang S, Huang Z, Huang T (2019) The application of artificial intelligence in electronic commerce. In: The 4th annual international conference on information system and artificial intelligence, IOP: Conference Series, Hunan, China, pp 1–6
11. Duan Y, Edwards JS, Dwivedi YK (2019) Artificial intelligence for decision making in the era of big data—evolution, challenges and research agenda. *Int J Inf Manage* 48:63–71
12. Di Vaio A, Boccia F, Landriani L, Palladino R (2020) Artificial intelligence in the agri-food system: rethinking sustainable business models in the COVID-19 scenario. *Sustainability* 12(12)
13. Pee L, Pan SL, Cui L (2019) Artificial intelligence in healthcare robots: a social informatics study of knowledge embodiment. *J Am Soc Inf Sci* 70:351–369
14. Yoon M, Baek J (2016) Paideia education for learners' competencies in the age of Artificial intelligence—the google Deep Mind challenge match. *Int J Multi Ubiquitous Eng* 11:309–318
15. Ying W, Pee LG, Jia S (2018) Social informatics of intelligent manufacturing ecosystems: a case study of KuteSmart. *Int J Inf Manage* 42:102–105
16. Russell SJ, Norvig P (2016) Artificial intelligence: a modern approach, 3rd ed, Pearson, Essex
17. Zhang C, Yang L (2021) Study on artificial intelligence: the state of the art and future prospects. *J Indus Inf Integr* 23
18. Dwivedi YK, Hughes L, Ismagilova E, Aarts G, Coombs C, Crick T et al (2021) Artificial intelligence (AI): multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *Int J Inf Manage* 57 Artificial Intelligence in E-commerce: A Literature Review 689
19. Swathi B, Babu SS, Ayyavaraiah M (2019) Artificial intelligence: characteristics, subfields, techniques and future predictions. *J Mech Continua Math Sci* 14(6):127–135
20. Soni VD (2020) Emerging roles of artificial intelligence in ecommerce. *Int J Trend Sci Res Develop* 4(5):223–225
21. Kumar T, Trakru M (2019) The colossal impact of artificial intelligence in e-commerce: statistics and facts. *Int Res J Eng Technol* 6(5):570–572
22. Soni N, Sharma EK, Singh N, Kapoor A Impact of artificial intelligence on businesses: from

research, innovation, market deployment to future shifts in business models

23. Shankar V (2018) How artificial intelligence (AI) is reshaping retailing. *J Retail* 94(4):6–11

24. Sterne J (2017) *Artificial intelligence for marketing: practical applications*. Wiley, USA

# A Study on Artificial Intelligence in Inventory Management

P. Varshaa<sup>1\*</sup> and E. Sweetline Priya<sup>2</sup>

<sup>1\*</sup>M. Com (COBA), Department of Commerce (SFS), Madras Christian College, Tambaram, Chennai, India.

<sup>2</sup>Assistant Professor of Computer Application (BCA), Madras Christian College, Tambaram, Chennai, India.

\*Corresponding Author e-mail iD: [varshaa.p10@gmail.com](mailto:varshaa.p10@gmail.com)

## Abstract

This article explores how artificial intelligence (AI) is revolutionizing supply chain inventory management in the context of contemporary commercial operations. AI emerges as a potent technology that is transforming conventional ways as firms aim to manage their inventories with efficiency, accuracy, and cost-effectiveness. The study examines the many uses and advantages of artificial intelligence (AI) in inventory management, emphasizing how it may improve demand forecasting, streamline replenishment procedures, increase inventory visibility, and lower manual errors. Through a comprehensive review of literature and case studies, this study examines how AI algorithms analyze vast amounts of data, including historical sales data, seasonality, promotions, and external factors, to make accurate predictions. Furthermore, it discusses how AI-driven systems automatically reorder products, leading to minimized stockouts and overstocking, thus improving customer satisfaction and cost savings. To give a fair assessment of the use of AI in inventory management, issues such data quality, costs associated with implementation, integration difficulty, ethical concerns, and security risks are also examined. With a focus on supply chain efficiency and individualized inventory solutions, the research offers an optimistic viewpoint on the field's potential applications of AI.

**Keywords:** Artificial Intelligence, Supply Chain, Inventory Management.

## 1. Introduction

An essential component of success in the dynamic corporate world is inventory management. It's a delicate balancing act: too much inventory can result in increased storage expenses and possible waste, while too little inventory can cause lost sales opportunities and disgruntled clients. This is where artificial intelligence (AI) inventory management, a ground-breaking tool that's revolutionizing how businesses handle their inventories, comes into play.

This technology represents a paradigm change that will redefine industry standards, not merely a slight improvement over traditional method. Businesses may handle inventory management's intricacies with previously unheard-of ease and efficiency as they use AI inventory management, transforming possible obstacles into chances for expansion [1].

The goal of computer science's artificial intelligence (AI) research is to replicate human intellect in robots. Artificial intelligence (AI) can analyze massive amounts of data, spot patterns and trends, and generate precise forecasts when used in inventory management.

Unlike traditional inventory management techniques, which frequently rely on manual input and analysis, AI has the capacity to process and learn from data. AI is capable of much more than just basic data processing; it can interpret intricate patterns, forecast trends, and make deft decisions instantly. This degree of intelligence and sophistication adds another level of complexity to inventory management, allowing companies to remain ahead of the curve, predict changes, and quickly adjust.

A crucial aspect of supply chain operation, inventory operation, is substantially concerned with organizing and managing an easy supply. It addresses challenges similar as calculating material conditions at various stages throughout the supply chain, determining the quantum of material needed, ordering frequency, and safety stock situations [2].

inventory visibility, managing inventory, lead times, stock shipping costs, valuation of stock, warehouse space availability, quality control, returns and damaged goods, and forecasting demand are also included.

## 2. Review of Literature

D Preil et al in [15] has said “Integrated planning and control of inventory for all supply chain participants, from the point of supply to the final consumer, is a crucial responsibility of supply chain management. This helps to lower overall inventory costs while enhancing customer service.”

Taylor et al in [16] has mentioned “AI approaches such as expert systems offer a promising new solution to inventory control and planning challenges of large volume and complexity because to their rich knowledge representation language, which is capable of capturing inventory patterns over the entire SC at all levels of detail.”

BM Osman et al in [16] mentioned “The findings demonstrate how inventory management tasks can be enhanced by the use of AI and machine learning. It increases productivity, enhances data accuracy, facilitates prompt decision-making, reduces expenses, and reliably guarantees customer pleasure.”

N Singh et al in [8] has stated “AI technology has greatly increased productivity and facilitated speedy decision-making in inventory management procedures. These developments result in reduced costs and steady customer satisfaction.”

EE Foya in [17] has previously said “Artificial intelligence (AI) refers to the quicker and ongoing use of new technology in supply chain and logistics, particularly in inventory management. The findings demonstrate how inventory management tasks can be enhanced using AI and machine learning. It increases productivity, enhances data accuracy, facilitates prompt decision-making, reduces expenses, and reliably guarantees customer pleasure. “

H Dinh in [18] has stated “Artificial Intelligence (AI) is widely used in Finland's supply chains and other businesses in the fourth industrial revolution (4.0). Globally, a significant portion of logistics businesses are gradually integrating automation, data sharing, machine learning, and deep learning into their daily operations. In essence, the way the supply chain functions is being altered by these technologies.”

### **3. Benefits of AI in Inventory Management**

A new era of accuracy and efficiency in inventory management has been created with the arrival of AI. This technology is altering the way firms manage their inventory; it is more than just a tool. AI is transforming the challenges associated with inventory management into chances for development and innovation by automating complicated processes, offering perceptive analytics, and facilitating real-time decision-making. But what precisely are these advantages that artificial intelligence offers? Let's examine a few of them to get a better idea.

#### **3.1 Inventory Management in Real Time**

AI systems integration makes it easier to track and manage inventories across various locations in real-time inventory management [3]. AI inventory management ensures higher accuracy and an



important boost in overall output. Businesses may make proactive adjustments and timely decisions by continuously monitoring their inventory status due to this modern technology. Moreover, businesses can lower the likelihood of stockouts and overstock situations, which lowers holding costs, enhances supply chain efficiency, prevents financial losses, and raises overall profitability.

### **3.2 Easy Demand Forecasting**

Demand forecasting is revolutionized by AI, which also introduces unmatched efficiency to a range of commercial activities. Artificial Intelligence (AI) utilizes machine learning algorithms to assess vast datasets, including real-time information from several sources such as economic conditions and customer behavior [4].

In inventory management, for example, generative AI automates tedious and repetitive operations while also detecting complex patterns and connections that human analysis would overlook. With a more adaptable and effective demand forecasting system, businesses can anticipate changes, maximize inventory levels, and boost operational efficiency.

### **3.3 Cutting Down on Overstock and Stockouts**

The challenge with inventory planning is to prevent overstock or out-of-stock situations by ordering precisely the correct quantity of goods to meet consumer demand [5]. By automatically assessing all available data and restrictions, artificial intelligence (AI) solutions can continuously rebalance supply and demand. These solutions therefore provide supply chain managers with an ideal purchase plan that is always prepared for implementation.

### **3.4 Data Mining**

Due to its ability to extract meaningful information from large databases, analyze both historical and present data, and improve precision, data mining artificial intelligence (AI) is revolutionizing inventory management.

By keeping supplies in check and cutting back on surplus inventory, this proactive approach optimizes the efficiency of the supply chain. Through the detection of trends in customer behavior, AI-driven data mining assists businesses in aligning their inventory with market demands. Moreover, it aids in decision-making by providing useful information for adjustments.

### **3.5 More Trust and Transparency**

AI with the power of blockchain technology enhances inventory management transparency and fosters stakeholder trust. It guarantees product traceability for all parties involved in the process and maximizes inventory visibility for them. Additionally, AI and blockchain create an immutable, tamper-proof record of every transaction made along the supply chain, which strengthens accountability while also fostering stakeholder trust [4]. The decentralized structure of blockchain provides safe storage and instant access to data, enhancing the supply chain's overall resilience. As a result, there is increased transparency throughout the inventory management ecosystem, lowering the likelihood of errors.

### **3.6 Predictive Maintenance for Equipment**

By examining sensor data, equipment repair can be forecasted with artificial intelligence in inventory management. Businesses can decrease downtime and increase the availability of replacement parts in their inventory by anticipating and preventing equipment malfunctions. Furthermore, AI-driven predictive maintenance makes timely interventions possible by increasing the equipment's lifespan [6]. Businesses may proactively schedule maintenance processes to prevent interruptions and ensure operational continuity by frequently assessing the condition of their equipment. As a result, expenses are reduced, and total productivity is increased.

## **4. Challenges in Implementing AI in Inventory Management**

There are disadvantages to using AI in inventory management in addition to its many advantages. The following part will address these problems in more detail.

### **4.1 Management and Quality of Data**

High-quality data is essential to AI and machine learning algorithms [7]. Poor model performance might result from the existence of outliers, missing values, or inaccurate entries.

Quality data is a prerequisite for the effectiveness of AI-enhanced Just-In-Time inventory systems [8]. A lack of completeness or consistency in the data can result in erroneous forecasts and poor inventory management. For AI systems to produce exact predictions and judgments, complete and correct data is necessary.

#### **4.2 Ethical and Regulatory Considerations**

**Transparency:** As AI algorithms become more autonomous, there is a need for transparency in how decisions are made.

**Fairness and Bias:** AI systems can inadvertently perpetuate biases present in the data used for training, leading to unfair outcomes [9].

**Regulatory Compliance:** Depending on the industry and location, there may be regulations regarding the use of AI in decision-making processes.

#### **4.3 Over-Reliance on AI**

Over-reliance on AI without human oversight can lead to a loss of human expertise and intuition. [10] If businesses solely rely on AI-generated predictions, they may miss out on unexpected market shifts or anomalies.

#### **4.4 Resistance to Change**

Resistance or hesitancy from employees to adopt AI-driven inventory management systems can impede successful implementation. Implementing AI requires a cultural shift towards data-driven decision-making, which may face resistance in traditional business environments [8].

#### **4.5 Training and Deficits in Skill**

In order to manage and maintain AI systems, organizations require staff with the necessary capabilities [7]. To keep staff members abreast of AI developments and best practices, ongoing training is crucial.

### **5. Opportunities and Future Directions AI in Inventory Management**

Artificial Intelligence (AI) in inventory management has huge possibility to advance supply chain operations' efficiency, creativity, and optimization in the future. A number of developments and trends in technology are influencing how AI will be used in inventory management going forward, including:

#### **5.1 Demand Forecasting and Predictive Analytics**

Demand forecasting accuracy will increase as AI algorithms develop further and incorporate machine learning and deep learning approaches [11].

In order to forecast demand more accurately, artificial intelligence (AI) technologies will offer real-time visibility into consumer behavior, market trends, and outside variables.

### **5.2 Increased Effectiveness of the Supply Chain**

AI will drive and connect whole supply chain networks, facilitating smooth collaboration and communication. AI will streamline logistics processes, cutting costs and speeding up delivery times. These processes include load balancing, transportation scheduling, and route planning [11].

### **5.3 Integration of IoT with Sensor Technologies**

With sensors offering real-time data on inventory quantities, conditions, and locations, the Internet of Things (IoT) will be vital to inventory management [13]. AI-driven smart shelves will monitor inventory movements on their own, placing reorders and making the best use of available shelf space.

### **5.4 Enhanced Visualization and Analytics of Data**

AI will provide more advanced data analytics capabilities that will give more in-depth understanding of supplier performance, inventory patterns, and operational efficiency [11][14]. Inventory managers will be able to make well-informed decisions instantly with the help of dynamic and user-friendly dashboards driven by artificial intelligence.

### **5.5 Blockchain Technology for Trackability and Openness**

AI and blockchain technology will work together to establish supply chains that are transparent and traceable, increasing trust and lowering fraud. Contracts and inventory transactions will be automated by AI-driven smart contracts, increasing productivity and decreasing paperwork.

## **6. Conclusion**

The application of artificial intelligence (AI) to inventory management has become a game-changing development that is changing the way supply chain operations are conducted. AI technology has greatly increased productivity and facilitated speedy decision-making in inventory management procedures [1][4][6]. Cost reduction and steady client satisfaction are the results of these developments. Particularly significant is AI's contribution to supply chain planning task optimization, demand forecasting, customer order feasibility checks, and supply chain network architecture. Notwithstanding its advantages, there are drawbacks to using AI in inventory management, such as problems with interpretability, data quality, and model transparency. These difficulties highlight the necessity for a thorough comprehension of the technology as well as the

obstacles unique to the area. It seems that AI in inventory management has a bright future ahead of it, with room for more developments [7][8].

In conclusion, creative solutions are being made possible by the merger of artificial intelligence (AI) and other technologies, such as the Internet of Things (IoT). Supply chains will become more effective, strong and responsive to shifting market situations as a result of this synergy, which creates new opportunities.

## References

1. Dunlea, J. (2024, January 4). Revolutionizing Inventory Management: the Power of AI. Akkio. <https://www.akkio.com/post/ai-for-inventory-management>
2. Albayrak, Ö., Erkeyman, B., & Usanmaz, B. (2023). Applications of Artificial Intelligence in Inventory Management: A Systematic Review of the literature. *Archives of Computational Methods in Engineering*, 30(4), 2605–2625.
3. Srivastava, S. (2023, December 27). 10 Ways Artificial Intelligence is Revolutionizing Inventory Management. Appinventiv. <https://appinventiv.com/blog/ai-in-inventory-management/>
4. Technologies, B. (2024, February 16). 5 Benefits of AI in Inventory Management: Key Insights. Binmile - Software Development Company. <https://binmile.com/blog/ai-inventory-management/>
- [5] Koshulko, A. (2023, February 6). 5 Ways AI Can Benefit Demand Forecasting and Inventory Planning. Forbes. <https://www.forbes.com/sites/forbestechcouncil/2023/02/06/5-ways-ai-can-benefit-demand-forecasting-and-inventory-planning/?sh=6e0bc101742a>
- [6] Zharovskikh, A. (2023, October 18). How to use AI for intelligent inventory management. InData Labs. <https://indatalabs.com/blog/ai-inventory-management>
- [7] Wang, Y. (2023b, July 21). Revolutionizing Inventory management with Artificial Intelligence: A Comprehensive guide. dzone.com. <https://dzone.com/articles/revolutionizing-inventory-management-with-artifici>
- [8] Singh, Navdeep & Adhikari, Daisy. (2023). AI in Inventory Management: Applications, Challenges, and Opportunities. *International Journal for Research in Applied Science and Engineering Technology*. 11. 2049-2053. 10.22214/ijraset.2023.57010.

- [9] Cannas, V. G., Ciano, M. P., Saltalamacchia, M., & Secchi, R. (2023). Artificial intelligence in supply chain and operations management: a multiple case study research. *International Journal of Production Research*, 1–28.
- [10] Francis, A. (2015, March 15). Case Study: Inventory Management Practices at Walmart - MBA Knowledge Base. MBA Knowledge Base. <https://www.mbaknol.com/management-case-studies/case-study-of-walmart-inventory-management/>
- [11] Florkin, J. (2024, February 1). AI in Inventory Management: 7 Important Aspect of a Bright Future. Julien Florkin. <https://julienflorkin.com/technology/artificial-intelligence/ai-in-inventory-management/#future-of-ai-in-inventory-management>
- [12] How AI is transforming smart inventory Management - Spiceworks. (2023, February 10). Spiceworks. <https://www.spiceworks.com/supplychain/warehousing/guest-article/ai-is-transforming-industries-with-smart-inventory-management/>
- [13] DiPerna, R. (2024, January 24). Why AI for inventory management could be the next big thing. Sortly. <https://www.sortly.com/blog/why-ai-for-inventory-management-could-be-the-next-big-thing/>
- [14] Delligatti, J. (2024, January 24). The future of Inventory Management: Integrating AI and Machine learning. SDI. <https://www.sdi.com/resources/blog/the-future-of-inventory-management-integrating-ai-and-machine-learning/>
- [15] Preil, D., Krapp, M. Artificial intelligence-based inventory management: a Monte Carlo tree search approach. *Ann Oper Res* **308**, 415–439 (2022).
- [16] [https://www.irjmets.com/uploadedfiles/paper/issue\\_3\\_march\\_2022/19468/final/fin\\_irjmets1646486656](https://www.irjmets.com/uploadedfiles/paper/issue_3_march_2022/19468/final/fin_irjmets1646486656)
- [17] Dinh, H. (2020). The revolution of warehouse inventory management by using Artificial intelligence :Case Warehouse of Company X. Theseus. <https://www.theseus.fi/handle/10024/346144>

# Problem and Prospects of AI Technology in E-Commerce Industry

**K. Sounthara Priya<sup>1\*</sup>** and **A. Josephine Stella<sup>2</sup>**

*Assistant Professor of Commerce, SFR College for Women, Sivakasi, India.*

*\*Corresponding Author e-mail iD: [Sountharapriya-com@sfrcollege.edu.in](mailto:Sountharapriya-com@sfrcollege.edu.in)*

## Abstract

AI is playing an increasingly significant role in ecommerce, enabling retailers to provide a more personalized, efficient, and seamless shopping experience to customers. As the technology continues to evolve, it lead to even more innovation and advancement in the ecommerce industry. The comprehensive use of technology has led us into this time period where we are engaged in social media, technology gadgets, and the internet as we've never been before. Therefore, a massive amount of businesses have decided to embrace the online market and hence they are seeking opportunities so that they can improve their sales and revenue this way. E-commerce businesses have seen an immense increase in profit after the pandemic. Therefore, many physical outlets/stores want to enter the e-commerce market as well in order to become a more substantial part of the business world. With the advent of artificial intelligence, we are witnessing a boost in sales and improved efficiency in operations. AI is boosting the engagement and interaction of customers with digital touchpoints. Apart from evolving the e-commerce industry in multiple ways, artificial intelligence in the business-to-business e-commerce industry is also driving a host of innovative solutions. The paper focuses on the description of the essence of e-commerce and artificial intelligence and their benefits and challenges.

**Keywords:** AI, e-commerce and Applications

## Introduction

In recent years, ecommerce has seen rapid growth and Artificial Intelligence (AI) undergone a significant transformation in the ecommerce industry. AI is playing an increasingly significant role in ecommerce, enabling retailers to provide a more personalized, efficient, and seamless shopping experience to customers. As the technology continues to evolve, it lead to even more innovation and advancement in the ecommerce industry. The comprehensive use of technology has led us into this time period where we are engaged in social media, technology





gadgets, and the internet as we've never been before. Therefore, a massive amount of businesses have decided to embrace the online market and hence they are seeking opportunities so that they can improve their sales and revenue this way. The paper focuses on the description of the essence of e-commerce and artificial intelligence and their benefits and challenges.

### **Artificial Intelligence in E-commerce Industry**

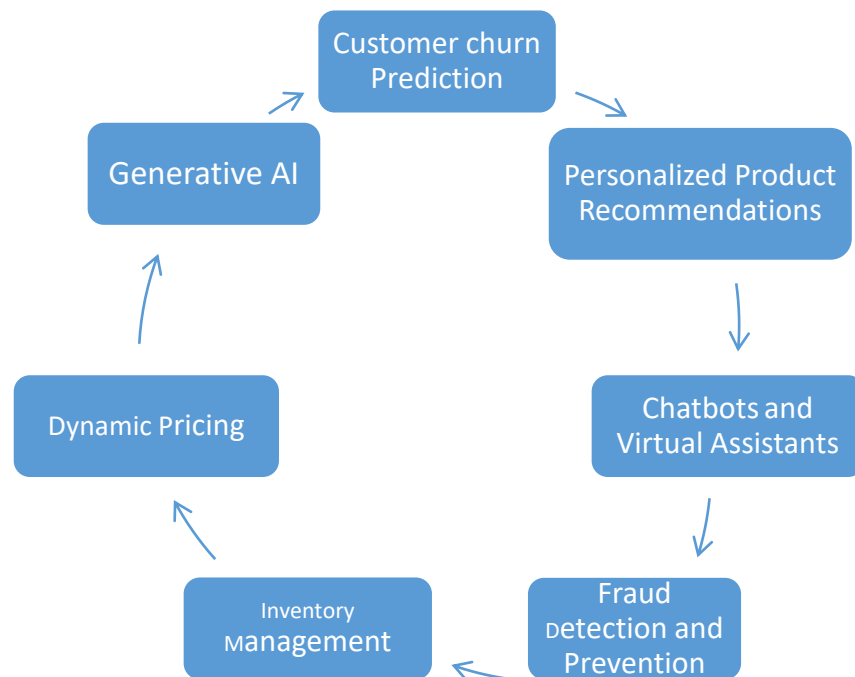
E-commerce businesses have seen an immense increase in profit after the pandemic. Therefore, many physical outlets/stores want to enter the e-commerce market as well in order to become a more substantial part of the business world. With the advent of artificial intelligence, we are witnessing a boost in sales and improved efficiency in operations. AI is boosting the engagement and interaction of customers with digital touchpoints. Apart from evolving the e-commerce industry in multiple ways, artificial intelligence in the business-to-business e-commerce industry is also driving a host of innovative solutions. In the last four years, the number of businesses fostering AI increased by 270%. Still, there are plenty of misconceptions about all things related to AI.

The main aim of companies in today's e-commerce world is to influence customer behavior in favor of certain products and brands. The application of artificial intelligence as an innovative tool in the field of E-commerce may seem as a positive step forward. It's crucial for a business to have an E-Commerce platform to be able to compete with other retail businesses. The revolutionary and transformative use of technology has led us into an era where we are immersed in social media, gadgets, and the internet as we've never been before. For all of those reasons, many successful businesses have decided to embrace the online market and are seeking opportunities to improve sales in this way. In E-Commerce arena, AI is becoming a substantial part of the business world. It's also boosting engagement and interaction with digital touchpoints. We're witnessing firsthand that implementing AI for E-Commerce websites can boost sales and improve the efficiency and productivity in operations.

### **AI Applications in Ecommerce Industry**

Ecommerce businesses have implemented AI across various business functions and will continue to find new and innovative applications for AI in ecommerce as adoption increases and the technology advances. In the past, businesses viewed advanced technologies like AI as "nice to

have,” primarily using them to delight customers and encourage repeat visits. Now, ecommerce businesses rely on AI to grow their company, maintain global operations, and meet customer demands across multiple channels.



### AI Applications in Ecommerce Industry

**Personalized product recommendations** use data from past customer behavior, browsing history, and purchase history to suggest products.

**Chatbots** and virtual assistants helping field customer queries and facilitating online shopping by providing tips.

Use machine learning models to generate user profiles based on behavior data like browsing habits, transaction history, and device history, then compare current consumer behaviors with historical data to identify **fraudulent** behavior.

AI-enabled **inventory management** can automate the inventory replenishment processes by integrating with suppliers to ensure timely restocking.

**Dynamic pricing** allows adjusting our prices and offerings based on real-time user behavior, global supply and demand, and competitors

AI allows ecommerce businesses to understand customers better and **identify new trends**.

**Generative AI** is an artificial intelligence system that generates text, images, or other media based on prompts.

### Benefits of AI Technology in E-commerce Industry

- AI in ecommerce is its ability to analyze large amounts of data and provide
- personalized recommendations to customers based on their purchase history,
- browsing behavior, and other data points. This allows retailers to provide a more
- targeted and relevant shopping experience, leading to increased customer
- satisfaction and loyalty.
- AI-powered chatbots and virtual assistants have also transformed customer
- service in ecommerce by providing instant responses to customer inquiries and
- helping resolve issues quickly, improving customer satisfaction and reducing the
- workload on customer service teams.
- AI is also improving the accuracy of fraud detection and prevention in
- ecommerce, reducing the risk of fraudulent transactions and chargebacks.
- AI in ecommerce enhances customer satisfaction and drive long-term success in
- the digital age.
- AI technology continue to advance, we can expect even more exciting
- developments in the empire of immersive shopping, ultimately transforming the
- way we browse, discover, and purchase products online.
- AI helps to create a more efficient sales process by gathering and analyzing
- customer data to personalize your sales funnel.
- AI can analyze customer feedback and big data from multiple touch points to
- measure customer interactions.
- AI can help to automate tasks and processes like emailing, order fulfillment,
- customer service, and payment processing. Automations help to reduce labor
- costs and improve operational efficiency.

- AI-enabled dynamic pricing is a strategy of changing the product price based on supply and demand.
- Access to more business and customer data and processing power is enabling ecommerce operators to
- understand their customers and identify new trends better than ever.
- “Machine learning’s predictive powers shine in logistics,
- helping to forecast transit times, demand levels, and shipment delays.” Smart logistics or intelligent logistics, is
- all about using real-time information through sensors.
- RFID tags, and the like, for inventory management and to
- better forecast demand. Machine learning systems become smarter over time to build better predictions for their supply chain and logistics functions.

#### Challenges of using AI Technology in ecommerce Industry

While AI has several benefits in ecommerce, it can also present challenges:

- Data privacy: AI algorithms rely on consumer data to make personalized recommendations and predictions. Ecommerce companies often struggle with data collection, cleaning, and ensuring data privacy compliance.
- AI also
- presents a security risk for companies around proprietary intellectual property, leading to
- accidental leaks and breaches.
- Many ecommerce businesses have legacy systems in place. Integrating AI solutions with these systems can be complex and costly, and it may require a complete overhaul of the existing infrastructure.
- High initial investment: Implementing AI can be costly. It involves an investment in
- infrastructure, talent, and maintenance. There is a shortage of AI and machine learning talent.
- Finding and retaining skilled data scientists and engineers can be challenging,

- Implementing AI in ecommerce may raise concerns among customers regarding data privacy, security, and the ethical use of AI. Building and maintaining customer trust is crucial.
- AI can enhance the user experience by personalizing recommendations and streamlining processes, poor implementation or overreliance on AI can lead to a frustrating customer experience positive return on investment (ROI).
- Potential for poor-quality customer service: Because AI customer service relies on chatbots,
- you may fail to offer the same support and empathy as a human customer service representative.
- Done poorly, AI customer service can cause friction, customer dissatisfaction, and a poor Reputation

## Conclusion

The E-Commerce business is in full bloom in terms of serving its consumers in everyway possible, from knowing their needs to forecasting their buying preferences to suggesting items that better fit their needs to providing round-the-clock customer service. The E-Commerce industry has rapidly transformed the way people sell, shop and browse items on the internet thanks to artificial intelligence. Most of the corporate companies are using the artificial intelligence techniques in their day to day operations. Artificial intelligence technology is maturing and transforming the way people function and live, particularly in the area of E-commerce. Artificial intelligence technology has increasingly evolved into a powerful weapon to fuel revenue growth and optimisation.

## References

1. Sangeetha. K (2021), A Study On Artificial Intelligence In Ecommerce Industry, *International Journal of Creative Research Thoughts*, volume 8, Issue 9, September.
2. Linh Nguyen (2023), Artificial Intelligence in E-commerce, LAB University of Applied Sciences, Bachelor of Business Administration, Business Information Technology
3. Granthaalayah (2021), Artificial Intelligence-Application in The Field of E-Commerce, *International Journal of Research*,

4. The Impact of AI on Ecommerce: Revolutionizing the Online Shopping Experience, [AIWORKS.AI](#), published Feb27, 2023.

5.<https://Www.Investopedia.Com/Terms/A/Artificial-IntelligenceAi.Asp>

6.[https://www.linkedin.com/pulse/current-status-artificial](https://www.linkedin.com/pulse/current-status-artificial-intelligence-stefan-pechardscheck) ◆intelligence-stefan-pechardscheck



# A Study on Chatbots and Virtual Assistants – AI Powered Customer Service

Anaswara Mohan<sup>1\*</sup> and E. Sweetline Priya<sup>2</sup>

<sup>1\*</sup>M. Com (COBA), Department of Commerce (SFS), Madras Christian College, Tambaram, Chennai, India.

<sup>2</sup>Assistant Professor of Computer Application (BCA), Madras Christian College, Tambaram Chennai, India.

\*Corresponding Author e-mail iD: [anaswaramohanankr@gmail.com](mailto:anaswaramohanankr@gmail.com)

## Abstract

The goal of this article is to highlight the role of artificial intelligence (AI) throughout chatbots and virtual assistants in enhancing customer experience. In today's competitive world, businesses use a variety of marketing opportunities to achieve their goals. A key component of marketing studies is customer experience, which requires firms to create strong and enduring customer experiences. To accomplish this goal, businesses can use technology, especially since it is changing the nature of service, customers' experiences, and customer relationship management. With their ability to provide individualized, effective, round-the-clock service, these intelligent virtual entities are revolutionizing the way businesses engage with their customers. They also come along with few drawbacks such as lack of emotional intelligence, security dangers, absence of compassion etc. The function of artificial intelligence (AI) in customer service, the capabilities of chatbots and virtual assistants, their advantages, and the future of AI-driven customer assistance will all be covered in this article.

**Keywords:** Chatbots and Virtual Assistants, Artificial Intelligence, Customer Service

## 1. Introduction

Chatbots are typically employed as interfaces for acquiring information, including extracting product specifics. Virtual assistants can help with several aspects of business, such as note-taking, organizing your to-do lists, and meeting reminders [1].

The e-commerce industry has grown significantly in the last several years and is now a major player in the world economy. This shift has been fueled by digitalization, and businesses now have to manage client interactions with efficiency and effectiveness. There are great expectations from customers. They expect constant communication from businesses and get





irritated when they have to clarify or restate facts when speaking with several agents. As a result, the issue faced by the e-commerce industry is to increase productivity while maintaining the highest standard of customer service [2].

Chatbots are computer programs designed to communicate textually or audibly with people. Organizations typically employ this AI-powered software to improve their customer service initiatives. In the field of customer service, chatbots play a vital role as information gathering instruments. Consumers can schedule an appointment with the product manager, get information about a product, and have their questions answered by chatbots.

A virtual assistant is a software agent that works digitally to help us with daily tasks such as placing calls, setting reminders for the clock, setting up appointments, and typing messages. Comparable to personal human assistants, virtual assistants can accomplish tasks like taking notes during meetings, reminding us to complete our "to-do lists," or reading emails and messages that are delivered to us. In a similar vein, virtual assistants assist us in: managing and controlling smart devices, Verify the status of the flight, Obtain guidance, control the breaking news, etc [1].

Consumers give top priority to prompt and effective handling of their complaints and concerns. As such, they have high standards for excellent client service. Chatbots come into play as a solution since they provide 24/7 client service. This constant accessibility guarantees that client enquiries are immediately answered and lowers friction in the customer service process, both of which improve the overall quality of the customer experience [3].

## 2. Review of Literature

Today's competitive world uses different marketing opportunities to achieve business goals. Customer experience is a core component in marketing studies; firms need to create strong and enduring customer experiences. To achieve this goal, enterprises can use technology, especially since it reshapes the nature of service, customers' experiences, and customer relationship management. In this sense, the purpose of the present article is to highlight the role of AI throughout chatbot and Virtual Assistants in powering customer experience. The major objective of using AI and Virtual Assistants tools is to save time and embrace productivity and business engagements in various service levels.

As chatbots can mimic interpersonal conversations, they are capable of engaging customers on a social level, which distinguishes them from self-service technologies (**van Doorn et al., 2017; Pizzi et al., 2021**).

Scholars and designers have aimed at enhancing the humanness of chatbots for a long time (**Schuetzler et al., 2020; Roy and Naidoo, 2021**), and have found that adding human attributes to chatbots can enhance positive experiences, and trigger social and emotional connectedness (**Araujo, 2018; Adam et al., 2021**).

Prior research also examines how visual and identity cues shape customer attitudes and behaviors (**Araujo, 2018; Van den Broeck et al., 2019**), arguing that identity cues have primacy over other humanness cues, such as language.

Several studies have emphasized the ability of chatbots and virtual assistants to provide immediate responses to customer queries, leading to improved efficiency and reduced waiting times (**Cheng et al., 2019; Wang et al., 2020**).

Research has shown that chatbots and AI assistants continuously learn and improve over time through machine learning algorithms and user interactions (**Li et al., 2020**).

Research has demonstrated the effectiveness of chatbots and AI assistants in delivering personalized experiences by leveraging customer data and preferences (**Luo et al., 2020**).

In the realm of customer service, traditional channels often struggle with issues like long wait times and limited availability. Chatbots and AI assistants offer a solution by providing immediate responses to inquiries, handling routine tasks, and freeing up human agents for more complex issues. This not only enhances efficiency but also improves the overall customer experience by ensuring round-the-clock availability and instant responses.

### **3. Benefits of AI Powered Customer Service**

Artificial intelligence-driven chatbots and virtual assistants for e-commerce that engage with consumers to offer prompt assistance and tailored experiences. Like a real assistant, they may converse with customers, respond to inquiries, and even help with the buying process. These days, chatbots are a big part of e-commerce, helping both large businesses and startups that

want to grow to streamline a lot of customer-related tasks. There are various benefits of these AI powered assistance in a business, lets discuss them in detail:

### **3.1 Smooth Real-Life Communication**

E-commerce chatbots are made to look like salespeople and customer service agents. The phrase “How can I help you today?” can be taught to them and they would say it just like how a normal human would, and without you having to lift a finger, welcome, recognize, and find out why your clients clicked on your chat widget [6].

### **3.2 Customer Service Is Available 24/7**

Customers are never kept waiting by e-commerce chatbots. They greatly increase a brand's first response time and offer round-the-clock customer service that isn't affected by bad hair days, meetings, lunch, or anything else. They can notify your support-seeking consumers of the business hours and direct them to the FAQ section even if they aren't designed to offer real-time assistance.

### **3.3 Resolving Linguistic Barriers**

Linguistic barriers should never exist in the global marketplace of today. Language obstacles, however, can occasionally arise. Introducing AI chatbots with multilingual help capabilities. These digital linguists ensure that no one feels excluded and open access to a wider customer base by removing language obstacles [4].

### **3.4 Minimizing Client Dissatisfaction**

As we previously discussed, chatbots are quick, helpful, and never keep clients waiting—day or night, even during busy times. Common problems and queries, like order tracking, returns, and refunds, can be promptly resolved by them. Even if a customer is initially upset, prompt responses tend to ease their frustration. Chatbots are unable to respond negatively after this initial pleasant interaction, regardless of how irate or impolite the user is (as long as they utilize the appropriate tone of voice and message). However, you must provide a way out and allow users to switch from speaking with the chatbot to speaking with a human agent.

### **3.5 Bringing About Cost Savings**

An organization can develop a number of chatbots for a range of uses, including tracking orders and deliveries, managing the sales process, enhancing internal communication, and customer service. This eliminates the need for larger teams and saves time, particularly for repeated and routine work [6].

### **3.6 Prevention Of Cart Abandonment**

Customers fill up their carts and they are far too frequently forgotten and abandoned. When a consumer chooses not to make a purchase, chatbots can step in and alleviate their anxieties, or they can at least figure out why and save the day. Conversion rates can be increased beyond belief with the help of these digital assistants, who can also give enticing rewards, remind clients about abandoned carts, and assist with the checkout process [4][6].

## **4. Drawbacks of Chatbots and Virtual Assistants in e-commerce**

These AI driven assistants come along with few drawbacks as well apart from above given benefits. Some of the drawbacks or disadvantages of these AI powered assistants are given below:

### **4.1 Insufficient Emotional Intelligence**

One of the major disadvantages of chatbots is the lack of emotional intelligence. Chatbots may perform worse in customer service interactions because they cannot identify or respond to human emotions. When chatbots don't react with emotion, users could feel insulted or neglected [10].

### **4.2 Possible dangers to security**

Chatbots that aren't properly guarded could cause major security issues. Hackers could be able to overhear chatbot conversations and obtain confidential customer information. Additionally, chatbots might become the object of angry attacks or con games, which would be bad for the customer and the business plan [10].

### **4.3 Limited capacity to manage intricate requests**

A chatbot's purpose is to respond to client inquiries. But they only get a small amount of response. When it comes to more complex or nuanced topics that require human skill, they could struggle. If chatbots are unable to appropriately answer users' questions or resolve their issues, users may become irate [10].

#### **4.4 Absence of compassion**

Users may become frustrated as a result of their lack of emotional intelligence and inability to handle delicate or emotional conversations [11].

#### **4.5 Limited comprehension**

Chatbots can misinterpret user inquiries, have trouble answering complicated queries, and give wrong answers [11].

#### **4.6 Technical restrictions**

Because chatbots rely on technology, they are subject to some technical limitations. They could have errors, malfunctions, or outages, which could result in a decreased quality of service. Furthermore, accents, dialects, and languages that are not supported by their programming may be difficult for chatbots to understand or translate [10].

#### **4.7 Insufficient customisation**

A major drawback of chatbots is their lack of personalisation. Even while chatbots can reply to customer questions fast and efficiently, they might need to provide a different calibre of personalised service than a human representative. Customers may become agitated or unsatisfied with generic or irrelevant responses [10].

### **5. Potential Developments of Chatbots and Virtual Assistants in E-Commerce**

Exciting potential await AI in customer service in the future. Some of them are as follows:

#### **5.1 Multichannel Assistance**

AI-driven systems will provide smooth support over chat, email, voice, and social media, among other channels of communication [5]

#### **5.2 The intelligence of emotions**

AI systems will be equipped with emotional intelligence, allowing them to recognize and respond to customer emotions, improving empathy in interactions [5].

#### **5.3 Chatbots will resemble people more.**

Three essential elements must be integrated in order to construct a chatbot: machine learning (ML), artificial intelligence (AI), and natural language processing (NLP). The integration of natural language processing (NLP) and machine learning (ML) has allowed chatbots to learn from interactions, interpret the subtleties of user intent, and execute commands more accurately—even in complex scenarios [8].

#### **5.4 Sector-Specific Remedies**

AI will be developed with particular businesses in mind, offering specialised knowledge and assistance in sectors like e-commerce, banking, and healthcare [5].

#### **5.5 Collaboration Between Human and AI**

Artificial intelligence (AI) technologies will collaborate with human agents to enhance their capabilities and offer real-time support [5].

#### **5.6 Trends with chatbots and Generation Z**

Every day, members of Generation Z utilise the internet, mostly social media and messaging apps. According to a LiveChat survey, Gen Z interacts on social media alone more quickly, succinctly, and effectively. Even while AI-powered instant messaging is practical, just 44% of Gen Z respondents think chatbots will eventually take the place of traditional call centres [8].

#### **5.7 Superior Customisation**

Artificial intelligence (AI) will enable hyper-personalization in customer service by anticipating the requirements and preferences of customers before they express them [5].

#### **5.8 Voice bots are starting to become commonplace.**

The broad deployment of voice technology in the next year has the potential to completely transform user experiences by providing individualised and interactive interactions. Forecasts indicate that voice searches will account for more than 50% of searches, highlighting the dramatic change towards voice-enabled interactions. Some important elements that contribute to the popularity of voice bots are engaging automation, reliable data insights, personalization capabilities [9].

### **6. Conclusion**

Virtual assistants and chatbots both have a wealth of features that could alter the commercial world. AI chatbot integration into corporate procedures won't be considered a luxury in 2024. Instead, they are priceless resources for companies looking to increase customer loyalty, scale customer service, provide better customer experiences, and increase return on investment. AI assistants, enabled by sophisticated natural language processing, have progressed to become conversational agents that resemble human beings, capable of carrying on meaningful discussions with clients and providing intelligent, situation-specific responses. According to reports, AI chatbots can actually handle 70% of consumer contacts, freeing up agents to handle

more complicated requests and responsibilities [3]. Virtual shopping assistants and chatbots are now essential parts of the e-commerce environment. Chatbots are computer programs that mimic human communication and offer users immediate assistance and responses. They are frequently driven by artificial intelligence. Conversely, virtual shopping assistants expand on the idea by helping customers with every step of the purchase process, making suggestions for products, and ensuring a smooth transaction [2].

Chatbots and virtual assistants, at the forefront of AI-powered customer care, are revolutionizing the way companies engage with their clientele. AI-driven support is an essential component of contemporary customer service strategy because of its advantages in increased efficiency, cost savings, and improved customer experience. We may anticipate ever more complex and customized interactions as AI technology develops, which will ultimately lead to great customer service and boost company success in the digital era [5]. Digital assistants are more than just computer code; they are the unsung heroes that help brands provide outstanding customer service. AI chatbots are an example of creativity and customer-centricity rather than just a passing fad. With a competitive advantage that goes beyond conventional customer assistance, they represent the e-commerce industry's future. The ability of AI chatbots to change and adapt is what really makes them unique. They interact, personalize, and increase sales rather than only provide solutions [4].

## References

- [1]Naveen Joshi <https://www.forbes.com/sites/cognitiveworld/2018/12/23/yes-chatbots-and-virtual-assistants-are-different/?sh=7349d0516d7d>
- [2]<https://ecommercegermany.com/blog/chatbots-and-virtual-shopping-assistants-how-generative-ai-enhances-customer-support#:~:text=What%20are%20chatbots%20and%20virtual,with%20instant%20responses%20and%20assistance>
- [3] <https://www.haptik.ai/blog/10-best-ai-chatbots-in-india>
- [4] <https://writesonic.com/blog/ai-chatbots-for-ecommerce>
- [5]<https://medium.com/@galiniostech/ai-in-customer-service-the-rise-of-chatbots-and-virtual-assistants-55e08f7ca7e4#:~:text=advantages%20for%20businesses%3A-.1.,to%20customers%2C%20eliminating%20human%20errors>



- [6] <https://juphy.com/blog/benefits-of-chatbots#:~:text=Chatbots%20are%20utilized%20by%20many,ups%20that%20aim%20to%20scale.>
- [7] <https://www.docomatic.ai/blog/chatbots/advantages-and-disadvantages-of-chatbots/>
- [8] <https://www.chatbot.com/blog/future-of-chatbots/>
- [9] <https://yellow.ai/blog/future-of-chatbots/>
- [10] <https://www.docomatic.ai/blog/chatbots/advantages-and-disadvantages-of-chatbots/>
- [11] <https://medium.com/@digitalflame/advantages-and-disadvantages-of-ai-powered-chatbots-91f3e6b8ff30#:~:text=Limited%20Understanding%3A%20Chatbots%20may%20misunderstand,questions%2C%20and%20provide%20inaccurate%20responses>
- [12] <https://www.sciencedirect.com/science/article/pii/S1877050922006627>
- [13] [https://www.sciencedirect.com/science/article/pii/S1877050922006627?ref=pdf\\_download&fr=RR-2&rr=85fac8866eac7f67](https://www.sciencedirect.com/science/article/pii/S1877050922006627?ref=pdf_download&fr=RR-2&rr=85fac8866eac7f67)
- [14] <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.902782/full>

# Reshaping e-Commerce: The Influence of Artificial Intelligence

**T. Jebasheela<sup>1\*</sup>** and **C. Anupriya<sup>2</sup>**

<sup>1\*</sup>Assistant Professor of Commerce CA – SF, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>2</sup>Assistant Professor of Commerce – CS, Ayya Nadar Janaki Ammal College (Autonomous), Sivakasi, India.

\*Corresponding Author e-mail iD: [Jebasheela.t.@vhnsnc.edu.in](mailto:Jebasheela.t.@vhnsnc.edu.in)

## Abstract

The goal of the large discipline of computer science known as artificial intelligence (AI) is to build intelligent machines that have human-like thought and behaviour. Sophisticated algorithms, machine learning, and historical data analytics are utilised to address difficult issues in domains like inventory control, customer behaviour, and customer experience. AI has the power to completely transform e-commerce companies by offering e-commerce solutions in a constantly evolving digital landscape.

**Keywords:** Artificial, Intelligence, Influence, Enhancement, Reshaping, Retention, Automation

## Introduction

The goal of the large discipline of computer science known as artificial intelligence (AI) is to build intelligent machines that have human-like thought and behaviour. Sophisticated algorithms, machine learning, and historical data analytics are utilised to address difficult issues in domains like inventory control, customer behaviour, and customer experience. AI has the power to completely transform e-commerce companies by offering e-commerce solutions in a constantly evolving digital landscape. The use of artificial intelligence in daily life is growing. Content is being created instantly by generative AI. A glimpse of the future is provided by predictive AI. Deep learning is creating personalities that resemble humans. The name ChatGPT is well-known. These days, big data is "thing." Global spending on artificial intelligence for e-commerce was projected to reach more than \$8 billion by 2024.

## Role of AI in e-Commerce

When you think of artificial intelligence (AI), a few things could come to mind: maybe intelligent personal assistants like Alexa and Siri, self-driving automobiles, or effective autonomous robotics. However, systems or machines that replicate human intelligence are the



essence of artificial intelligence. An increasing number of companies are utilizing AI in light of the current digital boom and the changing purchasing habits of consumers in order to stay competitive and successfully adapt to market developments. AI benefits the e-commerce sector by assisting merchants with process automation, providing individualized customer care, and making data-driven choices. AI enables e-commerce companies to provide product recommendations to consumers based on a variety of criteria, such as search history or past purchase history. Additionally, AI chatbots for automated customer support and e-commerce are advancing step by step with human-based engagement, enabling companies to deliver state-of-the-art customer assistance even with a small number of employees. These AI-based systems can intervene when a consumer has a question or problem, saving time and money and possibly resulting in happier customers.

### Need For the Present Study

Businesses have new chances to optimize client and customer data and enhance the customer experience using AI e-commerce. Numerous e-commerce business activities, including product recommendations and customized marketing campaigns, are being automated by AI algorithms. E-commerce companies are now able to provide better services and increase revenues thanks to these developments in AI technology. Artificial Intelligence is revolutionizing online commerce through enhanced efficiency, accuracy, and customization. Companies using AI at the forefront are already reaping the rewards.

### Objective of the Study

In this study the researcher aim to analyses the impact of AI in e-commerce and know how the e-commerce is reshaped by the influence of Artificial Intelligence.

### Importance of AI in Business

Even though AI is still in its early stages, its possible applications in business are becoming more apparent. The use cases are becoming more and clearer for e-commerce companies as online buying keeps becoming better.

➤ ***Improved Targeting in Advertising and Marketing***

Data mining by AI can help understand customer types and how best to connect with them, which can improve marketing and product design.

➤ ***Retention of Customers***

AI can assist companies in better understanding online shoppers and the motivations behind their actions. This will also influence how that company interacts with its current clientele in the future. AI often helps online retailers and enhances the user experience in customer support and customer satisfaction.

➤ ***Enhanced Automation***

Business optimisation is the result of embracing automation. Finding routine jobs that a digital solution can complete frees up employees to work on more productive projects that advance the company. Additionally, AI can create new automation opportunities by assisting with jobs for which it was previously ineffective.

➤ ***Effective Sales Procedure***

Sales trends can be found using AI, and forecasting can be adjusted to reflect them. It extends to real-time forecasts based on a variety of criteria, going beyond historical data. After then, machine learning will keep improving and enhancing the procedure.

### Uses of AI in e-Commerce

AI technology is being embraced by the e-commerce sector more and more, and it is being used to improve user experiences and streamline operations. These are a few applications of AI that have been made thus far.

➤ ***Customisation***

E-commerce companies can use artificial intelligence (AI) to tailor their customers' shopping experiences by making product recommendations based on their past purchases, tastes, and behaviour. This raises the likelihood of generating more sales in addition to enhancing consumer loyalty. In order to draw in more prospective clients, it can also consider factors like search engine queries.

➤ ***Optimizing Pricing***

Similar to the above-discussed process optimisation for sales, AI can optimise pricing to

guarantee that companies get the highest possible profit margins. Seasonal variations or problems with the supply chain may affect the cost of some products. All of this may be taken into consideration by AI, which allows for real-time dynamic pricing.

➤ ***Improved Client Support***

Improved chatbots are perhaps the best way to witness this. Artificial Intelligence-driven chatbots are a great way for online retailers to offer 24/7 customer service. In addition to helping with ordering, chatbots and virtual assistants can automate customer support requests and answer often asked inquiries. Customers enjoy a more efficient experience as a result, and customer service agents have less work to do.

➤ ***Improved Consumer Segmentation***

Software driven by artificial intelligence (AI) may examine millions of data points and offer insights on the most consistent purchasing behaviours, customer trends, and segment preferences. As a result, e-commerce businesses are able to tailor promotions and marketing messages to each segmented group, which eventually increases income and sales and improves the personalised buying experience.

➤ ***Enhanced Coordination***

Nearly every aspect of the fulfilment and supply chain may be enhanced with AI. E-commerce businesses are utilising AI in a variety of ways to cut costs and expedite the delivery of goods to clients, including inventory management, automated order fulfilment, and customised shipping options.

➤ ***Detecting and Preventing Fraud***

Fraudsters attack e-commerce platforms and enterprises. On the other hand, fraud detection systems driven by AI can lessen the possibility of fraudulent transactions. These systems have the ability to trace fake IP addresses, identify trends in consumer behaviour, and analyse it. This enhances the e-commerce platform's security and reliability in addition to helping to lower losses.

➤ ***Increased Precision in Predicting***

Forecasting can be challenging when it comes to demand, sales, product costs, or other factors. Data, which AI can mine for deeper insights, can enhance predicting. Algorithms for machine learning can advance and get a deeper comprehension of user requirements.

➤ ***AI Implementation for online Retailers***

AI should not be used without much thought. Before implementing a solution, e-commerce companies should have a clear plan outlining their goals and how they intend to satisfy key performance indicators.

➤ ***Determine Particular Use Cases***

E-commerce businesses must assess their demands and ascertain how AI might benefit them before putting the technology into practice. The owners can make sure that the AI system they choose is in line with their goals by clearly describing the business need.

➤ ***Utilise Outside Expertise***

Don't go into this endeavor unprepared. Make use of the experience of those who have gone before you to steer clear of typical traps. Using outside specialists may be wise because implementation, integration, and optimisation are difficult tasks. Decision-making becomes better as a result.

➤ ***Make Use of Internal Champions to Get Assistance***

Using AI, or any other technology, is best done when your employees are on board with it. To improve buy-in, identify internal advocates who will disseminate the word about the benefits to the organisation and staff.

## AI types Applied to e-Commerce

“The term "artificial intelligence" has several applications and is somewhat wide. These kinds highlight specific business operations that may be altered or enhanced.

➤ ***Data Mining***

Most online retailers have a wealth of information at their disposal. AI facilitates the processes of data collection, analysis, and utilisation to generate meaningful insights. Consider creating product recommendations based on historical sales data.

➤ ***Automated Learning***

In order to deliver a better customer experience, self-learning algorithms can be used to improve inventory management, predict sales trends, automate logistics, and connect with customers.

➤ **Natural Language Processing (NLP)**

NLP is a subset of AI that specialises in producing and comprehending human languages. NLP is being used by e-commerce organisations to enhance chatbots so they can respond more effectively to product inquiries and frequently asked questions. This implies that even after office hours, clients can receive prompt and precise responses to their inquiries.

➤ **Computer Vision**

Computers can now recognise and categorise visual images thanks to a technique called computer vision. This technology is being used by e-commerce businesses to enhance product recommendations and search. To find a product fast, for instance, a client can take a picture of it and use an app that uses image recognition to locate it.

### e-Commerce Transformation Due to AI's Influence

The e-commerce industry is growing quickly; by 2023, it is expected to reach a global market size of \$6.3 trillion. Furthermore, it is anticipated that m-commerce revenues would reach \$2.2 trillion, indicating the increasing significance of mobile devices in the realm of online purchasing. E-commerce marketers are always looking for fresh and creative approaches to interact with their customers in order to stay ahead of the competition, which is especially competitive in November and December.

The most innovative and revolutionary technology available today is artificial intelligence (AI), which is quickly revolutionising the marketing sector and becoming a necessary tool for astute marketers. E-commerce companies are reimagining workflows and changing user buying experiences by leveraging chatbots, personalised suggestions, predictive analytics, picture recognition, and augmented reality. For example, marketers may work faster and more intelligently and make budget allocation decisions at lightning speed thanks to AI's smoother and more efficient analytics.

A recent poll found that 44.4% of marketers use AI for content creation, while 61.4% of marketers have already integrated AI into their marketing initiatives. It's interesting to note that 19.2% of marketers have given AI-driven campaigns more than 40% of their marketing budget. The AI marketing market is expected to reach \$107.5 billion by 2028.



### The future of AI-Based e-Commerce

AI-powered e-commerce has a promising future because technology is only getting better. By leveraging increased automation capabilities, e-commerce companies can save expenses while enhancing the online purchasing experience.

Through the utilisation of cutting-edge technology like artificial intelligence (AI) software, robotic automation, virtual assistants, and historical sales data, the e-commerce sector may improve customer happiness and optimise operations by offering a more smooth and fluid online shopping experience. The possibilities for AI in e-commerce are virtually limitless as long as technology keeps getting better and evolving.

### Conclusion

While AI is developing, it is still far from mature. E-commerce businesses that adopt AI technologies early on may benefit from being ahead of the curve, but they should be aware of potential obstacles. Before putting AI and ML into practice, businesses need to make sure they have the resources and know-how to use these technologies efficiently. Future e-commerce will be significantly impacted by AI and ML, which will continue to change the sector in ways that are still unimaginable as they become more widely available and reasonably priced.

### References

- Abbasi, A., Zhang, Z., Zimbra, D., Chen, H., & Nunamaker, J. F. (2010). Detecting fake websites: The contribution of statistical learning theory. *MIS Quarterly*, 34(3), 435–461.
- Aghaei Chadegani, A., Salehi, H., Md Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ale Ebrahim, N. (2013). A comparison between two main academic literature collections: Web of science and scopus databases. *Asian Social Science*, 9(5), 18–26.
- Bawack, R. E., Wamba, S. F., & Carillo, K. (2021). A framework for understanding artificial intelligence research: insights from practice. *Journal of Enterprise Information Management*, 34(2), 645–678.
- Huang, M. H., & Rust, R. T. (2018). Artificial Intelligence in Service. *Journal of Service Research*, 21(2), 155–172.

Leloup, B. (2003). Pricing with local interactions on agent-based electronic marketplaces. *Electronic Commerce Research and Applications*, 2(2), 187–198.

Oliver, J. R. (1996). A Machine-Learning Approach to Automated Negotiation and Prospects for Electronic Commerce. *Journal of Management Information Systems*, 13(3), 83–112.

Wang, H. C., & Doong, H. S. (2010). Argument form and spokesperson type: The recommendation strategy of virtual salespersons. *International Journal of Information Management*, 30(6), 493–501.

## Study on ‘The Role of Artificial Intelligence in Fraud Detection and Prevention in e-Commerce’

R. John Samuel Abishegh<sup>1\*</sup> and E. Sweetline Priya<sup>2</sup>

<sup>1\*</sup>M.Com (COBA), Department of Commerce (SFS), Madras Christian College, Tambaram, Chennai, India.

<sup>2</sup>Assistant Professor of Computer Applications (BCA), Madras Christian College, Tambaram, Chennai, India.

\*Corresponding Author e-mail iD: [johndon192001@gmail.com](mailto:johndon192001@gmail.com)

### Abstract

E-commerce platforms have transformed the way people conduct transactions, providing convenience and accessibility to consumers all over the world. However, this convenience comes with inherent risks, as online transactions are vulnerable to various types of fraud. As e-commerce grows, the need for effective fraud detection and prevention mechanisms becomes more critical. This paper explores the pivotal role of Artificial Intelligence (AI) in addressing the challenges of fraud detection and prevention in the e-commerce domain. AI technologies, including machine learning algorithms, neural networks, and natural language processing, empower e-commerce platforms to analyze vast amounts of data and identify patterns indicative of fraudulent activities in real-time. The effectiveness of AI in fraud detection stems from its ability to adapt and evolve alongside emerging fraud tactics. Through continuous learning of historical data and current transactions, AI systems can detect anomalous behavior and flag potentially fraudulent activities before they cause significant financial losses to businesses and consumers alike. AI-powered fraud detection systems allow e-commerce platforms to improve security while reducing friction for legitimate customers. Businesses that use AI-driven risk assessment models can implement adaptive authentication mechanisms, such as biometric identification and behavioral analytics, to verify user identities and prevent unauthorized access. This article also addresses the ethical issues surrounding AI-driven fraud detection, such as privacy concerns and algorithmic biases. Addressing these issues requires a comprehensive approach that prioritizes transparency, accountability, and fairness in AI system design and implementation.

**Keywords:** Fraud, e-commerce, detection, AI



## 1. Introduction

The frequency and complexity of fraudulent behavior have increased with the development in online transactions. Sophisticated schemes created to evade conventional detection techniques continuously challenge cyber security mechanisms. Even if human control is still vital, it is insufficient to stop the vast number of security breaches that occur nowadays due to the speed and guile of sophisticated cyberthreats. One notable development in the fight against online fraud is the use of AI to detect fraud. AI systems can quickly sort through enormous information using sophisticated algorithms to find abnormalities and irregular patterns that can point to fraudulent activity. This technology gradually enhances its predictive skills by learning from every encounter and refining the detecting process. This technology ensures the integrity of business processes, lowers financial losses, and protects consumer trust all while enhancing security. This article explores the principles of AI fraud detection, covering the advantages and difficulties of its application as well as recommended practices for creating a plan that makes use of this technology [1].

The quantity and diversity of e-commerce fraud attacks are increasing as more consumers shop online. Bad actors thus have more and more chances to take advantage of a lucrative market. Of course, businesses use e-commerce fraud detection software to safeguard their online operations, but conventional technologies are limited to identifying the most common frauds and are unable to keep up with the ever-changing dangers. Nowadays, a growing number of companies are turning to more inventive methods to identify e-commerce fraud. One of the most effective methods is to use artificial intelligence to speed up the procedure [2].

AI fraud detection is a technology that looks for fraudulent activity in big datasets using machine learning. In order to identify patterns and anomalies that could point to fraud, algorithms must be trained. These machine learning models increase their forecast accuracy and adaptability to changing fraudulent methods by continuously learning from new data. Thanks to this proactive defensive mechanism, businesses now have an effective tool for ensuring transaction integrity and security [1].

## 2. Review of Literature

Jesse Jaffe in [3] has stated “An important development in the fight against e-commerce fraud is the application of AI. Massive amounts of data can be processed by AI, which can also

identify patterns that point to possible fraud. Its application should be tactical, though. To keep legitimate clients from being mistakenly blocked, we must make sure AI systems avoid generating an excessive number of false positives. In order to stay up to date with the latest fraud techniques, our models should be updated frequently with fresh data and kept extremely transparent to stop unfair practices. Another important factor to take into account is how to secure AI systems, since these systems are susceptible to cyber attacks. Combining AI with human oversight can result in a more thorough and sophisticated method of fraud detection.”

Yash Jain in [4] said “New age technologies such as AI and ML can be used to solve any problem because they enable organizations to validate their performance and adapt to changing realities with the click of a button. It can also help redesign business strategies and predict fraudulent activity. Artificial intelligence examines hundreds of data points from millions of online transactions to identify potential fraud trends. While ML analyzes the transaction and assigns a risk score ranging from 0 to 1, that score is then compared to a predefined threshold to determine whether the transaction is fraudulent or not. The main take away from this information is that fraudulent transactions are very different from legitimate transactions. These patterns can be detected using machine learning algorithms that detect fake.”

Santosh Kumar in [5] mentioned “Online payment fraud is an unavoidable scourge in the world of e-commerce, merchants and retailers. The situation is even worse because fraud detection continues to evolve, especially when it comes to identifying risk indicators that can predict and prevent fraud. Also, when it comes to online transactions, the lack of structured data and historical information makes the process difficult. Identifying patterns of fraud is therefore important and can be managed by properly classifying fraud and non-fraud.”

Fasih Ur Rehman in [6] said “Artificial intelligence-based fraud detection and prevention can be a valuable tool for commercial enterprises looking to protect themselves against the threat of fraud. By using artificial intelligence algorithms to analyze data and identify patterns of fraudulent activity, companies can reduce losses, improve efficiency and increase customer trust. However, the implementation of these systems can also create problems such as data quality problems, false positives, model bias, technical expertise and competitive attacks. By meeting these challenges and working with experienced partners, companies can deploy powerful AI-based fraud detection and prevention systems that meet their needs.”

Eleonóra Bassi in [7] stated “The share of fraud losses in the world in the last two decades is 6.05 percent of GDP. In addition, companies reported that cyber breaches caused a financial loss between 3 and 10 percent of their turnover. Additionally, it is projected that losses from digital fraud worldwide will surpass \$343 billion from 2023 to 2027. Considering the estimated amounts, it is important for any organization to establish an effective fraud management system. Fraud management is the identification, prevention, detection and response to fraud in an organization.”

Bhuman Vyas in [8] said “Fraud is becoming a bigger threat to the financial and e-commerce sectors in today's digitalized world. Since fraudsters are becoming more and more skilled, it is essential to employ cutting-edge tools and strategies to neutralize this threat. Artificial intelligence is transforming the way businesses safeguard their financial transactions, and Java has long been a reliable option for developing scalable and resilient applications. Organizations can create intelligent systems that analyze massive amounts of data in real time, spot suspicious patterns, and take swift action to stop fraud by combining these two potent technologies.”

### 3. How is fraud detection using AI carried out?

AI fraud detection analyzes activities and looks for anomalies that can point to fraud using machine learning techniques. Setting up a baseline of common transaction patterns and user behaviors is the first step. Subsequently, the system monitors the data, looking for any irregularities. The AI model adjusts its settings in response to fresh and varied input, improving its ability to discern between suspicious and authentic activity. To efficiently detect fraudulent activity, artificial intelligence fraud detection combines several approaches, including,

#### 3.1 Gathering of Data

The process of collecting data include obtaining pertinent information from a variety of sources, including user profiles, transaction records, behavioral patterns, etc. The basis for identifying fraudulent activity is this data. To train reliable fraud detection models, a large, representative, and varied set of data must be gathered.

#### 3.2 Feature Engineering

To prepare the gathered data for machine learning algorithms, feature engineering entails choosing, modifying, and producing features from it. The goal of this procedure is to draw attention to traits and trends that point to fraudulent activity. Transaction quantities, frequency, location, and user behavior patterns are a few examples of features [1].

### **3.3 Model Training**

Using past data, machine learning models are trained to differentiate between legitimate and fraudulent activity. This process is known as model training. Numerous techniques, including logistic regression, random forests, decision trees, and neural networks, can be used in this way. To forecast on unknown data, the models gain knowledge from labeled instances of both fraudulent and non-fraudulent transactions.

### **3.4 Anomaly Detection**

Anomaly detection is a key technique used in fraud detection to identify deviations from normal patterns or behaviors. It helps in detecting previously unseen fraudulent activities that might not conform to known patterns. Anomalies could be detected using statistical methods, unsupervised learning algorithms, or by setting thresholds for certain features [1].

### **3.5 Continuous Learning:**

Fraudsters continually adapt and evolve their tactics to bypass detection systems. Continuous learning mechanisms enable fraud detection systems to adapt and evolve alongside fraudulent activities. This involves regularly updating models with new data, retraining them periodically, and incorporating feedback mechanisms to improve performance over time.

### **3.6 Alerting and Reporting:**

Once potentially fraudulent activities are detected, the system triggers alerts to notify relevant stakeholders such as fraud analysts, investigators, or automated response systems. These alerts provide timely information to take necessary actions to mitigate risks and prevent further fraudulent activities. Additionally, the system generates reports summarizing detected fraud incidents, trends, and insights for further analysis and decision-making [1].

## **4. Benefits of AI Fraud Detection**

Artificial intelligence can help businesses become more efficient, secure, and provide better customer service. Businesses looking to safeguard their operations from constantly changing threats might benefit from several of its advantages. A few of them are

### **4.1 Real time detection and prevention:**

AI's round-the-clock transaction monitoring capability guarantees that any questionable activity is found as soon as it happens, enabling prompt intervention. For the purpose of apprehending fraudsters and reducing losses, prompt detection is crucial [1]. Businesses have



a tremendous weapon to protect themselves against fraud before it affects their profits because to AI's quick response times.

#### **4.2 Scalability:**

As transaction volumes rise, AI fraud detection systems can improve their monitoring capabilities without necessitating proportionate increases in labor. Because it allows them to maintain high levels of fraud detection and prevention with little additional cost, this scalability is essential for expanding businesses. AI systems can also handle the increased complexity that comes with larger datasets, ensuring that enterprises remain secure as they grow.

#### **4.3 Increased accuracy:**

More precise fraud transaction detection is the outcome of AI's superior precision in data analysis compared to human capabilities. These technologies are less prone to the mistakes that can happen when reviews are done by hand. Furthermore, as new data is fed into AI algorithms, they continuously learn and evolve, which gradually improves the system's ability to detect fraud.

#### **4.4 Customer trust and satisfaction:**

Customers are more inclined to stick with a business if they feel safe doing business with them. Customers feel safer and are more satisfied with the company's services when AI fraud detection is included. A strong security reputation can provide a major competitive advantage, recruiting new clients who value the protection of their personal and financial information.

### **5. Challenges of AI fraud detection**

AI fraud detection technologies offer a lot of advantages, but there are a lot of obstacles that companies need to get beyond. These difficulties could be anything from technical limitations to problems with regulatory compliance. Here are a few difficulties to think about,

#### **5.1 Data accessibility and quality:**

AI systems need to have access to relevant, high-quality data in order to efficiently detect fraud. However, erroneous, outdated, or missing data might lead to poor performance from AI systems. Moreover, data accessibility may be restricted by laws and privacy concerns, which would make it challenging for AI systems to absorb knowledge from a big dataset. It is challenging to strike a delicate balance between upholding privacy rules, maintaining data integrity, and allowing safe access to critical data.

### **5.2 Combining with current systems:**

It can be challenging to integrate AI fraud detection into an organization's current infrastructure. The most latest AI business tools and machine learning technologies could not be compatible with legacy systems, requiring major updates or even whole redesigns. During the transition phase, there may be downtime or reduced functionality due to the resource-intensive and disruptive nature of this integration process. To lessen these effects, businesses must carefully plan and carry out the integration of AI technologies.

### **5.3 Friction with customers and false positives:**

Even now, AI algorithms have the potential to detect genuine transactions as fraudulent and generate false positives. Customers may become frustrated as a result of this, which could damage the relationship between the client and the firm. It might be difficult to strike a balance between the requirement to give customers a great experience and the sensitivity to fraud. Sustaining consumer happiness and minimizing false positives require ongoing refinement of AI models.

### **5.4 Staying informed of changing risks:**

Fraudsters are always coming up with new ways to get around detection systems. No matter how sophisticated, AI models need to be updated frequently to keep up with these changing threats. Because of this, it is imperative to commit to providing the AI system with up-to-date information on fraudulent activity on a regular basis. AI systems cannot be static; instead, they must be a part of an adaptive and proactive fraud prevention strategy.

### **5.5 Observing regulations and taking ethics into account:**

Companies need to make sure that all applicable rules and regulations—such as those pertaining to data privacy and protection, including the General Data Protection Regulation (GDPR)—are complied with by their AI fraud detection systems. Ethical questions are raised by the application of AI in decision-making processes, such as the potential for bias in algorithms that could lead to unfair treatment of client segments. To stay compliant and moral, businesses need to carefully negotiate these regulatory and ethical environments.

## **6. Common types of e-commerce fraud AI can detect**

The range of fraud types in e-commerce is astounding. Here are a few of the most common fraud scenarios,

### **6.1 Card fraud:**

Card scammers don't manually break into cards. Their bots handle the menial tasks, often using brute force attacks that cause a heavy burden on payment gateways. Card fraud is one of the most prevalent forms of fraud [9]; according to forecasters, the total value of fraudulent transactions will rise from \$32.04 billion in 2021 to \$38.5 billion in 2027.

AI is capable of identifying this type of fraud because it doesn't merely rely on IPs and IP reputation to stop incoming threats. Artificial Intelligence keeps an eye on user behavior to identify and prevent malicious bots. It shows the user a CAPTCHA in the unlikely event that there is any doubt.

### **6.2 Fake account creation:**

Automated bots have the ability to generate phony accounts very quickly. Fraudsters can distort your product reviews, disseminate misleading information, propagate malware, sabotage your analytics, and more by creating fake accounts. Generally speaking, you can't increase standard security when it comes to account creation without also making it more difficult for users to create new accounts [9]. With AI, you can do so without altering the account creation process, as it can track numerous variables to block malicious bots while allowing legitimate users through.

### **6.3 Account takeover:**

Similar to the creation of fictitious accounts, account takeovers are automated threats in which fraudsters breach the accounts of real users. Account takeovers are becoming more common: According to 55% of online retailers, 2021 saw an increase in account takeover attacks over 2020. Account takeovers damage your company's reputation because they target your users and their personal information specifically.

The problem with account takeovers is that they aren't always immediately visible. The fact that these attacks are usually covert makes them dangerous. Multi-factor authentication can prevent account takeovers, but many users choose not to activate it [9]. Because AI tracks every clue that bots leave behind before taking over an account, it provides a discrete method of preventing account takeovers.

### **6.4 Credential stuffing:**

Credential stuffing is an automated threat in which a bot attempts to enter (or "stuff") common usernames and passwords into your login page. These usernames and passwords may be partially acquired from past data breaches [9]. Combined with basic or overused passwords, fraudsters have a decent possibility of gaining access to a large number of user accounts. This

can cause your login page to break, as well as account takeovers and carding. AI monitors variations in website traffic, a higher-than-usual login failure rate, and other indicators to identify if you're under credential stuffing attack.

## 7. Best practices for building an AI fraud detection strategy

Using an AI fraud detection technique requires a methodical approach that optimizes the efficacy and efficiency of the system [1]. This includes developing a strong operational structure for the AI system and solving challenges such as data quality, integration, and regulatory compliance.

### 7.1 Establish a cross-functional fraud management team:

It can be crucial to assemble a committed team with individuals from multiple areas, including operations, data science, compliance, IT, and legal. The development and upkeep of AI fraud detection systems should be overseen by this team, which will make sure that multiple viewpoints are considered, and that the system is in line with overall company goals and important outcomes.

### 7.2 Monitor and update continuously:

To make sure AI systems are operating as intended, they need to be constantly observed. To be successful against evolving fraud tendencies, they must be updated and retrained with new data on a regular basis [1]. To maintain the relevance and accuracy of AI models, this procedure ought to be a part of a planned maintenance schedule.

### 7.3 Develop a comprehensive fraud detection strategy:

A multi-layered approach to fraud detection should use AI. To provide a complete defense against fraudulent activity, combine it with additional fraud protection strategies like multi-factor authentication, encryption, and anomaly detection systems. This comprehensive method assures that if one layer is hacked, the additional security mechanisms will act as a backup to prevent fraud.

### 7.4 Invest in the right tools:

Invest in platforms and tools that will satisfy your demands for AI fraud detection. Selecting AI frameworks and applications that are scalable, compatible with your present systems, and well-supported falls under this category [1]. Among the instruments to think about are

- Kount
- Featurespace

- Darktrace
- SAS Fraud Management
- Feedzai
- DataVisor

### **7.5 Practice ethical data usage:**

Make sure that the application of AI to fraud detection respects ethical norms and rigorously preserves customer privacy. This can be achieved by following strict data protection laws and regulations, as well as by putting in place transparent data collection procedures and making sure that sensitive information is handled and stored securely.

### **7.6 Simulate attacks to test robustness:**

Assessing the durability of AI fraud detection systems requires regular fraud attack simulation, such as penetration testing or red team exercises. These realistic yet controlled attack scenarios can highlight gaps in the system's defenses and offer useful input for bolstering the system's resilience against actual fraud attempts [1]. By mimicking complex fraud techniques and advanced persistent threats, organizations may remain ahead of the curve.

### **7.7 Foster a culture of security:**

Establish a security-aware culture in your company by giving staff members specialized training that teaches them how to spot early indicators of fraud, such as phishing attempts or strange money requests. Give each team member a thorough understanding of their responsibilities within the company's anti-fraud framework and stress the need of following security protocols. In addition to enhancing the technological protections provided by AI detection systems, this proactive approach to security acts as a human firewall.

## **8. Conclusion**

The integration of artificial intelligence (AI) in fraud detection and prevention within e-commerce has revolutionized the way businesses secure their transactions and protect their customers. AI-powered systems offer unparalleled capabilities in analyzing vast amounts of data in real-time, identifying patterns, and detecting anomalies that signify fraudulent activities. Through machine learning algorithms, AI can adapt and evolve to stay ahead of sophisticated fraudsters, continuously improving its accuracy and effectiveness. By leveraging techniques such as supervised learning, unsupervised learning, and anomaly detection, AI systems can detect fraudulent transactions with high precision while minimizing false positives.

It's crucial to recognize that AI alone is not a panacea for fraud prevention. Human expertise remains essential in refining AI algorithms, interpreting results, and making informed decisions to mitigate risks effectively. Moreover, the ethical implications of AI-powered fraud detection systems, such as privacy concerns and algorithmic bias, need to be carefully addressed to ensure fair and transparent practices.

## References

1. Understanding AI fraud detection and prevention strategies. (n.d.). <https://www.digitalocean.com/resources/article/ai-fraud-detection>
2. Unicsoft, and Miroshnychenko, V. (2022, September 28). How AI Improves e-commerce fraud Detection and Prevention. *Unicsoft*. <https://unicsoft.com/blog/how-ai-improves-e-commerce-fraud-detection-and-prevention/>
3. *How can you use AI to prevent e-commerce fraud?* (2023, December 22). [www.linkedin.com](https://www.linkedin.com/advice/1/how-can-you-use-ai-prevent-e-commerce-fraud-skills-e-commerce). <https://www.linkedin.com/advice/1/how-can-you-use-ai-prevent-e-commerce-fraud-skills-e-commerce>
4. <https://economictimes.indiatimes.com/news/how-to/how-artificial-intelligence-can-help-detect-e-commerce-fraud/articleshow/93203636.cms?from=mdr>
5. Limited, I. (2020, November 17). *How generative AI can impact the world of e-commerce fraud prevention | Infosys BPM*. <https://www.infosysbpm.com/blogs/bpm-analytics/how-generative-ai-can-impact-the-world-of-e-commerce-fraud-prevention.html>
6. Rehman, F. U. (2023, April 28). *Using AI to detect and prevent fraud in ecommerce transactions*. <https://www.linkedin.com/pulse/using-ai-detect-prevent-fraud-ecommerce-transactions-fasih-ur-rehman/>
7. <https://cointelegraph.com/explained/how-is-artificial-intelligence-used-in-fraud-detection>
8. Vyas, B. (2023). Java in Action: AI for Fraud Detection and Prevention. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 9(6), 58–69.
9. *How AI is used in Fraud Detection – Benefits & Risks*. (n.d.). [datadome.co](https://datadome.co/learning-center/ai-fraud-detection/). <https://datadome.co/learning-center/ai-fraud-detection/>

## Impact of AI in e-Commerce

M. Jubi<sup>1\*</sup> and Hema. K.R<sup>2</sup>

<sup>1\*</sup>Assistant Professor, Centre for PG Studies, Sindhi College, Bangalore, India.

<sup>2</sup>Final year M.Com, Centre for PG Studies, Sindhi College, Bangalore, India.

\*Corresponding Author e-mail iD: [jubimothisha@gmail.com](mailto:jubimothisha@gmail.com)

### Abstract

E-commerce and artificial intelligence (AI) are two separate domains that come together to transform corporate operations, especially in online retail settings. Artificial intelligence (AI) describes how technology, particularly computer systems, mimic human intelligence processes. It entails the development of algorithms capable of learning, reasoning, solving problems, perceiving, and comprehending language—tasks that normally call for human intelligence. Artificial Intelligence (AI) comprises several subfields, such as robotics, computer vision, machine learning, and natural language processing. Electronic commerce, or e-commerce, is the term used to describe the purchasing and selling of goods and services via the internet. Online retail establishments, online marketplaces, digital payment systems, supply chain management, and other activities are all included in this broad category. The way that e-commerce and artificial intelligence are combined has resulted in major improvements and changes to the way that online business function and engage with their clientele. Businesses in a variety of industries employ a number of AI tools to improve production, efficiency, decision-making, and consumer experiences. Chatbots and virtual assistants, CRM systems, natural language processing (NLP) tools, marketing automation platforms, business intelligence (BI) and analytics tools are some of the most widely used artificial intelligence (AI) tools among businessmen. All of these tools are essential to the revolution of e-commerce because they improve productivity, efficiency, decision-making, and customer experiences. They meet certain requirements and difficulties that organisations have in the digital era, empowering them to innovate, adapt, and prosper in a market that is changing quickly. Through cutting-edge machine-learning applications in marketing, AI is utilised to make smart decisions and gain a competitive advantage. The study aims to investigate how AI tools help firms operate more effectively online.

**Keywords:** Artificial Intelligence, E-commerce, Marketing Automation





## Introduction

The combination of artificial intelligence (AI) and e-commerce has become a revolutionary force in the modern business world, changing the face of online retail settings. The term artificial intelligence (AI) refers to a wide range of technologies, including robotics, computer vision, machine learning, and natural language processing. AI is defined as the simulation of human intelligence processes by machines. Due to these technological advancements, computers are now capable of learning, thinking, solving problems, perceiving, and comprehending language—tasks that have historically required human intelligence. However, the term "e-commerce," or electronic commerce, refers to the exchange of products and services via the internet. It includes a broad range of tasks, such as supply chain management, digital payment systems, and online retail stores and marketplaces. According to certain researchers, definitions are the science and engineering of creating intelligent computers and machines is known as artificial intelligence. AI differs from psychology in that it places more of a focus on computation, whereas computer science emphasises perception, reasoning, and action (Shyna Kakkar, Vishal Monga-4th Jan, 2017). Making a computer-controlled robot or piece of software think intelligently in a way that is comparable to how intelligent humans think is known as artificial intelligence (Ms. J. PRABHA- 2021).

## Review of Literature

- Ms J. Prabha, Assistant Professor, Department of Commerce, Dr. M G R Educational and Research Institute, Chennai-95, Issue 9 September 2012 **“Study on Impact of Artificial Intelligence in E-Commerce”** E-commerce is currently utilising a variety of technologies to spot trends in the online purchasing and selling of goods and services, as well as the data and money transfers involved in carrying out these transactions. This essay focuses on the applications of artificial intelligence in various e-commerce domains and their effects on the industry. AI has aided in improving the user experience on e-commerce platforms.
- **Dr. R. A. Ayyappa rajan & Ms. S. Sabeena** issue 8, august-2022 **“Impact of Artificial Intelligence in E-Commerce”** India is the e-commerce market with the quickest rate of growth, per Forrester. A major increase in information science, tool research, and engineering will result from the AI revolution in e-trade. AI even creates IT employment in order to maintain and grow systems and software. However,

in the upcoming years, the combination of AI and e-trade may also have an impact on human unemployment.

- **Dr. S.S. Onyx Nathanael Nirmal Raj, Dr. A. Kalaivani, Y Suryanarayana Murthy, 2023 Volume 21 Issue 1, “Artificial Intelligence in E-Commerce”**, As to the survey, the largest online retailers are currently prioritising artificial intelligence technology and optimising their trade procedures to enhance their competitiveness. Artificial Intelligence (AI) technologies hold great promise for augmenting e-commerce by offering more control over client relationships and sales promotion, all while narrowing the gap between customization and privacy.
- **Shyna Kakkar, Vishal Monga, issue 4, jun-2017, “A Study on Artificial Intelligence in E-Commerce”**, The e-commerce market with the quickest growth is India [9]. AI will have a big impact on how e-commerce companies draw in and keep clients. There will be a huge demand for new data science, machine learning, and engineering due to the AI revolution in e-commerce. In addition to creating jobs in IT, AI-based e-commerce will also create jobs in system and software development and maintenance for those AI algorithms.

### Statement of the Problem

In the e-commerce industry, online business operations aim to show how they may enhance productivity, efficiency, decision-making, and consumer experiences. Artificial Intelligence seeks to explore the most recent developments in promoting consumer interaction in the digital marketplace. The study aims to determine the application of artificial intelligence (AI) in e-commerce and the ways in which it helps customers and entrepreneurs. The businessmen faced actual difficulties. It also attempts to examine the effectiveness of using AI techniques to resolve consumer concerns related to e-trade. As such, there has been adequate consideration given to how AI may affect e-commerce.

### Objectives of the Study

- To research how AI techniques are being used to improve online business operations.
- To research the ways in which AI technologies help entrepreneurs overcome the difficulties they encounter in enhancing consumer happiness.

- To evaluate how much an entrepreneur has improved company productivity in e-trade by using AI tools.

### Research Methodology

One of the most crucial parts of the research design is data collecting since it provides the means by which the research question can be answered. Finding, choosing, processing, and analysing data on a subject are all done using a particular process or set of procedures called research methodology. The reader can critically assess a study's overall validity and dependability in a research paper by looking at the methodology chosen. Surveys, focus groups, interviews, and observation are all included in the research.

### Primary Data

The data acquired from corporate staff and customers in Bangalore North Zone. The researcher wanted to know how the company used e-commerce to market its items, how AI tools were used to handle consumer complaints, how to improve e-trade and its benefits, and how the company overcame real-world e-trade challenges by utilising AI tools in the business. Customers and E-commerce traders provided information using the company's standardised surveys. 1740 clients in all received questionnaires. 150 of the completed forms were then chosen by the researcher because they had information that was relevant to the study. The researcher also acquired important data from E-traders and corporate staff department chiefs.

### Secondary Data

The researchers used the industry website who adopt AI tools in E-Commerce, books, journals, organisational records, financial reports, and the publication of corporate books as sources of information.

### Modern and Contemporary AI Tools for the e-Commerce Sector

#### ➤ Chatbots and Virtual Assistants

Chatbots and virtual assistants communicate with clients in real time by utilising machine learning and natural language processing (NLP). These tools respond to consumer questions, suggest products, help with transactions, and give tailored support. E-commerce companies frequently utilise chatbots, such as Drift, Intercom, and Zendesk Chat, to increase consumer engagement and conversion rates.

➤ **Predictive Analytics Platforms**

Machine learning algorithms are used by predictive analytics platforms to analyse historical data and forecast future results. These e-commerce solutions assist companies in predicting sales trends, recognising patterns in customer behaviour, and streamlining inventory control. Google Analytics, IBM Watson Analytics, and Microsoft Azure Machine Learning are a few examples.

➤ **Customer Relationship Management (CRM) System**

CRM solutions provide insights into consumer interactions and preferences by integrating customer data from several touchpoints. CRM solutions in e-commerce assist companies in managing client interactions, customising marketing campaigns, and monitoring sales results. E-commerce businesses frequently employ well-known CRM platforms like Salesforce, HubSpot, and Zoho CRM to expedite customer management procedures.

➤ **Natural Language Processing (NLP) Tools**

NLP technologies analyse and decipher spoken language to glean valuable information from textual data. NLP algorithms are utilised in e-commerce for chatbot interactions, sentiment analysis, and product review analysis. For text analysis in e-commerce systems, programmes like Stanford NLP, spaCy, and NLTK (Natural Language Toolkit) are frequently used.

➤ **Marketing Automation Platforms**

Businesses may automate tedious marketing operations and workflows with the help of marketing automation technologies. These solutions customise marketing messages, plan email campaigns, and segment consumers using AI-driven algorithms. Examples of popular marketing automation tools used in e-commerce for lead nurturing and customer engagement are Marketo, Mailchimp, and Active Campaign.

➤ **Business Intelligence (BI) and Analytics Tools**

Large datasets are visualised and analysed using BI and analytics technologies, which give firms actionable insights. These technologies support e-commerce companies in tracking key performance indicators (KPIs), keeping an eye on sales patterns, and spotting growth prospects. E-commerce businesses may make data-driven decisions and improve business operations with the help of tools like Tableau, Power BI, and Google Data Studio.

➤ **Personalization Engines**

Machine learning algorithms are used by personalization engines to provide customised experiences for each customer. These systems use consumer information, surfing patterns, and past purchases to make content and product recommendations that are pertinent. Personalized solutions like Evergage, Dynamic Yield, and Monetate assist e-commerce companies in raising conversion rates and improving consumer engagement.

➤ **Visual Search Technology**

Users may now look for products using photos instead of text thanks to visual search technology. These programmes analyse visual information and identify related products that can be bought using computer vision algorithms. Examples of visual search tools used in e-commerce to enhance product discovery and user experience are Pinterest Lens, Google Lens, and Slyce.

➤ **Dynamic Pricing Software**

Product prices are instantly changed by dynamic pricing software in response to competition pricing, market demand, and other variables. E-commerce companies may maximise income and maintain competitiveness by using these technologies to optimise pricing tactics. Prisync, Omnia Retail, and Revionics are a few examples of pricing optimization solutions that help e-commerce businesses set competitive, dynamic rates.

➤ **Recommendation Engines**

- i. Recommendation engines utilize machine learning algorithms to provide customers with suitable product recommendations based on their browsing history and behavior. These algorithms look at browsing behavior, historical purchases, and user interactions to deliver personalized product recommendations. A few e-commerce recommendation engines that can be used to increase the likelihood of cross-selling and upselling are Recombee, Clerk.io, and Amazon Personalize.
- ii. These systems were created in response to the need to filter massive amounts of data and offer customers a customized recommendation (based on their interests) while they were looking for a good or service within a sizable dataset.
- iii. Recommendation engines examine a user's historical data and concentrate on their decisions and actions. Additionally, they are able to examine clicks, prior transactions, shopping carts, and search requests. These algorithms give consumers a

well-rounded recommendation by concentrating on a number of variables. Stability, precision, disparity, and originality are some of these qualities. With the use of this data, artificial intelligence (AI) software is able to forecast customer behaviour and offer suggestions or recommendations for products that will help them successfully during the shopping or choosing process. E-businesses can therefore boost revenue and client happiness.

### Analysis and Findings

**Table No: 1 AI tools application in consumer goods as of 2023**

Sl.NO.	Usage of AI in Business	Frequency	Percentage
1	Personalization of product services	35	70
2	Forecast of product demand	26	52
3	Pricing	23	45
4	Marketing Strategies	22	43
5	Customer service	20	40
6	Speed Delivery	20	40
7	Quality control	45	90
8	Fraud Detection	24	48

**Source: Computed Data**

Executives in the Bangalore North zone was asked if they thought artificial intelligence would be beneficial to their companies in 2024. Ultimately, AI was seen by 70% of respondents as the most useful instrument for developing a customized experience. Furthermore, according to 52% of e-business executives, artificial intelligence helps predict a product's demand. Additional domains where artificial intelligence demonstrated promise included devising strategies for pricing and marketing, enhancing customer services and elevating consumer satisfaction, implementing AI-driven routing software to expedite delivery, and so on.

The Table unequivocally shows that people consider personalization to be AI's most valuable feature. By analyzing prior consumer habits, such as things they have searched for, bought, or added to their carts, AI software, for instance, can help firms create targeted marketing campaigns by giving their customers precise ideas. Decision-makers in North Bangalore estimate that in 2024, AI will assist e-commerce enterprises on a regular basis. This is shown in Table No. 1.

**Table No: 2 AI benefits in Marketing strategies**

Strategies	Frequency	Rank
MS-1	80	1
MS-2	75	2
MS-3	68	3
MS-4	56	4
MS-5	46	5

**Source: computed data**

Researchers predict that AI will significantly alter marketing. Artificial intelligence improved customer service through the deployment of marketing methods, which improved overall corporate sales. The following applications of AI-driven methodologies are beneficial: MS-1: determining consumer preferences; MS-2: projecting the consumer's next purchase; MS-3: targeted advertising; MS-4: learning the consumer's perception of the brand; and MS-5: obtaining market knowledge to support decision-making. Replika, an AI-powered personal chatbot companion, is one example. Its machine learning-powered chatbot mimics the communication style of users and can offer them emotional support. AI is also capable of analyzing a customer's purchasing patterns, preferences, and behaviors. Artificial intelligence (AI) has greatly helped chatbots, customer relationship management (CRM) software, and other technologies. These advantages raise a company's worthwhile also enhancing the consumer experience.

### Hypothesis

H0: There is no significant impact of AI tools on E-Commerce

H1: There is significant impact of AI tools on E-Commerce.

**TABLE No: 3 Usage of AI Tools in E-commerce**

AI Tools/Benefits	QC	PPS	FPD	ROW TOTAL
CVA	1	1	3	5
CRM	2	3	1	6
MAP	3	2	1	6
COLUMN TOTAL	6	6	5	17

XSQUARE	3.664444
DOF	4
PVALUE	0.453318

Source: Computed Data



The null hypothesis is rejected since the P Value is less significant than the 0.05 level. Thus, the report concludes that "AI tools have a significant impact on e-commerce." Here, artificial intelligence (AI) tools like chatbots and virtual assistants (CVAs), CRMs, and marketing automation platforms (MAP) are taken into consideration for hypothetical testing based on the most popular applications of AI tools. Quality control (QC), product personalization (PPS), and forecasting product demand (FPD) are the main advantages taken into consideration for Chi-square testing. From now on AI-powered systems can go through enormous volumes of data to find patterns in consumer behaviour. Today's decision-makers are better equipped to understand the needs and wants of the market. AI is constantly flexible and can be tailored to the needs of the business.

## Conclusion

To sum up, the word artificial intelligence is broad, has multiple meanings, and refers to the ability to add intelligence to software or apps. Innovative tools like inventory management, delivery path mapping, and sales forecasting have become more commonplace in business decision-making processes due to increased digitalization and interest in e-commerce. Companies can also learn about their clientele's consumption habits thanks to AI technology like recommendation engines and chatbots. Consequently, they can enhance customer service by offering tailored product recommendations and targeted advertising based on users' online activity, such as clicks, shopping cart contents, and past transactions.

Businesses must totally rethink their manual processes in order to convert them to automated ones if they hope to fully utilize AI technologies. This involves training staff members on these technologies as well as establishing a human-machine relationship in which humans not only give AI the data it needs to make decisions, but also serve as moderators, stepping in to correct or modify AI's solutions in accordance with all moral and legal obligations as well as the requirements of the company. As a result, businesses can address the moral issues raised by this technology, such as the fact that AI is presently unable to identify data that contains unjustified prejudices. As a result, the user may spot any errors and either fix them or comprehend the reasoning behind any surprising choices that were made.

## References

1. Soni, N.; Sharma, E.; Singh, N.; Kapoor, A. Impact of artificial intelligence on businesses: From research, innovation, market deployment to future shifts in business models. *arXiv* **2019**, arXiv:1905.02092.
2. Reflektion Inc. *Practical AI for E-Commerce How Artificial Intelligence Can Dramatically Improve E-Commerce Customer Experiences*. 2018.
3. Khrais, L.T.; Azizi, T. Analyzing consumer attitude toward mobile payment technology and its role in booming the E-commerce business. *J. Talent. Dev. Excell.* **2020**, *12*, 1069–1076.
4. Sharma, D. Impact of AI on E-Commerce. In *Applications of Artificial Intelligence in Business and Finance*; Apple Academic Press: Palm Bay, FL, USA, 2021; pp. 1–28.
5. Song, X.; Yang, S.; Huang, Z.; Huang, T. The Application of Artificial Intelligence in Electronic Commerce. *J. Phys. Conf. Ser.* **2019**, *1302*, 032030.
6. Brzozowska, A.; Bubel, D. E-business as a New Trend in the Economy. *Procedia Comput. Sci.* **2015**, *65*, 1095–1104.
7. Andonov, A.; Dimitrov, G.P.; Totev, V. Impact of E-Commerce on business performance. *TEM J.* **2021**, *10*, 1558–1564.
8. Lupulescu, G.M.G.; Zamfir, F.E. Can knowledge be created exclusively from online sources? A business intelligence approach in ecommerce. *Proc. Int. Conf. Bus. Excel.* **2021**, *15*, 119–127.
9. Attia, A. The drivers of e-business implementation and the effect on organizational performance. *J. Manag. Inf. Decis. Sci.* **2022**, *25*, 1–14.
10. Shyna, K.; Vishal, M. A study on artificial intelligence E-commerce. *Int. J. Adv. Eng. Sci. Res.* **2017**, *4*, 62–68.
11. Gururaj, P. Artificial intelligence-application in the field of e-commerce. *Int. J. Res.-Granthaalayah* **2021**, *9*, 170–177.
12. Verma, S.; Sharma, R.; Deb, S.; Maitra, D. Artificial intelligence in marketing: Systematic review and future research direction. *Int. J. Inf. Manag. Data Insights* **2021**, *1*, 100002.

# A Study of Customer Perception towards Artificial Intelligence in Banking Customer Services-With Reference to Nationalized Banks in Virudhunagar

**M. Ponuselvi**

*Assistant Professor of Commerce, Arulmigu Kalasalingam College of Arts and Science, Krishnankoil, India.*

*Corresponding Author e-mail iD: [ponuselvi20114@gmail.com](mailto:ponuselvi20114@gmail.com)*

## Abstract

Today trends in world are to use AI in all the customer oriented services. Banking institutions are also using this technology in customer service and employee services. This technology is more users friendly to get data and storing that in safe. Artificial intelligence has the potential to detect frauds, mitigate uncertain risks, and help manage regulatory compliance. Now a day most of the customers have their mobile phones this can be possible to achieve the application of AI technology in banking services. Artificial intelligence can be used by banks primarily in three areas: front office (conversational banking), middle office (fraud prevention), and back office (underwriting). Banks are utilizing artificial intelligence (AI) in order to streamline client identification and verification, create chatbots and voice assistants that imitate real personnel, strengthen customer relationships, and offer tailored insights and suggestions. This paper will discuss about using AI to provide customer services and how are they benefiting from it.

**Keywords:** banking, artificial intelligence, customer services

## 1. Introduction

In the banking industry, timely and effective customer service is essential. The primary responsibility of the banking operations is customer service. Fast and effective service will boost revenue, improve public relations, and decrease complaints. In the banking sector, offering excellent customer service is crucial since it increases customer retention, helps you better satisfy the demands of your clients, and makes them feel valued.

Because artificial intelligence makes it possible for banks to automate many of their routine tasks, the banking sector is undergoing a transformation. Customers can receive prompt and precise responses to their queries and concerns via chatbots driven by artificial intelligence,

which minimizes the need for human engagement. As a result, banks are able to reduce operating expenses and improve customer service. Furthermore, the application of AI tools in banking facilitates quicker and more precise decision-making in the areas of risk management and lending. These tools make it simpler for banks to recognize and reduce risks by analyzing vast volumes of data to find patterns and trends. AI is being quickly adopted by the banking and finance industry in an effort to cut costs and increase production, efficiency, and services.

## 2. Objectives

- Researching the idea of artificial intelligence in financial services.
- To research the domains and applications in which banking services leverage artificial intelligence.
- Researching how consumers view artificial intelligence in banking services.

## 3. Scope of the Study

This paper focus on customer perception toward Artificial Intelligent in Banking Services in Virudhunagar district constrained to client benefits as it were.

## 4. Data and Methodologies

The information acquired contains qualitative primary and secondary data that was further examined to produce recommendations and findings. A survey on the use of artificial intelligence in financial services was used to collect the primary data. For the survey, a questionnaire was created, and random sampling was carried out. The internet was used to gather secondary data from newspapers, periodicals, research papers, e-books, and other online sources.

## 5. Banking and Artificial Intelligence



**Figure 1. Potential of AI across different areas in a banking organization.**

The image above shows how data-driven AI may be applied to improve a financial organization's operations in the back office and create new revenue streams in the front office.

## 6. AI using banks in India

**State Bank of India** - The AI-powered SBI Intelligent Assistant (SIA) is a smart chat assistant that assists customers with routine banking transactions and provides prompt answers to their questions. This intelligent chatbot, created by AI banking platform Payjo, can manage up to 10,000 requests per second or 864 million queries daily, or approximately 25% of all queries processed by Google daily, according to sources.

**HDFC** - Another Indian banking and financial services company that makes use of AI is HDFC, which has its headquarters in Mumbai. The bank's intelligent chatbot, named "Eva," uses Google Assistant on millions of Android smartphones to respond to users' questions and offer better services. Additionally, HDFC offers OnChat, an AI-enabled chatbot that debuted on Facebook Messenger in 2016.

**ICICI** - One of India's top private sector banks, ICICI Bank, has implemented software robotics in more than 200 business operations spanning several departments. As a result, the bank was the first in the nation to implement AI on a wide scale across many procedures. The report claims that ICICI Bank has expanded its RPA program to include over 750 software robots that process close to 2 million transactions every day, or 20% of total transaction volumes.

**Axis** - Through an AI-powered bot, Axis Bank's customers may discuss their banking concerns at anytime, anywhere. In July 2020, AXAA, a conversational interactive voice response (IVR) system, was introduced by India's third-largest private sector bank. AXAA is a multilingual voice bot of the future generation that helps users navigate the IVR and responds to their questions and requests, usually without requiring human assistance. Additionally, the private lender operates an innovation center named "Thought Factory" with the goal of accelerating the creation of cutting-edge AI technology solutions for the banking industry.

**Bank of Baroda**: This public sector lender also focuses on using AI to enhance customer service while lowering account management expenses and expanding banking services. The bank makes use of cutting-edge technology, such as Digital Lab's free Wi-Fi and Baroda Brainy, an AI robot. Additionally, ADI (Assisted Digital Interaction) is the name of its chatbot. In order to establish a cutting-edge IT Center of Excellence (ITCoE) and Analytics Center of Excellence (ACoE), Bank of Baroda teamed with IBM and Accenture in 2018.

**Andhra Bank:** In April 2020, Andhra Bank, an Indian public sector bank of medium size, amalgamated with Union Bank of India. The bank has embraced modern banking practices due to its extensive nationwide branch network and numerous satellite offices.

### 7. Bank Customer Satisfaction

Table No. 1 Customer Satisfaction Based Banking

PARTICULARS	Cannot exact say	Desirable	Essential	Vital	GRAND TOTAL
Role of AI in banking	6	22	63	59	150

Table No. 1 demonstrates that AI-based banking outperforms traditional banking systems by 45% in fees. Additionally, 86% of customers believe that using AI-based banking services is safe and secure. Additionally, 89% of customers concur that AI banking technology is reliable and secure. Customers are generally 81.6% happy with AI-based banking services.

Table No. 2 Role of AI in banking

PARTICULARS	Maybe	No	Yes	GRAND TOTAL
Effective than traditional	32	60	58	150
Is it easy and secured	15	16	119	150
Accuracy and Useful	4	12	134	150
Do you feel safe AI based banking application for the banking transaction?	5	24	121	150
Anytime you can make transaction without any threads	6	29	115	150
TOTAL	62	141	547	750
AVERAGE	8.2	18.8	73	100

The role of the Ai Based Banking system is very important therefore customer feel that AI based economy. Banking system is playing essential role in the Economy.

Table No 3: Bank Employee Perception – AI Based Banking

Table No. 3 demonstrates the significance of AI-based applications in the banking sector. The average observation is that 40.28% of bank employees agree and 38.85 percent strongly believe that AI-based applications are beneficial to the banking industry. Employees at banks concur that AI-based banking services cut down on labor-intensive tasks and human labor.

PARTICULARS	Strongly Agreed	Agree	Neutral	Disagree	Strongly Disagree	GRAND TOTAL
Strong need for AI in Banking	54	20	41	20	15	150
AI is used Primary Medium for Consumers Interaction	45	30	61	12	2	150
AI reduce Manpower for Routine Task	36	54	15	21	24	150
AI application user Friendly	41	7	32	15	55	150
Payments are easily done	45	35	41	28	1	150
Anytime you can make transaction without any threads	12	35	25	35	43	150
AI Replace Tele callers For routine Consumers Interaction	61	24	18	35	12	150
TOTAL	294	205	233	166	152	1050

### 8. Challenges in Adopting AI in Banking

There are difficulties in widely implementing cutting-edge technologies like artificial intelligence. Banks that use AI technologies face a number of difficulties, including security concerns and a shortage of reliable and high-quality data.

1. Security of Data
2. Inadequate Information
3. Inability to Explain



## 9. Conclusion

The financial sector can benefit greatly from artificial intelligence. The results indicate that artificial intelligence in banking and financial services is meeting the needs of its customers. Customers of banking and financial services are well-informed about uses of artificial intelligence. The most popular use of AI in banking and financial services applications was found in chatbots, KYC/AML, security compliance, and helping to more quickly and easily meet client demands. Consumer satisfaction with AI is high.

## References

- 1.M. Bhuvana, P.G. Thirumagal and S.Vasanth, Big Data Analytics - A Leveraging Technology for Indian Commercial Banks, *Indian Journal of Science and Technology*, Vol 9 (32), August 2016 .
- 2.Banking In the age of disruption,EY, February2017.
- 3.[http://www.latinia.com/IF/Documentos/Intelligence\\_Digital\\_Banking.pdf](http://www.latinia.com/IF/Documentos/Intelligence_Digital_Banking.pdf)
- 4.Shivkumar Goel and Nihaal Mehta A Survey on the Role of Artificial Intelligence in FinTech, *International Journal of Innovative Research in Computer and Communication Engineering*, Vol. 5, Issue 6, June 2017.
- 5.Driving AI for Financial Services – Similarity Whitepaper
- 6.<https://www.livemint.com/AI/v0Nd6Xkv0nINDG4wQ2JOvK/Artificial-Intelligence-in-Indian-banking- Challenges-and-op.html>.
- 7.<https://www.financialexpress.com/money/8-amazing-ways-consumers-can-benefit-from-artificial-intelligences- impact-on-banking-financial-sectors/985652/>
- 8.<http://www.cxotoday.com/story/impact-of-artificial-intelligence-on-the-banking-sector/>
- 9.<https://www.financialexpress.com/industry/banking-finance/sbi-turns-to-artificial-intelligence-powered-chat- assistant-here-is-what-you-get/870752/>
- 10.<https://dzone.com/articles/ai-and-the-future-of-banking>
- 11.<https://www.maparesearch.com/5-use-cases-ai-banking-beyond-helpful-chatbots/>
- 12.[https://www.tutorialspoint.com/artificial\\_intelligence/artificial\\_intelligence\\_overview.htm](https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_overview.htm)

13. Cristi, Spulbar & Birau, Ramona & Shetty, Sharan & Filip, Robert. (2021). A Study On Artificial Intelligence (Ai) In Banking And Financial Services. *IJCRT* | Volume 9, Issue 9 September 2021 | ISSN: 2320-2882
14. A. Geetha & Dr. M.G.R. (2023). Impact of Artificial Intelligence in Banking Sector with Reference to Private Banks in India. *Annals of the University of Craiova, Physics*. 32.
15. <https://www.mckinsey.com/capabilities/quantumblack/our-insights/global-survey-the-state-of-ai-in-2021>
16. <https://www.capgemini.com/insights/research-library/world-retail-banking-report/>
17. <https://www.wipro.com/business-process/why-banks-need-artificial-intelligence/>
18. <https://appinventiv.com/blog/ai-in-banking/>

## A Study on Role of AI in e-Commerce Industry

V. Shunmathy<sup>1\*</sup> and K.B. Hariny<sup>2</sup>

Assistant Professor of Commerce CA (SF), V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar, India

\*Corresponding Author e-mail iD: [Shunmathy.v@vhnsnc.edu.in](mailto:Shunmathy.v@vhnsnc.edu.in)

### Abstract

Artificial intelligence is becoming increasingly important in the e-commerce sector. Simultaneously, technical advancements gave rise to several platforms that are helpful for keeping up with trends and meeting market demands. Three cognitive processes—learning, reasoning, and self-correction—are the main topics of AI programming. Artificial intelligence is being used by a lot of e-commerce companies these days to better understand their clients and match their expectations. The most widely utilized subset of artificial intelligence (AI) technology is machine learning, which makes sense of the vast amounts of data that e-commerce businesses gather and uses it to deliver insights that enhance consumer experience, internal business operations, and fraud prevention. AI helps individuals and allows e-commerce websites to recommend products that are specifically suited to customers.

**Keywords:** Artificial intelligence, E-commerce, Machine Learning, Business, Technology

### Introduction

One of the most expansive and well-liked areas of computer science nowadays is artificial intelligence, or AI, which deals with designing and developing intelligent machines. These clever machines are intended to be able to perform jobs that call for human intelligence to accomplish. It can be said with 100% certainty that everyone has heard of artificial intelligence. We may also argue that two other applications of the concept of artificial intelligence in the home are e-commerce and e-learning. Hardly any field is impacted by artificial intelligence already. We can claim that artificial intelligence permeates every aspect of our lives, beginning with the grocery shop department store you visit. Artificial intelligence can be found everywhere. From large shopping malls and airports with state-of-the-art security systems to grocery stores with self-checkout cash counters, artificial intelligence is present everywhere. In addition, AI is now being used in companies, schools, and other settings. More and more artificial intelligence-driven technology is being used by humans on a daily basis. To make people's life easier, it is now rather usual to see robots and machines carrying out the

menial and simple jobs that humans used to do on a regular basis. Considering the increasingly profit-driven society we live in, where businesses must meet deadlines and serve clients worldwide. Artificial intelligence is now a necessary component of daily life. AI assists with a nation's safety and security by enabling businesses to conduct investigations in real-time and increase productivity. One sector that is perhaps utilizing artificial intelligence (AI) to its fullest extent in the modern day is e-commerce, which generates a sizable customer base, comprehends customer wants, conducts research in real time, finds answers to issues head-on, and much more. AI is used in e-commerce in a variety of ways, including chatbots, product content management (PCM), CRM, ERP, and much more.

### Artificial Intelligence is changing the E-Commerce Sector

Artificial intelligence is more than simply a cutting-edge technology used for show. AI implementation may have an effect on several business operations within your company. It helps to grasp the components of artificial intelligence in order to see how it might affect your organization. Natural language processing, machine learning, and data mining are all included in the broad definition of artificial intelligence. The process of collecting both historical and Current data to make predictions is known as data mining.

Natural language processing pertains to the interpretation of natural human language by computers and human-computer interaction. Machine learning, on the other hand, deals with applying a set of algorithms to solve problems by applying examples or past experience. "Layering algorithms in an attempt to gain greater understanding of the data" is the definition of deep learning. AI technology has developed over the last many years into a potent instrument for increasing sales and streamlining operations. Even a large number of tiny e-commerce companies use AI-capable technologies.

### Role of AI plays in boosting and benefiting the Economic Industry

#### 1. Chatbots and other online help

Online shops are increasingly relying on chatbots or digital assistants to offer round-the-clock assistance to their customers. Chatbots that are created with AI technology are becoming more user-friendly and improving the consumer experience. Chatbots are increasing the influence of AI in e-commerce in addition to offering excellent customer service. Some of these capabilities include natural language processing, or NLP, Which can comprehend voice-based conversations with customers. Meeting customer demands

with more profound understanding Capabilities for self-learning that aid in their continual improvement. Offer customers customized or focused offers.

## **2. Intelligent Product Recommendations**

Personalized product recommendations for online buyers are one of the main ways artificial intelligence is being used in e-commerce to increase conversion rates and average order values. AI in e-commerce is influencing consumer choices through the use of big data, and its recommendations can help e-commerce companies in a number of ways, including increased sales and client retention, a more individualized online shopping experience, and a higher percentage of repeat business. A customized business email campaign is made possible by it.

## **3. AI customization for online shopping**

The fundamental component of AI in e-commerce marketing is personalization. Artificial intelligence (AI) and machine learning (ML) in e-commerce are gaining significant user insights from the generated consumer data, based on individual data collected from each online user.

The AI-enabled solutions, for example, are prepared to analyze client data from various touch points, such as websites, email campaigns, and mobile apps, to determine how well they are performing online interactions. With the use of these analytics, online shops can offer a uniform customer experience across all platforms and suggest products that are appropriate.

## **4. Control of Stock**

The key to effective inventory management is keeping the proper amount of goods on hand to meet market demand without increasing idle stock. AI-enabled inventory management allows for the maintenance of stocks based on data related to: Sales trends over previous years, Projected or anticipated changes in product demands and Potential supply-related issues that would impact inventory levels. Conventional inventory management was limited to current stock levels.

## **5. AI in the e-commerce fashion sector**

The amount of merchandise returned from online sales is declining thanks to artificial intelligence in the fashion e-commerce sector. For example, fashion brands are using AI to recommend the appropriate size of clothing (depending on the customer's measurement) and stylistic preferences (tight- or loose-fitting clothes). This could enhance repeat business and

reduce the number of returned products for the fashion brand. A noteworthy illustration of this is Lenskart's provision of an online 3D trial feature for their eyewear to their clientele.

In addition to the above-mentioned advancements, AI-powered technologies are revolutionizing the E-commerce sector in the following domains:

1. Email marketing with AI support that targets recipients with offers of goods and services that they would find interesting. These email marketing solutions are more suited to the specific needs of each individual consumer and intelligently analyze the user based on their reaction.

2. Effective supply chain management for e-commerce platforms is made possible by AI-enabled supply chain automation. Enabling business decisions about suppliers, supply schedules and market demands is one of the additional advantages.

3. AI-based data analytics solutions that offer a multitude of benefits to the e-commerce industry, including consumer profiles, online sale analysis, and business intelligence.

### E-Commerce companies can improve customer satisfaction and ensure higher sales by Using AI

When artificial intelligence is used properly, it can benefit e-commerce businesses in conversational commerce in addition to helping you provide better customer service. In addition to these services, AI facilitates human-to-human communication in real time between clients and customers through phone chats, chatbots, messengers, and much more. Artificial Intelligence is used to produce smart services, wherein the technology asks users questions and, depending on their responses, provides appropriate and personalized recommendations that are catered to their needs and expectations. These high levels of client satisfaction are what enable e-commerce companies to make more compelling sales pitches. An example of an eBay shop Bot engages users and then uses its understanding of their preferences to recommend the best offers to them. Customers can use the chatbot of the well-known Starbucks brand through its official application. Because of this chatbot, ordering from Starbucks has never been easier. It can also understand text messages and voice instructions.

In 2023, marketers predict five ways artificial intelligence will change marketing. One of the most significant technological advancements of the digital era is AI. It was believed a few decades ago that artificial intelligence (AI) belonged in the far future with robots, yet AI has quickly established itself in the present world.

AI is becoming a commonplace aspect of many of our daily lives. The majority of us engage with AI several times every day. It gathers information about our tastes for songs, movies, ads, and other content to give us a customized internet experience. Examples of this include social media, Netflix, and Spotify. It makes it possible for us to use smart assistants like Google, use facial recognition technologies, and navigate maps on apps like Uber and Google Maps and chatbots as well as smart assistants like Google Home, Siri, and Alexa.

AI has transformed marketing as well. It is now included into all digital marketing platforms, including display advertisements, social media, copywriting, and image creation. It makes marketing more intelligently possible by giving companies the ability to reach customers on the appropriate channel, at the appropriate moment, with the appropriate message. The market for artificial intelligence in marketing was valued at \$15.84 billion in 2021 and is expected to grow to over \$107.5 billion by 2028, to put a number on it.

### **Forecasting the sales uses AI**

Artificial intelligence is widely used for a variety of purposes, one of the most important and widespread being sales forecasting. It does this by assisting professionals in the analysis of large amounts of client data, allowing them to gain accurate and relevant insights. Artificial intelligence is preferable since, in the event that a person had to perform this kind of labor, it would normally take several days, hours, or even months. AI is therefore employed for these kinds of tasks in order to save time and resources.

### **Future of AI in e-commerce**

E-commerce has a highly promising future for AI. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops. The following are some anticipated future changes to the e-commerce sector brought about by AI:

#### **1. Customized shopping experiences**

Artificial Intelligence will be utilized to generate customized shopping experiences for clients. AI will be used to evaluate consumer information, including demographics, browsing patterns, and past purchases, in order to provide a customized shopping profile for each individual customer. This will enable companies to offer a more customized shopping experience and suggest items that are more likely to catch each customer's attention.



## **2. Virtual assistants**

The e-commerce sector will see an increase in the use of AI-powered virtual assistants. These virtual assistants will have the ability to assist clients with product searches, query resolution, and transaction completion. Customers will benefit from a more efficient and convenient shopping experience as a result.

## **3. Fraud detection**

AI will help the e-commerce sector detect fraud better. AI will be used to evaluate transactions and spot trends that point to fraud in order to do this. This will assist companies in safeguarding themselves from monetary damages.

## **4. Logistical optimization**

In the e-commerce sector, artificial intelligence will be employed to streamline logistical processes. Artificial Intelligence (AI) will be utilized to monitor stock levels, enhance transportation routes, and forecast demand. This will assist companies in cutting expenses and increasing productivity.

## **5. Customer Service**

AI will be utilized in the e-commerce sector to enhance customer service. AI will be used to respond to queries from customers, handle problems, and offer assistance. This will assist companies in offering a better customer experience and raising consumer satisfaction levels.

## **Conclusion**

People are becoming more interested in AI every day. Intelligence may help people thrive in their high sales and customer interactions in the e-commerce sector. For additional information about the use of artificial intelligence in e-commerce and other industries, keep reading our blogs and articles. The e-commerce sector is undergoing a rapid transformation thanks to artificial intelligence (AI), which is giving companies new opportunities to enhance consumer satisfaction, boost revenue, cut expenses, and boost productivity. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops. These apps will significantly change the way we purchase online and improve everyone's online shopping experience in terms of convenience, effectiveness, and enjoyment.

## References

<https://sendbird.com/blog/the-role-of-artificial-intelligence-in-ecommerce>

<https://www.divante.com/blog/ai-in-ecommerce-benefits-and-examples>

[https://www.researchgate.net/publication/362222810\\_Artificial\\_Intelligence\\_in\\_E-commerce\\_Applications\\_Implications\\_and\\_Challenges](https://www.researchgate.net/publication/362222810_Artificial_Intelligence_in_E-commerce_Applications_Implications_and_Challenges)

<https://cashflowinventory.com/blog/artificial-intelligence-in-the-ecommerce-industry/>

[https://www.researchgate.net/publication/342853646\\_Emerging\\_Roles\\_of\\_Artificial\\_Intelligence\\_in\\_ecommerce](https://www.researchgate.net/publication/342853646_Emerging_Roles_of_Artificial_Intelligence_in_ecommerce)

# Innovative Applications of AI in E-commerce: Trends and Insights

P. Sumalatha<sup>1\*</sup> and <sup>2</sup>Nazeer Shaik

<sup>1\*</sup> Assistant Professor of Computer Science and Information Technology, Central University of Andhra Pradesh, Anantapur, India.

<sup>2</sup> Assistant Professor of CSE, Srinivasa Ramanujan Institute of Technology (Autonomous), Anantapur, India.

\*Corresponding Author e-mail iD: [sumalatha.psl@gmail.com](mailto:sumalatha.psl@gmail.com)

## Abstract

The rapid advancement of Artificial Intelligence (AI) technologies has transformed the landscape of e-commerce, offering unprecedented opportunities for businesses to enhance customer experiences, optimize operations, and drive growth. This paper explores innovative applications of AI in e-commerce, highlighting key trends, insights, and emerging developments shaping the future of online retail. From personalized product recommendations and virtual assistants to predictive analytics and supply chain optimization, AI-powered solutions are revolutionizing every aspect of the e-commerce journey. Through a comprehensive analysis of recent literature and case studies, we examine how leading e-commerce companies are leveraging AI to stay ahead of the curve, capitalize on new opportunities, and deliver exceptional value to customers in an increasingly competitive marketplace.

**Keywords:** Artificial Intelligence, Supply Chain Optimization, e-commerce, Predictive Analytics, Deep Reinforcement Learning, Genetic Algorithms, Decision Support Systems.

## Introduction

The e-commerce industry has witnessed a seismic shift in recent years, driven by advancements in Artificial Intelligence (AI) technologies that are revolutionizing the way businesses operate and consumers shop online. From personalized shopping experiences to predictive analytics and supply chain optimization, AI is reshaping every aspect of the e-commerce journey, offering unparalleled opportunities for businesses to drive growth, efficiency, and innovation. In this paper, we explore the innovative applications of AI in e-commerce, highlighting key trends, insights, and emerging developments that are shaping the future of online retail [1,2].

### Personalized Product Recommendations

In the dynamic world of e-commerce, providing personalized product recommendations has emerged as a powerful strategy for enhancing customer engagement, increasing conversion rates, and driving sales. Artificial Intelligence (AI) plays a pivotal role in this process, enabling e-commerce platforms to analyze vast amounts of customer data and deliver tailored product suggestions that align with individual preferences, browsing behavior, and purchase history.

AI-powered recommendation engines leverage machine learning algorithms to process and interpret diverse data sources, including customer demographics, browsing patterns, past purchases, and product interactions. By analyzing these data points, recommendation algorithms can identify patterns and correlations that indicate customer preferences and interests. Through continuous learning and optimization, AI algorithms can adapt to changing customer behaviors and preferences, ensuring that recommendations remain relevant and effective over time [3].

One of the key advantages of AI-driven recommendation systems is their ability to offer personalized suggestions in real-time, at various touchpoints throughout the customer journey. Whether a customer is browsing product categories, adding items to their cart, or completing a purchase, recommendation algorithms can surface relevant products and promotions that resonate with the customer's interests and needs. This personalized approach enhances the shopping experience, making it more engaging and intuitive for customers while also increasing the likelihood of conversion.

Moreover, AI-powered recommendation engines can facilitate cross-selling and upselling opportunities by suggesting complementary or higher-value products to customers based on their current selections or purchase history. By analyzing patterns and associations between products, recommendation algorithms can identify opportunities to suggest additional items that complement or enhance the customer's original purchase, thereby increasing the average order value and driving incremental revenue for the e-commerce platform.

Case studies of leading e-commerce companies demonstrate the impact of AI-driven personalized product recommendations on driving business results. For example, Amazon's

recommendation engine, powered by machine learning algorithms, accounts for a significant portion of the company's revenue, with studies estimating that personalized recommendations contribute to over 35% of Amazon's sales. Similarly, e-commerce platforms such as Netflix and Spotify leverage AI to deliver personalized content recommendations, driving user engagement and retention.

In addition to driving sales and revenue, personalized product recommendations also play a crucial role in enhancing customer satisfaction and loyalty. By presenting customers with relevant and engaging product suggestions, e-commerce platforms demonstrate an understanding of their preferences and needs, fostering a sense of personalization and connection. This, in turn, strengthens customer relationships and increases the likelihood of repeat purchases and brand advocacy.

Overall, personalized product recommendations powered by AI represent a cornerstone of modern e-commerce strategies, offering a powerful tool for driving engagement, conversion, and loyalty. By leveraging AI technologies to deliver tailored product suggestions, e-commerce platforms can create more personalized and compelling shopping experiences for customers, ultimately driving business growth and success in the competitive online marketplace [4].

### **Virtual Assistants and Chatbots**

In the ever-evolving landscape of e-commerce, providing efficient and personalized customer service is paramount to driving customer satisfaction and loyalty. Virtual assistants and chatbots powered by Artificial Intelligence (AI) have emerged as transformative tools for enhancing customer support experiences in e-commerce platforms. These intelligent bots leverage natural language processing (NLP) and machine learning algorithms to understand and respond to customer inquiries in real-time, providing timely assistance and support across various channels.

Virtual assistants and chatbots offer several advantages for e-commerce businesses, including round-the-clock availability, scalability, and cost-effectiveness. Unlike traditional customer support channels that operate within limited hours, virtual assistants and chatbots are available 24/7, allowing customers to seek assistance at any time of day or night. This

ensures that customers receive prompt responses to their inquiries, regardless of their geographical location or time zone, enhancing overall customer satisfaction and loyalty [5]. Moreover, virtual assistants and chatbots enable e-commerce businesses to handle a high volume of customer inquiries simultaneously, without the need for human intervention. By automating routine customer service tasks, such as answering frequently asked questions, providing order status updates, or assisting with product recommendations, virtual assistants and chatbots free up human customer support agents to focus on more complex and high-value interactions. This not only improves efficiency and reduces response times but also enables businesses to allocate their resources more effectively and efficiently.

AI-powered virtual assistants and chatbots offer a personalized and intuitive customer support experience, thanks to their ability to understand and interpret natural language queries. Using sophisticated NLP algorithms, these intelligent bots can analyze and interpret customer inquiries, identify the intent behind the request, and provide relevant and accurate responses. Whether customers are seeking product information, troubleshooting technical issues, or requesting assistance with order processing, virtual assistants and chatbots can guide them through the resolution process with ease and efficiency [6].

Furthermore, virtual assistants and chatbots continuously learn and improve over time through machine learning techniques. By analyzing past interactions, customer feedback, and historical data, AI algorithms can refine their understanding and responses, becoming increasingly adept at addressing customer inquiries and resolving issues effectively. This iterative learning process ensures that virtual assistants and chatbots remain up-to-date and responsive to evolving customer needs and preferences, enhancing the overall quality of the customer support experience.

Case studies of leading ecommerce companies demonstrate the effectiveness of AI-powered virtual assistants and chatbots in driving customer satisfaction and loyalty. For example, Shopify's virtual assistant, Kit, helps merchants automate marketing tasks and manage their online stores more efficiently, resulting in increased sales and revenue. Similarly, Sephora's chatbot on Facebook Messenger provides personalized beauty recommendations and assistance to customers, enhancing engagement and driving sales [7].

Finally, virtual assistants and chatbots powered by AI represent a game-changer for customer service in e-commerce, offering businesses a scalable, cost-effective, and personalized solution for providing round-the-clock support to customers. By leveraging these intelligent bots, e-commerce platforms can enhance efficiency, improve response times, and deliver exceptional customer experiences that drive satisfaction, loyalty, and long-term success in the competitive online marketplace.

### Predictive Analytics and Demand Forecasting

In the dynamic and rapidly evolving world of e-commerce, accurate demand forecasting and predictive analytics are essential for optimizing inventory management, supply chain operations, and pricing strategies. Predictive analytics leverages advanced statistical models and machine learning algorithms to analyze historical sales data, market trends, and external factors, enabling ecommerce businesses to predict future demand with greater accuracy and confidence.

One of the key advantages of predictive analytics in e-commerce is its ability to identify patterns and trends in historical data that can be used to forecast future demand for products. By analyzing factors such as seasonality, product trends, and customer behavior, predictive analytics algorithms can generate forecasts that provide insights into expected sales volumes, revenue projections, and inventory requirements. This enables e-commerce businesses to make informed decisions about inventory procurement, allocation, and pricing, thereby optimizing operational efficiency and maximizing profitability.

Moreover, predictive analytics enables e-commerce businesses to anticipate and respond to changes in customer preferences and market dynamics in real time. By continuously monitoring sales data, market trends, and competitor activities, predictive analytics algorithms can identify emerging trends, shifts in consumer behavior, and fluctuations in demand, enabling businesses to adjust their strategies and tactics accordingly. This proactive approach to demand forecasting and market analysis enables e-commerce businesses to stay ahead of the curve, capitalize on new opportunities, and mitigate risks more effectively.

Predictive analytics also plays a crucial role in optimizing pricing strategies and promotional campaigns in e-commerce. By analyzing historical pricing data, customer segmentation, and



competitive pricing dynamics, predictive analytics algorithms can identify optimal price points, discount levels, and promotional strategies that maximize revenue and profitability while maintaining competitive positioning. This data-driven approach to pricing optimization enables e-commerce businesses to achieve a balance between maximizing sales and maintaining profit margins, ultimately driving long-term business success [8].

Case studies of leading ecommerce companies demonstrate the effectiveness of predictive analytics in driving business results. For example, Amazon leverages predictive analytics algorithms to forecast demand for millions of products with remarkable accuracy, enabling the company to optimize inventory levels, minimize stockouts, and maximize revenue. Similarly, online fashion retailer ASOS uses predictive analytics to anticipate customer demand for trending fashion items and adjust inventory accordingly, resulting in increased sales and customer satisfaction.

Thus, predictive analytics and demand forecasting are essential tools for optimizing inventory management, pricing strategies, and supply chain operations in e-commerce. By leveraging advanced statistical models and machine learning algorithms, e-commerce businesses can gain valuable insights into future demand, market trends, and customer behavior, enabling them to make informed decisions that drive operational efficiency, maximize profitability, and deliver exceptional customer experiences. As e-commerce continues to evolve, predictive analytics will play an increasingly important role in shaping the future of online retail, enabling businesses to stay ahead of the competition and thrive in the dynamic digital marketplace.

### **Supply Chain Optimization**

In the competitive landscape of e-commerce, efficient supply chain management is critical for ensuring timely order fulfillment, minimizing costs, and delivering exceptional customer experiences. Supply chain optimization involves leveraging data, technology, and strategic insights to streamline logistics processes, improve inventory management, and enhance overall operational efficiency. Artificial Intelligence (AI) is playing an increasingly important role in supply chain optimization, enabling e-commerce businesses to make data-driven decisions, anticipate demand, and optimize every aspect of their supply chain operations.

One of the key advantages of AI in supply chain optimization is its ability to analyze vast amounts of data from multiple sources and derive actionable insights that drive continuous improvement. AI algorithms leverage machine learning techniques to process and interpret data from various supply chain touchpoints, including production, transportation, warehousing, and distribution. By analyzing historical data, market trends, and real-time information, AI-powered supply chain optimization solutions can identify inefficiencies, bottlenecks, and areas for improvement, enabling businesses to implement targeted interventions and optimizations that enhance overall performance [9].

AI-driven predictive analytics plays a crucial role in demand forecasting and inventory management, enabling ecommerce businesses to anticipate customer demand and optimize inventory levels accordingly. By analyzing historical sales data, market trends, and external factors such as weather patterns and promotional campaigns, predictive analytics algorithms can generate accurate forecasts of future demand for products. This enables businesses to optimize inventory replenishment schedules, minimize stockouts and overstocking, and ensure that the right products are available in the right quantities at the right time, thereby improving customer satisfaction and maximizing sales.

Furthermore, AI-powered supply chain optimization solutions enable e-commerce businesses to optimize transportation and logistics operations, reducing costs and improving delivery efficiency. AI algorithms can analyze factors such as shipping routes, carrier performance, and delivery times to identify opportunities for optimization, such as route consolidation, load balancing, and delivery route optimization. By optimizing transportation routes and schedules, e-commerce businesses can minimize shipping costs, reduce transit times, and improve overall delivery performance, thereby enhancing customer satisfaction and loyalty.

In addition to demand forecasting and logistics optimization, AI technologies are also being used to optimize warehouse operations and inventory management in e-commerce supply chains. AI-powered warehouse management systems (WMS) leverage real-time data and predictive analytics to optimize inventory placement, pick-and-pack processes, and order fulfillment workflows. By automating routine tasks, optimizing storage space, and

minimizing order processing times, AI-driven WMS solutions improve operational efficiency, reduce labor costs, and enhance overall productivity in e-commerce warehouses. Case studies of leading e-commerce companies demonstrate the effectiveness of AI-driven supply chain optimization in driving business results. For example, Alibaba's Cainiao Network leverages AI and big data analytics to optimize logistics operations, enabling the company to deliver packages within 24 hours in China and 72 hours globally. Similarly, Amazon's AI-powered fulfillment centers use predictive analytics to anticipate customer demand and optimize inventory placement, resulting in faster delivery times and improved customer satisfaction.

Thus, AI-driven supply chain optimization represents a game-changer for e-commerce businesses, enabling them to streamline logistics operations, improve inventory management, and enhance overall operational efficiency. By leveraging AI technologies to analyze data, anticipate demand, and optimize every aspect of their supply chain operations, e-commerce businesses can gain a competitive edge in the dynamic and fast-paced digital marketplace. As AI continues to evolve, the potential for supply chain optimization in e-commerce will only continue to grow, enabling businesses to stay ahead of the curve and deliver exceptional value to customers [10].

## Conclusion

In conclusion, the innovative applications of AI in e-commerce are reshaping the future of online retail, offering unparalleled opportunities for businesses to enhance customer experiences, optimize operations, and drive growth. From personalized product recommendations and virtual assistants to predictive analytics and supply chain optimization, AI-powered solutions are revolutionizing every aspect of the e-commerce journey. By embracing AI technologies, e-commerce companies can stay ahead of the curve, capitalize on new opportunities, and deliver exceptional value to customers in an increasingly competitive marketplace.

## References

1. Zhao, Y., et al. (2022). "Optimizing E-commerce Supply Chain with Deep Reinforcement Learning." *IEEE Transactions on Industrial Informatics*, 18(3), 2262-2271.

2. Jiang, Y., et al. (2021). "AI-Driven Supply Chain Optimization in Ecommerce: A Review." *Information Systems Frontiers*, 23(6), 1491-1507.
3. Zhang, L., et al. (2020). "Machine Learning-Based Optimization for Ecommerce Supply Chain Management." *International Journal of Production Economics*, 229, 107910.
4. Wang, Z., et al. (2022). "Ecommerce Supply Chain Optimization with Multi-Agent Reinforcement Learning." *Journal of Cleaner Production*, 327, 129159.
5. Li, Y., et al. (2021). "Ecommerce Supply Chain Optimization using Genetic Algorithms and Deep Learning." *Computers & Industrial Engineering*, 151, 107067.
6. Liu, X., et al. (2020). "Data-Driven Optimization for Ecommerce Supply Chain Management: A Review." *Journal of Intelligent Manufacturing*, 31(4), 767-782.
7. Chen, H., et al. (2022). "AI-Driven Predictive Analytics for Inventory Optimization in Ecommerce Supply Chains." *Computers & Operations Research*, 139, 105400.
8. Zhou, Y., et al. (2021). "Deep Learning-Based Inventory Management for Ecommerce Supply Chains." *International Journal of Production Research*, 59(14), 4475-4491.
9. Sun, J., et al. (2020). "Ecommerce Supply Chain Optimization using Reinforcement Learning and Big Data Analytics." *International Journal of Production Economics*, 229, 107839.
10. Wang, Q., et al. (2022). "AI-Driven Decision Support Systems for Supply Chain Optimization in Ecommerce." *Expert Systems with Applications*, 194, 114311.

## A Study on Consumer Satisfaction Level of Granites

M. Kallaganadi<sup>1\*</sup> and P. Ramalakshmi<sup>2</sup>

<sup>1\*</sup>Research scholar, Sri Parasakthi College for Women, Courtallam, India.

<sup>2</sup>Assistant Professor of Commerce, Sri Parasakthi College for Women, Courtallam, India.

\*Corresponding Author e-mail iD: [murugankavitha802@gmail.com](mailto:murugankavitha802@gmail.com)

### Abstract

The foundation of any business is its consumer. Marketers need to be very aware of what consumers see, think, like, and buy in order to fine-tune their offers and achieve a high level of customer acceptability and contentment. Because rural markets are becoming more and more valuable, marketers are paying closer attention to studying and understanding these regions. Consumer satisfaction is the core component of the marketing position. This is a difficult concept to understand, but it is essential to effective marketing. Consumer behaviour is shaped by a variety of factors, including the product, pricing, physical attributes, advertising, and cultural influence; on the other hand, personality, perception, attitude, and learning play a more significant role. Therefore, marketers need to be aware of these aspects in order to better understand consumers. Granite's inherent attributes, such as its very smooth mirror polish, flawlessly glossy surface, and longevity, have made it known as the "King of Stones." The most sought-after and extensively used stone material in architectural structures and major structural works globally today is Indian granite. Due to its exquisite, aesthetically pleasant characteristics and durability, it enjoys great recognition in the global market.

**Keywords:** Satisfaction, Behaviour, Consumer

### Statement of the Problem

A company's customer attitude can be used to gauge how successfully it can deliver goods and/or services to the market. Customer attitude surveys are deployed as management information systems by organizations. The surveys follow a systematic process of collecting customer data, analyzing it to provide useful information, and sharing the findings across the firm. Maintains the voice of the customer by assessing performance from the customer's point of view. The granites of India Granite is highly valued and holds a substantial market share globally. It may retain a lovely gloss and firmly entice customers because it is durable. Consequently, the factors influencing customers' purchase decisions are the main focus of the study. Given that the study's objective is to acquire precise and value and valid result.

### Objective of the Study

1. To study the satisfaction level
2. To analyse the behaviour of the consumer
3. To analyse various factors considered during purchase of the granite.

### Review of Literature

**Dr.M.Surya Kumar & Uthiyakar (2020)** indicate that the “Problems of entrepreneurs in granite industry” from their study it creates and displays monuments made of the finest granite available and provides numerous work opportunities, the indian granite industry is now well- known throughout the world. India is the biggest granite expoter in the world. Taking over the market in the context of globalisation and running into competitor nations worldwide.

**Dr. V.Vishnu Priya (2018)** told that “A study on analysis of customer attitude towards the usage of granite stones” according to her research, indian granite has emerged as the most sought after and extensively utilised stone material for large construction projects worldwide. However, its prestige and aesthetic qualities are not acknowledged in the global market. Planning a cross tab between two segmented variables yields results from the chi square test of independence, the t test for equality, and the interrelationship analysis of human science.

### Scope of the Study

A company's ability to successfully supply goods and/or services to the market can be determined by measuring the satisfaction of its customers. An organization's customer satisfaction survey is implement the study was conducted using responses to an opinion poll given by granite stone customers. The primary focus of this study is the granite stone satisfaction of domestic and commercial customers in the Tenkasi District. The study highlights the attitudes of the customers on the availability and usage pattern of granite stones.

### Research Methodology

The study employed a convenient sampling technique to select 411 samples, and factor analysis and weighted average ranking were employed by the researcher. The primary

data was collected from customers in the Tenkasi district, while secondary data was gathered from various journals, magazines, newspapers, and web sources, among other sources.

### Analysis of the Study

The researcher coded the 23 statements using a five-point Likert scale. The factor analysis revealed five significant variables that influence customers' decisions to purchase granites in Tenkasi.

**Table – 1 Utilisation of Granites Stone in Tenkasi District**

1. There is no charge for granite	.823	.158	.289	.318	-.066
2. There is enough sales force for the marketer	.805	.072	-.144	.023	-.056
3. The seller accepts returns of unused granites	.802	-.011	-.042	.433	.019
4. There is little variation	.792	.019	.023	-.317	.245
5. A granite choice consulting service is offered	.782	.357	-.217	.013	.320
6. There are a lot of vendors in the area	.762	.069	-.339	.383	-.091
7. The seller uses the skimming technique of pricing	.012	.816	-.087	.122	.138
8. Primary and secondary packs of granites are arranged	.026	.812	.362	.089	.148
9. Each adviser has sufficient load of stone	-.087	.776	.126	.179	.144
10. Mass rebate is advertised	.426	.764	-.136	.234	.271
11. Direct advertiser while purchasing rock	.610	.236	.894	-.019	-.086
12. Rock stones are presented in shifting assortment	.065	-.087	.863	.028	-.129
13. Paper promoting impact is successful	.543	.826	.853	.022	-.127
14. granites are accessible in the closer area	.506	.824	.841	.219	.048
15. Granite is presented using a loan premise	.141	.786	.823	.077	-.220
16. Each granite has a recorded cost	.487	.772	.666	-.310	.342
17. After sale support is offered	.143	.331	-.082	.876	.042
18. Variety designs available	.096	.741	-.457	.808	.021
19. Variety size available	.056	.202	.253	.806	.264
20. Penetration pricing is mostly adhered	-.103	.661	.584	.652	.052
21. Granites are transported to every area within the district	.312	.071	.120	.331	.664
22. Granite slabs are brought to the residence	-.051	.340	-.310	-.371	.645
23. Granite marketer covers the entire district	.282	.463	-.222	.072	.617

The factor analysis result above, along with the five aspects mentioned above, show how Tenkasi district customers see the use of granites. Each component has been given a name and has undergone analysis. According to the previously mentioned factor analysis result, the five factors indicated above explain how consumers perceive the use of granites in the Tenkasi district. Every factor has been named after an analysis was done. The terms "opposition," "cost and wrapping," "vending promotion," "merchandise practices," and



"carriage of granite" are used to describe the first, second, fourth, and fifth components, respectively. Principal component analysis served as the extraction technique. Kaiser Normalization was used in conjunction with the varimax rotation approach. Rotation converged after seven iterations.

**Table 1.1 Naming of the Extracted Factors**

Factor	Factor Name	Dominant Variable	Highest Factor Loading
I	Opposition	There is no charge for granites	.823
II	Price and Wrapping	The seller uses the skimming technique of pricing	.816
III	Vending advertising	Direct adviser while purchasing rock	.894
IV	Merchandise practices	After sale support is offered	.876
V	Carriage of granites	Granites are transported to every area within the district	.664

#### **Rank Wise Factors Influencing The Use Of Granites For Household Use:**

The detailed study in this regard has been made and the responses are analysed accordingly.

**Table No 2 Factors Influencing The Use of Granites**

S.no	Problems	W	5	4	3	2	1	W.A	Mean score	Rank
		R	1	2	3	4	5			
1	Goodwill	No	108	94	85	63	61	1358	3.30	I
		Ws	540	376	255	126	61			
2	Life assured	No	92	87	65	105	62	1275	3.10	VI
		Ws	460	348	195	210	62			
3	Quality	No	66	98	99	84	64	1251	3.04	VII
		Ws	330	392	297	168	64			
4	easy accessibility	No	59	64	97	89	102	1122	2.72	XI
		Ws	295	256	291	178	102			
5	Worthable	No	99	74	63	62	113	1217	2.96	VIII
		Ws	495	296	189	124	113			
6	Maintenance	No	112	75	74	72	78	1304	3.17	II
		Ws	560	300	222	144	78			
7	Varieties	No	89	96	84	60	82	1283	3.12	V
		Ws	445	384	252	120	82			
8	Healthy Environment	No	95	84	83	81	68	1290	3.13	IV
		Ws	475	336	249	162	68			
9	Attractiveness	No	69	82	74	79	107	1160	2.82	

		Ws	345	328	222	158	107			IX
10	Pollution charge	No	94	93	71	84	69	1292	3.14	III
		Ws	470	372	213	168	69			
11	Cooling residence	No	68	82	70	84	107	1253	2.80	X
		Ws	340	328	210	168	107			

### Interpretation

The preceding data makes it clear that "Situation Symbol" has been chosen #1 by the respondents, with the highest mean score of 3.30. The rankings for "Pollution Charge" and "Easy Maintenance" are third and second, respectively. Simple Accessibility, with a mean score of 2.72, comes in last.

### Suggestions

1. It is essential that clients have thorough understanding about how to handle and use granite stones in their residences or workplaces.
2. . It's critical to let clients know that the stone has a lifetime of flawless quality.
3. It is advised that they understand how crucial it is to finish granite stone quality checks prior to purchasing and using them for construction.

### Conclusion

As is clear from the statement, "Indian granite is highly recognized internationally and makes a substantial contribution to the country's foreign exchange earnings." Attitudes toward the many applications of granites and factors affecting the Tenkasi district's clients are investigated with the use of factor. In conclusion, it can be said that almost all granite stone companies have grown throughout the last ten years, and this tendency is anticipated to continue. Innovative products and ideas for communication that satisfy clients' growing needs. Furthermore, the government needs to create an environment that enables the industry to reach its full potential.

### References

Dr.M.Surya Kumar, Uthiyakar (2020), Problems Of Entrepreneurs In Granite Industry, *International Journal Of Science And Technology*, Vol-9(4), Pp-2137-2139.

Dr.V.Vishnu Priya (2018),”A Study On Analysis Of Customer Attitude Towards The Usage Of Granite Stones”, *Journal Of Emerging Technologies And Innovative Research*,Vol-5(3),Pp-643-647.

[www.geologynet.com](http://www.geologynet.com)

[www.wikepdia.wikistonesofindia.com](http://www.wikepdia.wikistonesofindia.com)

[www.blackseaminerals.com](http://www.blackseaminerals.com)

[www.tnmine.tn.nic.in](http://www.tnmine.tn.nic.in)

[www.graniteland.com](http://www.graniteland.com)

# The influence of chatbots using GPT on academic writing among college students

Biji Jose<sup>1\*</sup> and S. Muthulakshmi<sup>2</sup>

<sup>1\*</sup> Assistant Professor of Commerce, Government College Kottayam, Kerala, India.

<sup>2</sup> Associate Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [bijijose@gckottayam.ac.in](mailto:bijijose@gckottayam.ac.in)

## Abstract

With the increased usage of artificial intelligence (AI) technologies, chatbots powered by GPT have emerged as versatile tools in various domains, including education. Through the integration of GPT-based chatbots into the academic writing process, students are provided with instant feedback, suggestions, and guidance, potentially enhancing their writing skills and overall academic performance. However, the study also looks into the potential challenges and limitations associated with the use of AI-driven chatbots in educational settings.

**Keywords:** Artificial Intelligence, chatbots, AI driven

## Introduction

The history of chatbots traces its roots back to the mid-20th century when artificial intelligence (AI) was in its infancy. Among the earliest examples is Eliza, developed by Joseph Weizenbaum in the 1960s at MIT. Eliza simulated conversation by using pattern matching and simple keyword substitution. In the 1970s, Kenneth Colby created PARRY, a chatbot simulating a person with paranoid schizophrenia, to study human interactions with AI. By the 1990s, Dr. Richard Wallace's ALICE (Artificial Linguistic Internet Computer Entity) attempted natural language processing to engage in conversation and learn from users. The 2000s saw the rise of SmarterChild, a popular chatbot on AOL Instant Messenger, demonstrating the potential for chatbots in everyday communication. Apple's Siri, introduced in 2011, marked a significant milestone by integrating virtual assistants into mainstream technology. The development of deep learning and natural language processing led to the emergence of GPT-based chatbots in the 2010s, such as Google Assistant and Amazon Alexa, offering more sophisticated conversational experiences. Throughout their evolution, chatbots have become increasingly prevalent across various domains, including customer service,

education, healthcare, and entertainment, showcasing the continuous advancements in AI technology.

In recent years, the integration of artificial intelligence (AI) technology into various aspects of education has generated considerable interest and discussion. Among these AI-based innovations, chatbots powered by generative pre-trained transformers (GPT) have emerged as promising tools to assist students in their academic pursuits. Academic writing is a fundamental skill essential for success in higher education, yet many students struggle with aspects of it, including organization, grammar, and coherence. AI technologies can shape the educational landscape and provides valuable implications for pedagogy and technology development in higher education.

### Statement of the Problem

The emergence of GPT-based chatbots offers a new approach to addressing these challenges by providing real-time feedback, advice, and guidance to students as they navigate the complexities of academic writing. The integration of chatbots powered by Generative Pre-trained Transformers (GPT) into educational settings has raised questions regarding their impact on the academic writing proficiency of college students. However, while the potential of integrating GPT-powered chatbots into the writing process is clear, there are questions about their effectiveness, impact, and potential pitfalls. In this context it is proposed to conduct a study on the topic "The Influence of Chatbots Using GPT on Academic Writing Among College Students"

### Objectives of the Study

1. To review the demographic profile of College students in Kottayam District.
2. To understand the influence of chatbot using GPT among the study area.
3. To analyse the Problems in academic writing by the use of chatbots.

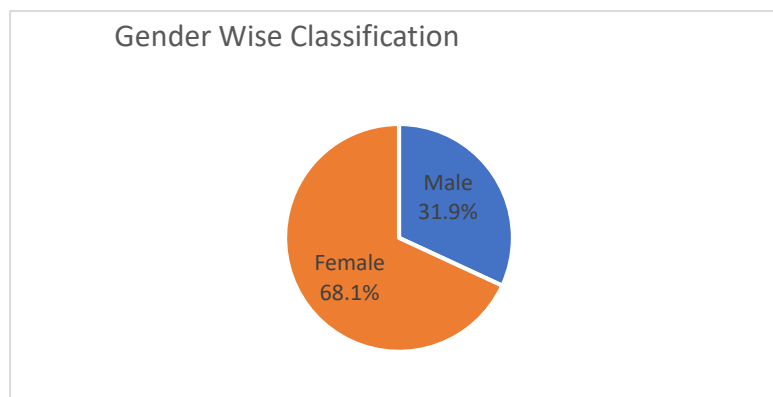
### Research Methodology

The study is based on both primary and secondary data. Primary data has been collected through a well-structured google form among 91 respondents in and around Kottayam district.

## Data Analysis and Interpretation

**I. Demographic Profile****Gender-wise Classification****Table:1 Gender -wise Classification**

Gender		
Male	29	31.9
Female	62	68.1
Total	91	100.0

**Fig:1****Table 2: Stream of Study**

	Frequency	Percent
Arts	22	24.2
Science	17	18.7
Commerce	52	57.1
Total	91	100.0

**Table 3: Place of Residence**

	Frequency	%
Gramapanchayath	42	46.2
Municipality	28	30.8
Municipal Corporation	13	14.3
Coastal Area	8	8.8
Total	91	100.0

**Table: 4 Usage of Laptops/Smartphones for Academic Purpose**

	Frequency	%
Below 1 hour	14	15.4
1 to 2 hour	26	28.6
3 to 4 hour	37	40.7
5 & above 5 hours	14	15.4
Total	91	100

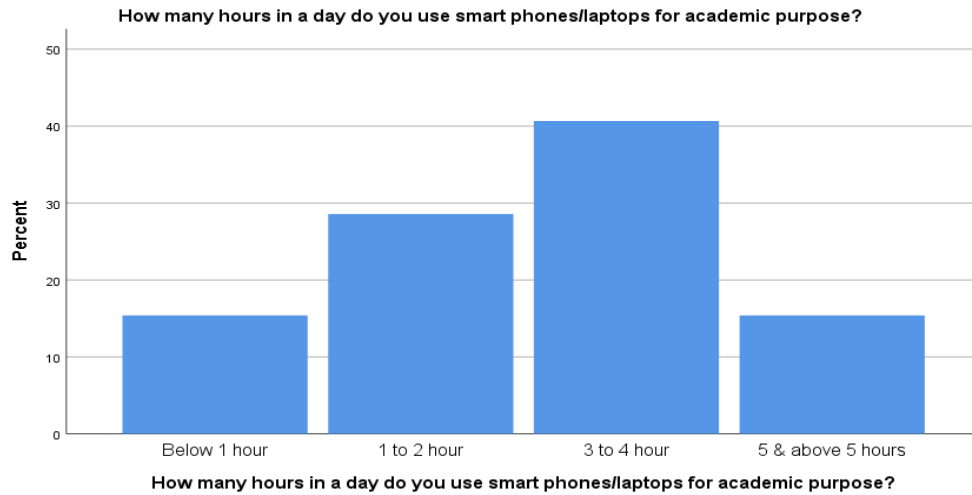


Fig: 2

From the above table & figures its very clear that majority of the respondents (68.1%) are female. 57.1% of the students are from Commerce field 46.2% resides in Gramapanchayath. Around 40.7% of the population use smartphones/laptops for around 4 hours in a day for academic purpose.

## II. Preference towards Academic Writing Assistance

Table:5

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Rank
Using chatbots powered by GPT exclusively	91	1	4	2.68	III
Using traditional writing resources (e.g., textbooks, writing guides, and consultations with professors or tutors)	91	1	4	2.29	II
A combination of chatbots powered by GPT and traditional writing resources	91	1	4	1.71	I
I prefer to work on academic writing tasks independently without external assistance.	91	1	4	3.32	IV
Valid N (listwise)	91				

From the above table its clear that majority of the respondents prefer to use a combination of chatbots powered by GPT and traditional writing sources for academic writing rather than relying fully on Chatbots



### III. Attraction Towards Chat GPT

**Table:6**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Rank
Chatbots offer immediate and accessible assistance anytime, anywhere	91	1	4	1.55	I
Chatbots can quickly generate ideas and provide feedback, saving time compared to traditional methods	91	1	6	2.23	II
Chatbots can adapt to individual writing styles and preferences, providing tailored assistance	91	2	6	3.59	III
Chatbots powered by GPT provide access to a wide range of resources and information sources	91	3	5	3.96	IV
Chatbots powered by GPT are better at identifying and correcting errors in grammar, spelling, and punctuation	91	2	6	4.75	V
Chatbots powered by GPT are perceived as a more cost-effective option for academic writing assistance	91	1	6	4.92	VI
Valid N (listwise)	91				

The main attraction towards chat bots is there immediate & accessible assistance anytime, anywhere. Least importance is given to its cost-effectiveness

### IV. Influence In Academic Writing

**Table:7**

	N	Sum	Mean	Rank
Chatbots using GPT have helped me generate ideas and overcome writer's block in my academic writing	91	380	4.18	II
Interacting with chatbots using GPT has enhanced my understanding of grammar and writing conventions	91	313	3.44	X
Using chatbots powered by GPT has made academic writing tasks more enjoyable for me.	91	364	4.00	III
Chatbots using GPT have provided valuable feedback that has helped me improve my academic writing.	91	314	3.45	VII
Chatbots powered by GPT have expanded my vocabulary and improved my word choice in academic writing.	91	280	3.08	XII
I feel more equipped to tackle complex academic writing tasks with the assistance of chatbots using GPT	91	330	3.63	V
Helps to understand the structure of academic writing.	91	325	3.57	VI
Improved my ability to incorporate citations and references accurately .	91	306	3.36	XI

I prefer using chatbots powered by GPT because they offer immediate assistance without the need to schedule appointments or wait for responses.	91	338	3.71	IV
GPT offer more relevant and up-to-date information compared to traditional writing resources	91	310	3.41	IX
GPT aligns with my preference for incorporating technology into my academic workflow.	91	314	3.45	VII
GPT provide a user-friendly experience to me	91	383	4.21	I
Valid N (listwise)	91			

User friendly feature of Chatbot powered by GPT is the main influential factor towards academic writing.

## V. Problems in Academic Writing

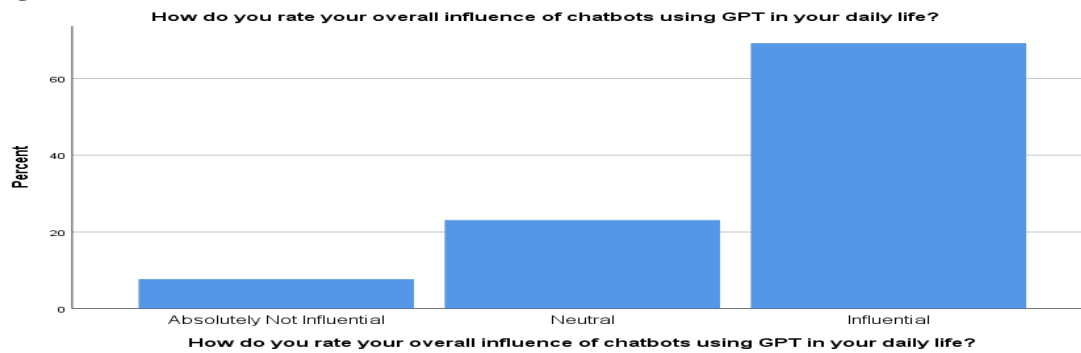
**Table:8**

Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Rank
I feel that relying on chatbots using GPT for academic writing might hinder my own writing skills development.	91	1	4	178	1.96	V
Sometimes GPT provide irrelevant or inaccurate information, leading to confusion	91	1	3	204	2.24	III
Struggle with incorporating the output from GPT into my academic matters	91	2	4	252	2.77	I
GPT may lead to overreliance, causing me to neglect the development of my own critical thinking and writing skills	91	1	4	197	2.16	IV
GPT sometimes generate content that lacks depth or originality, making it challenging for me	91	1	5	247	2.71	II
Valid N (listwise)	91					

The most important problem in the usage of GPT is its struggle in incorporating the output from GPT into the academic matters.

**Table:9**

	Frequency	%
Absolutely Not Influential	7	7.7
Neutral	21	23.1
Influential	63	69.2
Total	91	100.0

**Fig:3**

Around 69.2% of the respondents are of the opinion that ChatGPT has influence in academic writing.

### Findings of the Study

- 56.1% of the respondents use smartphones/laptops for academic purpose in a day.
- Majority of the responded apply a blended approach in academic writing ie, using both traditional and AI powered ChatGPT.
- The main attraction towards ChatGPT is there immediate & accessible assistance anytime, anywhere.
- User friendly feature of Chatbot powered by GPT is the main influential factor towards academic writing.
- The major problems in the usage of GPT is its struggle in incorporating the output from GPT into the academic matters and also it generates content that lacks depth or originality,
- 69.2% of the respondents has the opinion that ChatGPT has influence in academic writing.

### Conclusion

The integration of chatbots powered by GPT technology has shown significant promise in influencing academic writing among students. GPT-powered chatbots play a valuable role in supporting students throughout the writing process. They provide personalized feedback, guidance, and support, enhancing students' writing skills and confidence. Moreover, these chatbots can make writing instruction more engaging and accessible, promoting active student participation and learning. At the same time too much dependence on this type of AI assisted

technologies may adversely affect critical thinking and writing skills of the students. Overcoming these challenges will require collaborative efforts from educators, researchers, and technology developers to ensure the responsible and equitable integration of chatbots into writing pedagogy.

## References

- Smith, J., & Johnson, R. (2019). *The Role of Chatbots in Academic Writing Support: A Systematic Review*. Journal of Writing Studies, 8(1), 45-60.
- Allen, M., & Smithe, K. (2020). *Enhancing Academic Writing Skills Through AI Chatbots: A Systematic Review*. Journal of Educational Technology Integration, 12(2), 45-58.
- Johnson, L., & Smith, A. (2019). *The Role of GPT-based Chatbots in Writing Pedagogy: A Literature Review*. Journal of Writing Studies, 7(1), 89-104.

# Smart Farming Agriculture using IOT

**R. Maheswari**

Assistant Professor of Commerce CA (SF), V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [maheswari.r@vhnsnc.edu.in](mailto:maheswari.r@vhnsnc.edu.in)

## Abstract

Smart farming agriculture utilizing Internet of Things technology has emerged as a promising solution to address the challenges faced by modern agriculture. With the growing global population and increasing demand for food production, there is a pressing need to enhance productivity, optimize resource utilization, and ensure sustainability in farming practices. IoT offers a range of innovative solutions that enable farmers to monitor, manage, and automate agricultural operations in real time, leading to improved yields, reduced costs, and minimized environmental impact. This paper presents an overview of smart farming agriculture using IoT, highlighting its key components, benefits, and applications. It explores how IoT sensors, actuators, and connectivity technologies are deployed in farming environments to collect data on soil conditions, weather patterns, crop health, and livestock behaviour. The collected data were then analysed using advanced analytics and machine learning algorithms to derive actionable insights for decision-making. Furthermore, this study discusses the implementation of IoT-based solutions in various aspects of farming, including precision agriculture, irrigation management, crop monitoring, and livestock tracking. It examines how the IoT enables farmers to optimize resource usage, improve operational efficiency, and respond proactively to changing environmental conditions. In conclusion, smart farming agriculture using IoT holds immense potential to revolutionize the way we produce food, offering a pathway towards sustainable and efficient agricultural practices. By harnessing the power of IoT technology, farmers can unlock new opportunities for growth, resilience, and prosperity in the face of evolving challenges in the agricultural sector

**Keywords:** Smart Farming, SaaS, Senosrs, Drones, Precision Algorithm

## 1. Introduction

IoT stands for the Internet of Things. It refers to a network of physical devices, vehicles, home appliances, and other items embedded with sensors, software, and



connectivity features that enable them to collect and exchange data over the internet or other networks. In simple terms, IoT devices are everyday objects that are connected to the internet, allowing them to communicate and interact with each other without human intervention.

### Smart Farming

Smart farming centres on leveraging technology, both hardware and software, to enhance farm productivity. It integrates IOT, drones, robotics, machinery, and artificial intelligence to optimize farm management, from planting to harvesting, aiming for consistent and predictable outputs. Smart farming emphasizes the utilization of data from various sources historical, geographical, and instrumental to inform and improve farm activities. Merely being technologically advanced doesn't qualify a system as smart.

In smart farming, hardware such as IoT devices and software like Software as a Service (SaaS) work together to gather data and provide actionable insights for managing all farm operations, including pre- and post-harvest activities. This data is well-organized, accessible at all times, and encompasses various aspects of finance and field operations, enabling monitoring from anywhere in the world.

### 2. Key Components in Smart Framing

1. **Sensors:** IoT sensors play a crucial role in smart farming by collecting real-time data on environmental conditions such as soil moisture, temperature, humidity, and light levels. These sensors can be deployed across fields to monitor crop health and optimize irrigation, fertilization, and pest control strategies.
2. **Drones and UAVs:** Unmanned aerial vehicles (UAVs) equipped with cameras and sensors are used in smart farming for aerial imaging, mapping, and monitoring crops. Drones can provide high-resolution imagery of fields, allowing farmers to detect crop health issues, assess plant growth, and identify areas requiring attention.
3. **IoT-enabled Machinery:** Modern farm equipment such as tractors, harvesters, and irrigation systems are equipped with IoT sensors and connectivity features. These IoT-enabled machines can collect data on operational performance, fuel usage, and maintenance needs, allowing farmers to optimize equipment usage and reduce downtime.
4. **Precision Agriculture:** IoT technologies enable precision agriculture practices, where farmers can apply inputs such as water, fertilizer, and pesticides precisely where and when



they are needed. By analysing data from sensors and satellite imagery, farmers can create detailed maps of their fields and implement site-specific management practices to optimize yields and minimize environmental impact.

5. **Data Analytics and AI:** IoT-generated data is often processed using advanced analytics and artificial intelligence (AI) algorithms to extract actionable insights for decision-making. Machine learning algorithms can analyse large datasets to predict crop yields, identify disease outbreaks, and recommend optimal farming practices based on historical data and real-time observations.
6. **Smart Irrigation Systems:** IoT-based irrigation systems use sensors to monitor soil moisture levels and weather conditions, automatically adjusting water delivery to optimize irrigation efficiency and conserve water resources.
7. **Livestock Monitoring:** IoT technologies are also used in livestock farming for tracking animal health, behaviour, and location. Wearable sensors and RFID tags can monitor vital signs, detect illnesses, and track animal movements, enabling proactive management and improving overall herd health.

### 3. Smart Farming Cycle

In an IoT-based smart farming system, data serves as the cornerstone for optimizing agricultural processes. A continuous and iterative cycle is essential to collect, analyze, and act upon the data effectively. Here's an outline of the smart farming cycle:

1. **Observation:** Sensors deployed throughout the farm environment monitor various parameters such as soil moisture, temperature, humidity, and crop health. These sensors continuously gather data, providing real-time insights into the farm's conditions.
2. **Data Analysis:** The data collected by sensors is transmitted to IoT-based cloud platforms for analysis. Sophisticated algorithms and analytics tools process the data to identify patterns, trends, and anomalies. This analysis generates valuable insights into the farm's performance and potential areas for improvement.
3. **Decision-Making:** Farmers leverage the insights derived from data analysis to make informed decisions about farm management practices. These decisions may involve adjusting irrigation schedules, applying fertilizers or pesticides, implementing pest control measures, or planning crop rotations. By integrating data-driven insights into their decision-making processes, farmers can optimize resource allocation, maximize yields, and minimize waste.

4. **Implementation:** Actions based on the decisions made are executed on the farm. This may involve deploying automated machinery or irrigation systems, adjusting planting schedules, or implementing precision agriculture techniques. The implementation phase represents the practical application of data-driven insights to improve farm operations.
5. **Continuous Improvement:** The smart farming cycle is on-going and iterative. As new data is collected and analysed, farmers continually refine their strategies and practices to adapt to changing conditions and optimize performance. This iterative process of observation, analysis, decision-making, and action drives continuous improvement and innovation in smart farming practices.

By following this smart farming cycle, farmers can harness the power of IoT technology to optimize agricultural productivity, improve resource efficiency, and ensure sustainable farming practices.

#### 4. IoT Solutions for Small Farming

IoT solutions can offer numerous benefits to small-scale farmers by providing valuable insights, optimizing resource usage, and enhancing productivity. Here are some IoT solutions tailored for small farming:

1. **Soil Monitoring Sensors:** IoT-enabled soil sensors can measure key soil parameters such as moisture levels, pH, temperature, and nutrient content. By continuously monitoring soil conditions, farmers can ensure optimal growing conditions for their crops, leading to improved yields and reduced water and fertilizer usage.
2. **Weather Monitoring Stations:** IoT weather stations collect real-time data on temperature, humidity, rainfall, wind speed, and other weather parameters. This information helps farmers make informed decisions about irrigation, planting, and harvesting, allowing them to adapt to changing weather conditions and minimize risks associated with extreme weather events.
3. **Crop Monitoring Cameras:** IoT-enabled cameras can be used to monitor crop growth, detect pest infestations, and assess overall plant health. By capturing high-resolution images of the field, farmers can identify potential issues early and take proactive measures to protect their crops, leading to higher yields and reduced losses.
4. **Smart Irrigation Systems:** IoT-based irrigation systems use sensors to monitor soil moisture levels and weather conditions, automatically adjusting water delivery to ensure



optimal irrigation. By applying water only when and where it's needed, farmers can conserve water resources and reduce water-related costs while maintaining healthy crops.

5. **Livestock Tracking Devices:** For small-scale livestock operations, IoT-enabled tracking devices can be used to monitor the location, health, and behaviour of animals. These devices provide real-time insights into livestock movements, allowing farmers to optimize grazing patterns, detect health issues early, and prevent livestock theft or loss.
6. **Mobile Applications:** User-friendly mobile applications allow farmers to access real-time data, receive alerts and notifications, and remotely control IoT devices from their smartphones or tablets. These applications provide farmers with valuable insights and actionable information, enabling them to manage their farms more efficiently and effectively.
7. **Marketplace Platforms:** IoT-based marketplace platforms connect small-scale farmers directly with buyers, retailers, and consumers, bypassing traditional intermediaries and reducing transaction costs. These platforms enable farmers to access larger markets, obtain fair prices for their products, and increase their profitability.

## 5. Conclusions

By leveraging IoT solutions tailored for small farming, farmers can overcome various challenges, improve efficiency, and achieve sustainable growth in their operations. These technologies empower small-scale farmers with the tools and insights they need to succeed in today's competitive agricultural landscape.

## 6. References

Arora, S., and Sengar, S. S. (2020). Smart Farming: A Review on IoT-Based Monitoring and Controlling System. *In Proceedings of the International Conference on Computer Networks, Big Data and IoT (CNBDI'20)* (pp. 133-138). ACM.

Suryani, E., Wibowo, F. W., and Yuniarti, T. (2021). Smart Farming for Precision Agriculture Using Internet of Things (IoT) Technology: A Review. *In Proceedings of the International Conference on Information Technology and Digital Applications (ITDA'21)* (pp. 53-58). IEEE.

Nadeem, M. S., Javaid, N., Niyaz, Q., and Alrajeh, N. A. (2017). Internet of Things (IoT) in agriculture: System architecture, benefits and applications. *Computers and Electronics in Agriculture*, 142, 283-299.

Mishra, P., and Aparimita, A. (2020). Smart agriculture monitoring system using IoT. *In Proceedings of the International Conference on Intelligent Sustainable Systems (ICISS'20)* (pp. 775-780). IEEE.

Zou, Z., Chen, H., and Sun, J. (2020). A Review of IoT Applications in Smart Agriculture. *In Proceedings of the International Conference on Internet of Things, Data and Cloud Computing (ICC'20)* (pp. 124-129). ACM.

# AI's Effects on Customer Relationship Management in the Banking Sector

K. Uma Maheswari<sup>1\*</sup>, R. Deepa<sup>2</sup> and N. Bhagyashree<sup>3</sup>

<sup>1\*</sup>Professor, Centre for PG Studies, Sindhi College, Bangalore, India

<sup>2</sup>Assistant Professor, Ramaiah College of Arts, Science and Commerce, Bangalore, India

<sup>3</sup>PG. Student, Sindhi College, Bangalore, India

\*Corresponding Author e-mail iD: [umameenaxi@gmail.com](mailto:umameenaxi@gmail.com)

## Abstract

Every business needs to focus on effective Customer Relationship Management (CRM) to understand their customers better. Successful companies use CRM to automate their business processes, develop personalized communications, and provide customers with helpful answers to their questions. By combining generative AI with CRM, businesses can access customer information more easily and track, analyze and collaborate on customer data throughout their lifecycle. Banks also use AI tools for CRM to manage customers and strengthen their relationships. This study aims to determine the effectiveness of AI-combined CRM in the banking industry, which helps to improve customer satisfaction.

**Keywords:** Artificial Intelligence (AI), Customer Relationship Management (CRM) and banking sector

## Introduction

Artificial intelligence technology is becoming increasingly common in financial institutions. It is capable of replacing human-to-human interactions in decision-making and action-taking processes. AI is helping banks expand and is expected to capture over a trillion dollars of the financial sector by 2030<sup>1</sup>. The use of AI is crucial for financial institutions to stay updated with the latest technological advancements. Commercial banks have started using AI to address long-standing financial issues, such as fraud detection, enhancing customer experience, tracking customer behavior for recommending more personalized services, analyzing customer credit histories to predict risks associated with allotting loans, and many more. Application of AI-CRM tools with different perspectives drive in different areas includes sales, marketing, service, and operations activities, its inters functionality has made the AI-CRM research even more fragmented in the banking sector.

The banking industry is highly competitive due to the globalization of the economy, making the financial sector unstable and fragile. Banking involves various steps, from screening application forms to ensuring safe monetary operations for clients who continue to use the institution's services. Consumers expect better services wherever they interact, and they are constantly pressing for an enhanced customer experience. As technology has advanced over the years, businesses have started to implement cutting-edge innovations such as artificial intelligence to provide clients with higher-quality services. AI in the banking industry is incredible. The banks are implementing AI for detecting fraud, enhancing customer experience, tracking customer behavior for recommending more personalized services, analyzing customer credit histories to predict risks associated with allotting loans, and many more. The article examines how AI is being used in India's leading financial institutions, as well as in the various sectors of banks. Banking is becoming more modern, and banks are increasingly using cutting-edge technologies such as blockchain, cloud computing, and AI.

### **Statement of the Problem**

Customer Relationship Management CRM is a powerful tool in sales management, contact management, and productivity enhancement to enhance customer satisfaction and commercial relationships. Machines become quicker, more reliable, and cheaper than human workers, due to the continual rise in customers' expectations. Enhancing customer experience is a challenging task in the digital world. Customer Relationship Management with AI software options are available to financial institutions, corporates, and banking industries. Some of the most popular AI, tools for CRMs used by banks include Sugar CRM, Lead Squared, Creatio, VYMO and Automate CRM. To manage customer data efficiently, and to track customer interactions effectively, CRM software is a flexible tool that is used in the banking sector and they generate reports and analytics. In addition, it is also wielded to improve customer service, well-organized communication, and barbarize sales and marketing processes. Lead Squared is one of the pretentious CRMs for the banking industry. It furnishes a comprehensive range of banking-specific features like debtor management and corporate relationship management that make it an exclusive choice for banks. Despite their benefits, CRM platforms can introduce new challenges in banking is providing security, scalability, and restricted access to employees without compromising customers' data. Information security from unauthorized access and the incorporation with existing systems is the most emanate challenges while adopting CRM in the

banking sector. So, it is important to study. AI's Effects on Customer Relationship Management in the Banking Sector

### Objectives of the Study

- To find the AI's effectiveness on CRM in the banking sector to measure customer satisfaction.
- To suggest the ways and means used to improve the effectiveness of customer relationship management.

### Hypothesis

N0: There is no significant difference of opinion about AI's effect on CRM among different gender, age, education and occupation

### Research Methodology

This study is a combination of quantitative and qualitative research design. Both primary and secondary data were used to collect the data. to acquire primary data, a survey is being done using a questionnaire. For obtaining the secondary data different data accessible via websites, journals, books, etc. has been employed in this research. The Target Population and Sampling for this research are based in Bengaluru, the respondents are from Public and Private sector banks in Bengaluru concerning its customers. The questionnaire was distributed to 200 respondents out of which 107 responded. The Sampling Technique of sampling used in this research Convenience sampling techniques. Analysis of variance determines the statistically significant difference in means occurring between two or more groups. The Tools used for data analysis and interpretation in this research are SPSS and MS Excel have been used for both data coding as well as data transcription.

### Data Analysis

This study has analysed the AI's effects on customer relationship management in the Banking Sector, the following are the statements that represent the effects of AI on customer relationship management;

TABLE:1 STATEMENTS DETERMINING THE EFFECTS OF AI ON CRM

Sl.No	Statements determining the effects of AI
1	AI on CRM is personalized for each customer
2	AI on the customer support system is as per the customer's need
3	AI supports and assists the virtual solutions for customer
4	AI always updates the security system and CRM
5	CRM with AI ensures that it never shares customer data with others
6	AI provides some bonding and trust in customer relationships
7	AI updates CRM on a real-time basis
8	AI-based CRM is always customer friendly
9	AI-based CRM is more flexible
10	AI-based CRM always considers the customer's values

Factor analysis was carried out by using SPSS package for 200 respondents. The shows the results of Batletts test of sphericity and KMO test. The null hypothesis is "The factor analysis is not valid"

TABLE 2 KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.863
Bartlett's Test of Sphericity	Approx. Chi-Square	1216.070
	Df	105
	Sig.	.000

The above table shows the results of Bartlett's test of sphericity significance since the appropriate chi-square value is 1216.070 which is significant at 1% level, the test leads to the rejection of the null hypothesis therefore the hypothesis that the factor analysis is valid. The value of KMO statistics (.863) was also large and it reveals that factor analysis might be considered an appropriate technique for analysing the correlation matrix.

From the above table, it is clear that KMO is close to 1.0, so the correlation between variables is strong and the variables are suitable for factor analysis in this study Cronbach's Alpha is  $0.877 > 0.7$  which is consistent for research. Also, the KMO score is significant on the scale. The Study shows the KMO and Bartlett test at the score of  $0.863 > 0.6$  which is significant at

P values. The analysis of data shows the valid result of reliability and validity of data at significant p values. The results in the table suggest that the respondents in this study discriminated and provided evidence of discriminant validity.

AI-based CRM plays a vital role in all the fields, which is necessary for the development of the Industries, this study investigates the AI's Customer Relationship Management will be effective in the banking Industry. For that this study framed 10 statements to check the effects of AI's CRM in the banking industry through five point Likert Scale (1- strongly disagree, 2- disagree, 3- neither agree nor disagree, 4- agree, 5- strongly agree). These statements are considered as the dependent variables, analyzed with the help of factor analysis and named as different factors.

TABLE 3 ROTATED COMPONENT MATRIX  
AI'S EFFECT ON CRM IN BANKING

Statement (AI's Effect on CRM in Banking)	Factors	Component
		1 &2
personalization	AI Elevates Customer experiences across the system 51.831	.779
customer needs		.725
Virtual Solution		.590
Real-time update		.662
never sharing		.623
bonding		.621
Flexible	AI on Customer-Centric Banking 16.512	.835
customer value		.853
Updated Security		.658
Customer-friendly		.556

AI's Effect on CRM in Banking statements such as personalization, customer needs, virtual solution, real-time update, never sharing, and bonding come under one factor called AI Elevates customer experience across the system with total components of 52.831, and the flexibility,

customer value, updated security system and customer friendly come under one factor as AI on customer-centric banking with the total components values of 16.512.

This study analyses the opinion of the customers of AI's effect on CRM with the help of a structured questionnaire and frames the hypothesis. It has found the results using ANOVA test and the results are as follows;

Null hypothesis: There is no significant difference of opinion about AI's effect on CRM among different gender, age, education and occupation

TABLE 4 CUSTOMERS' OPINION OF 'AI'S EFFECT ON CRM' ON BANKING INDUSTRY

Perception	Type of Variables	N	Mean	Std. Deviation	't'/'F'	Sig.
Gender	Male	62	3.53	0.65	2.654	.106
	Female	55	3.37	0.71		
age	Less than 30	82	2.14	.68	1.828	.146
	31-40	16	2.00	.86		
	41-50	8	1.68	.57		
	50 above	11	1.77	.43		
education	High school	4	1.87	.16	1.652	.181
	UG	77	1.99	.65		
	PG	20	2.36	.65		
	Other	16	2.06	.90		
Occupation	Students	48	2.10	.51	2.654	.106
	professionals	23	1.91	.60		
	own business	4	1.37	.42		
	employee	38	2.19	.91		
	homemaker	4	2.00	.00		

From the above table, the significant values are more than 0.05 and the null hypothesis is accepted it gives the result that the customer's opinion about AI's effect on CRM among the bank customers is positive. There is no difference of opinion among the group of customers in their gender, age, education and occupation. So this study proved that AI tools are very effective in CRM and it helps to maintain the customer relationship.



## Conclusion

Retaining customers in the fast-paced world of technology is a challenging task for banks. The competition has become even tougher for the banking sector due to the rise of LPG. As a result, banks need to improve themselves by providing various AI tools to ensure the safety and comfort of their customers. The banking industry has been enhancing its relationship management by offering a variety of useful instruments that guarantee security, comfort, and stability. Upgrading technology can help raise the level of service and security and enhance the bank's reputation. Nowadays, internet and phone banking are more appealing to clients due to their efficiency and user-friendliness. To compete with non-banking sectors, banks must adopt the latest and most popular technologies of the modern age to boost their relationship marketing tactics. The banking sector has benefited greatly from automation. Artificial intelligence techniques can be employed in the banking sector to improve the speed and creativity of client banking transactions. Fortunately, AI has been offering a wide range of applications to help banks operate as efficiently as possible, opening the door for a new level of financial services.

## References

1. Bhatt, D. P. (2021). *Role of AI in improving CRM, Sales and Customer Experience*. Pandit Deendayal Petroleum University, Gandhinagar.
2. Cristina Ledro, A. N. ( December 2022). Artificial intelligence in customer relationship management: literature review and future research directions. *Journal of Business & Industrial Marketing* , 48-63.
3. Chatterjee, S., Ghosh, S.K., Chaudhuri, R. and Chaudhuri, S. (2020b), “*Adoption of AI-integrated CRM system by Indian industry: from security and privacy perspective*”, *Information & Computer Security*, Vol. 29 No. 1, pp. 1-24, doi: 10.1108/ICS-02-2019-0029, Emerald Group Publishing Ltd., Department of Computer Science and Engineering, Indian Institute of Technology, Kharagpur, India.
4. Waltman, L., Van Eck, N.J. and Noyons, E.C.M. (2010), “*A unified approach to mapping and clustering of bibliometric networks*”, *Journal of Informetrics*, Vol. 4 No. 4, pp. 629-635.
5. Catalan-Matamoros, D. (2012), “*An overview to customer relationship management*”, in Catalan-Matamoros, D. (Eds), *Advances in Customer Relationship Management*, IntechOpen, London.
6. Lokuge, S., Sedera, D., Kumar, S., Ariyachandra, T. and Ravi, V. (2020), “*The next wave of CRM innovation: implications for research, teaching, and practice*”, *Communications of the Association for Information Systems*, Vol. 46, pp. 560-583.

7. Przegalinska, A., Ciechanowski, L., Stroz, A., Gloor, P. and Mazurek, G. (2019), “*In bot we trust: a new methodology of chatbot performance measures*”, Business Horizons, Vol. 62 No. 6, pp. 785-797.
8. Satheesh Kumar M, S. N. (May 2021). Applications of Artificial Intelligence on Customer Experience and Service Quality of the Banking Sector. *International Management Review* Vol. 17 No. 1 2021 , 4-17.
9. Rauniyar, R. ( November 7, 2022). CRM in Banking, Benifits with Examples. *Top 10 CRM for Banking Industry in 2022* . India: TechJockey.
10. Awasthi, P., & Sangle, P. S. (2013). The importance of value and context for mobile CRM services in banking. *Business Process Management Journal*, 19(6), 864-891. 0.1108/BPMJ
11. Ullah Shafi, Ahmed Manzoor Hashmi, and Syed Muhammad Hasan (2013), “Electronic Customer Relationship Management in Banking Sector of Pakistan: A Challenge from the Emerging Technology”, *Asian Journal of Research in Banking and Finance* vol:3, issue:2



## AI and Fintech Companies

**Sathyannarayana. R**

*Assistant Professor, School of Business, St. Joseph's University, Bengaluru, Karnataka, India*

\*Corresponding Author e-mail ID: [Sathyamr26@gmail.com](mailto:Sathyamr26@gmail.com)

### Abstract

AI is been rapidly changing dynamics of every industry and providing quicker solution to various challenges. Industries cannot avoid AI and its integration, it's highly impossible to survive without adopting AI into business processes. Fintech which is referred as finance and technology integration also includes AI in its business process. Investors are more exposed to fintech after covid19 pandemic, many investors use fintech apps such as BharathPe, Upstock, Groww, Paytm and others to choose investment avenues such as equity, bonds, digital gold and so on to build portfolio of their own. However, the biggest question is AI which is merely build by humans, when it is integrated into fintech, investors who are using these various fintech apps are not taking their decision, rather their decision are being influenced by some others investment bias. This is the biggest challenge of AI integration into fintech. There are large number of players in fintech startups and investors exposure, especially retail investors participations in stock market through fintech. Therefore, there is a requirement to study the AI role in fintech and risks associated with the integration of AI and Fintech.

**Keywords:** Fintech, financial products, AI, and Regulatory sandbox.

---

### Introduction

The origin of Indian FinTech can be traced from the previous decade. The Indian FinTech industry is the result of a composition of different technological enablers, regulatory interventions and business opportunities as well as certain other characteristics unique to India. Penetration of internet and smart phones paved way for FinTech to expand their reach rapidly in India. Having a high composition of young population, Indian market demographic dividend is favorable for the growth of fintech<sup>1</sup>. According to the report of TRAI (2020)<sup>2</sup>, 1157.75 million subscribers were

actively using FinTech, among which 638 million were from urban area and the remaining 519 million consists of rural subscribers. According to the Global FinTech Adoption Index 2019, India and China took a lead with 87 per cent adoption rate. There has been a decline in tariff rates and at the same time an increase in per capita usage of internet can be witnessed. FinTech, has already started to revolutionalise banking sector. An industry report<sup>3</sup> predicts that the FinTech industry will grow up to 150 billion dollars within the next five years in India. Already over 2,000 FinTech companies grew stronger with a significant number of them having established shop in the last five years alone. As of 2021, this industry has produced 11 Unicorns<sup>4</sup> since January 2020, undeterred even by the pandemic. FinTech firms are not considered as competitors by banks, rather they are the connecting force between new generation customers and banking industry. Banks and NBFC's are adopting number of strategies to embrace technological innovation; ranging from investing in FinTech companies and launching FinTech subsidiaries, to collaborate with FinTechs for various operational functions. Banking and non-banking companies joined hands to offer the combination of trust and innovation to facilitate the Indian consumer<sup>5</sup>. To accelerate revenues and profits, they explore into newer areas such as insurance, asset management, brokerage and other services backed up by financial technologies. All these developments prompted RBI to introduce fintech department, to promote fintech startups to work with bank in Jan 2022<sup>6</sup>. Some of the fintechs promote automated trading through algorithms which is programmed by trading experts, this is been monitored by SEBI to safeguard the interest of retail investors. Therefore, there is a need to study this trend.

### Literature Review

- Livea Rose Paul<sup>7</sup> (2021) studied on understanding fintech and its applications. This paper covers significant areas such as cryptocurrency and digital cash, smart contracts, open banking, blockchain technology, regtech, insurtech, crowdfunding and the like. Further it discusses fintech history and its evaluation, confirming it as not completely new technology to deal with, but evolving overtime and bringing new challenges to address. The paper highlights that Know-hows like machine learning, AI and predictive analysis in financial services can effectively influence entire business policy, resource optimisation and revenue generation.

- Douglas W. Arner, et.al., (2017)<sup>8</sup> examined the importance of financial innovation and at same time its implications on financial stability. The study has highlighted the 2008 Global financial crises due to an innovative financial service embodied in product innovations such as collateralized debt obligation without appropriate regulatory framework in place. Therefore, this paper focused on regulatory framework of financial products and services with the help of technology, which is referred as Regtech. The study revealed that Regtech assures innovative financial products and services within the ambit of a country's regulations. In India regulatory sandbox of different financial regulators are in place, they support the development of innovative financial products and services within the acceptable financial regulator norms.
- Dr.P.Rajeswari and Dr. C.Vijai (2021)<sup>9</sup> had attempted to understand the revolution resulted in Indian financial system due to the role played by fintech industry. The paper analyzed the adoption of fintech technologies to avail better financial services and access new products through descriptive analysis. The study covers fintech industry structure, fintech startup in India and fintech news network. Fintech News Networks was launched in 2015 to deliver fintech centric content and updates on fintech events and webinars, thereby this network educates people about fintech role in the financial system.

### Statement of the problem

'Investors are rational' is the basic assumption that governs the investment portfolio regarding any innovative financial products. To substantiate this statement, investors are rational, who take calculative financial decisions based on their goals and risk-taking appetite. The same was quoted in rational choice theory<sup>10</sup>. However, it is proved that investors are not always rational. In recent study it is found that fintechs are coming up with lot of financial products and services, but very little study is done how this trend is influencing investors behavior and their risk-taking ability. It is observed that investors, especially retail investors use fintech as a means to invest in various products. But fintech itself supported by AI tools, which are built by other humans, this leads to bias investment decision. Hence, this paper focuses on studying the impacts of AI integration with fintechs and risk associated with this integration.

### Objectives of the study

- To understand the investors behaviors towards fintech products.
- To understand AI integration with fintechs.
- To study the risk associated with fintech products and services.
- To know the process involved in implementation of Regulatory Sandbox.
- To study the impact of implementation of regulatory sandbox on investment pattern.

### Research Methodology

The present study is an exploratory research. The relevant data for this study were collected from books, journals, magazines, periodicals, newspapers; published and unpublished reports, and other publication of current reviews kept in online repositories. This study review literature from articles, journals. Its attempt to investigate issues faced by fintech industry in regulatory framework and in offering innovative financial products and services.

### Regulatory Sandbox and its implications on FinTech companies

In the last five years, India has transformed as a house of innovation and entrepreneurship in the area of FinTech. No doubt, that such innovations and disruptions in the financial sector have taken place in an ambiguous regulatory area with insufficient rules and regulations. For example, the extensive entry of mobile wallets during 2010s due to boom in telecom and internet usage, paved way for RBI to issue detailed guidelines regarding operation of wallets like threshold limit of amount stored in wallet, in order to prevent huge risk<sup>11</sup>. To address growing regulatory concerns in the FinTech, Regulatory Sandbox was introduced in India by RBI in 2019, Regulatory Sandbox denotes to live testing of new products or services in a controlled/test regulatory environment for which regulators may or may not allow certain regulatory relaxations for the limited purpose of the testing. The RS allows the regulator, the innovators, the financial service providers (as potential deployers of the technology) and the customers (as final users) to conduct field tests to collect evidence on the benefits and risks of new financial innovations, at the same time carefully monitoring and containing their risks. It can provide a structured avenue for the regulator to engage with the ecosystem and to develop innovation-enabling or innovation-responsive regulations that facilitate delivery of relevant, low-cost financial products. The RS is an important tool which

enables more dynamic, evidence-based regulatory environment which learn from, and evolve with, emerging technologies.

### AI Bias

Data is neutral, however when it is used by humans to create an algorithm for trading, investment and to build portfolios, it results in bias which may be intentional or unintentional. Which is the biggest challenge of AI integration with fintech. As like influencers, who influence decision making of investors, especially retail investors for their gain have been monitored by SEBI. Similarly, SEBI has to look into the system of fintech apps and how they are being integrated by AI. SEBI and RBI can use regulatory sandbox to check on how fintech apps are support investors to choose financial products and curb bias algorithms. On other hand fintech companies have to keep diversified team to build AI tools to support their operations and business processes. As a result, they can avoid their clients being influenced by bias decisions.

### Findings of the study

Investors being rational and sensitive towards investing in safe avenues like gold, are lured to buy digital gold through promotional strategies and gradually exposed to innovative financial products and services.

FinTech, depending on their financial products and services are regulated by various regulatory authorities. Accordingly, some are regulated by RBI and others are by SEBI and IRDAI, while some come under multiple regulators. This has resulted in regulatory arbitrage and ambiguity in their operation.

There is a disparity between growth of FinTech and regulatory guidelines. In the absence or delay of latter, the grey area of the innovative FinTech products would not be spotted at the conception stage. RBI adopted and implemented Regulatory sandbox whereas SEBI and other regulatory bodies are in the process of implementation.

There is bias exist in AI tools which affect decision making of investors, when they use fintech apps for investment purpose.

## Conclusion

Fintechs are basically tech enabled platform through which financial products or services are being offered by various brokerage firms, banks and financial institutions. However, there are lot of issues emerging out of it as its growing rapidly and enhancing financial inclusion. The challenges are with respect to regulations, products and services features, investors unawareness of risk associated with them, strategies adopted by fintechs firms to promote these new products and services, etc. Investors are attracted to this new trend. Investors think that by using fintech apps for their investment they choose their financial products and build portfolios. But that is not true that they are being influenced by AI tools of fintech companies. Therefore, regulators such as SEBI, RBI and so on have to step in to see how algorithms of these fintech apps have been build and reviewed time to time to protect the interest of investors.

## References

---

<sup>1</sup>[https://www.rbi.org.in/Scripts/BS\\_ViewBulletin.aspx?Id=19899](https://www.rbi.org.in/Scripts/BS_ViewBulletin.aspx?Id=19899)

<sup>2</sup> TRAI (2020), “Highlights of Telecom Subscription Data as on 31 March 2020”, Press Release no. 49/2020, Telecom Regulatory Authority of India

<sup>3</sup><https://www.livemint.com/brand-stories/the-fintech-revolution-in-banking-11617194177586.html>

<sup>4</sup><https://kr-asia.com/india-doubled-number-of-unicorns-to-90-in-2021-report>

<sup>5</sup> Das, S. (2020), “Banking Landscape in the 21st Century”, Speech Delivered at the Mint Annual Banking Conclave, 2020, February 24

<sup>6</sup> Vivan Sharan. “The new fintech department of RBI has its work cut out”, Mint Money, 2022, 11<sup>th</sup> January <https://www.livemint.com/opinion/online-views/the-new-fintech-department-of-rbi-has-its-work-cut-out-11641834172394.html>

<sup>7</sup>[https://www.researchgate.net/publication/352579808\\_A\\_Systematic\\_Analysis\\_on\\_FinTech\\_and\\_Its\\_Applications](https://www.researchgate.net/publication/352579808_A_Systematic_Analysis_on_FinTech_and_Its_Applications) DOI: 10.1109/ICIPTM52218.2021.9388371

<sup>8</sup> Douglas W. Arner, Dirk A. Zetsche, Ross P. Buckley and Janos N. Barberis, “FinTech and RegTech: Enabling Innovation While Preserving Financial Stability”, *Georgetown Journal of International Affairs*, Vol. 18, No. 3, 2017, pp 47-58.



---

<sup>9</sup> P.Rajeswari and C.Vijai, “Fintech Industry In India: The Revolutionized Finance Sector”, *European Journal of Molecular & Clinical Medicine*, Vol. 8, No. 11, 2021, pp 4300 – 4306. Retrieved from [https://ejmcm.com/pdf\\_6599\\_483cc227fb7037c6b2f238d94aaa4b05.html](https://ejmcm.com/pdf_6599_483cc227fb7037c6b2f238d94aaa4b05.html)

<sup>10</sup> <https://www.investopedia.com/terms/r/rational-choice-theory.asp>

<sup>11</sup> Shashidhar K.J., “Regulatory Sandboxes: Decoding India’s Attempt to Regulate Fintech Disruption,” *ORF Issue Brief No. 361*, May 2020, Observer Research Foundation Retrieved from [https://www.orfonline.org/research/regulatory-sandboxes-decoding-indias-attempt-to-regulate-fintech-disruption-66427/#\\_edn18](https://www.orfonline.org/research/regulatory-sandboxes-decoding-indias-attempt-to-regulate-fintech-disruption-66427/#_edn18)

# The Strategic Integration of AI for Elevating E-commerce

**S. Rukkumani**

*Assistant Professor of Commerce, Government College of Arts and Science, Kappalur, Tirumangalam, Madurai, India.*

\*Corresponding Author e-mail iD: [profрукkumani@gmail.com](mailto:profрукkumani@gmail.com)

## Abstract

Artificial Intelligence (AI) is increasingly being used in various aspects of e-commerce to enhance customer experiences, streamline operations, and drive business growth. AI has indeed become ubiquitous, impacting various aspects of our lives, from self-checkout systems to security measures. The reported 270% increase in businesses fostering AI in the last four years reflects the growing recognition of AI's potential to enhance efficiency, productivity, and customer experiences. The misconception about AI being a relatively new field is common. In reality, AI has a rich history spanning almost 70 years, with roots in the mid-20th century. Over the decades, advancements in technology, computing power, and data availability have propelled AI into the forefront of innovation. The importance of having an e-commerce platform for businesses, especially in the context of the post-pandemic era, cannot be overstated. E-commerce has become a cornerstone for maximizing revenue, reaching a wider audience, and adapting to evolving consumer preferences. The pandemic has accelerated the shift towards online shopping, leading to a significant surge in e-commerce activities. Businesses that embraced online markets and implemented digital strategies have been better positioned to thrive in this changing landscape.

**Keywords:** Artificial Intelligence, AI, E-commerce, Customer Service, Chabot's

## Introduction

The integration of AI in e-commerce is a strategic move for businesses. AI enhances sales, efficiency, and productivity by offering personalized recommendations, optimizing pricing strategies, automating customer service, and providing innovative features such as virtual try-on experiences. AI's impact on boosting sales and improving efficiency in e-commerce operations is evident. Businesses that leverage AI technologies gain a competitive edge through data-driven decision-making, enhanced customer experiences, and streamlined processes. AI algorithms



analyze customer behavior, preferences, and purchase history to provide personalized product recommendations. This helps in increasing sales and improving customer satisfaction.

### Types of AI Technology Used in Ecommerce

**Natural Language Processing (NLP):** Enables computers to interpret and generate human language.

**Text Analysis:** NLP algorithms process and analyze text data. They can extract meaning from sentences, paragraphs, or entire documents. This is essential for tasks like sentiment analysis, topic modeling, and language translation.

**Tokenization:** NLP breaks down text into smaller units called tokens. These tokens can be words, phrases, or even characters. Tokenization is the foundation for many NLP tasks.

**Part-of-Speech Tagging:** NLP systems identify the grammatical parts of speech (such as nouns, verbs, adjectives) in a sentence. This helps in understanding the structure and meaning of text.

**Named Entity Recognition (NER):** NLP models recognize entities like names of people, organizations, locations, dates, and more.

**Sentiment Analysis:** NLP determines the sentiment expressed in text—whether it's positive, negative, or neutral. Businesses use this to gauge customer feedback and social media sentiment.

**Machine Translation:** NLP powers translation services like Google Translate. It converts text from one language to another, making global communication easier.

**Question Answering:** NLP models can answer questions based on a given context. Think of Chatbot's or virtual assistants that respond to user queries.

**Text Generation:** NLP can generate human-like text. From autocomplete suggestions to creative writing, it's used in various applications.

**Word Embedding's:** NLP represents words as dense vectors in a high-dimensional space. These embedding's capture semantic relationships between words.

**Machine Learning (ML):** Employs statistical techniques to allow computers to learn from data and make predictions without explicit programming.

**Supervised Learning:** In this approach, the model learns from labeled examples (input-output pairs). It predicts outcomes for new, unseen data.

**Unsupervised Learning:** Here, the model identifies patterns and structures in unlabeled data. Clustering and dimensionality reduction fall under this category.

**Reinforcement Learning:** The system learns by interacting with an environment and receiving feedback (rewards or penalties). It's commonly used in game-playing AI.

**Computer Vision (CV)** is a subfield of Artificial Intelligence (AI) that enables computers and machines to analyze images and videos. CV focuses on developing algorithms and techniques to extract meaningful information from visual inputs and make sense of the visual world.

**Object Detection:** Locating and identifying specific objects within an image or video stream.

**Image Segmentation:** Dividing an image into meaningful regions.

**Motion Tracking:** Monitoring and analyzing movement in videos.

**3D Reconstruction:** Creating 3D models from 2D images.

**Data Mining** is the process of extracting knowledge or insights from large amounts of data using various statistical and computational techniques. The data can be structured, semi-structured, or unstructured, and it may reside in databases, data warehouses, or data lakes.

The primary goal of data mining is to discover hidden patterns and relationships in the data, which can then be used for informed decisions or predictions. Techniques involved in data mining include clustering, classification, regression analysis, association rule mining, and anomaly detection.

Leveraging AI in e-commerce can significantly enhance sales and operational efficiency.

**Hyper-Personalization:** Use AI to tailor customer experiences by analyzing user behavior, preferences, and purchase history. Personalized recommendations, targeted marketing, and customized content can boost engagement and conversion rates.

E-commerce platforms collect data on customer behavior, including product views, searches, time spent on pages, and purchase history. Additional information such as demographics, location, and device used may also be considered. AI algorithms create individual user profiles based on the collected data. This profile includes a comprehensive understanding of the customer's preferences, interests, and shopping habits. Various machine learning models, such as collaborative filtering, content-based filtering, and hybrid models, are employed to analyze patterns within the data. These models learn from the behavior of similar users and identify correlations between products.

The AI system identifies opportunities for cross-selling (suggesting complementary products) and upselling (suggesting higher-priced alternatives) based on the user's preferences and behavior. This contributes to increased average order value. By presenting customers with products tailored to their preferences, the personalized recommendation system enhances the overall shopping experience. Customers are more likely to discover relevant items, leading to higher satisfaction and increased loyalty.

The AI adapts to changes in customer behavior, market trends, and product availability. This dynamic nature ensures that the recommendations remain effective and aligned with the evolving needs of individual users.

Overall, personalized recommendations powered by AI contribute significantly to the success of e-commerce platforms by creating a more engaging and relevant shopping experience for customers while simultaneously boosting sales and revenue for the business.

### **AI-powered Chabot's and virtual assistants**

Indeed, AI-powered Chabot's and virtual assistants play a crucial role in enhancing customer engagement and providing seamless support in the e-commerce landscape. Chabot's are designed to handle customer inquiries and provide instant responses 24/7. They can address common queries, offer assistance with order tracking, and provide information on products and services.

#### **Automated Order Processing**

Virtual assistants can guide customers through the entire purchase process, helping them find products, providing information on promotions or discounts, and facilitating order placement. This automation streamlines the customer journey. Chabot's leverage natural language processing (NLP) to understand and respond to user queries. They can fetch information from databases, product catalogs, or FAQs to provide accurate and relevant answers to customers. Chatbots can provide real-time order status updates, tracking information, and delivery estimates. Customers appreciate transparency and timely updates. AI analyzes user preferences, browsing history, and purchase behavior to suggest relevant products. Personalized recommendations enhance cross-selling and upselling opportunities. Chabot's can collect user

information and qualify leads. They initiate conversations, gather contact details, and guide potential customers through the sales funnel. Chabot's can remind users about abandoned carts, offer discounts, and encourage them to complete their purchase.

**Voice commerce:** is a rapidly evolving application of AI in e-commerce that leverages voice recognition technology to facilitate shopping through spoken commands. Here's a closer look at how AI is used in voice commerce. Advanced AI-driven voice recognition technology allows virtual assistants to understand and interpret spoken commands from users. Natural Language Processing (NLP) is a key component, enabling systems to comprehend the context and intent behind user queries. Leading virtual assistants, such as Amazon's Alexa, Google Assistant, Apple's Siri, and others, are integrated into smart devices like smart speakers, smartphones, and other IoT devices. These virtual assistants serve as the interface for voice-activated shopping.

#### Voice-Based Purchases

Customers can initiate purchases by verbally instructing the virtual assistant to add items to their shopping cart, place orders, or even reorder previously purchased items. The virtual assistant handles the transaction process securely. To ensure secure voice-based transactions, AI systems incorporate authentication methods such as voice biometrics or additional security layers. This helps prevent unauthorized purchases and protects user privacy. E-commerce platforms often integrate with virtual assistants, allowing seamless communication between the voice-activated system and the online store's backend. This integration ensures accurate product information and up-to-date inventory details.

#### Multi-Platform Accessibility

Voice commerce is not limited to specific devices; it can be accessed across various platforms, including smart speakers, smartphones, and other voice-enabled devices. This versatility increases the reach and accessibility of voice-activated shopping. Voice commerce provides a hands-free and convenient way for users to interact with e-commerce platforms, making the shopping experience more accessible and efficient. As technology continues to advance, voice commerce is likely to play an increasingly significant role in shaping the future of online retail.

## Predictive analytics

Predictive analytics, powered by AI algorithms, is a valuable tool in e-commerce that enables businesses to anticipate future trends, understand customer behavior, and make informed decisions.

## Customer Behavior Analysis

AI algorithms analyze historical customer data to identify patterns and trends in user behavior. This includes understanding which products customers frequently browse, how long they spend on the website, and their preferred purchasing channels. Predictive analytics assists in optimizing marketing campaigns by identifying the most effective channels, messaging, and timing. This ensures that marketing efforts are targeted and have a higher likelihood of resonating with the intended audience. AI models segment customers based on various attributes such as purchasing behavior, demographics, and preferences. This segmentation enables businesses to tailor marketing strategies and promotions to specific customer groups, improving overall campaign effectiveness. Predictive analytics contributes to the generation of personalized product recommendations for individual customers. By understanding user preferences, the system suggests products that align with the customer's interests, increasing the likelihood of conversion.

## Demand Forecasting

Predictive analytics models leverage historical sales data, seasonal trends, and other relevant factors to forecast future demand for products. This helps in optimizing inventory levels, avoiding stock outs, and reducing excess inventory. By predicting future demand and understanding inventory turnover rates, e-commerce businesses can optimize stock levels. AI algorithms analyze market conditions, competitor pricing, and customer behavior to recommend dynamic pricing strategies. This allows e-commerce platforms to adjust prices in real-time, maximizing revenue and staying competitive. Predictive analytics extends to the supply chain, helping businesses anticipate changes in demand, optimize logistics, and streamline the procurement process. This ensures a more efficient and responsive supply chain. By leveraging predictive analytics in e-commerce, businesses can make data-driven decisions, enhance operational efficiency, and ultimately provide a more personalized and seamless experience for

customers. This proactive approach enables companies to stay ahead of market trends and competition.

### **Supply Chain Optimization**

Supply Chain Optimization through the use of AI is a transformative aspect of e-commerce and retail operations.

#### **Demand Forecasting and Inventory Management**

AI algorithms analyze historical data, market trends, and external factors to predict future demand accurately. This forecasting helps businesses align their production and inventory levels with expected customer demand. AI systems optimize inventory levels by considering factors such as demand fluctuations, seasonality, and lead times. This ensures that businesses maintain optimal stock levels, reducing the risk of stock outs or excess inventory. AI-driven systems can automatically trigger reorder points and generate purchase orders when inventory levels fall below a specified threshold. This automation streamlines the replenishment process and minimizes manual intervention.

#### **Routing and Logistics Optimization**

AI algorithms optimize the routing of shipments, considering factors such as transportation costs, delivery times, and real-time traffic conditions. This ensures efficient and cost-effective logistics operations. AI is used for predictive maintenance of transportation vehicles and equipment. By analyzing historical data and sensor inputs, AI can predict when maintenance is needed, reducing the risk of breakdowns and disruptions in the supply chain. AI-powered automation in warehouses improves efficiency in tasks such as order picking, packing, and sorting. This reduces labor costs, minimizes errors, and accelerates order fulfillment. AI can contribute to sustainability efforts by optimizing supply chain routes to minimize carbon footprint, identifying opportunities for energy efficiency, and promoting environmentally friendly practices.

By leveraging AI for supply chain optimization, e-commerce businesses can achieve greater efficiency, reduce costs, improve customer satisfaction through timely deliveries, and remain competitive in an ever-evolving market. This integration of AI in the supply chain is crucial for meeting the demands of modern, fast-paced commerce.



## Visual Search

Visual search is a powerful application of AI that enhances the e-commerce user experience by allowing users to search for products using images instead of text queries. AI-driven image recognition algorithms analyze and interpret visual content within images. This technology enables the system to identify objects, patterns, and features within product images. Visual search simplifies the search process for users who may find it easier to express their preferences visually rather than text. Visual search is particularly beneficial for mobile users. Instead of typing out product descriptions, users can simply take a photo or upload an image, making it a convenient and efficient way to search for products on smaller screens. Users can discover similar or visually related products based on the features identified in the images they provide. This helps customers explore a broader range of options and discover products that match their preferences. AI algorithms enhance the accuracy of visual search results by recognizing specific details within images, such as colors, patterns, and shapes. This precision leads to more relevant product recommendations. Visual search can be seamlessly integrated into existing e-commerce platforms and mobile apps. Users can initiate visual searches directly within the application, streamlining the overall shopping experience. Visual search often integrates with AR technology, allowing users to virtually try on clothing, visualize furniture in their homes, or preview how accessories will look before making a purchase decision.

## Customer Service Automation

Customer service automation powered by AI is a transformative approach in the e-commerce industry, streamlining processes, enhancing efficiency, and providing around-the-clock support. AI-driven Chatbots and virtual assistants handle routine customer queries, providing instant responses to frequently asked questions. They guide users through various processes, such as order tracking, product information, and returns. AI systems automate order-related processes, including order confirmation, tracking, and status updates. This ensures that customers receive timely information about their purchases without the need for manual intervention. Chatbots can quickly resolve common customer issues by providing step-by-step guidance, troubleshooting tips, or directing customers to relevant resources. This reduces the resolution time for routine queries. AI-powered customer service operates 24/7, providing users with constant support

regardless of time zones or business hours. This ensures a seamless and responsive customer experience at any time of the day.

AI systems can identify complex issues that require human intervention and seamlessly escalate the conversation to a live customer support agent. This ensures that more challenging problems are addressed by qualified personnel. Automation reduces the workload on human customer support agents, allowing businesses to handle a high volume of inquiries without a proportional increase in staffing costs. This contributes to cost efficiency and scalability. AI-driven systems can initiate proactive engagement with customers, such as sending personalized recommendations, order updates, or promotional offers based on user behavior and preferences. By automating routine customer service tasks, businesses can allocate human resources to more complex and specialized inquiries, improving overall efficiency and providing a higher level of customer satisfaction. Customer service automation is a crucial element in modern e-commerce, enabling businesses to deliver prompt and effective support to their customers.

### Sentiment Analysis

Sentiment analysis, also known as opinion mining, is an AI-driven process that involves analyzing textual data, such as customer reviews and social media content, to determine the sentiment expressed. In the context of e-commerce, sentiment analysis is valuable for understanding public opinion about products and services.

AI tools gather and collect textual data from various sources, including customer reviews, social media posts, forums, and other online platforms where users express their opinions. NLP is a key component of sentiment analysis. AI algorithms use NLP to understand the context, semantics, and sentiment expressed in the collected text. This involves analyzing the language structure, sentiment-bearing words, and overall tone. Based on the analysis, sentiments are classified into categories such as positive, negative, or neutral. Some advanced systems may even categorize sentiments along a spectrum to capture more nuanced opinions. Sentiment analysis helps businesses understand how the public feels about their products or services. It provides insights into overall customer satisfaction, identifies areas of improvement, and highlights strengths and weaknesses.

By leveraging sentiment analysis, e-commerce businesses can gain valuable insights into customer perceptions, improve their products and services, enhance customer satisfaction, and maintain positive brand image in the competitive market.

### Recommendation engines

AI-powered recommendation engines are instrumental in enhancing the customer experience on e-commerce platforms by providing personalized and relevant product suggestions. Recommendation engines analyze user behavior, including browsing history, search queries, and past purchase patterns. This data is used to understand individual preferences and predict future buying behavior. Collaborative filtering is a common technique where the recommendation engine suggests products based on the preferences and behaviors of similar users. Content-based filtering recommends products based on the attributes of items that a user has shown interest in or purchased. Many recommendation engines use hybrid models that combine collaborative and content-based filtering to provide more accurate and diverse product recommendations. This approach leverages the strengths of both techniques. By leveraging recommendation engines, e-commerce platforms create a more personalized and enjoyable shopping experience for users. Cross-selling and upselling recommendations not only increase the likelihood of additional purchases but also contribute to a more comprehensive understanding of customer needs and preferences.

### Virtual try-on

Virtual try-on experiences, powered by AI and augmented reality (AR), have revolutionized the way customers engage with products, particularly in the fashion and beauty industries. AI-driven algorithms use image recognition to identify key facial or body features. These features are then mapped to enable precise placement and alignment of virtual products on the user's image. Augmented reality technology overlays virtual images onto the real-world view captured by the user's device (such as a smartphone or webcam). This creates a seamless and immersive virtual try-on experience. AI-powered virtual try-on experiences are designed with interactive and user-friendly interfaces. This ensures that users can easily navigate, customize, and experiment with different products during the virtual try-on process. By combining AI and AR technologies, virtual try-on experiences contribute to a more engaging and immersive online shopping journey.

They bridge the gap between the physical and digital shopping experiences, offering users a realistic preview of products and enhancing their confidence in making online purchases.

## Conclusion

In the ever-evolving world of e-commerce, embracing AI is not just an option; it's a strategic imperative. By incorporating artificial intelligence into various facets of online retail, businesses can unlock new levels of growth, efficiency, and customer satisfaction. From personalized experiences to optimized operations, the strategic implementation of AI is the key to unleashing the full potential of e-commerce for optimal success. In conclusion, the strategic incorporation of AI in e-commerce is not merely a technological upgrade; it's a fundamental shift that empowers businesses to navigate the complexities of the digital marketplace with agility, efficiency, and a customer-centric approach. By recognizing AI as a key enabler, e-commerce enterprises can unlock a realm of possibilities, driving optimal success in an ever-evolving industry.

## References

Gburová J (2019) Consumer shopping behavior in the e-commerce environment. J Global Sci4 (2):1–62.

Khrais L (2020) Role of artificial intelligence in shaping consumer demand in e-commerce. Future Internet 12(12)

Delina R, Vajda V (2006) Theory and practice of electronic commerce. Grafotlač, Prešov

Hagberg J, Sundstrom M, Egels-Zandén N (2016) The digitalization of retailing: an exploratory framework. Int J Retail Distrib Manage 44:694–712

Boboc PC (2020) VAT and e-commerce. Current legal framework and the 2021 changes. ClujTax F.J.,

Linh Nguyen ,Artificial Intelligence in E-commerce

LAB University of Applied Sciences Finland.

# Artificial Intelligence as a Boon in Food and Beverage Industry

**S. Kartheeswari**

*Assistant Professor of Commerce, The Standard Fireworks Rajaratnam College for Women, Sivakasi, India*

\*Corresponding Author e-mail ID: [kartheeswari367@gmail.com](mailto:kartheeswari367@gmail.com)

## Abstract

AI means Artificial Intelligence. It is a branch of computer science and it aims at making computers or machines that are as intelligent as human beings. Computational systems, data and data management and advanced AI algorithms are the key components to achieve the goal of implementing AI. The main aim of AI is to replicate human level intelligence. Most of the AI systems are narrow that is they are good only at a particular task. AI can perform some tasks better than humans. AI tools often complete jobs quickly and with comparatively few errors. Now AI captivates all the production oriented and service oriented sectors. So, the rule is not an exception on food and beverage industry. Today, AI can help restaurants and hotels to streamline their operations and improve their efficiency. For example, point-of-sale (POS) systems can automate order taking and payment processing and kitchen management systems can help to coordinate food preparation and delivery. This paper highlighted the challenges faced, positive and negative impact while using AI in the food and beverage industry.

**Keywords:** AI, ML, Reasons for using AI, AI Components, Model of AI in Food and Beverage Industry, Factors and Applications.

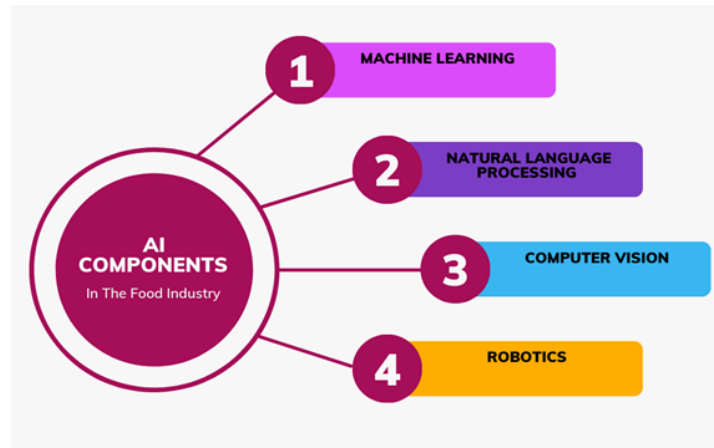
## Reasons for using AI in Food and Beverage Industry

1. Automation of food industry is necessary to food production and distribution.
2. The integration of AI in this industry has transformed the way that produce, distribute and consume food.
3. AI technologies like ML (Machine Learning), data analytics and computer vision are renovating traditional agricultural practices, optimizing supply chain logistics and enhancing food safety standards.
4. AI helps the CEO of food and beverage industry to take smarter business decisions.
5. AI assists to gain consumer insights for more targeted marketing efforts.
6. Customer experience, efficiency and productivity improved by using AI.



7. CEO can leverage the power of AI and ML to prevent human errors and address food waste challenges.
8. It helps them to save money by offset high energy, raw material and transportation costs.
9. It assists gain flexibility in sourcing and distribution strategies.
10. AI modernize manufacturing and warehouse operations.

### AI Components in Food and beverage industry



### Model of AI in Food and beverage industry

Autonomous food manufacturing may be the key to tackling the rising food demand. This process entails a variety of stages, such as packing and safety training, that are usually performed in a production facility. Robots can clean and categorize different sorts of food. For example, robotic systems can sort fruits and vegetables in different containers.



The above model depicts that Robotics and five machines helped the food and beverage industry by the following activities like cleaning, cooking, loading foodstuffs, preparation of drinks, delivery of food and customer service in the restaurant. Machines and robo are used to perform the above task on behalf of human being in a successful way.

Additionally, some foods can be processed by robots before packaging. Since various cutting tools are needed to slice fruits and vegetables, robots can operate more effectively by matching blades to the chop that is needed. With robotics automation, the cutting devices can be appropriately switched for ease and quick cutting. These robots can also be used independently in the supermarket for cutting and cooking. Besides, AI applied in the following aspects of food and beverage industry.

1. Cooking
2. Food packaging
3. Food delivery
4. Supply Chain Administration
5. Creation of new products
6. Food sorting options

### **Factors influencing AI in Food and beverage industry**

The following eight factors that influencing AI in the applications of AI in food and beverage industry,

#### **1. Safety / Quality Issues**

AI systems deliver safer, more accurate production lines results with greater speed and more consistency than human workers. AI used to maintain employees and equipment as safe by identifying the potential risks and converting such risks to maintain safety gear in quality.

#### **2. Improving food safety standards**

Robots that utilize AI and ML can handle and process food, fundamentally disposing of the odds that contamination can happen by touch. Robots and machinery can't communicate infections and such that people can accordingly limit the risk of it turning into an issue.



### **3. Waste Reduction**

AI is a new approach that followed in food and beverage industry to measure and monitor huge impact on waste reduction. AI that uses real-time monitoring can identify anomalies whenever it occurs.

### **4. Hygiene**

AI has potential for the optimization of the hygiene and cleaning tasks that are so difficult for food and beverage facilities. AI powered multi-sensor system will detect food residue and microbial debris on equipment in order to determine the optimal length of cleaning time.

### **5. Environmental Sustainability**

AI can play a vital role in optimizing power and water consumption which creates immediate benefits for operating costs and margins. AI solutions can easily recognize variances, removing contaminants without wasting whole batches and continually adjusting water and energy usage according to needs. The entire process including robotics can be fully automated and running 24/7 and active cross production.

### **6. Facility Management**

AI powered energy management tools can be developed to help operatives reduce peak demand charges. Besides, AI alerts app can utilize predictive machine learning algorithms to help users identify issues before they become problems reducing costly downtime.

### **7. Production optimization**

AI has enormous potential to optimize production and uncover manufacturing facilities best operating points to meet and exceed Key Performance Indicators(KPIs). AI could include faster production changeovers and reducing the amount of time needed to switch from one product to another and identifying production bottlenecks before they become a problem. Today, an operator is still required to tune the process but in the future models will be trained to calibrate production automatically, enhancing output quality and speed.

### **8. Packaging**

AI driven robotics is playing vital to meet the packing and picking demands accelerated by consumers' increasing use of e-commerce. The complex and labour intensive nature of the process offers unique potential for intelligent automation. AI can optimize productivity, efficiency and output.



## Benefits of using AI in Food and Beverage Industry

The potential use of AI in Food and beverage industry are given below.

### 1. Real-time market and brand analysis

In order to takeoff a new product or any changes in the existing product, the labour intensive process needs deep market and consumer research. AI can do real time analysis of market trends and to produce adequate product in an efficient manner. Social media analytics can reduce low responses in customer surveys. From this research of AI, we can see which type of products are moving from the market and find out the positive and negative feedbacks received from the customers on after using food or beverage products by the customers. For such purpose, AI makes data analysis and improve product development by means of assess consumer views in real-time, identify high value features for food and beverages and identify challenges for such products in the competitive digital arena.

### 2. Market trends forecasting

To forecast the market trend, the manager of food and beverage industry must use Social media analytics developed by AI. It can't predict the future certainly but it helps to understand what is coming in certain extent. AI identify such trends by using such KPIs like identify shifting consumer interests and trends, spot market trends related to brand and forecast waning or growing interest in product types.

### 3. Predictive maintenance

All the equipment in food court or production facility had life span and which poor maintenance can reduce. AI can use ML algorithm for real-time analysis to do speed of operation and enhanced productivity also. AI identifies patterns and predict when a machine needs maintenance. Predictive maintenance of AI becomes preventative maintenance instead of having to recover and restart from failure. AI helps the manager of food and beverage industry by the following manner like streamline product delivery, reduce production downtime, reduce manufacturing errors and optimize livestock feed algorithm.

### 4. Supply chain optimization

AI can enable the most efficient production plans for supply chain optimization, which is useful when confronted with unexpected delays or shortages. AI helps the manager to plan supply chain optimization with the activities of maximizing revenue subject to demand and production

constraints, streamline product delivery process, reduce or eliminate waste and human error and fixing the target delivery to predict demand. That is, AI bring ideas from conception to consumers. Moreover, AI helps them to study the major determinants of production and delivery like demand and capacity, value of materials cost along with supply chain and crop and livestock management.

### **5. Addressing food waste challenges**

AI and ML can improve production efficiency and output. Food waste and loss are affecting environment. AI helps to prevent food waste and not producing food unwanted thing and unnecessarily. By reducing such waste, AI helps to save on operating costs and improve sustainability also. AI helps food businesses improve their supply and demand management. An end-to-end solution can provide accurate data on the amount of stock needed based on real-time demand to cut down on food waste. Automation can also help food businesses maintain inventory levels and reduce their chain carbon footprint by minimizing travel throughout the supply cycle.

### **6. Rapid A/B testing to optimize marketing and sales**

AI and machine learning can make A/B testing measurements faster, more precise and less costly than traditional efforts. AI-backed technology can also segment your customers. For example, they can identify groups with similar buying behaviors within a customer base. Companies can leverage these insights for marketing efforts and product launches. AI helps them to analyze results from rapid prototyping, assess sales change effects of different innovations or product features, narrowly to identify the target consumer demand and tighten the development, test and feedback loops.

### **7. Limited period to market**

Advanced AI can improve the efficiency of overall food business by addressing workflow challenges and helping them to take more informed business decisions on time. AI enables the method to market opportunities and challenges, to build an agile development process, to streamline approval process and overall workflow, to automate processes, to define marketplace and sample and also to react basic responses from several and combined sources.

### **Examples**

A number of food companies are using AI and ML algorithms to streamline its distribution and supply chain. The following food industries are the examples of using AI and ML algorithms in their industry.

1. Coca-Cola: AI and ML algorithms used to forecast demand, ensuring that goods are accessible when and where needed, reducing stock-outs and maintain surplus inventory. To streamline its distribution and supply chain.
2. Starbucks: AI driven personalization to provide customers with tailored recommendations in its mobile app. The app analyzes past orders, preferences, and location information to make an appropriate personalized food and drink recommendations for each user.
3. Beyond Meat: To continually enhance the flavor and texture of its meat alternatives, this plant-based food company uses AI and ML. The technology examines sensory data, user feedback, and ingredient profiles to improve the flavor and consistency of the products.
4. Nestle: Nestlé employs AI to develop and improve products. AI-powered platforms to examine market data, social media trends, and customer input to find out new food trends and create goods that appeal to the needs of the market.

## Conclusion

From the above particulars, we can conclude that the future of AI in the food industry is poised to transform the food sector, ensuring sustainable practices, increased food safety, and improved customer experiences, ultimately paving the way for a more effective and sustainable future.

## References

1. Archana Shukla (2023), "COMPU-BYTES", Eupheus Learning Proficiency Learning Solutions Pvt. Ltd., New Delhi
2. Melanie Mitchell (2019), "Artificial Intelligence: A Guide for Thinking Humans", Pelican Publishing Company, Louisiana
3. <https://www.columbusglobal.com/en/blog/how-ai-can-solve-challenges-for-food-and-beverage-manufacturers>
4. <https://www.marcumllp.com/insights/how-ai-is-impacting-the-food-and-beverage-industry>
5. <https://www.publicissapient.com/insights>

## Challenges and Opportunities for AI in E-Commerce

**N. Vijayalakshmi**

*Assistant Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.*

\*Corresponding Author e-mail iD: [Vijayalakshmi.n@vhnsnc.edu.in](mailto:Vijayalakshmi.n@vhnsnc.edu.in)

### Abstract

In recent years, artificial intelligence (AI) has developed quickly and significantly impacted many different industries. The development of artificial intelligence contributes to raising everyone's standard of living and economic progress. Artificial Intelligence plays a crucial role in the future of business in India. Businesses and people groups are willing to invest in human capital, and e-business is essential to meeting customer demands for high-quality products and services in the shortest amount of time. Moreover, increasing the number of workers with AI preparation does not translate into a strong need for mechanical skills. Our lives are positively impacted by e-commerce. It's like a revolution in the way we work, learn, start businesses, operate online, etc. During a competitive era, firms aim to continuously generate revenue. Conversely, customers save time at home by meeting their demands and requirements. AI achieves the goals of both sides. AI provides solutions for a wide range of consumer and commercial issues. In today's era of e-commerce, businesses want to sway consumer behavior in favor of particular brands and products. It could appear like a step in the right direction when artificial intelligence is used as a cutting-edge tool in the e-commerce industry. This essay explains the fundamentals of artificial intelligence and e-commerce, along with its advantages. Examining the state of AI today, as well as its potential for the future and its primary opportunities and difficulties, is another goal.

**Keywords:** Artificial Intelligence (AI), E-Commerce.

### Introduction

Artificial intelligence (AI) is one of the diverse, exciting, and highly promising areas in computer science. The terms "artificial" and "intelligence" combine to generate the term artificial intelligence. "Artificial" denotes something that is "man-made," while "intelligent" denotes something that possesses "thinking power." This area of computer science allows us to build



intelligent machines with human-like behavior, thought processes, and decision-making abilities."

One of the sectors that now utilizes artificial intelligence the most is e-commerce, which does this by developing a sizable customer base, attempting to comprehend client demands, doing research in real time, developing innovative solutions, and performing a host of other tasks. AI implementation may have an effect on several business operations within your company. Artificial intelligence is fundamentally a constellation of many technologies that can execute jobs that need human intelligence. These technologies possess human-like intelligence in terms of learning, acting, and performing when used for routine commercial operations. By simulating human intelligence in machines, it helps us conduct business more quickly and affordably. It helps to grasp the components of artificial intelligence in order to see how it might affect your organization. Online retailers utilize e-commerce intelligence not only for product recommendations but also for Chatbot services, customer comment analysis, and customized services for their online customers. AI is essential to e-commerce because it helps companies to better understand and analyze consumer behavior patterns, improve the purchasing experience, and expedite a number of procedures.

### **The Current State of AI**

A subset of computer intelligence known as artificial intelligence (AI) imitates human cognitive processes. Expert systems, machine learning, speech recognition, natural language processing, and vision are just a few of the uses for it. AI research has been incredibly successful in creating efficient methods to address a variety of issues, from diagnosing medical conditions to playing video games. But there isn't a single, widely recognized definition of artificial intelligence. While some experts define artificial intelligence (AI) as a machine's capacity for independent thought, learning, and action, others define it as a machine's capacity to carry out tasks that are traditionally associated with human intellect.

The subject of artificial intelligence is expanding quickly, and there is a lot of enthusiasm about how AI may completely transform a lot of facets of our life. Concerns exist, meanwhile, regarding AI's possible drawbacks, including the loss of jobs and the creation of autonomous weaponry.

Here are some examples of AI in use today:

- **Virtual assistants:** Virtual assistants like Siri, Alexa, and Google Assistant use AI to understand our spoken requests and provide us with information or complete tasks.
- **Fraud detection:** AI is used to detect fraudulent transactions in a variety of industries, such as banking and insurance.
- **Personalized recommendations:** AI is used to recommend products, movies, and other content to us based on our past behavior and preferences.
- **Self-driving cars:** AI is used to develop self-driving cars that can navigate roads and avoid obstacles without human input.

What applications of AI does the e-commerce sector have?

The e-commerce sector is utilizing artificial intelligence (AI) in a number of ways, such as:

#### 1. Customized product recommendations:

AI can make product recommendations to users based on their browsing habits, prior purchases, and other information. Both sales and the consumer experience may benefit from this.

#### 2. Chatbots:

AI-driven chatbots can be used to finish transactions, respond to consumer inquiries, and offer assistance. By doing this, human customer support agents may have more time to devote to more difficult jobs.

#### 3. Virtual shopping assistants:

These AI-driven agents can aid clients in finding goods, evaluating costs, and completing transactions. Customers may find their purchasing more effective and convenient as a result.

#### 4. Dynamic pricing:

AI can be used to dynamically set product prices based on variables like inventory levels, competition, and demand. This can support companies in maximizing their earnings.

### **5. Fraud detection:**

Credit card fraud and other fraudulent transactions can be identified using AI. This can aid in shielding companies from monetary damages.

### **6. Inventory management:**

Demand forecasting, tracking inventory movement, and inventory optimization are all possible with AI. This can assist companies in cutting expenses, increasing productivity, and preventing stock outs.

### **7. Logistics optimization:**

AI can be used to optimize logistics operations, such as order fulfillment and shipping. This can help to improve efficiency and reduce costs.

### **8. Customer service:**

By offering automatic answers to frequently asked queries and problems, AI can help enhance customer service. This can free up human customer support agents to concentrate on more difficult jobs.

### **9. Marketing:**

AI can be used to target customers with offers that are relevant to them and personalize marketing efforts. Sales and brand exposure may both benefit from this.

These are but a few instances of the applications of AI in the e-commerce sector. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops.

### **AI's advantages for e-commerce**

The e-commerce sector is undergoing a rapid transformation thanks to artificial intelligence (AI), which is giving companies new opportunities to enhance consumer satisfaction, boost revenue, cut expenses, and boost productivity.

The following are a few advantages of applying AI to e-commerce:

**1. Better customer experience:**

By making tailored recommendations, responding to inquiries from customers, and completing transactions, AI can help to improve the consumer experience. Increased client pleasure, loyalty, and repeat business may result from this.

**2. Higher sales:**

By identifying fraudulent transactions, optimizing prices, and making product recommendations to clients who are likely to be interested, AI can help boost sales. Profits may increase as a result, and the company may become more resilient.

**3. Lower expenses:**

By automating processes like order fulfillment and customer support, AI can help lower expenses. This can increase profitability by freeing up human resources to concentrate on more strategic duties.

**4. Enhanced efficiency:**

By streamlining procedures like marketing and logistics, AI can aid in enhancing efficiency. Better inventory control, quicker order processing, and more successful marketing efforts can result from this.

**5. Better decision-making:**

By offering insights into consumer behavior and industry trends, artificial intelligence (AI) can assist firms in making better decisions. This can assist companies in finding fresh markets, enhancing their goods and services, and maintaining an advantage over rivals.

Artificial Intelligence (AI) holds great potential to transform the e-commerce sector by offering enterprises fresh approaches to enhance consumer satisfaction, boost revenue, cut expenses, and boost productivity.



## Examples of Artificial Intelligence in E-Commerce

Here are some particular instances of how AI is now being applied in e-commerce:

### 1. Amazon:

Amazon leverages AI to streamline their logistics processes, offer customer support, and make product recommendations to customers. AI is used, for instance, by Amazon's "Customers who bought this item also bought" feature to suggest items that are comparable to ones that a consumer has already bought. AI is also used by Amazon's "Alexa" voice assistant to process purchases, respond to queries from customers, and provide product information.

### 2. Walmart:

Walmart is utilizing AI to enhance its fraud detection, supply chain management, and customer support. Walmart, for instance, uses AI to detect fraudulent transactions, follow the flow of goods via its supply chain, and offer real-time customer service.

### 3. Netflix:

Based on users' viewing preferences and other information, Netflix use AI to suggest movies and TV series to them. With the help of artificial intelligence (AI), Netflix's "Continue Watching" feature keeps track of the movies and TV series that a user has begun and suggests more like them.

### 4. Spotify:

Based on a user's listening history and other variables, Spotify utilizes AI to suggest songs to users. With Spotify's "Discover Weekly" function, each user receives a customized playlist of recently released songs curated by AI.

## AI technologies utilized in e-commerce

Artificial Intelligence is a multifaceted field that involves multiple models. Four of the most popular AI technologies for e-commerce are as follows:

### ➤ Natural language processing (NLP):

The goal of NLP is to make it possible for computers to understand and produce natural human language.

➤ **Machine learning (ML):**

Without explicit programming, computers may learn from data and make predictions or judgments thanks to machine learning, which makes use of statistical approaches like algorithms. To better interpret data, deep learning models—including transformers and large language models (LLMs) like ChatGPT from OpenAi—layer algorithms.

➤ **Computer vision (CV):**

This branch of artificial intelligence makes it possible for machines to comprehend data from pictures and movies.

➤ **Data mining:**

Finding data to support AI systems and algorithms is known as data mining.

### Seven AI-based e-commerce applications

You can integrate AI into every aspect of your e-commerce business's operations, from price matching to assisting customers in finding the ideal products. The following are the top seven usage cases:

#### 1. Customized product suggestions

Product recommendations that are tailored to each individual consumer are made using information from past browsing and purchasing patterns. For instance, NLP-based AI can comprehend the words and visuals used by online buyers and match them with the things they want. AI-powered features that rank all the products that customer x will buy within the next 12 months or "which product is a specific individual most likely to buy next" can recommend complementary products based on the size, color, shape, fabric, and brand of the user as well as their buying cycle, click-through rate, visits, and duration.

#### 2. Virtual assistants and chatbots

Chatbots and virtual assistants can serve as your e-commerce company's customer care agents, answering questions from clients and making online purchasing easier by offering advice.

To comprehend and react to consumer requests, they make use of AI, NLP, and, most recently, generative AI.

Chatbots and virtual assistants can be used for:

**Have effective conversations with customers.**

With the ability to manage straightforward transactions, process orders, and present clients with tailored offers, chatbots and virtual assistants make it simpler to manage a high volume of requests from a variety of point-of-sale (POS) channels, including online, mobile apps, and physical stores.

**Gather client information.**

Chatbots and virtual assistants have the ability to gather client data, including dimensions and the purpose of the query, which can be used to improve customer support and product development.

**Make checkout better.**

In order to facilitate client inquiries regarding product specifics, quantities of highly desired items, and shipping details without requiring them to abandon their carts, online firms can also incorporate chatbots into their checkout pages.

**Offer round-the-clock client support.**

Your live support representatives may handle more complicated customer support issues by addressing complex chatbot and virtual assistant responses, which are available around-the-clock. AI can lower your customer support expenses by handling refunds and dispute resolution automatically.

**3. The identification and avoidance of fraud**

Through data analysis, anomaly detection, and real-time transaction monitoring, artificial intelligence (AI) can help in fraud detection and prevention. The system can identify and highlight anomalous transactions for additional inquiry, such as high-value transfers, multiple

transactions in a short period of time, or transactions from unknown places. Additionally, you may create user profiles using machine learning models based on information about past transactions, device histories, and surfing patterns. Then, you can use this information to compare the behavior of your current customers with that of previous customers to spot fraudulent activity. For instance, if a consumer makes an unexpectedly large purchase from a strange place and it doesn't fit their data profile, the machine learning model may flag it as fraudulent.

#### **4. Inventory control**

AI can assist you with inventory management by forecasting future demand and analyzing previous sales data. Real-time data from sensors and RFID tags, for instance—a wireless identification system that uses radiofrequency—can tell you what things are selling, where they're going, and whether they're coming from a distribution center or a physical store. By interacting with suppliers, AI-enabled inventory management may automate the procedures involved in inventory replenishment and guarantee timely replenishing. AI may also be used to predict cargo delays and transit periods, and it can be used to notify customers and other stakeholders of these developments.

#### **5. Dynamic pricing**

Dynamic pricing allows you to adjust your prices and offerings based on real-time user behaviour, global supply and demand, and competitors. With the power of AI, you can anticipate optimal discounting opportunities and dynamically determine the minimum discount required to drive a successful sale.

AI gives multichannel retailers more flexibility in price structuring. By leveraging AI, retailers can vary prices across different POS channels depending on observed demand. For instance, if you sell products on your website and Amazon, you can intelligently discount your items on Amazon when there is a significant influx of purchasing activity from this particular channel.

AI also facilitates assortment intelligence-data-driven optimisation of product variety and selection. Assortment intelligence provides insights into your products and competitors, making adjusting your selection and pricing easier.

## **6. Customer churn prediction**

AI allows ecommerce businesses to understand customers better and identify new trends. It can analyse customer engagements across POS channels and offer insights for optimization as more consumer data becomes available. Machine learning can help your business identify and reduce customer churn by predicting when customers might be on the verge of leaving your platform. First, AI can pull data on customer churn indicators such as abandoned carts, browse abandonment, or website bounce rate. Then, you can automate purchase completion emails, loyalty discounts, and follow-up abandoned cart inquiries, making it easier to encourage customers to complete the purchase process.

## **7. Generative AI**

Generative AI is an artificial intelligence system that generates text, images, or other media based on prompts. Popular generative tools include ChatGPT and DALL-E. Ecommerce businesses are using generative AI to scale the production of their marketing collateral and tailor it to different audiences. For example, a copywriter can write a marketing email and run it through a generative AI tool to customize it for various customer segments. Marketers can also prompt generative AI to give feedback on their brand messaging and positioning to ensure it aligns with targeted customer personas.

### **Challenges of Using AI in E-commerce:**

Artificial intelligence (AI) is quickly changing the e-commerce sector by giving companies new opportunities to enhance customer satisfaction, boost revenue, cut expenses, and boost productivity. When utilizing AI in e-commerce, companies should be mindful of a few potential drawbacks.

The following are some difficulties in implementing AI in e-commerce:

#### **1. Data privacy:**

AI needs a lot of data to function and be trained. Sensitive consumer data, like past purchases, surfing patterns, and personal information, may be included in this data. To preserve

client privacy, businesses must exercise caution in the way they gather, keep, and utilize this data.

## **2. Bias:**

If AI systems are taught on data that is not representative of the population, they may become prejudiced. Discrimination against particular groups of individuals may result from this. Companies must acknowledge this bias and take action to lessen it.

## **3. Security:**

Cyber attacks are a possibility for AI systems. An AI system that has been compromised might be used to steal customer. Businesses need to take steps to secure their AI systems and protect them from cyber attacks.

## **4. Cost:**

The development and application of AI technology can be costly. Before deciding to implement AI, businesses must carefully weigh its costs.

## **5. Complexity:**

It can be difficult to comprehend and use AI technologies. Companies must possess the knowledge necessary to oversee and sustain AI systems.

Notwithstanding these difficulties, AI has the power to completely transform the e-commerce sector. Companies who can successfully navigate these obstacles will be in a good position to grow in the future.

The following advice is for companies thinking about implementing AI in e-commerce:

### **Start small:**

Avoid trying to apply AI to every aspect of your company at once. Take on a modest project at first, and gain knowledge from it.

**Keep the customer in mind:**

AI should be utilized to enhance the client's experience. Ensure that the needs of your clients are taken into consideration when designing your AI solutions.

**Be open and honest:**

Describe your use of AI and data security measures for clients. Your customers' faith in you will grow as a result of this.

**Invest in knowledge:**

Artificial Intelligence is a complicated field. Make the investment in knowledge management and upkeep of your AI systems.

**Future of AI in e-commerce**

E-commerce has a highly promising future for AI. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops. The following are some anticipated future changes to the e-commerce sector brought about by AI:

**1. Customized shopping experiences:**

AI will be utilized to provide clients with customized shopping experiences. AI will be used to evaluate consumer information, including demographics, browsing patterns, and past purchases, in order to provide a customized shopping profile for each individual customer. This will enable companies to offer a more customized shopping experience and suggest items that are more likely to catch each customer's attention.

**2. Virtual assistants:**

The e-commerce sector will see an increase in the use of AI-powered virtual assistants. These virtual assistants will have the ability to assist clients with product searches, query resolution, and transaction completion. Customers will benefit from a more efficient and convenient shopping experience as a result.

### **3. Fraud detection:**

Artificial Intelligence will help the e-commerce sector detect fraud better. AI will be used to evaluate transactions and spot trends that point to fraud in order to do this. This will assist companies in safeguarding themselves from monetary damages.

### **4. Logistics optimization:**

In the e-commerce sector, artificial intelligence will be utilized to streamline logistics processes. Artificial Intelligence (AI) will be utilized to monitor stock levels, enhance transportation routes, and forecast demand. This will assist companies in cutting expenses and increasing productivity.

### **5. Customer service:**

AI will be utilized in the e-commerce sector to enhance customer service. AI will be used to respond to queries from customers, handle problems, and offer assistance. This will assist companies in offering a better customer experience and raising consumer satisfaction levels.

The following other developments are anticipated to influence how AI is used in e-commerce going forward:

#### **Conversational AI's ascent:**

In the e-commerce sector, conversational AI, or chatbots, is growing in popularity. These chatbots can be used for transaction completion, customer service, and question answering. We may anticipate seeing increasingly more advanced chatbots that may offer a more engaging and natural consumer experience as chatbots technology advances.

#### **The development of virtual reality (VR) and augmented reality (AR):**

Two cutting-edge technologies that could completely transform the e-commerce sector. While VR allows users to fully immerse themselves in a virtual environment, AR allows users to see digital information superimposed over the actual world. It is possible to give clients a more engaging and dynamic buying experience by utilizing these technologies. For instance, buyers



can virtually try on clothing using augmented reality (AR), and they can "walk around" a virtual store using virtual reality (VR).

### **The creation of new payment methods:**

AI is also being utilized in this regard. For instance, blockchain technology can be used to build safe and open payment systems, while facial recognition technology can be used to confirm customers' identities for payments. Customers may find it simpler and safer to make purchases online with these new payment options.

All things considered, AI's future in e-commerce looks quite promising. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops. These apps will significantly change the way we purchase online and improve everyone's online shopping experience in terms of convenience, effectiveness, and enjoyment.

### **Conclusion**

The e-commerce sector is undergoing a rapid transformation thanks to artificial intelligence (AI), which gives companies new opportunities to enhance consumer satisfaction, boost revenue, cut expenses, and boost productivity. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops. These apps will significantly change the way we purchase online and improve everyone's online shopping experience in terms of convenience, effectiveness, and enjoyment.

Here are some important lessons to remember from this blog post:

1. Personalized product suggestions, chatbots, virtual shopping assistants, dynamic pricing, fraud detection, inventory management, logistics optimization, and customer support are just a few of the e-commerce applications where artificial intelligence is being employed.
2. AI has the power to completely transform the e-commerce sector by enhancing consumer satisfaction, boosting revenue, cutting expenses, and boosting productivity.

3. The application of AI in e-commerce is not without its difficulties, including issues with data privacy, bias, security, expense, and complexity.
4. AI has the potential to be an effective tool for companies in the e-commerce sector, notwithstanding these obstacles.

## References

1. Kamahi, N. A. M., Musirin, I., Ibrahim, A. A., & Hali, S. A. (2016). "A Review Paper On e-commerce," Asian Journal of Technology & Management Research, 6(1), ISSN: 2249–0892, [http://www.ajtmr.com/papers/Vol6Issue1/Vol6Iss1\\_P3.pdf](http://www.ajtmr.com/papers/Vol6Issue1/Vol6Iss1_P3.pdf) (accessed on 8 March 2020).
2. Pereira, B. (2020, May 31). Amazon AI Conclave brings together AI fraternity in India. Digital Creed. <https://www.digitalcreed.in/amazon-ai-conclave/>
3. Shrivastava, D. (2021b, March 12). The Rise and Future of E-Commerce Industry in India | E-commerce Industry. Startup Talky. <https://startuptalky.com/ecommerce-industry-in-india/>
4. Indian E-commerce Industry Analysis | IBEF. (2020). IBEF. <https://www.ibef.org/industry/ecommerce-presentation>

# Revolutionizing E-Commerce: The Impact of AI-Enabled Technologies

A. Nagavaratharajan<sup>1\*</sup>, J. Porkodi<sup>2</sup> and M. Sivasankar<sup>3</sup>

<sup>1\*</sup>Associate Professor of Commerce with Computer Applications, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>2</sup>Head and Assistant Professor of Computer Applications (UG), V.V.Vanniaiperumal College for Women (Autonomous), Virudhunagar, India

<sup>3</sup>Assistant Professor of Commerce with Computer Applications, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [nagavaratharajan@vhnsnc.edu.in](mailto:nagavaratharajan@vhnsnc.edu.in)

## Abstract

The rapid evolution of digital and internet-based technologies has fundamentally reshaped the e-commerce landscape, with AI-driven innovations emerging as pivotal drivers of this transformation. This intersection underscores the critical need to explore how AI technologies can enhance the digital economy, particularly within e-commerce, while also catalyzing transformative changes in traditional industries. This special issue offers a valuable opportunity to delve into the transformative potential of AI within e-commerce, shedding light on its broader implications for organizational dynamics and consumer behaviour. Through a comprehensive examination of AI's multifaceted impacts on e-commerce, the aim is to deepen understanding of organizational strategies and consumer intentions in adopting AI technologies, addressing pressing issues such as privacy concerns and the intricate balance between perceived benefits and risks associated with AI-driven innovations. Moreover, the issue seeks to illuminate AI's crucial role in fostering trust relationships between users and technology within e-commerce environments, exploring mechanisms to cultivate trust in AI systems and driving sustainable user engagement and satisfaction. Through interdisciplinary exploration, the goal is to advance both scholarly discourse and practical strategies for harnessing AI's transformative potential in e-commerce, ultimately emphasizing its profound implications for organizational strategies, consumer behaviour, and the broader digital economy.

**Keywords:** AI-enabled technology; E-commerce; Digital economy

## 1. Introduction

E-commerce, the process of buying and selling goods and services online, emerged in the 1980s and has since become a dominant force in global trade. It encompasses transactions involving multiple parties, including businesses and individuals, facilitated through the exchange of data or currency. This digital marketplace operates within the broader framework of electronic business (e-business), which encompasses all online business processes.

The advent of e-commerce has profoundly impacted businesses, particularly smaller enterprises, by offering cost-effective distribution channels and broadening their market reach. Through online platforms, businesses can connect with customers globally, overcoming geographical barriers and establishing a more extensive market presence. This accessibility has leveled the playing field, allowing smaller businesses to compete with larger counterparts on a more equal footing.

For consumers, e-commerce has revolutionized the shopping experience, offering convenience, choice, and accessibility. With just a few clicks, consumers can browse through a vast array of products, compare prices, and make purchases from the comfort of their homes. The elimination of physical barriers has opened up a world of possibilities, enabling consumers to access goods and services from anywhere at any time.

Moreover, e-commerce facilitates better information dissemination, allowing consumers to make informed decisions about their purchases. Product descriptions, reviews, and ratings empower consumers to assess the quality and suitability of products before making a purchase. This transparency fosters trust and confidence in online transactions, driving further growth in the e-commerce sector.

However, success in e-commerce requires careful planning and execution. Businesses must conduct thorough research into their products, target markets, and competition to develop effective strategies. They must also consider factors such as logistics, payment processing, and customer service to ensure a seamless shopping experience for consumers.

## 2. Types of E-commerce

Depending on the goods, services, and organizational structure of an e-commerce company, various business models can be adopted. Here are several popular ones:

### Business to Consumer (B2C):

B2C e-commerce involves direct sales to end-users. Rather than going through intermediaries, these companies conduct transactions with consumers who will ultimately utilize the products or services. This model is commonly seen in retail websites or service-oriented mobile apps.

### Business to Business (B2B):

Similar to B2C, B2B e-commerce entails selling goods directly to users, but in this case, the user is typically another company. B2B transactions often involve larger quantities, specific requirements, and longer lead times, especially for recurring manufacturing processes.

### Business to Government (B2G):

Certain entities specialize as government contractors, offering goods or services to agencies or administrations. B2G e-commerce companies must meet government requirements, solicit bids, and adhere to specific product or service criteria, often participating in government-wide acquisition contracts.

#### Consumer to Consumer (C2C):

E-commerce platforms enable consumers to directly buy and sell products to each other without the involvement of companies. These platforms may feature auction-style listings or facilitate discussions between consumers, empowering individuals to engage in commerce independently.

#### Consumer to Business (C2B):

Modern platforms allow consumers to offer their services to businesses, particularly for short-term contracts, gigs, or freelance opportunities. For instance, platforms like Upwork enable consumers to bid for projects or interact with companies seeking specific services, giving consumers greater control over pricing and employment terms.

#### Consumer to Government (C2G):

Though less common, consumers can engage with administrations or governments through C2G partnerships. These transactions often involve the exchange of information or fulfilling obligations, such as submitting tax returns online or paying tuition fees electronically.

### 3. Digital Economy

The digital economy, propelled by the rapid expansion of e-commerce, has revolutionized traditional business models and consumer behaviors. Enabled by ubiquitous internet connectivity and mobile technology, e-commerce has transcended geographical boundaries, allowing businesses to reach global markets and consumers to access products and services with unprecedented ease. This democratization of commerce has leveled the playing field, empowering small and medium-sized enterprises (SMEs) to compete alongside industry giants and fostering entrepreneurship and innovation in the digital marketplace.

Moreover, the digital economy has spurred the development of new revenue streams and business models, including subscription services, digital marketplaces, and platform-based businesses. Digital payments have become a cornerstone of this ecosystem, providing consumers with secure and convenient ways to transact online while opening up new opportunities for businesses to monetize their offerings. However, as the digital economy continues to evolve, addressing challenges such as cybersecurity threats, data privacy concerns, and digital divide issues will be critical to ensuring the continued growth and sustainability of this dynamic and transformative economic landscape.

### 4. Artificial Intelligence

The sustained success of eCommerce giants like Alibaba Holding Group Limited and Amazon Inc. has captured the attention of academics eager to uncover the key drivers behind their remarkable turnovers in recent years. Mohapatra suggests that the core factor fueling the triumph of these industry leaders, as well as emerging eCommerce players, lies in AI's adeptness at recognizing and forecasting patterns in customer purchasing behaviour.

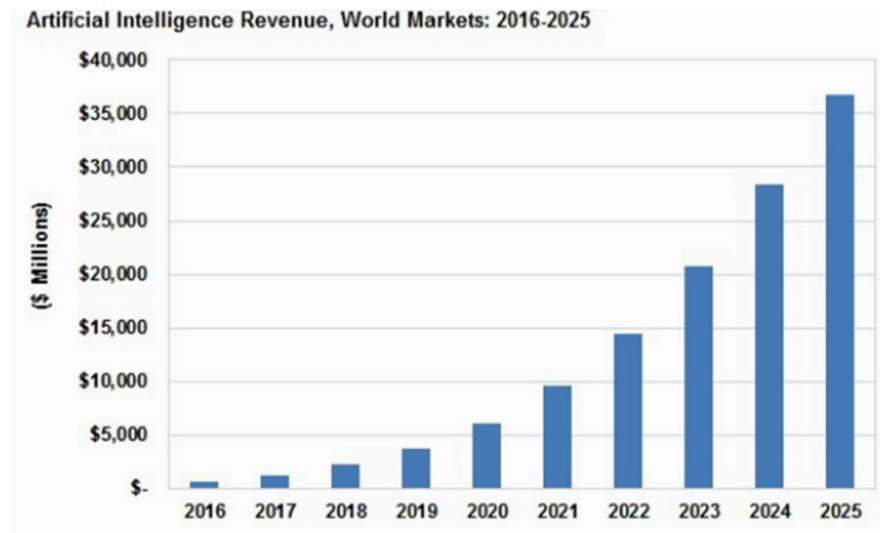


Fig.1. Revenue in World Market : 2016 - 2025

## 5. E-commerce and Artificial Intelligence

The modern era of information brings forth fresh opportunities, software, and technological advancements applicable to marketing and purchasing. These innovations compel businesses to become more innovative, leveraging technology to enhance efficiency, quality, and cost-effectiveness in the services they offer. Today's innovation is primarily driven by advancements in information and communication technology, which significantly influence the business landscape. The efficacy of these technologies hinges on various factors, such as investment in human capital and the optimal integration of e-commerce solutions. One sector where the digital shift and the significance of e-commerce are particularly pronounced is retail, where digital tools like websites either replace or complement physical transactions to a certain extent.

## 6. E-commerce and buyers' mindset

In contrast to the traditional retail setting, the average e-commerce customer typically has a shorter attention span. Not every visit to an e-commerce platform is driven by the intention to make a purchase. E-commerce introduced the phenomenon of shopping cart abandonment, where customers leave items in their carts without completing the purchase. Unlike the brick-and-mortar model, a significant portion of customer care in e-commerce begins after the order is placed. These are some fundamental aspects of the average e-commerce shopper. However, the industry must evolve to address the challenges posed by the integration of Artificial Intelligence algorithms for predicting consumer buying patterns. Here's a potential framework outlining the impact of AI on e-commerce.

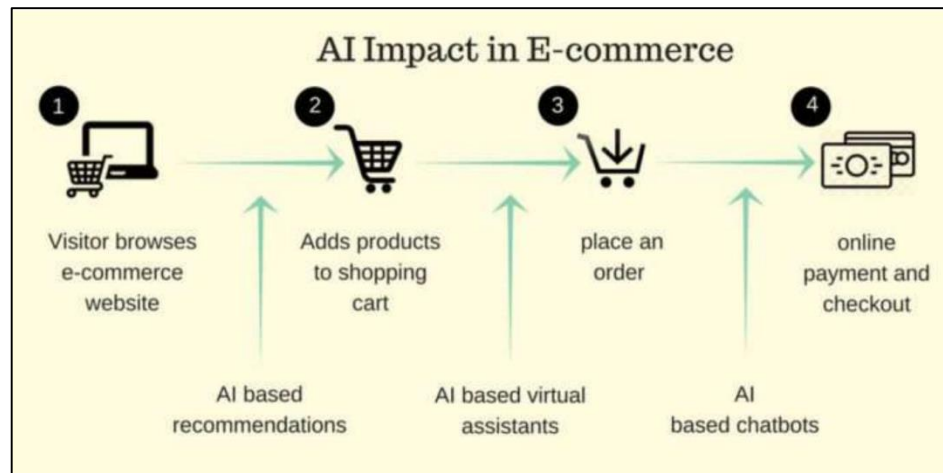


Fig.2.Impact of AI in E-commerce

## 7. Applications of Artificial Intelligence

The rapid advancement of science and technology is driving the swift evolution of intelligent technologies, significantly impacting daily human lifestyles, particularly in the e-commerce sector. The integration of artificial intelligence (AI) applications in e-commerce manifests in various facets:

- Real-Time Product Targeting in E-Commerce:** In the competitive landscape of online businesses, companies strive to enhance customer experience by offering seamless access to desired products. Machine learning algorithms enable personalized product recommendations, discounts, and reviews tailored to individual preferences, thereby optimizing the online shopping journey.
- Visual Search for Related Images:** AI facilitates image-based searches on e-commerce platforms, allowing users to explore related items through image recognition technology. Platforms like Pinterest utilize visual search capabilities, enabling users to select objects within images to discover similar products, enhancing the shopping experience.
- Voice Search Applications:** Voice search is gaining prominence in online marketing, gradually replacing traditional text-based searches. Speech recognition technology has significantly improved, with nearly 70% of applications supporting conversational language for voice assistants like Google Assistant and Siri-powered devices such as Apple HomePod. Voice-activated assistants like Amazon's Alexa-powered Echo streamline shopping tasks, enabling users to place orders through voice commands. AI-driven chatbot servers efficiently handle customer inquiries, respond to voice commands, and offer product recommendations using natural language processing capabilities, enhancing the overall shopping experience.



## 8. Innovative AI Solutions Reshaping E-Commerce

Artificial intelligence is not merely a trendy technology; its implementation has the potential to revolutionize various business functions across organizations. To grasp its impact, understanding the components of AI is crucial: data mining gathers both current and historical data for predictive insights, natural language processing enhances human-computer interaction, and machine learning utilizes algorithms to solve problems based on past experiences or examples. Deep learning further enhances understanding by layering algorithms. Over recent years, AI technology has matured significantly, becoming a powerful tool to boost sales and optimize operations. Even small e-commerce businesses are leveraging AI capabilities, showcasing its widespread adoption and effectiveness in improving business processes.

## 9. AI Use Cases in E-Commerce

### 1. Personalized Product recommendations

Collecting and processing customer data for online shopping experiences has become increasingly streamlined. Artificial intelligence plays a crucial role in providing personalized product recommendations by analyzing past customer behavior and identifying similar customers. Websites that suggest items based on previous purchases utilize machine learning algorithms to scrutinize purchase histories. Retailers depend on machine learning to gather, analyze, and utilize data for personalized experiences, marketing campaigns, pricing optimization, and gaining customer insights. As machine learning advances, it is expected to reduce the need for extensive involvement from data scientists in everyday ecommerce applications.

### 2. Pricing Optimization

Dynamic pricing enabled by AI involves adjusting product prices in response to changes in supply and demand. Utilizing relevant data, modern tools can forecast optimal discount timing and amounts, dynamically determining the minimum discount required to drive sales.

### 3. Enhanced Customer service

By leveraging virtual assistants and chatbot technology, businesses can provide the perception of elevated customer support. Although these bots aren't entirely autonomous, they streamline basic transactions, allowing live support agents to concentrate on more intricate matters. Furthermore, virtual agents offer the benefit of round-the-clock availability, enabling the resolution of minor inquiries and issues at any hour, thus minimizing customer wait times.



#### **4. Customer segmentation**

Enhanced access to business and customer data, coupled with increased processing power, empowers e-commerce operators to gain deeper insights into their customers and detect emerging trends with unprecedented accuracy. According to a statement from Accenture, "AI systems have the capability to swiftly explore intricate and diverse customer engagement strategies, continuously refining their performance as additional data becomes accessible. This enables marketers to establish parameters and enable AI to autonomously optimize and refine its strategies to achieve precision."

#### **5. Smart Logistics**

As outlined in a report by Emerging Tech Brew, machine learning demonstrates its predictive prowess in logistics by accurately forecasting transit durations, demand fluctuations, and potential shipment setbacks. Smart logistics, also known as intelligent logistics, involves leveraging real-time data from sensors, RFID tags, and similar technologies for improved inventory management and more precise demand forecasting. Over time, machine learning systems continuously enhance their predictive capabilities, thereby refining supply chain and logistics operations.

#### **6. Sales and demand forecasting**

Especially in the current and post-COVID-19 landscape, it's crucial to base inventory planning on both real-time and historical data. Artificial intelligence offers a solution to achieve this goal. According to a recent report by McKinsey, investing in real-time customer analytics remains essential for monitoring and responding to fluctuations in consumer demand. This data can be utilized for price optimization and targeted marketing strategies.

### **Conclusion**

Forrester reports that India stands as the swiftest-growing e-commerce region, underscoring the substantial impact AI is poised to make on client attraction and retention in this sector. The integration of AI in e-commerce brings forth novel innovations, while also fueling job creation in the IT sector to develop and manage the applications and technologies driving such AI algorithms. Notably, major e-commerce players are intensively focusing on AI technologies to enhance their competitive edge, optimizing trading channels and introducing initiatives like Alibaba and Amazon's intelligent robot support campaigns. These e-commerce giants have also ventured into the hardware market. As AI strategies mature and become more widely adopted, they increasingly influence variables such as user engagement and customer satisfaction in e-commerce sales. Over time, artificial intelligence is predicted to be the driving force behind the transformation of e-commerce, offering greater prospects for success by improving customer relationship management and sales marketing, while also bridging the gap between customization and privacy concerns.

## References

1. Agrawal, A., Gans, J., & Goldfarb, A. (2022). *Power and prediction: The disruptive economics of artificial intelligence*. Harvard Business Review Press.
2. Akter, S., & Wamba, S. F. (2016). Big data analytics in E-commerce: A systematic review and agenda for future research. *Electronic Markets*, 26(2), 173-194.
3. Akter, S., Wamba, S. F., Gunasekaran, A., Dubey, R., & Childe, S. J. (2016). How to improve firm performance using big data analytics capability and business strategy alignment? *International Journal of Production Economics*, 182, 113-131.
4. Amankwah-Amoah, J., Khan, Z., & Wood, G. (2021). COVID-19 and business failures: The paradoxes of experience, scale, and scope for theory and practice. *European Management Journal*, 39(2), 179-184.
5. Beckers, J., Weekx, S., Beutels, P., & Verhetsel, A. (2021). COVID-19 and retail: The catalyst for e-commerce in Belgium? *Journal of Retailing and Consumer Services*, 62, 102645.
6. Hasija, A., & Esper, T. L. (2022). In artificial intelligence (AI) we trust: A qualitative investigation of AI technology acceptance. *Journal of Business Logistics*, 43, 388-412.
7. Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30-50.
8. Iansiti, M., & Lakhani, K. R. (2020). *Competing in the age of AI: Strategy and leadership when algorithms and networks run the world*. Harvard Business Review Press.
9. Kawasaki, T., Wakashima, H., & Shibasaki, R. (2022). The use of e-commerce and the COVID-19 outbreak: A panel data analysis in Japan. *Transport Policy*, 115, 88-100.
10. Libai, B., Bart, Y., Gensler, S., Hofacker, C. F., Kaplan, A., Kötterheinrich, K., & Kroll, E. B. (2020). Brave new world? On AI and the management of customer relationships. *Journal of Interactive Marketing*, 51, 44-56.
11. Mena, C., Karatzas, A., & Hansen, C. (2022). International trade resilience and the Covid-19 pandemic. *Journal of Business Research*, 138, 77-91.
12. Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management*, 58(3), 103434.
13. Rana, N. P., Chatterjee, S., Dwivedi, Y. K., & Akter, S. (2022). Understanding dark side of artificial intelligence (AI) integrated business analytics: Assessing firm's operational inefficiency and competitiveness. *European Journal of Information Systems*, 31(3), 364-387.
14. Wang, X., Xie, J., & Fan, Z. P. (2021). B2C cross-border e-commerce logistics mode selection considering product returns. *International Journal of Production Research*, 59(13), 3841-3860.
15. Zhang, D., Pee, L. G., & Cui, L. (2021). Artificial intelligence in e-commerce fulfillment: A case study of resource orchestration at Alibaba's Smart Warehouse. *International Journal of Information Management*, 57, 102304.

# Role of Artificial Intelligence in E-commerce: Present and Future

**K. Latha**

*Professor, Department of Commerce with CA, Hindusthan College of Arts & Science, Coimbatore, India.*

*\*Corresponding Author e-mail iD: [lathak158@gmail.com](mailto:lathak158@gmail.com)*

## Abstract

In contrast to natural intelligence, which is proven by humans, artificial intelligence, also referred to as machine intelligence, is demonstrated by machines. In e-Commerce, artificial intelligence (AI) is quickly becoming a crucial component. It implicitly has the potential to open up new avenues for eCommerce companies by increasing gains, improving efficacy, and automating procedures. A number of advantages come with utilizing artificial intelligence for e-commerce, which helps companies increase productivity and profitability. With the use of AI-driven solutions, businesses can leverage large data from past purchases and customer interactions to increase customer awareness of gestures and preferences. With this information, companies may tailor their goods and services to better suit the needs of their visitors. The function of artificial intelligence in e-commerce and its advantages are highlighted in this study as well as advantages of artificial intelligence in e-commerce and how it functions in various e-commerce platforms. It finds that e-commerce websites now Offer a better stoner experience thanks to artificial intelligence.

**Keywords:** Artificial intelligence, Online shopping, Customer preferences and behavior

## Introduction

The goal of artificial intelligence (AI), a large subject of computer science, is to build intelligent machines with human-like thought and behavior. Sophisticated algorithms, machine learning, and historical data analytics are utilized to address difficult issues in domains like inventory control, consumer behavior, and customer experience. AI has the power to completely transform e-commerce companies by offering e-commerce solutions in a constantly evolving digital landscape. Businesses have new chances to optimize client and customer data and enhance the consumer experience using AI e-Commerce. Personalized marketing campaigns and product suggestions are just two of the numerous eCommerce operations that AI algorithms are automating. eCommerce companies are now able to provide



better services and increase revenues because to these developments in AI technology. More effectively, Artificial Intelligence is revolutionizing online commerce through enhanced efficiency, accuracy, and customisation.

### E-commerce

Electronic commerce, or e-commerce, is the term used to describe the purchasing and selling of goods and services via the internet. It includes a broad variety of internet-based business ventures, such as internet banking, electronic payments, online shopping, and online auctions. Through e-commerce, companies and customers can deal without having to physically be present in a real store. It has altered how people shop and conduct business, and it is now a crucial component of the global economy. Different kinds of e-commerce model exist, including:

- **Consumer to Consumer (C2C):** In this business model, customers sell to other customers directly. C2C e-commerce includes sites with classified ads like Craigslist and online marketplaces like eBay.
- **Consumer to Business (C2B):** This refers to the exchange of goods and services between private customers and companies. For example, freelance marketplaces where people provide businesses with skills like writing or graphic design.
- **Business to Government (B2G):** Companies who offer goods or services to governments or government agencies are involved in this kind of e-commerce. Services such as platforms for government agencies to purchase goods can fall under This category.

The term "mobile commerce," or "m-commerce," describes online purchases made using portable electronic devices, such as tablets and smartphones.

### Kinds of AI technology applied to online shopping

Artificial Intelligence is a multifaceted field that involves multiple models. Four of the most popular AI technologies for e-commerce are as follows:

- 1. NLP or natural language processing:** The goal of natural language processing is to make it possible for computers to understand and produce natural human language.
- 2. Machine learning (ML):** Without explicit programming, computers may learn from data and make predictions or judgments thanks to machine learning, which makes use of statistical approaches like algorithms. To better interpret data, deep learning models—including



transformers and large language models (LLMs) like ChatGPT from Open Ai—layer algorithms.

**3. Computer vision (CV):** This branch of artificial intelligence makes it possible for machines

to comprehend data from pictures and movies.

**4. Data mining:** Finding data to support AI systems and algorithms is known as data mining.

### What Applications Does Artificial Intelligence Have in the E-Commerce Sector?

The e-commerce sector is utilizing artificial intelligence (AI) in a number of ways, such as:

**1. Customized product recommendations:** AI can make product recommendations to users based on their browsing habits, prior purchases, and other information. Both sales and the consumer experience may benefit from this.

**2. Chatbots:** AI-driven chatbots can be used to finish transactions, respond to consumer inquiries, and offer assistance. By doing this, human customer support agents may have more time to devote to more difficult jobs.

**3. AI-powered virtual shopping assistants:** These AI-powered assistants aid clients in finding products, comparing pricing, and completing transactions. Customers may find their purchasing more effective and convenient as a result.

**4. Dynamic pricing:** AI can be used to dynamically set product prices according to variables like competition, demand, and stock levels. This can support companies in maximizing their earnings.

**5. Fraud detection:** Artificial intelligence is capable of identifying dishonest transactions, such credit card fraud. This can aid in shielding companies from monetary damages.

**6. Inventory management:** Demand forecasting, tracking inventory movement, and inventory optimization are all possible with AI. This can assist companies in cutting expenses, increasing productivity, and preventing stockouts.

**7. Optimization of logistics:** AI can be applied to streamline logistics processes like order fulfilment and shipment. This may contribute to cost savings and increased efficiency.

**8. Customer service:** By offering automatic answers to frequently asked queries and problems, AI can be utilized to enhance customer service. This can free up human customer support agents to concentrate on more difficult jobs.

**9. Marketing:** AI can be used to target clients with offerings that are relevant to them and personalize marketing efforts. Sales and brand exposure may both benefit from this.

### Examples of AI's Current Applications in E-Commerce

Here are some particular instances of how AI is now being applied in e-commerce:

**1. Amazon:** AI is used by Amazon to streamline its logistical processes, offer customer support, and make product recommendations to customers. AI is used, for instance, by Amazon's "Customers who bought this item also bought" feature to suggest items that are comparable to ones that a consumer has already bought. AI is also used by Amazon's "Alexa" voice assistant to process purchases, respond to queries from customers, and provide product information.

**2. Walmart:** Walmart is utilizing AI to enhance fraud detection, supply chain management, and customer support. Walmart, for instance, uses AI to detect fraudulent transactions, follow the flow of goods via its supply chain, and offer real-time customer service.

**3. Netflix:** Based on user viewing behavior and other variables, Netflix use AI to suggest movies and TV series to its audience. With the help of artificial intelligence (AI), Netflix's "Continue Watching" feature keeps track of the movies and TV series that a user has begun and suggests more like them.

**4. Spotify:** Based on a user's listening history as well as other variables, Spotify employs AI to suggest songs to users. With Spotify's "Discover Weekly" function, each user receives a customized playlist of recently released songs curated by AI.

These are only a few instances of the current applications of AI in e-commerce. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops.

### AI's advantages for E-Commerce

The following are a few advantages of applying AI to e-commerce:

**1. Better customer experience:** By making tailored recommendations, responding to inquiries from customers, and completing transactions, AI can help to improve the consumer experience. Increased client pleasure, loyalty, and repeat business may result from this.

**2. Higher sales:** By identifying fraudulent transactions, optimizing prices, and making product recommendations to clients who are likely to be interested, AI can help boost sales. Profits may increase as a result, and the company may become more resilient.

**3. Lower expenses:** By automating processes like order fulfilment and customer support, AI can assist in lowering expenses. This can increase profitability by freeing up human resources to concentrate on more strategic duties.

**4. Greater productivity:** By streamlining procedures like marketing and logistics, AI can contribute to greater productivity. Better inventory control, quicker order processing, and more successful marketing efforts can result from this.

**5. Improved decision-making:** AI's insights into consumer behavior and industry trends can assist companies in making more informed judgments. This can assist companies in finding fresh markets, enhancing their goods and services, and maintaining an advantage over rivals.

### Obstacles in Applying AI to E-Commerce

Artificial intelligence (AI) is quickly changing the e-commerce sector by giving companies new opportunities to enhance consumer satisfaction, boost revenue, cut expenses, and boost productivity. When utilizing AI in e-commerce, companies should be mindful of a few potential drawbacks. The following are some difficulties in implementing AI in e-commerce:

**1. Data privacy:** AI needs a lot of data to function and be trained. Sensitive consumer data, like past purchases, surfing patterns, and personal information, may be included in this data. To preserve client privacy, businesses must exercise caution in the way they gather, keep, and utilize this data.

**2. Bias:** If AI algorithms are taught on data that is not representative of the population, they may become prejudiced. Discrimination against particular groups of individuals may result from this. Companies must acknowledge this bias and take action to lessen it.

**3. Security:** Cyberattacks are a possibility for AI systems. An AI system breach could be exploited to steal client information or interfere with regular corporate operations. Companies must take action to safeguard AI systems from hackers and ensure their security.

**4. Cost:** The development and application of AI technology can be costly. Before deciding to implement AI, businesses must carefully weigh its costs.

**5. Complexity:** It can be difficult to comprehend and use AI technologies. Companies must possess the knowledge necessary to oversee and sustain AI systems.

Not with standing these difficulties, AI has the power to completely transform the e-



commerce sector. Companies who can successfully navigate these obstacles will be in a good position to grow in the future.

### Future of AI in e-commerce

AI's prospects in e-commerce are extremely promising. In the years to come, we should anticipate seeing even more ground-breaking and inventive uses of AI technology as it develops. The following are some anticipated future changes to the e-commerce sector brought about by AI:

- 1. Personalized shopping experiences:** AI will be utilized to provide clients with individualized shopping experiences. AI will be used to evaluate consumer information, including demographics, browsing patterns, and past purchases, in order to provide a customized shopping profile for each individual customer. This will enable companies to offer a more customized shopping experience and suggest items that are more likely to catch each customer's attention.
- 2. Virtual assistants:** The e-commerce sector will see a rise in the use of AI-powered virtual assistants. These virtual assistants will have the ability to assist clients with product searches, query resolution, and transaction completion. Customers will benefit from a more efficient and convenient shopping experience as a result.
- 3. Fraud detection:** Artificial intelligence will help the e-commerce sector detect fraud better. AI will be used to evaluate transactions and spot trends that point to fraud in order to do this. This will assist companies in safeguarding themselves from monetary damages.
- 4. Optimisation of logistics:** AI will be employed to enhance e-commerce logistics operations. Artificial Intelligence (AI) will be utilized to monitor stock levels, enhance transportation routes, and forecast demand. This will assist companies in cutting expenses and increasing productivity.
- 5. Customer service:** AI will be applied to enhance customer service inside the e-commerce sector. AI will be used to respond to queries from customers, handle problems, and offer assistance. This will assist companies in offering a better customer experience and raising consumer satisfaction levels.





## Conclusion

Artificial intelligence (AI) is changing the e-commerce sector quickly by giving companies new tools to enhance consumer satisfaction, boost revenue, save expenses, and boost productivity. AI-powered e-commerce has a promising future because technology is only getting better. Through the utilization of cutting-edge technology like artificial intelligence (AI) software, robotic automation, virtual assistants, and historical sales data, the e-Commerce sector may improve customer happiness and optimize operations by offering a smoother and fluid online shopping experience. The application of AI in eCommerce has virtually limitless possibilities as technology advances and changes. As AI technology advances, we should anticipate seeing even more ground-breaking and inventive uses in the years to come. These apps will significantly change the way we purchase online and improve everyone's online shopping experience in terms of convenience, effectiveness, and enjoyment.

## References

1. Avneet Pannu, "Artificial Intelligence and its Application in Different Areas", International Journal of Engineering and Innovative Technology (IJEIT) Volume 4, Issue 10, April 2015
2. Ayyapparajan, D. R., "Impact of Artificial Intelligence In E-Commerce", Journal of University of Shanghai for Science and Technology, (2022)
3. Dheeraj Kapoor, R. K. Gupta," Software Cost Estimation using Artificial Intelligence Technique" International Journal of Research and Development in Applied Science and Engineering (IJRDASE), Volume 9, Issue 1, February 2016
4. KASHYAP, D. A., "Artificial Intelligence and Its Applications In Ecommerce - A Review Analysis And Research" Journal of Theoretical and Applied Information Technology, (2022)
5. J.Prabha, M., "A Study on Impact of Artificial Intelligence in E-commerce", IJCRT, (2021)
6. Pallathadka H, Ramirez-Asis EH, Loli-Poma TP, Kaliyaperumal K, Ventayen RJM, Naved M,"Applications of artificial intelligence in business management, e-commerce and finance", (2022)



7. Siddharth Gupta, Deep Borkar, Chevelyn De Mello, Saurabh Patil, “An E-Commerce Website based Chabot” International Journal of Computer Science and Information Technologies (IJCSIT), Vol. 6 (2), 2015
8. <https://builtin.com/artificial-intelligence/ai-retail-ecommerce-tech>
9. [https://www.researchgate.net/publication/342853646\\_Emerging\\_Roles\\_of\\_Artificial\\_Intelligence\\_in\\_ecommerce](https://www.researchgate.net/publication/342853646_Emerging_Roles_of_Artificial_Intelligence_in_ecommerce)
10. <https://www.bigcommerce.com/articles/ecommerce/ecommerce-ai/>



## Role of Artificial Intelligence in Business Transformation (A study with special reference to Virudhunagar)

**R. Shanthi<sup>1\*</sup>** and **B. Nandhini<sup>2</sup>**

<sup>1\*</sup>Assistant Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>2</sup>Assistant Professor of Commerce, V.V.Vanniaaperumal College for Women (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [shanthi.r@vhnsnc.edu.in](mailto:shanthi.r@vhnsnc.edu.in)

### Abstract

Presently, AI is having an important impact on global sustainability trends. AI refers to the use of algorithms and machine learning techniques to automate jobs that were traditionally performed by humans. Technically speaking, Artificial intelligence is an integration process between cloud computing, network devices, robots, computer, and digital content production and in various business processes, systems, and daily operations. The applications of Artificial intelligence use technologies which comprises natural language processing, speech recognition, machine learning, robotics, and computer vision. These technologies offer a number of opportunities for business. The present environment is very interesting and challenging. Artificial Intelligence has emerged as a transformative technology that is changing the way businesses function. The potential benefits of AI are noteworthy, including increased productivity, cost savings, and enhanced decision-making. However, the adoption of AI also poses numerous challenges, including data privacy and security concerns, ethical considerations, and potential job displacement. Hence this study attempts to analyse the role of artificial intelligence in business transformation. The main objectives of this study are

- To present the socio economic profile of the sample respondents in the study area.
- To know the awareness of respondents about the applications of AI in marketing.
- To assess the opinion of respondents about the benefits of adopting AI in marketing.
- To analyse the challenges faced by the respondents in the adoption of AI in business.
- To offer suggestions for the effective use of AI technologies in business

The present study is based on both primary and secondary data. Primary data have been collected from 70 respondents doing business in Virudhunagar who were selected by convenience sampling method. The collected data were edited, tabulated and analysed for the purpose of presentation. Secondary data have been collected from various journals, books and websites.

## Introduction

Presently, AI is having an important impact on global sustainability trends. AI refers to the use of algorithms and machine learning techniques to automate jobs that were traditionally performed by humans. Technically speaking, Artificial intelligence is an integration process between cloud computing, network devices, robots, computer, and digital content production and in various business processes, systems, and daily operations. The applications of Artificial intelligence use technologies which comprises natural language processing, speech recognition, machine learning, robotics, and computer vision. These technologies offer a number of opportunities for business. Accepting the development of Artificial Intelligence is crucial to future marketing efforts. Every day businesses are using artificial intelligence software to optimize their own processes, reduce overhead, decrease turnaround time, and improve output. Technology is growing at a unique rate, and the move to marketing AI software are at a distinct advantage to jump on the next innovation.

## Statement of the Problem

Artificial Intelligence is rapidly becoming more central to the day-to-day digital world, marketing world and advertising world. The applications of Artificial Intelligence range from detecting trends in data to reduce market risks, improving customer service through virtual personal assistants, or analysing millions of documents across a server of the company to find compliance failures. Artificial Intelligence influences self-learning systems by using tools like data mining, pattern recognition and natural language processing. The field of marketing is changing rapidly with the changes and advancement in AI. The pace of this change will also transform the overall setting of marketing in academics, research, and business context. This will be a major challenge for the organizations to transform according to the changing scene of marketing. The companies will have to train their employees constantly with the advent of new technology. Working with AI is not observed as science fiction but instead, it is viewed as a reality which will become essential for survival. The present environment is very interesting and challenging. Artificial Intelligence has emerged as a transformative technology that is changing the way businesses function. The potential benefits of AI are noteworthy, including increased productivity, cost savings, and enhanced decision-making. However, the adoption of AI also poses numerous challenges, including data privacy and security concerns, ethical

considerations, and potential job displacement. Hence this study attempts to analyse the role of artificial intelligence in business transformation.

### Scope of the Study

The scope of the present study is confined to know the awareness of respondents about the applications of AI in marketing, to assess the opinion of respondents about the benefits of adopting AI in marketing, to analyse the challenges faced by the respondents in the adoption of AI in business and to offer suggestions for the effective use of AI technologies in business.

### Objectives

The main objectives of this study are

- To present the socio economic profile of the sample respondents in the study area.
- To know the awareness of respondents about the applications of AI in marketing.
- To assess the opinion of respondents about the benefits of adopting AI in marketing.
- To analyse the challenges faced by the respondents in the adoption of AI in business.
- To offer suggestions for the effective use of AI technologies in business.

### Review of Literature

Daniel Paschek et al (2017) conducted a study on “Automated Business Process Management in times of digital transformation using machine learning or artificial intelligence”. They stated that digitalisation is irresistible and changes the market situation in many business sectors. Time intensive manual workflows, based on e-mail, Excel and truly paper work reduce the productivity. They concluded that it becomes increasingly important for businesses to use the power of their data and to make smart and profitable decisions.

Sourav Gupta et al (2021) examined a study on “A Case Study of Artificial Intelligence is being used to Reshape Business ”AI is one of the emerging technologies which is constantly changing and growing in the corporate world. They explained the modern AI basics and, applications of AI, and its future in business throughout this paper. Many businesses benefit from AI technology by reducing operational expenses, improving efficiency, and intensifying the customer base.

## Methodology

The present study is based on both primary and secondary data. Primary data have been collected from 70 respondents doing business in Virudhunagar who were selected by convenience sampling method. The collected data were edited, tabulated and analysed for the purpose of presentation. Percentage analysis, Likert's five point scaling technique and simple ranking technique have been applied to analyse the data. Secondary data have been collected from various journals, books and websites.

## Socio Economic Profile of the Respondents

The opinion of businessmen about Artificial Intelligence may be influenced by socio economic variables such as age, gender, marital status, educational qualification, type of business and annual income. Hence, these variables of the respondents were collected and tabulated in Table 1.

**Table 1 Socio Economic Profile of the Respondents**

Socio Economic Variables		Number of Respondents	Percentage to Total
Age (in years)	Below 25	9	12.86
	25 – 35	15	21.43
	35 - 45	27	38.57
	Above 45	19	27.14
Gender	Male	47	67.14
	Female	23	32.86
Marital status	Married	43	61.43
	Unmarried	27	38.57
Educational Qualification	Upto HSC	18	25.72
	Under Graduate	27	38.57
	Post Graduate	25	35.71
Business	Textile	18	25.71
	Grocery	22	31.43
	Furniture Mart	17	24.29
	Others	13	18.57

Source: Primary data

Out of 70 respondents surveyed, 27 (38.57 %) are in the age group of 35-45; 47 (67.14%) are male respondents; 43 (61.43%) are married; 52 (74.29%) are degree holders; 22 (31.43%) have grocery stores.

### Applications of Ai In Marketing

There are several key applications of AI in marketing that have transformed the way businesses engage with customers and optimize their marketing efforts. Hence the respondents were asked to mention their awareness about AI applications in marketing.

**Table 2 Awareness about AI Applications**

Applications	With Awareness	Without Awareness	Total
Customer segmentation and targeting	38 (54.29)	32 (45.71)	70 (100)
Predictive analytics	45 (64.29)	25 (35.71)	70 (100)
Personalisation and recommendation engines	49 (70.0)	21 (30.0)	70 (100)
Chatbots and virtual assistants	39 (55.71)	31 (44.29)	70 (100)
Content generation and optimisation	53 (75.71)	17 (24.29)	70 (100)
Sentiment analysis and social listening	40 (57.14)	30 (42.86)	70 (100)
Voice search optimisation	46 (65.71)	24 (34.29)	70 (100)

Source: Primary data

Figures in Parentheses denote Percentages

Out of 70 respondents surveyed, 75.71 per cent are aware of the application ‘Content generation and optimisation’. This tool assist marketers in content creation, enhancing efficiency, and maintaining consistency and 70 per cent are aware of ‘Personalisation and recommendation engines’. This enhances customer engagement, drives conversations, and improves overall customer satisfaction.

### Benefits of adopting AI in marketing

Artificial intelligence is extensively used in marketing across various domains and processes. IT changes the landscape of marketing and will completely transform in near future. AI continues to advance, offering marketers new opportunities to improve customer experiences, enhance targeting, and optimize marketing efforts for better results. Hence, the respondents were asked to state their opinion about the benefits of applications of AI in marketing. Likert’s five point scaling technique has been applied to quantify their opinion and the results were shown in Table 3.

**Table 3 Opinion of Respondents about the Benefits of adopting AI in marketing**

Benefits	Strongly Agree	Agree	No opinion	Dis agree	Strongly disagree	Total score	Mean score	Rank
Enables marketers to process large volumes of data quickly and extract meaningful insights	18 (90)	14 (56)	21 (63)	9 (18)	8 (8)	235	3.36	III
Enables marketers to tailor their messaging and campaigns to specific customer segments.	24 (120)	17 (68)	16 (48)	6 (12)	7 (7)	255	3.64	II
Helps marketers to understand customer opinions, track brand reputation, and respond to customer feedback effectively.	19 (95)	27 (108)	13 (39)	5 (10)	6 (6)	258	3.69	I
Enhances customer experience, reduce response times, and free up resources for other tasks.	14 (70)	15 (60)	22 (66)	9 (18)	10 (10)	224	3.20	V
Enables marketers to analyse and understand visual content.	11 (55)	23 (92)	17 (51)	8 (16)	11 (11)	225	3.21	IV
Optimises content for search engines, improving search rankings and visibility.	9 (45)	16 (64)	18 (54)	15 (30)	12 (12)	205	2.93	VI
Helps to deliver highly targeted ads to the most relevant audiences	7 (35)	8 (32)	27 (81)	24 (48)	4 (4)	200	2.86	VII
Delivers personalised product recommendations, content suggestions, and offers.	10 (50)	15 (60)	9 (27)	22 (44)	14 (14)	195	2.79	VIII

Source: Primary data

Figures in Parenthesis denotes points

On the basis of the mean scores given by the respondents, the ranks have been found out. The benefit ‘Helps marketers to understand customer opinions, track brand reputation, and



respond to customer feedback effectively’ secures first rank with the mean score of 3.69 points; the benefit ‘Enables marketers to tailor their messaging and campaigns to specific customer segments’ gets second rank with the mean score of 3.64 points and the benefit ‘Enables marketers to process large volumes of data quickly and extract meaningful insights’ gets third rank with the mean score of 3.64 points.

### Challenges faced by the respondents in the adoption of AI in business

Regardless of the potential benefits of AI, its adoption also poses numerous challenges for businesses. The common challenges faced by the respondents in the adoption of AI in business are technical compatibility, skills gap, data privacy and security, cost of implementation and user acceptance and resistance. These challenges were given to the respondents and they were asked to rank them. Simple ranking technique has been applied to analyse the challenges faced by the respondents in the adoption of AI in business. The results have been tabulated in Table 4.

**Table 4 Challenges faced by the Respondents in the adoption of Cost reduction Strategies**

Challenges	Ranks					Total Score	Mean Score	Rank
	I	II	III	IV	V			
Technical compatibility	10 (50)	18 (72)	12 (36)	13 (26)	17 (17)	201	2.87	IV
Cost of implementation	24 (120)	13 (52)	17 (51)	9 (18)	7 (7)	248	3.54	I
Data privacy and security	15 (75)	17 (68)	20 (60)	7 (14)	11 (11)	228	3.26	II
User acceptance and resistance	19 (95)	14 (56)	11 (33)	16 (32)	10 (10)	226	3.23	III
Skills gap	7 (35)	14 (56)	20 (60)	6 (12)	23 (23)	186	2.66	V

Source: Primary data

Figures in Parenthesis denotes points

It is inferred from Table 4 that the first and foremost challenge faced by the respondents in the adoption of AI in business is ‘Cost of implementation’. Initial investment in AI technology and infrastructure can be prohibitive for businesses with limited financial resources. This challenge secures first rank with the mean score of 3.54 points. The challenge ‘Data privacy and security’ gets second rank with the mean score of 3.26 points. The challenge ‘User acceptance and resistance’ gets third rank with the mean score of 3.70 points because

employees may resist AI adoption due to fear of job displacement, lack of training, or unfamiliarity with new technologies. The challenges 'Technical compatibility' and 'Skills gap' secures fourth and fifth ranks respectively.

### Suggestions

In order to overcome the challenges faced by the respondents, in the light of inferences of the study, the following suggestions are to be made for the effective use of AI technologies in business. .

- User friendly AI technologies on a smaller scale should be used before committing to large investment. This helps to build confidence regarding AI's potential benefits against implementation cost.
- Clear strategy should be developed for data collection, management, and security to harness the power of AI effectively. Businesses should stay on the top of the latest trends in AI and data protection in order to face the problem of data privacy and security concern.
- Effective change management strategies should be adopted to foster acceptance and engagement.
- Continuous learning and training should be needed to eliminate skills gap.
- Collaboration should be made with AI experts who can guide in the adoption process and assist in overcoming technical challenges.

### Conclusion

The use of artificial intelligence in business operations speeds up transaction processing, reduces mistakes, improves transparency, and significantly boosts income. Although it is very hard to envisage where this technology may lead to the creation of new employment in the future, it is simple to understand how it can benefit people. AI has the potential to create a better business model in the world. Artificial intelligence will remain to develop in the near future and transform the business landscape. Therefore, both individuals and businesses must be prepared for the upcoming technological demands by accepting that innovation will succeed in the future.

## References

1. Statistical Methods, S.P.Gupta., Sultan Chand & sons, New Delhi, 2006.
2. Research Methodology, C.R. Kothari., New Age International Private Limited Publishers, New Delhi, 2011.
3. Daniel Paschek et al Automated business process management – in times of digital transformation using machine learning or artificial intelligence MATEC Web of Conferences 121, 04007 (2017), DOI: 10.1051/mateconf/20171210 MSE 2017 4007
4. Sourav Gupta et al (2021) “A Case Study of Artificial Intelligence is being used to Reshape Business” International Journal of Electrical, Electronics and Computers Vol-6, Issue-3 May-Jun, 2021 Available: <https://aipublications.com/ijeec/Peer-Reviewed-Journal>
5. Russell, S & Norvig, P. 2010. Artificial Intelligence: A Modern Approach. Third edition. Pearson Education. Upper Saddle River.
6. <https://itrexgroup.com/blog/artificial-intelligence-challenges/>
7. <https://www.forbes.com/sites/charlesrtaylor/2023/08/09/how-artificial-intelligence-is-helping-todays-small-businesses/>
8. <https://www.mailmodo.com/guides/ai-tools-for-small-businesses/>
9. <https://www.linkedin.com/advice/3/how-can-you-overcome-challenges-implementing-ai>

## Digital Marketing Trends Analysis in AI

M.Sivasankar<sup>1</sup>, V.M. Kannan<sup>2\*</sup> and A. Nagavaratharajan<sup>3</sup>

<sup>1</sup>Assistant Professor of Commerce with Computer Applications, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>2\*</sup>Assistant Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

<sup>3</sup>Associate Professor of Commerce with Computer Applications, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding author email iD: [v.m.kannan@vhnsnc.edu.in](mailto:v.m.kannan@vhnsnc.edu.in)

### Abstract

Advertising has well-thought-out the top of the peak in business tendencies. If there is Lack of effective marketing, businesses face an undefeatable challenge in promoting and selling their products. The absence of marketing translates to a famine of sales, resulting in a lack of profits. This deficiency in essential components creates an unfavorable business environment, impeding growth and success. Digital marketing serves as an expansive field that allows business individuals to widen their promotional exertions for a diverse range of products and service area. It involves various marketing strategies simplified by electronic campaigns and systems. Businesses operate digital platforms such as social media channels to effectively engage their customer base and this type of digital marketing involves things like social marketing commercials, posters, audiovisual advertisements like YouTube, Instagram, pintrest. In this modern field, it is a compulsory for the manipulators to enrich their digital marketing skills. This research explores into the current trends and explores innovative strategies embraced by influencers and supporters in the realm of AI in digital marketing.

**Keywords:** Commercial, Digital Marketing, Trends in AI, Marketing, AI social media, Trend Analysis.

### I. Introduction

In this fields of marketing, our central point turns to the prosperous communities, mainly existing within the massive expanse of the internet, mostly on various social platforms. These platforms serve as centres for frequent updates, extending from news to collective information,

creating an ideal atmosphere for businesses to showcase their crops and engage with their standing customer base. While grasping the art of content publication in the digital realm poses its tests, it remains a crucial space within social media, offering users a rich source of data and examination in the realm of online marketing.

The growth of technology and the cumulative user base on social media platforms have not only fuelled progressions in network skill but have also driven the progress of advanced marketing techniques. However, the truth underlying digital marketing fabrications in the fact that once strategies reach mainstream feasting, the allure of "glossy new items" inclines to wane, and reliable results become indescribable. A robust approach to digital marketing centers on identifying what truly works and steadily finding new, Advanced-thinking ways to control these insights.

Digital marketing, as a essential component of overall advertising strategies, operates through the consumption of networks and network-based digital hardware such as computers, tab, laptops, and mobile phones. This field has observed significant growth since the late 1990s and early 2005s, with users progressively digitizing their marketing techniques. This shift was catalyzed by a rising interest in social media, where people invest a considerable amount of their time, creation it a pivotal space for businesses to boom.

## **II. The Objective of The Study**

- Investigate into the realm of Digital Marketing.
- Examine both the challenges and benefit it presents.
- Investigate the latest trend of Digital Marketing.

## **III Latest Digital Marketing Trends**

As digital marketing definitely creates its presence in the future, it leftovers committed to constant refinement, integrating the latest trends, techniques, and tactics. This current evolution is tangible in our current landscape. By ordering people as the crucial point of our market strategies, a careful examination of their partialities becomes imperative. Our variation should be pitched towards meeting their needs based on separate tastes and preferences, a dynamic process prejudiced by cultural and societal distinctions.

## Artificial Intelligence

Artificial Intelligence (AI), a game-changer in judicious user preferences. Leveraging AI, we naturally collect insights into user preferences from their social media connections, enabling marketers to tailor their goods and services proactively. This strategic method safeguards a reactive and customer-point in digital marketing landscape.

AI has its influence on areas like:

- Basic announcement
- Product references
- Content formation
- E-commerce dealings

## Systematic Advertising

Systematic advertising operates by utilizing AI to program and allocate advertisements, enabling precise directing across varied audiences. In essence, it mirrors a real-time request process, shortening ad purchases through computerized programs. This approach proves effective, contributing to sensitive conversion rates and a concurrent reduction in acquisition costs.

## Chatbots

Chatbots emerged as a projecting highlight in the dominion of digital marketing this year. Operating under the control of AI, these bots excel in goodlooking with customers around the clock, nevertheless of the time of day. Notable statistics include their capability to deliver eighty five percent of services to clients in the year 2020, indicating a considerable impact. Looking ahead, businesses are anticipated to save a substantial sum, success up to 9 billion dollars soon. It is notable that over half of businesses are actively seeking to adopt the chatbot technique this year, knowing its pivotal role in commercial development.

## Conversational Marketing

Conversational Marketing facilitates direct interaction between brands/marketers and customers, marking a example shift in modern marketing strategies. The contemporary marketing landscape places a significant prominence on founding connections with clients, leveraging diverse message channels. Adapting to customer needs becomes highest, directing marketers to order timely responses. This digital marketing platform allows users to smoothly

occupy with customers through various manageable channels anytime, anywhere, and across any device. Its versatility and accessibility make it a superior substitute to traditional marketing methods.

### **Video marketing**

Video marketing stands out as a essential movement in the digital marketing landscape, controlled to maintain its fame in the approaching decade. This form of marketing helps the organic growth of content in media. The meaning of promoting products over digital marketing becomes obvious through the following observations:

1. Over half of clients prompt their proclivity to share video content with their network.
2. A substantial 82% of brands note an development in conversion rates when employing video ads.
3. Half of the customers quality a sense of boringness to their purchases, often influenced by product videos.

Exploring diverse formats within video marketing enhances its effectiveness:

- Live Streaming Video
- 1:1 Video
- Video SEO
- 360-Degree Video Content
- Short form video
- Tutorial video
- Story video
- User created video
- BHS video

Each of these set-ups pays to the multi-layered and dynamic landscape of video marketing, offering varied streets for engagement and joining with the audience.

### **Influencer marketing**

In influencer marketing, the idea is to use people who have a strong impact on others to promote products. Marketers often pick well-known persons, like celebrities on Instagram or Facebook, to spread the word about their brand. To make this procedure easier, marketers use Artificial Intelligence to find the right influencers. This helps boost the brand's respect among the people who might be interested in it.

### Social messaging apps

Using social messaging apps permits us to send private messages to clients while in respect of secrecy policies. It meets marketers' hopes of building a strong and straight connection with customers. Brands prefer these apps for various reasons:

- Connect with clients
- Share information
- Growth sales
- Involve people in events
- Win back possible customers
- Offer support and help

These apps help as appreciated tools for brands to interact, inform, and involve with their audience nonstop.

### Visual search

Visual search is a imaginary way for users to find what they're observing for. Instead of entering in text on social platforms, purchasers can upload images on websites to see a variety of results. Some examples of visual search tools include Pinterest Lens, Google Lens, Cam Find, and Bing Visual Search. These tools variety it easy for users to search what they need by simply using image content.

### Interactive Content

Digital marketing is widespread because it offers easy and concurrent access to content on social platforms. Content has progressed from plain text to engaging formats, providing users with a exclusive experience. This includes collaborative features like polls and quizzes, embedded calculators, enlarged reality ads, and 360-degree videos.

### Augmented Reality (AR) & VR Technologies

Virtual Reality (VR) has a big impact on both users and clients. It brings exciting sci-fi concepts to life, and composed with Augmented Reality (AR), it's a modern marketing technique. Many brands use VR to grow their customer base and enhance customer services.

### Geo-fencing

Geo-fencing is a method handlers use to reach customers based on their place. They pick a specific area, and when clients enter or exit that place, they get a notification or message. It's like a simulated boundary that helps businesses attach with customers in a exact area.



### 5G technology

The demand for mobile devices is growing globally, leading to the increase of 5G technology in 2023. This plays a vital role in digital marketing, marking the beginning of a new trend in communication. 5G is probable to dominate various businesses due to its advanced abilities.

### Privacy marketing

Privacy marketing is all about customers defective to keep their data safe when they buy from certain brands. Before targeting their spectators, users are wary about protecting purchaser data. This shapes trust between customers and the brands they buy from. It involves empathetic our audience and creating a message that vibrates with them.

### IV Conclusion

This research aims to discover various trends in digital marketing, particularly how customers attach with brands online. Active and powerful platforms help brands become widespread among users in the modest business world. Digital marketing on online platforms is booming, and change is constant. New trends, techniques, and strategies are emerging, and brands that embrace these trends early can outstrip their competitors and attract new customers to meet their goalmouths. This study focuses on current trends in marketing, exactly in digital marketing, with a crucial importance on incorporating digital techniques into social media podiums.

### References

- [1] Arvind Rangaswamya, NicoleMoch, ClaudioFelten, Gerritvan Bruggen, Jaap E. Wieringa, JochenWirtzf. The Role of Marketing in Digital Business Platforms, ISSN: 1094-9968. Journal of Interactive Marketing, Volume 52, April 2020.
- [2] Geng, R., Wang, S., Chen, X., Song, D. and Yu, J. (2020), "Content marketing in e-commerce platforms in the internet celebrity economy", Industrial Management and Data Systems, Vol. 120 No. 3.
- [3] <http://bigdata-madesimple.com/how-ai-is-dominating-the-marketing-5-real-time-observations>.

- [4] <https://www.digitaldoughnut.com/articles/2017/march/how-ai-is-changing-the-face-online-advertising>.
- [5] <http://www.digitalmilesgroup.com/digital-marketing-emerging-age-artificial-intelligence>.
- [6] <https://intotomorrow.com/how-ai-is-changing-digital-marketing>
- [7] <https://www.techemergence.com/artificial-intelligence-in-marketing-and-advertising-5-examples-of-real-traction>.

## The Role of AI in E-Commerce Industry

A. Ummul Barhana<sup>1\*</sup> and R. Mercy<sup>1</sup>

<sup>1</sup>Assistant Professor of Commerce CA (SF), V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [ummulbarhana.a@vhnsnc.edu.in](mailto:ummulbarhana.a@vhnsnc.edu.in)

### Abstract

Artificial Intelligence is capable of acquiring and analyzing vast amounts of data and making decisions for action. This technology is now being utilized in e-commerce to identify patterns based on browsing, purchase history, credit checks, account information, and other relevant data. Customized recommendations for each customer are created using the collected data. Google and Microsoft are already putting money into new technologies. Various forms of artificial intelligence have been implemented by many online businesses to better understand their customers and provide an enhanced customer experience.

**Keywords:** Artificial Intelligence, E-Commerce, Global Operations

### Introduction

Artificial intelligence (AI) technology, once only found in sci-fi stories, has become a regular part of our daily lives. The use of AI in ecommerce is especially significant because it can help us write emails, check the weather, and diagnose diseases. Businesses used advanced technologies like AI in the past as a 'nice to have', with a focus on delighting customers and encouraging repeat visits.

AI is now a necessity for ecommerce businesses to expand their business, maintain global operations, and meet customer demands across multiple channels. AI has been incorporated into Ecommerce businesses in various business functions and they will continue to discover new and innovative applications for AI in the industry. To discover fresh and imaginative uses for AI in E-Commerce as adoption rises and technology progresses. Artificial Intelligence technology is employed in E-Commerce to operate an online retail business.

The objective is to improve various aspects of the e-commerce experience through the use of advanced algorithms, including product recommendations and customized marketing campaigns. AI is utilized in E-Commerce to streamline operations and create customer profiles based on their shopping habits. Improve the buyer experience through digital asset enhancement.

### Types of AI Technology Used In E-Commerce

AI is not confined to a single technology; it encompasses multiple models. In E-Commerce, there are four leading AI technologies used:

- **Natural language processing (NLP):**

The aim of natural language processing is to enable computers to understand and produce natural human language.

- **Machine learning (ML):**

Statistics and algorithms are used in machine learning to allow computers to learn from data and make predictions or decisions without any specific programming. To improve data comprehension, layer algorithms are utilized by deep learning models, such as transformers and large language models (LLMs), such as OpenAi's ChatGPT.

- **Computer vision (CV):**

The ability of computers to interpret information from images and videos is facilitated by computer vision, a field of artificial intelligence.

- **Data mining:**

Data mining involves uncovering data that can be used to inform AI algorithms and systems.

### Applications of AI in E-Commerce

- 1) Personalized product recommendations
- 2) Chatbots and virtual assistants
- 3) Fraud detection and prevention
- 4) Inventory management
- 5) Dynamic pricing
- 6) Customer churn prediction

## 7) Generative AI

AI can be utilized in all aspects of your ecommerce business operations and processes, including helping customers find the right products and matching prices. Here are the seven main use cases:

### i. **Personalized product recommendations:**

Personalized product recommendations use data from past customer behavior, browsing history, and purchase history to suggest products.

For example, Online shoppers' language and images can be understood by NLP-based AI to match them with their desired products. AI-powered features such as 'People also purchased' or 'Customers also viewed' can suggest products that are compatible based on size, color, shape, fabric, and other variables.

### ii. **Chatbots and virtual assistants:**

E-Commerce businesses can employ chatbots and virtual assistants to serve as customer service representatives and assist with customer queries. By offering tips, we can make online shopping easier. Their understanding and response to customer requests is based on AI, NLP, and generative AI.

You can use chatbots and virtual assistants to:

- **Make efficient customer interactions:** Chatbots and virtual assistants have the capacity to process orders, handle simple transactions, and present customized offers to customers, simplifying the process of handling a large number of inquiries from various point-of-sale (POS) channels -- such as a physical store, online, or through a mobile device.
- **Collect customer data:** Chatbots and virtual assistants have the ability to gather customer data, including size and inquiry reasons, which can aid in product development and improve customer service.

- **Enhance checkout:** Online businesses have the option to add a chatbot to the checkout page to facilitate customer inquiries about product details. The ability to obtain quantities for highly sought-after items and shipping information is possible without leaving their cart.

- **Provide 24/7 customer service:** By providing prompt responses 24/7, chatbots and virtual assistants enable your live support agents to focus on addressing more intricate customer service issues. Implementing AI can result in reduced customer service expenses by automating dispute resolution and refund processing.

### **iii. Fraud detection and prevention:**

Fraud detection and prevention benefit from AI's ability to analyze data, detect anomalies, and monitor transactions in real time. Unusual transactions, such as high-value transfers or multiple transactions from unfamiliar locations, can be detected and flagged for additional scrutiny by the technology.

By employing machine learning models, it is possible to generate user profiles based on behavior data like browsing habits, transaction history, and device history. This allows for the detection of fraudulent behavior by comparing current consumer behaviors with historical data. When a user unexpectedly buys something significant from a new location, the machine learning model can identify it as a possible fraud based on their data profile.

### **iv. Inventory management:**

By analysing past sales data and anticipating upcoming demand, AI can help you manage your inventories. For example, you can get a sense of what products are selling, where they are going, and whether they come from a physical store or a distribution center with real time data through sensors and RFID tags, wireless identification technology using radio frequency.

By integrating with suppliers, AI enabled inventory management can enable automated replenishment processes to ensure timely stock accumulation. Forecasts of transit times and delays in shipments, as well as updates to stakeholders such as customers, can also be used with artificial intelligence.

**v. Dynamic pricing:**

Dynamic pricing allows you to adjust your prices and offers based on real-time user behavior, global supply and demand, and competitors. Using artificial intelligence, you can predict optimal discount opportunities and dynamically determine the minimum discount required for a successful sale.

Artificial intelligence gives multi-channel retailers greater flexibility in planning their pricing structure. Using artificial intelligence, retailers can adjust prices across different sales channels based on perceived demand. For example, if you sell products on your website and on Amazon, you can smartly discount your products on Amazon if there is significant buying activity on that particular channel.

AI also facilitates data-driven optimization of assortment. selection and selection of products. With selection data, you can learn about your products and your competitors, making it easier to adjust selection and pricing. You can also use AI to price your competitors so your customers always get the best deal.

**vi. Customer churn prediction:**

With the help of artificial intelligence, e-commerce companies can better understand customers and identify new trends. It can analyze customer engagement across checkout channels and provide optimization insights as consumer data becomes available.

Machine learning can help your business identify and reduce churn by predicting when customers will leave your platform. First, AI can collect data on customer abandonment indicators such as abandoned carts, browser abandonment, or website bounce rates. You can then

automate checkout completion emails, loyalty discounts and abandoned cart survey tracking, making it easy to encourage customers to complete the checkout process.

**vii. Generative AI:**

Generative AI is an artificial intelligence system that creates text, images or other resources based on prompts. Popular creative tools include ChatGPT and DALL-E. E-commerce companies use generative AI to scale the production of their marketing materials and tailor it to different audiences.

For example, a copywriter can write a marketing email and run it with a generative AI tool to tailor it to different customer segments. Marketers can also call on generative AI to provide feedback on brand messaging and positioning to ensure it aligns with targeted customer personas.

### Challenges of Using AI in E-Commerce

While AI has several benefits in ecommerce, it can also present challenges:

- **Data privacy:**

AI algorithms rely on consumer data to make personalized recommendations and Predictions. The collection of this information raises privacy and data protection issues. AI also creates a security risk for intellectual property companies by causing accidental leaks and breaches.

- **High initial investment:**

Implementing artificial intelligence can be expensive. This includes investment in Infrastructure, talent and maintenance. Additionally, AI solutions may not always yield a positive **return on investment (ROI)**.

- **Potential for poor-quality customer service:**

Because AI customer service is based on chatbots, you may not be able to provide the same level of support and empathy as a customer service representative. AI customer service done poorly can lead to friction, customer dissatisfaction and a bad reputation.



## Conclusion

The use of artificial intelligence in e-commerce can revolutionize the industry by improving the customer experience, increasing sales and turnover, and providing a competitive advantage. However, companies should be aware of the potential challenges and limitations of implementing artificial intelligence. By carefully evaluating the benefits and risks of AI, businesses can use this technology to drive growth and success.

When considering implementing AI in your online store, create an AI integration strategy that considers both its potential benefits and potential benefits. minuses You can unlock the full potential of AI to drive e-commerce growth and success if you use it thoughtfully and strategically. The role of artificial intelligence in e-commerce will only grow in the future.

## References

- AI in Ecommerce: Applications, Benefits, and Challenges (2023) (shopify.com)
- <https://www.iosrjen.org/Papers/Conf.ICCIDS-2018/Volume-3/9.%2060-65.pdf>
- AI in eCommerce: Explanation, Benefits, and Impacts (webretailer.com)

## Role of AI in E-Commerce industry

M. Govindammal<sup>1\*</sup> and A. Sathya<sup>2</sup>

<sup>1\*</sup>Assistant Professor of Computer Applications, The Standard Fireworks Rajaratnam College for Women (Autonomous), Sivakasi, India.

<sup>2</sup>Assistant Professor of Commerce, The Standard Fireworks Rajaratnam College for Women (Autonomous), Sivakasi, India.

\*Corresponding Author e-mail iD: [govindammal-com@sfrcollege.edu.in](mailto:govindammal-com@sfrcollege.edu.in)

### Abstract

The importance of artificial intelligence is increasing and it is used in all areas of life. In recent years, such as medicine, biology, information technology and business. In fact, our daily lives frequently and constantly interact with multiple intelligences. Incorporating technology into e-commerce is a great idea. By using artificial intelligence, businesses can improve customer experience, attract new customers, and nurture leads. Additionally, research demonstrates the potential of AI to transform many industries and demonstrates the important role AI will play in the future development of various industries. Practical applications of intelligence can be found inside and outside the home. This article attempts to understand the role of intelligence in e-commerce.

### 1.1 Introduction

Artificial intelligence technology in e-commerce is a very good idea. By using artificial intelligence, businesses can improve customer experience, attract new customers, and nurture leads. Additionally, research demonstrates the potential of AI to transform many industries and demonstrates the important role AI will play in the future development of various industries.

Artificial intelligence has become even more important and has started to be used in many areas of life such as medicine, biology, information technologies, and business in recent years. Our daily lives frequently and constantly interact with multiple intelligences. The whole way we use our phones uses intellectual property, for example, unlocking or predicting messages through facial recognition and automatically correcting messages based on the user's typing habits. Practical applications of intelligence can be found inside and outside the home. Self-driving cars,

voice recognition, recommendations, and automated systems are examples of smart technology based on artificial intelligence.

## **1.2 Types of Artificial Intelligence**

### **Artificial Narrow Intelligence (ANI)**

First, narrow intelligence is AI that learns algorithms to perform specific tasks, and the knowledge gained from that task cannot be used for subsequent tasks. Today's ubiquitous machine intelligence is a narrow type of intelligence. Apple and IBM's Siri and Watson, respectively, are examples of artificial intelligence. Narrow AI, also known as weak AI, operates within a limited and predefined set of terms, limits, and constraints. For example, Netflix recommendations, e-commerce shopping recommendations, driverless cars, speech and image recognition and translation.

### **Artificial General Intelligence (AGI)**

General artificial intelligence enables machines to understand, learn and perform useful tasks like humans. The purpose of general intelligence is to create a sense of self in relationships with people. But we don't have that kind of intelligence right now. It is the main subject of some scientific research on cognitive skills and is a popular topic in research and future research.

### **Artificial Super Intelligence (ASI)**

The last type of skill-based intelligence is super artificial intelligence. As the name suggests, super-artificial intelligence is a type of intelligence that exceeds the human brain by expanding the brain's ability and improving thinking. Super Artificial Intelligence is the best and most powerful, beyond the intelligence of Albert Einstein and other luminaries.

Superintelligence may be self-aware and create extraordinary explanations that humans cannot. Because the intelligence of the human brain is limited to millions of neurons. In addition to changing many aspects of human intelligence, it can also understand and analyze people's thoughts and experiences. Super AI develops its understanding based on the AI's cognitive abilities. But right now, superintelligence is more of a theoretical possibility than a reality; because most computer science and artificial intelligence research now focuses on narrow intelligence.

### **1.3 Role of AI in the E-commerce Industry**

Artificial intelligence is playing a significant role in e-commerce by changing all aspects of business and improving overall efficiency. Here are some important roles intelligence plays in the world of e-commerce:

Personalized shopping artificial intelligence algorithms analyze customers' behavior, preferences, and purchasing history to provide personalized recommendations.

This improves user experience and leads to conversions. 4,444 Chatbots and Virtual Assistants: 4,444 AI-powered chatbots and virtual assistants provide customer support, answer questions, help with product selection, and make work easier.

This improves customer service and helps increase customer satisfaction. approval system AI-powered recommendation engine uses machine learning algorithms to analyze user data and predict products that will appeal to customers. This helps increase sales and increase sales.

- Supply chain optimization: Artificial intelligence is used to improve inventory management, demand forecasting, and product delivery. This increases product efficiency, reduces costs, and reduces the risk of product outages.
- Safety and Security Detection: Use artificial intelligence to detect and prevent fraud such as fraud and theft. This helps ensure the security of both the customer and the e-commerce platform.
- Dynamic Pricing: AI implements dynamic pricing strategies by analyzing market trends, competitive pricing, and demand patterns. E-commerce platforms can adjust prices instantly to stay competitive and maximize profits.
- Visual Search: Artificial intelligence-supported visual search allows users to search for products using images instead of text. This improves search performance and helps users find products similar to those they are interested in.
- Customer Segmentation: Artificial Intelligence helps identify and segment customers based on their interests, behavior, and demographics. This information can be used to tailor marketing strategies and advertising to specific customers.
- Predictive Analytics: AI analyzes historical data to predict future trends, customer behavior, and business changes. This allows e-commerce businesses to make informed decisions and stay ahead of the competition.

- **Voice Marketing:** AI voice recognition technology supports voice-controlled purchases. Using this command, customers can search for products, add the products to the shopping cart, and complete the transaction.
- **Augmented Reality (AR) and Virtual Reality (VR):** AI-powered AR and VR technologies are enhancing online commerce by allowing consumers to try on products (such as clothing or home decor) before purchasing. The integration of AI in the E-commerce industry continues to evolve, providing businesses with innovative tools to streamline operations, improve customer engagement, and stay competitive in a rapidly changing market.

#### **1.4 The Impacts of AI on Society**

As artificial intelligence becomes more popular, we all know that artificial intelligence has the potential to make our lives easier. But some of us worship it or misunderstand it. This chapter considers two aspects of the use of intelligence.

##### **1.4.1 Positive Aspects of Using Artificial Intelligence**

- **Reduce human error:** People easily make mistakes in tedious and repetitive tasks, and proper computers can prevent errors. Smart models use algorithms combined with data to make predictions, reduce errors, and increase accuracy.
- **Managing big data is easy:** Artificial intelligence can process big data in a short time. Quickly capture and extract the data you need for analysis. In addition, artificial intelligence can interpret and transform this information for further processing.
- **Mitigation:** There are advantages to using these skills in hazardous areas. This is how smart machines reduce risks from human activities. For example, AI can perform dangerous tasks such as mining coal, surveying marine life, and assisting with natural disasters.
- **Create better jobs:** According to the 2020 Future of Jobs report published by the World Economic Forum, 97 million new jobs are expected to be created in 26 countries by 2025. But these new jobs will require new skills and require significant investments. “skills” and “education” for both young and old.

### 1.4.2 Negative Aspects of Using Artificial Intelligence

- Unemployment: While AI will create jobs in the future, it will also eliminate many of the traditional jobs currently performed by humans. According to the same report mentioned above, AI will eliminate 85 million jobs.
- More likely to cause human laziness: As more tasks become automated and digital assistants are used more, human laziness will increase as we rely on these tools. human executive ability
- Daily activities requiring memory or concentration may be impaired if intelligence is too great to complete simple tasks such as small calculations or remembering numbers or places of residence

### 1.6 Conclusion

Artificial intelligence is a subfield of computer science dedicated to creating machines that behave and work like humans. This process includes learning, planning, and problem-solving. The main goal of artificial intelligence is to create expert systems that teach, learn, explain, clarify, and recommend behavior to customers. The second goal is to apply human intelligence to machines by creating systems that can understand, think, learn, and behave.

It is undeniable that artificial intelligence improves our quality of life, but we need to know the advantages and disadvantages of this technology. We must work hard to overcome the negative effects it brings and minimize the damage it causes to people, especially businesses. Good traits also need to be developed.

### References

1. Ashraf, S. (2022) "Types of e-commerce business models".
2. Bloomenthal, A. (2022) "E-commerce defined: Types, history, and examples, Investopedia".
3. Chaffey, D. (2021) "E-commerce growth statistics - UK, US, and worldwide forecasts, SmartInsights".

4. Honghao Gao, Jung Yoon Kim, Walayat Hussain, Muddesar Iqbal, Yucong Duan (2021) “Intelligent Processing Practices and Tools for E-Commerce Data, Information, and Knowledge”.
5. Jasper Caprese(2019) “10 Ways to Make Money Online with AI”
6. Javier Segovia, Piotr S. Szczepaniak, Marian Niedzwiedzinski (2013) “E-Commerce and Intelligent Methods”
7. <https://www.alizila.com/alibaba-gives-sight-smart-speaker/>
8. <https://marutitech.com/recommendation-engine-benefits/>
9. <https://www.cloudways.com/blog/ecommerce-business-models/>
10. <https://www.haptik.ai/blog/virtual-assistant-retail-ecommerce/>
11. <https://www.investopedia.com/terms/e/ecommerce.asp>

# A Study on the Impact of Artificial Intelligence in E-Commerce Industry

R. Jeyanthi<sup>1\*</sup> and N. Padmavathy<sup>2</sup>

<sup>1</sup>Assistant Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [jeyanthi@vhnsnc.edu.in](mailto:jeyanthi@vhnsnc.edu.in)

## Abstract

Artificial intelligence is a way of making a computer-controlled robot or software considered intelligently in the manner intelligent humans think. This paper point out the impact of artificial intelligence in e-commerce. E-Commerce industry is now adopting various technologies to identify patterns based on the buying and selling of goods of services using the internet and the transfer of money and data to execute these transactions. This paper highlights the impact of artificial intelligence in e-commerce industry and its opportunities and challenges in different areas of e-commerce. It concludes artificial intelligence helped e-commerce websites in providing with better user experience.

**Keywords:** E-commerce, Artificial intelligence, Industry

## INTRODUCTION

Artificial intelligence is transforming the ecommerce industry, providing industries with new opportunities to improve customer experiences, optimize supply chain management, and prevent fraud. However, AI also poses several challenges that industries must address, including data privacy, job displacement, bias and discrimination, and customer trust. By being transparent about the use of AI and addressing these challenges proactively, industries can build trust with their customers and maximize the benefits of this powerful technology. As ecommerce continues to evolve, it is essential for industries to keep pace with the latest developments in AI and adopt strategies that leverage its capabilities. So that, they can keep themselves for success in an increasingly competitive world.

Artificially intelligent systems constantly work on the background of popular products and services such as Netflix, Amazon, flipkat and, naturally, Google. Moreover, tools previously available to enterprise level companies have become affordable and accessible to medium- and small-sized industries.



## OBJECTIVES OF THE STUDY

1. To understand the present status of e-commerce industry
2. To analyse the impact of artificial intelligence in e-commerce industry
3. To know the opportunities and challenges of Artificial Intelligence in E-commerce industry

## SCOPE OF THE STUDY

The scope of the study is to locate the impact of artificial intelligence in E-commerce. A genuine attempt has been made to include all the aspect describing to the study. The result and suggestions that artificial intelligence applications can generate and predict the accurate forecast of the E-Commerce. For this purpose this study analyses the impact of artificial intelligence in E-commerce industry.

## WAYS ARTIFICIAL INTELLIGENC IS POISED TO IMPACT THE E-COMMERCE INDUSTRY

AI is arming E-Commerce industries with extraordinary capabilities reforming their value chains. The ways artificial intelligence has been describing this transformation. The incorporation of AI in E-Commerce has modernized how the industry can search and order online, with voice search playing an important role. With AI improvements, voice assistants like Google and Siri can recognise human speech and identify our commands. Nowadays According to Google, 20% of searches operate voice search. This game-changing technology has not only transformed our devices but how the people interact with devices and how they make shopping. Imagine naturally saying, “Hello Google, remind me about the conference tomorrow at 10 am,” and having a reminder set within seconds. Such whole integration of AI and voice search has updated our daily tasks. AI-powered voice search has made a noteworthy impact. Customers can now have a speak-browse-purchase shopping experience, rejecting the resistance connected with out-dated typing and clicking.

### Customer Support with AI-Powered Assistance

The impact of artificial intelligence in the E-Commerce industry has been remarkable, mostly regarding improving customer support and engagement. One of the most innovative clarifications for this challenge is intelligent AI-powered chatbots. These chatbots

can support customers with purchases, answer common queries, and offer instantaneous explanations to common problems, making them a valuable addition to any E - Commerce industry.

Leading E - Commerce monsters like Amazon and H&M previously introduce chatbots in their customer support systems to increase customer engagement, improve the sales volume, and reduce costs. For example, H&M's chatbot, integrated into Face book Messenger, can help customers with product searches, giving outfit suggestions, and even process orders.

For industries seeking to connect the power of AI and implement transformative solutions, associating with a trustworthy mobile app development company is important. It can give the knowledge and funds required to develop AI applications in E - Commerce that initiative progress and victory in today's competitive market.

Take the case of Amazon, the E - Commerce giant. By leveraging AI-powered demand forecasting, they enhance inventory levels to meet customer demand while reducing stock outs and overstocking. This strategic approach allows them to manage their supply chain and achieve considerable cost savings effectively.

### Shielding E - Commerce Empire

AI's incomparable role in the E - Commerce industry lies in fraud detection and security, offering real-time protection against fraudulent events. By leveraging advanced algorithms, AI can examine transaction patterns, customer behaviour, and data points to quickly recognise and prevent fraudulent transactions, and ensuring the safety and integrity of E- Commerce platforms. For example, PayPal, a leading online payment platform, leverages AI-powered fraud detection systems to protect the consumers financial transactions. By continuously monitoring and analysing large amounts of data, they can promptly detect doubtful activities, prevent fraudulent transactions, and offer secure payment services to their customers.

## Opportunities of AI in Ecommerce

The incorporation of AI in ecommerce has opened up an overabundance of opportunities for industries, both large and small. A number of key opportunities that AI presents include:

**Personalization** - One of the most important benefits of AI in ecommerce is custom-made shopping experiences. AI algorithms analyze data such as client browsing behavior, buying history, and social media activity to give personalized product recommendations and search results. This, in turn, leads to increased purchaser engagement and faithfulness, as customers feel that their requirements and preferences are being understood and catered to.

**Customer Service** - AI-powered chatbots are becoming gradually more popular in ecommerce for customer service. These chatbots can hold simple queries and give quick and efficient support, freeing up human agents to handle more difficult issues. In addition, AI-powered chatbots can grant 24/7 support, which is a vital benefit in a overall ecommerce landscape where consumers may be situated in different time zones.

**Supply Chain Optimization** - AI can assist industries optimize their supply chain management by predicting demand, falling inventory costs, and getting better delivery times. By analyzing data on customer behavior and purchasing patterns, industries can predict demand more perfectly and optimize their inventory levels. Additionally, AI can optimize logistics and transportation routes, falling delivery period and expenses.

**Fraud avoidance** - AI can also be used to avoid scam in ecommerce. By analyzing patterns in consumer behavior and dealings, AI algorithms can identify and flag doubtful activity, reducing the threat of fake transactions and chargebacks.

## CHALLENGES OF AI IN ECOMMERCE

While AI presents important opportunities for ecommerce, it also poses several challenges that industries require to address. Some of the key challenges of AI in ecommerce consist of:

**Data Privacy** - One of the most important challenges of AI in ecommerce is data privacy. AI algorithms rely on huge amounts of consumer data to give personalized experiences and

create correct predictions. However, collecting and dealing out this data raises concerns about privacy and data security. Industries must ensure that they are clear about how they gather and use consumer data and submit with related data protection system.

**Job Displacement** - An additional challenge of AI in ecommerce is job displacement. As industries computerize more processes, there is a risk that individual jobs may be lost. This can have important implications for both individuals and the general public as a whole. However, it is most important to note that AI also creates recent job opportunities in fields such as data analysis and AI expansion.

**Bias and Discrimination** - AI algorithms are only as unbiased as the data they are trained on. If the data used to prepare an AI system is biased or discriminatory, the AI system will reproduce those biases. This can have important implications for ecommerce, where biased algorithms can result in unreasonable dealing of definite groups of consumers.

**Customer Trust** - AI can impact consumer faith in ecommerce. Customers may be shy to share their data or make purchases if they do not hope the AI algorithms being used. It is critical that industries are clear about their use of AI and ensure that their algorithms are fair, unbiased, and accurate.

The use of AI in ecommerce presents a variety of benefits for industries, from custom-made product recommendations to fraud prevention and enhanced customer experiences. However, there are also a number of challenges that industries need to be aware of, such as the require for first-class data and the cost of developing and maintaining AI systems. In spite of these challenges, the potential benefit of AI in ecommerce is too great to ignore.

## AI CHANGETHE FUTURE OF E-COMMERCE INDUSTRY:

Artificial intelligence, which has originated making an impact on different industries such as marketing, finance, healthcare, etc., and now it is extended in the field of e-commerce. A few years from currently, an industry will observer a huge growth of AI in e-commerce and this technology will be used in enchanting an important industry decisions, making pre-emptive solutions, and creating valuable industry insights.

Here the following are the key ways in which artificial intelligence is changing the realm of online shopping.

### **Personalized Customer Service**

Personalized customer service is not a new concept, but more and more companies are using the emerging AI technologies to improve the levels of customer service they provide. These companies make use of collaborative filters to provide their customers with recommendations, which are mainly based on search history, trends, and bestselling items from the website. AI gathers information from a lot of channels and provides deep insights that help industries achieve seamless client experience.

### **Image Search**

E-commerce companies are moving towards developing image search capabilities. This method allows users to upload an image of any product of their choice, and the website will help them find identical or similar products. AI-driven algorithms are expected to play a crucial role in the e-commerce industry, especially in this digital era of Instagram and Snapchat, where the consumer's attention span is greatly reduced. Therefore, image search is a technology that has made the life of consumers easy, as they can just upload a picture of any product they want and find the similar ones online.

### **Retargeting Clients**

Most of the companies are loaded with customer data but are not able to utilize the same for their industry. This data evidence to be most beneficial for e-commerce industries. With advancements in AI technology, e-commerce industries can now provide relevant special offers for their consumers, based on consumer's search history and customer data. The retailers are now able to effectively remarket their products to consumers through their websites.

### **Channelizing the Sales Process**

Sales systems have moved from the out-dated methods of cold calling and yellow pages to improved and smarter methods. Artificial intelligence in e-commerce helps in giving customized solutions to consumers and no longer gives results, which are not necessary and inappropriate. Using artificial intelligence, services can also be adapted with a sales message

that influences the right customer at the planned time. Therefore, an AI-driven CRM can efficiently manage all sales tasks and streamline the whole process.

### **Virtual Buying Assistants**

Artificial intelligence in e-commerce can be used to create a virtual buying assistant, which helps consumers decide which products or services to buy or choose. Virtual assistants will prompt the customer if there is a drop in the cost of the item in which the customer showed interest and if directed, it can also buy that item on behalf of the customer. This feature if incorporated into an e-commerce website, can prove to be highly beneficial for the consumer and lead to a considerable amount of cost savings.

### **Analyzing Big Data**

AI systems can be utilized to analyze large amounts of data to identify hidden insights, which helps industries to accurately predict the trends and make decisions that benefit the company. Today, AI systems are slowly but steadily replacing the traditional methods of replenishment and merchandising systems. Upgraded AI systems can help industries analyze data and provide a correlation between structured and unstructured data, indicate which products need to be procured, and also show the products which have to be discounted.

## **EXAMPLES OF AI IN E-COMMERCE**

As AI has a massive impact on e-commerce, several companies are using AI in their websites to provide superior personalized experiences to their customers. Some of the well-known companies making use of AI in their websites include -

**WayBlazer-** This is a travel start-up, which uses an intelligent AI system that delivers contextual, personalized insights and advice for travellers, using deep learning algorithms. The company assists numerous B2B companies who plan small outings, manage hotel bookings, arrange tours, etc. They also provide this service to companies that generate revenue through travel bookings.

**USAA** - This financial services company utilizes AI to identify inconsistencies in financial transactions by tracking client's behavior and identifying hidden patterns. They make use of thousands of factors to determine the customer behavior.

**Under Armour** - This is a sports and fitness apparel company, which uses IBM's Watson AI system. The company creates an app which keeps of a person's health and fitness. In the future, this system aims to offer the user with individualized training advice and personal nutrition information.

**Knorr** - Being a food brand owned by Unilever, Knorr uses AI application to develop recipes based on the ingredients available to the user. The application provides relevant hints to the user and also provides the company with information about what the customer needs or is looking for.

**Netflix** - This is well-known online video and media streaming website. Netflix uses AI to provide their customers with personalized recommendations. These recommendations will be usually based on what a user has watched or the video's online ratings.

## CONCLUSION

Artificial Intelligence (AI) has grown past its experimental roots and has become an instrumental technology that offers enormous potential to simplify and improve various aspects of industry lives. When implemented effectively, AI in E-Commerce can suggestively reduce human effort and improve convenience. Artificial Intelligence (AI) is now an important tool for several businesses, and India's technology market is growing rapidly. Artificial Intelligence has fixed itself into every aspect of modern life, from online shopping to educational data. Furthermore, many start-ups in India are growing and creating AI solutions for the financial, marketing, healthcare, and other sectors. The increasing demand in the present and the future has been attracting many businesses to adopt the tendency over the past few years, increasing investment.

## Reference

1. <https://www.columbusglobal.com/en/blog/how-ai-can-solve-challenges-for-food-and-beverage-manufacturers>
2. <https://www.marcumllp.com/insights/how-ai-is-impacting-the-food-and-beverage-industry>

## Job Satisfaction of Arts and Science College Faculty Members in Tirunelveli District

**M. Kallaganadi<sup>1\*</sup>** and **M. Esakkiammal<sup>2</sup>**

<sup>1\*</sup>Research Scholar of Commerce, Sri Parasakthi College for Women, Courtallam, India.

<sup>2</sup>Research Scholar of Commerce, Sri Parasakthi College for Women, Courtallam, India.

\*Corresponding Author e-mail iD: [murugankavitha802@gmail.com](mailto:murugankavitha802@gmail.com)

### Abstract

Irrespective of the position, field of study and institution, teaching is considered a noble profession. Teachers working in government educational institutions and government aided institutions are earning their living it should be developed in a peaceful and planned manner so that they and their family members can get full benefits from it. Their salary is decided by the government. There are always trade unions that work for their own benefit member (Teaching Department). Now a day, the government provides more packages for teacher grade primary schools also these teachers are very high considering the salary in government colleges and government aided colleges as they are not available salaries are not given like this in the government sector. Hence they enjoy higher salaries set by the government peaceful life with immense prosperity. Their workload is very moderate. They have neither job security nor teachers employees of self-help colleges have to face many problems at their workplace. The combined salary of each of them is there is no standard for calculating their basic pay per month; their pay scale is decided by the management and he insisted clerical work while preparing for class. They have no job security. Due to privatization policy many private institution has been authorized to start self-financed colleges and engineering colleges in arts and sciences. That's it Tirunelveli is known for its industrial and educational development and there are about 200 self-financed districts among these districts companies are performing well. But in many respects the status of teachers in all colleges is the same. And they torture in view of the high workload. Only in a limited number of colleges are teachers paid adequately. In all other colleges they are paid with less coordination. In such a situation, their financial condition is worsening due to rising prices of all things. To move ahead in life one must take initiative there are 1000 teachers



working in self-help colleges in Tirunelveli district and their standards life cannot be improved. Keeping in mind the above concepts the job satisfaction of the researcher and arts college faculty members about self-help colleges in Tirunelveli city". In this article the researchers investigate identify the causes and actual problems existing in Tirunelveli Self Help Colleges and rectify them.

**Keywords:** job satisfaction, colleges, faculty, Tirunelveli.

## Introduction

All who have studied the arts colleges the teaching are convinced that the future of these empires depends upon the education of the youth. It fosters psychological personality and personality development. Education is constantly growing, diversifying and improving its scope and has been at the beginning of human history. Every country develops its own educational system to express and develop one's unique socio-cultural identity and meet the challenges of the times. Thus begins the National Education Policy - 1986 and more light. Importance and necessity of meeting challenges – social, economic, cultural and ethical in today's Indian society. This is the only challenge education is, it is the most powerful tool for making meaningful and effective change. Youth is the most valuable legacy a nation educates and nurtures. This youth education leads to good education and good teachers. Good teachers have opportunities to change countries. Teachers shape future generations of society, they have a deep connection with human life and its development. Teachers play an important role in shaping the future of Indian students, job satisfaction of these teachers, they consider the fact that the most important architecture is for nation building. If a teacher is not satisfied with both the quantity and quality of his work, the quality of this performance will suffer and to improve the capacity of teachers affecting the growth and development of the country, strict measures should be taken to fulfill their wishes. A systematic assessment of job satisfaction provides scores for a teacher to improve their service ability in the institution. It is defined as obtaining and providing useful information to change the decision-making process. Factors identified for remedial action through such assessment impact on teachers' job satisfaction.

## Scope of The Study

High demand and policy for education the present government has emerged like a dog's shadow independent arts and science colleges in Tamil Nadu. This provided employment to thousands of people the faculty of these colleges, as faculty society must have stairs; guardians of conscience consider their needs and aspirations. Work satisfaction of teachers working in colleges they are very important because they train impact and form. The lives of many students are the hope of our future there is a common feeling among the people of the country teachers working in self-help colleges and poor job security, pay and working conditions other benefits compared to employees government and aided colleges. There is a catch a study is needed to find out the level of job satisfaction.

## Objective of The Study

1. To study the socio-economic conditions of the teachers working in various colleges of Tirunelveli city vise age, gender, family type, marital status and number of dependents.
2. To analyze the socio-economic conditions affecting job satisfaction.
3. To carry out a comparative study on perceived job satisfaction of college teachers working in four different colleges
4. Make recommendations to further improve the job satisfaction of member teachers of College of Arts and Science for Tirunelveli City.

## Review of Literature

P. Rajeswari, Dr. Beulah Suresh (2019) : A Study On The Impact Of Emotional Intelligence On Job Satisfaction Of College Faculty Members In Vellore, Erecson Sipin Solis, Erla Tek-ing, and Larino Namit (2023) : Job Satisfaction among Faculty Members of the Institute of Agriculture in Camiguin Polytechnic State College – Catarman Campus, E. Poomari, p. Ananthi (2022) : job satisfaction arts and science college faculty members in tenkasi district. Dr.G kamalaselvi, Dr.G. mahalakshmi (2020): impact of work place ethics on job satisfaction and job commitment of self-financing college professors- a Study with special reference to Thoothukudi.

### Limitations of The Study

The survey will be conducted only the college of Arts and Sciences and the sample size is limited to 200 respondents. Study is based on faculty perspectives and opinions. This method may change in future. The study was with the authors serving member of the College of Arts and Science colleges in Tirunelveli city only.

### Sample Technique and Size

In this study Judgment sampling method is used to collect data and the data were analysed by using tools like percentage, weighted average method. The sample size for this paper is 200 faculty members from the arts and Science colleges in Tirunelveli district.

### ANALYSIS AND INTERPRETATION:

Sl.no	Gender	Number of respondents	Percentage
1	Male	75	38
2	Female	125	62
	Total	200	100
Marital status		Number of respondents	Percentage
1	Single	80	40
2	Married	120	60
	Total	200	100
Age		Number of respondents	Percentage
1	25-30	40	20
2	31-35	55	27
3	36-40	60	30
4	Above 40	45	23
	Total	200	100
Educational qualification		Number of respondents	Percentage of total
1	Master of commerce	45	23
2	Ph.D	75	37
3	MPhil	40	20
4	MBA	40	20
	Total	200	
Designation		Number of respondents	Percentage

1	Professor	15	8
2	Assistant professor	140	70
3	Associate professor	45	22
	Total	200	100
<b>Category</b>		<b>Number of respondents</b>	<b>Percentage</b>
1	Arts faculty	105	53
2	Science faculty	65	32
3	Social science faculty	30	15
	Total	200	100
<b>Monthly income</b>		<b>Number of respondents</b>	<b>Percentage</b>
1	5000-15000	70	35
2	16000-25000	85	42
3	Above 25000	45	23
	Total	200	100

**Source: primary data**

The above table shows that out of 200 colleges faculty members, 62% of the respondents were female, 30% of the respondents belonged to the age group of 36-40 years, 60% of the respondents were married, 37% of the respondents were Ph.D. holders. 70% of the respondent were assistant professor, 53% of the respondent were arts faculty, 42% of the respondents earned monthly income 16000-25000.

#### FACTORS WHICH PROBLEM FACED INTHE WORKING PLACE

SI. No	Various Faculty	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied	Total
1	Standard education	55	85	20	25	15	200
2	Good salary	20	60	40	50	30	200
3	Best management	45	73	46	25	11	200
4	Normal working hours	60	45	30	45	20	200
5	Working condition	25	35	15	75	55	200
6	Freedom	15	45	55	45	40	200
7	Self-respect	35	40	36	44	45	200

8	Proud of the Institution	40	65	40	37	38	200
9	Relationship with management	25	40	50	45	40	200

### WEIGHTED AVERAGE METHOD

Sl. No	Various faculty	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied	Total	Weight	Rank
1	Standard education	275	340	60	50	15	740	3.7	1
2	Good salary	100	240	120	100	30	590	2.9	5
3	Best management	225	292	138	50	11	716	3.6	2
4	Normal working hours	300	180	90	90	20	680	3.4	4
5	Working condition	125	140	45	150	55	515	2.6	9
6	Freedom	75	180	165	90	40	550	2.7	8
7	Self-respect	175	160	108	88	45	576	2.9	6
8	Proud of the institution	200	260	120	74	38	692	3.5	3
9	Relationship with management	125	160	150	90	40	565	2.8	7

**Source: primary data**

From the weighted average method, It was applied to analyse the factors which problem faced in the working place and the given factors inferred that the first rank got standard education, second rank for management, third rank for proud of the institution, fourth rank for working hours, fifth rank for salary, sixth rank for self-respect, seventh rank for relationship with management, eighth rank for freedom, and ninth rank for working condition.

### Findings

- ❖ Find the gender wise classification majority of the respondents are female.
- ❖ Find the age wise classification majority of the respondents are age group.

- ❖ Find the marital status wise majority of the respondents are Married.
- ❖ Find the educational qualification wise majority of the respondents are Ph.D holders.
- ❖ Find the income wise classification majority of the respondent are earning income belongs to Rs16000-25000
- ❖ From the weighted average method, first rank got standard education, second rank for management, third rank for proud of the institution, fourth rank for working hours, fifth rank for salary, sixth rank for self-respect, seventh rank for relationship with management, eight rank for freedom, and ninth rank for working condition.

### Suggestion

1. Most of the respondents felt that they always had additional work provided for leave or sanction other employees of the department and higher than regular workload of government employees colleges and government aided colleges. By appointment of adequate number of employees the concerned department administration may try reduce the workload of teachers.
2. Salary given by some colleges only after 15th of every month adding more complexity to the placement of house rent and regular monthly expenses ward like grocery, milk and tuition etc.
3. Discrimination in some self-financed colleges as the authorities have shown on several occasions even in promotions, increments and workload.

### Conclusion

All teachers of self-help colleges in Tirunelveli district facing problems due to various reasons. Through the privatization policy of the government all private groups and individuals are encouraged this led to the establishment of arts and science colleges. It is known for its development in the field of higher education. So educated faculty from all parts of Tamil Nadu comes to Tirunelveli to teach the quality of life and cost of living in Tirunelveli. This is more than other cities of South India some parts of Tamil Nadu. Due to policy public housing prices and domestic product is increasing month by month. All teachers are suffering from this So organisations provide financial assistance to meet their family needs. If government universities and Government Institutions efforts should be made to ensure job security and fair wages and teacher qualification experience in providing good support to teachers not only working

members of self-help colleges not only in Tirunelveli district but in all parts of the state because teaching is considered a noble profession.

## References

Kalleberg, A. L. (1977). Work values and job rewards: A theory of job satisfaction. *American Sociological Review*, 124-143.

Mehta, S. (2012). Job satisfaction among teachers. *IUP Journal of Organizational Behavior*, 11(2), 54.

Chen, J. (2010). Chinese middle school teacher job satisfaction and its relationships with teacher moving. *Asia Pacific Education Review*, 11(3), 263-272.

# A Study on the Awareness of AI Applications among College Students in Online Shopping

S. Maheshwari<sup>1\*</sup> and P. Geetha<sup>1</sup>

<sup>1</sup>Assistant Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

\*Corresponding Author e-mail iD: [maheshwari@vhnsnc.edu.in](mailto:maheshwari@vhnsnc.edu.in)

## Abstract

Machine and Computational Intelligence strongly builds and strengthens the e-mode buying practices of users. People can understand the processes and its hopeful and negative ideas on application of Machine intelligence in E-business. The present study focuses to find out the opinions of College students about employing of new modern electronic applications in buying goods and services.

**Keywords:** E-business, electronic applications, e-mode buying.

## Introduction

Few years ago, direct selling and buying of products played an important role. But now the purchaser can buy directly from manufacturers at affordable price. These all happen with the advent of Electronic Commerce. In 2018, the E-commerce market in India was valued at approximately 22 billion U.S. dollars. This number is expected to reach 200 billion U.S. dollars by 2027, a growth of roughly 96.7 per cent over the period 2016-2027. Likewise the Indian e-commerce market is expected to become a major driver of the country's GDP by 2025, contributing to as much as 8 per cent of the GDP by that year.

At present customers are aware of Machine learning and Artificial intelligence for e-mode shopping. They can know merits and limitations of this applications. It gives assurance and comfort to the purchaser. It aids to sort out merchandise and supply channels at reduced price. Buyers can send true information to the shoppers, if they are not yet satisfied with the services. Their buying behaviour will also be changed. The authors aim to find out the ideas and opinion about AI among college students to see implications of AI in E- Commerce.



Background studies:

- R.Singh made use of secondary sources, like blogs and articles, to sum up that in comparison to previous technological developments, AI/ML systems have emerged as the most crucial component of the ecommerce ecosystem in a shorter time frame.
- Mehta, K., Das, D. R., & Jindal, S. (2019), "The Emerging Concern of Artificial Intelligence in the E-commerce Industry" discuss how AI is a blessing in disguise. The OECD report provided awareness to the designer about all the possible consequences, harm, and biases the algorithm can cause to the market and society everywhere and creation of laws pertaining to those harms.

### Objective of The Study

To study the opinion on awareness about AI in online shopping among college students.

### Discussion

The responses are analysed with the help of chi-square test.

#### Chi-square test:

The Chi-square test is applied to measure the opinion levels of the respondents.

The following hypothesis is framed:

H0: There is no significant relationship between Gender and respondents' opinion on awareness about Artificial Intelligence in online shopping

H1: There is a significant relationship between Gender and respondents' opinion on awareness about Artificial Intelligence in online shopping

#### **Gender and respondents' opinion on awareness about Artificial Intelligence in online shopping**

The respondents normally belong to male and female category. In this study, an attempt has been made to analyse whether there is any significant relationship between gender of the respondents and their opinion on awareness about Artificial Intelligence during online shopping. The following Table explains it.

## Gender and opinion of the respondents

Sl No	Gender	Level of respondents			
		Low	Medium	High	Total
1	Male	12	11	5	28
2	Female	13	6	3	22
	Total	25	17	8	50

Source: Computed from Primary data

From the above Table it is clear that among 25 respondents who have low level of opinions, 12 respondents are male and 13 respondents are female. Among 17 respondents who have medium level opinion, 11 respondents are male and six respondents are female. The respondents who come in the high level opinion are Eight. Among them five respondents are male and three respondents are female.

The table of expected value of respondents is given below:

14	10	4	28
11	7	4	22
25	17	8	50

In order to find out whether there is any significant relationship between gender of the respondents and their levels of opinion on AI applications, Chi – square test is applied. The following Table shows the working of Chi –square test.

**TABLE Gender and opinion of the respondents on awareness about Artificial Intelligence during online shopping**

O	E	O-E	$(O-E)^2$	$\frac{(O-E)^2}{E}$
12	14	$(-2)^2$	4	0.29
13	11	$(2)^2$	4	0.36
11	10	$(1)^2$	1	0.1
6	7	$(-1)^2$	1	0.14
5	4	$(1)^2$	1	0.25
3	4	$(-1)^2$	1	0.25
			Total	1.39

Calculated value of chi-square =  $X^2 = 1.39$

$$\begin{aligned}\text{Degrees of freedom} &= \\ &= (2 - 1) (3 - 1) \\ &= (1) (2) \\ &= 2\end{aligned}$$

Table value of Chi-square =  $X^2 = 0.05 = 5.991$

Since the calculated value of the respondents is less than the table value at 5 per cent level of significance, the hypothesis is accepted. This shows that there is no significant relationship between the gender of the respondents and respondents' opinion on awareness about Artificial Intelligence during online shopping.

### Conclusion

Artificial intelligence helps the people to find out solutions to face critical problems. This fact is proved in this study. The students are managing the complex situations with the help of AI applications.

### Source

- Yahoo is part of the Yahoo family of brands. (2022). Finance Yahoo. <https://finance.yahoo.com/news/worldwide-b2b-e-commerce-industry-181500658.html>
- Factors, F. (2022, January 13). Global Industry 4.0 Market Size To Hit USD 84.59 Billion by 2026 at a 19.4% CAGR (with COVID-19 Analysis): Facts&Factors. GlobeNewswire News Room.
- Singh, R. (2021). A Study of Artificial Intelligence and E-Commerce Ecosystem – A Customer's Perspective. International Journal of Research in Engineering, Science and Management
- Mehta, K., Das, D. R., & Jindal, S. (2019). The Emerging Concern of Artificial Intelligence in the E-commerce Industry . Transcending Technology

## Artificial Intelligence in Business Decision Making

P.V. Muthu Perumal<sup>1\*</sup> and K. Mangayarkarasi<sup>1</sup>

<sup>1</sup>Assistant Professor of Business Administration, Arul Anandar College. Karumathur, Madurai, India.

### Abstract

The term Artificial Intelligence is a very broad and umbrella term. My research focuses primarily on the issues of business decision making with the help of Artificial Intelligence and data mining. The aim of this thesis is too aware of people that Artificial Intelligence makes right decision in business. In the support of my idea, I have presented lots of example in my thesis. The objective are to explore which type of Artificial Intelligence approaches are used present scenario in business, what the capability of AI. Several AI modules and operandi are presented, which have been sensibly chosen for elucidating the various Artificial Intelligence methods in business.

### Introduction

Artificial Intelligence modeling can fill the gap between the need and fulfill the needs of customers. Artificial Intelligence paves the way for certain decision making, saves time and lots of money also. Artificial Intelligence system is has ability to gather data, forecasting and trend analysis. Artificial Intelligence can also predict the customer's life time value. In the short we can say Artificial Intelligence reduces the bounce rate system. Artificial Intelligence ravel the data called data mining i.e. also called opinion mining. With the help of opinion mining web searches the opinions and feelings. This is the way for marketers to know more about their specific products and target audiences. Artificial Intelligence uses different search engines, specific web pages and websites. With the help of Artificial Intelligence we can take decision easily and saves lots of time.

Agriculture is said to be spinal cord of the Indian economy. An IBEF report tells that more than 58% of rural people in India depend on agriculture for their living. Agriculture is fourth most exported commodity from India which comprises of 10% of total exports. The study describes the prognosis and decision making in business sector.

The focal objective of man-made brainpower or artificial intelligence (AI) is to make keen machines. As an umbrella term, AI alludes to a wide range of fields of study, which incorporate – yet are in no way, shape or form constrained to – mechanical autonomy, AI, neural systems, regular language handling and the sort of artificial intelligence that is frequently investigated in sci-fi: fake general knowledge. Simulated intelligence is certifiably not another control. In any case, progresses in computational power and the enormous information wonder have impelled artificial intelligence advancements into another domain, where shrewd machines are anticipated to be the "most problematic class of innovations throughout the following 10 years" by Gartner; and Forrester gauges that artificial intelligence will pull in multiple times progressively corporate speculation amid 2017.

### Working of Artificial Intelligence

AI works on the technology of simulated intelligence. It joins lot of data quickly with repetition and calculation and gains information for product from the examples and highlights. AI is a broader field which comprises of major subfields as follows-

Machine learning uses procedures from neural frameworks, projections, discovery exercises and material science. It locates covered experiences in data without specifically modifying where to look or wrap up. A neural framework is a kind of AI which comprises of interconnected units (neurons). This structure reacts to outside information by transferring information between each unit.

- An AI Neural system comprises of interconnected units as neurons in humans. These units respond to outside stimulus data and transfer them in units connected. This helps in discovering significant data from unclear information.
- Deep learning uses gigantic neural networks with multiple preparation unit layers. It lets to learn complicated examples in a lot of details.

Another field of Ai is Cognitive registering. It aims at characterizing human like connection with machines. It utilizes AI to mimic human procedures by building capacity to decode pictures and recitation and post that talking lucidly.

## Review of Literature

This area introduces the writing on AI's potential ramifications for the future position of authority. To start with, it portrays the future position of authority as including the observing and direction of AI. Potential outcomes and difficulties with utilizing artificial intelligence as a dynamic device are displayed, just as how these conceivable outcomes and difficulties make the requirement for the pioneer to have the option to screen and guide artificial intelligence. Second, it depicts what's to come pioneer's obligations as moving towards the social parts of the work environment, where the position of authority incorporates rousing, supporting and empowering representatives. It mirrors the significance of underscoring gentler qualities, for example, relational abilities and inventive reasoning when artificial intelligence replaces specialized aptitudes.

**W.E Spranger. (1991, June)** Artificial intelligence played very vital role in strategic business decision making process. With the help of AI, the productivity of corporate increases day by day and can take wise decisions. Traditionally, entire work has been done by employees of the company this took lots of time and there were many errors also which sometimes could not be calculated but with the help of AI systems, any of company can easily detect any errors, threats against the company and can easily prepare analog reasoning, assess the efficiency of humans with non-distributed analog systems. Many models are given to find the results in business and to plan efficiently for business models. Artificial intelligence system replaced the earlier models of strategic business decision making and help to understand the leaders in better way. At last, this article concluded that AI helps the customers to monitor transactions and provides various services to access the products and services of the particular bank.

## Research Gap

The aim of this study to underwrite the dearth of research about the technology of Artificial intelligence in business decision making in the organization with the help of data mining. Researcher has obvious to focus the research on Artificial intelligence makes business decisions with the use of data mining using ITians as respondents. Researcher's aim is to improve and develop the role of Artificial Intelligence in the business decision making. By directing this research, researcher demystify the fact that Artificial Intelligence is nor a

warning for the humanity and civilization and neither for the Human Resource department while artificial intelligence makes human as a superhuman. Artificial Intelligence enhances the economy as increases the productivity of the organization with in a very short period of time.

### Objective of the study

1. To explore the challenges in business decision making
2. To solve the problem of decision making with AI
3. To find out the role of AI
4. To explore the challenges in the introduction of AI

### Hypothesis of the study

#### **Hypothesis 1**

H<sub>0</sub>: Role of AI in business decision making is significant in today 'era

H<sub>1</sub>: Role of AI in Business decision making is not very significance in today's' era.

#### **Hypothesis 2**

H<sub>0</sub> : AI overall surpass human intelligence in the near future

H<sub>1</sub> : AI does not surpass human intelligence in the near future

#### **Hypothesis 3**

H<sub>0</sub> : AI cannot substitute the HR manager's job

H<sub>1</sub> : AI can substitute the HR manager's job

#### **Hypothesis 4**

H<sub>0</sub> : AI secure the data

H<sub>1</sub> : AI does not secures the data

#### **Hypothesis 5**

H<sub>0</sub>: AI saves time and cost.

H<sub>1</sub>: AI does not saves time and cost.

### Research Design and methodology

A questionnaire was prepared and distributed among 161 respondents in IT sector. Also the questionnaire was set for some common people as they do not know about AI. The researcher describes them about AI through a common example.

## Selection of the Sample

Total 161 ITians and some common people replied as respondents on the basis of the probability sampling.

## Sample Size Calculation

Since the population is finite that is 2000, the formula used for sample calculation is as mentioned

$$n = Z^2 \cdot N \cdot \sigma \cdot p^2 / (N-1) \cdot e^2 + Z^2 \cdot \sigma \cdot p^2$$

The confidence level fixed at 95% and the acceptable margin of error considered at 11% with some percent of response distribution.

$$\begin{aligned} \text{Therefore} &= (1.96)^2 \cdot 2000 \cdot (0.5) / (2000-1) \cdot (0.11)^2 + (1.96)^2 \cdot (0.5) \\ &= 3.8416 \cdot 2000 \cdot 0.25 / 1999 \cdot 0.00121 + 3.8416 \cdot 0.25 \\ &= 161 \end{aligned}$$

Therefore, the sample considered is 161 respondents. Because 161 questionnaires are validate and considered for analysis and hypothesis testing.

According to calculator of site [www.surveysystem.com/sscal](http://www.surveysystem.com/sscal), if we take the population size is 2000 at confidence interval is 10 while confidence level is 95%, then this calculator gives the 92 sample size. Hence after seeing this calculator and formula 161 questionnaires are validate and considered for analysis and hypothesis testing.

## Data Analysis

This chapter presents the analytical findings from quantitative questionnaire. This data is collected through questionnaire and respondents are ITians and some non ITians. Each question is synthesized systematically and the findings are attained according to the questionnaire theme. Transcriptions of the respondents are use honestly and respondents impart the researcher with insightful information.



**Statistics of Variables****Comparative chart of Mean, Median, Std. deviation and Variance**

Pasrticulars	Mean	Median	Std. D	Variance
Do you know about AI	.8199	1.0000	.38549	.149
Can you think that AI helps in business decision making?	.7516	1.0000	.43346	.188
Can you think that AI works right decision?	.7391	1.0000	.44048	.194
Do you agree that it is time of AI	.8075	1.0000	.39553	.156
Will AI replaces human job and human creativity	.2298	.0000	.03326	.178
What about my customer' personal data? Doesn't AI put all our data at risk	.2112	.0000	.40942	.168
Will the future look like as AI become more common in the workplace	.6335	1.0000	.48334	.234
AI will help answer the big question about data	.7888	1.0000	.40942	.168
Will the future look like as AI become more common in the workplace	.6335	1.0000	.48334	.234
Can AI substitute the HR manager's job	.2360	.0000	.42596	.181
Can technology replace a teacher	.1491	.0000	.35727	.128
Can artificial intelligence feel emotions	.1304	.0000	.33783	.114
Do you agree that AI will erase the boundaries between structured and unstructured data-based insights	.5404	1.0000	.49992	.250

Is it possible to read human's mind in the future	.7578	1.0000	.42977	.185
Can we recover memories visually	.4658	.0000	.50039	.250
Will AI overall surpass human intelligence in the near future	.9006	1.0000	.30010	.090
How can be stopping the malicious usage of artificial intelligence in the future	3.0559	3.0000	.76851	.591
AI will dangerous for the human being in the future	2.7019	3.0000	.70573	.498

**Source: Researcher's own calculation**

Table 5.1 shows the comparative chart of Mean, Median, Std. deviation and Variance. Mean is calculated for all the variables through SPSS 25.0 IBM student version. Mean value is important for every variable and parameters also. It reveals average value for responses. Mean is required for testing of hypothesis. Median value shows the mid value for all the responses. Std. deviation and variance is also calculated here through SPSS 25.0 IBM student version.

### **Hypothesis testing**

#### **Hypothesis 1**

H<sub>0</sub>: Role of AI in business decision making is significant in today 'era

H<sub>1</sub>: Role of AI in Business decision making is not very significance in today's era.

H<sub>0</sub> = 95%

H<sub>1</sub> < 95%

#### **AI helps in business decision making**

$$Z = \frac{X - \mu}{\sigma}$$

X = data point,  $\mu$  = mean,  $\sigma$  = Standard deviation

$$= \frac{0.95 - 0.7516}{0.43346}$$

$$= 0.46 \text{ (table value = 0.6772)}$$

Value of Alpha  $\alpha$  = 0.05 (1.645)

$= 0.6772 < 1.645$ , and lie in accepted region of normal distribution curve of Z-test. Hence null hypothesis is accepted and is proved.

### **Hypothesis 2**

$H_0$  : AI overall surpass human intelligence in the near future

$H_1$  : AI does not surpass human intelligence in the near future

$H_0 = 95\%$

$H_1 < 95\%$

#### **AI overall surpass human intelligence**

$$Z = X - \mu / \sigma$$

X = data point,  $\mu$  = mean,  $\sigma$  = Standard deviation

$$= 0.95 - .9006 / .090$$

$$= 0.54888 \text{ (Table value} = 0.7054)$$

Value of Alpha  $\alpha = 0.05$  (1.645)

$= 0.7054 < 1.645$ , and lie in accepted region of normal distribution curve of Z-test. Hence null hypothesis is accepted and is proved.

### **Hypothesis 3**

$H_0$  : AI cannot substitute the HR manager's job

$H_1$  : AI can substitute the HR manager's job

$H_0 = 95\%$

$H_1 < 95\%$

#### **AI cannot substitute the HR manager's job**

$$Z = X - \mu / \sigma$$

X = data point,  $\mu$  = mean,  $\sigma$  = Standard deviation

$$= 0.95 - 0.2360 / 0.181$$

$$= 3.9447 \text{ (Table value} = 0.4996)$$

Value of Alpha  $\alpha = 0.05$  (1.645)

$= 0.4996 < 1.645$ , and lie in accepted region of normal distribution curve of Z-test. Hence null hypothesis is accepted and is proved.

### **Hypothesis 4**

$H_0$  : AI secure the data

$H_1$  : AI does not secures the data

$H_0 = 95\%$

$H_1 < 95\%$

#### AI secure the data

$$Z = X - \mu / \sigma$$

$X$  = data point,  $\mu$  = mean,  $\sigma$  = Standard deviation

$$= 0.95 - 0.30714 / 0.168$$

$$= -0.30714 \text{ (Table value} = 0.38209)$$

Value of Alpha  $\alpha = 0.05$  (1.645)

$$= 0.38209 < 1.645, \text{ and lie in accepted region of normal distribution curve}$$

of Z-test. Hence null hypothesis is accepted and is proved

#### Hypothesis 5

$H_0$ : AI saves time and cost.

$H_1$ : AI does not saves time and cost.

$H_0 = 95\%$

$H_1 < 95\%$

#### It is time of AI (saves time and cost)

$$Z = X - \mu / \sigma$$

$X$  = data point,  $\mu$  = mean,  $\sigma$  = Standard deviation

$$= 0.95 - 0.8075 / 0.156$$

$$= 0.9134 \text{ (Table value} = 0.81594)$$

Value of Alpha  $\alpha = 0.05$  (1.645)

$= 0.81594 < 1.645$ , and lie in accepted region of normal distribution curve of Z-test. Hence null

hypothesis is accepted and is proved

#### AI helps in business decision making

##### AI helps in business decision making

	Frequency	Percent	Valid Percent	Cumulative Percent

No	40	24.8	24.8	24.8
Yes	121	75.2	75.2	100.0
Total	161	100.0	100.0	

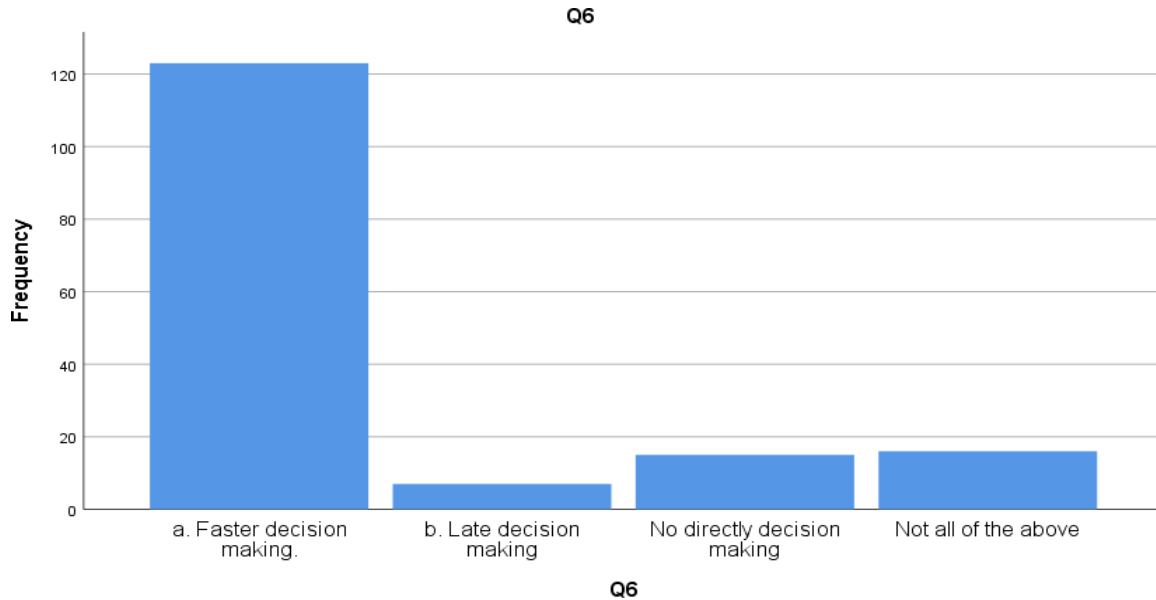
### Functions of Artificial Intelligence

#### Functions of Artificial Intelligence

	Frequency	Percent	Valid Percent	Cumulative Percent
a. Faster decisionmaking.	123	76.4	76.4	76.4
b. Late decision making	7	4.3	4.3	80.7
c. No directly decision making	15	9.3	9.3	90.1
d. Not all of the above	16	9.9	9.9	100.0
Total	161	100.0	100.0	

Source: Researcher's own calculation

#### Functions of Artificial Intelligence



Among 161 respondents 76.4% agrees that with the help of AI decision making tool we can makes fast decision while 4.3 % knows it takes late decision. 9.3 % respondents clear their view that AI nit directly involved in the decision making. 9.9% respondents open the lock of mind and told not all of the above.

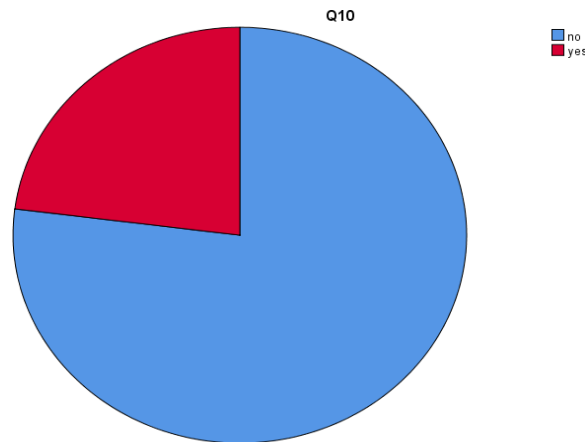
### Replacement of human job and human creativity

#### AI replace human job and human creativity

	Frequenc y	Percen t	Valid Percen t	Cumulativ ePercent
no	124	77.0	77.0	77.0
yes	37	23.0	23.0	100. 0
Tot al	161	100.0	100. 0	

Source: Researcher's own calculation

#### AI replace human job and human creativity



Among 161 respondents 23% agrees that AI replace human job and human creativity while 77 % denied. They think that AI will not replace human job and human creativity. This 77 % result supports my research objective and research statement also.

All the interpretation reveals that Artificial intelligence shows positive correlation with the business decision making. There are FIVE hypothesis designed having each of two sets, one is Null hypothesis and another is Alternate hypothesis. Two samples One tailed z –statistics are used to test the hypothesis. All the objectives are fulfilled through frequency distribution method. Pie chart graph and histogram well defined the objective of the study and majority of percentage reveals the positive responses as to fulfill the objective of he research. Challenges in business decision making, solve the problem of decision making with Artificial intelligence, find out of role of artificial intelligence and to explore the challenges in the introduction of artificial intelligence.

### Conclusion and Discussion

Artificial Intelligence that is fit for organization, jobs, environment, job satisfaction, employee dedication towards their job, performance of employee etc. To furnish the understanding of research gap the review of literature was completed underneath the following heads:

- I. Strategic decision making
- II .Decision making in agricultural business

### III. Data mining

The researcher to the best of her ability directed survey of writing to cover different parts of association research fit to comprehend the wonder of complex human conduct affected by different variables talked about here above. Researcher know the more about uses of artificial intelligence and deep understanding and also found the relationship between artificial intelligence and decision making with the help of review of literature. Artificial intelligence helps in Strategic decision making and business decision making concluded safely by the researcher with the help of review of literature.

This research is arranged analytically from describing the problem of statement with the help of review of literature then defining research objective then research parameters to sampling and sampling methods to collection of primary data with the help of questionnaire to devising of hypothesis and their testing through Z statistics and frequency distribution. Primary data are collected via Questionnaire method from the IT sector employees and some are non ITians. Around 161 respondents all were considered for analysis.

**Results of the questions related to Accuracy of decision** Respondents were asked the question to exploring related to accuracy of decision. It was found that majority of agreed that decision making capability will very accurate by the using of Artificial intelligence.

**Results of the questions related to Data Security** In other question related to data security respondents were asked for data security as personal information and other related data. It was found that respondents felt and assured about security of data except some percentage of respondents.

**Results of the questions related to Replacement of HR** Respondents were asked the questions for replacement of Human Resources (HR). It was found majority of respondents agreed that Artificial intelligence does not replace the Human Resource department while Artificial Intelligence acts as a helping hand for HR department.

**Results of the questions related to Time & cost** Respondents were asked to examine the question related with time and cost. What is the function of Artificial Intelligence? In the response of these question 123 respondents makes the answer Faster Decision Making. Faster Decision making response clear the researcher's point as Artificial Intelligence saves time and cost.



## References

1. Abdel-Basset, M., Chang, V., Gamal, A., & Hagrass, H. (2020). The role of big data in improving the business and customer experience. *Journal of King Saud University - Computer and Information Sciences*. <https://doi.org/10.1016/j.jksuci.2020.09.024>
2. Brynjolfsson, E., & McAfee, A. (2017). The business of artificial intelligence. *Harvard Business Review*, 95(1), 60-68.
3. Chen, L., Li, X., & Wang, Y. (2020). Artificial intelligence in healthcare: A critical review. *Journal of Healthcare Engineering*, 2020. <https://doi.org/10.1155/2020/2715313>
4. Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108-116.
5. Fitzgerald, M., & Stolterman, E. (2018). Designing beyond the limits of human ability: The impact of machine learning on human experience. *Design Studies*, 55, 1-8. <https://doi.org/10.1016/j.destud.2017.09.001>
6. Hastie, T., & Tibshirani, R. (2009). *The elements of statistical learning: Data mining, inference, and prediction* (2nd ed.). Springer.
7. Li, X., & Roth, D. (2002). Learning question classifiers. In *Proceedings of the 19th International Conference on Computational Linguistics (COLING-02)* (pp. 556-562).
8. Simon, H. A. (1957). *Models of man; social and rational*. Wiley.
9. Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.

## Role of Artificial Intelligence in Solar Energy

B. Roja<sup>1\*</sup> and S. Muthulakshmi<sup>2</sup>

<sup>1\*</sup>Research Scholar of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.,

<sup>2</sup>Associate Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

### Abstract

The solar energy sector is one of the largest renewable energy sources in the world and one of the fastest-growing industries. Solar energy is abundant, clean, and cost-effective, leading to an increase in demand for energy products from the sun. Despite this, the solar industry faces many challenges, such as high costs, low efficiency, and maintenance issues. But with the help of Artificial Intelligence (AI), the solar industry can overcome these obstacles and unlock its full potential. AI solves solar industry challenges such as precise energy prediction, better energy storage, and lower maintenance expenses. This paper attempts to understand the benefit of integrating AI with Solar Energy

**Keywords:** Solar Energy, E-Waste Management in Solar Technologies, Preventive Maintenance, Automated Monitoring, Google deep mind

### Introduction

The solar energy industry has seen a remarkable transformation with the introduction of Artificial Intelligence (AI). Solar energy production, monitoring, and management are being restructure by AI, which has enormous potential to improve efficiency and lower costs. AI has enabled solar energy applications to reach new heights, with significant benefits for businesses, the environment, and the future of energy. Artificial Intelligence (AI) advances, its transformative impact on the solar energy sector has become increasingly obvious. . It helps solar energy providers make informed decisions when planning and allocating resources, reducing energy waste and lowering costs. Utilising this powerful predictive analysis, energy providers can now more efficiently manage their resources, helping to create a more sustainable energy future

By leveraging this advanced technology, Energy suppliers are better able to predict consumption, reduce waste, and increase operational efficiency. In the end, this will result in a future for energy that is more dependable, affordable, and sustainable.

## **What is artificial intelligence?**

Artificial intelligence (AI) is changing the world by creating computer frameworks that can perform tasks that were once as it was possible for people. This incorporates issue- tackling, decision- making, and natural language processing. AI algorithms are outlined to learn from information, distinguish designs and make forecast based on that information. With the capacity to perform complex tasks, AI is revolutionizing industries and changing how we connected with innovation.

## **Artificial intelligence applications in the energy sector**

### **1. Energy Demand Forecast**

By minimizing energy waste and expenses, artificial intelligence (AI) can assist energy providers in better planning and resource allocation. Artificial intelligence (AI) can estimate energy demand with high accuracy by evaluating weather patterns, historical data, and other pertinent aspects. This enables energy suppliers to make decisions that optimise energy efficiency and avoid waste. It saves costs and contributes to the development of a more sustainable energy system.

### **2. Optimisation of Energy Storage:**

By analysing energy consumption patterns and weather forecasts, AI can help optimise energy storage and reduce energy waste and costs. AI can improve energy storage, reducing energy wasted and cheaper expenses. As a result, overall energy expenses are decreased since energy is stored and utilised economically and efficiently.

### **3. Google deep mind**

The work that Google Deep Mind is doing in the energy sector is revolutionizing the ways that we produce, distribute, and use energy. Google Deep Mind is contributing to the world's sustainability by advancing technological innovation and enhancing the sustainability of energy systems. Additionally, Google DeepMind is cutting expenses and increasing energy efficiency, making energy more widely available and reasonably priced. With its remarkable work, Google DeepMind is transforming the energy sector and moving us closer to a more sustainable future.

### **4. Preventive Maintenance**

Artificial intelligence algorithms can predict when a solar panel or component is likely to fail or require maintenance. This proactive approach reduces downtime and extends the life of the installation.

### **5. Optimal Energy Distribution**

AI can analyze energy consumption pattern and distribute energy more efficiently, ensuring that energy is used where and when is most needed

## **6. E-Waste Management in Solar Technologies**

As solar energy technologies become more and more common, the management of e-waste is becoming an important issue. Artificial intelligence interventions can significantly contribute to the development of effective e-waste management systems. These systems reflect India's commitment to sustainable practices and provide a technologically advanced solution to the challenges of increasing e-waste in the solar sector.

## **7. Monsoon Challenges for Solar Operations**

India's monsoon seasons present a unique challenge to solar operations as reduced sunlight affects panel efficiency. The predictive capabilities of artificial intelligence are at the forefront of mitigating these challenges by predicting and managing energy production under severe weather conditions. This proactive approach ensures a consistent and reliable power supply throughout the year, even in the face of weather disturbances.

## **8. Automated monitoring and maintenance**

AI-based systems can automatically monitor customer usage patterns and identify maintenance or repair needs in solar energy systems. This information allows companies to automate maintenance schedules and optimize customer systems without sending out technicians or incurring repair costs. The adoption of artificial intelligence will improve the capabilities of solar installers by providing insights and analytics that improve the customer experience, reduce costs, increase efficiency and promote the development of solar energy sources.

### **Machine Learning Algorithms for Solar Installation**

Solar installation using machine learning algorithms is a relatively new technology revolutionising how solar energy is used and managed. Machine learning algorithms enable the identification of optimal conditions for solar panel installation, such as roof tilt angle, roof orientation, and the best placement of panels. By analysing the terrain, geographic location, and weather patterns, machine learning algorithms can determine the optimal installation spot for solar panels. Solar installers can optimise the

installations by utilising machine learning algorithms for the best possible performance and cost-effectiveness

## Conclusion

Artificial intelligence (AI) seems to have a bright future, business, government and individual are rapidly adopting AI technology due to its advances. AI can transform various aspects of our daily lives, from healthcare to transportation and communication. By simplifying our schedules, AI has the potential to allow us to concentrate on what truly matters. Current application of AI range from expert diagnosing diseases to allowing robots to participate in surgeries.

As AI technology advances, its utilisation will probably become even more pervasive and advanced. The future of Artificial Intelligence is indeed promising, and it has the potential to revolutionise our existence.

Artificial Intelligence is revolutionising the Solar Energy Industry in many ways. From better forecasting to improved efficiency and cost reductions, AI makes solar energy more accessible and efficient. AI is also helping to increase the accessibility of solar energy to the public, making it more affordable and easier to access. The combination of AI and solar energy is revolutionising the industry and showing the world what a renewable and sustainable future can look like.

## References

Pamela Cargill, Marketing Strategies for Solar Businesses. The Green Economy Post, Filed under: 1sdn,Solar Energy, 2011

<https://www.linkedin.com/pulse/role-artificial-intelligence-solar-energy-management-0dznf>

<https://www.financialexpress.com/business/digital-transformation-the-role-of-artificial-intelligence-in-solar-energy-3375167/>

<https://halcolenergy.com.au/solar-news/9-ways-ai-is-revolutionising-the-solar-energy-industry/>

## Role of Artificial Intelligence In E -Commerce Industry

**P. Uma Shanthi<sup>1\*</sup> and J. Kamatchi Eswaran<sup>2</sup>**

<sup>1\*</sup>Assistant Professor, Department of Commerce with Computer Applications, Sri Kaliswari College, (Autonomous), Sivakasi, India.

<sup>2</sup>Assistant Professor, Department of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

### Abstract

In recent years, E - Commerce has shown tremendous growth, and Artificial Intelligence (AI) has played a crucial role in changing the online shopping experience. Artificial Intelligence has enabled E - Commerce retailers to provide a simpler, secured, and good shopping experience to online shoppers through various platforms. E - Commerce applications of the current scenario are required to be functional round the clock and throughout the week, on multiple channels simultaneously. With the automation through Artificial Intelligence, the online business gain more power for managing and finishing the repeated tasks more quickly and minimizing cost, simplifying the start and finish the workflow. The reduction of time gives a business a boost in the profit margins as well as reduction of cost for the customer, giving the business strength to fight with its competitors. In E – Commerce industry, the automation with help of Artificial Intelligence gives more edge compare to other business.

**Keywords:** Artificial Intelligence, E – Commerce, online shopping

### Introduction:

Artificial intelligence (AI) has made great strides in recent years, but most people are still confused about exactly what it is. AI means – “Artificial Intelligence” is the capability of a machine to imitate intelligent human behaviour.

- Data mining refers to the gathering of both current and historical data to inform predictions.
- Natural language processing focuses on human-computer interaction and how computers interpret naturalhuman language.
- Machine learning concerns using a collection of algorithms to apply past experience or provide examples to solve a problem. Deep learning “involves layering algorithms in an effort to gain greater understandingof the data.”

Over the past couple of years, AI technology has matured and become a powerful tool to boost sales and optimize operations. Even many small ecommerce businesses are using technology with some kind of AI capability.

Artificial Intelligence (AI) is the field of computer science dedicated to solving cognitive problems commonly associated with human intelligence, such as learning, problem solving, and pattern recognition. Artificial Intelligence, often abbreviated as "AI", may connote robotics or a futuristic scene, AI goes well

beyond the automatons of science fiction, into the non-fiction of modern day advanced computer science. Professor Pedro Domingos, a prominent researcher in this field, describes “five tribes” of machine learning, comprised of symbolists, with origins in logic and philosophy; connectionists, stemming from neuroscience; evolutionaries, relating to evolutionary biology; Bayesians, engaged with statistics and probability; and analogizers with origins in psychology. Recently, advances in the efficiency of statistical computation have led to Bayesians being successful at furthering the field in a number of areas, under the name “machine learning”. Similarly, advances in network computation have led to connectionists furthering a subfield under the name “deep learning”. Machine learning (ML) and deep learning (DL) are both computer science fields derived from the discipline of Artificial Intelligence.

## Using Artificial Intelligence in Ecommerce Companies

### 1. More targeted marketing and advertising.

Personalization is a top priority, according to surveyed retailers, but only 15% say they’ve fully implemented personalization across channels. Stand out from the crowd with a more personalized message and have one-to-one conversation with the customers. Advances in AI and machine learning have enabled deep personalization techniques to customize content by user. By analyzing big data from purchase histories and other customer interactions, can zero in on what the customers really want and deliver the message that will most resonate.

### 2. Increased customer retention.

Delivering targeted marketing and advertising messages personalized for their customers can increase retention. McKinsey omnichannel personalization research indicated there’s 10-15% uplift potential in revenue and retention from omnichannel personalization strategies. The report reads: “A critical element of personalization is building better data and insights on customers, an asset that also generates additional value across the value chain. Our research suggests the ROI for personalization will quickly outpace that of traditional mass marketing.

### 3. Seamless automation.

The goal of automation is to accomplish a task with as little human intervention as possible. That can mean anything from scheduling emails in a CRM or marketing tool, using Zapier to automate tasks or leveraging advanced technology to help with hiring. In the context of future ecommerce trends, however, some of the most commonly talked about today are robotics and machine learning. AI can play a big role in helping to automate the repetitive tasks that keep the online store functioning. With AI, we can automate things like product recommendations, loyalty discounts, low-level support, and more.

### 4. Efficient sales process.

Using AI can help to create a more efficient sales process by gathering data about the customers, automate follow-up abandoned cart inquiries, and more. With the help of AI we can move customers through the funnel by having them engage with chatbots for simple questions.

## AI Use Cases in E-commerce

There are plenty of use cases in ecommerce for AI, and you’re probably familiar with a lot of them — just might not know that the technology they’re built on is actually related to AI. Here are six of the most common:



1. Personalized product recommendations.
2. Pricing optimization.
3. Enhanced customer service.
4. Customer segmentation.
5. Smart logistics.
6. Sales and demand forecasting.

### **1. Personalized product recommendations.**

It's easier than ever to collect and process customer data about their online shopping experience. Artificial intelligence is being used to offer personalized product recommendations based on past customer behavior and lookalike customers. Websites that recommend items you might like based on previous purchases use machine learning to analyze your purchase history. Retailers rely on machine learning to capture data, analyze it, and use it to deliver a personalized experience, implement a marketing campaign, optimize pricing, and generate customer insights. Over time, machine learning will require less and less involvement from data scientists for everyday types of applications in ecommerce companies.

### **2. Pricing optimization.**

AI-enabled dynamic pricing is a strategy of changing your product price based on supply and demand. With access to the right data, today's tools can predict when and what to discount, dynamically calculating the minimum discount necessary for the sale.

### **3. Enhanced customer service.**

With virtual assistants and chatbot technology, you can deliver the appearance of higher touch customer support. While these bots aren't completely self-reliant, they can facilitate simple transactions, leaving live support agents able to focus on more complex issues.

Virtual agents also have the advantage of being available 24/7, so low-level questions and issues can be addressed at any time of day, without making your customer wait.

### **4. Customer segmentation.**

Access to more business and customer data and processing power is enabling ecommerce operators to understand their customers and identify new trends better than ever. In an insight from Accenture, they write, "AI systems can explore highly complex and varied options for customer engagement very quickly, and continuously optimize their performance as more data becomes available. This means marketers can set parameters and allow the AI to optimize and learn to achieve precision."

### **5. Smart logistics.**

According to a report from Emerging Tech Brew, "Machine learning's predictive powers shine in logistics, helping to forecast transit times, demand levels, and shipment delays." Smart logistics or intelligent logistics, is all about using real-time information through sensors, RFID tags, and the like, for inventory management and to better forecast demand. Machine learning systems become smarter over time to build better predictions for their supply chain and logistics functions.



## Future of Artificial Intelligence in e-commerce

AI's development in retail has helped e-commerce businesses reduce operational costs, boost sales, and increase customer satisfaction. For instance, some retailers have already successfully implemented chatbots into their customer service strategy—and it's proving to be a successful investment. It has also made shopping more convenient for customers who can now shop at any time of the day or night. This blog post will explore how AI is expected to play a massive role in shaping how retailers will operate in 2021 and beyond.

### How is AI bringing change to the e-commerce industry?

Artificial Intelligence (AI) is the next big thing in the e-commerce industry. It has been around for a while, but it has become easier to implement AI solutions in the e-commerce industry with recent developments in various technologies. The e-commerce industry proves its advantages through increased customer satisfaction, lower costs, and more efficient processes. Moreover, AI is expected to grow at a **33.2%** yearly rate between 2020 and 2027. By using AI technology, you can create an **AI-powered personalized search** experience for your customers to increase their loyalty towards your brand and help you grow your business more effectively.

### How can AI benefit e-commerce?

In the past, most e-commerce websites were created with a focus on **e-commerce conversion improvement** and sales alone. With AI, customers can get answers to their questions even before they ask them. They also don't have to wait on hold or chat with customer service representatives when they want answers; instead,

## Benefits of AI in the e-commerce industry

The advent of Artificial Intelligence (AI) and Machine Learning (ML) has changed the face of online shopping for good by making it more **personalized search** and responsive than ever before. Aimed at improving customer experience, By 2027, **80%** of retail CEOs want their companies to use AI-powered intelligent automation. Here's a list of benefits that an intelligent e-commerce platform provides:

### 1. Personalized marketing

With Artificial intelligence, e-commerce businesses can create personalized marketing strategies based on the needs and wants of their customer. They can collect data from social media, shopping history, and browsing habits to understand better what customers need and want. The AI will use this information to make predictions about customer behaviour. It will also make **AI-based recommendations** about how much they're willing to pay for a product or service.

### 2. Improve customer retention

Whether it's a local shop or a multinational corporation, nearly every business relies on customer retention to keep its business running. This is especially true in the e-commerce industry, which has created enormous opportunities for growth and development around the globe. However, despite how important it is to retain customers, many businesses still struggle with this part of the process. And if they're not working already, they will be soon enough because some significant changes are coming that will impact companies in the online marketplace.

The rise of artificial intelligence and chat bots can change things dramatically for businesses that haven't perfected customer retention strategies yet.

### 3. Seamless automation

E-commerce companies are now using artificial intelligence to improve their business. Many of them are opting for AI automation, which is quickly replacing humans in many industries. AI vendors have created services that help e-commerce companies automate their operations to focus on growth and sales optimization. The main advantage of AI automation is the ability to scale up the business while keeping costs low.

### 4. Efficient sales process

Artificial intelligence is helping e-commerce companies to improve their sales. It's also used to find the right market for a product, recommend products that are likely to have high demand, and forecast how many copies of each product need to be produced. In addition, AI can understand customer behaviour by analyzing search history and browsing patterns.

This allows companies to provide better-targeted marketing strategies and offers as well as **AI-based recommendations**. The result is that customers can be directed towards items that best match their interests and needs based on who they are as people rather than what they buy.

## Role of AI & ML in E - Commerce

Artificial Intelligence and Machine Learning play a vital role in enhancing the customer service of a website. When someone says Artificial Intelligence, a lot of you might think about self-driving cars and talking robots. But in fact, AI is being used in numerous industries and is especially capable of helping you in your very own eCommerce industry.

### 1. AI Chat bots for Customer Engagement

When you are visiting an E - Commerce website, you should be able to find your products easily without navigating the website for too long. An AI chatbot pops up on the website and answers customers' questions immediately.

Ecommerce has taken the world by a storm. No one would've expected the steep rise of E - Commerce via digitalization. Then with further advancements came along the use of chat bots in E - Commerce. An advanced iteration to the use of chat bots is conversational chat bots.

- An AI-induced chat bot simulates the conversation of a real-life human.
- The personalization potential of a chat bot will captivate online shoppers and provide a seamless shopping experience.
- AI chat bots also provide abandoned cart triggers and remind the customers of the products left in their carts.
- With AI chat bots, you can recommend products with up selling and cross-selling strategies to

customers.

- Page targeting is one of the significant features of AI chat bots. An online business owner can use Artificial Intelligence induced chat bots to gain insights and engagement.
- Machine learning and AI with human-in-the-loop technology will enhance the E - Commerce market's customer service.

### AI chat bots captivate customers in the E - Commerce space

The concept of commerce worked on the principle of attracting customers and creating demand in the market. This growth of commerce has mostly relied on sales by interacting with the customer and understanding their demand. Ever since conventional commerce moved towards digitalization, there hasn't been much of a conversational mode of commerce to drive sales.

## 2. Effective Automation

Consider the Zapier automation tool, featuring integration in email and Customer Relationship Management systems. The AI technology will maintain the data and automate the manual tasks of entering customer data into your systems.

- You can schedule emails in the customer relationship management systems with the AI chat bots.
- Your online store will become more functional by automating repetitive tasks with Artificial Intelligence technology.
- Automating low-level support in the E - Commerce industry will help you escalate sales exponentially.

## 3. Generate Business Leads for B2B

For B2B businesses, you have to find new prospects, schedule appointments, and select potential leads. Artificial Intelligence technology will automate all these tasks for E - Commerce site owners.

## 4. Mobile Commerce and AI technology

AI will improve the UX (User Experience) of E - Commerce websites. Mobile commerce is one of the latest trends in the E - Commerce industry. In simple words, mobile commerce is your E - Commerce website visibility through mobile applications. E - Commerce site should be visually appealing to customers. The artificial intelligence technology will help E - Commerce business owners for making decisions. E - Commerce business owners use AI applications for selecting images and video content for websites to optimize the site. To make your online store rank in the Google search results pages, you should optimize your stores for both mobile and desktop. AI can improve the mobile shopping and usability of your E - Commerce website.

## 5. E-commerce Logistics with AI Chat bots

When you are implementing AI chat bots on E - Commerce websites, customers will easily place and track their orders. We have looked into the exceptional role of AI-induced chat bots in guiding customers through E - Commerce websites to introduce products. In the same way, customers will place orders and track them efficiently with AI chat bots.

- You will also get real-time information. The AI will read the incoming data and flag certain things as apriority or less so, giving you a report.
- The predictive analysis enhances the functionality and supply chain of an E - Commerce business.
- AI chat bots also provide product descriptions directly through the chat windows.

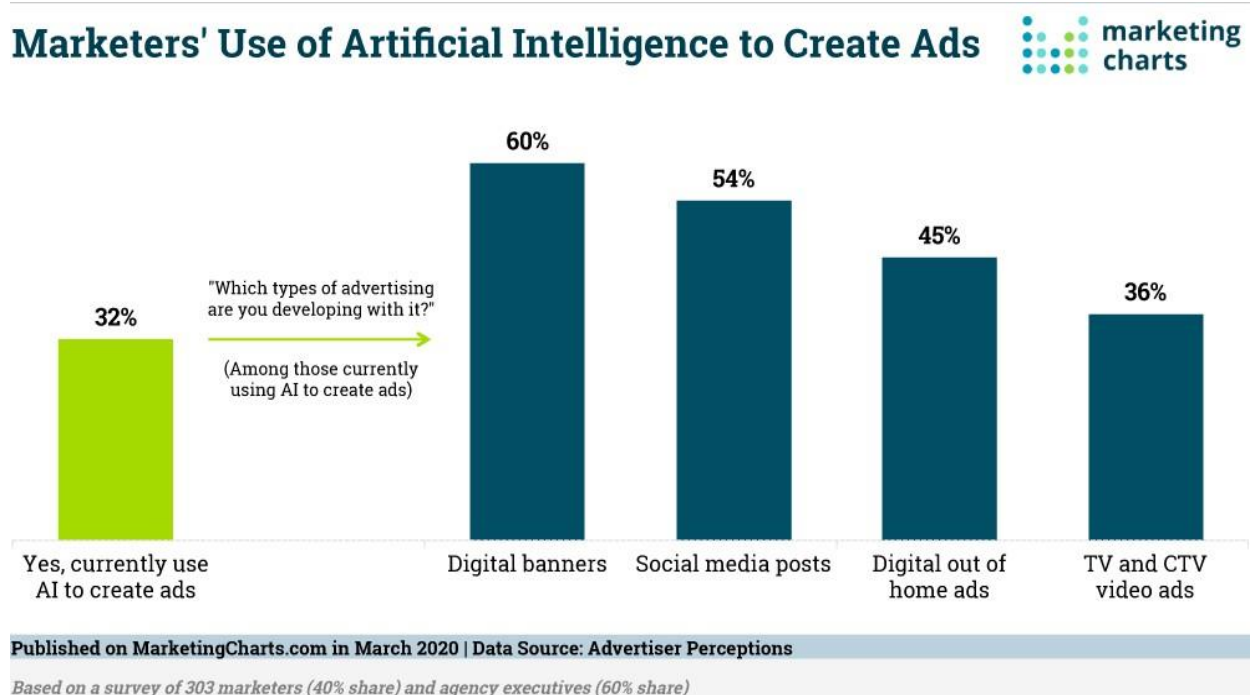
## 6. Voice Assistants in E - Commerce

Voice assistants are one of the best AI trends in E - Commerce. A customer need not type a search query, because, with an AI voice assistant, simple voice command will help customers reach their desired products without any difficulty.

In a famous E - Commerce store like Amazon, voice assistant plays an important role. Enabling voice assistants in the stores will accelerate product search and help customers place orders instantly without any delay. AI technology will understand users' questions and respond to them relevantly.

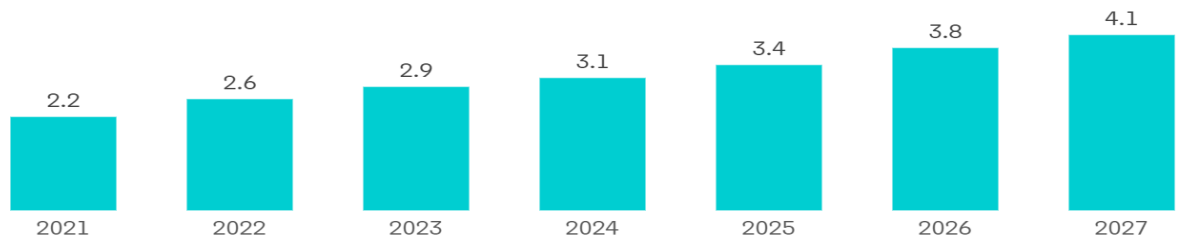
## Final Thoughts

The digital world is expanding at an unprecedented rate. Every day, trends change, and new trends arise. But, they all aim at bettering the user experience and satisfaction. In this case, Artificial Intelligence technology serves the right purpose by facilitating the user journey in the E - Commerce industry.



## AI in Food & Beverages Market Trends

Volume For Food Robotics, Global, in billion units, 2021-2027



Source: Next Move Strategy Consulting



The implementation of AI in digital marketing has a number of notable impacts on the functionality of marketing campaigns, including:

- **Better Return on Investment (ROI):** AI can aid in the making of more informed decisions regarding digital marketing campaigns, and the development of more effective content. Additionally, AI-assisted marketing strategies can help advertisers to reach the proper target audience.
- **Improved Marketing Results:** Through the utilization of data-driven research, AI can assist in the design of a more appropriate marketing strategy for big companies and small businesses.
- **Increased Productivity:** A variety of tedious tasks can be digitized and automated through the application of AI, resulting in a boost in productivity. By streamlining operations and reducing costs, AI can contribute to both increased revenue and reduced expenses for businesses.
- **Audience Analysis:** AI can analyze information to predict the buying patterns and actions of target consumers, improving user experience and providing them with exactly what they want.
- **Competitive Advantage:** The utilization of AI insights in business operations is becoming a priority for many companies, as it can lead to better decision-making, lower costs, decreased risk, faster time-to-market, and other advantages over competitors.

## Impact of AI on Jobs and Employment Market

Many have expressed concern for their job status with the impending growth of AI and machine learning. Semrush revealed that:

- 38% of employees expect their job to be automated by 2023.
- 13% expect AI to eliminate positions entirely in their industry.

Despite the negative perceptions:

- AI technology is expected to create 12 million more jobs (link is external) than it is expected to replace
- Jobs are anticipated to be in high demand with 97 million specialists needed in the AI industry by 2025

One O'Reilly report (link is external) broke down usage by industry. They show the following:

- Healthcare: 8%
- Education: 8%
- Government/Public Sector: 5%
- Telecomm: 4%

- Manufacturing 4%
- Retail: 4%
- Media:2%
- Energy: 2%
- Defense/Security: 3%
- Other: 28%

### Where is AI Used Today?

1. United States
2. India
3. Canada
4. Germany
5. United Kingdom
6. Spain
7. Brazil
8. Mexico
9. Australia
10. Italy
11. France
12. Japan

### AI and Marketers

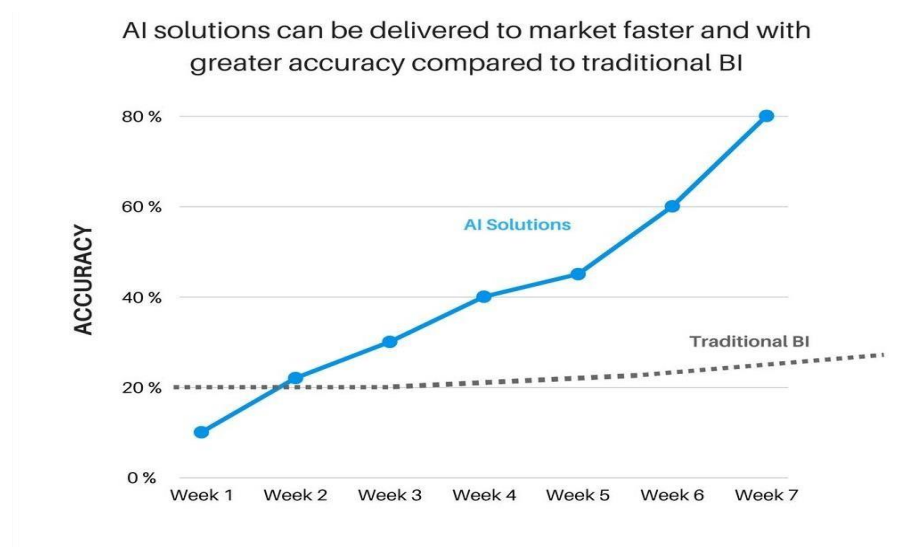
- AI augmentation is predicted to have created \$2T of business value by 2021. This value is equal to 6Bhours of worker productivity globally.
- 59% of respondents named ‘shortage of data science talent’ as the primary barrier to extracting valuefrom their big data technologies.
- 80% of business and tech leaders say AI already boosts productivity.
- Current AI technology can boost business productivity by up to 40%.
- By 2023, 40% of infrastructure and operations (I&O) teams will use AI-augmented automation in largeenterprises, freeing up IT personnel’s time for strategic work

### Gaps in AI knowledge in the B2B industry

- 38% of executives say that managers don’t understand cognitive technologies and how they work.
- Marketers say the top obstacle to integrating AI is applying it in their current role and workflow (33%)
- Only 15% of B2B marketers are very confident with their knowledge of AI, while 55% are somewhatconfident, and 30% are not at all confident.
- 60% of companies cannot explain how their AI systems make decisions and predictions
- 75% of enterprises are poorly equipped to consider the ethical implications of using artificial intelligence
- Only 45% of businesses engage in ethical AI monitoring
- By 2023, all AI professionals will have to demonstrate a good grasp of responsible AI principles tosecure a job

## Benefits of AI in B2B

- 64% of B2B marketers consider AI valuable for their sales and marketing strategy.
- 83% of early AI adopters have already achieved substantial (30%) or moderate (53%) economic benefits
- 41% of marketing executives say improving their ability to innovate is a marketing priority for 2022.
- 63% of Digital Marketing Leaders Still Struggle with Personalisation, Yet Only 17% Use AI and Machine Learning Across the Function
- 84% of digital marketing leaders believe using AI/ML enhances the marketing function's ability to deliver real-time, personalised experiences to customers.



## Challenges of AI in B2B

- 78% of CEOs are most concerned with the potential for bias and lack of transparency when it comes to AI adoption
- 70% of CEOs say AI and automation will increase vulnerability and disruption to the way they do business
- Through 2023, 80% of AI projects will deliver erroneous outcomes due to bias in data, algorithms, or the teams responsible for managing them
- 45% of executives say that technologies and expertise are too expensive
- 95% of automation technologists feel unprepared or only partially prepared to tackle the challenges associated with smart machine technologies
- 60% of B2B marketers are not using AI in their tech stack.
- Although 70% of respondents piloting AI/ML worry about trusting the technology, only 53% of those broadly using AI in the marketing organisation worry about trust in AI/ML.

## Traditional marketing powered by AI

- Worldwide data will grow 60% to 175 zetta bytes by 2025. This will make AI and ML vital for productivity and efficiency.
- AI embedded in analytics and other marketing software will free up more than one-third of data



analysts in marketing organisations by 2023.

- 81% of B2B marketers are interested in using AI for personalization.
- 73% of B2B marketers are interested in using AI to identify trends.
- 6 marketers expect AI to help identify prospective customers.
- 55% of B2B marketers expect AI to improve marketing effectiveness in driving revenue.
- 80% of companies that have adopted AI were using it to improve email marketing.
- 62% of marketers were also planning to use artificial intelligence in sales forecasting.
- 62% of marketers say artificial intelligence is the most important aspect of their data strategy
- Brave Browser reports that over 3.8M monthly transacting users have used Basic Attention Tokens (BAT) in the platform, which allow users to compensate creators based on time spent consuming their content.
- The use of AI and ML in cyber security is expected to reach \$38.2B by 2026

## Conclusion

As highlighted in this article, artificial intelligence in Ecommerce is playing a leading role in driving innovative solutions and customer experiences. Some the leading use cases of artificial intelligence in E commerce are in the area of personalized shopping, product recommendations, and inventory management. As an online retailer, considering how to implement a working model of artificial intelligence for the business. Designed for AI in E commerce startups, Countants is an established data analytics provider that is enabling online retailers with solutions centered around product analytics and E-commerce KPIs. Artificial Intelligence (AI) is now a crucial tool for several businesses, and India's technology market is expanding quickly. Artificial Intelligence has ingrained itself into every aspect of modern life, from online shopping to educational data. Additionally, many startups in India are growing and creating AI solutions for the financial, healthcare, and other sectors. The rising demand in the present and the future has been luring numerous businesses to adopt the trend over the past few years, increasing investment. Therefore, investing in digital technologies can yield enormous profits in the upcoming years.

## References

- Artificial Intelligence: A New Synthesis Book By Nils John Nilsson
- Artificial Intelligence Third Edition Paperback By Kevin Knight (Author), Elaine Rich (Author), Shivashankar B. Nair (Author)
- Artificial Intelligence By Example: Develop Machine Intelligence From Scratch Using Real Artificial Intelligence Use Cases Paperback By Denis Rothman (Author)
- <https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp>
- <https://www.oracle.com/in/artificial-intelligence/>
- Ravuri, S. R., Sambasivan, M., & Kumar, M. (2020). Artificial intelligence in inventory management: A systematic literature review. *Computers & Industrial Engineering*, 144, 106409.
- Chen, Y., & Li, B. (2019). Customer segmentation in inventory management: A review and future directions. *International Journal of Production Research*, 57(12), 3825-3843.



## Applications of AI in E-Commerce Industry

V.M. Kannan<sup>1\*</sup> and M. Saraswathi<sup>1</sup>

<sup>1</sup>Assistant Professor of Commerce, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, India.

### Abstract

Artificial intelligence (AI) has become integral across industries and academia, akin to the transformative impact of electricity or computers. Its versatile applications span various domains, with manufacturing benefiting from AI in manifold ways. Notably, AI optimizes efficiency by automating tasks and predicting future demand, thereby streamlining operations. Moreover, the ubiquitous presence of AI is evident in social media platforms, where AI-driven chat bots act as virtual assistants adept at managing customer service through conversational AI. Similarly, in ecommerce, AI revolutionizes operations through predictive inventory management, preventing stock outs and overstocking by leveraging data analytics. Fundamentally, AI comprises three core elements: data mining, natural language processing (NLP), and machine learning (ML). These elements synergize to enhance outcomes for ecommerce businesses, facilitating improved decision-making and performance optimization.

**Keywords:** Machine Learning, deep learning, Chatbots

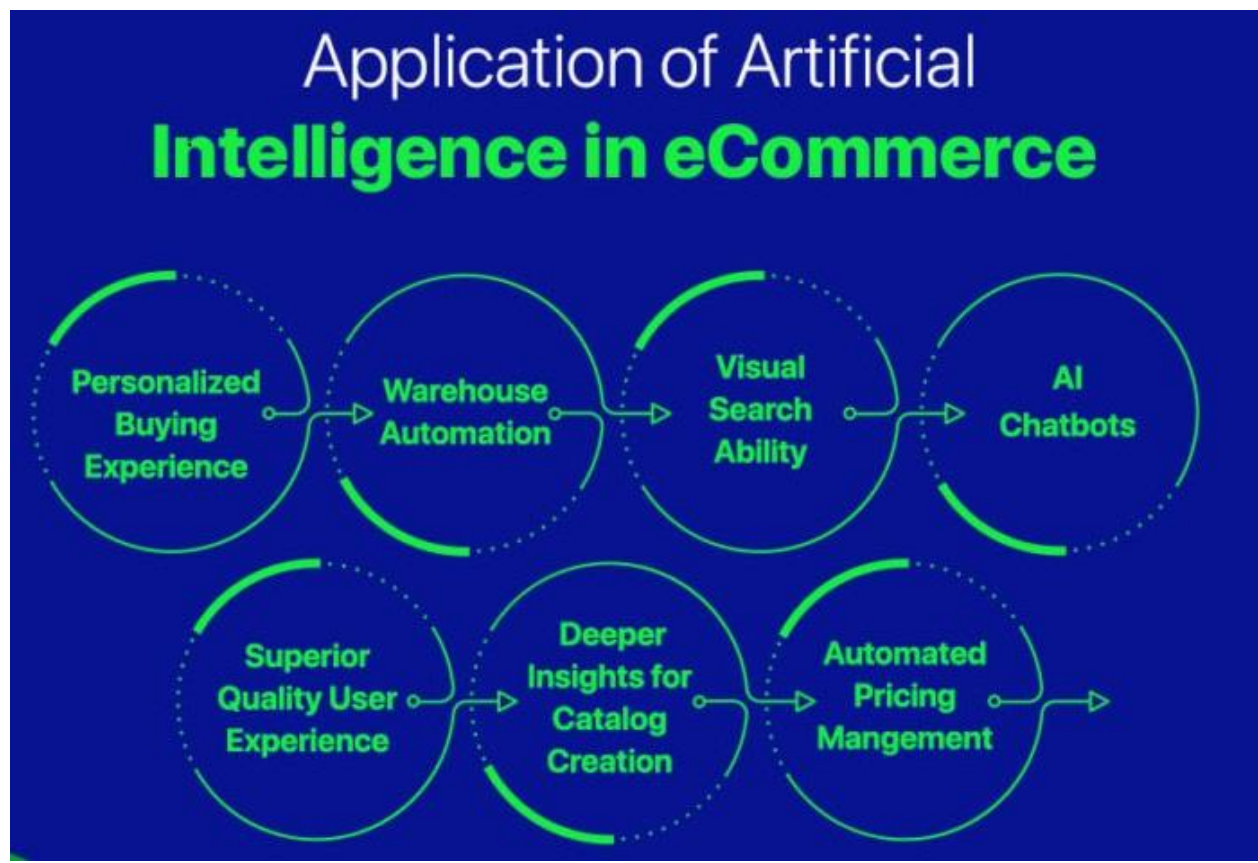
### Types of AI Technology Used in E-Commerce

AI is not a singular technology; it encompasses various models. There are four leading AI technologies used in ecommerce:

- **Natural language processing (NLP):** Natural language processing focuses on enabling computers to interpret and generate natural human language.
- **Machine learning (ML):** Machine learning uses statistical techniques, including algorithms, to enable computers to learn from data and make predictions or decisions without being explicitly programmed. Deep learning models—such as transformers and large language models (LLMs) like OpenAi’s ChatGPT—layer algorithms to understand data better.
- **Computer vision (CV):** Computer vision is a field of artificial intelligence that enables computers to interpret information from images and videos.
- **Data mining:** Data mining is the process of discovering data to inform AI algorithms and systems.



## 1. APPLICATIONS OF AI IN ECOMMERCE



**Figure: 1 AI for E-Commerce**

### 2.1. Personalized product recommendations:

Personalized product recommendations use data from past customer behavior, browsing history, and purchase history to suggest products.

For example, NLP-based AI can understand online shoppers' language and images to match them with desired products. AI-powered features like "People also purchased" or "Customers also viewed" can suggest complementary products based on size, color, shape, fabric, and brand.

### 2.2 Chat bots and virtual assistants:

Chat bots and virtual assistants can act as customer service representatives for your e-commerce business, helping field customer queries and facilitating online shopping by providing tips. They use AI, NLP, and, most recently, generative AI to understand and respond to customer requests. Provide 24/7 customer

service. Chatbots and virtual assistants can provide prompt responses 24/7, allowing your live support agents to address more complex customer service issues. AI can help you reduce customer service costs by automatically resolving disputes and processing refunds.

### **2.3. Fraud detection and prevention:**

AI can assist in fraud detection and prevention by analyzing data, detecting anomalies, and monitoring transactions in real time. The technology can spot unusual transactions, such as high-value transfers, multiple transactions within a short time frame or from unfamiliar locations, and flag them for further investigation. We can also use machine learning models to generate user profiles based on behavior data like browsing habits, transaction history, and device history, then compare current consumer behaviors with historical data to identify fraudulent behavior. For example, if a user suddenly makes a large purchase from an unfamiliar location, the machine learning model can flag it for fraud if it doesn't align with their data profile.

### **2.4. Inventory management:**

AI can help manage inventory by analyzing historical sales data and predicting future demand. For example, real-time data through sensors and RFID tags—wireless identification technology using radiofrequency—can give a sense of what products are selling, where they're going, and whether they're coming from a physical store or distribution center.

### **2.5. Dynamic pricing:**

Dynamic pricing allows you to adjust your prices and offerings based on real-time user behavior, global supply and demand, and competitors. With the power of AI, we can anticipate optimal discounting opportunities and dynamically determine the minimum discount required to drive a successful sale.

AI gives multichannel retailers more flexibility in price structuring. By leveraging AI, retailers can vary prices across different POS channels depending on observed demand. For instance, if you sell products on your website and Amazon, you can intelligently discount your items on Amazon when there is a significant influx of purchasing activity from this particular channel.

AI also facilitates assortment intelligence—data-driven optimization of product variety and selection. Assortment intelligence provides insights into your products and competitors, making adjusting your selection and pricing easier. You can also use AI to price-match your competitors to ensure your customers always get the best deal.

## 2.6. Generative AI:

Generative AI is an artificial intelligence system that generates text, images, or other media based on prompts. Popular generative tools include ChatGPT and DALL-E. Ecommerce businesses are using generative AI to scale the production of their marketing collateral and tailor it to different audiences.

## 2.7 How to Integrate AI into Your Ecommerce Strategy

For businesses that are ready to use AI for one or all of the above sectors, it's important to create a plan of action. We recommend the following steps:

1. Create a vision and strategy about how to use AI to drive your business forward. This strategy should be built using your data as a guide. Think about how your data differentiates you from the competition.
2. Prioritize your AI initiatives within your organization. AI should be at the top of your technology and information budgets to ensure it gets the focus and support it needs to succeed.

## 3 SCOPE OF ARTIFICIAL INTELLIGENCE IN INDIA

Although the adoption of Artificial Intelligence is still in its early stages in India, it is gradually being utilized to develop smart solutions to complex problems, and across all industries. AI encompasses several emerging technologies, including self-improving algorithms, machine learning, big data, and pattern recognition. Soon, virtually any industry or sector in India would be seen using this potent tool for getting simpler tasks done in less time. Latest innovations in the field of AI are the reason behind the rising demand for online courses in artificial intelligence in India.

### 3.1 AI will simplify Learning:

Artificial intelligence (AI) is used to digitize textbooks, early-stage virtual tutors support human instructors, and a facial analysis system gauges student emotions to identify who is struggling or bored and adapt the experience to their specific needs. Applications such as text translation systems, and real-time message-to-speech, automate redundant and repetitive tasks like taking attendance and automated grading.

### 3.2 AI for Healthcare:

- Healthcare in India is a very complex system, there are numerous that we are dealing with, including the cost of living and accessibility, the shortage of doctors, and other services like trained nurses, technicians, and infrastructure is particularly acute.

- A majority of India's high-quality healthcare facilities are located close to tier 1 and tier 2 cities, resulting in uneven access to necessities like healthcare. In addition to that, the overall cost of healthcare with AI would decrease due to higher efficiency.
- AI's ability to process massive amounts of data quickly makes it useful for designing and creating new products, including medical equipment. Having an AI-enabled system enhances efficiency and reduces medical errors.
- By using early detection followed by appropriate diagnostic acumen, artificial intelligence will help remove obstacles in reaching for medical help and addressing the accessibility challenge.

### 3.3 AI at our homes:

- We utilize artificial intelligence-based technology every day without even realizing it. For instance, we frequently utilize OkGoogle, ALEXA, or Cortana to complete various tasks with our voice commands.
- For voice recognition, these intelligent assistants employ machine learning and artificial intelligence that helps in identifying which voice belongs to whom. They increase their efficiency by learning from the commands of the users.
- Additionally, you can utilize this intelligent help to carry out several tasks, like playing a song, asking a question, and making an online purchase.

## 4. THE FUTURE OF AI IN ECOMMERCE

- As we look ahead, the possibilities of AI and machine learning in E-Commerce seem endless. According to research, AI in E-Commerce will be valued at over \$36 million by 2025 as more retailers continue to utilize it in harvesting customer data to provide increasingly personalized offers.
- AI to inventory management and demand forecasting to spend less and earn more. This will bring about \$20 billion in AI spending by 2026 and compared to the 85 million job losses due to AI by 2025, AI-related roles will employ 97 million individuals across all industries.
- As AI evolves, we may also see advancements in voice-activated shopping and augmented reality try-on experiences.
- Artificial intelligence is disrupting everything around us, and that's not necessarily bad. In fact, in 2022, 35% of companies worldwide adopted Artificial Intelligence (AI) at different levels of their business.

## 5 CONCLUSION

Artificial intelligence in e-commerce has increased tremendously in the past five years and its only going to increase in the coming year as according to a recent study, 84% of E-Commerce businesses are either actively working AI solutions into their business or have it as a top priority.

- AI is going to transform the user experience and boost monetization for merchants
- Consumers' shift to thrift will prompt more brands to reexamine their supply chains.
- Artificial intelligence has the potential to alter the way we interact with the world around us. With new technological innovations happening every day, Artificial Intelligence is becoming more prevalent in India, making it possible to teach machines to make decisions on their own under certain conditions.
- The AI market in India is anticipated to develop at a CAGR of 20.2%, from \$3.1 billion in 2020 to \$ 7.8 billion by 2025, according to the International Data Corporation (IDC).

### References

- <https://www.quora.com/How-will-AI-affect-future-technology-in-2030>
- <https://www.mayple.com/blog/top-ecommerce-trends>
- <https://www.bigcommerce.com/articles/ecommerce/ecommerce-ai/>
- <https://www.linnworks.com/blog/artificial-intelligence-in-ecommerce/>

