IMPACT OF ARTIFICIAL INTELLIGENCE ON THE INDIAN RETAIL INDUSTRY

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ABSTRACT

Many of the previously laborious and labor-intensive duties connected with running a successful business are being automated by AI, which is fast revolutionising the retail industry. AI applications for retail outlets could assist firms in pricing their products by visualising the possible effects of various pricing strategies. To do so, systems gather information about other items, promotional efforts, sales numbers, and other data. The objective of the study is to know the impact of AI in Reteail industry. At Vijayawada, Andhra Pradesh, India, 145 samples from various retail businesses were taken into consideration for the study. Both primary and secondary data are used in the investigation. The study was evaluated using factor analysis. The majority of respondents are aware of the use of AI in India's retail sector, according to data studies. It has also been noted that the majority of retail establishments are using AI in their Business models. Particularly AI is useful in order processing, shipping, and inventory management in the retail industry in India.it is also identified that, most of retail owners are aware of impact of AI on their business and also they are implementing the AI techniques in their business models to meet the changing requirements of the industry.
**Keywords:** *Artificial Intelligence, Machine Learning, Automation, Retail, Business*

1. INTRODUCTION

To be competitive in today's global economy, retail enterprises must prioritise profit and productivity. To assure success and keep ahead of competitors, it is vital to act fast and efficiently. Artificial intelligence (AI) can help retailers by raising earnings and optimising business procedures.

Only retailers who use creativity and the best available technologies can survive in today's market. The business models of traditional retailers are being faced by new entrants who can serve buyers more effectively and with more value. The old value chain is said to be inefficient, according to authors like [1]. Figure 1 shows Indian retail market size. Kearney Research estimates India's retail sector will grow 9 percent from 2019 to 2030, from US$ 779 billion to US$ 1,407 billion by 2026 and above US$ 1.8 trillion by 2030. In FY2022, Indian brick-and-mortar (B&M) introductions are prediction to growth revenue by Rs. 10,000-12,000 crore (US$ 1.39-2.77 billion). Direct selling in India would reach US$2.14 billion in 2021.E-retail has developed since pandemic, and a Bain and Flipkart analysis titled " How India Purchase Online 2021"

estimates that the market would reach US$120-140 billion by 2026, rising 25-30 percent per yaer over the next five years [2].


Source: https://www.ibef.org/
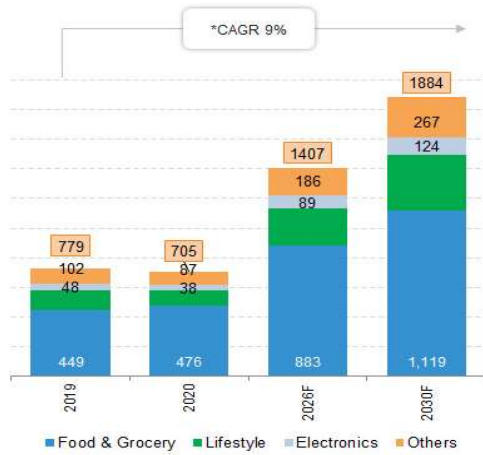
Figure: 1 Market Size (US$ billion)

1.1 Artificial Intelligence- Growth

The retail industry has been a forerunner in the adoption of technology, whether it is e-commerce or virtual storefronts, where customers can go in and choose the design, size, and other factors before shopping. Virtual consumer experiences based on artificial intelligence and 3D imagery have lately demonstrated the potential to fundamentally alter traditional retail experiences and take them to the next level through personalisation, automation, and enhanced efficiency.

Artificial intelligence (AI) is when computers simulate human intelligence. Expert systems, NLP, speech recognition, and machine vision are AI applications. AI is a vast subject of computer science that creates intelligent machines that can execute human functions. AI is an interdisciplinary discipline with various techniques, but developments in machine learning and deep learning are changing practically every tech field.

Figure 2 show the evaluation of AI. In the past ten years, AI has aided businesses in improving decisions and expanding their capabilities. Let's take a closer look at the timeline of AI development to understand its fundamental problems and outcomes. In order to improve customer service, Open AI released GPT-3, a sophisticated language model that can produce resumes, craft persuasive emails, and simulate real conversations. The model can also write code using a brief text description.
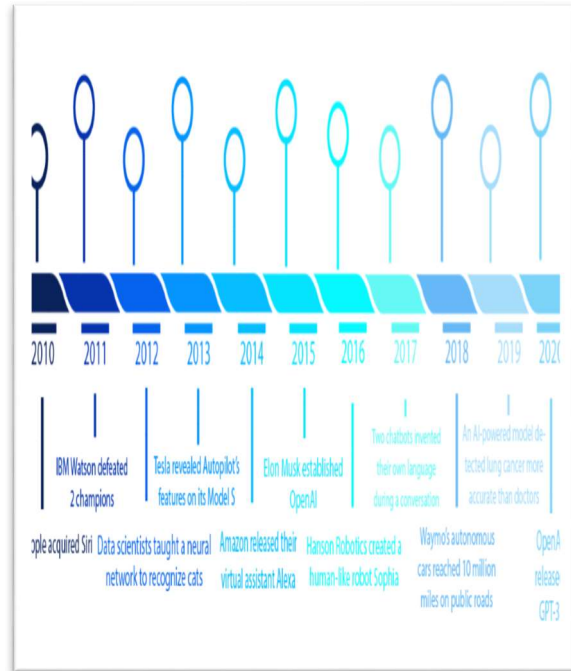
Source: www.analyticssteps.com.

Figure: 2 Evaluation of AI[3]

1.2 An Overview of AI in Retail

AI helps retail system collaborate to improve consumer experience, inventory management predicting, and more. AI gives retailer near –real-time intelligence. Cloud analysis can reveal new business insights [4]. Intel technologies allows intelligent display ads, endless aisle kiosks, smart shelving, enhanced inventory control, and smart self-checkout.

Artificial intelligence (AI) is a field of technology that repeats recurring patterns and behaviours by gathering data and information from datasets. Given that AI can complete tasks without being instructed to, it has evolved into a necessity for human existence. Every industry, including telecommunications, education, healthcare, entertainment, retail, transportation, and hospitality, is impacted by artificial intelligence. The use of AI App Development has spread to many areas of daily life.

Figure 3 denotes the expected market size of AI from 2021 to 2030. In the year 2021 the market size of AI is 87.04 billion dollars and it is expected to grow 1591.03 billion dollars. The artificial intelligence (AI) market is anticipated to grow at a CAGR of 38.1 percent.
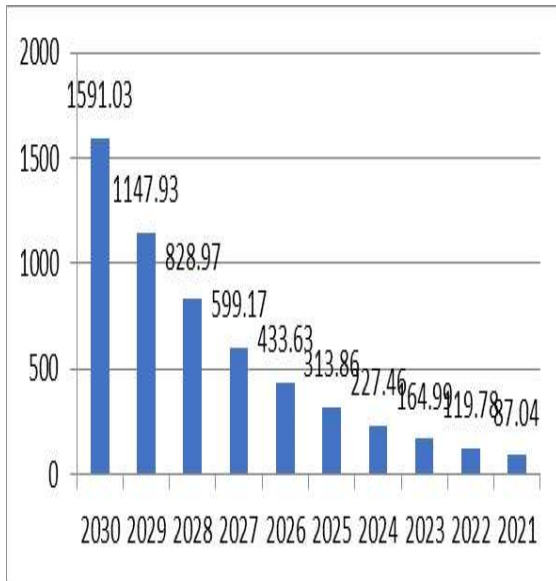
Figure: 3 Artificial Intelligence Market size from 2021 to 2030 (USD Billion)

1.3 Importance of AI in the Retail Industry

The digital change in retail is separating winners from losers. Here are five of the most significant benefits that may be gained by implementing AI in retail.

Tables 1 Importance of AI in the Retail Industry

Importance of AI in the Retail Industry	Description
Captivate Customers	Traditional retailers must engage customers in a personalised, relevant, and exciting manner across all contact points to compete with immersive shopping experiences from innovative competitors.
Create Exciting Experience	Retailers must offer engaging services and products to keep customers interested. Predictive analytics gives retailers market insight to innovate rather than react.
Create Insights from Disparate Data	Retailers must go through a deluge of data from their supply chain, stores, and customers to create consumer-first strategies.
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Synchronize Offline & Online Retail	Treating digital and physical shopping channels as independent company entities generates friction for customers and inefficiency.
Empower Flexible Logistics Networks	Treating digital and physical shopping channels as independent company entities generates friction for customers and inefficiency.
Empower Flexible Logistics Networks	Retailers must reimagine their supply chain to satisfy a wider spectrum of client demands that are transitioning from mainstream to niche.[5]

Source: global.hitachi-solutions.com/

Table 2 shows the applications of AI in retail Industry.

Table 2 Applications of AI in Retail Industry

Retail Activity	AI Application
Inventory Management	Retail AI enhances demand forecasting. Market, consumer, and competitor data lets AI business intelligence systems identify industry trends and make proactive marketing, merchandising, and business strategy changes. Supply chain, pricing, and advertising are affected.
Adaptive Homepage	Customers' current position, previous purchases, and buying patterns are recognised by mobile and digital portals to customise e-commerce. Users' digital abilities grow to give hyper-relevant presentations for each engagement with AI technologies..
Dynamic Outreach	Advanced CRM and marketing systems use repeated consumer interactions to build a detailed shopper profile and provide proactive, individualised outbound marketing—recommendations, prizes, or content.
Interactive Chat	AI-powered interactive chat programmes improve retail customer service and engagement. These AI-powered bots answer frequent questions and guide customers to good results. So, these bots gather valuable client data for future business decisions.
Visual Curation	Algorithmic engines use picture search and analysis to recommend

new or similar products based on aesthetics and resemblance.

Guided Discovery — Automated assistants can offer things based on needs, preferences, and fit to boost customer confidence in a purchase.

Conversational Support — AI-powered conversational assistants use natural language processing to help customers address queries, FAQs, and troubleshooting and redirect to a human expert when needed, increasing customer experience by delivering on-demand, always-available support and streamlining staffing.
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Personalization & Customer Insights — Intelligent retail environments recognise shoppers and personalise product displays, price, and service depending on customer profiles, loyalty accounts, or unlocked incentives and promotions utilising biometric identification. Stores utilise complicated algorithms and demographic data to forecast customer interests. This data improves online and in-store shopping and personalisation.

Emotional Response — AI interfaces may recognise shoppers' in-the-moment emotions, reactions, and attitude and deliver relevant products, advice, or help, ensuring a successful retail experience.

Customer Engagement — IoT-enabled solutions can help retailers understand client behavior without personally dealing with them. Kodisoft's interactive tablet: Kodisoft's restaurant tablet lets customers browse menus, order, and play games. This tablet, driven by the IoT Hub and machine learning, uses consumer data and behavior trends to boost customer engagement and success.

Operational Optimization — AI-powered logistics management solutions optimize inventory, staffing, distribution, and delivery to satisfy consumers' demands for high-quality, immediate access and assistance.

Responsive R&D — Deep learning algorithms analyze user input and purchase data to help design next-generation products and services that better fulfill customer wants or market gaps.

Demand Forecasting — Market, consumer, and competitor data lets AI business intelligence systems identify industry trends and make proactive marketing, merchandising, and business strategy changes.

Customized Selections — Many retailers are embracing AI to provide personalized client experiences, elevating customer service. Such services are profitable. "Brands that develop tailored experiences for customers by integrating advanced digital technology and proprietary data see sales increase by 6% to 10% — two to three times quicker than those that don't," a Boston Consulting Group study found.[6]

Source: https://global.hitachi-solutions.com/ blog /ai-in-retail/

2. REVIEW OF LITERATURE

It was discovered that retail companies that placed a strong emphasis on store layout and design as well as the adoption of technological innovation to facilitate consumer purchasing were more effective in retaining customers [7]. They also identified that, India still lags behind in adopting IT systems in the retail industry, and significant effort is needed in this area. Retailing as a function is critical to all economies and is a component of the retail value chain [8], [9].

AI is changing the way retailers interact with customers and how consumers choose products. The use of an alphabet varies depending on the context and is most commonly used by retailers and consumers [10]. Thus, among other digital technologies, AI will have a greater impact on retailing. [11], [12], [13. Customers' behaviour is changing all the time, which makes it difficult for retailers to keep up. As a result, they must keep them up to date by offering low-cost alternatives to e-commerce to customers at a low management cost], [14], [15] identify apparel industry AI implementation issues [16], [17]. It showed a variety of advanced solutions, benefits, and risks that AI generates in retail, in various segments of the value chain, abbreviated CECoR, from improving customer experience (CE) with virtual agents (chatbots, virtual assistants, etc.) to cost reductions (Co) by using smart shelves to revenue increases (R) due to product rec Customer profiles

and retail AI solutions are CECoR drivers' conceptual foundation [18], [19], [20] and [21] .

Ninety percent of retail business leaders said their employees are ready and skilled to adopt AI, an increase of 47 percentage points since the start of the KPMG study, 2022, which was published in early 2020. Although many (49%) believe that the adoption of AI in their sector is accelerating more quickly than it should, only half (53%) of business leaders in retail said that COVID-19 had sped up the pace of adoption at their company [22].

Based on the review of literature it is identified that, The Retail industry being transformed by AI by utilizing modern technology such as virtual assistants to give the greatest purchasing experiences. They are continually innovating in the industry by examining social media behavioural patterns in order to utilise technology. Hence there is a need to identify the impact of AI in Indian retail industry [23].

3. STATEMENT OF THE PROBLEM

The retail market in India is expected to rise to $2 trillion (Rs 160 lakh crore) by 2032, up from $844 billion (Rs 67.5 lakh crore) in 2022. When implementing a new AI or automated system, retailers will address a significant challenges faced by the retail industry in India. The data quality, volume, and accuracy. Many retailers lack adequate tracking and data analytics, making AI adoption less likely to make the most of what they have. As a researcher it is need to identify the challenges and impact of AI in retail industry in India. The study's primary goals are to comprehend the effect of AI on the retail industry in India. It also indicates the areas where AI has been used.

3.1. Objectives of the Study

The current study objectives are as given below:

- To know the impact of AI on Retail industry in India.
- To know the scope for implementation of AI on retail industry in India.
- To analyze the customers perceptions towards AI in retail industry in India
- To assess various factors AI technologies used by the different retail outlets in Vijayawada, Andhra Pradesh, India.

4. RESEARCH METHODOLOGY

The present study is exploratory research. It identifies the both qualitative and quantitative techniques. Further, the research methodology tools are as follows:

Tables 3 Research Methodology

Tools	Descriptions
Source of Data	Throughout the study, both primary and secondary sources of information were considered. The secondary data came from a variety of reports, websites, and annual reports of companies, among other sources; the primary data, on the other hand, were gathered with the help of a structured questionnaire and schedule.
Method	A Questionnaire is aimed to comprehensively break down the retailers' wishes and needs. These retailers will receive the survey via email or a printed copy will be delivered in person. The poll's objective is to assess respondents on a variety of factors, and the data gathered will be dissected to produce results.
Research Design	The study uses exploratory research design
Data Analysis Technique	A factor analysis will be used for the current study. The formula for the calculating factor analysis is : $X = \mu + L\,F + e$ The study also uses rotated component matrix and KMO Adequacy.
Sampling Technique	The study uses Simple Random Sampling techniques for collected primary data from the customers who are purchasing goods from organised retail outlets in Vijayawada City, Andhra Pradesh, India. , The retail outlets including Pantaloons, Shoppers Stop, D-mart, More, spencer's, reliance and many more.

Sample Size	The study considered 165 samples and out of these 145 samples considered as defect free. So the sample size for the study is 145. The sample includes all class of customers.

5. DATA ANALYSIS AND OUTCOMES

5.1. Descriptive statistics of the study:

Table 4 shows the demographic profile of the respondents of the study. Out of 145 respondents, 56 per cent of the respondents are male and 44 per cent respondents are female. Also more than 60 per cent of the respondents are having more than 30 years of age.

Most of the respondents are belongs Post graduated and more than 50 per cent of the respondents are private employees. It is also identified that more than 60 per cent of the respondents are having less than Rs.30000 income.

Table 4 Demographic profile

Particulars		Freq.	%
Age	Below 18 years	9	6.21
	18-25 years	38	26.21
	25-30 years	67	46.21
	Above 30 years	31	21.38
	Total	145	100
Gender	Male	82	56.55
	Female	63	43.45
	Total	145	100
Qualification	Below UG	25	17.24
	UG	34	23.45
	PG	60	41.38
	Professional course	18	12.41
	Diploma	8	5.52
	Total	145	100.00
Occupation	Private sector	86	59.31
	Public sector	24	16.55
	Own business	17	11.72

	Semi-Public	18	12.41
	Total	145	100
Income	Below Rs.20000	52	35.86
	Rs.20000-Rs.30000	46	31.72
	RS.30000-Rs.40000	32	22.07
	Above Rs.40000	15	10.34
	Total	145	100.00

Source: Primary data Analysis

5.2 Factor Analysis

This statistic illustrates the components' common variance. High values, 0.5 to 1, indicate how well the component fits the data. High KMO estimates suggest factor analysis may explain the relationships between sets of factors. The factor is unsuitable for factor analysis if this statistic is below 0.5. If the value is less than 0.5, the questionnaire data is flawed. Our KMO sampling adequacy measure is 0.620, which is above 0.5. Our significance level is 0.000 after Barlett's Test of Sphericity. It's substantial and associated. Furthermore, the KMO Barlett's test shows that factor analysis may be a good method for examining the correlation matrix and that the sample was adequate (table 5).

Table 5 KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.620
Bartlett's Test of Sphericity	Approx. Chi-Square	671.421
	df	66
	Sig.	.000

Table 6 Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Totall	% of Variance	Cumulateve %	Total	% of Variance
1	3.321	27.658	27.658	3.43	27.658
2	2.108	16.414	44.072	2.209	16.414
3	1.113	11.424	55.496	1.414	11.424
4	1.059	10.21	65.706	1.059	10.21
5	0.936	7.92	73.626		
6	0.822	6.77	80.396		
7	0.592	5.67	86.066		
8	0.517	4.308	90.374		
9	0.346	3.22	93.594		
10	0.323	3.12	96.714		
11	0.24	2.01	98.724		
12	0.112	0.936	99.66		

Table 7 Rotated Component Matrix

	Component			
	1	2	3	4
Customer Acquisition	-.180	.113	.743	.160
Customer Retention	.320	-.053	.618	-.480
Reacquiring Customer	-.109	.933	.031	.056
Consolidation of Data	- .001	.907	-.093	-.019
Identifying Trends	.150	.027	.063	.816
Personalization	.791	-.001	.104	.091
Brand Loyalty	.750	.124	.063	.240
Improving Marketing	.809	.164	-.056	.003
Cost Hurdles	.658	- .096	.072	.517
Lack of Understanding	.698	-.056	.155	-.135
Difficult Implementation	.360	.620	.011	-.008
ROI	.344	-.178	.695	.019

Table 6 shows the initial eigenvalue. The "total" column shows each component's variable variance. "% of Variance" shows each component's variance. Only components with eigenvalues greater than 1 will be selected. Factor 1 contributes 27.658% of the variation. The second component accounted for 16.414 percent of the overall variation, the third factor 11.424 percent, the fourth factor 10.21%, and the first four factors combined 65.706 percent. In our investigation, four components have total eigenvalues greater than 1. Clients acquisition, retention, reacquisition, and data consolidation are the primary loading components. These four components explain roughly 65% of the analysis's variance.

Rotated component matrix in Table 7 The component matrix is hard to read without varimax rotation. The rotation component matrix is the component matrix transformed with the identity matrix and varimax rotated. Varimax generates uncorrelated components. "Oblique rotation pattern matrix" is the rotated Component matrix. This graphic shows factor loading, or component correlation, in columns. Just the highest-variance components are used here. We used a higher cutoff, 0.6, to see if any components had factor loadings greater than 0.6. Form the rotated component matric the four components were loaded such as Customers acquisition, customer's retention, reacquiring customers and consolidation of data in implementing the AI in Retail industry in India. Out of loaded components, reacquiring customer is high loading with identify trends, brand loyalty and cost hurdles.

It also implies that, the customers retention having highest impact on identify trends by using the AI in retailing industry. AI also helps to consolidate the data related to the reacquiring customers. Hence it will helps to identifying the customers and push more information to customers for further purchase of products from retail stores of in the selected city of Andhra Pradesh, India.

6. RECOMMENDATIONS

Retail's future is AI. AI will progressively impact corporate research, pricing, inventory management, and customer shopping. AI is improving customer service in stores. Cameras are being used by stores to track dwell and stare times and identify thieves, and companies like Amazon have already implemented a no checkout policy. Naturally, not everything will always go as planned, as Walmart's collaboration with Bossa Nova demonstrated.

After AI dominates retail in a few years, this topic can be examined further. See how AI affected deals and consumer loyalty over unspecified timeframes. This data can also be compared to pre-AI times and to a full analysis of how AI affected retail.

AI's influence on jobs was another big concern. If weakening or activity fulfillment is affected, certain studies in this sector should be understandable. This examination missed a golden opportunity to understand how AI has affected this field.

7. CONCLUSION AND IMPLICATIONS

The retail sector of today's economy is powered by artificial intelligence. Prior to the COVID-19 epidemic, about 80% of consumers were accustomed to making purchases in physical stores. But, after the pandemic, physical stores are struggling with low sales. Consumers are likely to use e-commerce or online grocery applications to purchase their goods.

Traditional retail activities are automated by artificial intelligence, which also enhances their value. AI is crucial to retail, from in-store assistance, price forecasts, and product categorization to inventory tracking, supply chain management, and logistics [24], [25], [26].

From the analysis of the data it was identified that, most of the companies are aware about the usage of AI in retail industry. It is also identified that, most of graduated and postgraduate respondents are having more awareness when compare to other respondents at 0.05 per cent level of significance.

Artificial intelligence technology is blessed in that it offers retail business owners unrivalled possibilities. AI can improve important aspects of supply chain management, improve scheduling, speed up inventory management, and advance assortment planning, among other things. Most importantly, AI may provide a better customer experience while also improving internal retail procedures [27], [28]. AI adoption will address the demand for real-time customer care and cutting-edge shopping options such as virtual changing rooms and mirrors, cashier-free stores, and other cutting-edge retail concepts. Artificial intelligence provides numerous prospects for your company's future growth.

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