



SUCCESSIVE GROWTH AND FORWARD MOVEMENT OF RETAIL INDUSTRY THROUGH EFFECTIVE IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE

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Abstract

Retailing in India has been one of the most dynamic and fast paced industries, which has travelled through different phases. The retail industry is trying to cope with fast-changing customer shopping insights and giving importance for shifting the conventional trading to the web. This study aims to reveal the efficacy of artificial intelligence in retail industry and to understand how employees accept and implement AI technology in retailing. Study divided into five chapters, where in industry profile it deals with industry global and domestic scenario along with SWOT analysis and future growth and prospects. Data interpretation is done using various charts, such as pie charts and column charts, in the fourth chapter. Findings are made on the base of data interpretation and suggestions are given keeping in mind the future prospects and on analysis done and ended with giving conclusion for the study.

Keywords: Artificial intelligence, big data, machine learning, retail industry, retailing, technology adoption, marketing, digital transformation, robots, business analytics.

1. INTRODUCTION

Retailing is the biggest area within the world and the top mover of the economy. It debts for almost 10% of the GDP of maximum developed countries. Retail items are commonly sold in some of distinct establishments. India is the arena's 5th-biggest international destination in the retail area. AI can be implemented in each physical and virtual shops to present personalised buying experiences to clients.

Retailers use AI to optimize, save layouts via schooling an algorithm with income statistics which helps in predicting consequences which include a person's probability to shop for extra if they're displayed subsequent to each other. The global market for the use of AI in retail became rated three billion dollars in 2019, presently now in 2022 it has ranged to 6 billion dollars and it's miles anticipated to grow exponentially reaching 23.32 billion US bucks over the next 8 year.

This paper aims to determine the effective implementation of artificial Intelligence in retail industry in India and assess the impact of such technology on the Indian retail sector.

2. BACKGROUND OF THE STUDY

Rising technology is making each enterprise to alternate its conventional fashion and adapt these with a purpose to be competent in marketplace. Retail enterprise is looking at artificial intelligence (AI) and machine learning (ML) as a approach to take their company to the subsequent stage of productiveness and client enjoy. Some companies are changing employees with AI, some customers are selecting AI-based totally services over worker-based alternatives and all parties are the usage of AI generation before, within and after a service. Retail shops in and round India is now prepared to put into effect artificial intelligence which incorporates massive facts, machine learning, augmented fact, Radio frequency identity, Avatar, VR, three-D-printing etc. by way of making use of those technology they're greater competitive in marketplace. A sizeable majority of retailers have began checking out the possibility of AI, yet many retailers are missing the overall advantage of scaling the era throughout the price chain.

3. LITERATURE REVIEW

Robert Zimmermann, Daniel Mora, Douglas Cirqueira, et al (2022)²² The impact of a Smartphone-based AR shopping assistant application, which uses personalized recommendations and explainable AI features on shopping experiences. **Jaren Schemers, Sandra Streakiness (2022)**¹⁰ Theoretical backdrop for the safety perspective on service robots, as well as outlining a typology that researchers and practitioners can use to further advance this field. **Giada salvietti and cristinaziliani, et al (2022)**⁸ Overview of the Omnichannel phenomenon by identifying its theoretical foundations as well as future research directions. **Johan Hagberg and Anna Jonsson (2022)**¹² This paper draws from an in-depth case study of home-furnishing retail giant, IKEA conducted with semi-structured interviews, participant observations and document analyses. **Loh Li Hara, Umi Kartini Rashida, et al (2022)**¹⁷ Industrial 4.0 brought the retail industry into the fourth revolution. Retail 4.0, on the other hand, appears to be a novel concept for retailers worldwide. This paper examines the retail Industry's revolution and its application to the retail sector. **Preeti kapuria and harish s nalawode (2021)**¹⁹ Identifies current concerns over technology adoption among kirana store proprietors and proposes kiranas be digitized through the 'phygital' (physical plus digital) model.

ZHOU Yuwei, LÜ Wei (2021)³² Studies the underlying logic of Artificial Intelligence which is Reshaping the Retail Industry in current scenario. Finally, explicit and implicit challenges faced by consumers and enterprises are proposed. **Joanna F. DeFranco, Nir Kshetri, and Jeffrey Voas (2021)**¹¹ Revolution of retail shopping with artificial intelligence, and Internet of Things devices for better service in Malls of US. **Shahbaz Ali and Yongping Xie (2021)**²⁶ Disruptive technologies from Industry 4.0 may be able to assist Pakistan's retail sector in overcoming a number of issues, including low revenues, rising costs, and disorganised processes. **Ionuț Anica-Popa1, Liana Anica-Popa, Cristina Rădulescu and Marinela Vrîncianu (2020)**⁹ Contributing CECOR (customer experience enhancement, cost decrease and revenue growth) model for integrating AI technologies in the info. Systems of retail companies. **Dora e bock, feremy s wolter& o c Ferrell(2020)**⁶ AI's current and potential impact on prominent service theories related to the service encounter. **Byoungho Ellie Jin, Daeun Chloe Shin (2020)**⁴ Three disruptors (Born-digital start-ups, AI-enabled design and forecasting, Collaborative Consumption) and their ways of handling demand uncertainty and inventory management. **Youngkeun Choi (2020)**³¹ The role of artificial intelligence in the context of a front-line service meeting to understand how users accept AI technology-enabled service. **Thi Hieu Hanh Truong (2020)**²⁷ Mechanisms in which customers involve themselves in omni-channel retail setting and use its advantages.

Ali B. Mahmoud, Shehnaz Tehseen and Leonora Fuxman (2020)¹ Paper aims at Ethical aspects, considerations and issues regarding the employment of AI in retail and discusses the dark side of artificial intelligence in retail innovation. **Kiran Nimbalkar, vanishree pabalkar(2020)**¹⁵ Impact of AI on Retail Sector in India and to evaluate the connection between the retailer expectations and the considered effect of AI among the retailers. **Daniel Balance, Luis V. Catalo and Carlos FL avian (2020)**⁵ Exploring customers' attributions of responsibility and stability afterservice failure or success by comparing Robots or frontline employees. **Vinh Nhat Lu, Jochen Wirtz (2020)**³⁰ This article examines business literature about the effects of service robots on clients and staff. **Kim Oosthuizen, Elsamari Botha, Jeandri Robertson, Matteo Montecchi (2020)**¹³ This paper proposes the retail value chain where retailers are provided with a list of priorities for investing in AI. **Vasilis Stavrou (2019)**²⁸ Location analytics generate enormous insights for decision makers and marketers and gain competitive insights and acquire knowledge regarding offline shopper behaviour. **Felix Dominik Weber, Reinhard Schütte (2019)**⁷ AI applications for the Value-adding core processes/tasks in retailing are examined to determine the possible utilization and the market adoption. **Baqar**

Iftikhar Naqvi & Samir Soni (2019)³ Growth of Indian Economy and growth of organized sector with digital disruption and evolution of Artificial intelligence in Indian retail industry. **Savvas Papagiannidis, Eleonora Pantano, Eric W.K. See-To, et al (2019)²⁵** Evaluation of robust model of purchase intention which is influenced by satisfaction, enjoyment and engagement using 3D and immerses technologies.

Anastasia griva(2019)² Understanding of visit segmentation in retail by using various datasets reflecting customers' behaviour. **Komal Chopra, (2019)¹⁶** Motivation of young consumers to use AI tools such as chatbots, voice assistants and AR in shopping by generating Vroom's expectancy theory of motivation. **Roy, S. and Balaji, M. and Quazi, A. and Quaddus, M (2018)²³** The customer acceptance and resistance of smart technologies in the retail sector by integrating the technology acceptance model, technology readiness. **R. Seranmadevi and A. Senthil Kumar (2018)²⁰** Evaluating AI components in designing futuristic retail model and analyzing the intention of retailers and shoppers in experiencing the emergence of AI. **Sander de vries, christoffer thornvall (2018)²⁴** Investigate what future technologies to embrace, based on today's Gen Y and Gen Z customer journeys as well as customer's needs and values. **Noreen Nagji, Rajkumar Venkatesan, Ronald Trzcinski (2018)¹⁸** Automation of Marketing Models like Image recognition along with analytical techniques and brief about AI in today's scenario in retail. **Viktor p Semenov, vladimir v chernokulsky, Natalya v razmochaeva (2017)²⁹** Problems of automated retail systems, which named are vending machines and Neural networks which are becoming an important tool for forecasting retail sales. **Rita P. Ribeiro1, Ricardo Oliveira, and Jo˜ao Gama (2016)²¹** Exploratory study to detect fraud indicators by identifying outliers in transactional data.

3.1 Research Gap

- The past studies are concentrated on how AI emerged and what are the factors that influenced to adopt AI in retail whereas this paper includes how it transformed Indian retail and how retailers are reacting for the innovation.
- Most of the studies are restricted to countries other than India and this study mainly focused on Indian regions.
- Past studies speak on designing models, theories and other framework implemented in AI retail whereas this paper does not develop any models but examines the implementation of AI in marketing.
- Not many studies are made on AI effectiveness in Indian retail, this paper fills the gap between those studies and further helps in conducting research in different angles of AI marketing.

4. STATEMENT OF THE PROBLEM

By integrating AI into their operations, all retail stores are increasing their competitiveness. Despite the obvious growth of internet shopping, brick-and-mortar retailers are still fiercely competitive in the market because to their use of technology. Humans must manage all tasks that are linked to the worry of being incorrect if there is no AI.

In the present circumstances, where people are living healthy, digital lives, it is difficult for any business to stay in the market without using AI technology.

. This research will need to discuss the efficient use of AI in a variety of Indian retail stores and provide a clear understanding of how these have affected the performance of the businesses, as well as future estimates for an AI-driven approach to the retail industry.

5. Objectives of the Study

To identify the various factors influencing Artificial Intelligence.

6. Research methodology

Type of research: **Descriptive research**

Descriptive research will help us in carrying out research with no manipulation or intrusion from the researcher and this will occur in a natural environment. It will be helpful for researchers to get the what and how questions for respondents in an easier way. This type of research is carried out to know the efficacy of AI.

Table 1 Sample Determination Test

Population Size	25000
Z Score(Confidence level)	1.96
Margin of Error(E)	0.05
Proportion of the Population (P)	0.5
Q Value	0.5

Sample size is calculated using the formula, $S = (Z^2 * P * Q) / E^2$

$S = (1.96^2 * 0.5 * 0.5) / (0.05)^2 = 384$

Therefore, approximate sample required ranges 384 and this research study is made from taking 415 respondents. Hence, the effectiveness of research can be achieved.

The area of study will be the regions of India particularly in the states of Tamil Nadu and Karnataka, the importance of the study is to understand and analyse the effective use of artificial intelligence by retail companies in India.

Sample size: 415 respondents

Sampling method: Random sampling method.

Sampling Technique: Convenience sampling

Population: Selective retail shops around India.

Sample Unit: Employees of different retail companies

Sources of data :Primary & Secondary data

Data Collection instrument: Structured questionnaire, 5 points Likert scaling.

Statistical Tools: Percentage analysis, Factor analysis and Chi-square test.

Hypotheses of the Study

There is no factors influencing on implementation of Artificial Intelligence.

7. ANALYSIS & INTERPRETATION

7.1 PERCENTAGE ANALYSIS

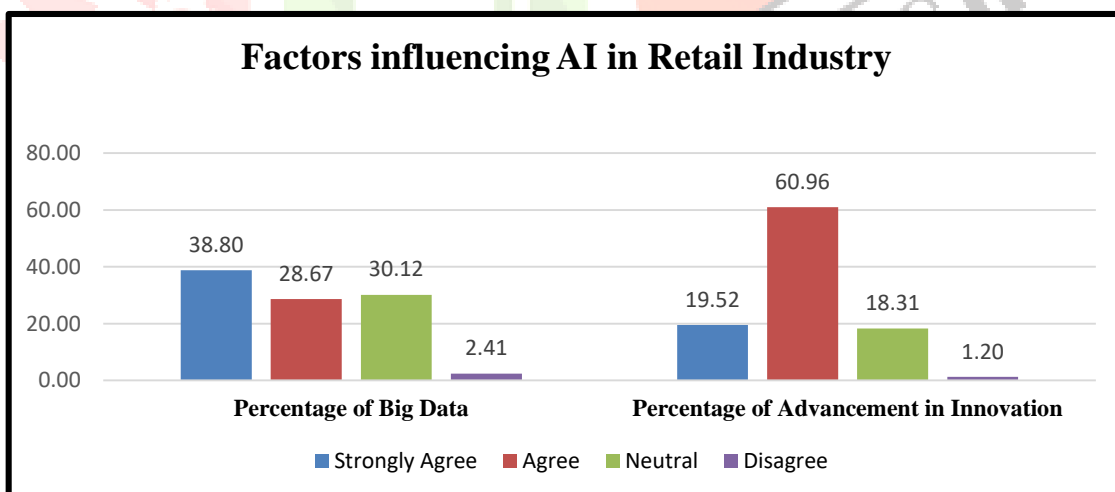


Chart 7.1.1

Big Data & Advancement in Innovation

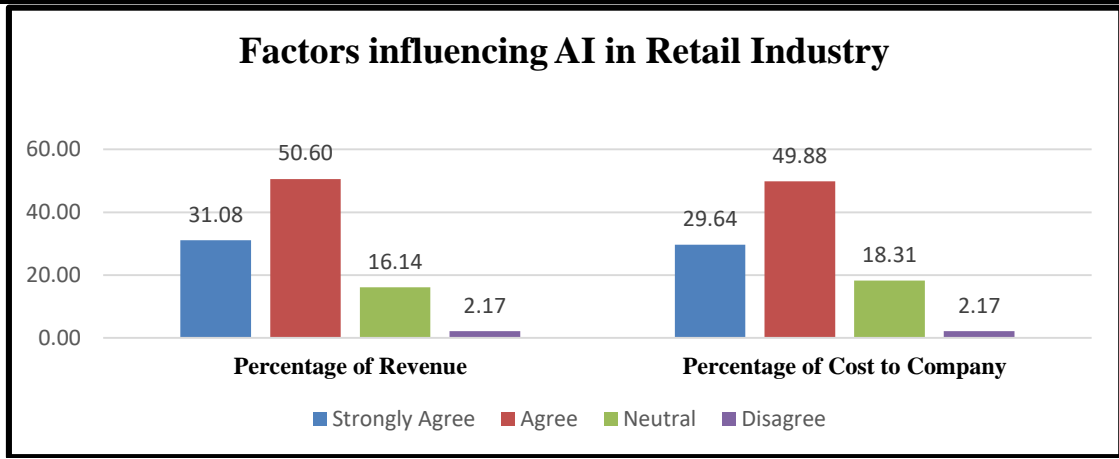


Chart 7.1.2

Revenue & Cost to Company

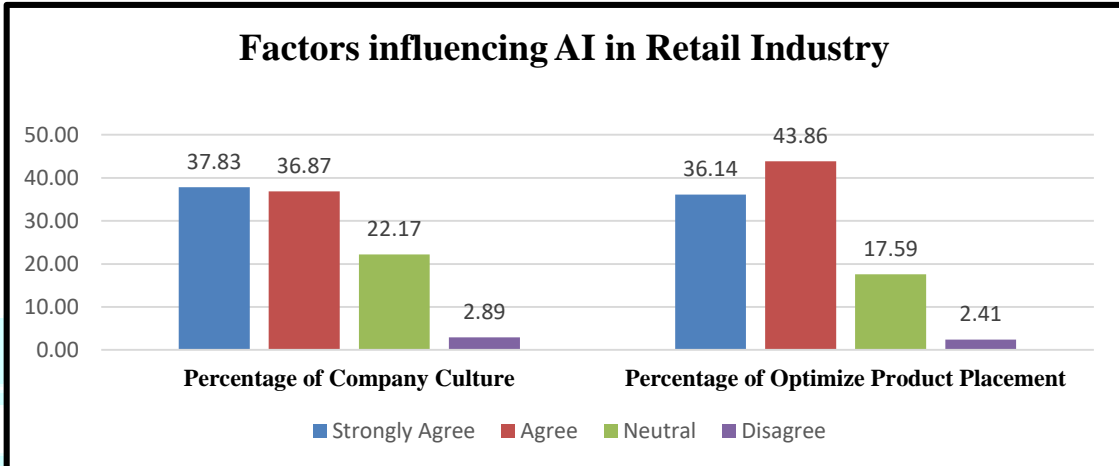


Chart 7.1.3

Company Culture & Optimize Product Placement

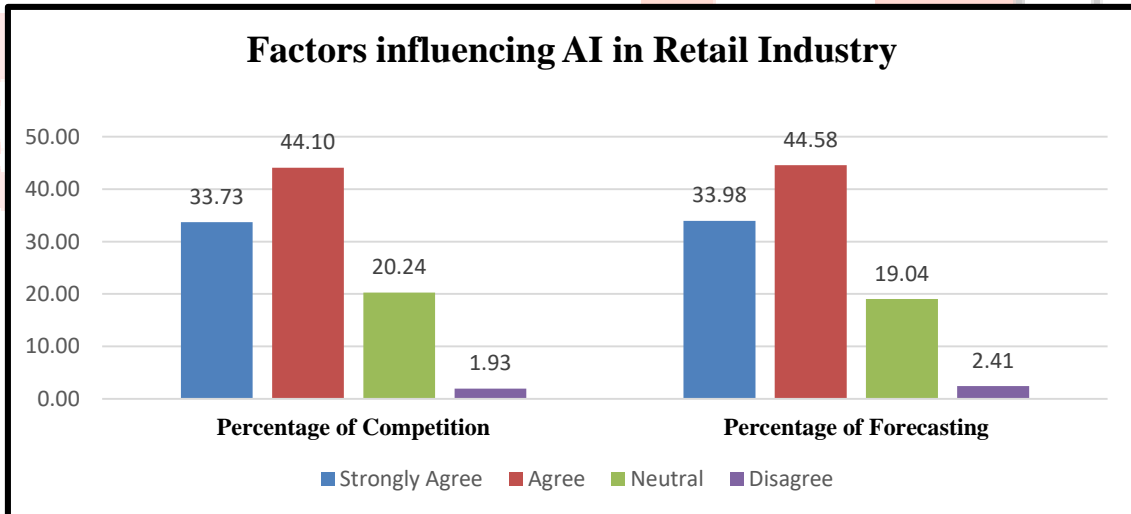


Chart 7.1.4

Competition & Forecasting

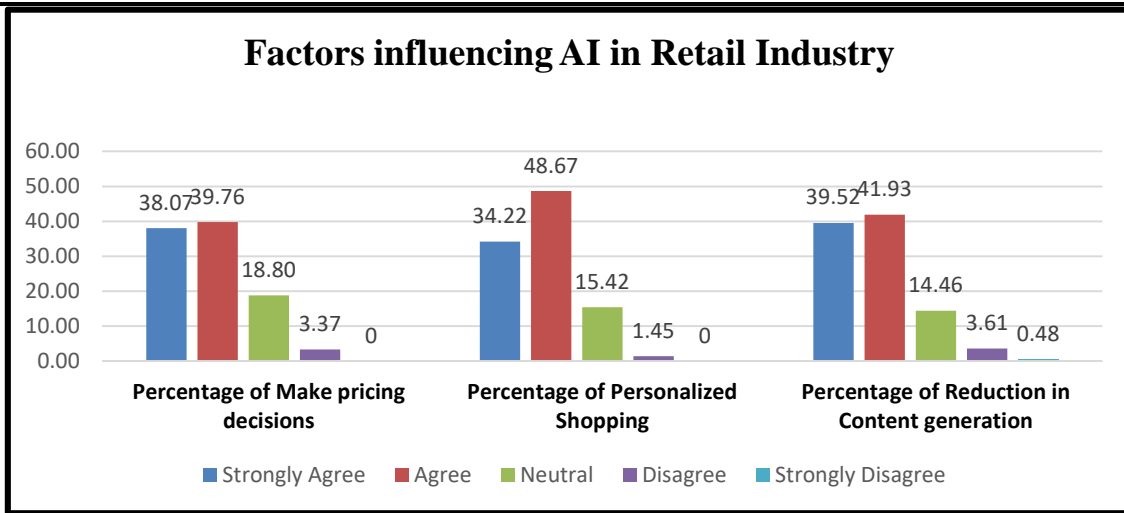


Chart 7.1.5 Make Pricing Decisions, Personalized Shopping & Content Generation

Interpretation

The Factors influencing AI in Retail Industry is being understood by all the above features where Competition & Forecasting. 33% of respondents strongly agree, 44% agree, 19% gave a neutral opinion and 2.41% disagree the Forecasting to be the factor influential in retail industry. 38% of respondents strongly agree, 36% agree, 22% gave a neutral opinion and 2.89% disagree the Company Culture. 20% of respondents strongly agree with the Big Data, 30% strongly agree and 50% disagree the Revenue while 33% agree and 44% agree with Forecasting, 48% agree the Personalized Shopping which are said to be the factor influential in retail industry.

7.2 FACTOR ANALYSIS

Factor Analysis is a method in which large amounts of data are collected and reduced in size to a smaller dataset. This reduction in the size of the dataset ensures that the data is manageable and easily understood by people. Using factor analysis, a hypothesis concerning the relationship between two variables is developed. This technique extracts maximum common variance from all variables and puts them into a common score. As an index of all variables, we can use this score for further analysis.

7.2.1 Correlation Matrix

Table 2 Results of Correlation matrix

Factors	Big Data	Advancement in Innovation	Revenue	Cost to Company	Company Culture	Optimize Product Placement	Competition	Forecasting	Make Pricing Decisions	Personalised Shopping	Content Generation
Big Data	1.000	0.443	0.420	0.312	0.400	0.305	0.354	0.334	0.377	0.368	0.395
Advancement in Innovation	0.443	1.000	0.467	0.460	0.343	0.399	0.386	0.505	0.399	0.500	0.422
Revenue	0.420	0.467	1.000	0.495	0.476	0.422	0.512	0.460	0.520	0.477	0.532
Cost to Company	0.312	0.460	0.495	1.000	0.419	0.398	0.381	0.475	0.428	0.409	0.416
Company Culture	0.400	0.343	0.476	0.419	1.000	0.417	0.371	0.428	0.515	0.472	0.451
Optimize Product Placement	0.305	0.399	0.422	0.398	0.417	1.000	0.412	0.502	0.426	0.551	0.450
Competition	0.354	0.386	0.512	0.381	0.371	0.412	1.000	0.511	0.498	0.494	0.518
Forecasting	0.334	0.505	0.460	0.475	0.428	0.502	0.511	1.000	0.506	0.576	0.484
Make Pricing Decisions	0.377	0.399	0.520	0.428	0.515	0.426	0.498	0.506	1.000	0.547	0.529
Personalised Shopping	0.368	0.500	0.477	0.409	0.472	0.551	0.494	0.576	0.547	1.000	0.595
Content Generation	0.395	0.422	0.532	0.416	0.451	0.450	0.518	0.484	0.529	0.595	1.000

Source: Primary Source SPSS software

The correlation coefficients between one variable and each other variable in the study are presented in a correlation matrix, which is just a rectangular array of numbers. Since a variable and itself always have a correlation coefficient of 1, the major diagonal of the correlation matrix is made up of 1s. The correlation indices are the same above and below the major diagonal. The correlation matrix in this study is flawlessly realised and continues to function well as a model.

7.2.2 KMO and Bartlett's Test

Table 3 Results of KMO and Bartlett's Test

KMO and Bartlett's Test of Sphericity Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.936
Bartlett's Test of Sphericity Bartlett's Test	Approx. Chi-Square	1906.461
	df	55
	Sig.	0.00

Source: Primary Source SPSS software

This statistic displays the typical variance that the underlying causes are responsible for. A high value, such as between 0.5 and 1, indicates how suitable the factor is for the available data or High KMO estimates indicate that multiple factors can explain the relationships between different sets of components and that factor analysis may be appropriate. A low value of this statistic, or one below 0.5, on the other hand, indicates that the factor is improper for the factor analysis. In other words, if the value is less than 0.5, there may be a problem with the information gathered by the survey. The KMO measure of sample adequacy in our analysis has a value of 0.936, which is greater than 0.5. After performing the Barlett's Test of Sphericity for our analysis.

7.2.3 Communalities

Table 4 Results of Communalities

Communalities		
	Initial	Extraction
Big Data	1	0.349
Advancement in Innovation	1	0.464
Revenue	1	0.557
Cost to Company	1	0.441
Company Culture	1	0.460
Optimize Product Placement	1	0.461
Competition	1	0.493
Forecasting	1	0.561
Make Pricing Decisions	1	0.554
Personalised Shopping	1	0.606
Content Generation	1	0.565
Extraction Method: Principal Component Analysis.		

Source: Primary Source SPSS software

The table of commonalities that follows in the output reveals how much of the variance i.e., the communality value should be greater than 0.5 to be taken into account for further research. Factor analysis in the variables has been accounted for by the extracted factors; otherwise, these variables are to be excluded from next steps. Here, "Personalized Shopping" makes up 60% of the variance, whereas "Big data" makes up 34% of the variance, which will not be further investigated.

7.2.4 Total Variance Explained

Table 5 Results of Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.51	50.09	50.09	5.51	50.09	50.09
2	0.80	7.25	57.35			
3	0.73	6.66	64.01			
4	0.68	6.15	70.16			
5	0.65	5.89	76.05			
6	0.52	4.75	80.80			
7	0.50	4.59	85.38			
8	0.45	4.07	89.45			
9	0.43	3.92	93.37			
10	0.39	3.50	96.88			
11	0.34	3.12	100.00			

Extraction Method: Principal Component Analysis.

Source: Primary Source SPSS software

This table displays the first eigenvalue. The "total" column displays the proportion of the variable's variance that can be attributed to each component. The proportion of variation that each component contributes to is displayed in the "percent of Variance" field. Only elements that are shown in the "Extraction sums of squared loadings" and have total eigen values larger than 1 will be picked. Factor 1 explains 50.09 percent of the total variation.

Therefore, in our analysis, the component's total eigenvalue is greater than 1. This demonstrates that the most data is being gathered from these regions. In other words, the component explains approximately 50.09 percent of the total variation in the analysis.

7.2.5 Component Matrix

Table 6 Results of Component Matrix

Component Matrix(a)	
Factors	Component
	1
Big Data	0.590
Advancement in Innovation	0.681
Revenue	0.746
Cost to Company	0.664
Company Culture	0.678
Optimize Product Placement	0.679
Competition	0.702
Forecasting	0.749
Make Pricing Decisions	0.744
Personalised Shopping	0.779
Content Generation	0.751

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Source: Primary Source SPSS software

This table shows the loadings of the factor that is extracted. The factors component should not exceed more than 1, if so then rotated component matrix is the further procedure. In this study, the data factor component did not exceed 1. Hence, the objectives of factor analysis is successfully achieved.

8. RESULTS & DISCUSSIONS.

- AI has the potential to significantly improve society and the economy.
- The study reveals that majority of the workers felt time saving and easily accessibility by implementing AI in their companies.
- Reduction in expenses is successfully achieved by implementing AI where it reduce queues and save on operational expenses.
- Retailers are worried less since customer service using AI is effective by making use of chatbots.
- Study also found that AI helps in price formulation where it takes data and frames pricing strategies for greater sales.
- Study found that the product classification and placement are well achieved after implementing AI.
- Personalized shopping is being efficient way to drive sales where customers get impressed and satisfied.
- Tracking and data security is highly agreed as a effective way of implementing AI.
- Crowd analysis and tracking customer satisfaction are not highly achieved by the companies and that would be the future prospects.
- In India only few retailers are ready to adapt possibilities of AI like touch screen orders, click & collect , in-store assistance due to investing factor and fear of facing loss.
- Few companies have built a centralized AI team for being more competitive and use extraordinary strategies.

SUGGESTIONS FROM THE STUDY

- As compared to any other country, India is still behind in adopting all the AI beneficial in retail thus, retailers need to think diverse and start implementing technology to the maximum extent.
- Each retail stores need to ensure that store shows up in online search results.
- Implementing Click and Collect in shopping almost many companies have implemented but taking overall economy as a consideration kirana shops can start implementing in a smarter way.
- Displaying inventory in search engines and maps so that customer in need can get helpful.
- Considering mobile orderings
- Being customer centric
- Eliminate the wait- Customers will leave during lengthy waits, which will drive sales.
- Have effective visualizations in-store
- Think carefully about your sales goals. Setting sales goals is one way to increase your retail earnings.
- Although product returns might leave a retailer with a terrible taste in their mouth, if you handle them correctly, you can transform them into sales or possibilities.

CONCLUSION

Consumers no longer merely visit these stores to buy the items; they now demand a trip from a tranquil entrance to a fulfilling leave. As a result, the expectations from a modern retail store have fundamentally changed. Future retail stores are anticipated to be digital kiosks with virtual trial rooms made possible by augmented reality, signalling the impact of digitalization on retail that has already started. Retailers are developing a variety of cutting-edge technologies that are in demand. In order to improve the buyer's experience, emerging technologies like AR, VR, AI, IoT, bots, drones, cloud platforms, etc. have therefore become essential. Many jobs relating to the retail industry are being carried out by robots. Retailers to give their consumers a more individualised experience in the future, retailers will need to capitalise on this preoccupation with AI. They have a wide range of effects, from back office tasks to customer service, warehousing, and logistics.

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