PROSPECTS FOR ARTIFICIAL INTELLIGENCE IMPLEMENTATION TO DESIGN PERSONALIZED CUSTOMER ENGAGEMENT STRATEGIES

Ram Kishen, KJ Somaiya Institute of Management
Satyendra Upadhyay, KJ Somaiya Institute of Management
Feba Jaimon, KJ Somaiya Institute of Management
Sawmini Suresh, KJ Somaiya Institute of Management
Nelli Kozlova, Peter the Great St. Petersburg Polytechnic University
Svetlana Bozhuk, Peter the Great St. Petersburg Polytechnic University
Angela Bahauovna Mottaeva, Moscow State University of Civil Engineering
Sergey Yevgenievich Barykin, Peter the Great St. Petersburg Polytechnic University
Vitaly Anatolievich Matchinov, Financial University under the Government of the Russian Federation

ABSTRACT

The rise of e-commerce and the explosion of digital shopper data with the advent of advanced Artificial Intelligence (AI) solutions are changing the landscape of retailing. Technology advancements with the arrival of AI will help in synthesizing and acting upon the consumer insights at every touch point in the data-driven digital economy. The research was designed with the objective to identify the impact created by artificial intelligence adoption in the retail industry on customer management strategies. This study touch upon personalized engagement marketing, agility in the supply chain (Robotics), and branding and customer management practices using artificial intelligence solutions. The research developed a conceptual model to identify branding and customer management implications in AI-powered retail. Primary research was conducted through an online survey among a selected tech-savvy target audience. Primary research was used to study perception about various factors affecting buying experience for shoppers in modern retail with the intervention of AI as a market driving tool. The study results provide relevant insights to retail marketers and supply chain partners on customer management practices by adopting AI solutions.

Keywords: Consumer Behavior, E-Commerce, Artificial Intelligence, Marketing Strategy

INTRODUCTION

Evolving consumer preferences, increasing competition in the retail industry to gain market share, growing digitization force retailers to adopt Artificial Intelligence (AI) in their retail marketing strategy. According to the GM survey report, the adoption of AI solutions in retail marketing is expected to grow at a CAGR of 45 percent in the period from 2020 to 2024 in the APAC of which India holds a significant share. This high expected growth rate can be attributed to customers demanding value shopping with real-time engagement and promotions, which are personalized according to customer needs. There is a growing need for modern retailers to adopt AI solutions for providing superior customer shopping experience, maintaining inventory accuracy and

building integrated data management systems for the omni channel strategy. Main areas of AI application:

- Artificial Intelligence-Key driver for Omnic hannel retailing strategies. Omni channel retailing is all about combining the physical stores and e-commerce shopping platforms to become the catalyst for sweeping improvements in buying experience and customer engagement across physical and digital touch points. AI solutions help in developing Omnichannel data management solutions for integrating point of sales data from offline channels and customer management data from websites and online channels. Omnichannel retailing will be the future of modern trade retail practices.

- Personalization of marketing programs is the key to the success of marketing strategies in modern retail. The anticipation of shopper needs is now possible with the help of AI-enabled solutions that analyze a vast amount of customer purchase behavior data sets to identify new trends or signals and predict future buying behavior. This micro-targeting by AI can help retailers in changing their merchandising model and realigning the category management practices (Front end retail operations). Artificial intelligence also aids in customer segmentation Some popular AI tools for retail are sentiment analysis (E-commerce and digital marketing), amazon Mturk (process automation) and Procuebot (Chatbots for operational procurements) Intelligence tools using AI and machine learning algorithms can evaluate trillions of data combinations, far more than any human intervention. AI can also predict the availability and deliverability of products through the supply chain integration using Robotics and ML (Back end retail operations). Artificial Intelligence technology combines big data and algorithms like neural networks to develop virtual assistants with human-like behavior. AI based modeling and algorithms are used for deriving actionable information for aiding critical decision-making procedures relating to business strategies, customers and inventory management. AI can learn and anticipate customer needs before they make purchases, based on which promotions and suggestions will be issued for the preferred product, and this increases the probability of sales conversion which will generate extra revenue for the company and build loyalty. AI can also help improve inventory turnover, optimized stock to make the supply chain more agile and increase the traceability within the retail supply chain.

AI solutions like virtual assistants, chatbots, image search and smart store automation are already being employed by many online and offline retailers. Currently, the use of AI-powered solutions is limited to big retailers, e-commerce giants and technology-driven startups. In the near future, the organized retail industry will be forced to adapt to AI-powered marketing strategies. A high percentage of unorganized retail is a major roadblock to the growth of AI penetration.

The research purpose is to determine the impact of the introduction of artificial intelligence in retail on customer management strategies. To achieve the goal, the analysis of the latest trends in the field of artificial intelligence and its implementation in retail marketing has been carried out, attributes characterizing the touchpoints of AI and consumer experience have been highlighted, a factor model has been built based on the results of consumer perception research.

MATERIALS AND METHODS

Literature Review

In any economy, trade plays the role of bridging geographical, qualitative and quantitative gap amid manufacturing and consumption. It includes the process of buying products from different manufacturers or trade intermediaries, shipping, stocking and combining the goods to form an assortment, and selling them to wholesale businesses or normal customers without the goods being, in essence, changed or refined (Kapustina et al., 2019). On the front end, it involves giving proper product related suggestions based on benefits and also managing the merchandise and handling the cash desks. It also involves generating interest among the customers for the product, making the sale and also post-purchase. The transport of products and provision entails any task associated with storage and therefore the removal of goods from storage. This constitutes the handling of merchandise at warehouses and transportation most efficiently. This will help maintain a good relationship with the customers (Mehta et al., 2020; Krymov et al., 2019; Krasyuk et al., 2020).

While the merchandise is consumed, services are experienced. According to statistics, 51% of shoppers stop visiting a store after facing bad experiences, which is why building a good shopper experience, is important. Generating loyalty among shoppers is the foundation of a successful retail store. Retail stores want more repeat purchases from the same customers than generating new customers, which costs more (Weber & Schütte, 2019). At the front end for the shopper is where personalized engagement marketing comes into play. Personalization has been used in both online and offline stores. An example in the case of online stores it comes in the form of recommendations where on websites like Amazon, Flipkart, Netflix and Myntra provide recommendations based on prior purchases or views. In the case of brick and mortar stores, it occurs in the form of displays and experiential marketing within the store (Barykin et al., 2019; Fejling et al., 2019; Khareva et al., 2020; Krasyuk et al., 2020). On the back end, with better supply chain and logistics comes better inventory management, the less time between product reaching customers, lesser costs involved, etc. (Barykin et al., 2021; Liu et al., 2018; Saponaro et al., 2018). If quality is also of particular standard this can also help with having better customer satisfaction. One of the major developments in each of these sections is the introduction of technology. It is said that 55% of the retailers around the world would adopt AI by the end of 2021(Grewal et al., 2016).

AI is used to predict future behaviors of the shoppers by combining large sets of data collected from the shoppers (Bolton et al., 2014; Cheng et al., 2018; Provost et al., 2019). The suggestions given by these applications would be highly targeted to each customer and would not be possible by normal people or other systems (Grewal et al., 2016; Burdakova et al., 2019; Kharlamova et al., 2019; Pantano et al., 2017). AI is also used for in-store marketing of the products using displays that shoppers can interact with due to the incorporation of AI-based motion sensing. In brick-and-mortar retail stores, virtual techniques using Machine learning algorithms can be leveraged to improve the In store purchase stage between the customer and the retailer (Grewal et al., 2016; Pantano et al., 2018; Barykin et al., 2021). AI is also possible because 64% of shoppers are not against sharing their information and purchase history with the retailer, particularly for personalization (Bozhuk et al., 2017; Bozhuk et al., 2019; Bozhuk et al., 2018; Kramer, 2018). Customer service in retail especially online also involves being able to track the merchandise and finding out where it is at a certain point of time. This can be fulfilled using AI applications thereby increasing customer loyalty (Kharlamova et al., 2019; Pantano et al., 2017; Pantano et al., 2018; Barykin et al., 2021; Bozhuk et al., 2017; Bozhuk et al., 2019; Bozhuk et al., 2018; Kramer, 2018).

In terms of supply chain management, the major use is robotics. Rather than replacing humans, robotics will take over repetitive and mundane tasks in a more efficient manner allowing humans to focus more on customer-oriented improvements (Kapustina et al., 2019; Demirkan et al., 2014; Pantano et al., 2017; Chang et al., 2021; Zhilenkova et al., 2019).

Opportunities that are provided to the company by the implementation of AI are considered in papers (Liu et al., 2018; Krasyuk et al., 2019). AI aids companies in reducing costs through increased efficiency and generate revenue in the near future. AI also offers the opportunity for the managers of brands to bring in more creativity by taking up all the mundane (Barykin et al., 2020; Krasnov et al., 2020; Krasnov et al., 2019) and repetitive tasks, creating more time for brand managers to build strategy (Konnikov et al., 2019; Konnikov et al., 2020). AI also analyses large amounts of data to figure out behavioral patterns (Sokolova et al., 2019; Maslova et al., 2020; Bataev, 2019).

Issues of the company's readiness for AI implementation are discussed in papers (Shamina et al., 2019; Okorokov et al., 2019; Aloini et al., 2013).

For a firm to be able to adopt AI it should have data scientists who could generate insights from a large amount of data and turn them into actions for the firm. The mission and vision of the business should match with that of the AI. AI should help take forward the firm's values (Grewal et al., 2017; Barykin et al., 2021; Barykin et al., 2021; Chang et al., 2021; Kumar et al., 2019;

I.O.P.C, 2019; Konnikov et al., 2020; Barykin et al., 2020). AI should also be implemented with the proper parameters and at the proper time. AI raises questions regarding ethics and privacy and the firm should be ready to tackle these limitations before they are ready to implement AI.

Predictions for a Firm in the Short Run in a Developed Economy Suggests that

- The development of brand-related experiences using AI will generate loyalty among customers, for example, the personalized playlist by Spotify.
- Using dynamic pricing will be beneficial, e.g., Uber which includes surge pricing that occurs during the time of higher demand.
- Delivery of services is automated using AI, e.g., Zomato and Swiggy using AI to optimize the delivery time.
- Creating content-focused advertisements, e.g., McCann's AI creative director that advises the creative team on directing commercials.

Predictions for a Firm in the Long Run in a Developed Economy suggests that

- It is very important for retailer to have a dedicated large number of shoppers that particularly prefer their firm. The higher the number of shoppers, the more accurate analysis is carried out by AI.
- As machines become more interactive and knowledgeable and, brands need to understand and learn about projecting brand personality through machines and acquiring or creating new consumers.
- Organizations in developed economies which concentrate on maintaining only a small customer base with high lifetime value won't be able to collect enough customer data to successfully improve their ML algorithms. These businesses will therefore need to focus on servicing a wide range of consumers with diverse tastes instead of concentrating on just customer lifetime value (Pantano et al., 2017).

Predictions for a Firm in the Long Run in a Developing Economy Suggests that

- In a developing economy, regional brands will have more importance than foreign brands. For example, Google India has introduced the Neighborly social media app that allows people to exchange information about local service providers and service providers.
- AI must be implemented while integrating with human resources. There is always an underlying fear among the laborers that they lose their jobs and are wary of new technology due to this fear.
- Companies can set up loyalty programs to reward consumers for more purchases, making users more profitable. AI should be used here as a powerful tool for customizing product recommendations that can subtly nudge customer buying decisions.

Theoretical Foundations

To understand the working of AI for generating personalized engagement marketing the below framework is used (Kumar et al., 2019). Key factors (Figure 1):

- Choice criteria and decision making. While personalized engagement marketing is carried out using AI too much information must not be delivered to the shopper. It is true that shoppers need reviews and suggestions before they make a purchase but personalization should be offered in such a way that there is no overflow of data.
- Knowledge organization and management. Constant knowledge collection and organization means that knowledge is always used. Nonetheless, it is a challenging task that involves forecasting when or how to access and use data. Successful knowledge management in organizations often involves careful selection, analysis and incorporation of information to add value overall, instead of just adding new technology.
- Customer management and branding implications in AI-driven retail environment (Kumar et al., 2019).
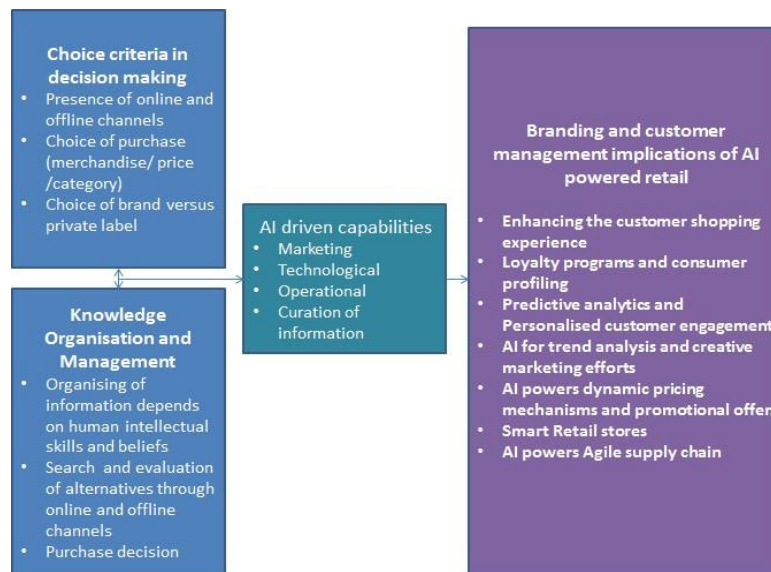
FIGURE 1
KEY FACTORS FOR CREATING PERSONALIZED ENGAGEMENT MARKETING

Natural Language Processing (NLP) is used by AI systems to derive meaningful insights from user-generated content on platforms like retail blogs, customer product reviews, daily tweets by brands as well as customers and social media posts (Malapane, 2019; Wu et al., 2020; Aagaard et al., 2018; Gupta et al., 2020; Ranjan et al., 2021). Most of the retail company websites use virtual assistants and chatbots with NLP for answering customer queries and providing better customer service.

Image recognition can be used in brick and mortar retail stores, which constitutes a larger chunk of retail purchases. Retail stores are using image processing through its smart shelves and intelligent display platforms equipped with optical sensors and high-resolution cameras. Image recognition techniques can collect customer demographic data and can be used to gauge customer's behavior and emotional reactions to products and in-store experience. Magic mirror in retail stores is interactive digital kiosks powered by AI to attract shoppers by showing curated content of featured products that use virtual reality and image processing. Raymond, Adidas and H&M are a few of the retail giants that have adopted the retail innovation mirrors in their stores that let the customer try different clothing and accessories virtually (Saponaro et al., 2018; Xu et al., 2020; Zhou et al., 2019; Pham, 1990; Luce, 2019).

AI enables online retailers and e-commerce platforms do to do consumer profiling through machine learning. Past customer purchases, buying behavior, online search keywords and product categories, social media comments and posts are processed to build consumer profiles and manifest their needs of wants through personalized product offerings. Amazon Prime, Flipkart plus are some of the examples of e-commerce customer loyalty programs.

E-commerce platforms are heavily relying on using AI for advertising and product pricing. While shopping on e-commerce websites, when a customer searches for items in a product category, a pop-up message comes in the form of suggestions for related product categories or bundled products. AI works at the backend of the e-commerce websites to develop personalized shopping suggestions and recommendations for the customers (Chen, 2012; Liu et al., 2018).

Marketers use AI-powered search algorithms for developing solution-focused advertising efforts that will entice customers. AI enables experiential marketing efforts like moment and personalized marketing. Experiential marketing tries to create a branded experience that creates a

strong impact on customers. Most of the experiential marketing campaigns and creative advertisements involve the use of artificial intelligence tools. One of the early moves of using AI for trend analysis was done by L'Oreal when they used social listening to identify whether the fashion trends and separate it from fads.

Most of the e-commerce platforms are relying on artificial intelligence techniques to develop dynamic pricing models, which in turn can lead to better offers and discounts. Most of the festival offers and mega sales like Big billion days by Flipkart and amazon great Indian festival attracts a huge volume of sales through discounted offers and promotions. AI automates inventory and stock updating and helps in dynamic pricing for product categories based on demand, in-stock inventory and profit margins.

Smart Retail stores are the future of modern retail. With the advent of e-commerce, millennials are seeking for seamless shopping experience while visiting offline stores. Smart retail stores combine the Internet of things and Artificial intelligence for sales automation, self-checkouts and improving in-store customer experience. Ecommerce players provide experience-based shopping using augmented and virtual reality while offline stores use immersive technologies like virtual mirrors to redefine the shopping experience.

AI powers an agile supply chain. With the help of AI, many components and touch points of the supply chain are automated. AI can be used to optimize and update the truck routes and loads for delivery and logistics without human intervention. AI can power robots and integrated shuttles for automated material handling within the warehouses to filling the shelves in retail stores. Same-day deliveries of online orders have been made possible through the adoption of artificial intelligence from warehousing to logistics.

Research Methodology

Primary research was conducted among selected target audience as a part of our research methodology since artificial intelligence is an evolving concept and most of the Data collection for Primary research was done through questionnaire floated among selective tech-savvy target audience who would at least have primary knowledge on artificial intelligence. The primary survey was targeted at the millennial group. The survey was conducted for a sample size of 101 respondents which included 51 females and 50 male respondents. 93 percent of the respondents were graduates of postgraduates.

Respondents were used to rate the importance of 5 factors related use of Artificial intelligence solutions in powering retail marketing on a Likert scale, with 1 being least important to 5 being most important:

- Convenience for shoppers.
- Personalized promotions/suggestions.
- Customer Engagement/Support.
- Smart stores (Virtual fitting rooms/digital kiosks).
- Powering Agile supply chain.

10 Statements were formed for Primary Research

- E-commerce platforms are heavily relying on using AI for advertising and product pricing.
- AI has improved the personalization of retail advertising messages.
- Smart stores with features like smart shelves, virtual reality mirrors, digital interfaces are the future of the organized retail Industry.
- Same-day deliveries of online orders have been made possible through the adoption of artificial intelligence from warehousing to logistics.

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- Retail stores should employ digital kiosks and scanners for self-service payments and access product details quickly.
- I am comfortable with virtual assistants while shopping online.
- I am comfortable with retail platforms using purchase history for consumer profiling and providing personalized offers.
- While visiting an e-commerce site pop up message comes in the form of suggestions for related product categories or bundled products that are relevant for me.
- The development of brand-related experiences (experimental marketing) using AI will generate loyalty among customers.
- Ethics and privacy are among the major challenges for the adoption of AI in the retail sector.

These statements represent different attributes relating to the perception of consumers on how Artificial intelligence has transformed the retail industry. Respondents were asked to rate these attributes/statements on a 5 point Likert scale, with a rating of 1 corresponding to strongly disagree to a rating of 5 corresponding to strongly agree.

RESULTS

Primary Research Analysis

Out of 101 respondents in the primary research survey, 95 percent of the sample were aware of the artificial intelligence adoption techniques that go at the backend in the retail industry to provide personalized customer experience for the shoppers. Out of the 95 percent, 86.1 percent believed that Artificial Intelligence has made a significant transformation to Retail marketing, while a small group (8.9 percent) had a negative perception about the role of AI in powering the retail industry.

To understand which all AI features are familiar and popular, the survey included a question of which AI features were used during retail shopping (Figure 2).
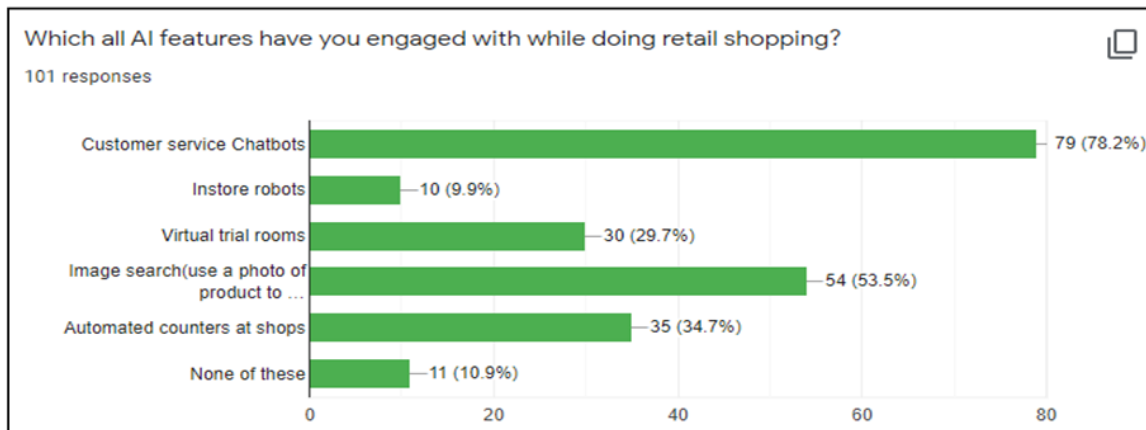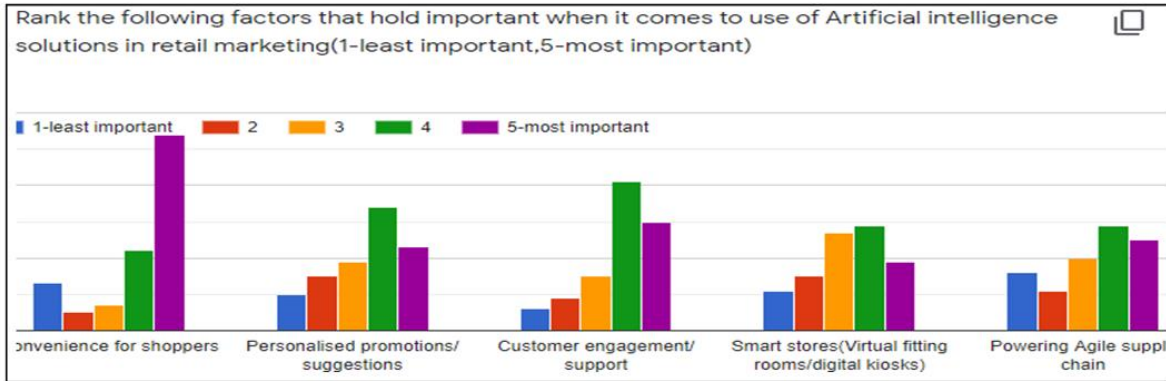

FIGURE 2
DEMAND FOR AI FUNCTIONS IN RETAIL MARKETING

Customer service chatbots and Image search are the most popular AI features according to the survey. Chatbots are very common as indicated by the survey as 78.2 percent of the survey respondents have interacted with chatbots. Chatbots use Machine learning algorithms and Natural language processing techniques to create a more engaging customer interaction experience while shopping online. Virtual trial rooms and digital kiosks are also gaining popularity as more and more

smart stores are coming up in the organized retail sector. In the near future, in-store robots can appear.

The factor analysis method identifies patterns of relationships among many dependent variables and reduces the number of dependent variables into a set of factors. Using SPSS Principal Component analysis method of factor analysis is used in this study on a set of 5 dependent variables namely Convenience for shoppers, Personalized promotions/suggestions, Customer Engagement, Smart stores(Virtual fitting rooms/digital kiosks), Powering Agile supply chain which is related to customers perception of how Artificial intelligence solutions is powering retail marketing (Figure 3).

FIGURE 3
RANKING FACTORS ON THE IMPORTANCE OF USING ARTIFICIAL INTELLIGENCE SOLUTIONS IN RETAIL MARKETING

KMO is a test of sampling adequacy must be greater than 0.5 to run a meaningful analysis. Here KMO is 0.573 (see Table 1) which means factor analysis can be performed. Also, Bartlett's test (Test of Correlation) should be significant. Here Sig. value is less than 0.05 which means that the matrix is not an identity matrix and variables do relate to each other which makes exploratory factor analysis meaningful.

Table 1 KMO AND BARTLETT'S TEST		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.573
Bartlett's Test of Sphericity	Approx. Chi-Square	54.902
	df	10
	Sig.	.000

Communality is a measure of the extent to which an item correlates with all other items. As seen from the above table for communalities, as all the variables have an Extraction value greater than 0.4, thus all the variables do co-relate with other variables and will load significantly on any one of the factors and we must proceed with the analysis (see Table 2).

Table 2 COMMUNALITIES		
	Initial	**Extraction**
Convenience for shoppers	1.000	0.555

personalized promotions	1.000	0.584
Customer engagement	1.000	0.509
Smart stores	1.000	0.626
powering agile supply chain	1.000	0.785

From the correlations table (see Table 3) we can infer that there is a high positive correlation between personalized promotions, Customer engagement, Convenience for shoppers while smart stores and powering agile supply chains are highly positively correlated. A moderate positive correlation can be observed between variable pairs. Smart stores/personalized promotions and powering agile supply chain/customer engagement.

<table>
<tr><td colspan="7" align="center">Table 3
CORRELATION (N=101)</td></tr>
<tr><td></td><td></td><td>Convenience for Shoppers</td><td>Personalized Promotions</td><td>Customer Engagement</td><td>Smart Stores</td><td>Powering Agile Supply Chain</td></tr>
<tr><td rowspan="2">Convenience for shoppers</td><td>Pearson Correlation</td><td>1</td><td>0.296(**)</td><td>0.310(**)</td><td>0.214(*)</td><td>0.015</td></tr>
<tr><td>Sig. (2-tailed)</td><td></td><td>0.003</td><td>0.002</td><td>0.031</td><td>0.883</td></tr>
<tr><td rowspan="2">Personalized promotions</td><td>Pearson Correlation</td><td>0.296(**)</td><td>1</td><td>0.322(**)</td><td>0.192</td><td>-0.001</td></tr>
<tr><td>Sig. (2-tailed)</td><td>0.003</td><td></td><td>0.001</td><td>0.054</td><td>0.990</td></tr>
<tr><td rowspan="2">Customer engagement</td><td>Pearson Correlation</td><td>0.310(**)</td><td>0.322(**)</td><td>1</td><td>0.170</td><td>0.222(*)</td></tr>
<tr><td>Sig. (2-tailed)</td><td>0.002</td><td>0.001</td><td></td><td>0.089</td><td>0.026</td></tr>
<tr><td rowspan="2">Smart stores</td><td>Pearson Correlation</td><td>0.214(*)</td><td>0.192</td><td>0.170</td><td>1</td><td>0.394(**)</td></tr>
<tr><td>Sig. (2-tailed)</td><td>0.031</td><td>0.054</td><td>0.089</td><td></td><td>0.000</td></tr>
<tr><td rowspan="2">Powering agile supply chain</td><td>Pearson Correlation</td><td>0.015</td><td>-0.001</td><td>0.222(*)</td><td>0.394(**)</td><td>1</td></tr>
<tr><td>Sig. (2-tailed)</td><td>0.883</td><td>0.990</td><td>0.026</td><td>0.000</td><td></td></tr>
</table>

Five factors explain 100 percent variance of the independent variable, while 2 factors explain 61% of the variance. Here we can see that two different factors are observable (see Table 4).

<table>
<tr><td colspan="10" align="center">Table 4
TOTAL VARIANCE EXPLAINED</td></tr>
<tr><td rowspan="2">Component</td><td colspan="3" align="center">Initial Eigenvalues</td><td colspan="3" align="center">Extraction Sums of Squared Loadings</td><td colspan="3" align="center">Rotation Sums of Squared Loadings</td></tr>
<tr><td>Total</td><td>% of Variance</td><td>Cumulative %</td><td>Total</td><td>% of Variance</td><td>Cumulative %</td><td>Total</td><td>% of Variance</td><td>Cumulative %</td></tr>
<tr><td>1</td><td>1.869</td><td>37.385</td><td>37.385</td><td>1.189</td><td>37.385</td><td>37.395</td><td>1.631</td><td>32.624</td><td>32.624</td></tr>
<tr><td>2</td><td>1.189</td><td>23.775</td><td>61.159</td><td>1.189</td><td>23.775</td><td>61.159</td><td>1.427</td><td>28.536</td><td>61.159</td></tr>
<tr><td>3</td><td>0.76</td><td>15.197</td><td>76.356</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>0.701</td><td>14.024</td><td>90.38</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>0.481</td><td>9.62</td><td>100</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Here, by analyzing the Rotated Component Matrix, two factors can be derived from 5 variables (see Table 5). Variables such as personalized promotions, Convenience for shoppers, Customer engagement can be clubbed together as a factor while powering an agile supply chain, Smart stores can be clubbed together as another factor.

Table 5
ROTATED COMPONENT MATRIX

	Component	
	Factor 1: Customer management factor	**Factor 2: Retail infrastructure Factor**
Personalized promotions	0.764	
Convenience for shoppers	0.744	
Customer engagement	0.658	0.274
Powering agile supply chain		0.884
Smart stores	0.239	0.754

Here factor comprising of variables personalized promotions, Convenience for shoppers, Customer engagement can be named as customer management factor and variables such as powering agile supply chain, Smart stores as retailer infrastructure factors.

Perception of customers for 10 statements relating to branding and customer management implications of AI-powered retail were analyzed to support the integrative model developed through secondary research.

Virtual assistants and chatbots use Natural language processing to create an engaging personalized shopping experience by answering customer queries and providing better customer service. Brick and mortar retail stores also employ virtual assistants on their websites or as a part of Omnichannel strategy. The following two statement analyses are relevant to this context.

63.3 % of the survey respondents have a positive perception of the interaction with virtual assistants and chatbots while doing online shopping. This shows greater acceptance and awareness of AI is driven customer engagement solutions in retail shopping (Figure 4).
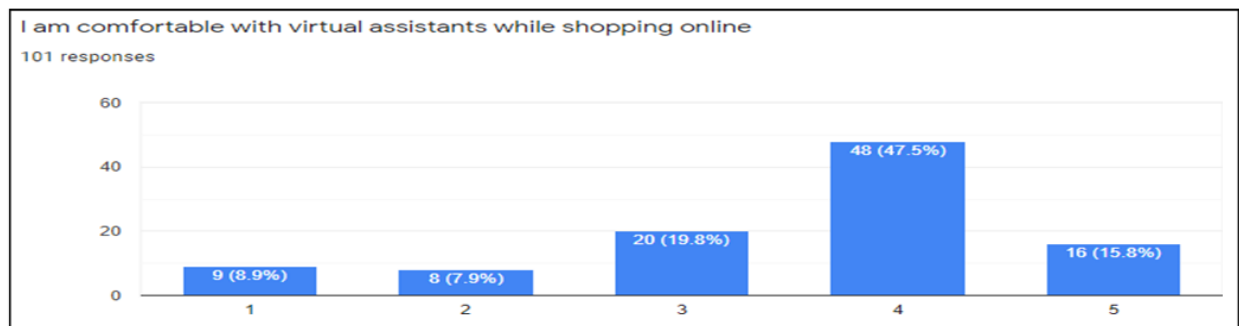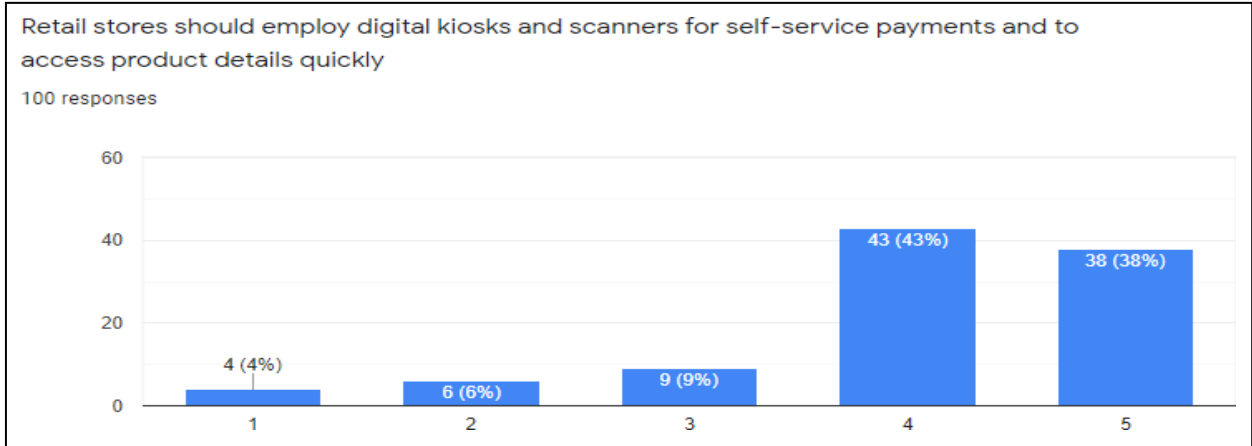

FIGURE 4
CUSTOMERS' ATTITUDES TOWARDS VIRTUAL ASSISTANTS AND CHATBOTS

A higher proportion of positive responses indicate that virtual assistants are engaging and helps to improve the shopping experience of customers.19.8%of the respondents had a neutral perception of interaction with virtual assistants while 16.8% were not comfortable with virtual
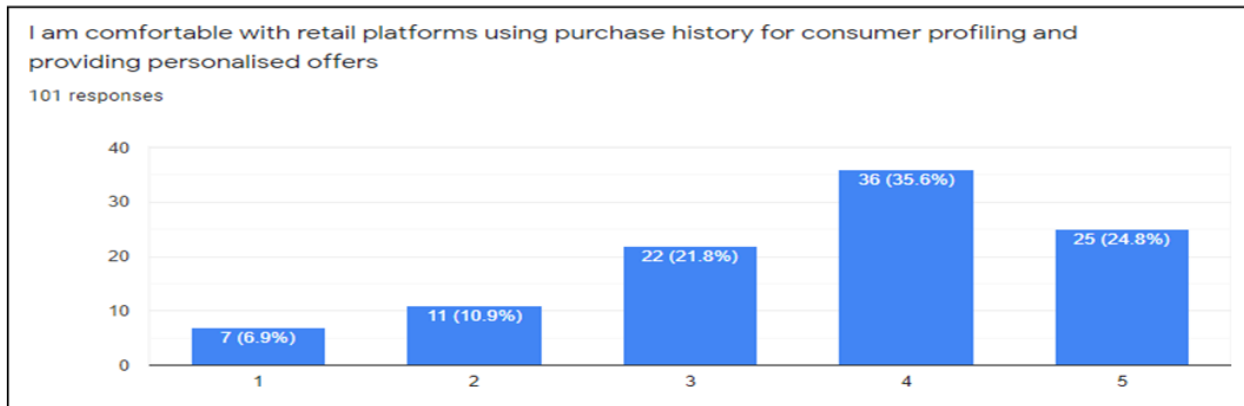
assistants. Virtual assistants and customer engagement AI solutions are frequently being updated to match with human-like behavior.

81% of the survey respondents believed that digital kiosks and automated payments and scanning systems should be employed in retail stores (Figure 5). This validates our finding that interactive digital kiosks in retail stores attract shoppers and provide a delightful shopping experience.

Retail stores should employ digital kiosks and scanners for self-service payments and to access product details quickly

100 responses

FIGURE 5
CUSTOMERS' ATTITUDES TOWARDS DIGITAL KIOSKS AND SELF- SERVICE PAYMENT

AI algorithms run at the backend of search engines and e-commerce platforms that collect and sort data on past customer purchases, buying behavior, SEO keyword rankings, frequently purchased products and related categories etc. This helps in building consumer profiles, categorizing customers into different segments and develop personalized loyalty programs and promotions based on consumer profiles. Many websites employ web cookies for data collection purposes (Figure 6).

I am comfortable with retail platforms using purchase history for consumer profiling and providing personalised offers

101 responses

FIGURE 6
CUSTOMERS' ATTITUDES TOWARDS CONSUMER PROFILING AND PERSONALIZED OFFERS

From the primary research results, it can be seen that 60.4% of the respondents are comfortable with retail platforms using customer purchase preference data and combining it with

demographic and psychographic data for consumer profiling and developing personalized offers. More than half of the target audience is ready to share data, which is a positive sign for the advancements of AI in the retail industry.

AI algorithms, data modeling and data mining are used to extract meaningful insights from unstructured data and predict trends and customer behavioral patterns for retail shopping. Digital marketing techniques have improved conversion rates from online advertisements. Primary research focused on understanding from the customer's perspective about the relevance and extends of personalization of retail advertising and customer engagement.

77.2% of the survey respondents agreed to the fact that AI has improved the personalization of retail advertising messages and offers (Figure 7). This validates our secondary research customer engagement implication that AI solutions have made a significant impact on the personalization of customer engagement. Relevant promotions and suggestions will increase the click-through rates for the advertisements and convert prospects to customers.
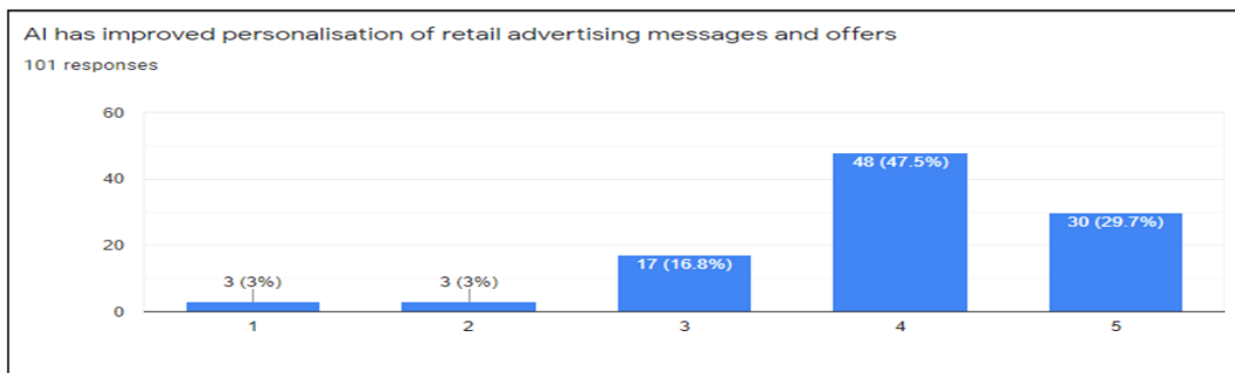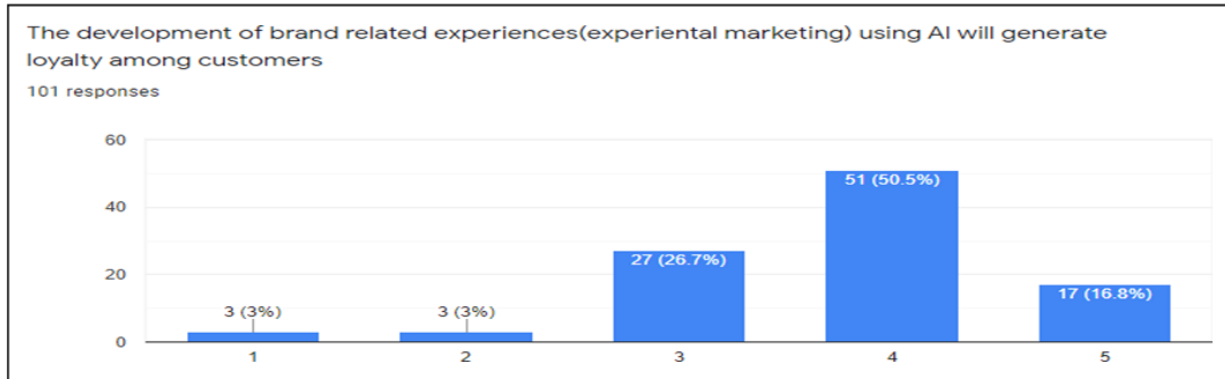

FIGURE 7
CUSTOMERS' ATTITUDES TOWARDS CUSTOMIZED ADVERTISING AND OFFERS

The advent of Digital marketing has increased the number of advertisement and pop up messages customer receives while visiting any e-commerce websites or social media sites. 59.4% of the survey respondents find targeted advertisements and personalized message suggestions relevant and resonating with their unique wants (Figure 8). Nearly 25% of the respondents are neutral with respect to the relevance attribute. This might be due to the advertising cluster and larger number of ads.
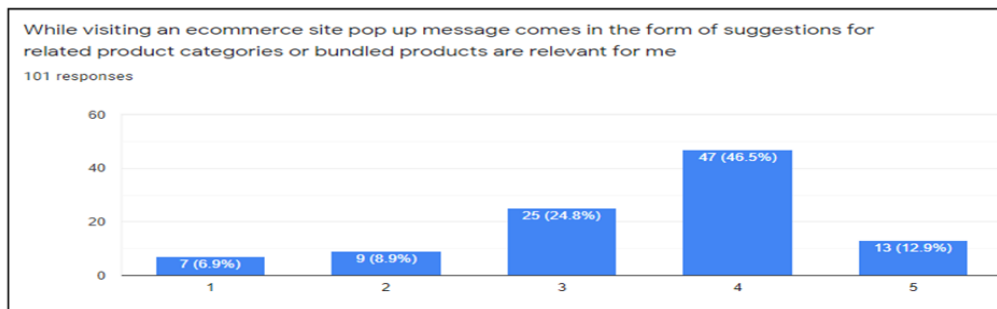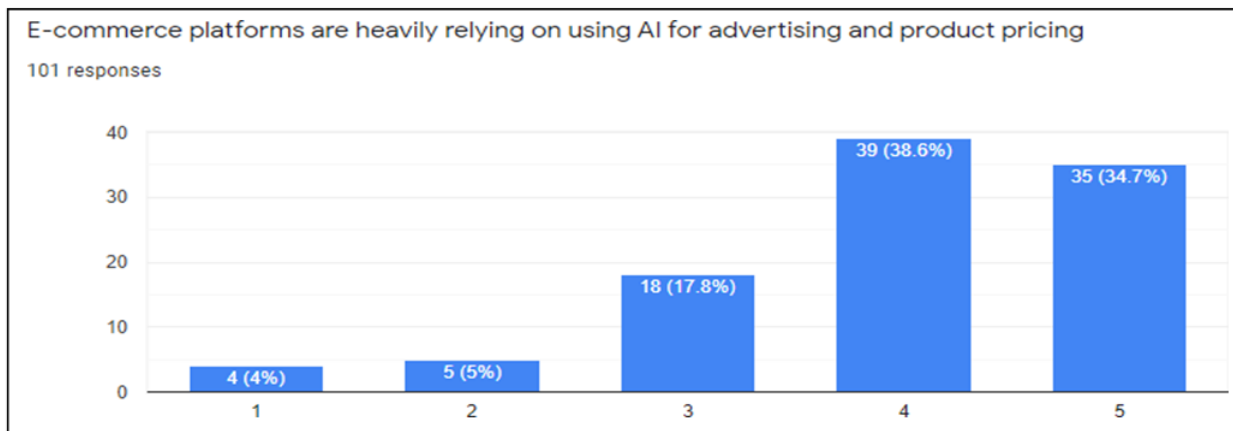

FIGURE 8
CUSTOMERS' ATTITUDES TOWARDS POP-UP MESSAGES AND RELEVANT PRODUCTS

Personalized and moment marketing is gaining popularity in the modern retail scenario. Big data combined with AI-powered technology solutions helps in predicting purchase behavior and helps to tailor marketing efforts accordingly.67.3% of the respondents believe that experimental marketing and personalized branding activities help in generating loyalty among customers (Figure 9). AI solutions form the base of modern-day experiential marketing activities both in the back end and front end.

The development of brand related experiences(experiental marketing) using AI will generate loyalty among customers

101 responses

FIGURE 9
CUSTOMERS' ATTITUDES TOWARDS BRAND-RELATED EXPERIENCE USING AL

AI-powered dynamic pricing and promotions have helped retailers to match demand-supply needs in the retail industry. Real-time data combined with AI solutions is used to develop dynamic pricing algorithms and promotional strategies. Product bundling and pricing for festival promotional offers and discount sales are also done with the help of an AI-powered algorithm. 73.3% of the survey respondents had a positive perception while 17.8% remained neutral regarding the use of AI in e-commerce for advertising and product pricing (Figure 10).

E-commerce platforms are heavily relying on using AI for advertising and product pricing

101 responses

FIGURE 10
AI POWERS DYNAMIC PRICING MECHANISMS AND PROMOTIONAL OFFERS

This validates our findings that AI powers dynamic pricing mechanisms and promotional offers which are mentioned in the secondary research framework.

AI, the Internet of things and cloud computing techniques are changing the landscape of the organized retail industry. Customers seek better in-store shopping experience while shopping

offline. Apart from product and price, customers seek a delightful shopping experience. Primary survey analysis tried to understand the perception of the customers regarding smart retail store features (Figure 11).
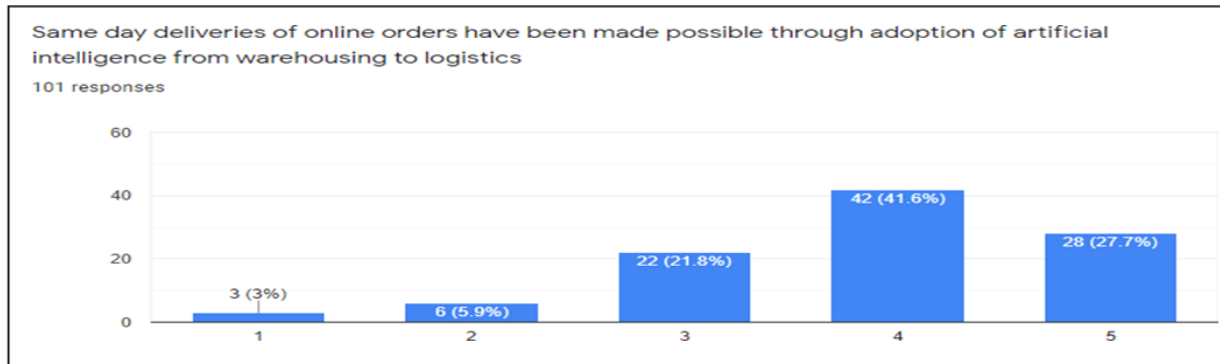
FIGURE 11
SMART RETAIL STORES- NEW OPPORTUNITIES FOR RETAIL LOGISTICS

79.2% of the survey respondents believe that in the near future, modern retail stores will have smart retail features like smart shelves, Virtual reality mirrors, digital interfaces and will provide a seamless shopping experience. Customers are looking forward to more technological advancements that improve the in-store shopping experience

AI powers automated material handling through robots and integrated shuttles in warehouses and stores. The supply chain is the backbone of the retail industry and impacts the customer experience. Supply chain activities are indirect yet crucial touch points of customer shopping experience.

The most familiar supply chain activity for end customers will be the delivery of their online orders. 69.3% of respondents are aware and have a positive perception of how the integration of AI is crucial for optimizing supply chain activities.

For a developing country like India, which is, technologically advancing ethics and privacy concerns pose a great roadblock for the adoption of AI in the retail industry. 87.1% of the survey respondents agreed to this statement.

However, there is a growing number of global customers who expect companies to use technology for the benefit of society and protect the privacy of personal data. Dentsu Aegis Network group (DAN) presented the results of the Digital Society Index 2020 study. The study involved 32 thousand people from 22 countries, including Russia. Experts focused on how the digital economy and people's attitudes to technology were affected by the COVID-19 pandemic. According to this survey, less than half of the world's Internet users believe that their personal data is protected. The lowest indicator in the surveyed markets was found in Russia. Only 19% of the country's users believe in protecting the privacy of their personal data. People are not sure that information about them is used in good faith, but at the same time, they share it more often and use online services more actively, experts say. According to the study, 8 out of 10 consumers will refuse goods or services if it turns out that the company used information about them unethically (Figure 12).

Most users do not want to share personal data. However, they still do this, often not aware of it. 21% of global consumers are ready to share data on viewed pages on the Internet, and 17% - information from their profiles on social networks. The DAN notes that Russians are more likely to provide personal data from the history of the browser (25%) than from social networks (13%).
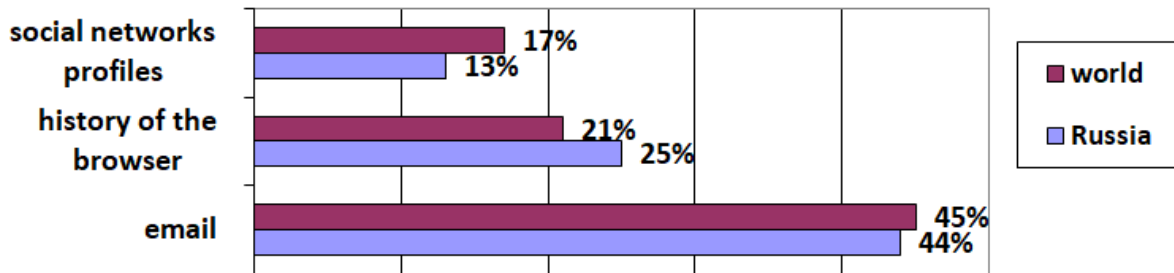
FIGURE 12
CUSTOMERS' ATTITUDES TOWARDS SHARING PERSONAL DATA

A third of respondents (both in the world and in Russia) refused to receive personalized advertising over the past year. A quarter of respondents (33% in Russia) installed an ad blocker. Consumers are also concerned about the ethics of using new technologies — such as facial recognition. However, about half of the respondents in the world (52% in Russia) are ready to make payments using Face-ID or Touch-ID systems. Thus, the challenge between personalized customer engagement strategies *vs* techlash (a strong negative reaction or backlash against the largest technology companies, or their services/ products) remains rather strong. Nevertheless, despite the general level of concern, customers appreciate the role and contribution of technology to improving the quality of life and solving social problems.

Summary of Results

Insights from the analysis emphasize adopting AI for developing personalized customer management solutions in retail marketing.

The research also tried to analyze various factors that customers hold important when it comes to the use of AI solutions in retail marketing. The majority of the survey respondents valued convenience for shoppers as the most important attribute. Exploratory factor analysis revealed that variables such as personalized promotions, Convenience for shoppers, Customer engagement exhibit a high degree of positive correlation and can be clubbed together as customer management factors. While using AI solutions to aid marketing strategies, retailers and marketers should consider the correlation between variables of the customer management factor. Retailers should focus on building smart stores to provide delightful and seamless in-store experience and optimize supply chain activities to reduce lag time for end customer experience Ethics and privacy concerns of customers are the major challenges for the adoption of AI practices in organized retail.

DISCUSSION

Artificial intelligence is a relatively new concept and awareness about various AI solutions in the retail industry is limited mostly to tech-savvy customers. This limited the sample size and demographics for primary research analysis. Primary research analysis for a larger sample would have generated better insights and increase the accuracy of the study. The research was based on the retail industry as a whole and not specific for any product category. The research study can be expanded to include more parameters on user experience and should be updated with the latest technological advancements to stay relevant to the industrial scenario. The study can also be used as a reference for any retailer or marketer for further analysis specific to any retail organization or marketing agency.

CONCLUSIONS

AI is in the very near future and will be beneficial specifically in the retail sector. AI could help with optimizing the relationship between the retailer and the shopper. The current trends have been defined during this research and confirmed the impact of artificial intelligence solution adoption powering retail marketing strategies on various retail touch points ranging from supply chain optimizations to in-store shopping experience.

Various attributes customers look forward to AI-powered solutions in retail are relevant personalized promotions, greater shopping convenience, smart in-store features, and reduced delivery times for online orders. These attributes fall under two factors, customer management factor and retailer infrastructure factor.

The factor model has been built based on the results of consumer perception research. The majority of surveyed customers are aware of the fact that their purchase history is used by retailers for personalized promotions and recommendations and had a positive perception towards this. Due to lack of awareness about artificial intelligence techniques, ethics and privacy concern is a major challenge for the growth of artificial intelligence adoption in the retail scenario.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

Aagaard, A., Presser, M., Beliatis, M., Mansour, H., & Nagy, S. (2018). A tool for internet of things digital business model innovation. In Proceedings of the 2018 IEEE Globecom Workshops (GC Wkshps), IEEE, 1–6.

Aloini, D., Bessant, J., Martini, A., & Von Stamm, B. (2013). Search practices for discontinuous innovation: Scale development and construct validation. *Technology Analysis & Strategic Management, 25*, 1139–1160.

Barykin, S., Kalinina, O., Aleksandrov, I., Konnikov, E., Yadikin, V., & Draganov, M. (2020). Personnel management digital model based on the social profiles' analysis. *Journal of Open Innovation: Technology, Market, and Complexity, 6*, 152.

Barykin, S.Y., Bakharev, V.V., Mottaeva, A.B., Aminov, K.I., & Ikramov, R.A. (2021). Features of a combined approach to corporate innovative strategic planning. *Academy of Strategic Management Journal, 20*, 1–10, Available at: https://www.abacademies.org/articles/features-of-a-combined-approach-to-corporate-innovative-strategic-planning.pdf.

Barykin, S.Y., Bochkarev, A.A., Sergeev, S.M., Baranova, T.A., Mokhorov, D.A., & Kobicheva, A.M. (2021). A methodology of bringing perspective innovation products to market. *Academy of Strategic Management Journal, 20*, 19. Available at: https://www.abacademies.org/articles/a-methodology-of-bringing-perspective-innovation-products-to-market.pdf.

Barykin, S.Y., Kapustina, I.V., Kirillova, T.V., Yadykin, V.K., & Konnikov, Y.A. (2020). Economics of Digital Ecosystems. *Journal of Open Innovation: Technology, Market, and Complexity, 6*, 124, doi:10.3390/joitmc6040124.

Barykin, S.Y., Smirnova, E.A., Sharapaev, P.A., Mottaeva, A.B. Development of the Kazakhstan digital retail chains within the EAEU E-commerce. *Academy of Strategic Management Journal 2(20)*, 1–18. Available at: https://www.abacademies.org/articles/development-of-the-kazakhstan-digital-retail-chains-within-the-eaeu-ecommerce-market.pdf.

Bataev, A.V. (2019). Big data: Evaluation of the basic trends of the Russian market. *In Proceedings of the 2019 14th International Conference on Advanced Technologies, Systems and Services in Telecommunications (TELSIKS),* IEEE, 396–399.

Bolton, R., Gustafsson, A., McColl-Kennedy, J., Sirianni, N., & Tse, D. (2014). Small details that make big differences. *Journal of Service Management, 2(25)*, 253–274, doi:10.1108/JOSM-01-2014-0034.

Bozhuk, S., Krasnostavskaia, N., Maslova, T., & Pletneva, N. (2019). The problems of innovative merchandise trade in the context of digital environment. *In Proceedings of the IOP Conference Series: Materials Science and Engineering*.

Bozhuk, S., Maslova, T., Kozlova, N., & Krasnostavskaia, N. (2019). Transformation of mechanism of sales and services promotion in digital environment. *In Proceedings of the IOP Conference Series: Materials Science and Engineering*.

Bozhuk, S.G., & Krasnov, A.S. (2017). Methodics of research of consumers psychographic characteristics in the Internet. *Proceedings of the 2017 International Conference "Quality Management, Transport and Information Security, Information Technologies", IT and QM and IS*, 166–172.

Burdakova, G., Byankin, A., Usanov, I., & Pankova, L. (2019). Smart technologies in education and formation of entrepreneurial competencies. *IOP Conference Series: Materials Science and Engineering, 497*, doi:10.1088/1757-899X/497/1/012066.

Chang, Y.W., & Chen, J. (2021). What motivates customers to shop in smart shops? The impacts of smart technology and technology readiness. *Journal of Retailing and Consumer Services, 58*, 102325,.

Cheng, J., Chen, W., & Gong, Y. (2018). Thoughts on the problem of small data. *In Proceedings of the IOP Conference Series: Materials Science and Engineering, 466*.

Chiang, C. (2012). Storey business intelligence and analytics: From big data to big impact. *MIS Quarterly, 36,* 1165.

Demirkan, H., & Spohrer, J. (2014). Developing a framework to improve virtual shopping in digital malls with intelligent self-service systems. *Journal of Retailing and Consumer Services, 21*, 860–868.

Fejling, T., Torosyan, E., Tsukanova, O., & Kalinina, O. (2019). Special aspects of digital technology-based brand promotion. IOP Conference Series: *Materials Science and Engineering, 497*.

Grewal, D., Roggeveen, A.L., & Nordfält, J. (2016). The future of retailing. *Journal of Retailing, 93*, 1–6, doi:10.1016/j.jretai.2016.12.008.

Gupta, S., Leszkiewicz, A., Kumar, V., Bijmolt, T., & Potapov, D. (2020). Digital analytics: Modeling for insights and new methods. *Journal of Interactive Marketing, 51*, 26–43.

Kapustina, I., Pereverzeva, T., Stepanova, T., & Rusu, I. (2019). Convergence of institutes of retail traditional and digital economy Convergence of institutes of retail traditional and digital economy.

Kapustina, L.M., Agababaev, M.S., & Drevalev, A.A. (2019). Advertising concepts evolution and benefits of promotion robots in the digital economy.

Khareva, V., Voronova, O., & Khnykina, T. (2020). Development of a reference model for the "purchase" business process as an element of modeling basic business processes at FMCG chain retailing companies. *IOP Conference Series: Materials Science and Engineering, 940*.

Kharlamova, T., Grashchenko, N., Timofeeva, A., & Okorokov, R. (2019). Personification of the service based on the Concept "internet of things." *IOP Conference Series: Materials Science and Engineering, 2, 49*7.

Konnikov, E., Dubolazova, Y., & Konnikova, O. (2020). Analysis and prospects of the digital economy in Russia analysis and prospects of the digital economy in Russia, doi:10.1088/1757-899X/940/1/012026.

Konnikov, E., Dubolazova, Y., Konnikova, O., & Malevskaia-Malevich, E. (2020). Analysis and Prospects of the Digital Economy in Russia. *IOP Conference Series: Materials Science and Engineering, 940*.

Konnikov, E., Konnikova, O., & Leventsov, V. (2019). IT Services market as a driver for the development of the artificial intelligence market. *IOP Conference Series: Materials Science and Engineering, 497*.

Kramer, P. (2018). Retailers turn to AI to enhance shopper experience. *Chain Drug Review, 40,* 53.

Krasnov, A., Krasnov, S., Griffith, R., Draganov, M., & Kostenarov, K. (2020). Conversion's forecast model for ADs in social networks. *IOP Conference Series: Materials Science and Engineering, 94*0, doi:10.1088/1757-899X/940/1/012074.

Krasnov, S., Sergeev, S., Titov, A., & Zotova, Y. (2019). Modelling of digital communication surfaces for products and services promotion. IOP Conference Series: *Materials Science and Engineering, 49*7, doi:10.1088/1757-899X/497/1/012032.

Krasyuk, I., Kirillova, T., Nazarova, E., Dudakov, G., & Moshkin, I. (2020). Marketing technologies in the organization of business processes of retail trade. *IOP Conference Series: Materials Science and Engineering, 940*.

Krasyuk, I., Medvedeva, Y., Baharev, V., & Chargaziya, G. (2019). Evolution of strategies of retail and technological systems under broad digitalization conditions. *IOP Conference Series: Materials Science and Engineering, 497*, doi:10.1088/1757-899X/497/1/012124.

Krasyuk, I., Yanenko, M., & Nazarova, E. (2020). Conceptual and strategic framework for the digitalization of modern retail as part of innovative marketing, 09006, 1–6.

Krymov, S., Kolgan, M., Suvorova, S., & Martynenko, O. (2019). Digital technologies and transformation of modern retail. *IOP Conference Series: Materials Science and Engineering, 497*, 012126, doi:10.1088/1757-899X/497/1/012126.

Kumar, V., Rajan, B., Venkatesan, R., & Lecinski, J. (2019). Understanding the role of artificial intelligence in personalized engagement marketing. *California Management Review,* 61, 135–155.

Liu, L., Zhou, B., Zou, Z., Yeh, S.C., & Zheng, L.A. (2018). Smart unstaffed retail shop based on artificial intelligence and IoT. In Proceedings of the 2018 IEEE 23rd International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD), IEEE, 1–4.

Luce, L. (2019). Artificial Intelligence for fashion, Apress: Berkeley, CA, ISBN 978-1-4842-3930-8.

Malapane, T.A. (2019). The impact of artificial intelligence and internet of things in the transformation of E-Business sector. *In Proceedings of the 2019 Systems and Information Engineering Design Symposium (SIEDS),* IEEE, 1–5.

Maslova, T., Pletneva, N., Althonayan, A., Tarasova, E., Krasnov, A. Transformation of consumer behavior in the tourism industry in the conditions of digital economy. *IOP Conference Series*: *Materials Science and Engineering, 940.*

Mehta, R., Singh, H., Banerjee, A., Bozhuk, S., & Kozlova, N. (2020). Comparative analysis of the consequences of purchasing models transformation within the global digitalization of the economy. *IOP Conference Series: Materials Science and Engineering, 2020,* 940, doi:10.1088/1757-899X/940/1/012071.

Okorokov, R., Timofeeva, A., & Kharlamova, T. (2019). Building intellectual capital of specialists in the context of digital transformation of the Russian economy. IOP Conference Series: *Materials Science and Engineering, 497*, doi:10.1088/1757-899X/497/1/012015.

Pantano, E., & Gandini, A. (2017). Exploring the forms of sociality mediated by innovative technologies in retail settings. *Computers in Human Behavior, 77*, 367–373.

Pantano, E., Priporas, C.V., & Dennis, C. (2017). Managing consumers' dynamics within the emerging smart retail settings: Introduction to the special issue. *Technological Forecasting and Social Change, 124*, 225–227, doi:10.1016/j.techfore.2017.06.018.

Pantano, E., Priporas, C.V., & Dennis, C. (2018). A new approach to retailing for successful competition in the new smart scenario. *International Journal of Retail & Distribution Management, 4*6, 264–282, doi:10.1108/IJRDM-04-2017-0080.

Pham, D.T. (1990). Artificial intelligence in manufacturing. *Engineering Applications of Artificial Intelligence, 3*, 249.

Provost, F., Dalessandro, B., Hook, R., Zhang, X., & Murray, A. (2009). Audience selection for on-line brand advertising: Privacy-friendly social network targeting. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 707–715, doi:10.1145/1557019.1557098.

Ranjan, J., & Foropon, C. (2021). Big data analytics in building the competitive intelligence of organizations. *International Journal of Information Management, 56*, 102231.

Saponaro, M., le Gal, D., Gao, M., Guisiano, M., & Maniere, I.C. (2018). Challenges and opportunities of artificial intelligence in the fashion world. In proceedings of the 2018 International Conference on Intelligent and Innovative Computing Applications (ICONIC), IEEE, 1–5.

Series, I.O.P.C., Science, M. (2019). Theoretical aspects of strategic sustainability of a trading enterprise under digitally transforming economy Theoretical aspects of strategic sustainability of a trading enterprise under digitally transforming economy, doi:10.1088/1757-899X/497/1/012128.

Shamina, L., Borisova, I., Syrneva, E., & Zdolnikova, S. (2019). Features of forecasting process in modern digital society. IOP Conference Series: *Materials Science and Engineering, 497.*

Sokolova, I., Orlovtseva, O., Leskina, O., Gubanova, E., & Kanikhin, T. (2019). Application of artificial intelligence capabilities for practical needs of participants in economic processes. *Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019: Education Excellence and Innovation Management through Vision*, 8592–8602.

Weber, F., & Schütte, R.A. (2019). Domain-oriented analysis of the impact of machine learning—The case of retailing. *Big Data and Cognitive Computing, 3*, 11.

Wu, J., Wu, T., & Schlegelmilch, B.B. (2020). Seize the day: How online retailers should respond to positive reviews. *Journal of Interactive Marketing, 52*, 52–60, doi:10.1016/j.intmar.2020.04.008.

Xu, J., Hu, Z., Zou, Z., Zou, J., Hu, X., Liu, L., & Zheng, L. (2020). Design of smart unstaffed retail shop based on IoT and artificial intelligence. *IEEE Access, 8*, 147728–147737.

Zhilenkova, E., Budanova, M., Bulkhov, N., & Rodionov, D. (2019). Reproduction of intellectual capital in innovative-digital economy environment. IOP Conference Series: *Materials Science and Engineering, 497*, doi:10.1088/1757-899X/497/1/012065.

Zhou, Q., Xu, Z., & Yen, N.Y. (2019). User sentiment analysis based on social network information and its application in consumer reconstruction intention. *Computers in Human Behavior, 100*, 177–183.