ARTIFICIAL INTELLIGENCE IN RETAIL STORES: EVALUATION OF READINESS TO ADOPT AI TECHNOLOGIES AMONG CONSUMERS

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This research aims to explore consumer attitudes toward the incorporation of Artificial Intelligence (AI) in physical retail settings, specifically examining how prior AI experiences, perceived risks, consumer self-efficacy in AI usage, and gender differences influence their readiness to embrace AI technologies in retail environments. Employing a quantitative cross-sectional survey methodology, the study gathered data from 243 consumers knowledgeable about AI who have engaged in shopping activities within physical stores over the past year. Through descriptive statistics, Pearson's correlation, and t-tests, the analysis reveals a direct positive correlation between consumers' previous AI interactions and their openness to AI in retail. Conversely, perceived risks are found to affect their willingness to engage with AI technologies negatively. The research is geographically limited to Slovenia, which may restrict the applicability of its findings to other contexts. The study emphasizes the potential for increasing consumer acceptance of AI in retail through the introduction of strategic technology and the emphasis on security features. Contributing original insights into the dynamics of consumer perceptions of AI within the physical retail sector, this work offers valuable implications for retailers aiming to optimize AI integration strategies to mitigate consumer apprehensions and accommodate diverse demographic preferences.

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1 Introduction

Artificial intelligence (AI) is reshaping marketing, enhancing customer engagement through personalized experiences, and increasing efficiency (Xu et al., 2021; Sterne, 2017). It supports the marketing evolution towards automated, data-driven value creation (American Marketing Association, 2017) and streamlines operations by automating tasks, improving customer service, and enabling precise marketing strategies (Martinez-Lopez & Casillas, 2013). AI's growth, driven by machine learning and natural language processing, offers transformative potential for marketing (Bornet et al., 2021). However, ethical and privacy issues associated with AI use necessitate careful consumer trust management (Crittenden, 2019; Hansen, D., 2010). The understanding of consumer attitudes towards AI is crucial, especially considering privacy concerns and the desire for human interaction (Moore et al., 2022; Chen & Chang, 2023). Studies indicate that prior AI experiences and factors like gender and self-efficacy significantly influence consumer openness to AI in retail (Chen & Chang, 2023; Sohn, 2024; Abed, 2024; Joshi et al., 2024), underscoring the need to align AI integration with consumer expectations to ensure growth and satisfaction.

2 Concepts and theoretical background

Use of Artificial Intelligence in Marketing

In the rapidly evolving field of digital marketing, artificial intelligence (AI) plays a pivotal role, enabling tailored customer interactions and efficient marketing strategies through data-driven insights (American Marketing Association, 2017; Xu et al., 2021). Machine learning and natural language processing are instrumental in understanding and predicting consumer behavior, enriching the marketing toolkit with capabilities previously requiring human intelligence (Martinez-Lopez & Casillas, 2013).

Augmented Reality, Blockchain, drones, and the Internet of Things drive forward marketing personalization and efficiency, marking a shift towards more interactive and data-centric marketing approaches (Crittenden, 2019; Azuma, 1997). However, the integration of AI in marketing also surfaces concerns regarding privacy, trust, and the ethical use of technology (Grewal, 2021). Moreover, consumer attitudes

towards AI, influenced by previous technological experiences and demographic factors, play a crucial role in accepting AI applications in retail settings (Joshi et al., 2024; Chen & Chang, 2023).

Utilization of Artificial Intelligence in Physical Retail Stores

AI technology in the retail sector, as outlined by Lin (2023), employs algorithms to analyze customer data for personalized marketing, efficient inventory management, and secure transactions, contributing to retail growth. Chen and Chang (2023) detail AI's role in enhancing physical store experiences through smart technologies, facilitating autonomous shopping, and reducing staff interaction. While Anica-Popa et al. (2021) emphasize AI's advantages in improving customer service and operational efficiency, Mahmoud et al. (2020) caution against potential negatives, such as job displacement, skill shortages, privacy concerns, and societal impacts. Balancing AI's benefits with its challenges is essential for a progressive retail environment (Donepudi et al., 2020; Mahmoud et al., 2020).

Existing Research on Customer Attitudes towards Artificial Intelligence in Physical Retail Stores

Studies indicate diverse consumer reactions to artificial intelligence (AI) in retail settings. Moore et al. (2022) found that while some consumers appreciate the innovation of AI assistants, others prefer traditional human interaction, emphasizing the social implications of AI in retail. Chen et al. (2022) examined consumers' perceptions of AI in marketing communications. When interpreting AI, consumers ussualy focuse on functionality, emotions, and comparisons with humans. Overall, they accepted AI in marketing communications without significantly affecting their product evaluations. In Gursoy et al.'s (2019) study, they explored the factors influencing the acceptance of AI devices in the services context. Factors such as social influence, motivation, anthropomorphism, and emotions were identified as significant in the acceptance process. Pillai et al. (2020) predicted customers' purchase intentions in stores using AI. Customers perceived these stores positively, and their enjoyment and adaptability were key predictors of purchase intentions.

3 Conceptual framework and research hypotheses

Our study investigates four hypotheses within the context of consumer readiness for AI in physical retail. These hypotheses are grounded in the literature, aiming to enrich the discourse on smart retail and AI adoption. To explore the dynamics of consumer behavior towards artificial intelligence (AI) technologies in the retail sector, we investigate various factors that may influence their readiness to adopt such innovations in physical stores. These factors range from prior experience with AI, perceived risks regarding confidentiality, self-assessment of the ability to manage AI technologies, to demographic differences, particularly gender. The formulation of our hypotheses is grounded in the review of recent literature, which provides insights into how these factors potentially affect consumer attitudes and behaviors towards adopting AI technologies in retail environments.

Firstly, drawing on the works of Chen and Chang (2023), Sohn (2024), Abed (2024), and Liu et al. (2024), we recognize the potential impact of consumers' prior experience with AI technologies on their readiness to embrace upcoming AI innovations in physical retail settings. These studies collectively suggest that familiarity with AI and related technologies could enhance consumers' openness and readiness for future AI applications in retail contexts. The underlying assumption is that prior experience with AI can reduce uncertainties and increase the comfort level with technology, thereby fostering a positive attitude towards new AI deployments. Therefore, we propose our first hypothesis *H1: There is a statistically significant positive correlation between consumers' prior experience with AI technologies and their readiness to adopt potential AI technologies in physical stores.*

Secondly, the relationship between consumers' perceived risks, especially concerning data confidentiality, and their readiness to adopt AI technologies in retail settings is of interest. Citing Schepman and Rodway (2020) and Abed (2024), we note that concerns over data privacy and security are significant factors that could hinder the willingness of consumers to adopt AI technologies. The apprehension about how personal information is handled and the potential for breaches could deter consumers from engaging with AI-based services. Consequently, we introduce our second hypothesis H2: There is a statistically significant negative correlation between consumers' expressed perceived risk regarding confidentiality and their readiness to adopt AI in physical stores.

Thirdly, we consider the role of self-efficacy in technology adoption, particularly how consumers' self-assessment of their ability to manage AI technologies influences their interest in adopting these technologies. Wang & Zhao (2024) emphasize the importance of self-efficacy in mitigating perceived risks and enhancing engagement with technology. The belief in one's ability to effectively use and manage AI technologies can make consumers more inclined to adopt them. Thus, we propose our third hypothesis H3: There is a statistically significant positive correlation between the self-assessment of consumers' ability to manage AI technologies and their interest in adopting these technologies in physical stores.

Lastly, the examination of demographic differences, specifically between male and female consumers, in their readiness to adopt AI technologies in physical stores is crucial. Joshi et al. (2024) provide a basis for considering how demographic factors may play a role in shaping consumer attitudes towards AI in retail. Gender differences, in particular, may influence perceptions, expectations, and readiness to engage with AI technologies. Therefore, we propose our fourth hypothesis *H4: There is a statistically significant difference between male and female consumers in their readiness to adopt AI technologies in physical stores*.



Figure 1: Conceptual Research Model

In Figure 1, we present the conceptual research model illustrating the relationships between hypotheses and the examined constructs. The model is grounded in four hypotheses focusing on constructs: customers' prior experiences with AI technologies, perceived risk in using AI in physical stores, self-assessed capability in

managing AI technologies, and gender as a sexual identity. These constructs collectively influence the willingness to adopt AI technologies in physical stores.

4 Methodology

In this study, we conducted a quantitative research on customers' perceptions of AI in physical retail stores. We designed a questionnaire with 7-point and 5-point Likert scale questions. This questionnaire was adapted by Meuter et al. (2005), and was administered online to a sample of customers who had shopped in physical stores in the past year and were familiar with AI.

For sample acquisition, we employed a combination of a purposive approach, engaging participants from the author's network and social circles, and chain sampling, encouraging participants to share the questionnaire with their acquaintances, friends, and relatives. The sample includes 243 respondents. Respondents provided insights into their experiences with AI, associated risks, self-efficacy in managing AI, and demographic details via the 1KA platform. Data analysis, encompassing descriptive statistics, Pearson's correlation, and t-tests, was conducted using SPSS, with results presented through visual aids. Informed consent was obtained from all respondents, and their data were treated confidentially.

5 Results

Our analysis reveals a significant positive correlation, indicating that consumers with more extensive experience with AI technologies are more inclined to use them in stores. This is evidenced by positive Pearson coefficients between statements of AI technology use in everyday life (T1) and willingness to try such technologies in physical stores (T4, T5, T6), with coefficients ranging from 0.368 to 0.411 (p < 0.001).

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	Correlations									
		Т1	Т2	Т3	Τ4	Т5	Т6			
T1	Pearson Correlation	1	550**	.741**	.383**	.411**	.368**			
	Sig. (2-tailed)		<.001	<.001	<.001	<.001	<.001			
	Ν	215	215	215	215	215	215			
Т2	Pearson Correlation	550**	1	557**	276 ^{**}	255**	227**			
	Sig. (2-tailed)	<.001		<.001	<.001	<.001	<.001			
	Ν	215	215	215	215	215	215			
Т3	Pearson Correlation	.741**	557**	1	.438 ^{**}	.472**	.428**			
	Sig. (2-tailed)	<.001	<.001		<.001	<.001	<.001			
	Ν	215	215	215	215	215	215			
T4	Pearson Correlation	.383**	276**	.438**	1	.843**	.760**			
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	<.001			
	Ν	215	215	215	215	215	215			
Т5	Pearson Correlation	.411**	255**	.472**	.843**	1	.848**			
	Sig. (2-tailed)	<.001	<.001	<.001	<.001		<.001			
	Ν	215	215	215	215	215	215			
Т6	Pearson Correlation	.368**	227**	.428**	.760 ^{**}	.848**	1			
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001				
	Ν	215	215	215	215	215	215			

Table 1: Pearson's Correlation for Hypothesis H1

**. Correlation is significant at the 0.01 level (2-tailed).

The analysis for H1 (Table 1) demonstrates a significant positive correlation between consumers' frequent use of AI technologies in daily life (T1) and their willingness to try such technologies in physical stores (T4, T5, T6), evidenced by Pearson coefficients of 0.383, 0.411, and 0.368 (p < 0.001). It is noteworthy that statement T2 is formulated in the opposite direction, explaining the negative correlation with statements about willingness. However, it still supports the basic assumption of H1, as higher experiences with the use of technologies correspond to a greater willingness to use them in stores. Based on these findings, we can confirm Hypothesis H1 and conclude that consumers' previous experience with artificial intelligence technologies significantly influences their willingness to adopt these technologies in physical stores.

Using one-way Pearson's correlation coefficient, we reanalyzed the relationship between statements about risk and privacy perception (T7, T8, T9, T10) and statements about willingness to use these technologies in physical stores (T4, T5, T6).

				Correlatio	ons				
		Т7	Т8	Т9	T10	T11	Т4	Т5	Т6
Т7	Pearson Correlation	1	.345**	.683**	.632**	207**	344**	376**	292**
	Sig. (2-tailed)		<.001	<.001	<.001	.002	<.001	<.001	<.001
	N	215	215	215	215	215	215	215	215
Т8	Pearson Correlation	.345**	1	.479**	.381**	472**	450**	496**	453**
	Sig. (2-tailed)	<.001		<.001	<.001	<.001	<.001	<.001	<.001
	Ν	215	215	215	215	215	215	215	215
Т9	Pearson Correlation	.683**	.479**	1	.706**	320**	383**	439**	346**
	Sig. (2-tailed)	<.001	<.001		<.001	<.001	<.001	<.001	<.001
	Ν	215	215	215	215	215	215	215	215
Т10	Pearson Correlation	.632**	.381**	.706**	1	347**	447**	458**	373**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	<.001	<.001	<.001
	Ν	215	215	215	215	215	215	215	215
T11	Pearson Correlation	207**	472**	320**	347**	1	.575**	.643**	.653**
	Sig. (2-tailed)	.002	<.001	<.001	<.001		<.001	<.001	<.001
	N	215	215	215	215	215	215	215	215
T4	Pearson Correlation	344**	450**	383**	447**	.575**	1	.843**	.760**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001		<.001	<.001
	Ν	215	215	215	215	215	215	215	215
Т5	Pearson Correlation	376**	496**	439**	458**	.643**	.843**	1	.848**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001		<.001
	Ν	215	215	215	215	215	215	215	215
Т6	Pearson Correlation	292**	453**	346**	373**	.653**	.760**	.848**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001	
	N	215	215	215	215	215	215	215	215

Table 2: Pearson's Correlation for Hypothesis H2

**. Correlation is significant at the 0.01 level (2-tailed).

Analysis for H2 (Table 2) revealed a significant negative correlation between consumers' data confidentiality concerns and their willingness to use AI technologies in physical stores, evidenced by Pearson coefficients ranging from -0.344 to -0.458 (p < 0.001). Conversely, positive views on technology effectiveness correlated positively with willingness to use AI, with coefficients between 0.575 and 0.653. Based on these findings, we can confirm Hypothesis H2 and conclude that consumers' perception of risk and privacy in connection with the use of artificial intelligence technologies has a statistically significant impact on their willingness to adopt these technologies in physical stores.

To explore the connection between consumers' confidence in using AI technologies (T12, T14, T16, T17) and their openness to adopting such technologies in physical retail settings (T4, T5, T6) we utilized Pearson's correlation coefficient (Table 3)

				Corre	elations					
		T12	T13	T14	T15	T16	T17	Τ4	Т5	Т6
T12	Pearson Correlation	1	380**	.744**	563**	.477**	.651**	.380**	.381**	.326
	Sig. (2-tailed)		<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
	N	215	215	215	215	215	215	215	215	215
Т13	Pearson Correlation	380**	1	396**	.348**	124	349**	046	095	131
	Sig. (2-tailed)	<.001		<.001	<.001	.069	<.001	.502	.167	.056
	N	215	215	215	215	215	215	215	215	215
Т14	Pearson Correlation	.744**	396**	1	617**	.496**	.698**	.381**	.357**	.320*
	Sig. (2-tailed)	<.001	<.001		<.001	<.001	<.001	<.001	<.001	<.001
	N	215	215	215	215	215	215	215	215	215
T15	Pearson Correlation	563**	.348**	617**	1	383**	567**	258**	223**	200*
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	<.001	<.001	<.001	.003
	N	215	215	215	215	215	215	215	215	215
T16	Pearson Correlation	.477**	124	.496**	383**	1	.534**	.431**	.402**	.369
	Sig. (2-tailed)	<.001	.069	<.001	<.001		<.001	<.001	<.001	<.001
	N	215	215	215	215	215	215	215	215	215
T17	Pearson Correlation	.651**	349**	.698**	567**	.534**	1	.333**	.325**	.308
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001		<.001	<.001	<.001
	N	215	215	215	215	215	215	215	215	215
Т4	Pearson Correlation	.380**	046	.381**	258**	.431**	.333**	1	.843**	.760
	Sig. (2-tailed)	<.001	.502	<.001	<.001	<.001	<.001		<.001	<.001
	N	215	215	215	215	215	215	215	215	215
Т5	Pearson Correlation	.381**	095	.357**	223**	.402**	.325**	.843**	1	.848
	Sig. (2-tailed)	<.001	.167	<.001	<.001	<.001	<.001	<.001		<.001
	N	215	215	215	215	215	215	215	215	215
Т6	Pearson Correlation	.326**	131	.320**	200**	.369**	.308**	.760**	.848**	1
	Sig. (2-tailed)	<.001	.056	<.001	.003	<.001	<.001	<.001	<.001	
	N	215	215	215	215	215	215	215	215	215

Table 3: Pearson's Correlation for Hypothesis H3

**. Correlation is significant at the 0.01 level (2-tailed).

The analysis revealed statistically significant positive correlations, notably between T14 and T4 (r = 0.381, p < 0.001), affirming that greater self-confidence in managing AI technologies correlates with increased willingness to engage with these technologies in-store. Based on these findings, we can confirm H3, concluding that consumers' self-assessment of their ability to use AI technologies statistically significantly influences their willingness to accept these technologies in physical stores.

Finally, differences between men and women were analyzed with an independent samples t-test. Group 1, representing female consumers, and Group 2, representing male consumers, were compared across three statements regarding their readiness to use AI technologies.

	Independent Samples Test												
		Levene's Test fo Varian			t-test for Equality of Means								
		F	Sig.	t	df		icance Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Differe			
T4	Equal variances assumed	3.024	.084	-1.538	212	.063	.125	297	.193	677	.084		
	Equal variances not assumed			-1.660	89.163	.050	.100	297	.179	652	.058		
T5	Equal variances assumed	.936	.334	-2.162	212	.016	.032	443	.205	847	039		
	Equal variances not assumed			-2.262	84.570	.013	.026	443	.196	832	054		
Т6	Equal variances assumed	.203	.653	-2.865	212	.002	.005	605	.211	-1.021	189		
	Equal variances not assumed			-2.898	80.089	.002	.005	605	.209	-1.020	190		

Table 4: Independent Samples T-Test for Hypothesis H4

The results of the analysis for Hypothesis H4 indicate (Table 16) that:

- For statement T4 ("I am willing to try artificial intelligence technologies in physical stores"), there was no statistically significant difference between men and women (t(212) = -1.538, p = 0.125).
- For statement T5 ("I am willing to accept the use of artificial intelligence technologies in physical stores"), there was a statistically significant difference between men and women (t(212) = -2.162, p = 0.032), indicating a difference in their readiness.
- Similarly, for statement T6 ("I would like to see more use of artificial intelligence technologies in physical stores"), the difference between men and women was statistically significant (t(212) = -2.865, p = 0.005).

Based on these findings and the relevance of statement T5, we can conclude that there are statistically significant differences between men and women in their readiness to accept artificial intelligence technologies in physical stores.

6 Discussion

The study validates the hypothesis that consumers with prior experience with AI are more inclined to adopt such technologies in physical stores, underscoring the significance of familiarity and comfort with AI in shaping consumer readiness. The findings also underscore the critical role of perceived risk in consumer acceptance of AI, where concerns over privacy and data security emerge as significant barriers. Interestingly, our analysis revealed that consumer confidence in using AI technologies and gender differences also play pivotal roles in the adoption of AI in retail settings, with males generally more open to embracing these technologies. For retailers, these insights offer actionable strategies to enhance AI adoption among consumers. Gradual technology implementation, prioritizing security, and transparency, and providing educational support emerge as key recommendations. Additionally, tailoring marketing and product offerings to address gender-specific preferences could further refine consumer targeting and increase technology acceptance. Future research directions should explore the impact of AI across different retail sectors, demographic factors on AI acceptance, strategies to mitigate perceived risks, and the effectiveness of different educational approaches. The nuanced understanding of these areas can significantly contribute to the strategic deployment of AI in retail, maximizing both consumer satisfaction and business efficiency.

In conclusion, our study provides valuable insights into consumer attitudes towards AI in the retail sector, highlighting the importance of experience, risk perception, confidence, and gender differences in shaping these attitudes. The confirmation of all proposed hypotheses not only enriches the academic discourse on AI in retail but also offers practical guidelines for retailers aiming to navigate the complexities of AI integration. Future research, while addressing the limitations of this study, holds the potential to further unravel the multifaceted dynamics of AI adoption in the retail landscape, offering a roadmap for the successful integration of technology in enhancing consumer experiences.

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