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Digital literacy and guest perceptions of AI chatbot services in hotels: A field study on enjoyment, satisfaction, and loyalty

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Abstract

Purpose – This study investigates the relationship between digital literacy and hotel guests' perceptions of AI chatbot services, focusing on three key dimensions: enjoyment, satisfaction, and loyalty. Drawing on empirical data from a field survey conducted in Serbia and Montenegro, the research explores how varying levels of digital literacy influence guests' evaluations of AI chatbot-assisted interactions and their behavioral intentions. **Methodology** – A purposive sampling approach was used to recruit participants with prior experience using hotel AI chatbots during booking, check-in, or customer service inquiries. Descriptive statistics, multiple regression analysis, and comparative mean testing were conducted using IBM SPSS Statistics 26.0. **Findings** – The results reveal that digital literacy significantly influences enjoyment, satisfaction, and loyalty toward AI chatbot customer services in hotels. Serbian respondents consistently reported higher mean scores across all dimensions, with the most pronounced difference observed in loyalty. **Implications** – The findings contribute to the theoretical discourse on customer–AI interaction by positioning digital literacy as an important explanatory factor in shaping user experience. Practically, the results offer actionable insights for hotel managers and service designers, highlighting the importance of tailoring AI-based service strategies to guests' digital capabilities to optimize satisfaction and encourage repeat usage.

Keywords: hotel guest satisfaction, AI chatbot services, guest loyalty, digital literacy
JEL classification: L83, M31, O33

Digitalna pismenost i percepcije gostiju o AI četbot servisima u hotelima: Terensko istraživanje o uživanju, zadovoljstvu i lojalnosti

Sažetak

Svrha – Ovaj rad istražuje odnos između digitalne pismenosti i percepcije hotelskih gostiju o AI četbot servisima, sa fokusom na tri ključne dimenzije: uživanje, zadovoljstvo i lojalnost. Na osnovu empirijskih podataka prikupljenih terenskim istraživanjem u Srbiji i Crnoj Gori, rad analizira kako različiti nivoi digitalne pismenosti utiču na ocenu interakcija sa AI

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četbotovima i na ponašanje gostiju. **Metodologija** – Upitnik je plasiran ciljanom uzorku onih ispitanika koji su imali prethodno iskustvo sa hotelskim AI četbotovima prilikom rezervacije, prijave ili korisničke podrške. Deskriptivna statistika, analiza višestruke regresije i testiranje razlika u srednjim vrednostima sprovedeni su pomoću softverskog paketa IBM SPSS Statistics 26.0. **Rezultati** – Rezultati pokazuju da digitalna pismenost značajno utiče na uživanje, zadovoljstvo i lojalnost gostiju prema AI četbot servisima u hotelima. Ispitanici iz Srbije dosledno su pokazivali više nivoe u svim segmentima, a najveća razlika zabeležena je u segmentu lojalnosti. **Implikacije** – Rezultati pružaju teorijski doprinos teorijskom diskursu o interakciji korisnika sa veštačkom inteligencijom, ističući digitalnu pismenost kao ključni objašnjavajući faktor u oblikovanju korisničkog iskustva. Sa praktičnog stanovišta, rezultati pružaju korisne uvide za menadžere hotela i dizajnere usluga, naglašavajući važnost prilagođavanja AI uslužnih strategija digitalnim sposobnostima gostiju kako bi se optimizovalo zadovoljstvo i ohrabrila ponovna upotreba.

Ključne reči: zadovoljstvo hotelskih gostiju, AI četbot servisi, lojalnost gostiju, digitalna pismenost
JEL klasifikacija: L83; M31; O33

1. Introduction

Artificial intelligence (AI) encompasses a range of tools and techniques that enable machines to simulate essential aspects of human cognition, such as language comprehension, reasoning, learning, and problem-solving, while also recognizing and responding to various sensory inputs (Ghandour, 2021). AI systems are able to analyze their environment, interpret information independently, draw conclusions, and perform appropriate actions and activities (Lukić Nikolić & Andrian Sredojević, 2025). Over time, AI technologies refine their performance by assimilating experience and adapting through iterative learning processes (Kaya, 2019). Contemporary AI systems can detect complex patterns, derive insights from data, and make informed predictions or decisions, thereby performing tasks that traditionally required human intelligence and expertise (Boustani, 2022). In hospitality, AI-driven tools have become essential to modern hotel management, optimizing guest interactions, handling repetitive inquiries, and improving the overall efficiency of service delivery (Cozzio et al., 2025; Wüst & Bremser, 2025). Their deployment not only reduces the workload of front-line employees but also necessitates new employee competencies in digital literacy, system management, and adaptive communication (Garabinović & Lukić Nikolić, 2025). The tourism and hospitality employ a broad spectrum of AI and robotic technologies, including reception assistants, luggage carriers, concierge robots, tour guides, automated service units (Cozzio et al., 2025), and video games that enabled almost realistic experience and feelings (Nikolić & Leković, 2025). Within hotels, such AI solutions and robots perform a wide variety of functions, ranging from check-in and housekeeping to food service, entertainment, and information provision (Chen et al., 2023; Huang et al., 2021). By leveraging AI-driven insights, hospitality businesses can tailor marketing campaigns, customize promotional offers, and foster deeper customer engagement (Jevtić et al., 2025). Moreover, AI-powered analytics play a pivotal role in strategic decision-making by uncovering market trends and consumer behavior patterns, thereby enhancing the precision and impact of targeted marketing efforts (Sahota, 2024).

Among the most widely implemented AI applications in tourism are *chatbots*, which support diverse functions from basic room reservations to personalized travel recommendations (Wüst & Bremser, 2025). Chatbots are computer programs that simulate human communication using text, audio, or facial expressions (Ranieri et al., 2024). They perform efficient tasks such as customer service, sales support, and information retrieval by offering

fast, personalized, and reliable automated interactions (Lee et al., 2023). A hotel AI chatbot streamlines guest communication by offering instant, 24/7 support for reservations, front desk queries, housekeeping requests, and basic payment information (Hollander, 2025). Research indicates that AI can substantially enhance operational efficiency, improve customer experience, and create competitive advantages through cost reduction and service innovation (Cozzio et al., 2025). Despite these advancements, limited attention has been paid to the role of digital literacy in shaping guests' perceptions, experiences, and behavioral outcomes related to AI-based services (Della Corte et al., 2025; Nanu, 2025). Digital literacy determines how effectively individuals interact with AI systems, influencing their perceived enjoyment, satisfaction, and loyalty during service encounters. Understanding this relationship is particularly relevant in the context of AI chatbots, which increasingly mediate guest communication and service personalization (Magano et al., 2025).

Therefore, this paper aims to examine the relationship between digital literacy and guest perceptions of AI chatbot services in hotels, with a specific focus on enjoyment, satisfaction, and loyalty. Drawing upon empirical data from a field study, this research investigates how varying levels of digital literacy affect guests' evaluation of chatbot-assisted services and subsequent behavioral intentions.

2. Background

The adoption of AI in the hospitality industry is influenced by operational and emotional factors (Rasheed et al., 2024). Operational factors encompass the tangible benefits of AI, including enhanced productivity, process optimization, and service customization, each contributing to improved customer engagement and loyalty. Emotional factors, by contrast, reflect consumers' affective responses and intrinsic motivations, shaped by perceptions of human likeness, personalization, and interactivity (Alam et al., 2024; Belanche et al., 2021). Together, these factors support the integration of AI technologies that elevate service quality, boost guest satisfaction, and align with evolving customer expectations (Cozzio et al., 2025).

Customer satisfaction is widely recognized as a cornerstone of customer loyalty, typically defined by the extent to which service performance meets or exceeds prior expectations (Raza et al., 2020). When expectations are not fulfilled, satisfaction diminishes, thereby reducing the likelihood of repeat patronage or continued consumption (Lukić Nikolić et al., 2026). In this sense, satisfaction serves as a direct reflection of a service provider's capacity to fulfill or surpass consumer demands (Mwiya et al., 2017). Within the context of this study, enjoyment refers to the degree to which guests perceive their interactions with the hotel's AI chatbot as fun, pleasant, and entertaining. Satisfaction denotes the extent to which these interactions meet or exceed guest expectations, representing overall contentment with the service experience. Loyalty is conceptualized as the intention to continue using AI chatbot services in the future, to recommend them to others, and to prefer them over alternative service options (Chotisarn & Phuthong, 2025). Together, these constructs are anchored in established theories of technology acceptance and customer experience, thereby situating the study's dependent variables within broader conceptual frameworks.

Historically, customer loyalty in hospitality was cultivated through brand awareness, emotional engagement, and digital marketing strategies such as search engine optimization. However, the rise of autonomous AI systems has transformed the loyalty landscape. These systems increasingly manage travel decisions (searching for accommodations, comparing reviews, and making bookings) thereby shifting the locus of loyalty from the consumer to the algorithm. AI agents now serve as gatekeepers of loyalty, prompting hotels to design experiences and programs that appeal not only to human guests but also to the algorithmic

criteria used by these digital intermediaries (Bilgihan et al., 2025). This dual focus necessitates strategic innovation in loyalty frameworks, emphasizing personalized service, algorithmic visibility, and ethical data used to remain competitive in an AI-driven travel ecosystem. Guest satisfaction emerges as a critical mediator between AI features and loyalty intentions. To sustain and enhance loyalty, hotel managers must implement integrated AI solutions that balance operational efficiency with emotionally intelligent service design (Espiloy, 2025). Prior research has emphasized that hotel management should prioritize strategic initiatives designed to enhance the overall guest experience and cultivate long-term loyalty (Josimović et al., 2024). These strategies encompass not only the quality of core services but also the consistency, personalization, and emotional resonance of the hospitality experience.

Recent studies further emphasize the role of digital literacy in shaping user experiences with AI-powered customer service tools. Digital literacy refers to the ability to effectively use, understand, and critically engage with digital technologies, encompassing both practical (instrumental) and analytical dimensions (Pangrazio et al., 2020). It extends beyond mere technical proficiency to include the capacity to navigate, evaluate, and create content across diverse digital platforms, reflecting the evolving nature of communication and information in the digital age (Jones & Hafner, 2012). Serbia has achieved some advancements in digital development, as recognized by the Digital Economy and Society Index (Regional Cooperation Council, 2023). As of 2023, 33.6% of the Serbian population possessed basic or above-basic digital skills which is an improvement, yet still below the EU-27 average of 55.6% (Eurostat database, 2026). A significant digital divide persists, particularly across age and education levels. Only 5.3% of individuals aged 65–74 demonstrate such competencies, compared to 58.9% among those aged 25–34. Educational attainment also plays a critical role: 58.8% of highly educated individuals possess digital skills, while only 17.7% of those with low or no formal education do so (Paraušić et al., 2025). Montenegro has similarly advanced in digital connectivity. By 2023, household internet access reached 81.3%, marking a seven-point increase since 2019. The urban–rural gap in internet usage narrowed to 14%, with 85.9% of urban and 71.9% of rural residents reporting online activity. Additionally, 88.4% of individuals had accessed the internet within the previous three months, and among them, 90.1% used it daily or almost daily (Kara et al., 2024). Overall, digital literacy in both Serbia and Montenegro has shown steady improvement, driven by national efforts to integrate digital technologies into education, public services, and daily life. In Serbia, approximately one-third of the population possesses foundational digital skills, though disparities remain across demographic lines. Younger individuals and those with higher levels of formal education consistently exhibit stronger digital competencies. Montenegro reflects similar trends, with slightly higher overall skill levels and a growing emphasis on digital inclusion through targeted national strategies (European Training Foundation, 2023).

Individuals with higher digital competencies are more likely to perceive AI chatbots as enjoyable and engaging, owing to their ability to navigate and interact with these technologies confidently (Ranieri et al., 2024). This familiarity enhances satisfaction, as users value the speed, personalization, and reliability offered by chatbot services (Lee et al., 2023). Additionally, digital literacy fosters stronger customer loyalty, with tech-savvy guests more inclined to reuse and recommend chatbot-based services (Singh & Singh, 2024). These insights suggest that digital proficiency not only influences immediate satisfaction but also drives long-term behavioral intentions, reinforcing its strategic importance in AI-enabled hospitality environments. Drawing on a global survey of 1,802 hoteliers across 79 countries and extensive testing of AI solutions, recent findings indicate that 70% of guests find

chatbots helpful, while 58% believe AI can enhance their hotel stay (Hollander, 2025). Based on this theoretical foundation, the following hypotheses are proposed:

H_1: Higher digital literacy enhances users' enjoyment in interacting with the hotel's AI chatbot.

H_2: Higher digital literacy contributes to greater satisfaction with the hotels' AI chatbot service quality.

H_3: Higher digital literacy fosters stronger loyalty toward the hotel brand via AI chatbot engagement.

3. Materials and methods

Research design. This study employed a quantitative survey design to investigate the relationship between digital literacy and hotel guests' perceptions of AI chatbot customer service. The research aimed to test three hypotheses (H1–H3) concerning the influence of digital literacy on perceived enjoyment, satisfaction, and loyalty toward AI-based chatbot services in hotel settings.

Sampling and participants. Participants were selected using purposive sampling, targeting individuals who had previously interacted with a hotel AI chatbot during booking, check-in, or customer service inquiries. Eligibility criteria were clearly stated at the beginning of the questionnaire to ensure that only relevant respondents participated. The sample included adult hotel guests from Serbia and Montenegro who had previously stayed in green hotels within these two countries. Serbia and Montenegro present compelling contexts for examining digital literacy and guest perceptions of AI chatbot services in hospitality due to their dynamic digital transformation trajectories and growing tourism sectors. Moreover, the hospitality industries in Serbia and Montenegro are increasingly adopting smart technologies to enhance guest engagement. This shift aligns with broader national strategies aimed at digital inclusion and service innovation (European Training Foundation, 2023).

Data collection. The questionnaire used in this research consisted of two sections. The first section collected profile data such as gender, age, education, and purpose of hotel visit. The second section consisted of closed-ended questions organized into thematic sections: digital literacy, enjoyment, satisfaction, and loyalty. Statements for the scales measuring enjoyment, satisfaction and loyalty were based on previous research where those scales demonstrated high validity and reliability (above the treshold 0.700) (Chotisarn & Phuthong, 2025). Each construct was measured using multiple items rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). This structured approach allowed for robust statistical analysis of the relationships between digital literacy and user perceptions of AI chatbot services in hotels. The questionnaire was designed to be completed in approximately 8 minutes, and all responses were anonymous and voluntary, with data handled in accordance with ethical research standards. The final version of the questionnaire was distributed online using the Google Forms application. Data were collected during October 2025. In this period 467 respondents filled in the questionnaire.

Data analysis. Data were analyzed using SPSS version 26.0, with a significance level set at $p < 0.05$. Cronbach's alpha values demonstrated high internal consistency for all scales, with coefficients well above the recommended threshold of 0.70 (DeVellis, 2003), as presented in Table 1.

Table 1: Cronbach's alpha coefficients results

No.	Scale	Items	Cronbach's alpha
1	Digital literacy	4	0.965
2	Enjoyment	3	0.962
3	Satisfaction	3	0.967
4	Loyalty	3	0.962

Source: Authors' research

The normality of data distribution was assessed using the Kolmogorov-Smirnov test, supported by visual inspections (histograms, boxplots, and probability plots) and evaluations of skewness and kurtosis. These complementary procedures confirmed that the assumption of normality was met across all key variables. As a result, parametric statistical methods were deemed appropriate and employed for subsequent hypothesis testing. To examine the proposed relationships between digital literacy and the three outcome variables (enjoyment, satisfaction, and loyalty) a series of multiple linear regression analyses was conducted. Specifically, three separate regression models were specified, each using digital literacy as the independent variable and one of the outcome variables as the dependent measure. This analytical strategy enabled a focused assessment of the predictive strength of digital literacy across distinct dimensions of guest perception toward AI chatbot services in hotels. In addition to regression analysis, descriptive statistics (means and standard deviations) and comparative analyses (frequency distributions and cross-tabulations) were used to explore national differences between respondents from Serbia and Montenegro. Descriptive statistics were presented separately for Serbia and Montenegro to highlight contextual differences, while correlations and regressions were conducted on the pooled dataset. This approach was motivated by the need to ensure sufficient statistical power for multivariate analyses, while also reflecting the substantial socio-cultural, linguistic, and institutional similarities between the two countries. Their shared historical trajectories, educational systems, and technological infrastructures reduce the likelihood of markedly divergent patterns in digital literacy and service perceptions. Furthermore, Pearson correlation analysis was performed to assess the strength and direction of bivariate relationships among digital literacy and the outcome variables. This combination of statistical techniques is well-established in hospitality and technology adoption research (Ranieri et al., 2024; Singh & Singh, 2024), providing both depth and reliability in evaluating user experience with AI-driven customer service.

4. Results

Table 2 provides an overview of the sample, comprising 467 hotel guests, 235 from Serbia and 232 from Montenegro, offering a balanced representation of both countries. The gender distribution was balanced in both countries, with females slightly outnumbering males (Serbia: 50.64% vs. 45.96%; Montenegro: 47.85% vs. 46.98%). The largest age group in Serbia was 21–30 years (31.06%), while in Montenegro it was 41–50 years (30.17%). Most respondents held at least a bachelor's or master's degree (Serbia: 46.81%; Montenegro: 42.24%). Regarding the purpose of hotel visits, leisure travel dominated in Serbia (76.60%), while Montenegro had a more balanced distribution, with 59.48% leisure and 40.52% business travelers.

Table 2: Key information about the respondents

Characteristic	Answers	Serbia		Montenegro	
		N	%	N	%
Gender	Male	108	45.96	109	46.98
	Female	119	50.64	111	47.85
	Prefer not to say	8	3.40	12	5.17
Age	Up to 20 years	39	16.60	23	9.91
	From 21 to 30	73	31.06	48	20.69
	From 31 to 40	47	20.00	58	25.00
	From 41 to 50	41	17.45	70	30.17
	Above 50	35	14.89	33	14.23
Education	Primary school	1	0.43	0	0.00
	High school	53	22.55	49	21.12
	College	50	21.27	55	23.71
	Faculty - bachelor's and master's degree	110	46.81	98	42.24
	Faculty - doctoral degree	21	8.94	30	12.93
Purpose of hotel visit	Leisure	189	76.60	138	59.48
	Business	55	23.40	94	40.52

Source: Authors' research

Across all four digital literacy statements presented in Table 3, Serbian respondents consistently reported higher proportions in the top category (score 5), indicating stronger self-perceived proficiency and confidence in using digital tools and services. In contrast, Montenegrin respondents showed relatively higher percentages in the lower categories (scores 1 and 2), suggesting greater variability and more moderate assessments of their digital skills.

Table 3: Comparative responses to digital literacy statements

Statements	Marks	Serbia		Montenegro	
		N	%	N	%
I consider myself skilled in using new digital tools and applications.	1	14	5.96	21	9.05
	2	41	17.45	67	28.88
	3	45	19.15	39	16.81
	4	45	19.15	22	9.48
	5	90	38.30	83	35.78
I can easily learn how to use a new application or online service without assistance.	1	17	7.23	25	10.78
	2	34	14.47	61	26.29
	3	52	22.13	32	13.79
	4	43	18.30	37	15.95
	5	89	37.87	77	33.19
I regularly use new technological features on my devices.	1	21	8.94	44	18.97
	2	28	11.91	39	16.81
	3	57	24.26	39	16.81
	4	43	18.30	30	12.93
	5	86	36.60	80	34.48
I feel confident when using chatbots and automated digital services.	1	26	11.06	40	17.24
	2	35	14.89	44	18.97
	3	50	21.28	33	14.22
	4	35	14.89	35	15.09
	5	89	37.87	80	34.48

Source: Authors' research

Table 4 shows respondents' comparative perceptions of enjoyment related to the hotel's AI chatbot customer service. Serbian respondents reported higher proportions in the top category (score 5), indicating stronger agreement that chatbot services improved their stay, were pleasant, and added fun. Montenegrin respondents, by contrast, showed relatively higher percentages in the lower categories (scores 1 and 2), suggesting more moderate or cautious evaluations of chatbot-related enjoyment.

Table 4: Comparative responses to enjoyment statements

Statements	**Marks**	**Serbia**		**Montenegro**	
		N	**%**	**N**	**%**
The hotel's AI chatbot customer service made my stay more enjoyable.	1	23	9.79	26	11.21
	2	36	15.32	62	26.72
	3	43	18.30	41	17.67
	4	55	23.40	34	14.66
	5	78	33.19	69	29.74
Interacting with the hotel's AI chatbot customer service was a pleasant experience.	1	16	6.81	24	10.35
	2	40	17.02	56	24.14
	3	44	18.72	40	17.24
	4	48	20.43	41	17.67
	5	87	37.02	71	30.60
Using the hotel's AI chatbot customer service added an element of fun to my stay.	1	20	8.51	36	15.52
	2	32	13.62	50	21.55
	3	47	20.00	40	17.24
	4	51	21.70	31	13.36
	5	85	36.17	75	32.33

Source: Authors' research

Table 5 shows respondents' comparative satisfaction levels with the hotel's AI chatbot customer service. Serbian respondents reported higher proportions in the top category (score 5), indicating stronger satisfaction and more positive attitudes toward AI chatbot services. Montenegrin respondents, by contrast, showed relatively higher percentages in the lower categories (scores 1 and 2), reflecting more cautious or critical evaluations of chatbot-related satisfaction.

Table 5: Comparative responses to satisfaction statements

Statements	**Marks**	**Serbia**		**Montenegro**	
		N	**%**	**N**	**%**
I am satisfied with all aspects of the hotel's AI chatbot customer service.	1	28	11.91	35	15.09
	2	30	12.77	53	22.84
	3	48	20.43	35	15.09
	4	53	22.55	39	16.81
	5	76	32.34	70	30.17
I have a positive attitude toward using the hotel's AI chatbot customer service.	1	23	9.79	36	15.52
	2	29	12.34	52	22.41
	3	52	22.13	36	15.52
	4	45	19.15	32	13.79
	5	86	36.60	76	32.76
Overall, I am satisfied with my experience using the hotel's AI chatbot customer service.	1	14	5.96	46	19.83
	2	38	16.17	41	17.67
	3	48	20.43	30	12.93
	4	48	20.43	41	17.67
	5	87	37.02	74	31.90

Source: Authors' research

Table 6 shows respondents' comparative loyalty toward the hotel's AI chatbot customer service. Serbian respondents reported slightly higher proportions in the top category (score 5), indicating stronger intentions to share positive experiences, reuse AI chatbot services, and select them as a preferred option. Montenegrin respondents, however, showed higher percentages in the lower categories (scores 1 and 2), reflecting more cautious or moderate evaluations of chatbot-related loyalty.

Table 6: Comparative responses to loyalty statements

Statements	**Marks**	**Serbia**		**Montenegro**	
		N	**%**	**N**	**%**
I will share positive experiences and stories about the hotel's AI chatbot customer service with my friends or acquaintances.	1	17	7.23	30	12.93
	2	35	14.89	62	26.73
	3	37	15.74	29	12.50
	4	49	20.85	23	9.91
	5	97	41.28	88	37.93
I would use the hotel's AI chatbot customer service again during a future stay or when using the hotel's services.	1	21	8.94	31	13.36
	2	34	14.47	58	25.01
	3	39	16.60	29	12.50
	4	52	22.13	24	10.34
	5	89	37.87	90	38.79
I would choose the hotel's AI chatbot customer service as my preferred option when staying at or using the services of a hotel.	1	25	10.64	50	21.55
	2	34	14.47	42	18.10
	3	37	15.74	28	12.07
	4	43	18.30	26	11.21
	5	96	40.85	86	37.07

Source: Authors' research

Table 7 presents a comparative analysis of mean scores (M) and standard deviations (SD) for digital literacy, enjoyment, satisfaction, and loyalty across respondents from Serbia and Montenegro. Serbian respondents consistently reported higher mean values across all four scales, indicating more favorable perceptions of the hotel's AI chatbot customer service. The largest difference was observed in the loyalty scale (Serbia: M = 3.68; Montenegro: M = 3.31), suggesting that Serbian guests are more likely to reuse and recommend the chatbot service compared to their Montenegrin counterparts.

Table 7: Mean scores (M) and standard deviations (SD) for statements

Statements for digital literacy	**Serbia**		**Montenegro**	
	M	**SD**	**M**	**SD**
I consider myself skilled in using new digital tools and applications.	3.66	1.305	3.34	1.439
I can easily learn how to use a new application or online service without assistance.	3.65	1.310	3.34	1.439
I regularly use new technological features on my devices.	3.62	1.323	3.27	1.540
I feel confident when using chatbots and automated digital services.	3.54	1.406	3.31	1.525
Average	**3.62**	**1.336**	**3.32**	**1.486**
Statements for enjoyment				
The hotel's AI chatbot customer service made my stay more enjoyable.	3.55	1.346	3.25	1.413
Interacting with the hotel's AI chatbot customer service was a pleasant experience.	3.64	1.314	3.34	1.396
Using the hotel's AI chatbot customer service added an element of fun to my stay.	3.63	1.321	3.25	1.486
Average	**3.61**	**1.327**	**3.28**	**1.432**
Statements for satisfaction				
I am satisfied with all aspects of the hotel's AI chatbot customer service.	3.51	1.369	3.24	1.469
I have a positive attitude toward using the hotel's AI chatbot customer service.	3.60	1.346	3.26	1.495
Overall, I am satisfied with my experience using the hotel's AI chatbot customer service.	3.66	1.285	3.24	1.541
Average	**3.59**	**1.333**	**3.25**	**1.502**
Statements for loyalty				
I will share positive experiences and stories about the hotel's AI chatbot customer service with my friends or acquaintances.	3.74	1.326	3.33	1.517
I would use the hotel's AI chatbot customer service again during a future stay or when using the hotel's services.	3.66	1.348	3.36	1.523
I would choose the hotel's AI chatbot customer service as my preferred option when staying at or using the services of a hotel.	3.64	1.408	3.24	1.610
Average	**3.68**	**1.361**	**3.31**	**1.550**

Source: Authors' research

Table 8 presents the Pearson correlation coefficients between digital literacy and key experience variables - enjoyment, satisfaction, and loyalty.

Table 8: Pearson correlation matrix between digital literacy and AI chatbot experience variables

Variable	**1. Digital Literacy**	**2. Enjoyment**	**3. Satisfaction**	**4. Loyalty**
1. Digital Literacy	—	0.848*	0.830*	0.812*
2. Enjoyment	0.848*	—	0.912*	0.878*
3. Satisfaction	0.830*	0.912*	—	0.905*
4. Loyalty	0.812*	0.878*	0.905*	—

N = 467. All values are Pearson's *r*. * Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' research

The correlation analysis revealed strong and statistically significant positive associations between digital literacy and all three outcome variables: enjoyment ($r = 0.848$, $p < 0.01$), satisfaction ($r = 0.830$, $p < .01$), and loyalty ($r = 0.812$, $p < 0.01$). These findings support the proposed hypotheses, indicating that individuals with higher levels of digital literacy tend to report greater enjoyment, satisfaction, and loyalty in their interactions with the hotel's AI chatbot customer service.

The results of three separate linear regression analyses presented in Table 9 provide robust support for all proposed hypotheses.

Table 9: Linear regression model summary results

Statistic	Enjoyment	Satisfaction	Loyalty
Model Summary			
R	0.848	0.830	0.812
R^2	0.719	0.689	0.660
Adjusted R^2	0.718	0.689	0.659
Std. Error of Estimate	0.711	0.772	0.826
F Change	1189.06	1031.80	902.12
df_1, df_2	1, 465	1, 465	1, 465
Sig. F Change	< 0.001	< 0.001	< 0.001
ANOVA			
Regression SS	600.52	615.51	616.08
Residual SS	234.84	277.39	317.56
Total SS	835.36	892.90	933.63
Mean Square (Regression)	600.52	615.51	616.08
Mean Square (Residual)	0.505	0.597	0.683
F	1189.06	1031.80	902.12
Sig.	< 0.001	< 0.001	< 0.001
Coefficients			
Intercept (Constant)	B = 0.532, SE = 0.091, *t* = 5.873, p< 0.001	B = 0.471, SE = 0.099, *t* = 4.783, p< 0.001	B = 0.546, SE = 0.105, *t* = 5.182, p< 0.001
Digital Literacy	B = 0.840, SE = 0.024, β = 0.848, *t* = 34.483, p< 0.001	B = 0.851, SE = 0.026, β = 0.830, *t* = 32.122, p< 0.001	B = 0.851, SE = 0.028, β = 0.812, *t* = 30.035, p< 0.001
Tolerance / VIF	1.000 / 1.000	1.000 / 1.000	1.000 / 1.000
Collinearity Diagnostics			
Condition Index	1.000 (Dim 1), 5.325 (Dim 2)	1.000 (Dim 1), 5.325 (Dim 2)	1.000 (Dim 1), 5.325 (Dim 2)
Variance Proportions	Constant = 0.03, Digital Literacy = 0.03 (Dim 1); 0.97 / 0.97 (Dim 2)	Same as Enjoyment	Same as Enjoyment

Source: Authors' research

Digital literacy significantly predicted enjoyment (H1), satisfaction (H2), and loyalty (H3) toward the hotel's AI chatbot customer service. For **H1**, digital literacy was a strong predictor of enjoyment (β = 0.848, t = 34.483, p < 0.001), accounting for 71.9% of the variance (R^2 = 0.719). The model was statistically significant (F(1, 465) = 1189.06, p < 0.001), with a standard error of 0.711. For **H2**, digital literacy also significantly predicted satisfaction (β = 0.830, t = 32.122, p <0.001), explaining 68.9% of the variance (R^2 = 0.689). The regression model was significant (F(1, 465) = 1031.80, p < 0.001), with a standard error of 0.772. For **H3**, digital literacy was a significant predictor of loyalty (β = 0.812, t = 30.035, p < 0.001), accounting for 66.0% of the variance (R^2 = 0.660). The model was statistically significant (F(1, 465) = 902.12, p < 0.001), with a standard error of 0.826. Across all models, collinearity diagnostics indicated no multicollinearity concerns (Tolerance = 1.000, VIF = 1.000). These findings confirm that higher digital literacy is strongly and positively associated with more favorable user experiences with AI chatbot services, validating all three hypotheses.

To assess whether enjoyment and satisfaction with hotel AI chatbot services significantly predict customer loyalty, a multiple regression analysis was performed, with results presented in Table 10.

Table 10: Multiple regression predicting loyalty from enjoyment and satisfaction

Statistic / Coefficient	**Value**
Model Summary	
R	0.914
R^2	0.835
Adjusted R^2	0.834
Std. Error of Estimate	0.576
Durbin-Watson	2.015
ANOVA	
Regression SS	779.618
Residual SS	154.016
Total SS	933.634
df (Regression, Residual, Total)	2, 464, 466
Mean Square (Regression)	389.809
Mean Square (Residual)	0.332
F	1174.367
Sig.	0.000
Coefficients	
Constant (Intercept)	B = 0.190, SE = 0.074, t = 2.561, p = 0.011
Enjoyment	B = 0.333, SE = 0.048, β = 0.315, t = 6.873, p < 0.001
Satisfaction	B = 0.631, SE = 0.047, β = 0.617, t = 13.467, p < 0.001

Source: Authors' research

The multiple regression analysis revealed that enjoyment and satisfaction together explained 83.5% of the variance in loyalty (R^2 = 0.835, p < 0.001). Both predictors were statistically significant, with satisfaction (β =0.617, p < 0.001) exerting a stronger effect than enjoyment (β =0.315, p < 0.001). These results confirm that guests who find AI chatbot interactions enjoyable and satisfying are more likely to express loyalty intentions.

5. Discussion

The results of this study offer compelling empirical support for the proposed hypotheses, confirming that digital literacy is a key determinant of positive user experiences with AI-driven customer service in the hotel industry. As shown in Table 8, Pearson correlation analysis revealed strong and statistically significant positive associations between digital literacy and enjoyment ($r = 0.848$, $p < 0.01$), satisfaction ($r = 0.830$, $p < 0.01$), and loyalty ($r = 0.812$, $p < 0.01$). These associations suggest that individuals with higher digital literacy are more likely to engage meaningfully with AI chatbot systems, perceive the interaction as enjoyable and satisfying, and develop a stronger sense of loyalty toward the hotel brand.

Regression analyses (Table 9) further reinforce these findings. Digital literacy significantly predicted enjoyment ($\beta = 0.848$, $t = 34.483$, $p < 0.001$), satisfaction ($\beta = 0.830$, $t = 32.122$, $p < 0.001$), and loyalty ($\beta = 0.812$, $t = 30.035$, $p < 0.001$), with each model explaining a substantial proportion of variance in the respective outcome ($R^2 = 0.719$, 0.689, and 0.660, respectively). These results indicate that digital literacy is not only correlated with but also a strong predictor of how users evaluate and respond to AI chatbot services.

These results align with a growing body of literature emphasizing the importance of digital competence in enhancing technology-mediated service experiences. For instance, one research showed that AI tools such as chatbots are most effective when users possess the digital fluency to navigate and interpret automated interactions, leading to higher satisfaction and perceived service quality (Batra & Chatterji, 2024). Similarly, the hospitality sector is undergoing a digital transformation, where customer experience is increasingly shaped by the ability to interact with intelligent systems (Chotisarn & Phuthong, 2025; Garabinović & Lukić Nikolić, 2025; Huang et al., 2021; Nanu, 2025). Research conducted in Serbia and Hungary showed that AI personalization enhances guest satisfaction, especially when guests trust the technology and are comfortable using it (Makivić et al., 2024). In this context, digital literacy serves as a foundational skill that enables users to extract value from AI technologies, personalize their interactions, and build trust in automated service channels (Carl, 2024).

Moreover, the findings support the notion that digital literacy enhances not only immediate user satisfaction but also long-term behavioral outcomes such as loyalty. This is consistent with research showing that digitally literate users are more likely to perceive AI systems as reliable, efficient, and aligned with their expectations (Sheikh & Jaiswal, 2024). As loyalty is a critical metric for customer retention and brand advocacy in hospitality, these insights have practical implications for hotel managers and system designers. Specifically, chatbot interfaces should be designed with varying levels of user digital literacy in mind, offering intuitive navigation, clear language, and adaptive support features to ensure accessibility and engagement across diverse user groups.

The results of this study underscore the strategic value of investing in user education, interface design, and digital inclusion initiatives to maximize the effectiveness of AI-driven customer service in hospitality settings.

6. Conclusion

This study in which 467 hotel guests participated provided strong empirical evidence that digital literacy significantly enhances hotel guests' experiences with AI chatbot customer service. Across both correlation and regression analyses, digital literacy emerged as a consistent and powerful predictor of enjoyment, satisfaction, and loyalty. Serbian respondents reported slightly higher digital competence and more favorable perceptions than

their Montenegrin counterparts, with the greatest difference observed in loyalty-related responses. Overall, the findings suggest that digital literacy is a key driver of positive engagement with AI technologies in hospitality, underscoring the importance of designing AI chatbot systems that are intuitive, accessible, and aligned with users' digital capabilities.

The findings provide important theoretical contributions by reinforcing the role of digital literacy as a critical antecedent of positive technology-mediated service experiences in hospitality. The strong correlations between digital literacy and enjoyment, satisfaction, and loyalty suggest that user competencies in navigating digital interfaces significantly shape perceptions of AI chatbot interactions. This extends existing theories of technology acceptance and service quality by highlighting digital literacy not merely as a background variable, but as a central determinant of customer engagement and loyalty formation in smart service environments. By focusing on two emerging markets, Serbia and Montenegro, it offers a more nuanced understanding of AI adoption in non-Western, transitional economies, providing insights that are both locally grounded and globally significant.

From a practical perspective, the results underscore the necessity for hospitality managers to invest in initiatives that enhance guests' digital literacy, such as user-friendly chatbot designs, clear instructions, and digital training resources. By doing so, hotels can foster greater enjoyment and satisfaction, which in turn translate into stronger loyalty. Moreover, the results suggest that strategies aimed at improving digital literacy among guests may serve as a lever for accelerating the adoption of AI-driven customer service tools, thereby aligning with broader industry goals of innovation, sustainability, and competitive differentiation.

This research has several limitations that should be acknowledged. First, the study was conducted in Serbia and Montenegro, which may constrain the generalizability of the findings to other cultural or regional contexts. Variations in digital infrastructure, hospitality standards, and user expectations across countries could shape perceptions of AI chatbot services differently. Second, all variables were measured using self-reported questionnaires, which are inherently susceptible to social desirability bias and subjective interpretation. This may affect the reliability of responses, particularly in assessing digital literacy and satisfaction. Moreover, self-assessment measures of digital literacy may be subject to self-report bias, including the potential overestimation or underestimation of one's competencies. Such distortions are well documented in phenomena like the Dunning-Kruger effect, where individuals with lower ability may overestimate their skills, while more competent respondents may underestimate theirs. Third, pooling the Serbian and Montenegrin samples, while useful for identifying overarching regional patterns, may reduce interpretive clarity and limit generalizability. Future research should therefore consider country-specific analyses to validate whether effects vary across contexts and to capture potential nuances in guest experiences.

Looking ahead, future research should broaden the geographic scope to include diverse cultural and economic environments, enabling comparative analyses of digital literacy and AI chatbot experiences across global hospitality markets. Additionally, to strengthen causal inferences, future studies could employ longitudinal designs or integrate behavioral data such as actual chatbot usage logs and satisfaction tracking over time to complement self-reported measures and offer deeper insights into user engagement and loyalty development. Furthermore, the application of more advanced analytical methods, such as Structural Equation Modeling (SEM), and the development of more complex behavioral models are suggested to capture latent constructs more effectively and to provide a deeper understanding of the mechanisms underlying guest perceptions and technology adoption in hospitality. Finally, future studies could also examine the moderating role of demographic and

contextual variables such as gender, age, education, and purpose of hotel visit, which may shape the strength of relationships between enjoyment, satisfaction, and loyalty.

CRediT author statement

Bojana Ostojić: Conceptualization, Formal Analysis, Investigation, Writing – original draft. **Dragan Bulatović:** Data curation, Validation, Visualization, Software. **Dražen Jovanović:** Methodology, Supervision, Writing – review & editing.

Declaration of generative AI in the writing process

During the preparation of this work the authors did not use generative AI and AI-assisted technologies in the writing process.

Conflict of interest

The authors declare no conflict of interest.

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