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The Impact of Artificial Intelligence Adoption on Customer Loyalty: The Mediating Role of Digital Marketing in Al Salam Bank Algeria

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Abstract

This study examines the effect of artificial intelligence (AI) adoption on customer loyalty in Islamic banking and tests the mediating role of digital marketing. A field study was conducted among 116 customers of Al Salam Bank Algeria. Using a descriptive-analytical design, data were collected through a questionnaire and analyzed with SPSS 22 and SmartPLS 4 using partial least squares structural equation modeling (PLS-SEM). The findings indicate that AI adoption has a positive and statistically significant effect on digital marketing and a positive direct effect on customer loyalty. Digital marketing also has a strong positive effect on customer loyalty and partially mediates the relationship between AI adoption and customer loyalty. The study recommends expanding the responsible use of AI applications, strengthening digital marketing strategies, and investing in digital transformation to improve customer experience and foster loyalty in Islamic banks.

Keywords: artificial intelligence adoption; digital marketing; customer loyalty; Islamic banking; Al Salam Bank Algeria.
JEL classification: G21; M31; O33.

1. Introduction:

The banking sector has undergone rapid digital transformation in recent years, driven largely by advances in artificial intelligence. AI has become a major source of innovation and performance improvement in financial institutions, enabling banks to enhance service delivery, analyze customer data, and provide faster, more accurate, and more personalized services. These capabilities improve the customer experience and strengthen institutional competitiveness. Islamic banks must therefore integrate AI into their digital strategies while maintaining compliance with Islamic banking principles and responding to changing customer expectations. Digital marketing is among the areas most profoundly affected by AI. AI-supported tools can improve customer communication, facilitate personalized content and services, and increase the effectiveness of marketing campaigns, thereby contributing to customer loyalty. As competition among financial institutions intensifies, retaining loyal customers has become a strategic priority. This makes it important to examine the relationships among AI adoption, digital marketing, and customer loyalty in Islamic banking.

1.1 Research problem and questions:

The study addresses the following main question

To what extent does AI adoption affect customer loyalty in Algerian Islamic banks, and what role does digital marketing play in mediating this relationship?

The main question is divided into four subsidiary questions:

1. Does AI adoption affect digital marketing at Al Salam Bank Algeria?
2. Does AI adoption affect customer loyalty?
3. Does digital marketing affect customer loyalty?
4. Does digital marketing mediate the relationship between AI adoption and customer loyalty?

1.2 Research hypotheses

H1. AI adoption has a positive and statistically significant effect on digital marketing.

H2. AI adoption has a positive and statistically significant effect on customer loyalty.

H3. Digital marketing has a positive and statistically significant effect on customer loyalty.

H4. Digital marketing mediates the relationship between AI adoption and customer loyalty in Islamic banks.

1.3 Significance and objectives of the study

This study is relevant because AI is a central driver of digital transformation in banking. It also clarifies how digital marketing can foster customer loyalty in Islamic banks and provides practical evidence that bank managers may use to develop digital strategies, improve service quality, and strengthen competitiveness.

The study aims to:

- determine the effect of AI adoption on digital marketing;
- measure the effect of AI adoption on customer loyalty;
- analyze the effect of digital marketing on customer loyalty; and
- examine the mediating role of digital marketing in the relationship between AI adoption and customer loyalty.

1.4 Methodological overview

A descriptive–analytical approach was adopted because it is appropriate to the nature and objectives of the study. Data were collected through a questionnaire administered to 116 customers of Al Salam Bank Algeria. SPSS 22 was used for descriptive analysis, and SmartPLS 4 was used to assess the measurement and structural models through PLS-SEM.

2. Artificial Intelligence Adoption in Islamic Banks

AI adoption in banking refers to the integration of technologies such as machine learning, natural language processing, computer vision, and expert systems into banking activities. These technologies are used to improve operational efficiency, support decision-making, manage risk, and develop financial services. AI adoption is therefore a major component of digital transformation and an important source of innovative solutions and competitive advantage in banking (Kumar, 2024).

2.1 Requirements for AI adoption

Successful AI adoption in financial institutions depends on several conditions:

- Digital infrastructure: modern communication networks, advanced information systems, and cloud-computing platforms capable of processing large volumes of data.
- Data quality and integration: accurate, current, structured, and integrated data on which reliable AI models can be built.
- Qualified human resources: personnel with skills in data analysis, programming, and intelligent system management, supported by continuous training.
- Managerial and strategic support: senior-management commitment to a clear digital transformation strategy and adequate resource allocation.
- Regulation and governance: rules that protect customer data and privacy, together with governance frameworks that ensure responsible and ethical AI use (Hidayat & Kassim, 2024).

2.2 Importance of AI adoption in banking

AI can improve the quality, speed, accuracy, and personalization of banking services. Chatbots and virtual assistants enhance the customer experience by making services available around the clock. Automation can reduce human error, operating time, and costs. AI algorithms can also strengthen risk management and fraud detection by identifying unusual transaction patterns in real time, while large-scale data analysis can support more accurate and effective managerial decisions (Bi & Bao, 2024).

3. Digital Marketing in Islamic Banks

Banks use marketing and marketing-communication strategies to raise awareness of their services and develop lasting customer relationships. Clear and accurate information delivered through advertising, relationship marketing, websites, email, mobile applications, and social media helps customers make informed financial decisions. These activities can also strengthen the bank's image, brand equity, and long-term performance (Hoque et al., 2018). In the Islamic-banking context, digital marketing may be defined as the use of internet-based and mobile channels to promote Sharia-compliant products and services and to communicate effectively with customers while respecting religious and ethical requirements.

3.1 Criteria for evaluating digital-marketing adoption

An effective performance-evaluation system for Islamic banks may incorporate the following dimensions (Suandi et al., 2023):

- Islamic business ethics: the bank's adherence to Sharia principles in its activities;
- Customer satisfaction and retention: the bank's ability to maintain customer loyalty relative to competitors;
- Product and service innovation: success in introducing new offerings and entering new markets;
- Financial position: the ability to generate sufficient cash flow and profit to sustain competitive advantage and attract investment; and
- Operational improvement: the speed and effectiveness with which the bank improves operational efficiency in terms of cost, time, and value creation.

3.2 Customer empowerment through digital transformation

Digital transformation can empower bank customers in three principal areas. First, customers increasingly use self-service digital banking and automated advisory services. Second, the convergence of physical and digital channels enables hybrid interactions involving multiple service providers and seamless customer journeys. Third, externally oriented customer profiles can supplement conventional demographic and financial data with customer-centered behavioral data, allowing services to be matched more accurately to individual needs (Gasser, 2017).

4. Customer Loyalty in Islamic Banking

Delivering superior customer value is central to building loyalty (Kotler & Keller, 2007). Customer loyalty may be understood as the positive outcome of repeated favorable experiences with an organization. When customers receive distinctive value, they develop a positive attitude and an intention to continue the relationship. Loyalty develops progressively, beginning with basic product awareness, followed by trial, increased use, repeat purchase, and regular patronage (Anis, 2016; Bahous, 2019). Tapp et al. (2014) distinguish four forms of loyalty:

- Emotional loyalty, which is based on personal affinity with the brand's real or perceived values and benefits;
- Price loyalty, which is driven by rational economic behavior, careful money management, or financial necessity;
- Incentivized loyalty, which develops when customers without a preferred brand become loyal through repeated rewarding experiences; and
- Monopoly loyalty, which occurs when customers have no alternative provider and is therefore not considered genuine loyalty.

5. Methods

5.1 Population and sample

The target population comprised customers of Islamic banks in Algeria. Respondents were recruited from two branches of Al Salam Bank Algeria, and both electronic and paper questionnaires were distributed. All 116 returned questionnaires were retained for analysis. The sample exceeds the minimum size suggested by the traditional ten-times rule for PLS-SEM, under which the minimum sample should be ten times the largest number of formative indicators used to measure a construct or ten times the largest number of structural paths directed toward a construct (Hair et al., 2012). The largest construct in the retained measurement model contained eight indicators; thus, a minimum of 80 observations was required.

5.2 Data analysis

SPSS 22 was used to calculate frequencies and percentages describing the sample. Smart PLS 4 was used to assess the measurement model through indicator loadings, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), the Fornell–Larcker criterion, the heterotrait–monotrait ratio (HTMT), and cross-loadings. The structural model was assessed through path coefficients, the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and direct, indirect, and mediating effects.

6. Results

6.1 Sample characteristics

Most respondents were male (71.6%) and between 31 and 40 years old (59.5%). A large majority held a university or postgraduate qualification. Occupational backgrounds were diverse, and 70.6% of respondents had maintained a relationship with the bank for at least four years. The sample therefore included customers with substantial experience of the bank's services.

6.2 Use of digital channels and intelligent services

Email was the most frequently reported digital channel (42.6%), followed by intelligent chat services (27.8%). Moreover, 68.1% of respondents reported having used an intelligent service offered by the bank, such as a virtual assistant, automated response system, or smart notification. These results suggest a substantial level of customer acceptance of intelligent and digital banking services.

6.2 Measurement-model assessment

Convergent validity was assessed using standardized loadings, Cronbach's alpha, CR, and AVE. Recommended values are generally above 0.70 for CR and Cronbach's alpha, above 0.50 for AVE,

Table 1: Demographic characteristics of the sample (N = 116)

Variable	Category	N	Valid %
Gender	Male	38	71.6
	Female	33	28.4
Age	18–30 years	3	2.6
	31–40 years	69	59.5
	41–50 years	21	18.1
	More than 50 years	23	19.8

Education	Below secondary education	13	11.2
	University degree	56	48.3
	Postgraduate degree	39	33.6
	Professional qualification	8	6.9
Occupation	Public-sector employee	24	20.7
	Private-sector employee	21	18.1
	Trader	10	8.6
	Retired	29	25.0
	Other	32	27.6
Length of relationship with the bank	Less than one yea	6	5.2
	1–3 years	28	24.1
	4–6 years	49	42.2
	More than six years	33	28.4

Table 2: Respondents' use of digital channels and intelligent banking services

Response	Frequency	Valid percentage
Most frequently used digital channel (n = 115 valid responses)		
Social media	5	4.3
Mobile banking	16	13.9
Bank website	13	11.3
Email	49	42.6
Intelligent chat services	32	27.8
Previously used an intelligent banking service (N = 116)		
Yes	79	68.1
No	30	25.9
No	7	6.0

and above 0.50 for indicator loadings (Abid et al., 2023).

Table 3: Indicator loadings and construct reliability

Code	Response	Loading	A	CR	AVE
AI5	The bank's intelligent services are easy to use.	.669	.746	.839	.561
AI6	AI improves my experience when using banking services.	.843			
AI7	I trust the services the bank provides using AI technologies.	.826			

AI8	Al Salam Bank keeps pace with technological development by adopting AI.	.635			
DM3	The bank provides clear and easily understood digital content.	.864	.881	.916	.651
DM4	The bank responds quickly to customer inquiries through digital channels.	.920			
DM5	The bank's digital channels help me learn about its products and services.	.870			
DM6	The bank uses digital communication channels effectively.	.539			
DM7	The bank's digital marketing campaigns meet my needs.	.772			
DM8	The bank's digital channels strengthen my interaction with the bank.	.818			
LOY1	I prefer Al Salam Bank to other banks.	.808	.888	.907	.553
LOY2	I intend to continue using Al Salam Bank in the future.	.833			
LOY3	I recommend Al Salam Bank to others.	.833			
LOY4	I will continue using Al Salam Bank even when other banks make offers.	.756			
LOY5	I trust Al Salam Bank and regard it as my first choice.	.748			
LOY6	I feel a sense of belonging to Al Salam Bank.	.663			
LOY7	I seek to see most of the services offered by Al Salam Bank.	.734			
LOY8	I intend to increase my use of Al Salam Bank in the coming period.	.824			

CR ranged from .839 to .916, AVE from .553 to .651, and Cronbach's alpha from .746 to .888. All constructs therefore met the accepted thresholds for internal consistency and convergent validity. Although AI5, AI8, DM6, and LOY8 had comparatively low loadings, each remained above the minimum threshold of .50.

5.3.1 Discriminant validity

Table 4: Fornell–Larcker criterion

Construct	AI	DM	LOY
AI adoption (AI)	.749		
Digital marketing (DM)	.505	.807	
Customer loyalty (LOY)	.483	.760	.744

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The square root of AVE is shown on the diagonal. The criterion was satisfied for AI adoption and digital marketing. For customer loyalty, however, the correlation with digital marketing (.760) was slightly higher than the square root of loyalty's AVE (.744), indicating potential conceptual overlap. HTMT was therefore used as an additional assessment.

Table 5: Heterotrait–monotrait ratio (HTMT)

Construct pair HTMT	
Alpha <-> AI	0,548
LOY <-> AI	0,578
LOY <-> Alpha	0,820

All HTMT values were below the conservative threshold of .85 (Henseler et al., 2015). The highest value was .820 for loyalty and digital marketing, which indicates a strong relationship without reaching a level that undermines conceptual distinctiveness. Overall, the HTMT results support discriminant validity

Table 6: Cross-loadings

Item	AI	DM	LOY	Item	AI	DM	LOY
AI5	0,669	0,579	0,361	LOY1	0,370	0,746	0,808
AI6	0,843	0,322	0,376	LOY2	0,433	0,612	0,833
AI7	0,826	0,298	0,374	LOY3	0,429	0,618	0,833
AI8	0,635	0,158	0,311	LOY4	0,363	0,471	0,756
MD3	0,430	0,864	0,691	LOY5	0,386	0,579	0,748
MD4	0,511	0,920	0,713	LOY6	0,376	0,485	0,663
MD5	0,445	0,870	0,673	LOY7	0,292	0,394	0,734
MD6	0,303	0,539	0,286	LOY8	0,172	0,492	0,524
MD7	0,322	0,772	0,572				
MD8	0,403	0,818	0,634				

Each indicator loaded more strongly on its assigned construct than on the other constructs. The cross-loading criterion therefore provides further support for discriminant validity.

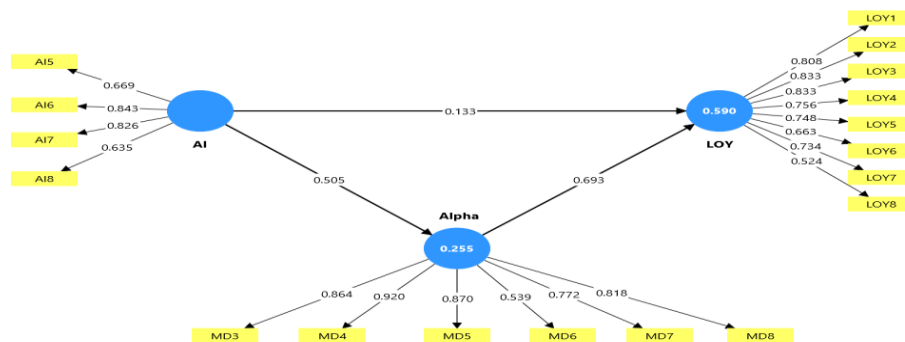
5.4 Structural-model assessment

The structural model was evaluated in terms of explanatory power and predictive relevance. AI adoption explained 25.5% of the variance in digital marketing, while AI adoption and digital marketing jointly explained 59.0% of the variance in customer loyalty

Table 7: Explanatory and predictive power of the model

Endogenous construct	R ²	Q ² predict	Interpretation
Digital marketing	.255	.232	Acceptable
Customer loyalty	.590	.211	Moderate/acceptable

Both Q² predict values were positive, indicating acceptable out-of-sample predictive relevance. The model therefore has an appropriate level of explanatory and predictive power (Shmueli et al., 2019).

**Figure 1: Structural model and standardized path coefficients**

5.5 Hypothesis testing and mediation analysis

Bootstrapping in SmartPLS 4 was used to test the hypotheses. Statistical significance was assessed at the 5% level.

Table 8: Hypothesis-testing results

Hypothesis	Path	β	SE	t	p	Decision
H1	AI $\rightarrow$ DM	.505	.058	8.688	< .001	Supported
H2	AI $\rightarrow$ LOY	.133	.064	2.078	.038	Supported
H3	DM $\rightarrow$ LOY	.693	.056	12.437	< .001	Supported
H4	AI $\rightarrow$ DM $\rightarrow$ LOY	.350	.052	6.782	< .001	Supported

H1 was supported: AI adoption had a positive effect on digital marketing ($\beta = .505$, $p < .001$), with a medium effect size ($f^2 = .342$). H2 was also supported at the 5% level: AI adoption had a small positive direct effect on customer loyalty ($\beta = .133$, $p = .038$; $f^2 = .032$). H3 was supported because digital marketing had a strong positive effect on customer loyalty ($\beta = .693$, $p < .001$), with a large effect size ($f^2 = .872$). The indirect effect of AI adoption on loyalty through digital marketing was positive and significant ($\beta = .350$, $p < .001$). Because both the direct and indirect effects were significant, digital marketing partially mediated the relationship between AI adoption and customer loyalty. The indirect effect was notably larger than the direct effect, indicating that AI contributes to loyalty primarily when it is integrated into the bank's digital-marketing activities.

7 Discussion

The findings demonstrate that AI adoption strengthens digital marketing in Islamic banking. Intelligent technologies can support faster interactions, more relevant content, personalization, and improved access to banking information. These capabilities help explain the positive path between AI adoption and digital marketing. AI adoption also had a positive but comparatively small direct effect on loyalty. Customers may value AI-enabled efficiency and convenience, but technology alone is unlikely to generate a strong relational commitment. By contrast, digital marketing had the largest direct effect on loyalty. Timely responses, clear digital content, effective communication, and campaigns that reflect

customer needs appear to translate technological capabilities into tangible customer value. The mediation result reinforces this interpretation. AI becomes more influential when its capabilities are embedded in a coherent digital-marketing strategy. Islamic banks should therefore avoid treating AI as an isolated technical investment. Its value depends on how it is applied to customer communication and service delivery while preserving trust, privacy, transparency, and Sharia compliance.

8 Conclusion and Recommendations

This study investigated the effect of AI adoption on customer loyalty in Islamic banks and examined the mediating role of digital marketing among customers of Al Salam Bank Algeria. The proposed model was tested using PLS-SEM. AI adoption positively affected digital marketing and had a 10 smaller direct effect on customer loyalty. Digital marketing was the strongest predictor of loyalty and partially mediated the effect of AI adoption. The results indicate that Islamic banks can obtain greater value from AI by integrating it into a comprehensive digital-marketing strategy. Banks should expand customer-centered AI applications, strengthen the quality and responsiveness of digital communication, invest in secure and interoperable data infrastructure, and train employees to use intelligent systems effectively. They should also establish clear governance arrangements to protect privacy, ensure transparency, reduce algorithmic bias, and maintain compliance with Sharia principles. Because the study used a cross-sectional convenience sample from two branches of one Algerian bank, its findings should be generalized cautiously. Future research could use probability sampling, include several Islamic and conventional banks, employ longitudinal or experimental designs, and examine additional mediators or moderators such as trust, perceived usefulness, service quality, privacy concerns, and digital literacy.

References

- Abid, M. A., Shafique, F., Zahid, M., Mehmood, S., & Asim, N. (2023). Impact of social media influencers on consumers' purchase intentions to buy Pakistani food: Investigating the mediating role of consumer attitude. *International Journal of Contemporary Issues in Social Sciences*, 2 (3).
- Alamsyah, Y. D., & Sharif, O. O. (2023). The influence of social media marketing Instagram towards consumer-brand engagement and brand knowledge of Gojek. *Innovative: Journal of Social Science Research*, 3 (4), 3698–3711.
- Anis, A. A. (2016). *Marketing management from a customer-value perspective* (1st ed.). Dar Al-Jinan.
- Bahous, N. (2019). *The impact of the Internet on activating an organization's marketing communications and improving its performance: The case of Jumia.dz* [Unpublished doctoral dissertation]. Djillali Liabes University.
- Bi, S., & Bao, W. (2024). Innovative application of artificial intelligence technology in bank credit risk management. *arXiv*.
- Fitrianingsih, Y., Karuniana Dianta, A. S., & Saparuddin, M. (2022). Pengaruh business plan dan digital marketing terhadap ketahanan UMKM pasca pandemi di Jakarta Timur. *Jurnal Ekonomi Kreatif dan Manajemen Bisnis Digital*, 1 (2), 152–170.
- Gasser, U. (2017). *Digital banking 2025*. Research Platform Alexandria.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2012). *A primer on partial least squares structural equation modeling (PLS-SEM)*.
- Sage, Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43 (1), 115–135.
<https://doi.org/10.1007/s11747-014-0403-8>
- Hidayat, A., & Kassim, S. (2024). The determinants of digital banking adoption among banks offering Islamic banking services. *Journal of Islamic Monetary Economics and Finance*, 9 (4), 559–588.
- Hoque, M. E., Nik Hashim, N. M., & Bin Azmi, M. H. (2018). Moderating effects of marketing communication and financial consideration on customer attitude and intention to purchase Islamic banking products: A conceptual framework. *Journal of Islamic Marketing*, 9 (4), 799–822.
- Kotler, P., & Keller, K. L. (2007). *Marketing management* (12th ed.). Prentice Hall.
- Kumar, A. (2024). *Redefining finance: The influence of artificial intelligence and machine learning*. *arXiv*.
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. *European Journal of Marketing*, 53 (11), 2322–2347.
- Sobaih, A. E. E., & Elshaer, I. A. (2022). Personal traits and digital entrepreneurship: A mediation model using SmartPLS data analysis. *Mathematics*, 10 (21), 3926.
- Suandi, E., Herr, H., Yulhasri, Y., & Syafrizal, S. (2023). An empirical investigation of Islamic marketing ethics and convergence marketing as key factors in the improvement of Islamic banks' performance. *Journal of Islamic Marketing*, 14 (6), 1438–1462.
- Tapp, A., Whitten, I., & Housden, M. (2014). *Principles of direct, database and digital marketing*. Pearson.