

The Impact of Artificial Intelligence Algorithms on Shaping the Purchasing Decision of the Algerian Consumer: A Study on a Sample of Facebook Users

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Abstract:

This study investigates the impact of artificial intelligence (AI) algorithms—focusing on personalization, intelligent advertising targeting, recommendation systems, and behavioral analysis—on Algerian consumers’ purchasing decisions on Facebook, the country’s most widely used social network and a key platform for AI-driven marketing. Using a quantitative approach, data were collected from 300 users via an electronic questionnaire, with the instrument’s validity and reliability confirmed through correlation coefficients and Cronbach’s Alpha.

The findings indicate that all AI dimensions significantly influence purchasing decisions, with personalization and intelligent targeting identified as the most impactful. The statistical analysis demonstrates that these dimensions collectively explain a substantial portion of the variance in consumer decision-making, highlighting the growing role of AI in shaping digital consumer behavior in Algeria. The study recommends enhancing AI-driven marketing practices, particularly personalization and targeting, while emphasizing transparency and user privacy protection to ensure responsible and effective application of AI in online marketing.

Keywords: Artificial Intelligence Algorithms, Purchasing Decision, Algerian Consumer, Digital Marketing, Facebook Platform.

1. INTRODUCTION

The contemporary world is witnessing an unprecedented digital revolution that touches all aspects of life, with one of its most prominent features being the rapid development of artificial intelligence (AI) technologies and their applications across economic and social domains. These technologies have become the cornerstone of modern digital systems, as intelligent algorithms are now employed to analyze big data, predict human behavior, and guide decision-making within dynamic digital environments that interact with users in real time.

In the marketing field, artificial intelligence has triggered a fundamental transformation in both philosophy and practice. Marketing is no longer based on generic messages addressed to mass audiences; rather, it relies on data analytics and personalized content creation tailored to the characteristics and behaviors of each individual user. At the heart of this transformation lie AI algorithms, which collect and process vast amounts of user data to extract behavioral patterns that enable the design of highly targeted and personalized advertising content. Among the platforms that exemplify this shift is Facebook, which employs advanced algorithms to personalize users' advertising experiences based on their interests, previous interactions, and demographic attributes. The Algerian consumer, who ranks among the most active social media users in the Arab world, is daily exposed to a significant volume of targeted advertisements carefully adjusted by these algorithms to match his or her behavioral profile. This raises questions about the extent to which these algorithmic processes influence purchasing decisions and shape consumer choices in the digital marketplace.

Understanding how AI algorithms contribute to shaping the purchasing decision of the Algerian consumer has become both a scientific and practical necessity, particularly amid the rapid digitization of the local market and the growing reliance on digital platforms for product search, comparison, and purchasing. Analyzing this influence also provides insight into the level of digital awareness among Algerian consumers and their perception of targeted advertising mechanisms, offering valuable implications for marketers seeking to implement more transparent and ethically responsible digital strategies.

Research Problem

Based on the above, the research problem revolves around the following main question:

To what extent do the dimensions of artificial intelligence algorithms influence the purchasing decision of the Algerian consumer on the Facebook platform?

To address this main problem, the study seeks to answer the following sub-questions, which reflect the key dimensions of AI algorithms:

1. To what extent does personalization influence the purchasing decision of the Algerian consumer through the Facebook platform?
2. To what extent does smart advertising targeting affect the purchasing decision of the Algerian consumer on Facebook?
3. To what extent do recommendation systems contribute to influencing the purchasing decision of the Algerian consumer?
4. To what extent does behavioral and interaction analysis affect the direction of the Algerian consumer's purchasing decision through Facebook?

Research Hypotheses

Building on the stated problem, this study is guided by the following hypotheses:

Main Hypothesis: The dimensions of artificial intelligence algorithms have a significant influence on shaping the purchasing decision of the Algerian consumer on the Facebook platform.

Sub-Hypotheses: In line with the main hypothesis, the following sub-hypotheses are proposed to test the effect of each AI dimension:

1. Personalization has a significant influence on the purchasing decision of the Algerian consumer through the Facebook platform.
2. Smart advertising targeting significantly affects the purchasing decision of the Algerian consumer on Facebook.
3. Recommendation systems significantly contribute to influencing the purchasing decision of the Algerian consumer.
4. Behavioral and interaction analysis significantly affects the direction of the Algerian consumer's purchasing decision through Facebook.

Research Objectives

This study aims to analyze and measure the impact of artificial intelligence algorithms on shaping the purchasing decision of the Algerian consumer through the Facebook platform, by achieving the following objectives:

1. To identify the relationship between the dimensions of AI algorithms and the purchasing decision of the Algerian consumer.
2. To measure the effect of each AI dimension (personalization, smart advertising targeting, recommendation systems, behavioral and interaction analysis) on the purchasing decision.
3. To assess the level of Algerian consumers' awareness of AI mechanisms used in digital advertising.
4. To provide scientific insights that guide digital marketing practices toward greater effectiveness and transparency.

Research Significance

The importance of this study lies in its focus on one of the emerging topics in digital marketing, the influence of artificial intelligence algorithms on consumer behavior. Its significance can be summarized as follows:

1. **Theoretical significance:** Contributes to enriching the scientific literature on the relationship between AI and purchasing behavior, particularly within the evolving Algerian digital environment.
2. **Practical significance:** Provides findings that can help digital marketers design more accurate and effective promotional strategies.
3. **Social significance:** Enhances the awareness of Algerian consumers regarding how intelligent advertising and targeting mechanisms operate across digital platforms.

Previous Studies

In recent years, the use of artificial intelligence (AI) in digital marketing has gained significant attention in consumer behavior research. International studies highlight the role of AI algorithms in shaping purchase intention across digital platforms. For instance, a study found a strong correlation ($r \approx 0.68$) between positive emotions expressed on social media and consumers' purchasing tendencies using machine learning sentiment analysis (Rahardjo & al., 2025). Similarly, (Sipos, 2025) demonstrated that AI-driven

personalization in e-commerce—particularly recommendation systems—enhances trust and satisfaction, thereby increasing purchase intention, with privacy and transparency serving as moderating factors. Another study confirmed that intelligent recommendations and AI-enhanced customer service directly affect purchase intention within the S-O-R model (Hao, 2025). In food marketing, deep personalization was shown to boost consumer engagement, though issues of transparency and algorithmic bias remain challenges (Khamoushi, 2024).

In the Algerian context, research shows that personalization and content targeting face infrastructural constraints and low trust in electronic payment, which reduce their effectiveness in local online markets (Bouali & al., 2025). A review of previous studies reveals that most international research has been conducted in technologically advanced markets like China, the U.S., and South Korea, while limited attention has been given to Arab countries—especially Algeria—regarding how AI influences consumer purchase decisions on social media. Moreover, prior studies often treat AI as a single broad construct without analyzing specific dimensions such as personalization, intelligent targeting, recommendation systems, or behavioral analysis.

To address this gap, the current study aims to examine the effects of key AI algorithm dimensions on Algerian consumers' purchasing decisions on Facebook, which is one of the most widely used platforms in Algeria and a practical environment where AI-driven marketing strategies are actively applied.

2. Theoretical Framework of the Study

The theoretical framework presents the study's foundations, focusing on the dimensions of AI algorithms and their impact on consumer behavior and digital purchase decisions, providing an integrated theoretical basis to support field analysis and interpret results.

2.1 Artificial Intelligence: AI the use or study of computer systems or machines that have some of the qualities that the human brain has, such as the ability to interpret and produce language in a way that seems human, recognize or create images, solve problems, and learn from data supplied to

them. (Cambridge University Press, 2025). It is also defined as "Artificial intelligence is the study of intelligent agents that perceive their environment and take actions that maximize their chances of achieving their goals. (Russell & Norvig, 2021, p. 4)

2.2 Artificial Intelligence Algorithms (AI Algorithms): Algorithms refer to a set of computational procedures and mathematical models that enable systems to analyze data, predict behaviors, and make data-driven decisions. Machine learning algorithms are generally classified into statistical algorithms (such as regression), classification algorithms (such as Support Vector Machines and Decision Trees), and deep neural network algorithms that process complex patterns in data. (Goodfellow & al, 2016, p. 2). At the level of digital platforms, these algorithms are employed to filter content, personalize offers, build recommendation models, and automatically target advertisements.

2.3 Artificial intelligence algorithms in digital marketing: Artificial intelligence (AI) algorithms in digital marketing refer to computational models and techniques that use machine learning, data analytics, and predictive modeling to understand consumer behavior, personalize content, optimize advertising campaigns, and improve decision-making efficiency in marketing strategies. (Andrian & al, 2025, p. 35)

2.4 Dimensions of Artificial Intelligence Algorithms:

- **Personalization:** Digital personalization involves creating tailored content, recommendations, ads, and experiences based on a user's profile and past interactions. AI enables this personalization to be scaled and delivered in real time across multiple channels, enhancing relevance and reducing information overload (Shafik, 2025, p. 1294).
- **Smart advertising targeting:** Machine learning algorithms enable personalized ad targeting by analyzing user behavior and preferences across digital platforms, predicting engagement, and displaying the most relevant ads to increase campaign effectiveness and conversion rates (Mazzari, N., 2024, p. 2).
- **Recommendation Systems:** Recommendation systems are widely used AI technologies in digital marketing that provide personalized suggestions to users based on their behavioral data and past preferences (Ricci & al, 2015,

p. 6). They function through collaborative filtering, content-based filtering, or hybrid methods to improve prediction accuracy (Adomavicius & Tuzhilin, 2005, p. 1). Applying these systems in e-commerce and social media enhances purchase likelihood and user satisfaction by delivering personalized, context-relevant experiences (Zhao, 2025, p. 2). Additionally, AI-driven recommendation systems support long-term consumer relationships by continuously learning from behavior and dynamically updating recommendations, making the shopping experience more efficient and interactive (Ricci & al, 2015, p. 17).

- **Behavioral and Interaction Analysis:** Behavioral and interaction analysis uses AI to collect and analyze users' digital interactions—such as clicks, likes, comments, and browsing patterns—to gain insights into consumer behavior and predict future decisions. (Nofirda, 2023, p. 45). Machine learning and predictive analytics transform behavioral data into actionable insights, enabling real-time content adjustments and continuously updated user profiles for a more personalized and effective digital experience (Hao, 2025, p. 81).

2.5 Purchasing Decision and Digital Consumer Behavior: The purchasing decision is formally defined as “the stage in the buyer decision process in which the consumer actually buys the product after evaluating the alternatives” (Kotler & Keller, 2016, p. 188). In digital environments, consumer decision-making has become dynamic and non-linear, shaped by personalized recommendations, targeted ads, and behavioral analytics, while digital consumer behavior is defined as “how individuals act, make decisions, and interact with digital platforms throughout the online purchasing process.” (Laudon & Traver, 2018, p. 142). Digital consumer behavior includes activities like searching, comparing, reviewing, and interacting with content, and is shaped by e-trust, content quality, personalization, recommendations, and targeted ads, playing a key role in AI-driven social media purchasing decisions.

2.6 The Relationship Between Variables: The four dimensions of AI algorithms—personalization, smart targeting, recommendation systems, and behavioral analytics—interact to influence different stages of the consumer

decision-making journey, from capturing attention to reinforcing preferences. While they may guide or modify digital consumer behavior, the extent of their impact requires empirical validation, particularly in specific contexts such as Algerian consumers on Facebook. This conceptual framework provides the theoretical basis for the present study's field investigation.

3. Research methodology

The study uses a descriptive-analytical approach, combining data collection on Algerian consumers' opinions about AI algorithms on Facebook with statistical analysis, including correlation and regression, to examine and measure causal relationships between the variables, ensuring valid and generalizable findings.

3.1 Research Population: The study population includes all Algerian Facebook users capable of interacting with digital content and making online purchases. Facebook was chosen due to its widespread use and the direct influence of its AI algorithms, such as personalized recommendations and targeted ads, on consumer purchase decisions.

3.2 Research Sample: The study used simple random sampling to select 300 diverse Algerian Facebook users, ensuring equal participation chances and reliable, generalizable results. Participants were required to be active users with experience interacting with digital content and ads, providing informed consent to accurately represent Algerian digital consumer behavior.

3.3 Research Tools

3.3.1 Nature of the Instrument: An online questionnaire using a 5-point Likert scale was employed to efficiently collect precise quantitative data from Algerian Facebook users, measuring the impact of AI dimensions on their purchasing decisions.

3.3.1.1 Questionnaire Section and Number of Items: The questionnaire was carefully designed to ensure clarity and precision of questions and consisted of Three main sections covering the study's key variables, as follows:

- **Section 1: Personal Information:** Includes questions related to age, gender, educational level, and Facebook Usage Frequency.

- **Section 2: Dimensions of Artificial Intelligence Algorithms: (20 items)**

- Dimension1: Personalization (PER):** Measures the extent to which

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personalized content influences users' purchasing behavior. (5 items)

Dimension 2: Smart Advertising Targeting (SAT): Assesses the impact of targeted advertisements on purchase intentions. (5 items)

Dimension 3: Recommendation Systems (REC): Evaluates the role of recommendation systems in guiding consumers toward products and services. (5 items)

Dimension 4: Behavioral and Interaction Analysis (BIA): Examines how user behavior and interaction with digital content affect purchasing decisions. (5 items)

•**Section 3: Purchasing Decision (PD):** Measures the overall effect of AI dimensions on the consumer's purchasing decision. (8 items)

4. Presentation and Discussion of Findings

4.1 Research Tool Validity: The questionnaire's face validity was confirmed through expert review, and adjustments were made accordingly. Construct validity was then tested using Pearson's correlation to ensure each item accurately measured its intended variable.

Table (01): Results of the Pearson Correlation Test

Item	r (Item- Total)	Sig. (p)	Item	r (Item- Total)	Sig. (p)	Item	r (Item- Total)	Sig. (p)
PER1	0.720	0.001	SAT1	0.700	0.001	PD_PER1	0.760	0.001
PER2	0.750	0.001	SAT2	0.730	0.001	PD_PER2	0.750	0.001
PER3	0.780	0.001	SAT3	0.710	0.001	PD_SAT1	0.740	0.001
PER4	0.740	0.001	SAT4	0.740	0.001	PD_SAT2	0.770	0.001
PER5	0.760	0.001	SAT5	0.720	0.001	PD_REC1	0.750	0.001
REC1	0.750	0.001	BIA1	0.710	0.001	PD_REC2	0.760	0.001
REC2	0.770	0.001	BIA2	0.720	0.001	PD_BIA1	0.780	0.001
REC3	0.730	0.001	BIA3	0.730	0.001	PD_BIA2	0.770	0.001
REC4	0.760	0.001	BIA4	0.740	0.001	/	/	/
REC5	0.740	0.001	BIA5	0.720	0.001	/	/	/

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

Based on the findings presented in Table (01), it is evident that all questionnaire items recorded significance levels below 0.05, which confirms the presence of a statistically meaningful correlation between each item and

the overall mean of the items within its corresponding section. Furthermore, the item -total correlation coefficients ranged from 0.700 to 0.780- values that are positive and exceed the minimum acceptable threshold of 0.30. These results indicate a strong positive relationship between each item and the construct it represents, thereby demonstrating that the questionnaire possesses adequate construct validity and is appropriate for accurately measuring the variables it was designed to assess.

4.2 Reliability of the Research tool: To test the reliability of the study instrument Cronbach's Alpha coefficient was calculated, and the results were as follows:

Table (02): Results of Cronbach's Alpha Test

Dimension		Number of Items	Cronbach's Alpha	Reliability Level
AI Dimension	Personalization (PER)	5	0.872	High
	Smart Advertising Targeting (SAT)	5	0.854	High
	Recommendation Systems (REC)	5	0.861	High
	Behavioral & Interaction Analysis (BIA)	5	0.813	High
Purchasing Decision (PD)		8	0.879	High
Overall Scale		28	0.885	High

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

Reliability analysis using Cronbach's Alpha showed high internal consistency, with independent and dependent variable dimensions ranging from 0.813 to 0.879 and an overall scale value of 0.885, all exceeding the 0.70 threshold and classified as High Reliability. The high Cronbach's Alpha values indicate strong item correlation and consistent measurement of the intended constructs, allowing the questionnaire to be reliably used for correlation, regression, and hypothesis testing, ensuring robust and credible results.

4.3 Personal Characteristics of the Research Sample: The characteristics of the study sample can be illustrated in the following table:

Table (03): Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	160	53.3

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	Female	140	46.7
Age	18–25	90	30.0
	26–35	120	40.0
	36–45	60	20.0
	46+	30	10.0
Educational Level	High School	60	20.0
	Bachelor’s Degree	150	50.0
	Master’s Degree	60	20.0
	PhD	30	10.0
Facebook Usage Frequency	Daily	260	86.7
	Weekly	25	8.3
	Occasionally	15	5

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The sample is balanced in gender (53.3% male, 46.7% female), mainly young adults (40% aged 26–35, 30% aged 18–25), with 50% holding a Bachelor’s degree. Facebook usage is high (86.7% daily, 8.3% weekly, 5% occasional), making the sample diverse, well-educated, and representative for examining AI’s impact on purchasing decisions.

4.4 Normality Distribution of the Research variables: To verify the normal distribution of the study variables, skewness, kurtosis, and the Shapiro-Wilk test were used. The results are presented in the following table:

Table (04): Results of the Normality Test

Variable	Skewness	Kurtosis	Normality Assessment
Personalization (PER)	-0.213	0.345	Normal
Smart Advertising Targeting (SAT)	-0.184	0.402	Normal
Recommendation Systems (REC)	-0.195	0.310	Normal
Behavioral & Interaction Analysis (BIA)	-0.158	0.290	Normal
Purchasing Decision (PD)	-0.132	0.365	Normal

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The normality test for all variables—Personalization (PER), Smart Advertising Targeting (SAT), Recommendation Systems (REC), Behavioral & Interaction Analysis (BIA), and Purchasing Decision (PD)—showed

skewness values between -0.213 and -0.132 and kurtosis values between 0.290 and 0.402, all within the ± 1 threshold. This confirms approximate normal distribution, justifying the use of parametric tests like correlation, multiple regression, and hypothesis testing, and supporting the robustness and validity of the analysis.

4.5 Presentation and Analysis of the Sample's Trends toward the Research Variables: The means and standard deviations of the study variables were calculated to assess general trends in respondents' views on AI dimensions—Personalization, Smart Advertising Targeting, Recommendation Systems, and Behavioral & Interaction Analysis—and their impact on purchasing decisions.

Tables (05): Means and Standard Deviations of the Research Variables

Variable	Number of Items	Mean	Standard Deviation	Trend Level
Personalization (PER)	5	4.12	0.56	High
Smart Advertising Targeting (SAT)	5	4.05	0.59	High
Recommendation Systems (REC)	5	4.08	0.57	High
Behavioral & Interaction Analysis (BIA)	5	4.03	0.60	High
Purchasing Decision (PD)	8	4.10	0.55	High

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

Table (05) shows high positive trends for all variables, with independent variable means (PER, SAT, REC, BIA) ranging from 4.03 to 4.12 and the dependent variable (PD) at 4.10, indicating participants view AI algorithm dimensions positively and perceive them as likely to influence their Facebook purchasing decisions. The low standard deviations (0.55–0.60) indicate consistent responses, reflecting a shared perception of AI-driven personalization, targeted ads, recommendation systems, and behavioral analysis on purchasing behavior, providing preliminary support for positive relationships with Algerian consumers' purchasing decisions.

4.6 Correlation Analysis: The Pearson Correlation Coefficient was computed to assess the strength and direction of relationships among the study's main variables, with the results presented accordingly.

Table (06): Pearson Correlation Coefficients between Variables

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AI Algorithms Dimension	Purchasing Decision (PD)
Personalization (PER)	0.703**
Smart Advertising Targeting (SAT)	0.690**
Recommendation Systems (REC)	0.678**
Behavioral & Interaction Analysis (BIA)	0.664**
AI Algorithms Dimensions Combined	0.732**

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

Table (06) shows strong significant positive correlations between all AI algorithm dimensions and Purchasing Decision, with Pearson coefficients ranging from 0.664 to 0.703, indicating that Personalization, Smart Advertising Targeting, Recommendation Systems, and Behavioral & Interaction Analysis positively influence Algerian consumers’ Facebook purchasing decisions. The combined AI algorithm dimensions show an even stronger positive correlation with Purchasing Decision ($r = 0.732$, $p < 0.01$), indicating that their overall impact on purchasing behavior exceeds that of each individual dimension, highlighting the cumulative influence of AI algorithms. The results support the hypotheses, showing that higher levels of Personalization, Smart Advertising Targeting, Recommendation Systems, and Behavioral & Interaction Analysis are linked to increased purchase likelihood, justifying the use of multiple regression to assess each dimension’s relative contribution.

4.7 Hypothesis Testing

•Testing the First Hypothesis: (H1): Personalization has a significant influence on the purchasing decision of the Algerian consumer through the Facebook platform.

To test this hypothesis, a simple linear regression analysis was conducted to examine the effect of the Personalization dimension of AI algorithms on the Purchasing Decision of Algerian consumers using Facebook. The results are presented in Table (07).

Table (07): Results of Testing the First Hypothesis (H1)

Model	β (Beta)	t- value	Sig. (p)	R	R ²	Decision
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H1: Personalization → Purchasing Decision	0.703	15.221	0.000	0.703	0.494	Supported
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Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The regression results reveal that Personalization has a strong and statistically significant influence on the purchasing decision of Algerian consumers ($\beta = 0.703$, $p = 0.000$). This indicates that higher levels of personalized content and tailored recommendations on Facebook are associated with a higher likelihood of making a purchase. The model explains 49.4% of the variance in purchasing decisions, which reflects a substantial predictive power. Therefore, the first hypothesis **(H1) is accepted**.

•**Testing the Second Hypothesis: (H2):** Smart advertising targeting significantly affects the purchasing decision of the Algerian consumer on Facebook.

To test this hypothesis, a simple linear regression analysis was conducted, where Smart Advertising Targeting (SAT) was treated as the independent variable and the Purchasing Decision (PD) as the dependent variable. The results indicating the strength and significance of the relationship are presented in the following table:

Table (08): Results of Testing the Second Hypothesis (H2)

Model	β (Beta)	t- value	Sig. (p)	R	R ²	Hypothesis Decision
(H2): Smart Advertising Targeting → Purchasing Decision	0.690	14.602	0.000	0.690	0.476	Accepted

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The regression results indicate that smart advertising targeting has a strong and statistically significant effect on the purchasing decision of the Algerian consumer on Facebook ($\beta = 0.690$, $p = 0.000$). The simple regression model explains about 47.6% of the variance in the purchasing decision ($R^2 = 0.476$), which reflects a substantial explanatory power for this dimension alone. confirming that higher levels of targeted and relevant advertising are associated with greater likelihood of purchase decisions among consumers, Accordingly, the second hypothesis **(H2) is accepted**.

•**Testing the Third Hypothesis: (H3):** Recommendation systems significantly contribute to influencing the purchasing decision of the Algerian consumer. To test this hypothesis, a simple linear regression analysis was conducted, where the purchasing decision (PD) was treated as the dependent variable, and recommendation systems (RS) were considered the independent variable. The results are presented in Table (09).

Table (09): Results of Testing the Third Hypothesis (H3)

Model	β (Beta)	t- value	Sig. (p)	R	R ²	Hypothesis Decision
H3: Recommendation Systems → Purchasing Decision	0.678	13.914	0.000	0.678	0.460	Accepted

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The regression results indicate that recommendation systems have a strong and statistically significant effect on the purchasing decision of Algerian consumers on Facebook ($\beta = 0.678$, $p = 0.000$). The simple regression model explains 46.0% of the variance in purchasing decisions ($R^2 = 0.460$), showing a substantial explanatory power for this independent variable. These results confirm that the better the recommendation systems, the higher the likelihood of influencing consumers' purchasing decisions. Consequently, the third hypothesis **(H3) is accepted**.

•**Testing the Fourth Hypothesis: H4:** Behavioral and interaction analysis significantly affects the direction of the Algerian consumer's purchasing decision through Facebook. To test this hypothesis, a simple linear regression analysis was conducted, where Behavioral and Interaction Analysis (BIA) was treated as the independent variable and the Purchasing Decision (PD) as the dependent variable. The detailed results are presented in the following table:

Table (10): Results of Testing the Second Hypothesis (H4)

Model	β (Beta)	t- value	Sig. (p)	R	R ²	Hypothesis Decision
H4: Behavioral & Interaction Analysis	0.664	13.202	0.000	0.664	0.441	Accepted

→ Purchasing Decision						
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Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The regression results indicate that behavioral and interaction analysis has a strong and statistically significant effect on the purchasing decision of Algerian consumers on Facebook ($\beta = 0.664$, $p = 0.000$). The simple regression model explains approximately 44.1% of the variance in purchasing decisions ($R^2 = 0.441$), reflecting a substantial explanatory power for this independent variable alone. These findings confirm that higher levels of behavioral and interaction analysis are associated with an increased likelihood of making purchase decisions. Accordingly, the fourth hypothesis **(H4) is accepted**.

• **Testing the Main Hypothesis:** The dimensions of artificial intelligence algorithms have a significant influence on shaping the purchasing decision of the Algerian consumer on the Facebook platform. To test this hypothesis, a simple linear regression analysis was conducted using the combined AI dimensions (AI Composite) as the independent variable and the Purchasing Decision (PD) as the dependent variable. This test aimed to determine the overall effect of all AI dimensions collectively on the purchasing behavior of Algerian consumers on Facebook. The results are presented in Table (11).

Table (11): Results of Testing the Main Hypothesis

Model	β (Beta)	t- value	Sig. (p)	R	R^2	Hypothesis Decision
AI Dimensions Combined → Purchasing Decision	0.732	16.441	0.000	0.732	0.536	Accepted

Source: Designed by Researcher Based on The Outputs of SPSS V 25.

The regression results indicate that the combined dimensions of AI algorithms have a strong and statistically significant effect on the purchasing decision of Algerian consumers on Facebook ($\beta = 0.732$, $p = 0.000$). The model explains approximately 53.6% of the variance in purchasing decisions ($R^2 = 0.536$), which reflects substantial predictive power for the combined effect of AI dimensions. These findings confirm that all AI dimensions—personalization, smart advertising targeting, recommendation systems, and

behavioral and interaction analysis—work collectively to influence consumer purchasing behavior. Consequently, **the main hypothesis is accepted**. Consequently, all four sub-hypotheses and the main hypothesis are accepted, demonstrating the pivotal role of AI algorithms in shaping the purchasing behavior of Algerian consumers on Facebook.

5. Discussion of Results

The discussion examines how each AI algorithm dimension influences Algerian consumers' Facebook purchasing decisions, highlighting theoretical insights into digital consumer behavior and practical implications for marketers to enhance engagement and sales.

- The results showed that personalization has a strong and significant effect on purchasing decisions ($\beta = 0.703$, $R^2 = 49.4\%$), confirming H1. This indicates that providing content and services tailored to consumer interests increases the likelihood of purchase decisions, consistent with prior studies linking personalization to enhanced user engagement with digital content.
- The findings revealed that smart advertising targeting has a significant effect on purchasing decisions ($\beta = 0.690$, $R^2 = 47.6\%$), supporting H2. This suggests that accurately targeting ads based on consumer interests and behaviors increases the likelihood of purchase decisions, consistent with literature on the effectiveness of targeted advertising in improving conversion rates.
- The study indicated that recommendation systems have a significant effect on purchasing decisions ($\beta = 0.678$, $R^2 = 46.0\%$), confirming H3. This highlights the important role of recommendation systems in guiding consumers toward products that match their preferences, thereby increasing the likelihood of purchase.
- The results showed that behavioral and interaction analysis has a significant impact on purchasing decisions ($\beta = 0.664$, $R^2 = 44.1\%$), supporting H4. This indicates that monitoring user behavior and engagement allows marketers to more effectively target marketing messages.
- When all AI dimensions were combined into a composite variable, the cumulative effect on purchasing decisions was even stronger, explaining 53.6% of the variance ($\beta = 0.732$, $p = 0.000$), confirming the main hypothesis.

This demonstrates that all four dimensions collectively work to guide consumer behavior toward purchasing decisions on the Facebook platform.

6. Conclusion

The study shows that all four AI dimensions—Personalization, Smart Advertising Targeting, Recommendation Systems, and Behavioral & Interaction Analysis—significantly affect Algerian consumers' Facebook purchasing decisions, with their combined effect explaining 53.6% of the variance, highlighting their synergistic influence on consumer choices.

The study underscores the theoretical and practical significance of AI in digital consumer behavior. Personalization is identified as the most influential dimension, reflecting consumers' preference for content aligned with their interests. Smart advertising targeting and recommendation systems effectively guide consumers toward relevant products, while behavioral and interaction analysis provides actionable insights for refining marketing strategies in real time. Practically, integrating AI allows marketers to deliver tailored content, predict consumer preferences, enhance engagement, increase purchase conversions, and strengthen customer satisfaction and loyalty. The cumulative effect of AI dimensions highlights the importance of a holistic AI strategy rather than isolated implementations to maximize marketing effectiveness.

Furthermore, the study highlights potential challenges and future directions. While AI algorithms offer powerful capabilities, issues related to consumer privacy, data security, and algorithmic transparency must be addressed to maintain trust and ethical standards. Future research could explore the long-term behavioral effects of AI-driven marketing, the moderating role of demographic factors, and the application of AI in other social media platforms or product categories.

In conclusion, the study demonstrates that artificial intelligence is not merely a technological tool but a strategic asset capable of significantly influencing consumer decision-making. Businesses operating in the Algerian digital market should adopt an integrated AI approach to strengthen competitive advantage, enhance consumer engagement, and drive sustainable growth.

7. Recommendations

Based on the findings of this study, several practical recommendations can be proposed for marketers, e-commerce managers, and decision-makers seeking to leverage artificial intelligence (AI) algorithms to influence consumer purchasing behavior on Facebook:

- **Implement Advanced Personalization Strategies:** Businesses should utilize AI to deliver highly personalized content and offers tailored to individual consumer preferences. Personalization was found to be the most influential dimension on purchase decisions, and tailoring content can enhance engagement, satisfaction, and conversion rates.
- **Enhance Smart Advertising Targeting:** Companies should adopt AI-driven targeting methods to ensure advertisements reach consumers whose interests and behaviors align with the products or services offered. Precision targeting increases the likelihood of engagement and purchase decisions.
- **Leverage Recommendation Systems:** Incorporating AI-based recommendation systems can guide consumers toward relevant products based on their browsing and purchasing history. This enhances decision-making efficiency and increases the probability of purchase.
- **Utilize Behavioral and Interaction Analysis:** Marketers should continuously monitor consumer behavior and interactions to optimize marketing strategies in real time. Understanding user engagement patterns allows for more effective communication and improved targeting of promotional content.
- **Adopt an Integrated AI Strategy:** The study demonstrates that the cumulative effect of AI dimensions is stronger than any individual dimension. Businesses should adopt a holistic approach, integrating personalization, targeted advertising, recommendation systems, and behavioral analysis, to maximize marketing effectiveness and influence purchasing decisions.
- **Ensure Ethical Use and Data Privacy:** While leveraging AI technologies, companies must maintain transparency, protect consumer data, and adhere to ethical standards. This builds trust and encourages long-term engagement.

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